

# ENVIRONMENTAL PRODUCT DECLARATION

## RECYCLED GLASS SAND -5MM

ISO 14025:2006 and EN 15804+A2:2019/AC:2021

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

**Programme operators:** EPD International AB;  
EPD Hub Australasia

**Valid until:** 2029-10-01

**Publication Date:** 2024-10-01

**EPD registrationNo:** EPD-IES-0016608:001

**Fully aligned regional hub:** EPD Australasia,

<https://epd-australasia.com/>  
EPD Australasia

An EPD should provide current information and may be updated if conditions change. The stated validity is therefore subject to the continued registration and publication at <https://epd-australasia.com/>



TOMORROW'S  
SOLUTIONS,  
TODAY

05

PRODUCT  
INFORMATION

08

SYSTEM  
BOUNDARIES

14

PRODUCT  
STAGE

17

LIFE CYCLE  
INVENTORY (LCI)  
DATA AND  
ASSUMPTIONS

19

ASSESSMENT  
INDICATORS

22

ENVIRONMENTAL  
PERFORMANCE

29

REFERENCES  
AND GENERAL  
INFORMATION

33





# Tomorrow's solutions, today

## ABOUT RESOURCECO

ResourceCo is a global leader in the recovery and re-manufacturing of primary resources, extracting maximum value from materials otherwise destined for landfill. We work with governments, communities and multinational companies to progress the circular economy and preserve natural resources for a sustainable future.

By adopting innovative advanced re-manufacturing principles, and a maintaining a continued focus on process and product quality, ResourceCo is one of Australia's most diversified recyclers capable of recovering resources from construction and demolition (C&D), commercial and industrial waste, soils and tyres.



**ResourceCo's beginnings were humble, yet our ambition was bold; to be leaders in resource recovery living true to our brand promise to leave the world in a better place than we found it.**



## CONSTRUCTION & DEMOLITION MATERIAL RECYCLING

We provide a wide range of recycled products, including pavement and asphalt type materials, aggregates, concrete and sand, and services to major civil engineering projects and both residential and commercial construction.

Recent investment in plant has enabled ResourceCo to manage heavily contaminated glass fines from municipal sources such as Materials Recovery Facilities (MRFs), re-purposing material otherwise destined for landfill.

- Conservation of resources through extending the life of sand quarries
- The reuse of scrap metal recovered during processing
- Full lifecycle of waste glass from kerbside collection through to re-supply for a wide range of uses
- Making the best use of the embodied carbon of materials
- Reducing landfill usage (and associated greenhouse gas emissions)

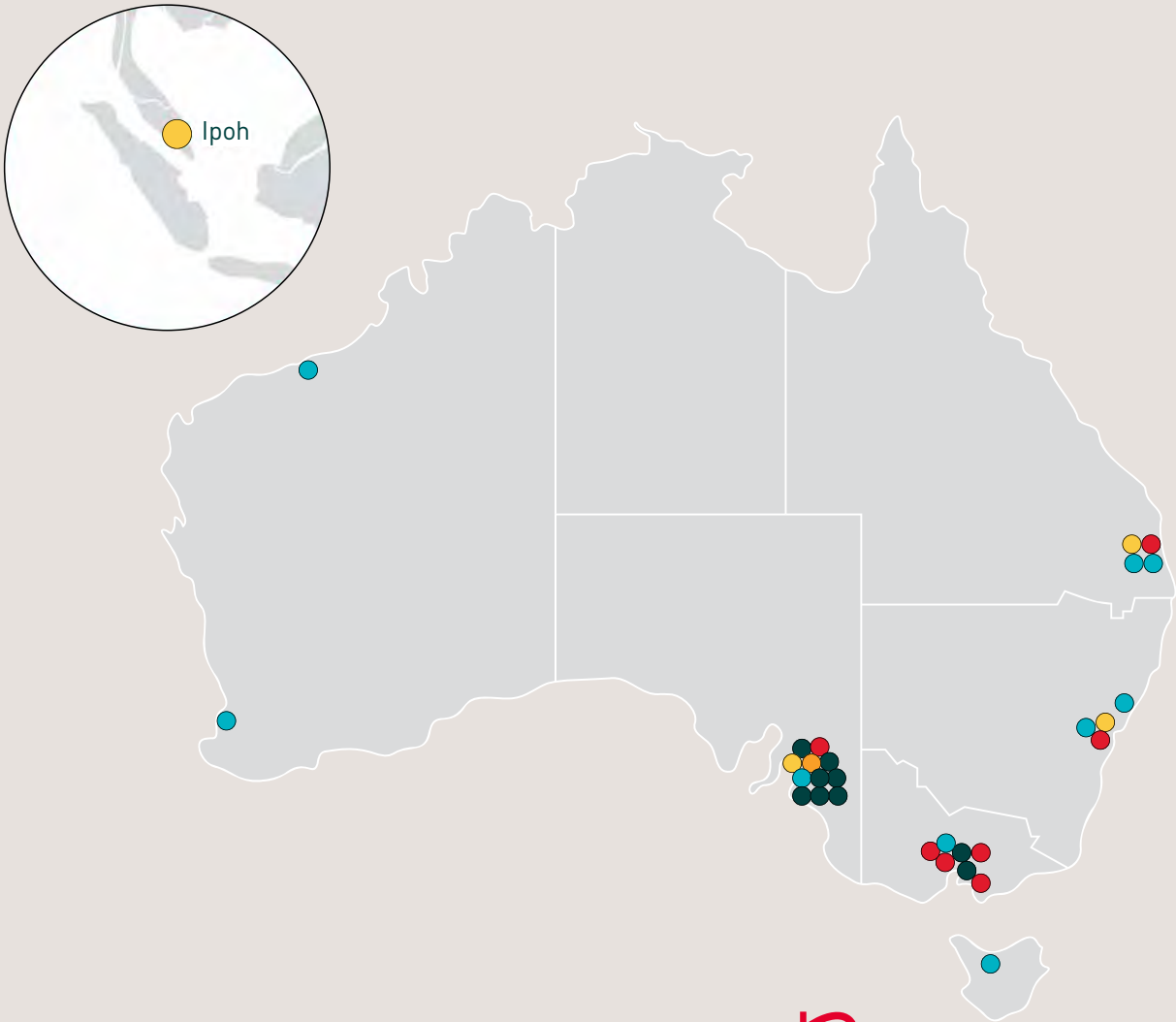
This EPD covers a single product from one ResourceCo site.

