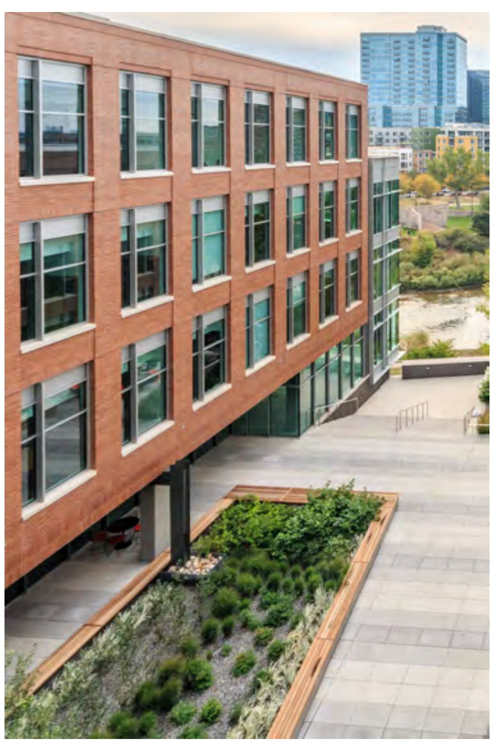
WELLS®

Architectural cladding and facade envelope systems

When it comes to making a unique building stand out, Wells brings expertise in all market segments. When partners have visionary ideas, we partner with you to value engineer and design a solution to exceed your schedule requirements and bring your vision to life.

A great finish puts the final touch on any prefabricated project. Whether you need to match an existing building, integrate multiple finishes, mimic the look of traditional brick or stone, or develop a signature look, Wells offers endless architectural cladding solutions. As your building partner, Wells will help guide you through the variety of colors, textures, unique features and custom exterior designs to bring your vision to life.

Performance dashboard



Features & functionality

Achieve your design vision with limitless facade options including surface textures, decorative finish options, colors and detailing techniques.

Superior thermal performance to reduce heating and cooling costs.

All-weather installation creating improved schedule and lower costs.

Low maintenance and highly durable, resistant to fire, pests, blasts and harsh weather conditions.

PCI-Certified manufacturing facilities ensure a quality architectural product manufactured under strict regulations.

Visit Wells for more product information:

Architectural Solutions
Architectural Cladding

MasterFormat® 03 40 00, 03 45 13, 03 45 33, 03 48 33

Wells Design Handbook, Inspiration Guide, Building Envelope

For spec help, contact us or call 303-964-7064

Environment & materials

Improved by:

Our manufacturing facilities create custom and optimized mix designs to reduce the percentage of cement and other ingredients for sustainable prefabrication.

We offer a unitized cladding system, Infinite Facade, that uses 65% less concrete.

Our process manages local inventory and supplier selection.

During our manufacturing process we manage and reclaim water and other raw materials used in the manufacturing process.

Certifications, rating systems & disclosures:

PCI certified erector

PCI certified plants

PCI architectural certification level AA

See LCA, interpretation & rating systems

PCI CERTIFIED PLANT | PCI MEMBERS | PCI CERTIFIED ERECTOR

SM Transparency Report (EPD)™

VERIFICATION	LCA
3rd-party reviewed	✔
	Transparency Report (EPD)
3rd-party verified	✔

The declaration is intended for use in Business-to-Consumer (B-to-C) communication.

Validity: 20231018 – 20281017

Decl #: WEL-20231018-002

This environmental product declaration (EPD) was externally verified, according to ISO 21930:2017 and the NSF PCR, as well as ISO 14025:2006, by Jack Geibig, President, Ecoform.

Ecoform, LLC
11903 Black Road,
Knoxville, TN 37932
www.ecoform.com
(865) 850-1883

SUMMARY

Reference PCR
NSF PCR for Precast Concrete v3.0

Regions; system boundary
North America; Cradle-to-gate

Declared unit:
1 tonne (1,000 kg) precast concrete

LCIA methodology: TRACI 2.1

LCA software; LCI database
SimaPro Analyst 9.5
ecoinvent v3, Industry data 2.0, NREL, US-EI 2.2

LCA conducted by: Sustainable Minds

Public LCA:
Wells Precast Concrete LCA Background Report, Wells 2023

Wells
210 Inspiration Lane
Albany, MN, 56307
wellsconcrete.com
800.658.7049

Contact us

LCA results & interpretation

Architectural Solutions - Brighton, CO

Life cycle assessment

Scope and summary

✔ **Cradle to gate** ○ Cradle to gate with options ○ Cradle to grave

Product description

Wells Architectural Solutions encompasses precast concrete products that are utilized to clad building facades or construct free-standing walls. These products can incorporate structural and architectural characteristics, offering a wide range of customization options, including various colors, textures, features, and custom exterior designs. Important to note, a majority of Wells architectural solutions are prestressed and reinforced to allow our products to provide load bearing structural support, impacting performance results when compared to traditional architectural solutions. This versatility allows for achieving highly durable architectural and structural solutions with customized concrete finishes.

