



Global **GreenTag**

International ^{PTY} _{LTD}



NaturePositive+ Declaration



Bird Habitats

Thermal Haven Nest Boxes[®]

Drouin Victoria 3818 Australia

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Manufacturer Story

Thermal Haven Nest Boxes are designed to restore habitats for hollow-dependent fauna.

Bird Habitats manufacture them to restore habitats for hollow-dependent fauna for future generations.

The design addresses temperature variations within the inner nesting space. Air is used as a thermal buffer to create a stable microclimate and limit extreme temperature variations. Corner profiles create a cavity between external wall, roof, floor panels and the internal nesting space. Ventilated cavities promote air convection to avoid interior overheating and allow for any water ingress to drain. No formaldehyde, glue or plastics are used.

Quality, sustainable sourced materials are used to produce durable nest boxes.

Product Description

Thermal Haven Nest Boxes are designed to restore habitats for hollow-dependent fauna.

The design addresses temperature variations within the inner nesting space. Air is used as a thermal buffer to create a stable microclimate and limit extreme temperature variations. The corner profiles create a cavity between external wall, roof, floor panels and the internal nesting space, and the ventilated cavity promotes air convection to avoid overheating of the interior and allows for any water ingress to drain. The nest boxes are made from reformed Australian PEFC-certified hardwood timber (89% post-industrially sourced weatherboards that otherwise would have been burnt for energy-recovery), stainless steel fixings and beeswax.

No formaldehyde, glues or plastics are used.

Each nest box is fitted with a stainless steel QR code for easy monitoring.





