ENVIRONMENTAL PRODUCT DECLARATION FOR HIGGINS READY-MIX CONCRETE

In accordance with ISO 14025 and EN15804+A2:2019

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Geographical scope:	New Zealand

AUSTRALASIA EPD
ENVIRONMENTAL PRODUCT DECLARATION

ECO PLATFORM EPD VERIFIED

HIGGINS FAMILY HOLDINGS LIMITED

HIGGINS CONCRETE

COUNTIES READY MIX

SUPACRETE

HIROCK

This Environmental Product Declaration (EPD) has been produced in accordance with a consistent set of rules known as product category rules (PCR). EPDs within the same product category from different programmes may not be comparable.

EPDs of construction products may not be comparable if they do not comply with EN15801+A2 or if they are produced using different product category rules.

CONTENT

WHAT IS AN ENVIRONMENTAL PRODUCT DECLARATION?

An Environmental Product Declaration (EPD) tells the environmental story of a product over its life cycle in a format that is clear and transparent. It is science-based, independently verified and publicly available. EPDs are often compared to the nutrition labels on food products.

EPDs help manufacturers translate complex sustainability information about their product's environmental footprint into simpler information that governments, companies, industry associations and end consumers can trust to make decisions.

An EPD communicates the environmental impacts at different stages in a product's life cycle. This includes for example greenhouse gas emissions plus a range of other environmental indicators, with results reported separately for each life cycle stage (product, construction, use and end-of-life).

ABOUT HIGGINS CONCRETE LTD

Located in New Zealand, Higgins Concrete Limited is an experienced team of industry experts. With a focus on continual innovation, our reputation is based on exceptional service and premium ready-mix concrete products.

Higgins Concrete was established by the Higgins Family in Palmerston North in 1976. Today we're still privately owned by the Higgins Family and operate under the umbrella of parent company Higgins Family Holdings Limited (HFHL). HFHL also has majority ownership of Counties Ready Mix in Auckland, and Supacrete in Tauranga.

HFHL is managed by Bernard Higgins, Shane Higgins, and Grant Higgins, who form the current Board of Directors. Our concrete businesses are all certified by Concrete NZ.

We continually invest in new resources such as plant, equipment, and safety systems. Supported by proven management capability, we're able to maintain a sustainable supply chain and meet the market demand of our local communities.

Higgins Concrete operates its own IANZ Accredited laboratory, HiLab. All our aggregate and concrete testing is done by IANZ-qualified technicians, overseen by an IANZ signatory.

WHAT WE DO

Backed by nearly five decades of industry experience, we have the capacity to supply concrete for projects of all sizes - from residential driveways to nationally significant civil infrastructure projects such as Te Ahu a Turanga (the Manawatū Gorge replacement highway project).

Our valued customers include individuals, Waka Kotahi New Zealand Transport Agency, government organisations, energy companies, large commercial site developers, residential builders, concrete placers, and pumping companies.

HFHL has six quarries operating under our Hirock brand. Located in the Manawatū, Tararua, and Hawkes Bay regions, Hirock provide high quality aggregates to meet the needs of all sectors of the construction market.

With a range of mobile and fixed plants for crushing, screening, and extraction and our expertise and experience Hirock is a quarry market leader in the central and lower North Island.

SUSTAINABILITY COMMITMENT

Higgins Concrete recognises that taking a sustainable approach to managing resources is key to running an efficient business. Our sustainability framework encompasses three pillars:

carbon reduction

We're committed to reducing the cradle-to-gate carbon emissions of our business operations and products and supporting New Zealand to meet its obligations under the Paris Agreement.

This EPD will provide a baseline from which to measure our progress, enabling us to put more sustainable products out into the construction market.

How we are reducing our carbon footprint:

With the use of Supplementary Cementitious Materials (SCMs) and admixtures such as fly ash are extensively used in our concrete products to reduce the amount of $C0_2$ contained in our products. Waste materials such as glass, plastic, and recycled aggregates are also used.

Recycling - All sites have solutions available for the recycling and reuse of concrete waste material.

Vehicles - We're working on maximising performance while reducing emissions across our fleet. This includes opting for electric and hybrid vehicles where appropriate.

social sustainability

The Higgins family has been part of the Manawatū community for over 60 years.

HFHL is deeply embedded in the communities we operate in, particularly our founding region of the Manawatū. We believe it's important to give back, and we're proud to have supported many worthy services, sports clubs and facilities over the years. These include Arohanui Hospice, Manawatū Turbos Foundation, Central Energy Trust Arena, Manawatu Jets, Marist Sports Clubs, Child Cancer Foundation, Coach House Museum and many community and school fundraisers.

Looking after the wellbeing of our employees is a top priority so our employees and their families have free access to Groov – a programme that supports mental wellbeing.

Through our partnership with local iwi, we're able to provide Māori youth with work experience and a pathway into the industry.

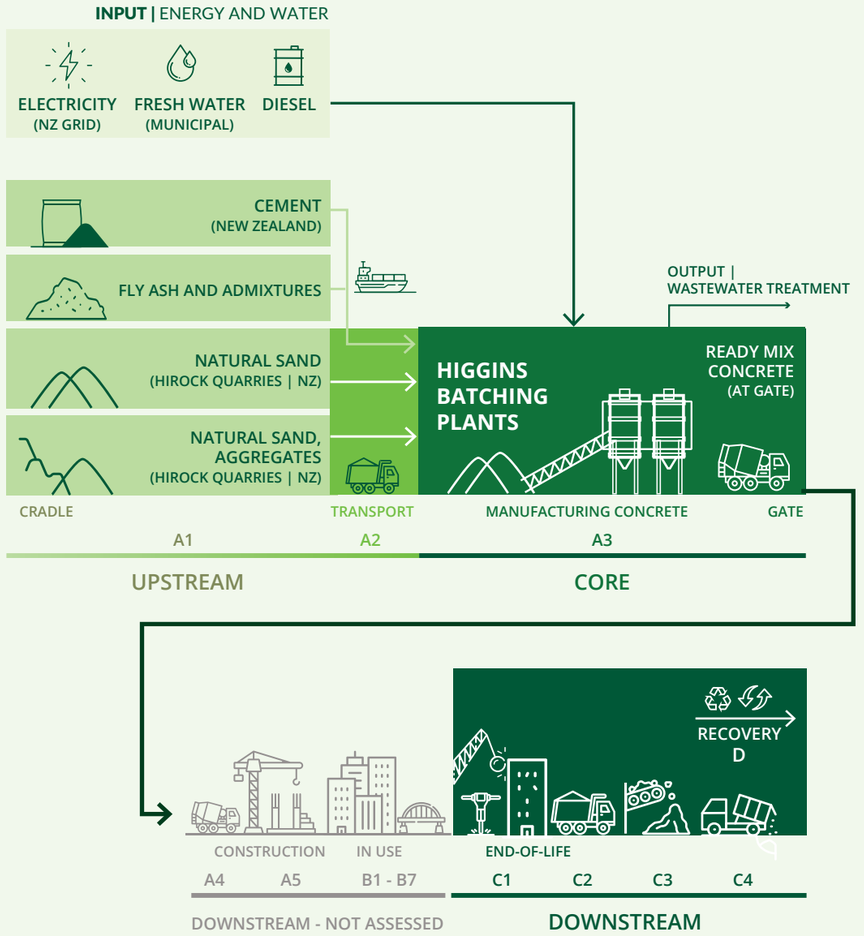
water conservation

All water types (including captured rainwater) are recycled back into concrete production and washing processes at each site.

OUR MANUFACTURING
LOCATIONS

Higgins Concrete manufactures ready-mix concrete products at 14 batching plants across New Zealand:

HIGGINS READY-MIX CONCRETE
MANUFACTURING PROCESS



READY-MIX
CONCRETE PRODUCTS

This EPD covers 28 concrete mix types that are manufactured by Higgins Concrete, Counties Ready Mix and Supacrete.

We supply a wide range of premixed concrete for a variety of applications. We supply 10-30 MPa strength concrete for use primarily in residential slabs, footings, driveways and paths and 35-50 MPa strength concrete which is primarily used for industrial jobs where a greater resistance to loading and trafficking is required. We strive to provide our customers a range of different concrete mixes that can meet their technical and environmental needs.

Table 1 presents the mixes that are considered in this EPD only - however, note that all these mixes are or can be produced at all batching plants.

Table 1. Ready-mix concrete products considered in the EPD

Mix ID	Strength/ Details	Sites produced at
1019	10 MPa	Produced at all sites
1013	10 MPa	Produced at all sites except Counties, Waipukurau, Supacrete, Nelson, and Marton
1519	15 MPa	Produced at all sites except Counties, Waipukurau, and Nelson
1513	15 MPa	Produced at all sites except Counties, Waipukurau, Supacrete, and Marton
1719	17.5 MPa	Produced at all sites
1713	17.5 MPa	Produced at all sites except Counties, Supacrete, and Hastings
2019	20 MPa	Produced at all sites
2013	20 MPa	Produced at all sites except Counties
2019RM	20 MPa Raft mix	Produced at Waipukurau, Palmerston North & Te Matai, Otaki, Hastings, and Feilding
2013RM	20 MPa Raft mix	Produced at Waipukurau and Otaki
2019KM	20 MPa Kerb mix	Produced at Taupo, Porirua, Palmerston North &Te Matai, Otaki, Hastings, Feilding, and Wellington

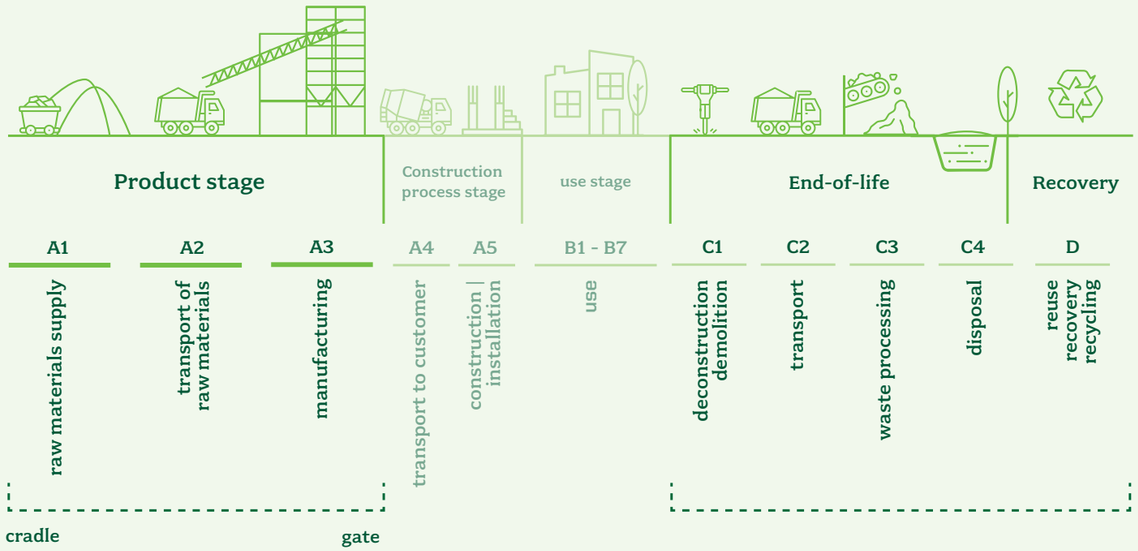
Table 1. Contd. Ready-mix concrete products

Mix ID	Strength/ Details	Sites produced at
2013KM	20 MPa Kerb mix	Produced at all sites except Counties, Supacrete, Marton
2519	25 MPa	Produced at all sites
2513	25 MPa	Produced at all sites except Counties
2519RM	25 MPa Raft mix	Produced at all sites except Counties, Supacrete, Palmerston North & Te Matai, Otaki, Nelson, Masterton, and Dannevirke & Pahiatua
2513RM	25 MPa Raft mix	Produced at Waipukurau and Otaki
3019	30 MPa	Produced at all sites
3013	30 MPa	Produced at all sites except Counties
3519	35 MPa	Produced at all sites
3513	35 MPa	Produced at all sites except Counties
4019	40 MPa	Produced at all sites
4013	40 MPa	Produced at all sites except Counties
4013SC	40 MPa Self compacting	Produced at Waipukurau, Taupo, Porirua, Palmerston North & Te Matai, Otaki, Nelson, and Wellington
4519	45 MPa	Produced at all sites except Waipukurau, Marton, and Dannevirke & Pahiatua
4513	45 MPa	Produced at Taupo, Supacrete, Porirua, Palmerston North & Te Matai, Hasting, and Feilding
5019	50 MPa	Produced at Taupo, Porirua, Nelson, Masterton, Marton, Palmerston North & Te Matai, Hastings, Fielding, and Wellington
5013	50 MPa	Produced at Taupo, Porirua, Palmerston North & Te Matai, Nelson, Masterton, Hastings, Feilding, and Wellington
5013SC	50 MPa Self-compacting	Produced at Taupo, Porirua, Palmerston North & Te Matai, Nelson, Masterton, Hastings, and Wellington

PRODUCT LIFE CYCLE

This is a "cradle-to-gate with modules C1–C4 and module D" type EPD. This means that the production (modules A1-A3), end-of-life (C1-C4) and recovery (D) stages are modelled in this EPD. The distribution and construction process (modules A4-A5) and use stages (B1-B7) are not modelled as these are best considered at building or structure level.

The product stage involves the extraction (cradle) of all raw materials, transport to the batching plant, and the manufacturing/mixing of these materials to make ready-mix concrete ready to be distributed to customers (gate). The end-of-life stage includes the deconstruction of the concrete structure, the transportation to landfill, and the landfilling of the concrete.



HOW TO USE THIS EPD

Higgins Concrete has developed this product specific EPD to help to showcase the environmental credentials of their concrete products. The EPD also provides life cycle data for calculating the impacts of concrete products. These data sets may be used by specifiers and developers to calculate and present the environmental impacts of particular construction projects.

This EPD can allow the represented products to qualify for points under the New Zealand Green Building Council (NZGBC) Green Star rating system.

The following section of this EPD comprises of the technical information for the method, assumptions, description of environmental indicators. Followed by the results from modelling the Life Cycle Assessment of the different products.

TECHNICAL INFORMATION

DECLARED UNIT

1 m³ of ready-mix concrete

EPDs that do not cover the full product life cycle from raw material extraction through to end-of-life use the term “declared unit”, rather than functional unit. “Declared unit” will be used in this EPD and is defined as: 1 m³ of ready-mix concrete at the batching plant gate which is purchased by the customer and is paid for.

Higgins Concrete ready-mix concrete is used for buildings and infrastructure in a range of structural and decorative applications.

INDUSTRY CLASSIFICATION

The UN CPC and ANZSIC codes applicable to Higgins Concrete ready-mix concrete products in this EPD are shown in Table 2.

Table 2. UN CPC and ANZSIC codes applicable to Higgins Concrete ready mixed concrete products

Product	Classification	Category
Ready-mixed concrete	UN CPC 375	Articles of concrete, cement and plaster
	ANZSIC 20330	Concrete – ready mixed – except dry mix

PRODUCT COMPOSITION

Higgins Concrete ready-mix concrete products declared in this EPD are composed of the following materials:

Table 3. Material composition of Higgins Concrete ready-mix concrete

Product components	Portion of concrete by weight (%)		Renewable material, weight (%)	Post-consumer recycled content (%)
	Min	Max		
Cement	8.1	21.0	0	0
Fly Ash	0.0	2.9	0	0
Coarse Aggregates	26.7	43.3	0	0
Fine Aggregates	0.0	17.6	0	0
Sand	17.3	50.2	0	0
Water	4.8	8.7	0	0
Admixtures	0.1	0.2	0	0

Packaging does not apply for Higgins Concrete ready-mix concrete and the biogenic content of concrete is zero.

SYSTEM BOUNDARY

In Life Cycle Assessments (LCA), the system boundary is a line that divides the processes which are included from everything else. The system boundary of this EPD includes production ('cradle-to-gate', modules A1-A3), end-of-life (modules C1-C4) and the recovery potential of the concrete (module D) - as illustrated in Table 4 below.

Table 4. Modules included in the scope of the EPD (X = declared module | ND = module not declared)

	Product stage			Construction process stage		Use stage							End-of-life				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	ND	ND	ND	ND	ND	ND	ND	ND	ND	X	X	X	X	X
Geography	GLO	NZ	NZ	-	-	-	-	-	-	-	-	-	NZ	NZ	NZ	NZ	NZ
Specific data	>90%	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Variation – products	0%	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Variation - sites	0%	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-

X = included in the EPD; ND = Module not declared; NZ= New Zealand

UPSTREAM

A1| Raw material supply

• Extraction and processing of raw materials.

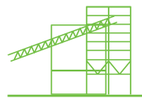
• Generation of electricity from primary energy resources, also including their extraction, refining and transport. This includes energy needed for raw material supply and energy for manufacturing in core process.

• Processing up to the end-of-waste state.

A2 | Transportation

• Transport of raw materials to Higgins Concrete batching plants.

CORE



A3 | Manufacturing

• Material handling, concrete batching and mixing, washing down of plant and equipment, and production waste transport and disposal are included.

Modules A4 and A5 are not included in this EPD due to the wide variances in potential scenarios. Hence, following streams are not included in this study:

• Any ready-mix concrete which is left over after a job is completed.

• Any concrete which is returned to the plant because of customers ordering more than what they need.

• Any concrete left in the trucks which are washed out when trucks are cleaned.

Table 5. End-of-life scenarios for ready-mix concrete

Processes	Quantity per m^3 of concrete	Unit	Additional information
Demolition	0.396	kg diesel for demolition	Module C1 | 120-kW construction excavator
Collection process specified by type	2,332*	kg collected separately	-
	0	kg collected with mixed construction waste	-
Transport from demolition site to disposal sites	50	km transport	Module C2
Recovery system specified by type	0	kg for recycling	
	0	kg for re-use	
	0	Kg for energy recovery	
Disposal to landfill	2,332	kg product or material for final deposition	Module C4

* Average density of ready-mix concrete is considered.

DOWNSTREAM

C1 | Deconstruction/ demolition

• Demolition of the whole building including concrete, using a 120- kW construction excavator.

C3 | Waste Processing

• None given 100% of concrete waste is disposed in landfill.

D | Resource recovery stage

• None given 100% of concrete waste is disposed in landfill.

C2 | Transport

• Transport of concrete waste to landfill.

C4 | Disposal

• All concrete waste is disposed in landfill, modelled as inert matter on landfill.

LIFE CYCLE INVENTORY (LCI) AND ASSUMPTIONS

Primary data were collected for the batching plants for the period 1 July 2020 to 30 June 2021 – including:

- Materials per declared unit of product (1 m^3 concrete).
- Sources and modes of transport for raw materials and destinations for wastes.
  - The different sources or destinations of materials were identified to calculate respective transport distances and impacts.
- Manufacturing facility (processing inputs) data.
  - This includes electricity, diesel, water, wastewater, and solid waste.
- Production data.
  - The quantities of products manufactured at Higgins Concrete batching plants were collected for allocation of common inputs and outputs.

Background datasets (e.g. for energy and transport processes) were obtained from the ecoinvent v3.9.1 database and published EPDs.

UPSTREAM DATA

For cement, the background data for cement was used from the EPD for EcoSure cement produced by Golden Bay (Golden Bay, 2023).

For all admixtures, the background data was taken from the EPD published by European Federation of Concrete Admixtures Associations for various admixtures (EPD registration no. EFC-20210193-IBG1-EN, EFC-20210197-IBG1-EN, EFC-20210198-IBG1-EN) (EFCA, 2021). EPD produced by ISOMAT for silicone-silicate renders was used as background data for silica (EPD registration no. S-P-09189) (ISOMAT, 2023).

Fly ash is sourced locally in New Zealand, which is treated as a waste material and only includes transport impact. If the dust was not utilised as a supplementary cementitious material, this material would otherwise have been landfilled and hence is classified as waste.

ELECTRICITY

Electricity has been modelled for core processes using the AusLCI data for the electricity mix used in New Zealand. The GWP-GHG** of the electricity is 0.135 kg CO_2eq./kWh.