Declared unit

The declared unit is one metric tonne (1,000 kg) of precast concrete product. The results in this report are expressed in terms of potential impacts per 1,000 kg of product from cradle to gate. Lifting/connection hardware are included.

Manufacturing data

Reporting period: January 2022 – December 2022
Locations: The data covers one Wells manufacturing plant located in Brighton, CO.

Sensitivity analysis

Sensitivity analyses were performed to check the robustness of the results where the highest potential environmental impacts are occurring. As the bulk of impacts are attributed to raw materials acquisition and processing, the mass of specified raw materials was changed by +/-20%. These raw materials were chosen based on a combination of relatively higher contribution to the results.
Global warming potential was evaluated for sensitivity since Wells is interested in the potential CO_2-equivalent emissions of its products. The range of change in total life cycle impacts was in a +/-4% change.

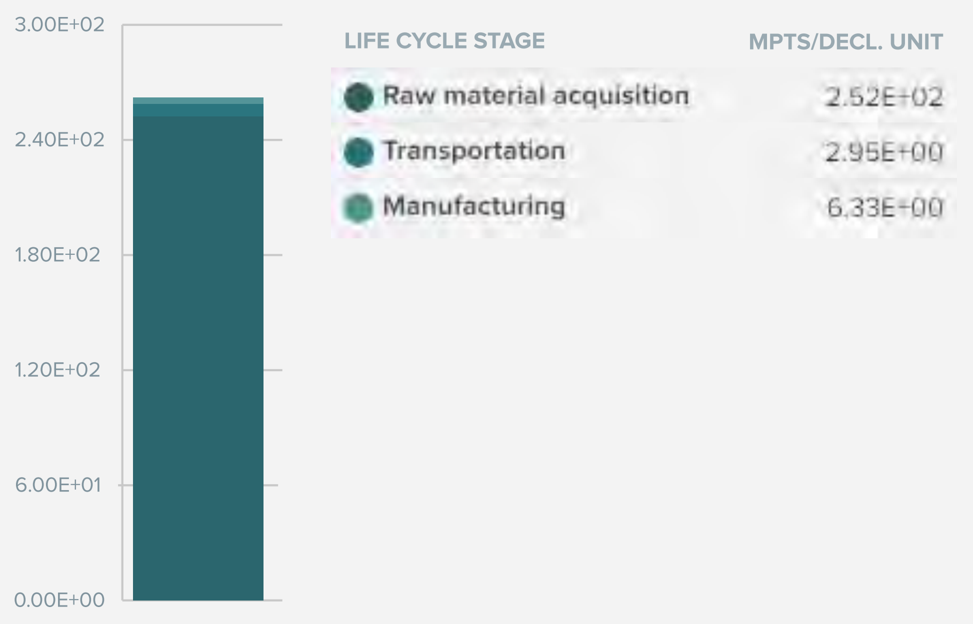
Embodied carbon

The total embodied carbon per one tonne of precast structural concrete manufactured in Brighton, CO is 8.31E+02 kg CO_2 eq per declared unit.

Material composition greater than 1% by weight

MATERIAL	% WT.
Cement	20-30%
Aggregate	70-80%
Steel reinforcement	1-5%
Chemical admixture	<1%
Others	<1%

Total impacts by life cycle stage [mPts/decl unit]



What's causing the greatest impacts

All life cycle stages

Activities during the supply of raw materials (A1) are responsible for much of the impacts in each impact category. The next highest impact contributor is manufacturing (A3) in most of the impact categories. Transportation (A2) accounts for a notable impact only in the ozone depletion and fossil fuel depletion impact categories. Impact results for the architectural precast products made in Brighton, CO are notably higher as compared to the average impacts of the same products made in other facilities. This increase is due to the higher amount of steel reinforcement required for the types of architectural solutions manufactured in Brighton. Since the volume of architectural products coming from Brighton accounts for less than 2% of the total volume of architectural precast produced across all locations, the relatively higher results from this location are understood to have a minimal impact on the average results.