**ResourceCo maintains ISO certification for Quality, Safety and environmental management systems.**



# Operating locations

ResourceCo operates at locations in Australia and Asia across five business pillars: Tyre Recycling, Recycling & Waste, Soil Reuse & Recycling, Energy and Shared Services.



- TYRE RECYCLING**
- RECYCLING & WASTE**
- SOIL REUSE & RECYCLING**
- ENERGY**
- SHARED SERVICES**

# Production site

## SOUTH AUSTRALIA

### WINGFIELD RECYCLING FACILITY

144 – 150 Wingfield Road, Wingfield, SA, 5013



# Product information

This EPD covers one aggregate product Recycled Glass Sand -5mm produced by ResourceCo at the Wingfield facility in South Australia. Glass sands produced at Wingfield are consistent and produced from the same 'waste' feedstock.

## PRODUCT

## CODE

RECYCLED GLASS SAND -5MM

RECYCLED GLASS SAND

ResourceCo's recycled products are produced to meet the requirements of various construction and transport uses. ResourceCo's recycled products can also be brought back to ResourceCo facilities at the end of their useful life and recycled further into more recycled products.



### RECYCLED GLASS SAND -5MM

**APPLICATIONS:**

This product is used in the manufacture of more sustainable construction materials and as an alternative to sand.

- Bedding / backfill
- Unbound granular base
- Fine aggregates in concrete
- Fine aggregates in asphalt
- Filtration



**TABLE 1: INDUSTRY CLASSIFICATION**

<b>PRODUCT</b>	<b>CLASSIFICATION</b>	<b>CODE</b>	<b>CATEGORY</b>
<b>AGGREGATES AND SAND PRODUCTS</b>	UN CPC VER.2	89420	NON-METAL WASTE AND SCRAP RECOVERY (RECYCLING) SERVICES, ON A FEE OR CONTRACT BASIS
	ANZSIC 2006	2922P	WASTE REMEDIATION AND MATERIALS RECOVERY SERVICES (OR 292 WASTE TREATMENT, DISPOSAL AND REMEDIATION SERVICES)

**TABLE 2: TECHNICAL SPECIFICATIONS**

<b>PRODUCT</b>	<b>STATE</b>	<b>RELEVANT STANDARDS</b>
<b>AGGREGATES AND SAND PRODUCTS</b>	SOUTH AUST.	RD-PV-S1 SUPPLY OF PAVEMENT MATERIALS (SA DEPARTMENT OF INFRASTRUCTURE AND TRANSPORT)
	SOUTH AUST.	TS 0631 – FINE MATERIALS FOR PIPE EMBEDMENT (SA WATER) AND ASSOCIATED TECHNICAL MEMO ON RECYCLED GLASS

**TABLE 3: PRODUCT COVERED BY THIS EPD**

<b>LOCATION</b>	<b>PRODUCT</b>
WINGFIELD, SA	RECYCLED GLASS SAND -5MM

This EPD shows results that are product specific. Averaging (grouping) has not been performed in product or site level.



# DECLARED UNIT

ISO 14040 defines a functional unit as “quantified performance of a product system for use as a reference unit”. EPDs that do not cover the full product life cycle from raw material extraction through to end-of-life use the term “declared unit” instead.

The declared unit is 1 000 kg of aggregate.

**TABLE 4: CONTENT DECLARATION**

PRODUCT COMPONENTS	RECYCLED GLASS SAND -5MM	POST-CONSUMER RECYCLED MATERIAL	BIOGENIC MATERIAL
	WEIGHT KG	WEIGHT %	WEIGHT % & KG C/KG
WASTE GLASS FINES AND OTHER WASTE GLASS INCLUDING LAMINATED GLASS	1 000	100%	0% RESP. 0
<b>TOTAL</b>	<b>1 000</b>		<b>0% RESP. 0</b>

## Dangerous substances from the candidate list of SVHC for Authorisation

The products have no hazardous properties. Chemical analysis has been performed in the products and a copy of the chemical report can be found in Annex. Potential hazardous substances are well below the threshold for registration with the European Chemicals Agency (i.e., if the substance constitutes more than 0.1% of the weight of the product) of Candidate List of Substances of Very High Concern (SVHC) which exceeds the limits



# Manufacturing process

The processing for all products covered by this EPD are consistent, with various products produced during the same processing circuit.

## Modules A1-A3 Manufacturing

Recycled glass sand is processed from the MRFs sorted fine waste at ResourceCo’s crushing plant at Wingfield, SA (figure 1).