TRANSPORT

Primary transport data was used for transport of production inputs (A2). Any wastes from the production process (A3) are assumed to be transported over a 50 km distance to a treatment or disposal site.

Transport modes:

- Transport, freight, lorry 16-32 metric ton, EURO4.

- Transport, freight, sea, container ship.

CUT-OFF CRITERIA

PCR 2019:14 v1.3.1 section 4.3.2 (EPD International, 2023), states:

- “Personnel-related processes, such as transportation of employees to and from work, shall not be accounted for.

- In general, the production and end-of-life processes of infrastructure or capital goods used in the product system should be excluded, unless there is evidence that they are relevant in terms of their environmental impact, or when a generic LCI dataset includes infrastructure/capital goods, and it is not possible, within reasonable effort, to subtract the data on infrastructure/capital goods from this dataset.”

In line with the PCR, we have not accounted for personnel-related activities in the LCI - such as transportation to and from work, while we have included all process-related transport.

We have included the infrastructure/capital goods used in the product system given the ecoinvent LCI datasets (version 3.9.1) (ecoinvent, 2022) usually include infrastructure/capital goods.

ALLOCATION

Higgins Concrete produces a range of ready-mix concrete products at its batching plants. Energy use for concrete production has been allocated to the products based on a volume basis (total m^3 of ready-mix concrete products).

End-of-life allocation follows the requirements of EN15804:2012+A2:2019 § 6.4.3.3 and generally follows the polluter pays principle.

SOFTWARE AND DATABASE

The LCA model was created on Microsoft Excel, using ecoinvent LCI datasets (version 3.9.1) and published EPDs.

KEY ASSUMPTIONS

CO_2 absorption from carbonation is not considered due to high variability and uncertainty and to be conservative.

ENVIRONMENTAL IMPACT INDICATORS

An introduction the core environmental impact indicators is provided below. The best-known effect of each indicator is listed in the descriptions and the abbreviations, in brackets, correspond to the labels in the following results tables.

Table 6. Environmental impact indicators described

Climate change (GWP-total, GWP-fossil, GWP-biogenic, GWP-luluc)

A measure of greenhouse gas emissions, such as CO_2 and methane. These emissions are causing an increase in the absorption of radiation emitted by the earth, increasing the natural greenhouse effect. This may in turn have adverse impacts on ecosystem health, human health and material welfare. The Global Warming Potential (GWP) is split into three sub indicators: total (GWP-total), fossil (GWP-fossil), biogenic (GWP-biogenic), and land-use and land-use change (GWP-luluc).

Ozone Depletion Potential (ODP)

Depletion of the ozone leads to higher levels of UVB ultraviolet rays reaching the earth's surface with detrimental effects on humans and plants. The Ozone Depletion Potential is a measure of air emissions that contribute to the depletion of the stratospheric ozone layer.

Acidification potential (AP)

Acidification Potential is a measure of emissions that cause acidifying effects to the environment. A molecule's acidification potential indicates its capacity to increase the hydrogen ion (H+) concentration in the presence of water, thus decreasing the pH value. Potential effects include fish mortality, forest decline, and the deterioration of building materials.

Eutrophication Potential (EP-fw, EP-fm, EP-tr)

Eutrophication covers all potential impacts of excessively high levels of macronutrients, the most important of which are nitrogen (N)and phosphorus (P). In aquatic ecosystems where this term is mostly applied, this typically describes a degradation in water quality. Eutrophication can result in an undesirable change in the type of species that flourish and an increase in the production of biomass. As the decomposition of biomass consumes oxygen, eutrophication may decrease the available oxygen level in the water column and threaten fish in their ability to respire.

Photochemical Ozone Formation Potential (POCP)

Photochemical Ozone Formation Potential gives an indication of the emissions from precursors that contribute to ground level smog formation, mainly ozone (O_3). Ground level ozone may be harmful to human health and ecosystems and may also damage crops. These emissions are produced by the reaction of volatile organic compounds (VOCs) and carbon monoxide in the presence of nitrogen oxides and UV light.

Abiotic Resource Depletion (ADP-mm, ADP-fossil)

The consumption of non-renewable resources decreases the availability of these resources and their associated functions in the future. Depletion of mineral resources and non-renewable energy resources are reported separately. Depletion of mineral resources is assessed based on total reserves.

Water use (WDP)

Water scarcity is a measure of the stress on a region due to water consumption

THE RESULTS

The following tables show the results grouped into few categories, each looking at different types of indicators. The headings below and overleaf provide descriptions for each of these categories.

Table 7. Core Environmental Impact Indicators (EN15804+A2)

Impact category	Abbreviation
Climate change – total	GWPt
Climate change – fossil	GWPf
Climate change – biogenic	GWPb
Climate change – land use and land use change	GWPluluc
Ozone depletion	ODP
Acidification	AP
Eutrophication aquatic freshwater	EPfw
Eutrophication aquatic marine	EPm
Eutrophication terrestrial	EPt
Photochemical ozone formation	POCP
Depletion of abiotic resources – minerals and metals*	ADPmm*
Depletion of abiotic resources – fossil fuels*	ADPf*
Water Depletion Potential*	WDP

CORE ENVIRONMENTAL IMPACT INDICATORS (EN15804+A2)

The reported impact categories represent impact potentials, i.e., they are approximations of environmental impacts that could occur if the emissions would (a) follow the underlying impact pathway and (b) meet certain conditions in the receiving environment while doing so. The environmental impact results are therefore relative expressions only and do not predict actual impacts, the exceeding of thresholds, safety margins, or risks.

Long-term emissions (>100 years) are not taken into consideration in the impact estimate.

*The results of this impact category may be highly uncertain in LCAs that include 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 this indicator in currently available generic datasets sometimes lack temporal, technological and geographical representativeness. Caution should be exercised when using the results of this indicator for decision-making purposes.

Table 8. Resource Use Indicators

Indicator	Abbreviation
Use of renewable primary energy excluding renewable primary energy resources used as raw materials	PERE
Use of renewable primary energy resources used as raw materials	PERM
Total use of renewable primary energy resources	PERT
Use of non-renewable primary energy excluding non-renewable primary energy resources used as raw materials	PENRE
Use of non-renewable primary energy resources used as raw materials	PENRM
Total use of non-renewable primary energy resources	PENRT
Use of secondary material	SM
Use of renewable secondary fuels	RSF
Use of non-renewable secondary fuels	NRSF
Total use of net fresh water	FW

RESOURCE USE

The resource use indicators describe the use of renewable and non-renewable material resources, renewable and non-renewable primary energy and water.

Note: Water consumption: The FW indicator in the EPD results tables reports consumption (i.e. net use) of 'blue water' (which includes river water, lake water and ground water). This indicator deliberately excludes consumption of 'green water' (rain water), as net loss should be interpreted as any additional water loss beyond what would occur in the original, natural system.

Table 9. Waste and Output Flows

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

WASTE AND OUTPUT FLOWS

Waste indicators describe waste generated within the life cycle of the product. Waste is categorised by hazard class, End-of-Life fate and exported energy content.

Table 10. Biogenic Carbon Content

Indicator	Abbreviation
Biogenic carbon content – product	BCC-prod
Biogenic carbon content – packaging	BCC-pack

BIOGENIC CARBON CONTENT

Biogenic carbon refers to the carbon stored in organic materials. This is sequestered during growth and released at end-of-life. EN15804+A2 requires the declaration of biogenic carbon content of the product and its packaging. Packaging does not apply for Ready Mix concrete.

Table 11. Additional Environmental Impacts

Impact category	Abbreviation
Particulate matter emissions	PM
Ionising radiation – human health***	IRP***
Eco-toxicity (freshwater)*	ETP-fw*
Human toxicity, cancer*	HTPc*
Human toxicity, non-cancer*	HTPnc*
Land use related impacts / soil quality*	SQP*
Global warming potential - climate impact**	GWP-GHG**

ADDITIONAL ENVIRONMENTAL IMPACTS

Optional environmental impact categories provide further information on environmental impacts.

The GWP-GHG indicator is identical to GWP-total except that the characterisation factor for biogenic CO_2 is set to zero. This means that the uptake and emissions of biogenic CO_2 are "balanced out" already in modules A1-A3, instead of in modules A1-A5 (for packaging) or modules A-C (for product).

***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 some construction materials, is not measured by this indicator.

RESULTS FOR COUNTIES | MODULES A1-A3 Impacts per 1 m³ of Ready-Mix Concrete

Mix ID		N1019	N1719	N2019	N2519	N3019	N3519	N4019	N4519	N5019
EPD Registration No.		S-P-09359-001	S-P-09359-002	S-P-09359-003	S-P-09359-004	S-P-09359-005	S-P-09359-006	S-P-09359-007	S-P-09359-008	S-P-09359-009
Core Environmental impacts (EN15804+A2)										
GWPt	kg CO_2-eq.	130	167	188	207	226	244	259	284	321
GWPf	kg CO_2-eq.	130	167	188	207	226	244	259	284	320
GWPb	kg CO_2-eq.	0.0719	0.0831	0.0888	0.0938	0.103	0.106	0.109	0.116	0.126
GWPluluc	kg CO_2-eq.	0.0128	0.0144	0.015	0.0154	0.0145	0.014	0.014	0.0149	0.0157
ODP	kg CFC11-eq.	1.34E-07	2.30E-07	2.32E-07	2.34E-07	2.39E-07	1.48E-07	1.49E-07	1.50E-07	1.53E-07
AP	Mole of H+ eq.	0.229	0.288	0.32	0.348	0.377	0.399	0.419	0.457	0.512
EPfw	kg P eq.	0.00206	0.00231	0.00231	0.00229	0.00236	0.00205	0.00196	0.00199	0.00197
EPm	kg N eq.	0.0909	0.114	0.127	0.139	0.152	0.163	0.171	0.187	0.21
EPt	Mole of N eq.	1.03	1.29	1.44	1.58	1.72	1.84	1.94	2.12	2.38
POCP	kg NMVOC eq.	0.257	0.321	0.358	0.39	0.424	0.453	0.476	0.519	0.582
ADPmm*	kg Sb-eq.	6.55E-05	9.25E-05	9.87E-05	1.04E-04	1.09E-04	9.78E-05	9.94E-05	1.09E-04	1.20E-04
ADPf*	MJ	580	734	815	887	957	1,010	1,060	1,160	1,300
WDP	m³ world equiv.	9.69	12.2	13.4	14.4	15.4	15.9	16.6	18	20
Resource Use										
PERE	MJ	150	192	217	239	260	281	298	327	369
PERM	MJ	0	0	0	0	0	0	0	0	0
PERT	MJ	150	192	217	239	260	281	298	327	369
PENRE	MJ	548	691	768	836	903	957	1,010	1,100	1,230
PENRM	MJ	0	3.92	3.92	3.92	3.92	0	0	0	0
PENRT	MJ	548	695	772	840	907	957	1,010	1,100	1,230
SM	kg	0	0	0	0	0	0	0	0	0
RSF	MJ	116	150	170	188	206	224	239	262	296
NRSF	MJ	0	0	0	0	0	0	0	0	0
FW	m³	3.13	3.2	3.24	3.27	3.37	3.37	3.29	3.38	3.44
Waste Categories and Output Flows										
HWD	kg	0.246	0.272	0.271	0.269	0.277	0.244	0.231	0.235	0.232
NHWD	kg	9.41	10.6	10.6	10.7	11	9.66	9.27	9.51	9.51
RWD	kg	0.00193	0.0024	0.00268	0.00293	0.00306	0.00335	0.0035	0.00392	0.00439
CRU	kg	0	0	0	0	0	0	0	0	0
MFR	kg	0.00248	0.00273	0.00276	0.00278	0.00288	0.00266	0.0026	0.00266	0.0027
MER	kg	7.23E-06	8.33E-06	8.40E-06	8.46E-06	8.80E-06	7.76E-06	7.42E-06	7.70E-06	7.80E-06
EEE	MJ	0.0381	0.0427	0.0423	0.0419	0.0431	0.0368	0.0345	0.035	0.0342
EET	MJ	0.00972	0.0136	0.0139	0.0142	0.0147	0.0115	0.0112	0.0118	0.0122
Biogenic Carbon Content										
BCC-prod	kg	0	0	0	0	0	0	0	0	0
BCC-pack	kg	0	0	0	0	0	0	0	0	0
Additional Environmental Impacts										
PM	Disease incidences	2.13E-06	2.55E-06	2.78E-06	2.98E-06	3.22E-06	3.36E-06	3.48E-06	3.76E-06	4.15E-06
IRP***	kBq U235 eq.	0.447	0.497	0.495	0.492	0.508	0.444	0.422	0.429	0.424
ETP-fw*	CTUe	388	496	557	612	669	719	761	832	938
HTPc*	CTUh	7.89E-09	9.36E-09	9.79E-09	1.02E-08	1.07E-08	1.03E-08	1.03E-08	1.09E-08	1.16E-08
HTPnc*	CTUh	2.53E-07	3.22E-07	3.53E-07	3.80E-07	4.10E-07	4.19E-07	4.37E-07	4.74E-07	5.26E-07
SQP*	Pt	155	161	165	167	174	174	170	177	182
GWP-GHG**	kg CO_2-eq.	130	167	188	207	226	244	259	284	320

* Refer to footnote on page 24 ** Refer to footnote on page 25 *** Refer to footnote on page 25

RESULTS FOR WAIPUKURAU | MODULES A1-A3 Impacts per 1 m³ of Ready-Mix Concrete

Mix ID		1019	1719	1713	2019	2013	2019RM	2013RM	2013KM	2519	2513	2519RM	2513RM	3019	3013	3519	3513	4019	4013	4013SC
EPD Registration No.		S-P-09359-010	S-P-09359-011	S-P-09359-012	S-P-09359-013	S-P-09359-014	S-P-09359-015	S-P-09359-016	S-P-09359-017	S-P-09359-018	S-P-09359-019	S-P-09359-020	S-P-09359-021	S-P-09359-022	S-P-09359-023	S-P-09359-024	S-P-09359-025	S-P-09359-026	S-P-09359-027	S-P-09359-028
Core Environmental impacts (EN15804+A2)																				
GWPt	kg CO_2-eq.	175	199	208	211	219	221	224	217	232	242	240	244	246	258	276	285	311	323	395
GWPf	kg CO_2-eq.	175	199	207	211	219	220	224	216	232	242	240	244	245	257	276	284	311	323	395
GWPb	kg CO_2-eq.	0.0913	0.0968	0.0999	0.0995	0.103	0.105	0.106	0.11	0.11	0.11	0.112	0.112	0.11	0.114	0.118	0.121	0.127	0.131	0.296
GWPluluc	kg CO_2-eq.	0.0156	0.017	0.0176	0.0172	0.0178	0.0193	0.0193	0.0162	0.0192	0.0182	0.0195	0.0203	0.0178	0.0185	0.0186	0.0192	0.0197	0.0204	0.0226
ODP	kg CFC11-eq.	2.46E-07	2.57E-07	2.65E-07	2.61E-07	2.68E-07	4.51E-07	4.51E-07	2.63E-07	4.56E-07	2.77E-07	4.58E-07	4.62E-07	2.73E-07	2.82E-07	2.83E-07	2.90E-07	2.94E-07	3.03E-07	7.12E-07
AP	Mole of H+ eq.	0.338	0.379	0.394	0.397	0.412	0.422	0.428	0.408	0.442	0.451	0.455	0.462	0.454	0.475	0.504	0.519	0.561	0.582	0.712
EPfw	kg P eq.	0.00305	0.00311	0.00322	0.00309	0.00319	0.00366	0.00363	0.00329	0.00369	0.00322	0.00369	0.00374	0.00309	0.00319	0.00307	0.00317	0.00309	0.00319	0.00449
EPm	kg N eq.	0.132	0.149	0.154	0.156	0.162	0.163	0.165	0.161	0.171	0.178	0.176	0.179	0.179	0.188	0.199	0.205	0.223	0.231	0.284
EPt	Mole of N eq.	1.49	1.67	1.74	1.76	1.83	1.84	1.86	1.81	1.93	2	1.98	2.02	2.02	2.12	2.25	2.32	2.51	2.61	3.16
POCP	kg NMVOC eq.	0.38	0.426	0.443	0.446	0.463	0.468	0.474	0.459	0.49	0.506	0.504	0.512	0.51	0.534	0.566	0.583	0.63	0.654	0.788
ADPmm*	kg Sb-eq.	8.15E-05	9.72E-05	1.02E-04	1.00E-04	1.05E-04	1.37E-04	1.38E-04	7.80E-05	1.41E-04	1.12E-04	1.43E-04	1.46E-04	1.11E-04	1.17E-04	1.20E-04	1.25E-04	1.31E-04	1.37E-04	1.28E-04
ADPf*	MJ	795	905	940	949	984	1,020	1,030	927	1,070	1,080	1,100	1,110	1,090	1,140	1,210	1,240	1,340	1,390	1,630
WDP	m³ world equiv.	12.3	13.7	14.2	14.3	14.8	16	16.1	14.3	16.6	16	17	17.2	16.2	16.8	17.8	18.3	19.7	20.4	25.4
Resource Use																				
PERE	MJ	199	228	237	241	250	251	255	240	264	276	273	278	280	294	315	324	355	368	422
PERM	MJ	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
PERT	MJ	199	228	237	241	250	251	255	240	264	276	273	278	280	294	315	324	355	368	422
PENRE	MJ	766	867	900	908	941	970	983	905	1,010	1,030	1,040	1,060	1,040	1,080	1,150	1,180	1,280	1,330	1,600
PENRM	MJ	0	0	0	0	0	7.84	7.84	0	7.84	0	7.84	7.84	0	0	0	0	0	0	15.7
PENRT	MJ	766	867	900	908	941	978	990	905	1,020	1,030	1,050	1,070	1,040	1,080	1,150	1,180	1,280	1,330	1,610
SM	kg	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
RSF	MJ	155	177	184	188	195	195	199	195	206	217	213	217	220	231	249	257	282	293	361
NRSF	MJ	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
FW	m³	3.35	3.44	3.59	3.42	3.57	3.46	3.46	3.62	3.49	3.62	3.5	3.6	3.44	3.6	3.45	3.61	3.49	3.65	4.02
Waste Categories and Output Flows																				
HWD	kg	0.321	0.329	0.343	0.326	0.339	0.387	0.384	0.351	0.39	0.343	0.39	0.397	0.326	0.339	0.323	0.337	0.325	0.339	0.483
NHWD	kg	11.9	12.3	12.8	12.3	12.7	14.8	14.7	12.8	15	12.9	15	15.2	12.3	12.8	12.3	12.8	12.5	13	17.8
RWD	kg	0.00182	0.00246	0.00256	0.00261	0.00271	0.00272	0.00277	0.00142	0.00286	0.003	0.00296	0.00302	0.00305	0.0032	0.00345	0.00355	0.00389	0.00404	0.00248
CRU	kg	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
MFR	kg	0.00434	0.00458	0.00475	0.00465	0.00481	0.00517	0.00518	0.00488	0.00528	0.00502	0.00534	0.00543	0.00492	0.00511	0.00515	0.00531	0.00543	0.00562	0.00728
MER	kg	1.08E-05	1.12E-05	1.17E-05	1.13E-05	1.18E-05	1.35E-05	1.35E-05	1.21E-05	1.37E-05	1.21E-05	1.38E-05	1.41E-05	1.16E-05	1.22E-05	1.19E-05	1.24E-05	1.24E-05	1.29E-05	1.87E-05
EEE	MJ	0.0468	0.0476	0.0498	0.0468	0.049	0.0578	0.0574	0.0509	0.0581	0.0491	0.058	0.0593	0.046	0.0482	0.045	0.0473	0.0447	0.0469	0.0718
EET	MJ	0.0165	0.0176	0.0183	0.0179	0.0186	0.0253	0.0253	0.0189	0.0258	0.0195	0.026	0.0264	0.0191	0.0199	0.02	0.0207	0.0213	0.0221	0.0396
Biogenic Carbon Content																				
BCC-prod	kg	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
BCC-pack	kg	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Additional Environmental Impacts																				
PM	Disease incidences	3.19E-06	3.48E-06	3.62E-06	3.60E-06	3.74E-06	3.79E-06	3.83E-06	3.79E-06	3.94E-06	4.01E-06	4.02E-06	4.10E-06	3.99E-06	4.17E-06	4.33E-06	4.47E-06	4.73E-06	4.91E-06	6.03E-06
IRP***	kBq U235 eq.	0.549	0.561	0.586	0.553	0.577	0.667	0.662	0.599	0.671	0.582	0.671	0.685	0.549	0.574	0.542	0.567	0.543	0.567	0.83
ETP-fw*	CTUe	553	623	647	656	681	689	700	683	724	750	747	759	759	795	850	874	952	988	1,230
HTPc*	CTUh	1.14E-08	1.22E-08	1.27E-08	1.24E-08	1.29E-08	1.42E-08	1.43E-08	1.31E-08	1.46E-08	1.35E-08	1.48E-08	1.51E-08	1.33E-08	1.39E-08	1.40E-08	1.45E-08	1.49E-08	1.55E-08	2.11E-08
HTPnc*	CTUh	3.49E-07	3.86E-07	4.02E-07	4.03E-07	4.18E-07	4.53E-07	4.58E-07	4.20E-07	4.71E-07	4.54E-07	4.83E-07	4.91E-07	4.56E-07	4.77E-07	5.02E-07	5.17E-07	5.55E-07	5.76E-07	7.70E-07
SQP*	Pt	297	308	316	308	316	315	313	325	320	324	322	325	316	325	322	330	331	340	374
GWP-GHG**	kg CO_2-eq.	175	199	207	211	219	220	224	216	232	242	240	244	245	257	276	284	311	323	395