Raw materials acquisition and transportation

This stage dominated the results for all impact categories. The raw materials acquisition and transportation stage includes raw material extraction and upstream processing, and it accounts for about 73% of the impact of global warming and more than half of the impacts for all other impact categories. This sub-category PCR recognizes fly ash, silica fume, and granulated blast furnace slag as recovered materials and thus the environmental impacts allocated to these materials are limited to the treatment and transportation required to use as a precast concrete material input. Since Wells architectural precast products contain a higher amount of steel or rebar as compared to Wells structural precast concrete products, the impacts in this stage are greater.

Transportation

Transportation of raw materials is a relatively small contributor to all product life cycle impacts. Average transportation distances and modes of transport were modeled for the transportation of raw materials to each production facility. Most of the ingredients are transported via truck and trailer within the US and were assumed to come directly from the supplier.

Manufacturing

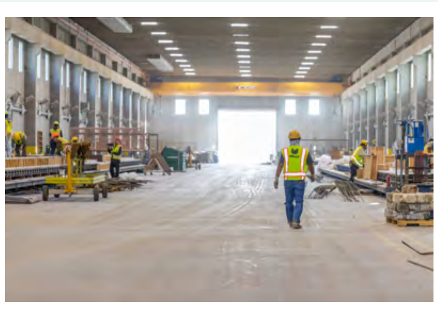
Manufacturing is the second highest contributor to most impact categories due to the energy required from each facility. Once materials are delivered to the facilities, the forms are set, then reinforcing steel rebar, inserts, anchors, etc. are tied in. After the forms are built, concrete is batched, loaded into delivery vehicles, and poured into the form. The concrete is manually adjusted to meet the necessary thickness and then when necessary, vibrated to ensure proper consolidation. When specified, insulation is laid directly on top of the concrete that has been previously poured into the form, and wythe connectors are inserted through the insulation. If strength requirements are met, the prestressed strand is cut, and individual prestress/precast components are stripped from the form, cleaned off, loaded onto a trailer, and sent out to the finishing area.

How we're making it greener

Our production facilities improve our concrete mix through the use of supplementary cementitious materials (SCMs), such as fly ash and slag, to partially replace the cement content in standard concrete mixes – ultimately improving the concrete's properties and reducing greenhouse gas emissions. To ensure we are utilizing the most environmentally friendly materials, Wells works in conjunction with our industry partners by conducting research and development to maximize their usage. With an eye to operations, Wells recently replaced existing batch plant equipment with more energy efficient options to improve raw material utilization and minimize waste.

See how we make it greener

LCA results

LIFE CYCLE STAGE	PRODUCTION STAGE	PRODUCTION STAGE	PRODUCTION STAGE
Information modules: **Included (X)** | Excluded (MND)* *Modules A4, A5, B, C, and D are excluded.	**(X) A1 Raw material supply** 	**(X) A2 Transport** 	**(X) A3 Manufacturing** 

SM Single Score

Learn about SM Single Score results

Impacts per one tonne of precast concrete	2.52E+02 mPts	2.95E+00 mPts	6.33E+00 mPts
Materials or processes contributing >20% to total impacts in each life cycle stage	Energy used for raw material extraction (electricity and fuels).	Truck and trailer transportation (fuel consumption).	Energy and electricity consumed for precast concrete production.

TRACI v2.1 results per declared unit (Architectural Solutions - Brighton, CO)

LIFE CYCLE STAGE		A1 RAW MATERIAL SUPPLY	A2 TRANSPORT	A3 MANUFACTURING
Ecological damage				
Impact category	Unit			
Acidification	**kg SO_2 eq**	1.65E+00	5.19E-02	1.42E+00
Eutrophication	**kg N eq**	3.43E-01	6.21E-03	3.32E-02
Global warming	**kg CO_2 eq**	6.07E+02	4.87E+01	1.75E+02
Ozone depletion	**kg CFC-11 eq**	2.99E-05	1.12E-06	5.07E-07
Human health damage				
Impact category	Unit			
Carcinogenics	**CTU_h**	1.16E-04	2.83E-08	2.94E-07
Non-carcinogenics	**CTU_h**	5.49E-05	6.43E-06	6.34E-06
Respiratory effects	**kg $PM_{2.5}$ eq**	3.50E-01	1.43E-02	9.41E-02
Smog	**kg O_3 eq**	2.37E+01	8.60E-01	1.50E+01
Additional environmental information				
Impact category	Unit			
Fossil fuel depletion	**MJ surplus**	5.52E+02	9.99E+01	1.21E+02
Ecotoxicity	**CTU_e**	1.80E+03	1.31E+02	5.66E+01

See the additional content required by the NSF PCR for precast concrete on page 4 of the **Transparency Report PDF**.