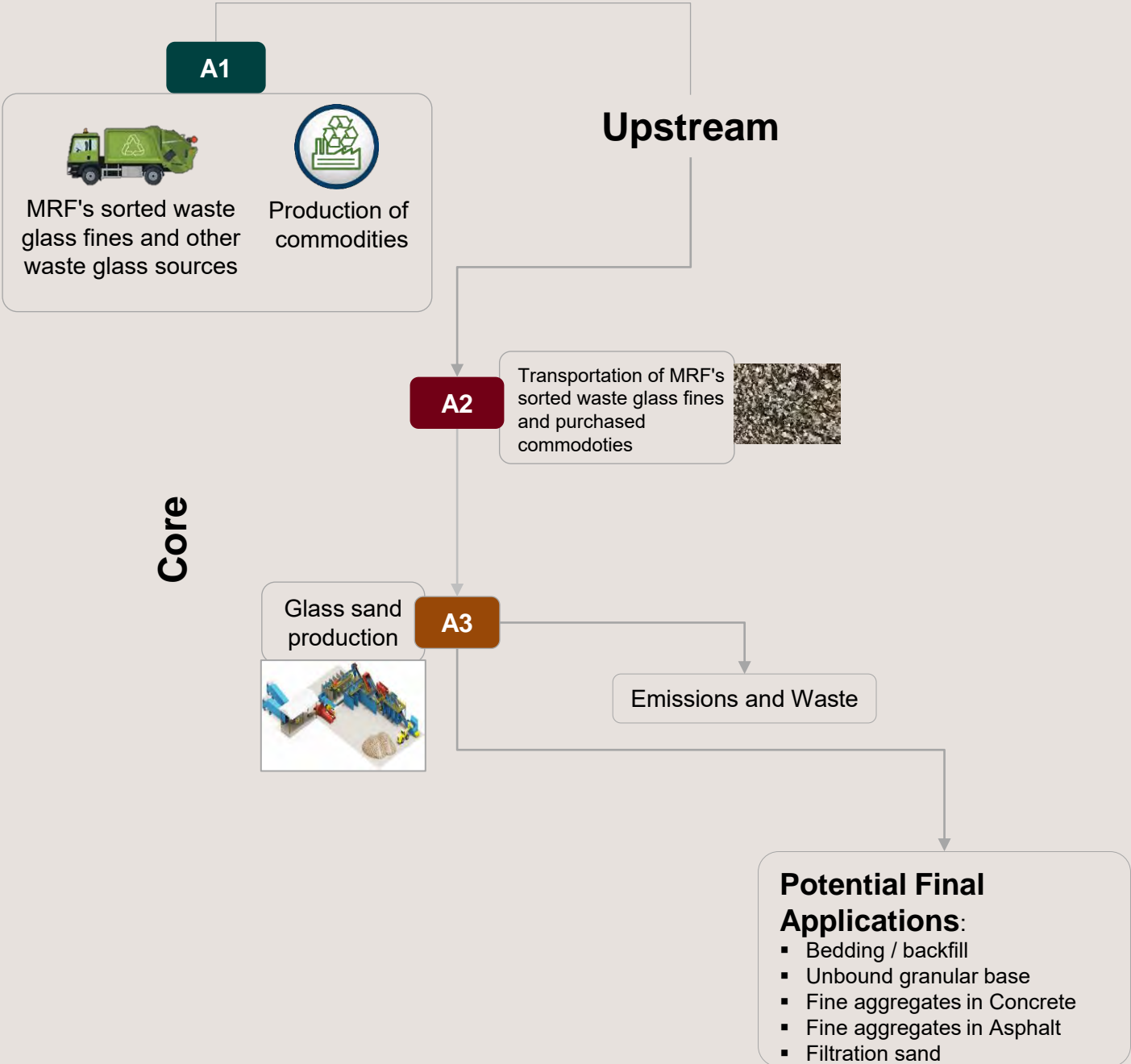


Figure 1: System diagram

# System boundaries

As shown in table 5, this EPD is of the type d 'Cradle to gate (as per 2.2.2 of PCR 2019:14 V1.3.4). The production stage (Modules A1-A3) includes all aspects of recycled aggregate production from cradle to gate, utilising elementary and product flows. Other life cycle stages (Modules A4-A5, B1-B7, C1-C4, and D) are dependent on particular scenarios and best modelled at the building or construction level.

For scope of 'cradle-to-gate type d, three conditions must be met:

- the product or material is physically integrated with other products during installation so they cannot be physically separated from them at end of life,
- the product or material is no longer identifiable at end of life as a result of a physical or chemical transformation process, and
- the product or material does not contain biogenic carbon.

As ResourceCo products are to be integrated in construction products and assemblies (e.g. blended fine aggregates, concrete and asphalt), they meet the first two criteria.



**TABLE 5: MODULES INCLUDED IN THE SCOPE OF THE EPD**

	PRODUCT STAGE			CONSTRUCTION PROCESS STAGE		USE STAGE							END OF LIFE STAGE			RESOURCE RECOVERY STAGE	
	RAW MATERIAL SUPPLY	TRANSPORT OF RAW MATERIALS	MANUFACTURING	TRANSPORT TO CUSTOMER	CONSTRUCTION / INSTALLATION	USE	MAINTENANCE	REPAIR	REPLACEMENT	REFURBISHMENT	OPERATIONAL ENERGY USE	OPERATIONAL WATER USE	DECONSTRUCTION / DEMOLITION	TRANSPORT TO WASTE PROCESSING	WASTE PROCESSING	DISPOSAL	REUSE - RECOVERY-RECYCLING- POTENTIAL
	A1	A2	A3	A4	A5	B1	B2	B3	B4	B5	B6	B7	C1	C2	C3	C4	D
	X	X	X	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
GEOGRAPHY	AU	AU	AU														
SPECIFIC DATA	>90%					-	-	-	-	-	-	-	-	-	-	-	-
VARIATION: PRODUCTS	NA					-	-	-	-	-	-	-	-	-	-	-	-
VARIATION: SITES	0%					-	-	-	-	-	-	-	-	-	-	-	-

X = included in the EPD

ND = Module not declared (such a declaration shall not be regarded as an indicator result of zero)

NA = Not Applicable

Three conditions must be met for type d EPD:

- The product or material is physically integrated with other products during installation so they cannot be physically separated from them at end of life,
- The product or material is no longer identifiable at end of life as a result of a physical or chemical transformation process, and
- The product or material does not contain biogenic carbon.