* Refer to footnote on page 24 ** Refer to footnote on page 25 *** Refer to footnote on page 25

RESULTS FOR TAUPŌ | MODULES A1-A3 Impacts per 1 m³ of Ready-Mix Concrete

Mix ID		1019	1013	1519	1513	1719	1713	2019	2013	2019KM	2013KM	2519	2513	2519RM	3019	3013	3519	3513	4019	4013	4013SC	4519	4513	5019	5013	5013SC
EPD Registration No.		S-P-09359-029	S-P-09359-030	S-P-09359-031	S-P-09359-032	S-P-09359-33	S-P-09359-034	S-P-09359-035	S-P-09359-036	S-P-09359-037	S-P-09359-038	S-P-09359-039	S-P-09359-040	S-P-09359-041	S-P-09359-042	S-P-09359-043	S-P-09359-044	S-P-09359-045	S-P-09359-046	S-P-09359-047	S-P-09359-048	S-P-09359-049	S-P-09359-050	S-P-09359-051	S-P-09359-052	S-P-09359-053
Core Environmental impacts (EN15804+A2)																										
GWPt	kg CO_2-eq.	254	254	277	277	301	309	312	320	321	318	329	344	338	353	367	379	390	413	432	488	430	438	476	475	476
GWPf	kg CO_2-eq.	254	254	277	277	301	309	312	320	321	317	329	343	337	352	366	378	390	413	432	487	430	438	476	475	475
GWPb	kg CO_2-eq.	0.105	0.106	0.111	0.112	0.116	0.119	0.118	0.121	0.133	0.128	0.124	0.129	0.128	0.132	0.136	0.138	0.142	0.147	0.153	0.206	0.151	0.154	0.161	0.162	0.198
GWPluluc	kg CO_2-eq.	0.0653	0.0656	0.0655	0.0658	0.0668	0.0671	0.0666	0.0670	0.0687	0.0679	0.0672	0.0673	0.0674	0.0674	0.0673	0.0676	0.0679	0.0682	0.0686	0.0704	0.0673	0.0677	0.0679	0.0697	0.0671
ODP	kg CFC11-eq.	1.75E-06	1.75E-06	1.74E-06	1.75E-06	1.75E-06	1.75E-06	1.74E-06	1.74E-06	1.86E-06	1.81E-06	1.77E-06	1.75E-06	1.78E-06	1.77E-06	1.76E-06	1.76E-06	1.76E-06	1.76E-06	1.76E-06	2.55E-06	1.73E-06	1.73E-06	1.71E-06	1.75E-06	2.33E-06
AP	Mole of H+ eq.	0.729	0.730	0.764	0.765	0.805	0.818	0.820	0.833	0.855	0.841	0.850	0.872	0.867	0.889	0.909	0.928	0.947	0.982	1.01	1.12	1.00	1.02	1.07	1.08	1.09
EPfw	kg P eq.	0.0105	0.0106	0.0104	0.0105	0.0105	0.0105	0.0104	0.0104	0.0112	0.0109	0.0105	0.0104	0.0106	0.0105	0.0104	0.0104	0.0104	0.0103	0.0103	0.0126	0.0101	0.0101	0.00984	0.0102	0.0118
EPm	kg N eq.	0.275	0.275	0.289	0.289	0.305	0.311	0.312	0.317	0.325	0.320	0.324	0.333	0.330	0.340	0.348	0.356	0.363	0.378	0.390	0.424	0.387	0.392	0.415	0.417	0.414
EPt	Mole of N eq.	3.01	3.01	3.17	3.17	3.36	3.41	3.43	3.49	3.58	3.52	3.57	3.67	3.64	3.74	3.84	3.93	4.01	4.18	4.32	4.71	4.28	4.34	4.60	4.63	4.60
POCP	kg NMVOC eq.	0.913	0.915	0.952	0.953	0.997	1.01	1.01	1.03	1.06	1.04	1.05	1.07	1.07	1.09	1.11	1.14	1.16	1.19	1.23	1.32	1.22	1.23	1.29	1.30	1.29
ADPmm*	kg Sb-eq.	3.90E-04	3.91E-04	3.93E-04	3.95E-04	4.09E-04	4.12E-04	4.10E-04	4.12E-04	4.09E-04	3.98E-04	4.18E-04	4.20E-04	4.23E-04	4.25E-04	4.27E-04	4.30E-04	4.33E-04	4.38E-04	4.42E-04	4.97E-04	4.35E-04	4.38E-04	4.52E-04	4.62E-04	4.54E-04
ADPf*	MJ	2,090	2,090	2,170	2,170	2,280	2,310	2,310	2,340	2,370	2,330	2,390	2,430	2,430	2,480	2,520	2,570	2,610	2,700	2,760	2,880	2,740	2,770	2,910	2,940	2,790
WDP	m³ world equiv.	17.6	17.7	18.8	18.9	20.3	20.7	20.8	21.3	21.1	20.8	21.8	22.6	22.2	23.0	23.8	24.4	25.1	26.3	27.3	34.0	27.1	27.6	29.7	29.7	32.2
Resource Use																										
PERE	MJ	191	191	217	218	247	256	260	269	256	255	278	296	287	305	323	336	350	376	398	436	398	407	455	451	426
PERM	MJ	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
PERT	MJ	191	191	217	218	247	256	260	269	256	255	278	296	287	305	323	336	350	376	398	436	398	407	455	451	426
PENRE	MJ	2,060	2,070	2,140	2,140	2,240	2,260	2,270	2,300	2,350	2,310	2,340	2,390	2,380	2,430	2,470	2,520	2,550	2,630	2,700	2,850	2,670	2,700	2,830	2,850	2,760
PENRM	MJ	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	35.9	0	0	0	0	28.0
PENRT	MJ	2,060	2,070	2,140	2,140	2,240	2,260	2,270	2,300	2,350	2,310	2,340	2,390	2,380	2,430	2,470	2,520	2,550	2,630	2,700	2,880	2,670	2,700	2,830	2,850	2,790
SM	kg	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	50.0	50.0	80.0
RSF	MJ	140	140	162	162	184	191	195	202	199	199	210	224	217	232	247	258	269	291	309	368	309	316	353	350	361
NRSF	MJ	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
FW	m³	3.46	3.61	3.50	3.64	3.56	3.72	3.54	3.69	3.83	3.73	3.57	3.72	3.61	3.60	3.75	3.61	3.77	3.65	3.82	4.21	3.60	3.76	3.65	3.81	4.03
Waste Categories and Output Flows																										
HWD	kg	1.35	1.36	1.34	1.35	1.34	1.35	1.33	1.34	1.44	1.40	1.35	1.34	1.36	1.35	1.34	1.33	1.34	1.32	1.33	1.56	1.29	1.30	1.26	1.31	1.47
NHWD	kg	43.7	44.1	43.5	43.9	43.8	44.1	43.5	43.7	46.6	45.3	43.9	43.9	44.3	44.0	43.9	43.6	43.9	43.4	43.6	52.7	42.4	42.7	41.7	43.2	49.0
RWD	kg	0.00173	0.00173	0.00198	0.00198	0.00264	0.00274	0.00279	0.00289	0.00153	0.00153	0.00299	0.00319	0.00309	0.00329	0.00349	0.00364	0.00379	0.00409	0.00434	3.02E-04	0.00434	0.00444	0.00543	0.00538	2.88E-04
CRU	kg	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
MFR	kg	0.0141	0.0142	0.0142	0.0143	0.0145	0.0146	0.0144	0.0145	0.0154	0.0151	0.0147	0.0148	0.0149	0.0149	0.0149	0.0150	0.0151	0.0151	0.0153	0.0174	0.0150	0.0151	0.0151	0.0154	0.0165
MER	kg	9.53E-05	9.56E-05	9.49E-05	9.51E-05	9.53E-05	9.52E-05	9.46E-05	9.46E-05	1.02E-04	9.88E-05	9.57E-05	9.50E-05	9.65E-05	9.60E-05	9.50E-05	9.52E-05	9.51E-05	9.48E-05	9.44E-05	1.00E-04	9.27E-05	9.28E-05	9.10E-05	9.37E-05	9.63E-05
EEE	MJ	0.142	0.144	0.141	0.143	0.141	0.143	0.140	0.142	0.152	0.148	0.141	0.141	0.142	0.141	0.141	0.139	0.140	0.137	0.138	0.186	0.133	0.135	0.130	0.135	0.170
EET	MJ	0.213	0.213	0.212	0.212	0.213	0.213	0.212	0.211	0.227	0.221	0.215	0.213	0.216	0.215	0.213	0.214	0.213	0.213	0.212	0.235	0.209	0.208	0.205	0.211	0.224
Biogenic Carbon Content																										
BCC-prod	kg	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
BCC-pack	kg	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Additional Environmental Impacts																										
PM	Disease incidences	1.08E-05	1.08E-05	1.10E-05	1.10E-05	1.13E-05	1.14E-05	1.13E-05	1.14E-05	1.21E-05	1.18E-05	1.16E-05	1.17E-05	1.18E-05	1.19E-05	1.20E-05	1.21E-05	1.22E-05	1.24E-05	1.26E-05	1.34E-05	1.24E-05	1.25E-05	1.27E-05	1.30E-05	1.30E-05
IRP***	kBq U235 eq.	1.69	1.71	1.68	1.70	1.69	1.70	1.67	1.69	1.81	1.76	1.69	1.69	1.70	1.69	1.69	1.67	1.68	1.65	1.66	2.15	1.61	1.63	1.57	1.63	1.98
ETP-fw*	CTUe	1,250	1,250	1,310	1,310	1,380	1,400	1,410	1,430	1,480	1,450	1,460	1,500	1,490	1,530	1,570	1,600	1,630	1,700	1,750	1,940	1,740	1,760	1,860	1,870	1,890
HTPc*	CTUh	5.46E-08	5.48E-08	5.48E-08	5.50E-08	5.55E-08	5.57E-08	5.53E-08	5.56E-08	5.92E-08	5.77E-08	5.62E-08	5.63E-08	5.68E-08	5.68E-08	5.67E-08	5.69E-08	5.72E-08	5.74E-08	5.77E-08	6.46E-08	5.67E-08	5.70E-08	5.67E-08	5.81E-08	6.17E-08
HTPnc*	CTUh	1.30E-06	1.30E-06	1.32E-06	1.32E-06	1.36E-06	1.37E-06	1.37E-06	1.38E-06	1.45E-06	1.42E-06	1.40E-06	1.42E-06	1.42E-06	1.44E-06	1.45E-06	1.47E-06	1.48E-06	1.51E-06	1.54E-06	1.75E-06	1.52E-06	1.53E-06	1.56E-06	1.59E-06	1.68E-06
SQP*	Pt	1,130	1,140	1,130	1,140	1,140	1,140	1,130	1,140	1,210	1,180	1,150	1,150	1,160	1,150	1,150	1,150	1,150	1,150	1,150	1,150	1,130	1,130	1,120	1,150	1,120
GWP-GHG**	kg CO_2-eq.	254	254	277	277	301	309	312	320	321	318	329	343	337	352	367	378	390	413	432	487	430	438	476	475	475

* Refer to footnote on page 24 ** Refer to footnote on page 25 *** Refer to footnote on page 25

RESULTS FOR SUPACRETE | MODULES A1-A3 Impacts per 1 m³ of Ready-Mix Concrete

Mix ID		N1019	N1519	N1719	N2019	N2013	N2519	N2513	N3019	N3013	N3519	N3513	N4019	N4013	N4519	N4513	N5019
EPD Registration No.		S-P-09359-054	S-P-09359-055	S-P-09359-056	S-P-09359-057	S-P-09359-058	S-P-09359-059	S-P-09359-060	S-P-09359-061	S-P-09359-062	S-P-09359-063	S-P-09359-064	S-P-09359-065	S-P-09359-066	S-P-09359-067	S-P-09359-068	S-P-09359-069
Core Environmental impacts (EN15804+A2)																	
GWPt	kg CO_2-eq.	166	191	202	209	234	227	256	252	288	274	314	299	343	321	361	347
GWPf	kg CO_2-eq.	166	191	202	209	234	227	256	252	288	274	314	299	342	321	360	346
GWPb	kg CO_2-eq.	0.0551	0.0595	0.0614	0.0626	0.0696	0.0658	0.0733	0.0902	0.079	0.0959	0.116	0.103	0.124	0.108	0.129	0.115
GWPluluc	kg CO_2-eq.	0.0279	0.0294	0.0301	0.0305	0.0327	0.0316	0.0339	0.0236	0.0359	0.024	0.0232	0.0244	0.0235	0.0246	0.0236	0.025
ODP	kg CFC11-eq.	4.60E-07	4.57E-07	4.56E-07	4.54E-07	4.55E-07	4.52E-07	4.51E-07	4.62E-07	4.47E-07	4.59E-07	4.55E-07	4.55E-07	4.50E-07	4.51E-07	4.48E-07	4.47E-07
AP	Mole of H+ eq.	0.343	0.379	0.395	0.406	0.446	0.432	0.477	0.474	0.525	0.506	0.564	0.544	0.606	0.575	0.632	0.613
EPfw	kg P eq.	0.00366	0.00361	0.00359	0.00358	0.00375	0.00354	0.00369	0.00361	0.00363	0.00357	0.00365	0.00352	0.00359	0.00346	0.00356	0.00341
EPm	kg N eq.	0.134	0.15	0.156	0.161	0.177	0.172	0.191	0.189	0.211	0.202	0.227	0.218	0.245	0.231	0.256	0.247
EPt	Mole of N eq.	1.5	1.68	1.75	1.8	1.99	1.93	2.14	2.12	2.37	2.27	2.56	2.45	2.76	2.6	2.89	2.78
POCP	kg NMVOC eq.	0.405	0.446	0.464	0.476	0.521	0.506	0.556	0.554	0.609	0.59	0.655	0.632	0.703	0.667	0.732	0.71
ADPmm*	kg Sb-eq.	1.19E-04	1.22E-04	1.23E-04	1.24E-04	1.30E-04	1.26E-04	1.32E-04	1.58E-04	1.36E-04	1.63E-04	1.42E-04	1.69E-04	1.45E-04	1.73E-04	1.47E-04	1.79E-04
ADPf*	MJ	879	965	1,000	1,030	1,110	1,090	1,190	1,230	1,300	1,310	1,390	1,400	1,490	1,480	1,550	1,570
WDP	m^3 world equiv.	11.6	12.9	13.5	13.8	15.3	14.8	16.4	16.4	18.1	17.6	19.4	19	20.9	20.1	21.8	21.5
Resource Use																	
PERE	MJ	169	198	210	218	248	239	272	273	309	298	337	328	369	353	390	383
PERM	MJ	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
PERT	MJ	169	198	210	218	248	239	272	273	309	298	337	328	369	353	390	383
PENRE	MJ	862	944	980	1,000	1,090	1,060	1,160	1,180	1,260	1,260	1,350	1,340	1,450	1,420	1,510	1,500
PENRM	MJ	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
PENRT	MJ	862	944	980	1,000	1,090	1,060	1,160	1,180	1,260	1,260	1,350	1,340	1,450	1,420	1,510	1,500
SM	kg	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
RSF	MJ	133	158	168	175	200	193	221	214	253	235	277	260	305	281	323	305
NRSF	MJ	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
FW	m^3	3.15	3.19	3.21	3.22	3.68	3.25	3.7	3.3	3.76	3.33	3.77	3.37	3.81	3.4	3.84	3.44
Waste Categories and Output Flows																	
HWD	kg	0.454	0.447	0.445	0.443	0.465	0.438	0.458	0.446	0.45	0.44	0.452	0.433	0.444	0.426	0.44	0.419
NHWD	kg	15.9	15.7	15.6	15.6	16.4	15.5	16.2	16.1	16	16	16.1	15.8	15.9	15.6	15.8	15.5
RWD	kg	0.00119	0.0014	0.00149	0.00155	0.00176	0.0017	0.00194	0.00297	0.00221	0.00326	0.00231	0.00359	0.00253	0.00388	0.00268	0.00422
CRU	kg	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
MFR	kg	0.00492	0.00494	0.00496	0.00496	0.00518	0.00498	0.00518	0.00513	0.00522	0.00515	0.00533	0.00517	0.00536	0.00517	0.00537	0.00519
MER	kg	2.46E-05	2.43E-05	2.42E-05	2.41E-05	2.42E-05	2.39E-05	2.39E-05	2.46E-05	2.35E-05	2.43E-05	2.39E-05	2.40E-05	2.35E-05	2.36E-05	2.33E-05	2.33E-05
EEE	MJ	0.0567	0.0556	0.0553	0.055	0.0597	0.0543	0.0586	0.0549	0.0574	0.0541	0.0572	0.0531	0.056	0.052	0.0553	0.051
EET	MJ	0.0504	0.0499	0.0497	0.0495	0.0485	0.0491	0.0479	0.0507	0.0472	0.0503	0.0484	0.0497	0.0477	0.0491	0.0474	0.0485
Biogenic Carbon Content																	
BCC-prod	kg	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
BCC-pack	kg	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Additional Environmental Impacts																	
PM	Disease incidences	3.96E-06	4.20E-06	4.30E-06	4.37E-06	4.69E-06	4.54E-06	4.89E-06	4.84E-06	5.20E-06	5.04E-06	5.50E-06	5.28E-06	5.77E-06	5.48E-06	5.95E-06	5.72E-06
IRP***	kBq U235 eq.	0.672	0.663	0.66	0.657	0.708	0.651	0.698	0.662	0.688	0.655	0.689	0.645	0.679	0.636	0.673	0.627
ETP-fw*	CTUe	597	668	699	719	790	771	850	840	942	901	1,020	972	1,100	1,030	1,150	1,100
HTPc*	CTUh	1.73E-08	1.76E-08	1.77E-08	1.78E-08	1.87E-08	1.81E-08	1.89E-08	1.88E-08	1.93E-08	1.91E-08	2.00E-08	1.94E-08	2.04E-08	1.96E-08	2.06E-08	1.99E-08
HTPnc*	CTUh	4.79E-07	5.12E-07	5.26E-07	5.35E-07	5.71E-07	5.59E-07	5.98E-07	5.97E-07	6.40E-07	6.25E-07	6.82E-07	6.58E-07	7.19E-07	6.85E-07	7.42E-07	7.18E-07
SQP*	Pt	359	359	359	359	370	359	369	369	369	369	377	369	376	368	377	368
GWP-GHG**	kg CO_2-eq.	166	191	202	209	234	227	256	252	288	274	314	299	342	321	360	346

* Refer to footnote on page 24 ** Refer to footnote on page 25 *** Refer to footnote on page 25