References

LCA Background Report
Wells Architectural and Structural Precast Concrete LCA Background Report, Wells 2023; SimaPro Analyst 9.5; ecoinvent v3, Industry data 2.0, NREL, and US-EI 2.2 databases; TRACI 2.1

PCRs

ISO 21930:2017, "Sustainability in Building Construction — Environmental Declaration of Building Products" serves as the core PCR

NSF PCR for Precast Concrete v3.0 serves as the subcategory PCR
Valid through Apr 30, 2026. PCR review conducted by Thomas P. Gloria (Industrial Ecology Consultants), Ph. D; Bill Stough (Bill Stough, LLC); Dr. Michael Overcash (Environmental Clarity).

ISO 14025, "Sustainability in buildings and civil engineering works -- Core rules for environmental product declarations of construction products and services"

Download PDF SM Transparency Report, which includes the additional EPD content required by the NSF PCR.

SM Transparency Reports (TR) are ISO 14025 Type III environmental declarations (EPD) that enable purchasers and users to compare the potential environmental performance of products on a life cycle basis. Environmental declarations from different programs (using different PCR) may not be comparable. In order to support comparative assertions, this EPD meets all comparability requirements stated in ISO 14025:2006. However, differences in certain assumptions, data quality, and variability between LCA data sets may still exist. As such, caution should be exercised when evaluating EPDs from different manufacturers, as the EPD results may not be entirely comparable. Any EPD comparison must be carried out at the building level per ISO 21930 guidelines, use the same sub-category PCR where applicable, include all relevant information modules, be limited to EPDs applying a functional unit, and be based on equivalent scenarios with respect to the context of construction works. Some LCA impact categories and inventory items are still under development and can have high levels of uncertainty. To promote uniform guidance on the data collection, calculation, and reporting of results, the ACLCA methodology (ACLCA 2019) was used.

Rating systems

The intent is to reward project teams for selecting products from manufacturers who have verified improved life-cycle environmental performance.

LEED BD+C: New Construction | v4 - LEED v4
Building product disclosure and optimization
Environmental product declarations

- ○ Industry-wide (generic) EPD — ½product
- ✔ Product-specific Type III EPD — 1 product

LEED BD+C: New Construction | v4.1 - LEED v4.1
Building product disclosure and optimization
Environmental product declarations

- ○ Industry-wide (generic) EPD — 1 product
- ✔ Product-specific Type III EPD — 1.5 product

Collaborative for High Performance Schools National Criteria
MW 7.1 – Environmental Product Declarations

- ✔ Third-party certified type III EPD — 2 points

Green Globes for New Construction and Sustainable Interiors
Materials and resources

- ✔ NC 3-5-1-2 Path B: Prescriptive Path for Building Core and Shell
- ✔ NC 3-5-2-2 and SI 4-1-2 Path B: Prescriptive Path for Interior Fit-outs

BREEAM New Construction 2018
Mat 02 - Environmental impacts from construction products
Environmental Product Declarations (EPD)

- ○ Industry-average EPD — .5 points
- ✔ Multi-product specific EPD — .75 points
- ○ Product-specific EPD — 1 point

SM Transparency Report (EPD)™

VERIFICATION	LCA
3rd-party reviewed	✔
	Transparency Report (EPD)
3rd-party verified	✔

The declaration is intended for use in Business-to-Consumer (B-to-C) communication.
Validity: 20231018 – 20281017
Decl #: WEL-20231018-002

This environmental product declaration (EPD) was externally verified, according to ISO 21930:2017 and the NSF PCR, as well as ISO 14025:2006, by Jack Geibig, President, Ecoform.

Ecoform, LLC
11903 Black Road,
Knoxville, TN 37932
www.ecoform.com
(865) 850-1883

SUMMARY
Reference PCR
NSF PCR for Precast Concrete v3.0
Regions; system boundary
North America; Cradle-to-gate
Declared unit:
1 tonne (1,000 kg) precast concrete
LCIA methodology: TRACI 2.1
LCA software; LCI database
SimaPro Analyst 9.5
ecoinvent v3, Industry data 2.0, NREL, US-EI 2.2
LCA conducted by: Sustainable Minds
Public LCA:
Wells Precast Concrete LCA Background Report, Wells 2023