As ResourceCo products are to be integrated in construction products and assemblies (e.g. concrete and asphalt), they meet the first two criteria. The products also do not contain biogenic carbon as presented in the content declaration.

The processes below are included in the product system to be studied.





# Product stage (Modules A1-A3)

## RAW MATERIAL SUPPLY (A1)

MRFs collect recyclables from kerbside yellow bins and transport them to their facilities. The sorting processes also produced other recyclables, aluminum, steel, paper, cardboard, PET and PE plastics. ResourceCo receives sorted waste glass from MRFs, which includes portions of small pieces of metals, paper, and plastics. The sorted glass waste is received free of impacts and ResourceCo responsible for environmental impacts of the waste that reaches the end-of-life state at its boundaries.

## TRANSPORT (A2)

Sorted glass waste is disposed to the Wingfield recycling site by MRFs and handled onsite by wheel-front loaders. ResourceCo becomes responsible for the environmental burden once it is deposited at its boundaries. Transport of fuels are part of the assessment. The distance of transport for fuels is approximately 17.9 km.

ResourceCo receives sorted glass waste from two MRFs in Adelaide. The material is received under a small fee. The manufacturing processes employs screening, crushers, and conveyor belts. Scrap metal and combustible wastes (plastic and paper fragments) are sorted from glass sand. No washing process involved in the manufacturing. In which of scrap metal are sold and combustible wastes are sent to nearby incineration for energy production.

The recycled glass sand meets the relevant conditions for limiting the scope to modules A1-A3, as the materials:

- becomes physically integrated with other products (e.g. blended fine aggregates, concrete, and asphalt) so it cannot be physically separated at the end of life;
- is no longer identifiable at the end of life as a result of the physical transformation process, and
- does not contain biogenic carbon.

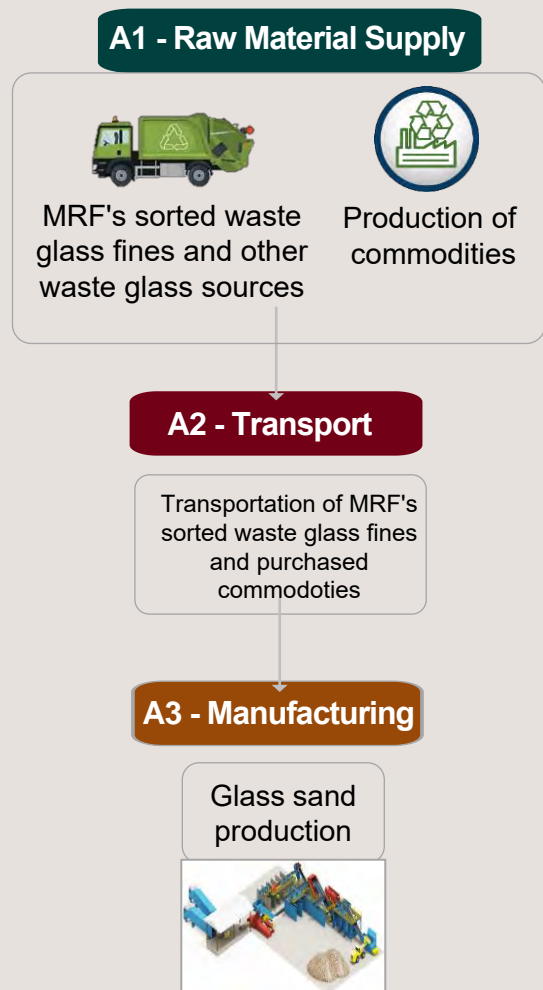
## 2.4.3. MANUFACTURING (A3)

ResourceCo receives sorted glass waste from several Material Recovery Facilities (MRFs) in Adelaide. The material is received under a fee.

The manufacturing processes employs screening, crushers, and conveyor belts. Scrap metal and combustible wastes (plastic and paper fragments) are sorted from glass sand.

This crushing process is crucial to ensure that the recycled glass sand conforms to specific size and quality standards suitable for their intended use in construction projects.

No washing process involved in the manufacturing. In which of scrap metal are sold and combustible wastes are sent to nearby incineration for energy production.



# Recycling and recycled inputs

Waste glass inputs, consisting of waste glass fines from various MRFs and other waste glass sources are based on the cut-off approach. This waste is then used to manufacture recycled glass sand.

As per the polluter-pays principle, “processes of waste processing shall be assigned to the product system that generates the waste until the end-of-waste state is reached” (CEN, 2019) and in the case of secondary use of material, “the system boundary between the system under study and the previous system (...) is set where outputs of the previous system (...) reach the end-of-waste state” (CEN, 2019).

ResourceCo becomes responsible for environmental impacts of the material that reaches the end-of-life state at its boundaries. That is to say that waste sent to energy generation is not part of ResourceCo boundaries.



# Life cycle inventory

## (LCI) data and assumptions

Primary data were used for all manufacturing operations up to the plant gate, including upstream data for inputs. Primary data for ResourceCo operations were sourced for 12 months from 2023-08-01 to 2024-07-31). Background data was used for input materials purchased from other suppliers.

All data in the background system were from the AusLCI and the AusLCI shadow database (v1.42) (AusLCI 2023). All background data fall within the 10-year limit allowable for generic data under EN 15804.

### UPSTREAM DATA

Australia-specific datasets have been used where available, including regional electricity mix.