RESULTS FOR PORIRUA | MODULES A1-A3 Impacts per 1 m³ of Ready-Mix Concrete

Mix ID		1019	1013	1519	1513	1719	1713	2019	2013	2019KM	2013KM	2519	2513	2519RM	3019	3013	3519	3513	4019	4013	4013SC	4519	4513	5019	5013	5013SC
EPD Registration No.		S-P-09359-070	S-P-09359-071	S-P-09359-072	S-P-09359-073	S-P-09359-074	S-P-09359-075	S-P-09359-076	S-P-09359-077	S-P-09359-078	S-P-09359-079	S-P-09359-080	S-P-09359-081	S-P-09359-082	S-P-09359-083	S-P-09359-084	S-P-09359-085	S-P-09359-086	S-P-09359-087	S-P-09359-088	S-P-09359-089	S-P-09359-090	S-P-09359-091	S-P-09359-092	S-P-09359-093	S-P-09359-094
Core Environmental impacts (EN15804+A2)																										
GWPt	kg CO_2-eq.	153	160	174	182	193	197	206	208	222	222	230	235	234	254	252	268	269	298	332	354	337	349	367	374	382
GWPf	kg CO_2-eq.	152	160	174	182	193	196	206	207	222	222	230	234	234	254	252	268	268	297	332	354	336	348	366	373	381
GWPb	kg CO_2-eq.	0.112	0.117	0.121	0.126	0.135	0.131	0.141	0.141	0.115	0.115	0.103	0.106	0.105	0.11	0.11	0.114	0.115	0.121	0.132	0.138	0.229	0.238	0.247	0.25	0.166
GWPluluc	kg CO_2-eq.	0.0168	0.0175	0.0177	0.0185	0.0191	0.0192	0.0192	0.0196	0.0165	0.0164	0.0187	0.0193	0.019	0.0193	0.0194	0.0198	0.0204	0.0203	0.0219	0.0225	0.0174	0.0182	0.018	0.0187	0.0178
ODP	kg CFC11-eq.	3.05E-07	3.13E-07	3.05E-07	3.15E-07	3.12E-07	3.11E-07	3.12E-07	3.11E-07	3.21E-07	3.20E-07	3.18E-07	3.25E-07	3.20E-07	3.22E-07	3.20E-07	3.23E-07	3.30E-07	3.24E-07	3.38E-07	3.42E-07	3.28E-07	3.36E-07	3.34E-07	3.44E-07	3.47E-07
AP	Mole of H+ eq.	0.315	0.331	0.35	0.366	0.382	0.388	0.403	0.405	0.435	0.434	0.448	0.458	0.456	0.488	0.486	0.511	0.516	0.56	0.621	0.659	0.616	0.639	0.666	0.68	0.696
EPfw	kg P eq.	0.00338	0.00352	0.00332	0.00347	0.00337	0.00338	0.00334	0.00333	0.0036	0.00359	0.00335	0.00349	0.00342	0.00336	0.00339	0.00335	0.00351	0.00327	0.00344	0.00346	0.00321	0.00338	0.00324	0.0034	0.00343
EPm	kg N eq.	0.122	0.128	0.137	0.143	0.15	0.152	0.158	0.159	0.17	0.169	0.174	0.177	0.177	0.19	0.189	0.199	0.2	0.219	0.243	0.258	0.246	0.255	0.267	0.272	0.276
EPt	Mole of N eq.	1.36	1.43	1.52	1.59	1.67	1.7	1.77	1.78	1.91	1.91	1.96	2	1.99	2.14	2.12	2.24	2.26	2.46	2.74	2.91	2.75	2.85	2.98	3.04	3.12
POCP	kg NMVOC eq.	0.354	0.371	0.392	0.41	0.427	0.434	0.45	0.452	0.487	0.487	0.499	0.51	0.508	0.543	0.54	0.569	0.573	0.621	0.688	0.729	0.685	0.71	0.739	0.756	0.774
ADPmm*	kg Sb-eq.	5.88E-05	6.17E-05	5.79E-05	6.09E-05	5.92E-05	5.93E-05	5.87E-05	5.84E-05	6.41E-05	6.39E-05	1.17E-04	1.21E-04	1.20E-04	1.23E-04	1.25E-04	1.28E-04	1.31E-04	1.35E-04	1.48E-04	1.55E-04	5.78E-05	6.13E-05	5.87E-05	6.19E-05	6.25E-05
ADPf*	MJ	705	736	778	810	847	854	890	894	928	926	1,050	1,070	1,070	1,140	1,140	1,200	1,200	1,310	1,440	1,530	1,340	1,390	1,440	1,470	1,440
WDP	m³ world equiv.	10.7	11.2	11.8	12.3	12.8	13	13.5	13.5	14.2	14.2	15.4	15.7	15.6	16.7	16.6	17.4	17.5	19	20.9	22.2	20	20.7	21.5	22	22.2
Resource Use																										
PERE	MJ	171	179	195	203	215	219	229	231	245	245	270	274	274	297	295	313	313	347	386	412	370	382	402	409	417
PERM	MJ	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
PERT	MJ	171	179	195	203	215	219	229	231	245	245	270	274	274	297	295	313	313	347	386	412	370	382	402	409	417
PENRE	MJ	701	732	773	804	841	849	883	887	928	926	1,010	1,030	1,030	1,090	1,090	1,150	1,150	1,250	1,380	1,460	1,330	1,370	1,430	1,460	1,440
PENRM	MJ	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
PENRT	MJ	701	732	773	804	841	849	883	887	928	926	1,010	1,030	1,030	1,090	1,090	1,150	1,150	1,250	1,380	1,460	1,330	1,370	1,430	1,460	1,440
SM	kg	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
RSF	MJ	131	139	153	160	171	174	183	185	199	199	203	206	206	225	223	238	238	267	298	320	309	320	338	344	355
NRSF	MJ	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
FW	m³	3.27	3.49	3.24	3.47	3.37	3.42	3.39	3.4	3.61	3.63	3.43	3.61	3.54	3.5	3.58	3.49	3.7	3.49	3.8	3.95	3.51	3.77	3.61	3.86	3.97
Waste Categories and Output Flows																										
HWD	kg	0.351	0.37	0.343	0.363	0.35	0.352	0.347	0.345	0.378	0.378	0.347	0.364	0.356	0.348	0.353	0.346	0.367	0.336	0.358	0.361	0.329	0.352	0.333	0.354	0.36
NHWD	kg	13.8	14.5	13.5	14.2	13.8	13.8	13.6	13.6	14.7	14.7	14.3	14.9	14.6	14.4	14.6	14.4	15.1	14.1	15	15.1	13	13.7	13.1	13.8	13.9
RWD	kg	6.05E-04	6.38E-04	7.00E-04	7.34E-04	8.89E-04	7.98E-04	9.51E-04	9.61E-04	1.25E-04	1.25E-04	0.00281	0.00286	0.00286	0.00305	0.0031	0.00329	0.0033	0.00368	0.00412	0.00441	0.00172	0.00178	0.00188	0.00187	1.87E-04
CRU	kg	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
MFR	kg	0.00585	0.00607	0.00603	0.00625	0.00628	0.00632	0.00639	0.0064	0.0068	0.00679	0.00662	0.00679	0.00672	0.00688	0.00688	0.00701	0.00716	0.00726	0.00778	0.00803	0.00768	0.00796	0.00802	0.00825	0.00842
MER	kg	1.43E-05	1.49E-05	1.41E-05	1.47E-05	1.43E-05	1.43E-05	1.42E-05	1.41E-05	1.55E-05	1.55E-05	1.43E-05	1.48E-05	1.46E-05	1.44E-05	1.45E-05	1.44E-05	1.51E-05	1.41E-05	1.49E-05	1.49E-05	1.40E-05	1.47E-05	1.41E-05	1.48E-05	1.49E-05
EEE	MJ	0.048	0.0512	0.0464	0.0498	0.0476	0.0479	0.047	0.0468	0.0518	0.0519	0.0466	0.0496	0.0482	0.0467	0.0477	0.0461	0.0497	0.0444	0.0479	0.0485	0.043	0.0468	0.0433	0.047	0.0481
EET	MJ	0.0256	0.0262	0.0255	0.0261	0.0257	0.0256	0.0255	0.0254	0.0277	0.0275	0.026	0.0266	0.0262	0.0261	0.026	0.0264	0.0271	0.0261	0.027	0.0268	0.026	0.0268	0.0264	0.027	0.027
Biogenic Carbon Content																										
BCC-prod	kg	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
BCC-pack	kg	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Additional Environmental Impacts																										
PM	Disease incidences	3.14E-06	3.29E-06	3.35E-06	3.51E-06	3.58E-06	3.62E-06	3.70E-06	3.71E-06	4.03E-06	4.03E-06	3.93E-06	4.03E-06	4.00E-06	4.19E-06	4.18E-06	4.33E-06	4.41E-06	4.61E-06	5.06E-06	5.30E-06	5.06E-06	5.27E-06	5.40E-06	5.55E-06	5.69E-06
IRP***	kBq U235 eq.	0.564	0.599	0.55	0.586	0.564	0.567	0.558	0.556	0.613	0.613	0.557	0.589	0.574	0.56	0.57	0.555	0.594	0.539	0.58	0.588	0.528	0.569	0.534	0.574	0.586
ETP-fw*	CTUe	511	535	575	599	630	640	668	671	724	723	728	741	739	797	790	837	840	921	1,020	1,090	1,050	1,090	1,140	1,160	1,190
HTPc*	CTUh	1.27E-08	1.33E-08	1.30E-08	1.36E-08	1.36E-08	1.37E-08	1.38E-08	1.38E-08	1.49E-08	1.48E-08	1.42E-08	1.47E-08	1.45E-08	1.48E-08	1.48E-08	1.51E-08	1.55E-08	1.55E-08	1.67E-08	1.73E-08	1.63E-08	1.71E-08	1.71E-08	1.77E-08	1.81E-08
HTPnc*	CTUh	3.60E-07	3.75E-07	3.89E-07	4.05E-07	4.18E-07	4.22E-07	4.35E-07	4.36E-07	4.71E-07	4.70E-07	4.65E-07	4.75E-07	4.73E-07	5.00E-07	4.97E-07	5.19E-07	5.25E-07	5.58E-07	6.12E-07	6.44E-07	6.20E-07	6.42E-07	6.64E-07	6.79E-07	6.97E-07
SQP*	Pt	453	463	453	463	459	459	458	457	482	481	463	473	468	468	468	470	481	469	486	488	473	485	479	490	494
GWP-GHG**	kg CO_2-eq.	152	160	174	182	193	196	206	207	222	222	230	234	234	254	252	268	268	297	332	354	336	348	366	373	381

* Refer to footnote on page 24 ** Refer to footnote on page 25 *** Refer to footnote on page 25

RESULTS FOR PALMERSTON NORTH & TE MATAI | MODULES A1-A3 Impacts per 1 m³ of Ready-Mix Concrete

Mix ID		1019	1013	1519	1513	1719	1713	2019	2013	2019RM	2019KM	2013KM	2519	2513	3019	3013	3519	3513	4019	4013	4013SC	4519	4513	5019	5013	5013SC
EPD Registration No.		S-P-09359-095	S-P-09359-096	S-P-09359-097	S-P-09359-098	S-P-09359-099	S-P-09359-100	S-P-09359-101	S-P-09359-102	S-P-09359-103	S-P-09359-104	S-P-09359-105	S-P-09359-106	S-P-09359-107	S-P-09359-108	S-P-09359-109	S-P-09359-110	S-P-09359-111	S-P-09359-112	S-P-09359-113	S-P-09359-114	S-P-09359-115	S-P-09359-116	S-P-09359-117	S-P-09359-118	S-P-09359-119
Core Environmental impacts (EN15804+A2)																										
GWPt	kg CO_2-eq.	164	171	178	178	190	198	205	213	209	215	215	228	236	247	255	266	274	312	328	383	331	339	392	378	388
GWPf	kg CO_2-eq.	163	171	178	178	190	198	205	213	209	215	215	228	236	247	255	266	274	312	327	382	331	338	392	377	387
GWPb	kg CO_2-eq.	0.0618	0.0643	0.0663	0.0673	0.0687	0.0717	0.0723	0.0753	0.0733	0.0864	0.0864	0.0818	0.0849	0.0866	0.0895	0.0913	0.0943	0.103	0.108	0.145	0.108	0.111	0.124	0.119	0.146
GWPluluc	kg CO_2-eq.	0.018	0.0184	0.0183	0.0187	0.019	0.0197	0.0195	0.0202	0.0196	0.0181	0.0181	0.0191	0.0198	0.0198	0.0204	0.0204	0.0211	0.0223	0.0232	0.0209	0.0229	0.0236	0.0255	0.0274	0.0232
ODP	kg CFC11-eq.	2.78E-07	2.85E-07	2.86E-07	2.90E-07	2.94E-07	3.03E-07	3.03E-07	3.12E-07	3.05E-07	3.16E-07	3.16E-07	3.20E-07	3.29E-07	3.31E-07	3.40E-07	3.42E-07	3.51E-07	3.70E-07	3.83E-07	4.35E-07	3.81E-07	3.90E-07	4.20E-07	4.70E-07	5.14E-07
AP	Mole of H+ eq.	0.331	0.345	0.355	0.358	0.378	0.393	0.403	0.419	0.41	0.424	0.424	0.444	0.46	0.477	0.492	0.51	0.525	0.59	0.618	0.711	0.622	0.638	0.73	0.716	0.731
EPfw	kg P eq.	0.00271	0.00277	0.00271	0.00281	0.00275	0.00286	0.00274	0.00285	0.00274	0.00304	0.00304	0.0028	0.00293	0.00282	0.00292	0.00282	0.00293	0.0029	0.00301	0.00329	0.00289	0.003	0.00303	0.00333	0.0036
EPm	kg N eq.	0.127	0.133	0.137	0.138	0.146	0.152	0.156	0.162	0.159	0.165	0.165	0.172	0.178	0.185	0.191	0.198	0.205	0.23	0.242	0.281	0.243	0.249	0.286	0.28	0.289
EPt	Mole of N eq.	1.43	1.49	1.54	1.55	1.64	1.71	1.76	1.83	1.79	1.85	1.85	1.94	2.01	2.09	2.16	2.24	2.3	2.6	2.72	3.18	2.74	2.81	3.23	3.15	3.26
POCP	kg NMVOC eq.	0.37	0.386	0.397	0.4	0.422	0.439	0.45	0.468	0.458	0.475	0.475	0.496	0.514	0.533	0.55	0.569	0.587	0.659	0.69	0.798	0.694	0.712	0.814	0.803	0.826
ADPmm*	kg Sb-eq.	9.84E-05	1.02E-04	9.60E-05	9.80E-05	1.08E-04	1.13E-04	1.13E-04	1.18E-04	1.14E-04	9.52E-05	9.52E-05	1.22E-04	1.27E-04	1.28E-04	1.33E-04	1.35E-04	1.39E-04	1.52E-04	1.59E-04	8.49E-05	1.58E-04	1.62E-04	1.81E-04	1.97E-04	1.00E-04
ADPf*	MJ	780	813	824	829	889	925	950	985	965	952	952	1,050	1,080	1,120	1,160	1,200	1,240	1,390	1,450	1,500	1,460	1,500	1,720	1,720	1,570
WDP	m³ world equiv.	12	12.4	12.7	12.7	13.4	13.9	14.2	14.7	14.4	14.5	14.5	15.5	16	16.5	17	17.5	18	20	20.9	22.5	21	21.5	24.3	23.8	22.8
Resource Use																										
PERE	MJ	179	188	193	193	209	218	226	234	230	229	229	251	260	272	281	294	302	345	362	397	366	375	434	417	398
PERM	MJ	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
PERT	MJ	179	188	193	193	209	218	226	234	230	229	229	251	260	272	281	294	302	345	362	397	366	375	434	417	398
PENRE	MJ	749	781	796	801	853	887	911	945	925	931	931	1,000	1,040	1,080	1,110	1,150	1,180	1,330	1,390	1,500	1,400	1,430	1,640	1,640	1,570
PENRM	MJ	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
PENRT	MJ	749	781	796	801	853	887	911	945	925	931	931	1,000	1,040	1,080	1,110	1,150	1,180	1,330	1,390	1,500	1,400	1,430	1,640	1,640	1,570
SM	kg	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	50	70
RSF	MJ	140	147	154	154	165	172	179	186	182	189	189	200	207	217	224	235	242	277	291	350	294	301	350	333	350
NRSF	MJ	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
FW	m³	3.48	3.56	3.47	3.61	3.52	3.66	3.5	3.65	3.5	3.78	3.78	3.55	3.7	3.55	3.69	3.54	3.69	3.61	3.75	4.06	3.58	3.73	3.72	3.77	3.94
Waste Categories and Output Flows																										
HWD	kg	0.335	0.343	0.335	0.348	0.34	0.355	0.339	0.354	0.34	0.378	0.378	0.348	0.364	0.35	0.364	0.351	0.365	0.362	0.376	0.416	0.36	0.375	0.379	0.42	0.457
NHWD	kg	12	12.2	11.9	12.3	12.2	12.7	12.2	12.7	12.2	13.2	13.2	12.5	13.1	12.6	13.1	12.7	13.2	13.1	13.6	13.8	13.1	13.6	13.9	15.2	15.1
RWD	kg	0.00197	0.00206	0.00182	0.00182	0.0023	0.0024	0.00249	0.00259	0.00254	0.00138	0.00138	0.00277	0.00287	0.00301	0.00311	0.00325	0.00335	0.00382	0.00402	1.89E-04	0.00406	0.00416	0.00483	0.00506	1.92E-04
CRU	kg	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
MFR	kg	0.0046	0.00474	0.00477	0.00487	0.00494	0.00513	0.00511	0.0053	0.00515	0.00551	0.00551	0.00543	0.00564	0.00566	0.00585	0.00588	0.00608	0.00648	0.00675	0.00778	0.00668	0.00688	0.00751	0.0077	0.00824
MER	kg	1.43E-05	1.46E-05	1.46E-05	1.50E-05	1.50E-05	1.56E-05	1.52E-05	1.58E-05	1.53E-05	1.68E-05	1.68E-05	1.60E-05	1.66E-05	1.64E-05	1.70E-05	1.68E-05	1.74E-05	1.81E-05	1.88E-05	2.12E-05	1.84E-05	1.90E-05	2.02E-05	2.32E-05	2.55E-05
EEE	MJ	0.0461	0.0471	0.0456	0.0479	0.0461	0.0484	0.0454	0.0477	0.0454	0.0514	0.0514	0.046	0.0485	0.0458	0.0479	0.0453	0.0475	0.0456	0.0475	0.0522	0.0447	0.047	0.0459	0.0504	0.0549
EET	MJ	0.026	0.0267	0.0269	0.0273	0.0278	0.0287	0.0287	0.0296	0.0289	0.031	0.031	0.0305	0.0314	0.0317	0.0326	0.0329	0.0338	0.0361	0.0374	0.0426	0.0372	0.0381	0.0415	0.0482	0.053
Biogenic Carbon Content																										
BCC-prod	kg	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
BCC-pack	kg	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Additional Environmental Impacts																										
PM	Disease incidences	3.10E-06	3.21E-06	3.27E-06	3.32E-06	3.43E-06	3.57E-06	3.60E-06	3.75E-06	3.65E-06	3.89E-06	3.89E-06	3.90E-06	4.05E-06	4.13E-06	4.27E-06	4.36E-06	4.50E-06	4.93E-06	5.16E-06	6.07E-06	5.15E-06	5.29E-06	5.93E-06	6.02E-06	6.45E-06
IRP***	kBq U235 eq.	0.545	0.557	0.541	0.565	0.548	0.573	0.543	0.568	0.543	0.61	0.61	0.553	0.58	0.552	0.575	0.549	0.574	0.558	0.581	0.639	0.551	0.577	0.572	0.621	0.674
ETP-fw*	CTUe	530	553	575	577	610	635	656	681	667	697	697	726	751	784	808	841	866	980	1,030	1,230	1,040	1,060	1,220	1,200	1,270
HTPc*	CTUh	1.24E-08	1.28E-08	1.28E-08	1.31E-08	1.32E-08	1.38E-08	1.37E-08	1.42E-08	1.38E-08	1.48E-08	1.48E-08	1.45E-08	1.51E-08	1.51E-08	1.56E-08	1.56E-08	1.62E-08	1.72E-08	1.79E-08	2.07E-08	1.77E-08	1.82E-08	1.98E-08	2.10E-08	2.28E-08
HTPnc*	CTUh	3.70E-07	3.84E-07	3.94E-07	3.98E-07	4.14E-07	4.30E-07	4.38E-07	4.55E-07	4.45E-07	4.68E-07	4.68E-07	4.78E-07	4.95E-07	5.09E-07	5.25E-07	5.40E-07	5.57E-07	6.17E-07	6.45E-07	7.61E-07	6.47E-07	6.64E-07	7.51E-07	7.59E-07	8.10E-07
SQP*	Pt	270	275	274	280	279	288	282	291	283	305	305	292	302	298	306	303	312	320	330	364	323	332	347	375	402
GWP-GHG**	kg CO_2-eq.	163	171	178	178	190	198	205	213	209	215	215	228	236	247	255	266	274	312	327	382	331	338	392	377	387