Wells
210 Inspiration Lane
Albany, MN, 56307
wellsconcrete.com
800.658.7049

Contact us

How we make it greener

Architectural Solutions - Brighton, CO

Collapse all

See LCA results by life cycle stage

RAW MATERIALS ACQUISITION

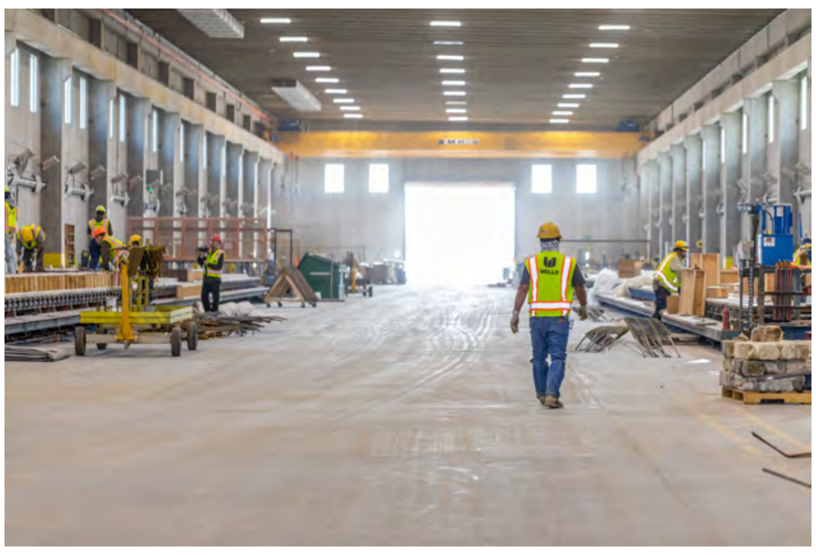
The efforts to make concrete more sustainable involve replacing a portion of cement with alternatives like fly ash and slag, and crushing and recycling waste concrete as aggregate. Sustainability in concrete products lies in its constituent materials – concrete doesn't use scarce resources, it's cost-effective, and it's easy to work with. Concrete is made up of naturally occurring ingredients like Portland cement, which is a blend of limestone, silica, and various chemicals. The aggregates in concrete come from naturally occurring local gravel, sand or crushed rock, and they can also be sourced from recycled materials such as old concrete or glass.

TRANSPORTATION

Wells building solutions focus on a localized production strategy, sourcing local ingredients and raw materials from nearby suppliers, reducing transportation costs as well as environmental impact. This local sourcing results in a significant reduction in the number of vehicles driving across long distances to deliver construction materials. This contributes to several sustainability benefits, including reduced carbon footprint, energy conservation, supporting the local economy, and faster delivery and construction. When shipping our building solutions to construction sites, there is negligible packaging, as well as the use of reusable load securement systems combined with just-in-time (JIT) delivery with immediate installation, reducing waste and excess on-site storage.

MANUFACTURING

Our prefabrication manufacturing process is grounded in utilizing precise mixture proportions, reducing waste by limiting concrete excess. Wells prefabricated building solutions are manufactured in a controlled environment. Our preconstruction process includes advanced engineering coordination to determine panel sizes to determine the most efficient building layout and reduce waste.



OTHER (USE, END OF LIFE)

The durability and extended life of prefabricated building systems creates buildings that stand the test of time. Additionally, when the building reaches the end of its life cycle, material can be diverted from the landfill and repurposed for other applications, contributing to a more sustainable approach to construction. The thermal mass of prefabricated concrete with insulation supports energy conservation by absorbing and releasing heat slowly, leading to long-term energy savings in our buildings.

SM Transparency Report (EPD)™

VERIFICATION	LCA
3rd-party reviewed	✔
	Transparency Report (EPD)
3rd-party verified	✔

The declaration is intended for use in Business-to-Consumer (B-to-C) communication.

Validity: 20231018 – 20281017

Decl #: WEL-20231018-002

This environmental product declaration (EPD) was externally verified, according to ISO 21930:2017 and the NSF PCR, as well as ISO 14025:2006, by Jack Geibig, President, Ecoform.

Ecoform, LLC
11903 Black Road,
Knoxville, TN 37932
www.ecoform.com
(865) 850-1883

SUMMARY

Reference PCR
NSF PCR for Precast Concrete v3.0

Regions; system boundary
North America; Cradle-to-gate

Declared unit:
1 tonne (1,000 kg) precast concrete

LCIA methodology: TRACI 2.1

LCA software; LCI database
SimaPro Analyst 9.5
ecoinvent v3, Industry data 2.0, NREL, US-EI 2.2

LCA conducted by: Sustainable Minds

Public LCA:
Wells Precast Concrete LCA Background Report, Wells 2023

Wells
210 Inspiration Lane
Albany, MN, 56307
wellsconcrete.com
800.658.7049

Contact us

Additional EPD content required by: NSF PCR: Precast Concrete

Wells Architectural Solutions (Brighton, CO)