Declaration Summary

NaturePositive+

Build material world in balance and harmony with nature

Nature Positive+

151%

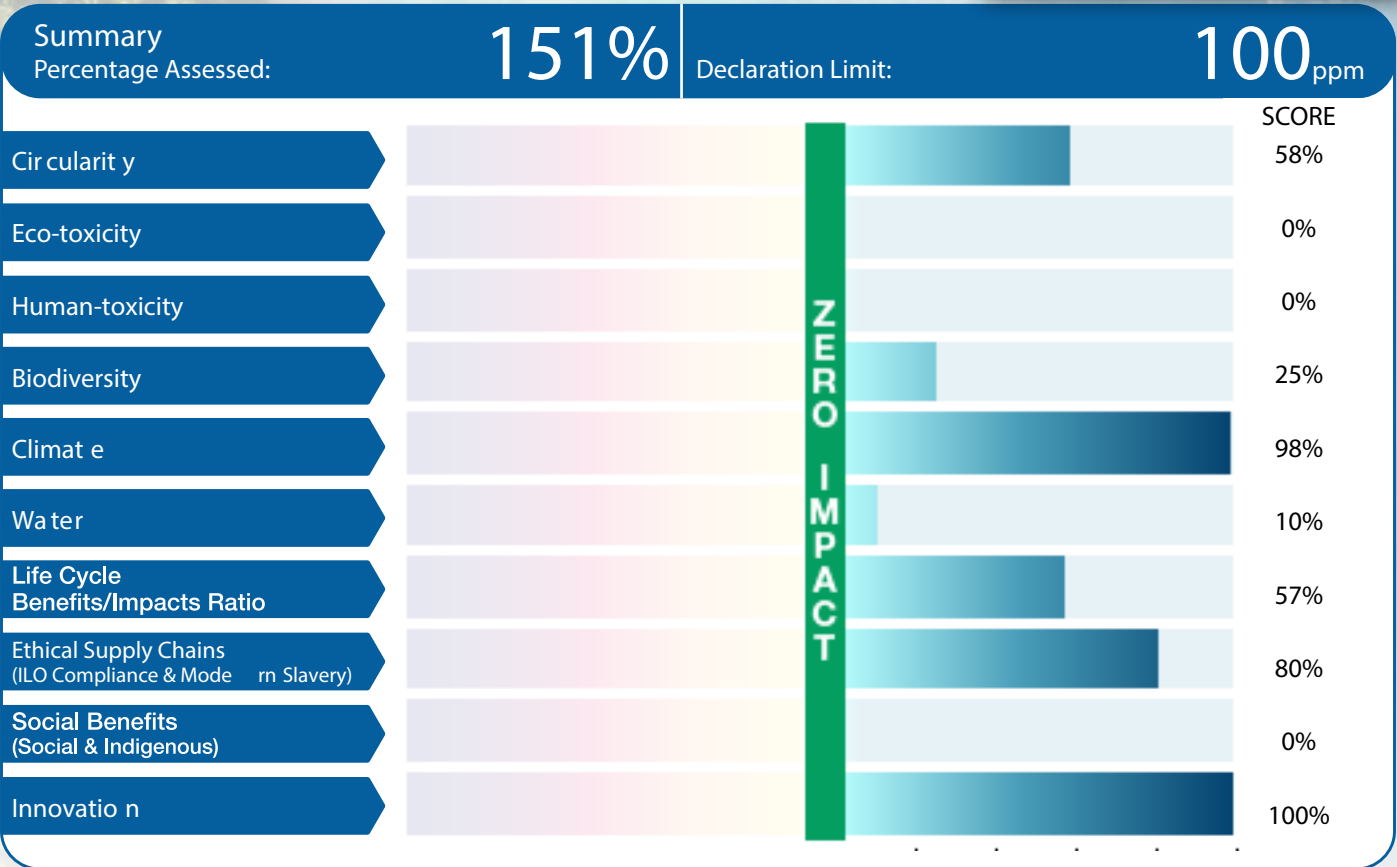
Global **GreenTag** Certified

PLATINUM

Bird Habitats Thermal Haven Nest Boxes®

Product or Range Name/s:
Thermal Haven Nest Boxes
Life Cycle Scope:
Cradle to Grave

Licensed Site/s: Drouin Victoria 3818 Australia
Licence Number: BIH:TH01:2023:NP
Licence Date: 17th November 2023
Valid To: 17th November 2028
Standard: NaturePositive+ Declaration v1.0



Declared by: Global GreenTag International Pty Ltd

The Global GreenTag NaturePositive+ Declaration has been designed to; provide substantially greater transparency of products' impacts and benefits to society and nature, facilitate an easier industry understanding of risks (if any) associated with any certified product/s, and start redressing the current and historical human impacts on climate and nature.

David Baggs
Chief Executive Officer

Dr Nana Bortsie-Aryee
Program Director



Summary Report



Bird Habitats Thermal Haven Nest Boxes®

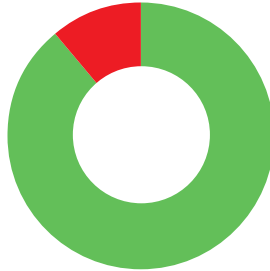
1. CIRCULARITY

Overall Material Circularity (CTI) Score:
= +58



Material Inputs Recycled/Virgin

■ Post Industrial recycled input	= 89%
■ Virgin material inputs	= 11%
Total = 100%	



Material Outputs

■ Repairable, refurbishable, manufacturable or recyclable	= 30%
■ Non Recoverable outflow	= 70%
Total = 100%	



Technical vs Biological Cycle Content

■ Technical Cycle Materials vs	= 100%
■ Biological Cycle Materials	= 0%



Technical vs Biological Cycle Content

NO	Product Stewardship Program (PSP)
YES	Spare Parts Availability (where relevant)
NO	Serviceable or Service Network? (where relevant)
YES	Warranty



2. TOXICITY

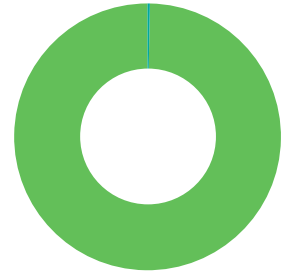
Overall Toxicity Score: = [0]

2A) HUMAN HEALTH TOXICITY RISK ASSESSMENT = [0]

Human Health Hazard Risks
H-Statements:

Percentage
of product

■ Level 1 – Acute & bio-accumulative risks	= 0%
■ Level 2 – Chronic & mild bio-accumulative risks	= 0%
■ Level 3 - Minor Risks only	= 0.3%
■ Level 4 – Safe: no known risks	= 99.7%



2A) HUMAN HEALTH TOXICITY RISK ASSESSMENT = [0]

Ecotoxicity Hazard Risks
H-Statements:

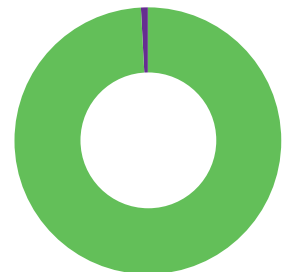
H-Statements:

■ Level 1 – Acute & bio-accumulative risks	= 0%
■ Level 2 – Chronic & mild bio-accumulative risks	= 0%
■ Level 3 – Minor Risks Only	= 0%
■ Level 4 - Safe: no known risks	= 100%



3. BIODIVERSITY = +25

■ Bio-Based Material	= 99.2%
■ Non Bio-Based Material	= 0.8%
■ Total Score for Bio-Based Material	= 26
■ Total Score for Non Bio-Based Material	= -0.4



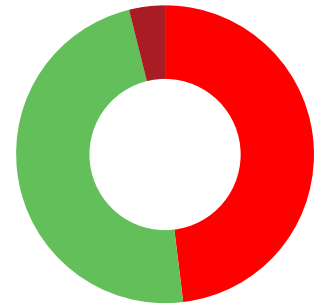


4. CLIMATE IMPACT

CLIMATE IMPACT Score= 97.92

CarbonRATE Results: 0.02%

■ Upfront Carbon	= 48.1 %
■ Fossil Fuel	= 3.8 %
■ Renewable Energy	= 0 %
■ Wind	= 0 %
■ Solar	= 0 %
■ Thermal	= 0 %
■ Wave	= 0 %
■ Biological Carbon	= 48.1 %