* Refer to footnote on page 24 ** Refer to footnote on page 25 *** Refer to footnote on page 25

RESULTS FOR OTAKI | MODULES A1-A3 Impacts per 1 m³ of Ready-Mix Concrete

Mix ID		1019	1013	1519	1513	1719	1713	2019	2013	2019RM	2013RM	2019KM	2013KM	2519	2513	2519RM	2513RM	3019	3013	3519	3513	4019	4013	4013SC	4519	4513
EPD Registration No.		S-P-09359-120	S-P-09359-121	S-P-09359-122	S-P-09359-123	S-P-09359-124	S-P-09359-125	S-P-09359-126	S-P-09359-127	S-P-09359-128	S-P-09359-129	S-P-09359-130	S-P-09359-131	S-P-09359-132	S-P-09359-133	S-P-09359-134	S-P-09359-135	S-P-09359-136	S-P-09359-137	S-P-09359-138	S-P-09359-139	S-P-09359-140	S-P-09359-141	S-P-09359-142	S-P-09359-143	S-P-09359-144
Core Environmental impacts (EN15804+A2)																										
GWPt	kg CO_2-eq.	149	149	172	177	192	196	211	211	211	208	197	197	225	235	224	232	252	259	275	283	314	309	338	332	344
GWPf	kg CO_2-eq.	149	149	172	176	192	196	211	211	211	208	196	196	225	235	223	231	251	259	275	282	313	308	337	331	344
GWPb	kg CO_2-eq.	0.112	0.114	0.124	0.127	0.132	0.135	0.0909	0.0901	0.0923	0.144	0.144	0.145	0.1	0.103	0.164	0.17	0.107	0.109	0.112	0.116	0.122	0.122	0.315	0.224	0.233
GWPluluc	kg CO_2-eq.	0.0143	0.0148	0.015	0.0157	0.0197	0.0201	0.0185	0.0192	0.0181	0.0194	0.0169	0.017	0.0171	0.0177	0.0146	0.0152	0.0181	0.0184	0.0185	0.0193	0.0196	0.02	0.0188	0.0164	0.0174
ODP	kg CFC11-eq.	2.29E-07	2.34E-07	2.36E-07	2.44E-07	2.47E-07	2.52E-07	2.54E-07	2.55E-07	2.54E-07	2.56E-07	2.46E-07	2.47E-07	2.61E-07	2.67E-07	2.63E-07	2.71E-07	2.73E-07	2.77E-07	2.77E-07	2.87E-07	2.89E-07	2.94E-07	3.11E-07	2.97E-07	3.10E-07
AP	Mole of H+ eq.	0.296	0.299	0.335	0.345	0.37	0.377	0.407	0.408	0.408	0.397	0.381	0.381	0.432	0.451	0.424	0.44	0.478	0.491	0.516	0.532	0.581	0.576	0.618	0.603	0.628
EPfw	kg P eq.	0.00284	0.00297	0.00284	0.00299	0.00292	0.00297	0.00295	0.00299	0.00298	0.00299	0.00311	0.00313	0.00301	0.00309	0.00303	0.00313	0.00306	0.00309	0.00297	0.00313	0.00296	0.00311	0.00329	0.00293	0.00315
EPm	kg N eq.	0.116	0.117	0.131	0.135	0.146	0.149	0.158	0.158	0.158	0.157	0.15	0.15	0.168	0.175	0.168	0.174	0.186	0.191	0.201	0.207	0.227	0.225	0.25	0.241	0.251
EPt	Mole of N eq.	1.29	1.3	1.47	1.51	1.63	1.66	1.78	1.78	1.78	1.75	1.67	1.68	1.89	1.97	1.87	1.94	2.1	2.16	2.27	2.34	2.57	2.54	2.75	2.7	2.81
POCP	kg NMVOC eq.	0.328	0.332	0.371	0.383	0.41	0.418	0.45	0.451	0.451	0.44	0.422	0.423	0.478	0.498	0.47	0.487	0.528	0.543	0.57	0.588	0.642	0.636	0.684	0.669	0.696
ADPmm*	kg Sb-eq.	4.04E-05	4.27E-05	4.11E-05	4.42E-05	4.37E-05	4.48E-05	9.90E-05	9.97E-05	9.94E-05	4.56E-05	4.69E-05	4.73E-05	1.04E-04	1.09E-04	4.66E-05	4.87E-05	1.13E-04	1.16E-04	1.19E-04	1.24E-04	1.30E-04	1.31E-04	5.63E-05	4.88E-05	5.35E-05
ADPf*	MJ	644	649	726	746	804	820	941	943	943	862	826	827	998	1,040	919	951	1,100	1,130	1,190	1,230	1,340	1,330	1,390	1,300	1,350
WDP	m³ world equiv.	10.5	10.6	11.7	12	12.8	13	14.4	14.4	14.4	13.6	13	13.1	15.2	15.7	14.4	14.8	16.6	17	17.8	18.3	19.9	19.7	20.4	19.8	20.5
Resource Use																										
PERE	MJ	166	167	191	196	213	217	246	247	247	229	217	217	262	274	246	254	292	300	319	327	363	357	368	361	374
PERM	MJ	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
PERT	MJ	166	167	191	196	213	217	246	247	247	229	217	217	262	274	246	254	292	300	319	327	363	357	368	361	374
PENRE	MJ	639	644	720	741	797	813	900	902	901	854	819	820	955	994	910	943	1,050	1,080	1,140	1,170	1,280	1,270	1,360	1,290	1,340
PENRM	MJ	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
PENRT	MJ	639	644	720	741	797	813	900	902	901	854	819	820	955	994	910	943	1,050	1,080	1,140	1,170	1,280	1,270	1,360	1,290	1,340
SM	kg	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
RSF	MJ	133	133	155	159	174	177	188	188	188	188	177	177	202	211	203	211	226	233	248	255	284	279	307	307	318
NRSF	MJ	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
FW	m³	3.29	3.45	3.3	3.51	3.45	3.52	3.52	3.57	3.54	3.55	3.62	3.65	3.59	3.71	3.59	3.72	3.66	3.71	3.55	3.78	3.6	3.82	4.06	3.56	3.86
Waste Categories and Output Flows																										
HWD	kg	0.298	0.314	0.297	0.317	0.309	0.315	0.312	0.317	0.315	0.317	0.331	0.334	0.319	0.33	0.322	0.335	0.325	0.329	0.313	0.334	0.312	0.333	0.356	0.31	0.338
NHWD	kg	11.4	12	11.4	12	11.8	12	12.5	12.7	12.6	12	12.5	12.6	12.8	13.2	12.2	12.6	13	13.2	12.7	13.4	12.7	13.4	13.3	11.7	12.6
RWD	kg	6.92E-04	6.94E-04	8.01E-04	8.21E-04	0.00103	0.00105	0.00263	0.00263	0.00262	0.00111	0.00103	0.00103	0.00277	0.00292	0.00115	0.00119	0.00314	0.00322	0.00344	0.00352	0.00393	0.00383	0.00339	0.00171	0.00177
CRU	kg	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
MFR	kg	0.00486	0.00498	0.00511	0.0053	0.00541	0.0055	0.00561	0.00564	0.00563	0.00565	0.0056	0.00561	0.00582	0.006	0.00586	0.00604	0.00615	0.00626	0.00632	0.00655	0.00673	0.00682	0.00732	0.00698	0.00731
MER	kg	9.51E-06	9.98E-06	9.71E-06	1.04E-05	1.03E-05	1.05E-05	1.05E-05	1.07E-05	1.06E-05	1.07E-05	1.10E-05	1.11E-05	1.09E-05	1.13E-05	1.10E-05	1.14E-05	1.13E-05	1.15E-05	1.12E-05	1.19E-05	1.16E-05	1.21E-05	1.31E-05	1.17E-05	1.27E-05
EEE	MJ	0.0434	0.0461	0.0428	0.0461	0.0445	0.0455	0.0447	0.0455	0.0452	0.0456	0.0483	0.0487	0.0456	0.0473	0.0461	0.0482	0.0461	0.0466	0.0436	0.0471	0.0427	0.0464	0.0499	0.0419	0.0465
EET	MJ	0.0143	0.0148	0.015	0.0158	0.016	0.0164	0.0166	0.0168	0.0167	0.0168	0.0169	0.017	0.0173	0.0179	0.0174	0.0181	0.0183	0.0187	0.0187	0.0196	0.0198	0.0203	0.022	0.0205	0.0218
Biogenic Carbon Content																										
BCC-prod	kg	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
BCC-pack	kg	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Additional Environmental Impacts																										
PM	Disease incidences	2.78E-06	2.84E-06	3.04E-06	3.16E-06	3.30E-06	3.37E-06	3.49E-06	3.51E-06	3.50E-06	3.51E-06	3.44E-06	3.45E-06	3.68E-06	3.82E-06	3.71E-06	3.85E-06	3.99E-06	4.09E-06	4.21E-06	4.37E-06	4.64E-06	4.65E-06	5.08E-06	4.89E-06	5.13E-06
IRP***	kBq U235 eq.	0.51	0.539	0.506	0.542	0.526	0.537	0.53	0.539	0.536	0.54	0.568	0.572	0.542	0.561	0.547	0.57	0.55	0.557	0.526	0.564	0.52	0.559	0.599	0.514	0.564
ETP-fw*	CTUe	477	479	547	561	606	619	653	654	654	654	621	622	696	726	701	727	774	796	842	866	956	942	1,030	1,030	1,060
HTPc*	CTUh	1.03E-08	1.07E-08	1.09E-08	1.14E-08	1.16E-08	1.19E-08	1.21E-08	1.22E-08	1.22E-08	1.22E-08	1.22E-08	1.22E-08	1.26E-08	1.31E-08	1.27E-08	1.32E-08	1.34E-08	1.37E-08	1.37E-08	1.44E-08	1.47E-08	1.50E-08	1.63E-08	1.52E-08	1.61E-08
HTPnc*	CTUh	3.06E-07	3.10E-07	3.42E-07	3.53E-07	3.74E-07	3.82E-07	3.99E-07	4.01E-07	4.00E-07	4.01E-07	3.86E-07	3.86E-07	4.23E-07	4.40E-07	4.26E-07	4.42E-07	4.64E-07	4.76E-07	4.96E-07	5.13E-07	5.54E-07	5.51E-07	6.03E-07	5.89E-07	6.15E-07
SQP*	Pt	360	368	364	374	373	377	378	381	380	381	389	390	386	393	388	397	395	399	395	406	401	409	427	405	421
GWP-GHG**	kg CO_2-eq.	149	149	172	176	192	196	211	211	211	208	196	196	225	235	223	231	251	259	275	282	313	308	337	331	344

* Refer to footnote on page 24 ** Refer to footnote on page 25 *** Refer to footnote on page 25

RESULTS FOR NELSON | MODULES A1-A3 Impacts per 1 m³ of Ready-Mix Concrete

Mix ID		1019	1513	1719	1713	2019	2013	2013KM	2519	2513	3019	3013	3519	3513	4019	4013	4013SC	4519	5019	5013	5013SC
EPD Registration No.		S-P-09359-145	S-P-09359-146	S-P-09359-147	S-P-09359-148	S-P-09359-149	S-P-09359-150	S-P-09359-151	S-P-09359-152	S-P-09359-153	S-P-09359-154	S-P-09359-155	S-P-09359-156	S-P-09359-157	S-P-09359-158	S-P-09359-159	S-P-09359-160	S-P-09359-161	S-P-09359-162	S-P-09359-163	S-P-09359-164
Core Environmental impacts (EN15804+A2)																					
GWPt	kg CO_2-eq.	164	174	210	214	222	222	218	243	251	261	266	290	293	328	332	363	348	383	371	398
GWPf	kg CO_2-eq.	164	174	210	214	222	222	218	243	251	260	265	290	293	328	331	363	348	382	370	397
GWPb	kg CO_2-eq.	0.077	0.0801	0.0889	0.0891	0.094	0.0932	0.104	0.1	0.105	0.109	0.109	0.115	0.117	0.124	0.126	0.245	0.131	0.14	0.137	0.268
GWPluluc	kg CO_2-eq.	0.0155	0.0158	0.0182	0.0189	0.0173	0.018	0.0149	0.018	0.0172	0.0165	0.0175	0.0177	0.0183	0.0182	0.0189	0.0173	0.0193	0.0198	0.0199	0.0176
ODP	kg CFC11-eq.	2.40E-07	2.42E-07	2.50E-07	2.52E-07	2.51E-07	2.53E-07	2.44E-07	2.58E-07	2.59E-07	2.58E-07	2.61E-07	2.60E-07	2.68E-07	2.60E-07	2.69E-07	2.85E-07	2.72E-07	2.71E-07	2.74E-07	2.88E-07
AP	Mole of H+ eq.	0.325	0.342	0.405	0.413	0.424	0.425	0.415	0.46	0.474	0.487	0.498	0.537	0.544	0.598	0.607	0.656	0.635	0.691	0.672	0.712
EPfw	kg P eq.	0.00277	0.0028	0.0029	0.00293	0.00287	0.0029	0.00293	0.0029	0.00291	0.00283	0.0029	0.00279	0.00293	0.00266	0.0028	0.00302	0.0028	0.0027	0.0028	0.00295
EPm	kg N eq.	0.125	0.132	0.157	0.16	0.165	0.165	0.163	0.179	0.185	0.191	0.195	0.21	0.213	0.235	0.238	0.263	0.249	0.272	0.265	0.286
EPt	Mole of N eq.	1.41	1.49	1.77	1.81	1.86	1.86	1.84	2.02	2.09	2.15	2.2	2.38	2.41	2.66	2.7	2.94	2.82	3.08	2.99	3.2
POCP	kg NMVOC eq.	0.36	0.38	0.448	0.456	0.469	0.47	0.461	0.509	0.523	0.538	0.55	0.593	0.601	0.66	0.67	0.725	0.7	0.761	0.741	0.786
ADPmm*	kg Sb-eq.	7.72E-05	8.01E-05	9.10E-05	9.26E-05	9.35E-05	9.39E-05	4.67E-05	9.87E-05	1.01E-04	9.05E-05	1.04E-04	1.08E-04	1.09E-04	1.15E-04	1.18E-04	5.03E-05	1.22E-04	1.29E-04	1.28E-04	4.95E-05
ADPf*	MJ	745	783	922	938	962	965	862	1,040	1,070	1,080	1,130	1,220	1,230	1,350	1,370	1,400	1,430	1,560	1,520	1,520
WDP	m³ world equiv.	11.6	12.2	14.2	14.4	14.8	14.8	13.9	15.9	16.3	16.6	17.1	18.4	18.5	20.3	20.6	21.4	21.5	23.3	22.7	23.2
Resource Use																					
PERE	MJ	189	201	242	246	255	255	238	279	288	296	305	333	335	376	380	395	398	438	424	432
PERM	MJ	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
PERT	MJ	189	201	242	246	255	255	238	279	288	296	305	333	335	376	380	395	398	438	424	432
PENRE	MJ	718	755	887	903	926	928	862	1,000	1,030	1,050	1,080	1,170	1,180	1,300	1,320	1,390	1,370	1,490	1,450	1,500
PENRM	MJ	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
PENRT	MJ	718	755	887	903	926	928	862	1,000	1,030	1,050	1,080	1,170	1,180	1,300	1,320	1,390	1,370	1,490	1,450	1,500
SM	kg	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
RSF	MJ	145	154	188	192	200	200	200	220	227	237	241	265	267	301	304	337	320	353	341	371
NRSF	MJ	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
FW	m³	3.22	3.29	3.54	3.58	3.56	3.58	3.61	3.61	3.66	3.57	3.69	3.59	3.75	3.52	3.7	4.1	3.73	3.74	3.8	4.12
Waste Categories and Output Flows																					
HWD	kg	0.299	0.303	0.317	0.32	0.313	0.317	0.322	0.317	0.318	0.308	0.317	0.302	0.32	0.285	0.304	0.334	0.303	0.292	0.303	0.325
NHWD	kg	11.7	11.9	12.4	12.6	12.3	12.4	12	12.5	12.5	12.1	12.5	12.1	12.7	11.6	12.2	12.4	12.2	11.9	12.3	12
RWD	kg	0.00171	0.00181	0.00221	0.00227	0.00234	0.00235	1.29E-04	0.00256	0.00264	0.00223	0.00281	0.00308	0.00302	0.00349	0.00352	0.00196	0.00371	0.00408	0.00395	0.0022
CRU	kg	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
MFR	kg	0.00492	0.00506	0.00553	0.0056	0.00563	0.00566	0.00568	0.00589	0.00598	0.00602	0.00613	0.00629	0.00645	0.00657	0.00674	0.00733	0.00691	0.0072	0.00715	0.00764
MER	kg	1.01E-05	1.03E-05	1.08E-05	1.09E-05	1.06E-05	1.08E-05	1.10E-05	1.08E-05	1.09E-05	1.06E-05	1.08E-05	1.05E-05	1.10E-05	1.00E-05	1.06E-05	1.15E-05	1.06E-05	1.03E-05	1.07E-05	1.13E-05
EEE	MJ	0.0428	0.0434	0.0456	0.0462	0.0451	0.0456	0.0467	0.0453	0.0456	0.0437	0.0452	0.0425	0.0454	0.0394	0.0425	0.0474	0.0422	0.0402	0.0421	0.0457
EET	MJ	0.0162	0.0164	0.017	0.0172	0.0168	0.017	0.0172	0.0172	0.0173	0.0171	0.0173	0.0171	0.0178	0.0168	0.0175	0.0185	0.0176	0.0173	0.0177	0.0184
Biogenic Carbon Content																					
BCC-prod	kg	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
BCC-pack	kg	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Additional Environmental Impacts																					
PM	Disease incidences	2.93E-06	3.06E-06	3.50E-06	3.55E-06	3.60E-06	3.62E-06	3.65E-06	3.85E-06	3.94E-06	4.01E-06	4.09E-06	4.30E-06	4.40E-06	4.65E-06	4.76E-06	5.24E-06	4.93E-06	5.26E-06	5.17E-06	5.58E-06
IRP***	kBq U235 eq.	0.507	0.515	0.541	0.547	0.535	0.541	0.552	0.54	0.544	0.525	0.541	0.514	0.547	0.485	0.519	0.574	0.517	0.498	0.518	0.559
ETP-fw*	CTUe	518	548	654	666	686	687	690	749	772	802	814	885	895	994	1,010	1,110	1,050	1,150	1,120	1,210
HTPc*	CTUh	1.08E-08	1.11E-08	1.22E-08	1.23E-08	1.24E-08	1.24E-08	1.25E-08	1.29E-08	1.31E-08	1.31E-08	1.34E-08	1.36E-08	1.41E-08	1.41E-08	1.46E-08	1.61E-08	1.50E-08	1.55E-08	1.55E-08	1.67E-08
HTPnc*	CTUh	3.32E-07	3.47E-07	4.02E-07	4.08E-07	4.17E-07	4.18E-07	4.20E-07	4.49E-07	4.60E-07	4.73E-07	4.81E-07	5.12E-07	5.21E-07	5.62E-07	5.72E-07	6.30E-07	5.96E-07	6.42E-07	6.28E-07	6.78E-07
SQP*	Pt	286	289	301	304	299	302	304	306	308	305	309	307	317	305	315	333	318	316	321	333
GWP-GHG**	kg CO_2-eq.	164	174	210	214	222	222	218	243	251	260	265	290	293	328	331	363	348	382	370	397