Data

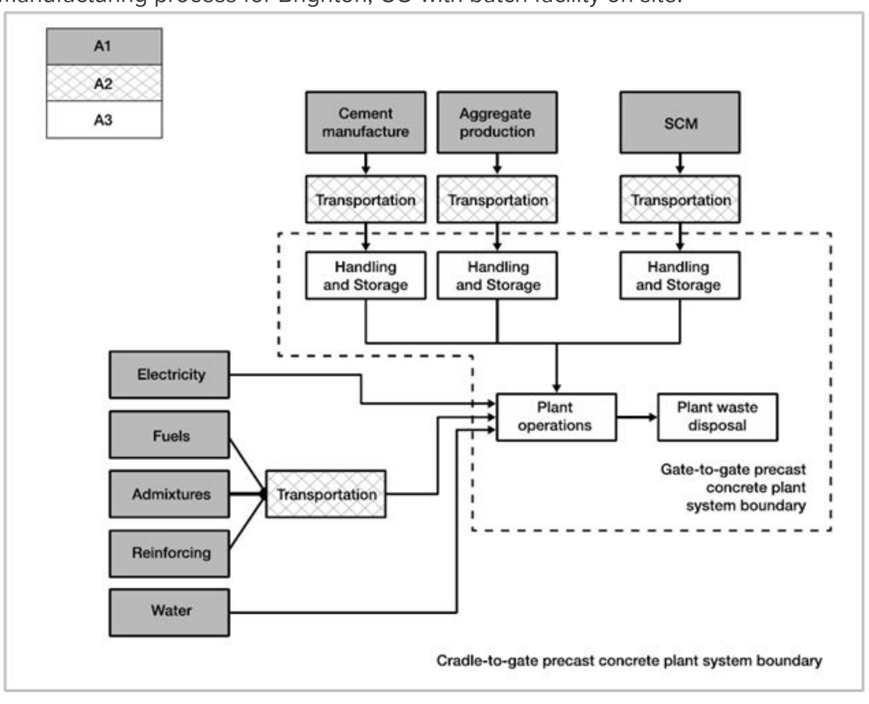
Background This average product declaration was created by collecting life cycle data for Wells architectural precast concrete products from the Brighton, CO location for a declared unit of one tonne (1,000 kg) of product including lifting or connecting hardware. Data adopted in the model include ecoinvent v3, Industry data 2.0, NREL, and US-EI 2.2 databases.

Allocation The manufacturing inputs that needed allocation were electricity, water, and fuel consumption since there are only one electric meter and one water meter that include the production of Wells architectural precast concrete in Brighton, CO. The allocation of electricity, water, and fuel consumption were based on the percentage of production by mass for the individual product divided by total site production output. In addition, there is no co-product produced in the manufacturing process.

Cut-off criteria for the inclusion of mass and energy flows are 1% of renewable primary resource (energy) usage, 1% nonrenewable primary resource (energy) usage, 1% of the total mass input of that unit process, and 1% of environmental impacts. The total of neglected input flows per module does not exceed 5% of energy usage, mass, and environmental impacts. The only exceptions to these criteria are substances with hazardous and toxic properties, which must be listed even when the given process unit is under the cut-off criterion of 1% of the total mass. Fly ash is used as a supplementary cementitious material and is regulated under RCRA and the Clean Water Act; no other hazardous substances are present. No known flows are deliberately excluded from this declaration; therefore, these criteria have been met. No biogenic carbon enters the product system. Carbon emissions during carbonation and calcination are also considered in this study. While no carbonation occurs during the production of precast concrete, calcination occurs due to the use of cement. Calcination CO2 emissions for cement are calculated and reported separately using a carbon intensity factor for cement.

Quality Temporal and technological representativeness are considered to be high. Geographical representativeness is considered to be good. All relevant process steps for the product system were considered and modeled. The process chain is considered sufficiently complete with regards to the goal and scope of this study. The product system was checked for mass balance and completeness of the inventory. Capital equipment was excluded. Otherwise, no data were knowingly omitted. For more information on data quality, see the LCA background report.

Flow diagrams
Manufacturing process for Brighton, CO with batch facility on site:



Major assumptions and limitations:

- Material input and transportation distances are averages and do not reflect changes in material efficiency and supplier locations.
- Proxy materials were used when matching secondary data sets were not identified.
- Generic data sets used for material inputs, transport, and waste processing are considered good quality, but actual impacts from material suppliers, transport carriers, and local waste processing may vary.
- LCA results are relative expressions and do not predict impacts on category endpoints, the exceeding of thresholds, safety margins or risks.
- This EPD covers only the cradle-to-gate impacts of products using a declared unit. The results listed in this EPD cannot be used to compare between products.

Major system boundary exclusions:

- Capital goods & infrastructure; maintenance and operation of support equipment;
- Manufacture & transport of packaging materials not associated with final product;
- Human labor and employee transport;
- Building operational energy and water use not associated with final product.