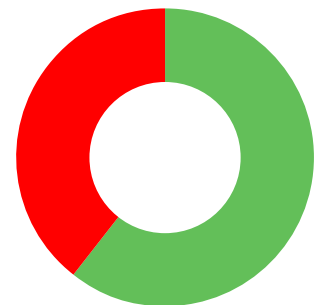
Offsets:

■ Carbon only (Renewables) Type/s:	= 0 kgCO _{2e} /Result
■ Offsets: Carbon drawdown	= 0 kgCO _{2e} /Result

5. LIFE CYCLE BENEFIT TO IMPACT RATIO:

= +56.5

■ LCA: ReCiPe Eco-indicator	= 56.5
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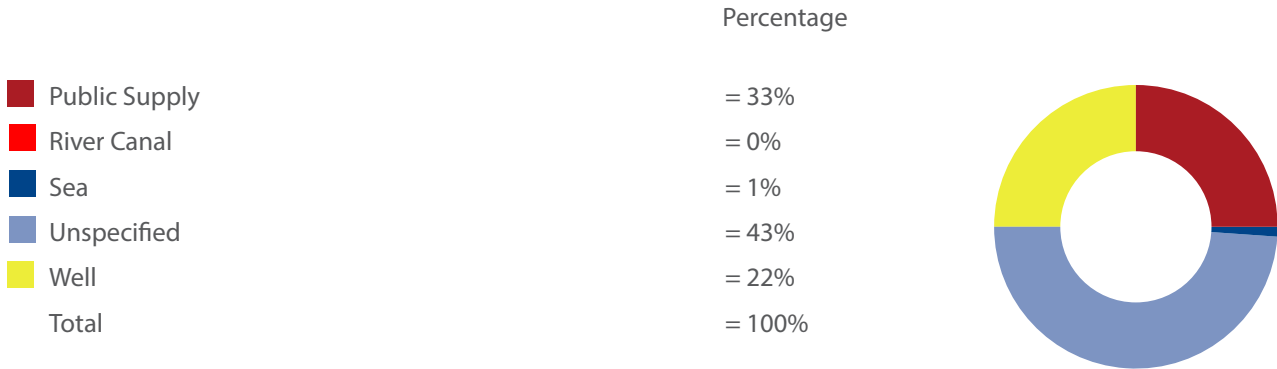




6. Water Footprint

Final Score: 10%

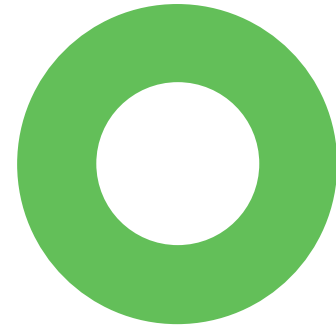
Water source by use (Cradle to Fate/Kg)



7. ETHICAL SUPPLY CHAINS

ILO Compliance = +80

■ NO
■ YES



- YES | Freedom of Association and Protection of the Right to Organise Convention, 1948 (No. 87)
- YES | Right to Organise and Collective Bargaining Convention, 1949 (No. 98)
- YES | Forced Labour Convention, 1930 (No. 29) (and its 2014 Protocol)
- YES | Abolition of Forced Labour Convention, 1957 (No. 105)
- YES | Minimum Age Convention, 1973 (No. 138)
- YES | Worst Forms of Child Labour Convention, 1999 (No. 182)
- YES | Equal Remuneration Convention, 1951 (No. 100)
- YES | Discrimination (Employment and Occupation) Convention, 1958 (No. 111)
- YES | Occupational Safety and Health Convention, 1981 (No. 155)
- YES | Promotional Framework for Occupational Safety and Health Convention, 2006 (No. 187)

8. SOCIAL BENEFITS = 0

- 8a) Social Benefit Outcomes
- 8b) Indigenous Engagement Benefits

9. INNOVATION = 10

The innovation inherent in Thermal Haven Nests is rated 'High' and given the maximum score for 'Leadership in Innovation' for the following reasons.



1.