* Refer to footnote on page 24 ** Refer to footnote on page 25 *** Refer to footnote on page 25

RESULTS FOR MASTERTON | MODULES A1-A3 Impacts per 1 m³ of Ready-Mix Concrete

Mix ID		1019	1013	1519	1513	1719	1713	2019	2013	2013KM	2519	2513	3019	3013	3519	3513	4019	4013	4519	5019	5013
EPD Registration No.		S-P-09359-165	S-P-09359-166	S-P-09359-167	S-P-09359-168	S-P-09359-169	S-P-09359-170	S-P-09359-171	S-P-09359-172	S-P-09359-173	S-P-09359-174	S-P-09359-175	S-P-09359-176	S-P-09359-177	S-P-09359-178	S-P-09359-179	S-P-09359-180	S-P-09359-181	S-P-09359-182	S-P-09359-183	S-P-09359-184
Core Environmental impacts (EN15804+A2)																					
GWPt	kg CO_2-eq.	152	157	168	168	203	207	207	212	197	220	236	245	252	269	276	304	313	332	360	368
GWPf	kg CO_2-eq.	152	156	168	168	203	207	207	212	196	220	236	244	252	269	276	303	312	331	359	367
GWPb	kg CO_2-eq.	0.0689	0.0702	0.0936	0.0935	0.0806	0.0833	0.084	0.0853	0.118	0.0891	0.0943	0.0958	0.0985	0.132	0.105	0.112	0.114	0.119	0.126	0.129
GWPluluc	kg CO_2-eq.	0.0162	0.0164	0.0143	0.0142	0.0183	0.0181	0.0173	0.0176	0.0157	0.0166	0.0175	0.0175	0.0181	0.0148	0.0191	0.0197	0.02	0.0205	0.0216	0.0223
ODP	kg CFC11-eq.	2.31E-07	2.34E-07	2.37E-07	2.36E-07	2.50E-07	2.54E-07	2.52E-07	2.55E-07	2.41E-07	2.54E-07	2.66E-07	2.67E-07	2.73E-07	2.80E-07	2.85E-07	2.93E-07	2.98E-07	3.03E-07	3.16E-07	3.24E-07
AP	Mole of H+ eq.	0.307	0.314	0.33	0.33	0.393	0.401	0.399	0.409	0.38	0.42	0.451	0.464	0.478	0.5	0.52	0.565	0.581	0.613	0.662	0.678
EPfw	kg P eq.	0.00271	0.00274	0.00272	0.00271	0.0027	0.00276	0.0027	0.00273	0.00285	0.00267	0.00279	0.00271	0.0028	0.00273	0.00286	0.00278	0.0028	0.00277	0.00283	0.00294
EPm	kg N eq.	0.118	0.121	0.129	0.129	0.152	0.156	0.155	0.159	0.149	0.163	0.175	0.181	0.186	0.198	0.203	0.221	0.227	0.24	0.26	0.266
EPt	Mole of N eq.	1.33	1.36	1.45	1.45	1.72	1.75	1.75	1.79	1.67	1.84	1.98	2.04	2.1	2.23	2.29	2.5	2.57	2.71	2.93	3
POCP	kg NMVOC eq.	0.339	0.348	0.367	0.367	0.435	0.444	0.442	0.452	0.422	0.466	0.499	0.513	0.529	0.556	0.576	0.626	0.643	0.679	0.733	0.751
ADPmm*	kg Sb-eq.	8.07E-05	8.29E-05	4.33E-05	4.31E-05	9.67E-05	9.91E-05	9.71E-05	1.00E-04	4.73E-05	1.01E-04	1.09E-04	1.10E-04	1.14E-04	4.85E-05	1.23E-04	1.30E-04	1.33E-04	1.38E-04	1.48E-04	1.53E-04
ADPf*	MJ	709	727	700	700	910	928	923	945	811	974	1,040	1,070	1,110	1,050	1,200	1,310	1,350	1,420	1,530	1,570
WDP	m³ world equiv.	11	11.2	11.2	11.2	13.7	13.9	13.9	14.2	12.7	14.5	15.5	15.9	16.3	16.2	17.6	19.1	19.6	20.6	22.1	22.6
Resource Use																					
PERE	MJ	174	179	181	181	231	236	236	241	211	250	268	278	286	287	313	345	355	376	408	417
PERM	MJ	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
PERT	MJ	174	179	181	181	231	236	236	241	211	250	268	278	286	287	313	345	355	376	408	417
PENRE	MJ	680	697	698	698	870	887	884	904	807	931	996	1,030	1,060	1,050	1,150	1,250	1,280	1,350	1,460	1,500
PENRM	MJ	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
PENRT	MJ	680	697	698	698	870	887	884	904	807	931	996	1,030	1,060	1,050	1,150	1,250	1,280	1,350	1,460	1,500
SM	kg	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
RSF	MJ	134	137	152	152	181	185	185	189	178	197	211	220	226	248	248	274	283	300	326	334
NRSF	MJ	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
FW	m³	3.28	3.32	3.27	3.26	3.32	3.41	3.32	3.36	3.45	3.27	3.46	3.35	3.49	3.37	3.56	3.46	3.5	3.48	3.56	3.72
Waste Categories and Output Flows																					
HWD	kg	0.308	0.312	0.31	0.309	0.307	0.315	0.307	0.311	0.327	0.303	0.319	0.309	0.321	0.313	0.328	0.318	0.32	0.317	0.325	0.339
NHWD	kg	11.5	11.7	11.1	11	11.6	11.9	11.6	11.7	11.7	11.5	12.1	11.7	12.2	11	12.4	12.1	12.3	12.2	12.5	13
RWD	kg	0.00187	0.00194	3.15E-04	3.15E-04	0.00252	0.00257	0.00253	0.00263	6.20E-04	0.00272	0.00293	0.00305	0.00313	4.20E-04	0.00344	0.00379	0.00391	0.00414	0.0045	0.0046
CRU	kg	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
MFR	kg	0.00446	0.00454	0.00469	0.00468	0.00502	0.00512	0.00506	0.00514	0.00509	0.00517	0.00546	0.00549	0.00565	0.00585	0.00596	0.0062	0.00631	0.0065	0.00686	0.00705
MER	kg	1.00E-05	1.02E-05	1.03E-05	1.03E-05	1.07E-05	1.10E-05	1.07E-05	1.09E-05	1.13E-05	1.07E-05	1.14E-05	1.12E-05	1.17E-05	1.18E-05	1.22E-05	1.23E-05	1.24E-05	1.26E-05	1.32E-05	1.37E-05
EEE	MJ	0.0452	0.0458	0.0451	0.0449	0.044	0.0452	0.0438	0.0444	0.0475	0.0428	0.0453	0.0433	0.0453	0.0433	0.0458	0.0434	0.0437	0.0428	0.0434	0.0457
EET	MJ	0.0153	0.0155	0.0161	0.0161	0.0173	0.0177	0.0174	0.0177	0.0177	0.0178	0.0189	0.0189	0.0196	0.0203	0.0207	0.0215	0.022	0.0226	0.0239	0.0247
Biogenic Carbon Content																					
BCC-prod	kg	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
BCC-pack	kg	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Additional Environmental Impacts																					
PM	Disease incidences	2.82E-06	2.88E-06	3.05E-06	3.05E-06	3.39E-06	3.47E-06	3.43E-06	3.50E-06	3.44E-06	3.56E-06	3.81E-06	3.87E-06	3.99E-06	4.23E-06	4.29E-06	4.57E-06	4.67E-06	4.88E-06	5.22E-06	5.37E-06
IRP***	kBq U235 eq.	0.53	0.537	0.531	0.529	0.523	0.536	0.521	0.527	0.56	0.511	0.54	0.52	0.541	0.523	0.55	0.528	0.532	0.524	0.533	0.559
ETP-fw*	CTUe	481	493	540	540	631	644	643	658	625	680	730	754	777	847	849	930	957	1,010	1,100	1,120
HTPc*	CTUh	1.05E-08	1.07E-08	1.11E-08	1.11E-08	1.19E-08	1.21E-08	1.20E-08	1.22E-08	1.21E-08	1.22E-08	1.30E-08	1.30E-08	1.34E-08	1.38E-08	1.42E-08	1.47E-08	1.50E-08	1.54E-08	1.63E-08	1.68E-08
HTPnc*	CTUh	3.12E-07	3.19E-07	3.42E-07	3.42E-07	3.90E-07	3.98E-07	3.96E-07	4.04E-07	3.89E-07	4.14E-07	4.43E-07	4.54E-07	4.68E-07	5.02E-07	5.07E-07	5.47E-07	5.61E-07	5.89E-07	6.34E-07	6.50E-07
SQP*	Pt	387	390	393	393	397	401	397	400	407	398	409	407	413	415	422	424	427	429	439	447
GWP-GHG**	kg CO_2-eq.	152	156	168	168	203	207	207	212	196	220	236	244	252	269	276	303	312	331	359	367

* Refer to footnote on page 24 ** Refer to footnote on page 25 *** Refer to footnote on page 25

RESULTS FOR MARTON | MODULES A1-A3 Impacts per 1 m³ of Ready-Mix Concrete

Mix ID		1019	1519	1719	1713	2013	2019	2519	2513	2519RM	3013	3019	3513	3519	4013	4019	5019
EPD Registration No.		S-P-09359-185	S-P-09359-186	S-P-09359-187	S-P-09359-188	S-P-09359-189	S-P-09359-190	S-P-09359-191	S-P-09359-192	S-P-09359-193	S-P-09359-194	S-P-09359-195	S-P-09359-196	S-P-09359-197	S-P-09359-198	S-P-09359-199	S-P-09359-200
Core Environmental impacts (EN15804+A2)																	
GWPt	kg CO_2-eq.	189	209	222	230	238	231	264	271	268	288	280	313	305	366	355	458
GWPf	kg CO_2-eq.	188	209	222	229	238	230	263	271	267	287	280	312	305	366	354	457
GWPb	kg CO_2-eq.	0.126	0.132	0.136	0.135	0.138	0.139	0.151	0.15	0.152	0.156	0.156	0.164	0.165	0.181	0.18	0.212
GWPluluc	kg CO_2-eq.	0.0274	0.0284	0.0289	0.0288	0.0294	0.0294	0.0307	0.0306	0.0309	0.0316	0.0316	0.0329	0.033	0.0358	0.0356	0.0408
ODP	kg CFC11-eq.	5.86E-07	6.04E-07	6.14E-07	6.09E-07	6.19E-07	6.24E-07	6.54E-07	6.48E-07	6.57E-07	6.65E-07	6.71E-07	6.89E-07	6.94E-07	7.36E-07	7.38E-07	8.22E-07
AP	Mole of H+ eq.	0.436	0.473	0.498	0.509	0.524	0.513	0.574	0.585	0.581	0.615	0.604	0.661	0.65	0.758	0.74	0.926
EPfw	kg P eq.	0.00542	0.00551	0.00557	0.00547	0.00554	0.00564	0.00582	0.00572	0.00584	0.00582	0.00592	0.00597	0.00606	0.00624	0.00632	0.00678
EPm	kg N eq.	0.167	0.181	0.191	0.195	0.201	0.197	0.221	0.225	0.224	0.237	0.233	0.255	0.251	0.294	0.287	0.36
EPt	Mole of N eq.	1.86	2.02	2.13	2.18	2.25	2.2	2.47	2.52	2.5	2.66	2.6	2.86	2.81	3.3	3.21	4.04
POCP	kg NMVOC eq.	0.508	0.549	0.576	0.588	0.605	0.594	0.661	0.673	0.67	0.707	0.696	0.759	0.747	0.868	0.848	1.06
ADPmm*	kg Sb-eq.	1.37E-04	1.44E-04	1.58E-04	1.59E-04	1.63E-04	1.61E-04	1.75E-04	1.77E-04	1.77E-04	1.84E-04	1.82E-04	1.94E-04	1.92E-04	2.16E-04	2.13E-04	2.54E-04
ADPf*	MJ	1,080	1,170	1,240	1,260	1,300	1,280	1,420	1,440	1,440	1,520	1,490	1,620	1,600	1,850	1,810	2,250
WDP	m³ world equiv.	13.9	15	15.8	16.2	16.7	16.3	18.1	18.5	18.4	19.4	19.1	20.8	20.4	23.8	23.2	28.8
Resource Use																	
PERE	MJ	194	217	234	243	252	243	279	288	284	307	298	334	325	394	380	494
PERM	MJ	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
PERT	MJ	194	217	234	243	252	243	279	288	284	307	298	334	325	394	380	494
PENRE	MJ	1,060	1,140	1,200	1,220	1,260	1,240	1,370	1,390	1,390	1,460	1,440	1,570	1,540	1,790	1,750	2,170
PENRM	MJ	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
PENRT	MJ	1,060	1,140	1,200	1,220	1,260	1,240	1,370	1,390	1,390	1,460	1,440	1,570	1,540	1,790	1,750	2,170
SM	kg	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
RSF	MJ	150	168	179	187	194	187	217	224	221	239	232	262	254	310	299	392
NRSF	MJ	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
FW	m³	3.79	3.85	3.9	3.92	3.95	3.93	4.04	4.06	4.06	4.12	4.1	4.21	4.19	4.38	4.35	4.69
Waste Categories and Output Flows																	
HWD	kg	0.572	0.583	0.59	0.583	0.59	0.597	0.618	0.61	0.62	0.622	0.629	0.638	0.645	0.669	0.675	0.729
NHWD	kg	19.5	19.9	20.2	20	20.3	20.5	21.2	21	21.3	21.4	21.6	22	22.2	23.1	23.3	25.3
RWD	kg	0.00178	0.002	0.00252	0.00262	0.00272	0.00262	0.00303	0.00313	0.00308	0.00334	0.00323	0.00364	0.00354	0.00431	0.00416	0.00544
CRU	kg	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
MFR	kg	0.00699	0.00731	0.0075	0.00752	0.00767	0.00765	0.00817	0.0082	0.00824	0.00847	0.00845	0.00887	0.00885	0.00971	0.00963	0.0112
MER	kg	2.67E-05	2.75E-05	2.79E-05	2.78E-05	2.82E-05	2.83E-05	2.97E-05	2.95E-05	2.98E-05	3.02E-05	3.04E-05	3.13E-05	3.14E-05	3.34E-05	3.34E-05	3.72E-05
EEE	MJ	0.0742	0.0753	0.076	0.0749	0.0756	0.0767	0.0788	0.0777	0.079	0.0789	0.08	0.0806	0.0817	0.0837	0.0846	0.0899
EET	MJ	0.0509	0.0526	0.0537	0.0535	0.0544	0.0546	0.0575	0.0574	0.0579	0.0589	0.0591	0.0612	0.0613	0.0659	0.0657	0.0743
Biogenic Carbon Content																	
BCC-prod	kg	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
BCC-pack	kg	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Additional Environmental Impacts																	
PM	Disease incidences	5.05E-06	5.34E-06	5.51E-06	5.55E-06	5.68E-06	5.64E-06	6.12E-06	6.16E-06	6.18E-06	6.41E-06	6.37E-06	6.77E-06	6.73E-06	7.53E-06	7.44E-06	8.87E-06
IRP***	kBq U235 eq.	0.866	0.881	0.89	0.878	0.887	0.9	0.927	0.915	0.93	0.931	0.943	0.952	0.965	0.994	1	1.08
ETP-fw*	CTUe	693	756	795	815	841	821	924	944	937	996	976	1,070	1,050	1,240	1,210	1,520
HTPc*	CTUh	2.07E-08	2.15E-08	2.20E-08	2.20E-08	2.25E-08	2.25E-08	2.39E-08	2.39E-08	2.40E-08	2.46E-08	2.46E-08	2.57E-08	2.57E-08	2.80E-08	2.78E-08	3.20E-08
HTPnc*	CTUh	5.16E-07	5.52E-07	5.74E-07	5.83E-07	5.99E-07	5.90E-07	6.49E-07	6.58E-07	6.56E-07	6.88E-07	6.79E-07	7.33E-07	7.24E-07	8.29E-07	8.12E-07	9.93E-07
SQP*	Pt	832	846	855	840	850	865	892	876	894	892	907	913	928	954	966	1,030
GWP-GHG**	kg CO_2-eq.	188	209	222	229	238	230	263	271	267	287	280	312	305	366	354	457

* Refer to footnote on page 24 ** Refer to footnote on page 25 *** Refer to footnote on page 25

RESULTS FOR DANNEVIRKE & PAHIATUA | MODULES A1-A3 Impacts per 1 m³ of Ready-Mix Concrete