### LCA SOFTWARE AND DATABASE

The LCA model was created using the SimaPro v9.6.0.1 software. The Ecoinvent v3.10 database, AusLCI and AusLCI shadow database (v1.42) (AusLCI 2023) provided the life cycle inventory data for several of the raw and process materials obtained from the background system. Background data may represent Global or European Conditions where no matching Australian LCI dataset is available within the SimaPro databases.

### Data quality

Both foreground data on raw material inputs are for 1st August 2023 to 31st July 2024. The information and data utilised in this document is correct and factual at the time of development. Primary data were measured on the operation of the recycling facility and assessed with high quality. Background data quality was deemed to be good as only geographical proxy data for diesel and ancillary materials have been used because of unavailability of local data. No data gap has been identified. The overall confidence in the LCA results considering the data quality is high.

### ELECTRICITY

The composition of the electricity grid mix was modeled in SimaPro based on the state-specific grid, which sourced data from the Australian Energy Market Operator for the 2022-23 financial year (Department of Climate Change, Energy, Environment and Water, 2023).

The source of electricity for A3 is the South Australian Grid (based on a subnational residual mix), which is made up of 45.29% wind, 24.50% natural gas, 26.01% solar technologies, 0.79% oil and 3.41% imported from Victoria.

The South Australian residual grid mix is conservatively estimated by subtracting renewables from the consumption mix on the market (as per 4.8.1 of the PCR) with a GWP-GHG impact of 0.313 kg CO<sub>2</sub>-eq/kWh.

All electricity purchased from the grid used by ResourceCo for recycled glass sand manufacturing is backed by SA Power Networks.”

## TRANSPORT

MRFs deposit waste glass fines at ResourceCo by paying a weight-based fee. The transport is excluded. Transport for purchased commodities was estimated being lorry 3.5-16 t fleet average weight with 3.3km and 0.7km transport distance respectively.

## CUT OFF CRITERIA

Where possible (i.e. for which data are available), all inputs and outputs to a process have been included. The cut-off criteria applied are 1% of renewable and non-renewable primary energy usage and one per cent of the total mass input of a process.

According to the PCR 2019:14 V1.3.4 Construction Products (EPD International, 2023) no energy or mass flows, except packaging of materials and personnel were excluded. All materials required for manufacturing are delivered in bulk via trucks and do not utilise any packaging.

High-quality infrastructure-related data isn't always available, and there is no clear cut-off for what to include. For this reason, capital goods data are applied to LCA studies inconsistently. This is expected to lead to reduced consistency and comparability of EPDs. Capital goods for input raw materials, energy production, and manufacturing equipments not directly consumed in the process were previously excluded.

For the processes within the system boundary, glass waste and its transport are cut offs, as explained above. However, all other energy and material flow data have been included in the model. In cases where no matching life cycle inventories are available to represent a flow, proxy data have been applied based on conservative assumptions regarding environmental impacts. The influence of the proxy data used in the LCA was assessed and deemed minor, as only geographical proxy data for diesel and ancillary materials were used due to the unavailability of local data.

Ancillary materials used on the sites including, but not limited to, greases, lubricating oils, engine oils, car shampoo and other minor ancillary materials used during production have been excluded.



## ALLOCATION

Recycling of sorted glass waste through crushing requires a definition of the end-of-waste state for the scrap metal and combustible wastes (plastic and paper fragments).

According to the PCR 2019:14 v1.3.4, section 4.5.2, all waste treatment processes for the waste flows to fulfil the end-of-waste criteria have been included in the LCA calculation. Waste sent to energy recovery is out of ResourceCo boundaries that has been excluded in the LCA.



SCAN QR CODE

Multi-output allocation generally follows the requirements of ISO 21930 and the provision of PCR 2019:14 v1.3.4, section 4.5.1. This EPD uses economic allocation for co-products, scrap metal. There is underlying physical relationship between co-products, however, the difference in the price of the co-product, scrap metal, was large (>25%). ResourceCo shows a classical joint co-production process where it is not possible to divide the unit process per product. Because the combustible wastes do not have economic value that it is burden free. Meanwhile, scrap metal does pick up environmental impacts from the crushing process.

## ASSUMPTIONS

Assumptions made during the LCI collection and modelling process are as follows:

Cut-off criteria, as per the PCR 2019:14 v1.3.4, are reasonable in the context of the overall impacts of recycled aggregates production.

Accuracy of data measurement falls within normal industrial weighing systems accuracy limits of  $\pm 10\%$ . Hence, for mass balance of inputs and outputs, we assumed that total input of material (glass waste) was equal to the total ResourceCo output (products, waste, and scrap). ResourceCo does not monitor dust emissions that it is assumed as zero in the output inventory.

The plant commenced operations in 2023. The primary data are based on twelve months of operation.

## CONTENT DECLARATION

### SVHC SUBSTANCES

The products have no hazardous properties. Chemical analysis has been performed in the products and a copy of the chemical report can be found in Annex. Potential hazardous substances are well below the threshold for registration with the European Chemicals Agency (i.e., if the substance constitutes more than 0.1% of the weight of the product) of Candidate List of Substances of Very High Concern (SVHC) which exceeds the limits.

# Assessment indicators

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

**TABLE 6** contains the core environmental impact indicators in accordance with EN 15804:2012 +A2:2019/AC:2021 describing the potential environmental impacts of the product.

**TABLE 7** shows the life cycle inventory indicators for resource use.

**TABLE 8** displays the life cycle inventory indicators for waste and other outputs.

**TABLE 9** provides additional environmental impact indicators in accordance with EN 15804:2012 +A2:2019/AC:2021. Indicators are from EF 3.1 package.