Secondary data sets used

DATA SET	SOURCE	REF YEAR
eGRID – MRO, WECC, RFC	US EPA	2019
Cement, Portland {US}| cement production, Portland | Cut-off, U	ecoinvent v3	2022
Cement, CEM II/A-L {ZA}| cement production, CEM II/A-L | Cut-off, U	ecoinvent v3	2022
Sand {RoW}| sand quarry operation, extraction from river bed | Cut-off, U	ecoinvent v3	2017
Gravel, crushed {RoW}| gravel production, crushed | Cut-off, U	ecoinvent v3	2018
Rosin size, for paper production {RoW}| rosin size production, for paper production | Cut-off, U	ecoinvent v3	2018
Plasticiser, for concrete, based on sulfonated melamine formaldehyde {GLO}| plasticiser production, for concrete, based on sulfonated melamine formaldehyde | Cut-off, U	ecoinvent v3	2015
Calcium nitrate {RoW}| calcium nitrate production | Cut-off, U	ecoinvent v3	2020
Polyethylene, high density, granulate {RoW}| polyethylene production, high density, granulate | Cut-off, U	ecoinvent v3	2018
Printing ink, rotogravure, without solvent, in 55% toluene solution state {RoW}| printing ink production, rotogravure, product in 55% toluene solution state | Cut-off, U	ecoinvent v3	2012
Steel, low-alloyed {RoW}| steel production, electric, low-alloyed | Cut-off, U	ecoinvent v3	2021
Steel, unalloyed {RoW}| steel production, converter, unalloyed | Cut-off, U	ecoinvent v3	2020
Metal working machine, unspecified {RoW}| metal working machine production, unspecified | Cut-off, U	ecoinvent v3	2013
Steel wire rod {GLO} | blast furnace route and electric arc furnace route | production mix, at plant | 1kg | LCI result	Industry data 2.0	2021
Carbon fiber/US	US-EI 2.2	2013
C3 hydrocarbon mixture {Europe without Switzerland}| C3 hydrocarbon production, mixture, petroleum refinery operation | Cut-off, U	ecoinvent v3	2019
Reinforcing steel {RoW}| reinforcing steel production | Cut-off, U	ecoinvent v3	2020
Concrete, 40MPa {RoW}| concrete production, 40MPa, for civil engineering, with cement, Portland | Cut-off, U	ecoinvent v3	2022
Steel, chromium steel 18/8, hot rolled {RoW}| steel production, chromium steel 18/8, hot rolled | Cut-off, U	ecoinvent v3	2021
Shale brick {RoW}| shale brick production | Cut-off, U	ecoinvent v3	2014
Polystyrene foam slab {RoW}| polystyrene foam slab production | Cut-off, U	ecoinvent v3	2022
Methylene diphenyl diisocyanate {RoW}| market for methylene diphenyl diisocyanate | Cut-off, U	ecoinvent v3	2022
Polyol {RoW}| market for polyol | Cut-off, U	ecoinvent v3	2022
Pentane {RoW}| pentane production | Cut-off, U	ecoinvent v3	2018
Acrylonitrile-butadiene-styrene copolymer {RoW}| acrylonitrile-butadiene-styrene copolymer production | Cut-off, U	ecoinvent v3	2022
Hydrochloric acid, without water, in 30% solution state {US}| zirconium and hafnium tetrachloride production, from zircon | Cut-off, U	ecoinvent v3	2022
Polypropylene, granulate {RoW}| polypropylene production, granulate | Cut-off, U	ecoinvent v3	2018
Injection moulding {RoW}| injection moulding | Cut-off, U	ecoinvent v3	2020
Polystyrene foam slab with graphite, 6% recycled {CH}| polystyrene foam slab with graphite, 6% recycled | Cut-off, U	ecoinvent v3	2016
Argon, crude, liquid {CA-QC}| air separation, cryogenic | Cut-off, U	ecoinvent v3	2020
Welding, gas, steel {RoW}| welding, gas, steel | Cut-off, U	ecoinvent v3	2022
Carbon dioxide, liquid {RoW}| carbon dioxide production, liquid | Cut-off, U	ecoinvent v3	2022
Diesel, burned in building machine {GLO}| diesel, burned in building machine | Cut-off, U	ecoinvent v3	2022
Gasoline, combusted in equipment NREL/US U	NREL	2008
Heat, district or industrial, other than natural gas {CA-QC}| heat production, propane, at industrial furnace >100kW | Cut-off, U	ecoinvent v3	2013
Nitrogen, liquid {RoW}| air separation, cryogenic | Cut-off, U	ecoinvent v3	2022
Oxygen, liquid {CA-QC}| air separation, cryogenic | Cut-off, U	ecoinvent v3	2022
Heat, district or industrial, natural gas {CA-QC}| heat production, natural gas, at industrial furnace low-NOx >100kW | Cut-off, U	ecoinvent v3	2022