Mix ID		1019	1013	1519	1513	1719	1713	2019	2013	2013KM	2519	2513	3019	3013	3519	3513	4019	4013	5019
EPD Registration No.		S-P-09359-201	S-P-09359-202	S-P-09359-203	S-P-09359-204	S-P-09359-205	S-P-09359-206	S-P-09359-207	S-P-09359-208	S-P-09359-209	S-P-09359-210	S-P-09359-211	S-P-09359-212	S-P-09359-213	S-P-09359-214	S-P-09359-215	S-P-09359-216	S-P-09359-217	S-P-09359-218
Core Environmental impacts (EN15804+A2)																			
GWPt	kg CO_2-eq.	174	178	190	198	210	218	222	230	229	250	263	270	279	295	307	335	348	417
GWPf	kg CO_2-eq.	173	177	189	198	209	218	221	230	229	250	262	270	279	294	307	335	347	416
GWPb	kg CO_2-eq.	0.0666	0.0676	0.0708	0.0729	0.0756	0.0788	0.0785	0.0817	0.0865	0.0859	0.0901	0.0912	0.0944	0.0973	0.102	0.108	0.112	0.128
GWPluluc	kg CO_2-eq.	0.0183	0.0184	0.019	0.0194	0.0197	0.0205	0.0202	0.0209	0.0205	0.0215	0.0224	0.0225	0.0232	0.0235	0.0244	0.0252	0.0262	0.0293
ODP	kg CFC11-eq.	3.46E-07	3.49E-07	3.59E-07	3.65E-07	3.72E-07	3.83E-07	3.81E-07	3.92E-07	3.91E-07	4.04E-07	4.19E-07	4.22E-07	4.33E-07	4.40E-07	4.54E-07	4.71E-07	4.85E-07	5.37E-07
AP	Mole of H+ eq.	0.361	0.368	0.39	0.404	0.424	0.441	0.445	0.462	0.462	0.496	0.52	0.532	0.549	0.575	0.599	0.646	0.67	0.792
EPfw	kg P eq.	0.00297	0.00297	0.003	0.00302	0.003	0.00312	0.003	0.00312	0.00327	0.00308	0.00321	0.00314	0.00326	0.00318	0.00331	0.00325	0.00338	0.00348
EPm	kg N eq.	0.139	0.141	0.15	0.156	0.164	0.17	0.172	0.179	0.179	0.192	0.202	0.207	0.213	0.224	0.233	0.252	0.262	0.31
EPt	Mole of N eq.	1.56	1.59	1.69	1.75	1.84	1.92	1.94	2.01	2.01	2.16	2.27	2.33	2.4	2.52	2.62	2.84	2.95	3.49
POCP	kg NMVOC eq.	0.408	0.416	0.44	0.456	0.479	0.498	0.502	0.521	0.521	0.559	0.586	0.6	0.619	0.648	0.675	0.728	0.755	0.891
ADPmm*	kg Sb-eq.	1.06E-04	1.07E-04	1.12E-04	1.15E-04	1.19E-04	1.24E-04	1.23E-04	1.29E-04	1.12E-04	1.35E-04	1.42E-04	1.43E-04	1.48E-04	1.52E-04	1.59E-04	1.68E-04	1.75E-04	2.06E-04
ADPf*	MJ	865	881	933	967	1,010	1,050	1,060	1,100	1,070	1,190	1,240	1,270	1,310	1,370	1,430	1,540	1,600	1,900
WDP	m³ world equiv.	12.2	12.4	13	13.5	14.1	14.6	14.7	15.2	14.9	16.3	17	17.4	17.9	18.7	19.4	20.9	21.6	25.4
Resource Use																			
PERE	MJ	192	196	210	219	232	241	245	255	248	277	290	299	308	326	340	371	384	462
PERM	MJ	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
PERT	MJ	192	196	210	219	232	241	245	255	248	277	290	299	308	326	340	371	384	462
PENRE	MJ	832	848	897	930	976	1,010	1,020	1,060	1,040	1,140	1,190	1,220	1,260	1,320	1,370	1,480	1,530	1,810
PENRM	MJ	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
PENRT	MJ	832	848	897	930	976	1,010	1,020	1,060	1,040	1,140	1,190	1,220	1,260	1,320	1,370	1,480	1,530	1,810
SM	kg	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
RSF	MJ	147	151	162	169	180	188	191	199	199	217	228	236	243	258	269	294	305	368
NRSF	MJ	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
FW	m³	3.41	3.41	3.43	3.44	3.41	3.56	3.39	3.54	3.64	3.42	3.58	3.45	3.61	3.46	3.62	3.48	3.64	3.64
Waste Categories and Output Flows																			
HWD	kg	0.37	0.371	0.375	0.377	0.376	0.392	0.376	0.392	0.41	0.386	0.404	0.394	0.411	0.4	0.417	0.41	0.428	0.441
NHWD	kg	13.6	13.6	13.8	13.9	13.8	14.4	13.9	14.4	14.8	14.2	14.9	14.6	15.1	14.8	15.4	15.2	15.8	16.4
RWD	kg	0.00205	0.0021	0.00226	0.00236	0.00251	0.00261	0.00266	0.00276	0.00188	0.00301	0.00316	0.00326	0.00337	0.00356	0.00372	0.00407	0.00422	0.00532
CRU	kg	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
MFR	kg	0.00531	0.00536	0.00554	0.00565	0.00577	0.00598	0.00591	0.00612	0.00624	0.00631	0.00658	0.00661	0.00682	0.00693	0.0072	0.00747	0.00773	0.00862
MER	kg	1.55E-05	1.56E-05	1.60E-05	1.63E-05	1.66E-05	1.73E-05	1.69E-05	1.76E-05	1.82E-05	1.79E-05	1.88E-05	1.87E-05	1.94E-05	1.95E-05	2.04E-05	2.09E-05	2.17E-05	2.39E-05
EEE	MJ	0.0503	0.0503	0.0506	0.0506	0.0498	0.0522	0.0494	0.0518	0.0547	0.0498	0.0524	0.0503	0.0528	0.0502	0.0527	0.0503	0.0528	0.0522
EET	MJ	0.0285	0.0288	0.03	0.0307	0.0315	0.0327	0.0325	0.0336	0.0344	0.0351	0.0366	0.037	0.0382	0.0391	0.0406	0.0427	0.0442	0.0501
Biogenic Carbon Content																			
BCC-prod	kg	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
BCC-pack	kg	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Additional Environmental Impacts																			
PM	Disease incidences	3.54E-06	3.59E-06	3.76E-06	3.86E-06	4.00E-06	4.16E-06	4.14E-06	4.30E-06	4.38E-06	4.52E-06	4.74E-06	4.80E-06	4.96E-06	5.11E-06	5.33E-06	5.64E-06	5.85E-06	6.73E-06
IRP***	kBq U235 eq.	0.594	0.594	0.599	0.6	0.593	0.62	0.59	0.617	0.649	0.599	0.628	0.608	0.635	0.61	0.639	0.616	0.645	0.648
ETP-fw*	CTUe	578	590	628	653	689	715	726	752	756	814	853	877	903	951	991	1,080	1,120	1,330
HTPc*	CTUh	1.37E-08	1.38E-08	1.43E-08	1.46E-08	1.49E-08	1.55E-08	1.53E-08	1.59E-08	1.62E-08	1.64E-08	1.71E-08	1.72E-08	1.78E-08	1.80E-08	1.88E-08	1.95E-08	2.03E-08	2.26E-08
HTPnc*	CTUh	3.98E-07	4.04E-07	4.26E-07	4.40E-07	4.60E-07	4.78E-07	4.80E-07	4.98E-07	5.03E-07	5.31E-07	5.56E-07	5.67E-07	5.85E-07	6.09E-07	6.34E-07	6.80E-07	7.05E-07	8.23E-07
SQP*	Pt	531	532	538	541	542	552	546	555	568	560	571	570	580	580	591	596	608	634
GWP-GHG**	kg CO_2-eq.	173	177	190	198	209	218	222	230	229	250	262	270	279	294	307	335	347	416

* Refer to footnote on page 24 ** Refer to footnote on page 25 *** Refer to footnote on page 25

RESULTS FOR HASTINGS | MODULES A1-A3 Impacts per 1 m³ of Ready-Mix Concrete

Mix ID		1013	1019	1513	1519	1719	2013	2019	2019RM	2013KM	2019KM	2513	2519	2519RM	3013	3019	3513	3519	4013	4019	4513	4519	5019	5013	5013SC
EPD Registration No.		S-P-09359-219	S-P-09359-220	S-P-09359-221	S-P-09359-222	S-P-09359-223	S-P-09359-224	S-P-09359-225	S-P-09359-226	S-P-09359-227	S-P-09359-228	S-P-09359-229	S-P-09359-230	S-P-09359-231	S-P-09359-232	S-P-09359-233	S-P-09359-234	S-P-09359-235	S-P-09359-236	S-P-09359-237	S-P-09359-238	S-P-09359-239	S-P-09359-240	S-P-09359-241	S-P-09359-242
Core Environmental impacts (EN15804+A2)																									
GWPt	kg CO_2-eq.	180	180	203	203	224	243	231	239	225	225	262	247	254	277	265	300	288	343	323	350	342	392	388	399
GWPf	kg CO_2-eq.	180	180	203	203	223	242	231	238	224	225	262	246	254	277	265	300	288	342	323	350	342	391	388	398
GWPb	kg CO_2-eq.	0.39	0.389	0.396	0.395	0.401	0.407	0.403	0.405	0.104	0.107	0.414	0.409	0.411	0.113	0.109	0.119	0.115	0.13	0.124	0.131	0.128	0.139	0.139	0.182
GWPluluc	kg CO_2-eq.	0.0225	0.0221	0.023	0.0226	0.023	0.0236	0.023	0.0231	0.0193	0.0187	0.023	0.0223	0.0225	0.0207	0.0201	0.021	0.0204	0.0219	0.0211	0.0218	0.0212	0.0241	0.0244	0.028
ODP	kg CFC11-eq.	3.18E-07	3.13E-07	3.19E-07	3.14E-07	3.19E-07	3.23E-07	3.18E-07	3.18E-07	3.22E-07	3.30E-07	3.25E-07	3.20E-07	3.20E-07	3.30E-07	3.25E-07	3.28E-07	3.24E-07	3.30E-07	3.25E-07	3.28E-07	3.23E-07	3.68E-07	3.72E-07	1.30E-06
AP	Mole of H+ eq.	0.36	0.358	0.397	0.394	0.429	0.461	0.44	0.452	0.429	0.433	0.492	0.465	0.477	0.515	0.494	0.55	0.529	0.617	0.584	0.627	0.612	0.7	0.696	0.755
EPfw	kg P eq.	0.00346	0.00335	0.00343	0.00333	0.00338	0.00341	0.00333	0.00331	0.00347	0.00358	0.00339	0.00331	0.0033	0.00337	0.00329	0.00329	0.00321	0.00323	0.00315	0.00314	0.00305	0.00319	0.00329	0.0062
EPm	kg N eq.	0.137	0.136	0.152	0.151	0.165	0.178	0.17	0.174	0.169	0.17	0.19	0.18	0.185	0.203	0.195	0.217	0.209	0.245	0.232	0.249	0.243	0.278	0.277	0.288
EPt	Mole of N eq.	1.52	1.51	1.69	1.68	1.83	1.98	1.89	1.94	1.9	1.91	2.12	2	2.06	2.29	2.19	2.45	2.36	2.77	2.61	2.81	2.75	3.14	3.12	3.25
POCP	kg NMVOC eq.	0.4	0.397	0.44	0.437	0.476	0.511	0.488	0.501	0.486	0.49	0.545	0.516	0.529	0.58	0.557	0.619	0.596	0.694	0.657	0.705	0.688	0.788	0.784	0.824
ADPmm*	kg Sb-eq.	9.82E-05	9.61E-05	1.03E-04	1.01E-04	1.15E-04	1.22E-04	1.17E-04	1.18E-04	9.40E-05	9.63E-05	1.27E-04	1.21E-04	1.23E-04	1.35E-04	1.30E-04	1.40E-04	1.35E-04	1.51E-04	1.44E-04	1.51E-04	1.47E-04	1.78E-04	1.79E-04	2.39E-04
ADPf*	MJ	1,160	1,150	1,240	1,240	1,330	1,400	1,360	1,390	992	1,000	1,480	1,420	1,440	1,240	1,190	1,320	1,280	1,480	1,400	1,500	1,470	1,710	1,690	1,700
WDP	m³ world equiv.	15.2	15.2	16.5	16.4	17.6	18.7	18	18.4	16	16	19.7	18.8	19.2	19.2	18.5	20.4	19.7	22.7	21.6	23	22.6	25.4	25.3	29.8
Resource Use																									
PERE	MJ	196	195	222	222	247	269	256	264	245	245	291	273	282	313	299	340	326	388	366	397	388	446	442	420
PERM	MJ	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
PERT	MJ	196	195	222	222	247	269	256	264	245	245	291	273	282	313	299	340	326	388	366	397	388	446	442	420
PENRE	MJ	1,040	1,030	1,120	1,110	1,200	1,270	1,220	1,250	970	978	1,330	1,280	1,300	1,190	1,140	1,260	1,220	1,410	1,340	1,440	1,400	1,620	1,610	1,670
PENRM	MJ	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	37.5
PENRT	MJ	1,040	1,030	1,120	1,110	1,200	1,270	1,220	1,250	970	978	1,330	1,280	1,300	1,190	1,140	1,260	1,220	1,410	1,340	1,440	1,400	1,620	1,610	1,700
SM	kg	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	50	50	80
RSF	MJ	140	140	162	162	180	199	188	195	199	199	217	202	210	247	236	269	258	309	291	316	309	353	350	361
NRSF	MJ	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
FW	m³	4.31	4.16	4.34	4.2	4.28	4.41	4.25	4.25	4.37	4.46	4.42	4.26	4.27	4.43	4.28	4.42	4.26	4.46	4.29	4.4	4.25	4.31	4.44	4.73
Waste Categories and Output Flows																									
HWD	kg	0.388	0.375	0.385	0.371	0.377	0.382	0.371	0.368	0.389	0.403	0.379	0.368	0.367	0.376	0.365	0.366	0.355	0.358	0.348	0.347	0.335	0.353	0.366	0.684
NHWD	kg	14.4	13.9	14.3	13.8	14.2	14.4	14	13.9	14.1	14.6	14.3	13.9	13.9	14.1	13.7	13.9	13.5	13.7	13.3	13.4	12.9	13.7	14.2	25.8
RWD	kg	0.00639	0.00639	0.00664	0.00664	0.00724	0.0075	0.00734	0.00744	0.00145	0.00145	0.00774	0.00754	0.00764	0.00341	0.00326	0.00371	0.00356	0.00427	0.00401	0.00437	0.00426	0.00536	0.00531	2.31E-04
CRU	kg	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
MFR	kg	0.00488	0.00478	0.00502	0.00493	0.00511	0.00529	0.00512	0.00516	0.00536	0.00547	0.00541	0.00522	0.00527	0.00565	0.00548	0.00575	0.00558	0.006	0.00578	0.00598	0.00583	0.00639	0.00645	0.00896
MER	kg	1.58E-05	1.54E-05	1.57E-05	1.53E-05	1.56E-05	1.57E-05	1.54E-05	1.53E-05	1.62E-05	1.67E-05	1.56E-05	1.53E-05	1.53E-05	1.57E-05	1.54E-05	1.54E-05	1.51E-05	1.52E-05	1.49E-05	1.48E-05	1.44E-05	1.66E-05	1.70E-05	2.88E-05
EEE	MJ	0.0537	0.0513	0.053	0.0507	0.0514	0.0523	0.0503	0.0499	0.0538	0.0559	0.0516	0.0498	0.0495	0.0513	0.0495	0.0497	0.0477	0.0481	0.0463	0.0463	0.0442	0.0449	0.0472	0.104
EET	MJ	0.0279	0.0275	0.0278	0.0275	0.028	0.028	0.0277	0.0276	0.0289	0.0297	0.0281	0.0278	0.0277	0.0284	0.0281	0.028	0.0277	0.0279	0.0275	0.0273	0.0269	0.0323	0.0327	0.0699
Biogenic Carbon Content																									
BCC-prod	kg	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
BCC-pack	kg	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Additional Environmental Impacts																									
PM	Disease incidences	3.40E-06	3.35E-06	3.63E-06	3.58E-06	3.82E-06	4.04E-06	3.87E-06	3.94E-06	4.09E-06	4.15E-06	4.23E-06	4.03E-06	4.11E-06	4.57E-06	4.40E-06	4.77E-06	4.61E-06	5.19E-06	4.95E-06	5.23E-06	5.10E-06	5.78E-06	5.79E-06	6.58E-06
IRP***	kBq U235 eq.	0.628	0.603	0.623	0.598	0.609	0.619	0.597	0.593	0.636	0.659	0.613	0.593	0.591	0.614	0.593	0.598	0.576	0.584	0.564	0.566	0.543	0.558	0.582	1.17
ETP-fw*	CTUe	543	541	609	608	665	721	686	708	725	728	777	731	753	867	832	932	897	1,050	996	1,070	1,050	1,200	1,190	1,280
HTPc*	CTUh	1.36E-08	1.33E-08	1.40E-08	1.37E-08	1.43E-08	1.48E-08	1.43E-08	1.44E-08	1.50E-08	1.54E-08	1.51E-08	1.46E-08	1.47E-08	1.58E-08	1.53E-08	1.61E-08	1.56E-08	1.68E-08	1.61E-08	1.67E-08	1.62E-08	1.82E-08	1.84E-08	2.75E-08
HTPnc*	CTUh	3.84E-07	3.80E-07	4.15E-07	4.12E-07	4.42E-07	4.70E-07	4.50E-07	4.60E-07	4.74E-07	4.80E-07	4.97E-07	4.72E-07	4.83E-07	5.41E-07	5.22E-07	5.71E-07	5.51E-07	6.28E-07	5.98E-07	6.35E-07	6.21E-07	7.11E-07	7.09E-07	9.25E-07
SQP*	Pt	433	427	435	429	436	441	434	433	448	457	443	436	436	448	442	447	440	449	442	444	437	463	468	511
GWP-GHG**	kg CO_2-eq.	180	180	203	203	223	242	231	238	224	225	262	246	254	277	265	300	288	342	323	350	342	392	388	399

* Refer to footnote on page 24 ** Refer to footnote on page 25 *** Refer to footnote on page 25