**TABLE 10** displays biogenic carbon content indicators.

**TABLE 11** contains results for environmental impact indicators in accordance with EN 15804:2012+A1:2013 to aid backward comparability.

The estimated impact results are only relative statements, which do not indicate the endpoints of the impact categories, exceeding threshold values, safety margins and/or risks.

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



**TABLE 6: EN 15804:2012+A2:2019/AC:2021 CORE ENVIRONMENTAL IMPACT INDICATORS**

<b>IMPACT CATEGORY</b>	<b>ABBREVIATION</b>	<b>UNIT</b>
CLIMATE CHANGE – TOTAL	GWP-total	kg CO <sub>2</sub> -eq.
CLIMATE CHANGE – FOSSIL	GWP-fossil	kg CO <sub>2</sub> -eq.
CLIMATE CHANGE – BIOGENIC	GWP-biogenic	kg CO <sub>2</sub> -eq.
CLIMATE CHANGE – LAND USE AND LAND USE CHANGE	GWP-luluc	kg CO <sub>2</sub> -eq.
OZONE DEPLETION	ODP	kg CFC11-eq.
ACIDIFICATION	AP	Mole of H <sup>+</sup> eq.
EUTROPHICATION AQUATIC FRESHWATER	EP-freshwater	kg P eq.
EUTROPHICATION AQUATIC MARINE	EP-marine	kg N eq.
EUTROPHICATION TERRESTRIAL	EP-terrestrial	Mole of N eq.
PHOTOCHEMICAL OZONE FORMATION	POFP	kg NMVOC eq.
DEPLETION OF ABIOTIC RESOURCES – MINERALS AND METALS <sup>1</sup>	ADP-m&m	kg Sb-eq.
DEPLETION OF ABIOTIC RESOURCES – FOSSIL FUELS <sup>1</sup>	ADP-fossil	MJ
WATER USE <sup>1</sup>	WDP	m <sup>3</sup> world equiv.

**TABLE 7: LIFE CYCLE INVENTORY INDICATORS ON USE OF RESOURCES**

<b>INDICATOR</b>	<b>ABBREVIATION</b>	<b>UNIT</b>
USE OF RENEWABLE PRIMARY ENERGY EXCLUDING RENEWABLE PRIMARY ENERGY RESOURCES USED AS RAW MATERIALS	PERE	MJ
USE OF RENEWABLE PRIMARY ENERGY RESOURCES USED AS RAW MATERIALS	PERM	MJ
TOTAL USE OF RENEWABLE PRIMARY ENERGY RESOURCES	PERT	MJ
USE OF NON-RENEWABLE PRIMARY ENERGY EXCLUDING NON-RENEWABLE PRIMARY ENERGY RESOURCES USED AS RAW MATERIALS	PENRE	MJ
USE OF NON-RENEWABLE PRIMARY ENERGY RESOURCES USED AS RAW MATERIALS	PENRM	MJ
TOTAL USE OF NON-RENEWABLE PRIMARY ENERGY RESOURCES	PENRT	MJ
USE OF SECONDARY MATERIAL;	SM	kg
USE OF RENEWABLE SECONDARY FUELS	RSF	MJ
USE OF NON-RENEWABLE SECONDARY FUELS	NRSF	MJ
TOTAL USE OF NET FRESH WATER	FW	m <sup>3</sup>



**TABLE 8: LIFE CYCLE INVENTORY INDICATORS ON WASTE CATEGORIES AND OUTPUT FLOWS**

<b>INDICATOR</b>	<b>ABBREVIATION</b>	<b>UNIT</b>
HAZARDOUS WASTE DISPOSED	HWD	kg
NON-HAZARDOUS WASTE DISPOSED	NHWD	kg
RADIOACTIVE WASTE DISPOSED	RWD	kg
COMPONENTS FOR REUSE	CRU	kg
MATERIALS FOR ENERGY RECOVERY	MER	kg
MATERIALS FOR RECYCLING	MFR	kg
EXPORTED ELECTRICAL ENERGY	EEE	MJ
EXPORTED THERMAL ENERGY	EET	MJ

**TABLE 9: EN15804+A2 ADDITIONAL ENVIRONMENTAL IMPACT INDICATORS**

<b>INDICATOR</b>	<b>ABBREVIATION</b>	<b>UNIT</b>
CLIMATE CHANGE <sup>2</sup>	GWP-GHG	kg CO <sub>2</sub> -eq.
PARTICULATE MATTER EMISSIONS	PM	DISEASE INCIDENCES
IONISING RADIATION – HUMAN HEALTH <sup>3</sup>	IRP	kBq U235 eq.
ECO-TOXICITY (FRESHWATER) <sup>1</sup>	ETP-fw	CTUe
HUMAN TOXICITY, CANCER <sup>1</sup>	HTP-c	CTUh
HUMAN TOXICITY, NON-CANCER <sup>1</sup>	HTP-nc	CTUh
LAND USE RELATED IMPACTS / SOIL QUALITY <sup>1</sup>	SQP	Pt

**TABLE 10: BIOGENIC CARBON CONTENT INDICATORS**

<b>INDICATOR</b>	<b>ABBREVIATION</b>	<b>UNIT</b>
BIOGENIC CARBON CONTENT - PRODUCT	BCC-prod	kg C
BIOGENIC CARBON CONTENT - PACKAGING	BCC-pack	kg C