Wells Architectural Solutions (Brighton, CO): LCIA results, resource use, output and waste flows, and carbon emissions & removals per declared unit of 1 tonne (1,000 kg)

Parameter	Unit	A1	A2	A3	Total
LCIA results (per 1,000 kg)					
Ozone depletion	kg CFC-11 eq	2.99E-05	1.12E-06	5.07E-07	**3.15E-05**
Global warming	kg CO_2 eq	6.07E+02	4.87E+01	1.75E+02	**8.31E+02**
Smog	kg O_3 eq	2.37E+01	8.60E-01	1.50E+01	**3.96E+01**
Acidification	kg SO_2 eq	1.65E+00	5.19E-02	1.42E+00	**3.12E+00**
Eutrophication	kg N eq	3.43E-01	6.21E-03	3.32E-02	**3.82E-01**
Respiratory effects	kg $PM_{2.5}$ eq	1.16E-04	2.83E-08	2.94E-07	**1.16E-04**
Carcinogenics	CTUh	5.49E-05	6.43E-06	6.34E-06	**6.77E-05**
Non-carcinogenics	CTUh	3.50E-01	1.43E-02	9.41E-02	**4.58E-01**
Additional environmental information					
Ecotoxicity	CTUe	1.80E+03	1.31E+02	5.66E+01	**1.98E+03**
Fossil fuel depletion	MJ surplus	5.52E+02	9.99E+01	1.21E+02	**7.72E+02**
Resource use indicators					
Renewable primary energy used as energy carrier (fuel)	MJ, NCV	1.56E+02	1.49E+00	8.15E+02	**9.72E+02**
Renewable primary resources with energy content used as material	MJ, NCV	2.74E+02	2.32E-01	4.76E+00	**2.79E+02**
Total use of renewable primary resources with energy content	MJ, NCV	4.31E+02	1.72E+00	8.19E+02	**1.25E+03**
Non-renewable primary resources used as an energy carrier (fuel)	MJ, NCV	7.28E+03	6.97E+02	2.47E+03	**1.04E+04**
Non-renewable primary resources with energy content used as material	MJ, NCV	1.91E+01	7.15E-05	2.02E-03	**1.91E+01**
Total use of non-renewable primary resources with energy content	MJ, NCV	7.29E+03	6.97E+02	2.47E+03	**1.05E+04**
Secondary materials	kg	0	0	0	**0**
Renewable secondary fuels	MJ, NCV	0	0	0	**0**
Non-renewable secondary fuels	MJ, NCV	0	0	0	**0**
Recovered energy	MJ, NCV	0	0	0	**0**
Use of net fresh water resources	m^3	3.10E+01	1.43E+00	3.12E+00	**3.56E+01**
Abiotic depletion potential for fossil resources (ADPfossil)	MJ, NCV	6.30E+03	6.52E+02	2.28E+03	**9.23E+03**
Output flows and waste category indicators					
Hazardous waste disposed	kg	0	0	0	**0**
Non-hazardous waste disposed	kg	0	0	1.59E+03	**1.59E+03**
High-level radioactive waste, conditioned, to final repository	kg	6.42E-02	1.09E-03	1.29E-01	**1.95E-01**
Intermediate- and low-level radioactive waste, conditioned, to final repository	kg	4.61E-04	9.58E-07	8.47E-06	**4.71E-04**
Components for re-use	kg	0	0	0	**0**
Materials for recycling	kg	0	0	3.44E+00	**3.44E+00**
Materials for energy recovery	kg	0	0	0	**0**
Exported energy	MJ, NCV	0	0	0	**0**
Carbon emissions and removals					
Biogenic carbon removal from product	kg CO_2	0	0	0	**0**
Biogenic carbon emission from product	kg CO_2	0	0	0	**0**
Biogenic carbon removal from packaging	kg CO_2	0	0	0	**0**
Biogenic carbon emission from packaging	kg CO_2	0	0	0	**0**
Biogenic carbon emission from combustion of waste from renewable sources used in production processes	kg CO_2	0	0	0	**0**
Calcination carbon emissions	kg CO_2	6.65E+01	0	0	**6.65E+01**
Carbonation carbon removals	kg CO_2	0	0	0	**0**
Carbon emissions from combustion of waste from non-renewable sources used in production processes	kg CO_2	0	0	0	**0**