RESULTS FOR FEILDING | MODULES A1-A3 Impacts per 1 m³ of Ready-Mix Concrete

Mix ID		1013	1019	1513	1519	1713	1719	2013	2019	2019RM	2013KM	2019KM	2513	2519	2519RM	3013	3019	3513	3519	4013	4019	4513	4519	5013	5019
EPD Registration No.		S-P-09359-243	S-P-09359-244	S-P-09359-245	S-P-09359-246	S-P-09359-247	S-P-09359-248	S-P-09359-249	S-P-09359-250	S-P-09359-251	S-P-09359-252	S-P-09359-253	S-P-09359-254	S-P-09359-255	S-P-09359-256	S-P-09359-257	S-P-09359-258	S-P-09359-259	S-P-09359-260	S-P-09359-261	S-P-09359-262	S-P-09359-263	S-P-09359-264	S-P-09359-265	S-P-09359-266
Core Environmental impacts (EN15804+A2)																									
GWPt	kg CO_2-eq.	194	186	199	191	216	207	231	223	231	229	229	247	243	251	275	263	295	290	346	334	362	354	395	402
GWPf	kg CO_2-eq.	194	186	199	191	215	207	231	223	230	229	229	247	243	251	275	262	294	290	346	334	362	353	394	401
GWPb	kg CO_2-eq.	0.087	0.0848	0.0875	0.0842	0.0934	0.0898	0.0956	0.0925	0.0943	0.105	0.105	0.103	0.101	0.103	0.11	0.105	0.114	0.112	0.128	0.124	0.132	0.128	0.138	0.139
GWPluluc	kg CO_2-eq.	0.0213	0.021	0.0223	0.0215	0.0227	0.0218	0.0235	0.0228	0.023	0.0217	0.0217	0.0233	0.0228	0.0231	0.0243	0.0235	0.025	0.0245	0.027	0.0262	0.0275	0.0268	0.0292	0.0309
ODP	kg CFC11-eq.	3.94E-07	3.90E-07	4.01E-07	3.91E-07	4.15E-07	4.02E-07	4.20E-07	4.11E-07	4.15E-07	4.26E-07	4.26E-07	4.35E-07	4.28E-07	4.33E-07	4.51E-07	4.39E-07	4.62E-07	4.55E-07	4.92E-07	4.81E-07	5.00E-07	4.91E-07	5.20E-07	5.73E-07
AP	Mole of H+ eq.	0.404	0.39	0.415	0.399	0.445	0.427	0.47	0.454	0.467	0.469	0.469	0.5	0.49	0.504	0.548	0.524	0.581	0.572	0.671	0.648	0.698	0.682	0.756	0.776
EPfw	kg P eq.	0.0036	0.00359	0.0037	0.00357	0.00378	0.00362	0.00373	0.00362	0.00361	0.00393	0.00393	0.00381	0.0037	0.00372	0.00382	0.0037	0.00382	0.00372	0.00389	0.00379	0.00388	0.00377	0.00393	0.00411
EPm	kg N eq.	0.156	0.15	0.16	0.153	0.171	0.164	0.182	0.175	0.181	0.182	0.182	0.193	0.19	0.195	0.212	0.203	0.226	0.222	0.262	0.253	0.272	0.266	0.295	0.303
EPt	Mole of N eq.	1.74	1.68	1.79	1.72	1.92	1.85	2.04	1.97	2.03	2.04	2.04	2.17	2.13	2.19	2.39	2.28	2.54	2.5	2.94	2.84	3.07	3	3.32	3.41
POCP	kg NMVOC eq.	0.458	0.442	0.47	0.451	0.503	0.483	0.531	0.513	0.528	0.532	0.532	0.564	0.554	0.569	0.618	0.592	0.655	0.645	0.756	0.73	0.785	0.767	0.849	0.875
ADPmm*	kg Sb-eq.	1.15E-04	1.12E-04	1.26E-04	1.21E-04	1.33E-04	1.27E-04	1.37E-04	1.32E-04	1.35E-04	1.13E-04	1.13E-04	1.44E-04	1.40E-04	1.43E-04	1.53E-04	1.47E-04	1.60E-04	1.57E-04	1.78E-04	1.72E-04	1.84E-04	1.79E-04	2.03E-04	2.16E-04
ADPf*	MJ	960	929	998	960	1,070	1,030	1,130	1,090	1,120	1,080	1,080	1,200	1,180	1,210	1,310	1,260	1,390	1,370	1,600	1,550	1,660	1,630	1,810	1,880
WDP	m³ world equiv.	13.4	13	13.8	13.3	14.7	14.2	15.5	15	15.5	15.1	15.1	16.4	16.1	16.6	17.9	17.2	19	18.7	21.7	21	22.6	22.1	24.5	24.9
Resource Use																									
PERE	MJ	211	202	218	209	236	227	254	244	253	243	243	271	267	276	302	289	325	320	382	369	400	391	438	444
PERM	MJ	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
PERT	MJ	211	202	218	209	236	227	254	244	253	243	243	271	267	276	302	289	325	320	382	369	400	391	438	444
PENRE	MJ	930	900	961	925	1,030	989	1,080	1,050	1,080	1,060	1,060	1,150	1,130	1,160	1,260	1,210	1,330	1,310	1,530	1,480	1,590	1,560	1,730	1,790
PENRM	MJ	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
PENRT	MJ	930	900	961	925	1,030	989	1,080	1,050	1,080	1,060	1,060	1,150	1,130	1,160	1,260	1,210	1,330	1,310	1,530	1,480	1,590	1,560	1,730	1,790
SM	kg	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	50
RSF	MJ	164	157	168	161	183	175	197	190	197	197	197	212	208	216	237	226	256	252	303	292	318	311	347	351
NRSF	MJ	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
FW	m³	3.49	3.44	3.6	3.43	3.67	3.48	3.62	3.46	3.46	3.73	3.73	3.67	3.52	3.54	3.67	3.51	3.67	3.52	3.72	3.57	3.7	3.55	3.74	3.61
Waste Categories and Output Flows																									
HWD	kg	0.418	0.415	0.43	0.414	0.441	0.42	0.434	0.42	0.419	0.459	0.459	0.444	0.43	0.432	0.447	0.431	0.447	0.434	0.456	0.442	0.455	0.44	0.462	0.485
NHWD	kg	15	14.9	15.5	14.9	15.9	15.2	15.7	15.2	15.2	16.2	16.2	16.1	15.6	15.7	16.2	15.6	16.2	15.8	16.6	16.1	16.6	16.1	17	17.8
RWD	kg	0.00194	0.00185	0.00235	0.00225	0.00255	0.00245	0.00275	0.00265	0.00275	0.00144	0.00144	0.00295	0.00289	0.00299	0.00329	0.00314	0.00354	0.00349	0.00419	0.00404	0.00439	0.00429	0.00518	0.00533
CRU	kg	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
MFR	kg	0.00593	0.00583	0.00607	0.00585	0.00633	0.00608	0.00645	0.00626	0.00634	0.00663	0.00663	0.00672	0.00657	0.00667	0.00704	0.0068	0.00727	0.00713	0.00792	0.00768	0.00809	0.00789	0.00849	0.00881
MER	kg	1.90E-05	1.88E-05	1.95E-05	1.88E-05	2.02E-05	1.94E-05	2.02E-05	1.96E-05	1.97E-05	2.12E-05	2.12E-05	2.09E-05	2.04E-05	2.06E-05	2.15E-05	2.08E-05	2.19E-05	2.14E-05	2.32E-05	2.25E-05	2.34E-05	2.29E-05	2.43E-05	2.71E-05
EEE	MJ	0.0555	0.0551	0.0573	0.0547	0.0585	0.0553	0.0569	0.0547	0.0543	0.0607	0.0607	0.058	0.0556	0.0558	0.0575	0.0551	0.0569	0.0547	0.0567	0.0547	0.0561	0.0538	0.0561	0.0571
EET	MJ	0.036	0.0356	0.0367	0.0357	0.0382	0.0369	0.0387	0.0378	0.0382	0.0403	0.0403	0.0403	0.0396	0.0402	0.042	0.0408	0.0432	0.0425	0.0465	0.0455	0.0474	0.0465	0.0496	0.0566
Biogenic Carbon Content																									
BCC-prod	kg	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
BCC-pack	kg	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Additional Environmental Impacts																									
PM	Disease incidences	4.01E-06	3.91E-06	4.10E-06	3.95E-06	4.33E-06	4.16E-06	4.49E-06	4.34E-06	4.43E-06	4.61E-06	4.61E-06	4.72E-06	4.62E-06	4.72E-06	5.05E-06	4.85E-06	5.28E-06	5.18E-06	5.92E-06	5.73E-06	6.10E-06	5.95E-06	6.49E-06	6.78E-06
IRP***	kBq U235 eq.	0.655	0.65	0.675	0.647	0.691	0.655	0.675	0.65	0.647	0.717	0.717	0.689	0.664	0.666	0.687	0.66	0.683	0.659	0.688	0.665	0.683	0.658	0.687	0.703
ETP-fw*	CTUe	653	629	667	641	717	690	763	737	760	770	770	813	799	824	897	859	956	943	1,110	1,080	1,160	1,130	1,260	1,290
HTPc*	CTUh	1.59E-08	1.56E-08	1.63E-08	1.57E-08	1.70E-08	1.63E-08	1.73E-08	1.67E-08	1.69E-08	1.78E-08	1.78E-08	1.80E-08	1.75E-08	1.78E-08	1.88E-08	1.81E-08	1.94E-08	1.89E-08	2.10E-08	2.04E-08	2.14E-08	2.09E-08	2.25E-08	2.39E-08
HTPnc*	CTUh	4.59E-07	4.46E-07	4.69E-07	4.51E-07	4.98E-07	4.79E-07	5.21E-07	5.04E-07	5.17E-07	5.30E-07	5.30E-07	5.51E-07	5.40E-07	5.54E-07	5.96E-07	5.72E-07	6.28E-07	6.18E-07	7.13E-07	6.90E-07	7.38E-07	7.21E-07	7.91E-07	8.29E-07
SQP*	Pt	545	543	552	542	563	550	562	554	555	580	580	573	566	569	581	571	586	579	603	594	607	598	618	643
GWP-GHG**	kg CO_2-eq.	194	186	199	191	215	207	231	223	230	229	229	247	243	251	275	262	294	290	346	334	362	353	394	401

* Refer to footnote on page 24 ** Refer to footnote on page 25 *** Refer to footnote on page 25

RESULTS FOR WELLINGTON | MODULES A1-A3 Impacts per 1 m³ of Ready-Mix Concrete

Mix ID		1019	1519	1719	2019	2519	3019	3519	4019	5019	1013	1513	1713	2013	2013KM	2019KM	2513	2519RM	3013	3513	4013	5013	4013SC	4519	5013SC
EPD Registration No.		S-P-09359-267	S-P-09359-268	S-P-09359-269	S-P-09359-270	S-P-09359-271	S-P-09359-272	S-P-09359-273	S-P-09359-274	S-P-09359-275	S-P-09359-276	S-P-09359-277	S-P-09359-278	S-P-09359-279	S-P-09359-280	S-P-09359-281	S-P-09359-282	S-P-09359-283	S-P-09359-284	S-P-09359-285	S-P-09359-286	S-P-09359-287	S-P-09359-288	S-P-09359-289	S-P-09359-290
Core Environmental impacts (EN15804+A2)																									
GWPt	kg CO_2-eq.	145	167	182	197	219	242	259	301	356	153	175	183	189	214	214	223	226	244	268	305	365	347	334	384
GWPf	kg CO_2-eq.	145	166	182	196	218	242	259	301	355	153	174	183	189	214	213	222	226	244	267	304	364	347	333	383
GWPb	kg CO_2-eq.	0.096	0.105	0.117	0.13	0.0863	0.0987	0.097	0.108	0.228	0.101	0.11	0.112	0.119	0.11	0.0989	0.0889	0.0889	0.0935	0.101	0.11	0.235	0.359	0.116	0.356
GWPluluc	kg CO_2-eq.	0.0129	0.0138	0.0151	0.0153	0.0147	0.0141	0.0158	0.0165	0.0139	0.0137	0.0147	0.0152	0.016	0.0129	0.0124	0.0152	0.0151	0.0155	0.0165	0.0172	0.0147	0.0176	0.0173	0.0185
ODP	kg CFC11-eq.	1.84E-07	1.84E-07	1.90E-07	1.91E-07	1.94E-07	1.99E-07	1.98E-07	2.02E-07	2.07E-07	1.92E-07	1.93E-07	1.90E-07	1.90E-07	1.92E-07	1.92E-07	2.01E-07	1.98E-07	1.98E-07	2.03E-07	2.07E-07	2.18E-07	3.11E-07	2.03E-07	3.13E-07
AP	Mole of H+ eq.	0.28	0.315	0.341	0.364	0.406	0.445	0.474	0.543	0.624	0.296	0.331	0.343	0.352	0.404	0.398	0.416	0.42	0.45	0.491	0.552	0.643	0.623	0.597	0.691
EPfw	kg P eq.	0.00241	0.00234	0.00239	0.00237	0.00237	0.00242	0.00235	0.00228	0.00222	0.00255	0.00249	0.00241	0.00238	0.00258	0.00258	0.00251	0.00243	0.00242	0.00248	0.00241	0.00239	0.00275	0.00222	0.00273
EPm	kg N eq.	0.109	0.124	0.134	0.144	0.158	0.174	0.185	0.213	0.251	0.116	0.13	0.135	0.139	0.157	0.156	0.162	0.164	0.176	0.192	0.216	0.259	0.25	0.235	0.274
EPt	Mole of N eq.	1.23	1.39	1.5	1.61	1.79	1.97	2.09	2.41	2.81	1.29	1.46	1.52	1.56	1.77	1.77	1.83	1.85	1.99	2.17	2.45	2.9	2.75	2.66	3.03
POCP	kg NMVOC eq.	0.308	0.346	0.374	0.4	0.445	0.488	0.519	0.595	0.686	0.325	0.364	0.377	0.387	0.44	0.438	0.456	0.461	0.493	0.538	0.604	0.706	0.674	0.654	0.743
ADPmm*	kg Sb-eq.	3.66E-05	3.56E-05	3.68E-05	3.65E-05	9.36E-05	7.50E-05	1.05E-04	1.14E-04	3.53E-05	3.95E-05	3.86E-05	3.72E-05	3.67E-05	4.12E-05	4.03E-05	9.64E-05	9.70E-05	1.02E-04	1.09E-04	1.19E-04	3.88E-05	5.79E-05	1.24E-04	5.89E-05
ADPf*	MJ	595	667	723	777	926	969	1,080	1,230	1,320	626	698	724	747	827	810	944	957	1,020	1,120	1,250	1,360	1,410	1,360	1,530
WDP	m³ world equiv.	10.1	11.1	11.9	12.7	14.5	15.4	16.7	18.9	20.7	10.5	11.6	12	12.3	13.6	13.5	14.8	14.9	15.9	17.2	19.2	21.2	21.3	20.7	23.1
Resource Use																									
PERE	MJ	162	185	201	217	256	276	302	350	389	170	193	203	209	237	235	260	264	285	312	354	399	382	388	423
PERM	MJ	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
PERT	MJ	162	185	201	217	256	276	302	350	389	170	193	203	209	237	235	260	264	285	312	354	399	382	388	423
PENRE	MJ	591	662	717	769	883	940	1,030	1,170	1,300	621	693	719	741	826	810	900	912	975	1,060	1,190	1,340	1,370	1,290	1,500
PENRM	MJ	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	3.84	0	3.84
PENRT	MJ	591	662	717	769	883	940	1,030	1,170	1,300	621	693	719	741	826	810	900	912	975	1,060	1,190	1,340	1,380	1,290	1,500
SM	kg	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
RSF	MJ	131	152	166	181	198	223	237	277	334	138	159	168	173	198	198	202	205	222	244	280	343	319	308	354
NRSF	MJ	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
FW	m³	3.15	3.12	3.25	3.27	3.3	3.4	3.38	3.42	3.48	3.37	3.35	3.29	3.26	3.52	3.49	3.51	3.42	3.46	3.56	3.61	3.74	3.83	3.43	3.9
Waste Categories and Output Flows																									
HWD	kg	0.265	0.257	0.264	0.261	0.26	0.267	0.258	0.248	0.242	0.284	0.277	0.266	0.262	0.288	0.287	0.278	0.269	0.266	0.275	0.266	0.265	0.304	0.241	0.301
NHWD	kg	10.2	9.91	10.1	10	10.7	10.6	10.7	10.5	9.3	10.8	10.6	10.2	10.1	12	10.9	11.3	11	11	11.3	11.1	10.1	12.8	10.3	14.5
RWD	kg	5.96E-04	6.91E-04	8.62E-04	0.00104	0.00274	0.00185	0.00327	0.00374	0.00185	6.29E-04	7.24E-04	7.64E-04	9.02E-04	8.03E-04	1.17E-04	0.00275	0.00284	0.00308	0.00337	0.00386	0.0019	0.00487	0.00424	0.00543
CRU	kg	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
MFR	kg	0.00442	0.00459	0.0048	0.00493	0.00513	0.00546	0.00554	0.00592	0.00651	0.00463	0.00482	0.00483	0.00486	0.00531	0.00531	0.00531	0.00527	0.00544	0.00575	0.00608	0.00678	0.0068	0.00621	0.00717
MER	kg	8.38E-06	8.14E-06	8.36E-06	8.27E-06	8.30E-06	8.54E-06	8.28E-06	8.01E-06	7.89E-06	8.94E-06	8.74E-06	8.42E-06	8.30E-06	9.21E-06	9.20E-06	8.84E-06	8.54E-06	8.50E-06	8.80E-06	8.55E-06	8.57E-06	9.86E-06	7.83E-06	9.85E-06
EEE	MJ	0.0393	0.0377	0.0389	0.0382	0.0379	0.0388	0.0373	0.0354	0.0341	0.0425	0.0411	0.0393	0.0385	0.0427	0.0425	0.0411	0.0394	0.039	0.0401	0.0385	0.0379	0.0451	0.034	0.0445
EET	MJ	0.0124	0.0122	0.0124	0.0124	0.0125	0.0129	0.0127	0.0124	0.0124	0.013	0.0128	0.0125	0.0124	0.0135	0.0136	0.0131	0.0128	0.0127	0.0132	0.013	0.0132	0.0168	0.0123	0.0169
Biogenic Carbon Content																									
BCC-prod	kg	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
BCC-pack	kg	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Additional Environmental Impacts																									
PM	Disease incidences	2.49E-06	2.70E-06	2.88E-06	3.03E-06	3.23E-06	3.53E-06	3.65E-06	4.06E-06	4.68E-06	2.64E-06	2.85E-06	2.91E-06	2.95E-06	3.34E-06	3.34E-06	3.34E-06	3.34E-06	3.52E-06	3.80E-06	4.16E-06	4.86E-06	4.68E-06	4.38E-06	5.07E-06
IRP***	kBq U235 eq.	0.463	0.448	0.461	0.456	0.455	0.467	0.452	0.435	0.426	0.497	0.484	0.466	0.458	0.506	0.505	0.489	0.471	0.468	0.483	0.468	0.468	0.54	0.423	0.537
ETP-fw*	CTUe	454	517	561	604	658	735	774	895	1,070	478	542	566	582	662	663	671	681	732	800	906	1,100	1,030	989	1,140
HTPc*	CTUh	9.29E-09	9.58E-09	1.01E-08	1.03E-08	1.07E-08	1.14E-08	1.15E-08	1.23E-08	1.34E-08	9.89E-09	1.02E-08	1.02E-08	1.02E-08	1.13E-08	1.13E-08	1.12E-08	1.11E-08	1.14E-08	1.21E-08	1.27E-08	1.42E-08	1.46E-08	1.28E-08	1.54E-08
HTPnc*	CTUh	2.91E-07	3.20E-07	3.43E-07	3.63E-07	3.90E-07	4.29E-07	4.46E-07	5.04E-07	5.87E-07	3.07E-07	3.36E-07	3.45E-07	3.53E-07	3.97E-07	3.97E-07	4.00E-07	4.03E-07	4.27E-07	4.62E-07	5.12E-07	6.06E-07	5.91E-07	5.48E-07	6.43E-07
SQP*	Pt	230	229	234	235	238	246	243	244	250	240	240	235	234	253	253	247	243	244	253	253	262	265	245	269
GWP-GHG**	kg CO_2-eq.	145	166	182	196	218	242	259	301	355	153	174	183	189	214	213	222	226	244	267	304	364	347	334	383

* Refer to footnote on page 24 ** Refer to footnote on page 25 *** Refer to footnote on page 25

RESULTS FOR ALL SITES MODULES C & D Impacts per 1 m³ of Ready-Mix Concrete

Modules C1-C4 and D are only sensitive to mass. The average density of ready-mix concrete is 2,332 kg/m³. Hence, results for one of the mixes (Counties N2519) with the closest density (2,336 kg/m³) to average density (2,332 kg/m³) is provided here.

		END-OF-LIFE				RECOVERY
		C1	C2	C3	C4	D
Core Environmental impacts (EN15804+A2)						
GWPt	kg CO_2-eq.	3.99	22.2	0	14.1	0
GWPf	kg CO_2-eq.	3.99	22.2	0	14.1	0
GWPb	kg CO_2-eq.	8.51E-04	0.00694	0	0.00741	0
GWPluluc	kg CO_2-eq.	4.44E-04	0.0116	0	0.00853	0
ODP	kg CFC11-eq.	6.28E-08	3.51E-07	0	4.09E-07	0
AP	Mole of H+ eq.	0.0119	0.0974	0	0.106	0
EPfw	kg P eq.	1.21E-04	0.00180	0	0.00118	0
EPm	kg N eq.	0.00458	0.0357	0	0.0409	0
EPt	Mole of N eq.	0.0489	0.382	0	0.438	0
POCP	kg NMVOC eq.	0.0189	0.131	0	0.152	0
ADPmm*	kg Sb-eq.	1.38E-06	7.29E-05	0	1.99E-05	0
ADPf*	MJ	52.1	316	0	355	0
WDP	m³ world equiv.	0.129	1.49	0	1.10	0
Resource Use						
PERE	MJ	0.293	3.99	0	2.98	0
PERM	MJ	0	0	0	0	0
PERT	MJ	0.293	3.99	0	2.98	0
PENRE	MJ	52.1	316	0	355	0
PENRM	MJ	0	0	0	0	0
PENRT	MJ	52.1	316	0	355	0
SM	kg	0	0	0	0	0
RSF	MJ	5.63E-05	0.00180	0	0.00183	0
NRSF	MJ	0	0	0	0	0
FW	m³	0.00279	0.0383	0	0.366	0
Waste Categories and Output Flows						
HWD	kg	0.0240	0.240	0	0.170	0
NHWD	kg	0.478	7.60	0	5.09	0
RWD	kg	1.61E-06	1.88E-05	0	1.49E-05	0
CRU	kg	0	0	0	0	0
MFR	kg	1.64E-04	0.00243	0	0.00159	0
MER	kg	6.45E-07	1.98E-05	0	5.71E-06	0
EEE	MJ	0.00219	0.0223	0	0.0195	0
EET	MJ	0.00120	0.0459	0	0.0121	0
Additional Environmental Impacts						
PM	Disease incidences	2.67E-07	1.81E-06	0	2.33E-06	0
IRP***	kBq U235 eq.	0.0245	0.267	0	0.223	0
ETP-fw*	CTUe	24.7	172	0	165	0
HTPc*	CTUh	3.21E-09	1.01E-08	0	6.03E-09	0
HTPnc*	CTUh	1.12E-08	2.26E-07	0	7.60E-08	0
SQP*	Pt	3.47	187	0	699	0
GWP-GHG**	kg CO_2-eq.	3.99	22.2	0	14.1	0

* Refer to footnote on page 24 ** Refer to footnote on page 25 *** Refer to footnote on page 25

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PROGRAMME-RELATED INFORMATION AND VERIFICATION

Declaration owner		Higgins Concrete Limited Web: www.higginsconcrete.co.nz Email: enquire@higginsconcrete.co.nz Post: 18 El Prado Drive, Palmerston North 4414 New Zealand
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PCR		PCR 2019:14 Construction Products, v1.3.1, published on 2023/08/07 (valid until 2024/12/20) c-PCR 003, complementary rules to PCR 2019:14 for Concrete and Concrete Elements (EN 16757) , published on 2023/01/02 (valid until 2024/12/20)
PCR review conducted by:		The Technical Committee of the International EPD® System Claudia A. Peña, University of Concepción, Chile info@environdec.com
Independent verification of the declaration and data, according to ISO 14025:	☐ ☑	EPD process certification (Internal) EPD verification (External)
Third party verifier:		Hüdai Kara, PhD Web: www.metsims.com Email: hudai.kara@metsims.com Post: Metsims Sustainability Consulting 4 Clear Water Place, Oxford OX2 7NL, U.K.
Approved by:		EPD Australasia Limited
Procedure for follow-up of data during EPD validity involved third-party verifier	☐ ☑	yes no
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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).

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