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

**TABLE 11: EN15804+A1 ENVIRONMENTAL IMPACT INDICATORS**

<b>INDICATOR</b>	<b>ABBREVIATION</b>	<b>UNIT</b>
GLOBAL WARMING POTENTIAL	GWP (EN15804+A1)	kg CO <sub>2</sub> -eq.
OZONE DEPLETION POTENTIAL	ODP (EN15804+A1)	kg CFC11-eq.
ACIDIFICATION POTENTIAL	AP (EN15804+A1)	kg SO <sub>2</sub> -eq.
EUTROPHICATION POTENTIAL	EP (EN15804+A1)	kg PO <sub>4</sub> <sup>3-</sup> eq.
PHOTOCHEMICAL OZONE CREATION POTENTIAL	POCP (EN15804+A1)	kg C <sub>2</sub> H <sub>4</sub> -eq.
ABIOTIC DEPLETION POTENTIAL FOR NON-FOSSIL RESOURCES	ADPE (EN15804+A1)	kg Sb-eq.
ABIOTIC DEPLETION POTENTIAL FOR FOSSIL RESOURCES	ADPF (EN15804+A1)	MJ

Note: the indicators and characterisation methods used here are from EN 15804:2012+A1:2013, but other LCA rules (system boundaries, allocation, etc.) are according to EN 15804:2012+A2:2019.

- <sup>1</sup> The results of this environmental impact indicator shall be used with care as the uncertainties on these results are high or as there is limited experience with the indicator.
- <sup>2</sup> This indicator is identical to GWP-total except that the CF for biogenic CO<sub>2</sub> is set to zero. It has been included in the EPD following the PCR.
- <sup>3</sup> This impact category deals mainly with the eventual impact of low dose ionizing radiation on human health of the nuclear fuel cycle. It does not consider effects due to possible nuclear accidents, occupational exposure nor due to radioactive waste disposal in underground facilities. Potential ionizing radiation from the soil, from radon and some construction materials, is also not measured by this indicator.

The following indicators are not relevant, hence result in zero values:

- Components for re-use (CRU) is zero since there are none produced.
- Materials for energy recovery (MER) is zero since no credits are claimed for any incinerated wastes, applying the cut-off approach.
- Exported electrical energy (EEE) is zero since there is none produced.
- Exported thermal energy (EET) is zero since there is none produced.



# Environmental performance

## Wingfield (SA)

Results for one tonne of Recycled Glass Sand at Wingfield (SA)

**TABLE 12: EN15804+A2 CORE ENVIRONMENTAL IMPACT INDICATORS FOR A1-A3 AT WINGFIELD (SA)**

PARAMETER	UNIT	RECYCLED GLASS SAND
GWP-total	kg CO <sub>2</sub> eq.	3.08
GWP-fossil	kg CO <sub>2</sub> eq.	3.08
GWP-biogenic	kg CO <sub>2</sub> eq.	7.3E-04
GWP-luluc	kg CO <sub>2</sub> eq.	5.91E-05
ODP	kg CFC 11 eq.	5.53E-07
AP	mol H <sup>+</sup> eq.	0.041
EP-freshwater	kg P eq.	1.59E-05
EP-marine	kg N eq.	0.0184
EP-terrestrial	mol N eq.	0.215
POCP	kg NMVOC eq.	0.0498
ADP-m&m	kg Sb eq.	6.78E+01
ADP-fossil	MJ	9.23E-08
WDP	m <sup>3</sup> world eq. deprived	7.44

**TABLE 13: USE OF RESOURCES FOR A1-A3 AT WINGFIELD (SA)**

PARAMETER	UNIT	RECYCLED GLASS SAND
PERE	MJ	7.453
PERM	MJ	0
PERT	MJ	7.453
PENRE	MJ	67.79
PENRM	MJ	0
PENRT	MJ	67.79
SM	kg	1 000
RSF	MJ	0
NRSF	MJ	0
FWT	m <sup>3</sup>	0.0401

**TABLE 14: WASTE PRODUCTION AND OUTPUT FLOWS FOR A1-A3 AT WINGFIELD (SA)**

PARAMETER	UNIT	RECYCLED GLASS SAND
HWD	kg	1.41E-04
NHWD	kg	138.516
RWD	kg	1.39E-06
CRU	kg	0
MER	kg	11.41
MFR	kg	182.76
EEE	MJ	0
EET	MJ	0

**TABLE 15: EN15804+A2 ADDITIONAL ENVIRONMENTAL IMPACT INDICATORS FOR A1-A3 AT WINGFIELD (SA)**

PARAMETER	UNIT	RECYCLED GLASS SAND
GWP-GHG	kg CO <sub>2</sub> -eq.	3.05
PM	Disease incidences	3.73E-07
IR	kBq U235 eq.	0.00667
ETP-fw	CTUe	2.95
HTP-c	CTUh	3.76E-08
HTP-nc	CTUh	1.5E-09
SQP	Pt	0.7399

**TABLE 16: BIOGENIC CARBON CONTENT FOR A1-A3 AT WINGFIELD (SA)**

PARAMETER	UNIT	RECYCLED GLASS SAND
BCC-prod	kg C	0
BCC-pack	kg C	0

**TABLE 17: EN15804+A1 ENVIRONMENTAL IMPACT INDICATOR FOR A1-A3 AT WINGFIELD (SA)**

PARAMETER	UNIT	RECYCLED GLASS SAND
GWP	kg CO <sub>2</sub> eq.	3.07
ODP	kg CFC-11 eq.	4.39E-08
AP	kg SO <sub>2</sub> eq.	0.269
EP	kg PO <sub>4</sub> <sup>3-</sup> eq.	6.59E-03
POCP	kg C <sub>2</sub> H <sub>4</sub> eq.	4.52E-04
ADPE	kg Sb eq.	9.26E-08
ADPF	MJ	67.71





# References

EN. 2019. 'EN 15804:2012+A2:2019 Sustainability of Construction Works – Environmental Product Declarations - Core Rules for the Product Category of Construction Products'. The European Committee for Standardization (EN).

[https://infostore.saiglobal.com/en-au/standards/i-s-en-15804-2012-2-2019-876069\\_saig\\_nsai\\_nsai\\_2787517/](https://infostore.saiglobal.com/en-au/standards/i-s-en-15804-2012-2-2019-876069_saig_nsai_nsai_2787517/).

European Commission. Joint Research Centre. 2018. Supporting Information to the Characterisation Factors of Recommended EF Life Cycle Impact Assessment Methods: Version 2, from ILCD to EF 3.0. LU: Publications Office. <https://data.europa.eu/doi/10.2760/002447>.

IEPDS. 2019. 'PCR 2019:14 Construction Products (EN 15804: A2) (v1.0) 2019-12-20'. Version 1.0. Sweden: The International EPD System. <https://environdec.com/pcr-library/with-documents>.

ISO 14040:2006; Environmental management – Life cycle assessment – Principles and framework. Geneva: International Organization for Standardization.

ISO 14044:2006; Environmental management – Life cycle assessment – Requirements and guidelines. Geneva: International Organization for Standardization.

ISO 14025:2006; Environmental labels and declarations — Type III environmental declarations — Principles and procedures. Geneva: International Organization for Standardization.

AusLCI (2023). AusLCI\_V1.42, Retrieved from <https://www.lifecycles.com.au/life-cycle-assessment-databases>.

IPCC. 2013. 'Climate Change 2013: The Physical Science Basis. Contribution of Working Group I to the Fifth Assessment Report (AR5) of the Intergovernmental Panel on Climate Change'. United Kingdom and New York: Cambridge University Press, Cambridge. <http://www.ipcc.ch/report/ar5/wg1/>.

IPCC. 2021. 'Climate Change 2021: The Physical Science Basis. Contribution of Working Group I to the Sixth Assessment Report (AR6) of the Intergovernmental Panel on Climate Change'. United Kingdom and New York: Cambridge University Press, Cambridge. <http://www.ipcc.ch/report/ar6/wg1/>.

South Australian Electricity Report, November 2023.

Australian National Greenhouse Accounts Factors, August 2023.

Turner, DA, Williams, ID & Kemp, S 2015, 'Greenhouse gas emission factors for recycling of source-segregated waste materials', Resources, Conservation and Recycling, vol. 105, pp. 186-197. Hossain, MU, Poon, CS, Lo, IMC & Cheng, JCP 2016, 'Comparative environmental evaluation of aggregate production from recycled waste materials and virgin sources by LCA', Resources, Conservation and Recycling, vol. 109, pp. 67-77.

Tushar, Q, Salehi, S, Santos, J, Zhang, G, Bhuiyan, MA, Arashpour, M & Giustozzi, F 2023, 'Application of recycled crushed glass in road pavements and pipeline bedding: An integrated environmental evaluation using LCA', Sci Total Environ, vol. 881, Jul 10, p. 163488.

Zhang, J, Zhang, G, Bhuiyan, MA & Agostino, J 2022, 'Comparative life cycle assessment of kerbside collection methods for waste glass cullet for asphalt production', Journal of Cleaner Production, vol. 374.

# General information

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).

ResourceCo has the sole ownership, liability, and responsibility for the EPD. EPDs within the same product category but from different programmes may not be comparable.

EPDs of construction products may not be comparable if they do not comply with EN 15804.

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

The results for EN15804+A1 compliant EPDs are comparable with EN15804+A2 compliant studies as the methodologies are different. Results that are EN15804+A1 compliant are given in this document to assist comparability across EPDs.



RESOURCECOP

FRONT PRESENTERS  
THINK. ACT.  
BE SAFE.

RESOURCECOP



**Declaration owner:** ResourceCo  
**Web:** www.resourceco.com.au  
**Email:** enquiries@resourceco.com.au  
**Post:** Level 1, 162 Fullarton Road,  
Rose Park, SA 5067, Australia  
**Reference Year for Data:** [01-01-2022 to 31-12-2022]



**EPD Regional programme operator: Web:** EPD Australasia Limited  
<http://www.epd-australasia.com>  
**Email:** info@epd-australasia.com  
**Post:** EPD Australasia Limited,  
315a Hardy Street, Nelson 7010,  
New Zealand



**EPD programme operator:** The International EPD® System  
**Web:** <http://www.envirodec.com>  
**Email:** info@envirodec.com EPD  
**Post:** EPD International AB, Box 210  
60, SE-100 31 Stockholm,  
Sweden

## PRODUCT CATEGORY RULES (PCR)

CEN standard EN 15804:2012+A2:2019/AC:2021 served as the core Product Category Rules (PCR)

**Product Category Rules (PCR):** PCR 2019.14 Construction Products, version 1.3.4 The Technical Committee of the International EPD® System.  
**PCR review was conducted by:** See [www.envirodec.com](http://www.envirodec.com) for a list of members.

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

## LIFE CYCLE ASSESSMENT (LCA)

**LCA accountability:** University of Adelaide (Professor Jian Zuo)  
**LCA Practitioner:** Liancheng Li and Dr. Daniel Oteng  
**Web:** [www.adelaide.edu.au](http://www.adelaide.edu.au)  
**Email:** jian.zuo@adelaide.edu.au



## THIRD-PARTY VERIFICATION

Independent verification of the declaration and data, according to ISO 14025:2006, via:  
 EPD verification by individual verifier  
**Third party verifier:** Claudia Peña (Director of PINDA LCT SpA)  
email: [pinda.lct@gmail.com](mailto:pinda.lct@gmail.com)

**Verifier approved by:** EPD Australasia

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

Yes  No



Find out what we can do for you:  
[enquiries@resourceco.com.au](mailto:enquiries@resourceco.com.au)  
1300 696 733  
[resourceco.com.au](http://resourceco.com.au)