CIRCULARITY



Bird Habitats
Thermal Haven Nest Boxes®
Drouin Victoria 3818 Australia



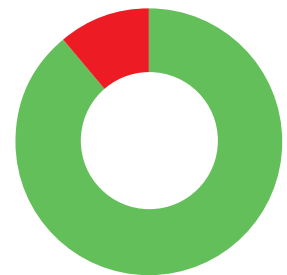
1. CIRCULARITY

Overall Material Circularity (CTI) Score:
= +58



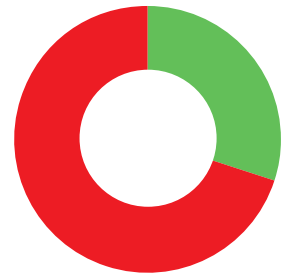
Material Inputs Recycled/Virgin

■ Post consumer/ industrial recycled input	= 7.8 Kg/product
■ Virgin material inputs	= 1 Kg/product
■ Scrap to re-use	= 0 Kg/product
■ Scrap to landfill	= 0 Kg/product
■ Scrap to energy	= 0 Kg/product
Total = 8.8 kg	



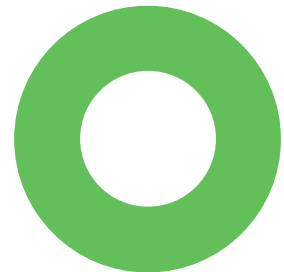
Material Outputs/Circularity

■ Repairable, refurbishable, manufacturable or recyclable	= 2.6 Kg/product
■ Non Recoverable outflow	= 6.2 Kg/product
Total = 8.8 Kg	



Technical vs Biological Cycle Content

■ Technical Cycle Materials vs	= 8.8 Kg
■ Biological Cycle Materials	= 0s Kg



Technical vs Biological Cycle Content

NO	Product Stewardship Program (PSP)
YES	Spare Parts Availability (where relevant)
NO	Serviceable or Service Network? (where relevant)
YES	Warranty

2.

TOXICITY



Bird Habitats
Thermal Haven Nest Boxes®
Drouin Victoria 3818 Australia



2. TOXICITY

Banned Ingredients

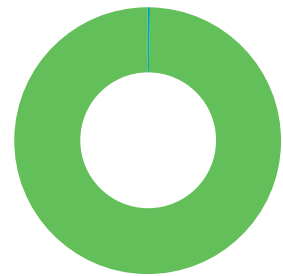
- Substances of Very High Concern (SVHCs) - under EU's REACH;
- Pesticide & Industrial Chemicals (PICs) - under Rotterdam Convention Annex III;
- Persistent Organic Pollutants (POPs) – under Stockholm Convention;
- Ozone Depleting Substances - under Montreal Protocol (Annex A, B, C or E);
- Fluorinated Hydrocarbons (excepting some specific external coating and load bearing exceptions e.g., roofing, bearings etc.);
- ‘Substances which must not form part of the composition of cosmetics’ – under EN 1223:2009 Annex II;
- Cosmetics ‘Conditionally Excluded chemicals’ – under EN 1223:2009 Annex III;
- Brominated Fire Retardants;

2A) HUMAN HEALTH TOXICITY RISK ASSESSMENT = [0]

Human Health Hazard Risks

H-Statements:

	Percentage of product	Weight
■ Level 1 – Acute & bio-accumulative risks	= 0%	= 0 Kg/product
■ Level 2 – Chronic & mild bio-accumulative risks	= 0%	= 0 Kg/product
■ Level 3 - Minor Risks only	= 0.3%	= 0.02 Kg/product
■ Level 4 – Safe: no known risks	= 99.7%	= 8.78 Kg/product



2A) HUMAN HEALTH TOXICITY RISK ASSESSMENT = [0]

Ecotoxicity Hazard Risks

H-Statements:

H-Statements:

■ Level 1 – Acute & bio-accumulative risks	= 0%	= 0 Kg/product
■ Level 2 – Chronic & mild bio-accumulative risks	= 0%	= 0 Kg/product
■ Level 3 – Minor Risks Only	= 0%	= 0 Kg/product
■ Level 4 - Safe: no known risks	= 100%	= 8.8 Kg/product



Additional Notes:

The products have successfully passed the relevant GreenTag Standard's Cautionary Assessment Process and no issues of concern or red lights comments exist regarding the toxicity of the products

No Human and Environmental health benefit has been identified.



2C) PRODUCT HEALTH DECLARATION

GLOBAL GREEN TAG INTERNATIONAL PTY LTD



Bird Habitats Thermal Haven Nest Boxes®

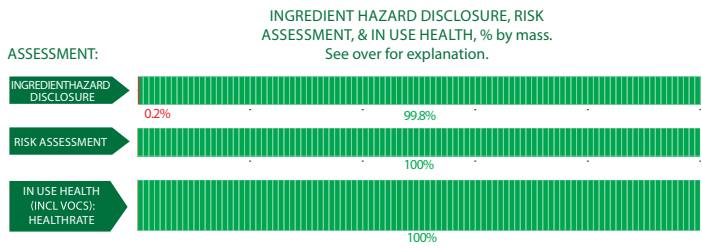
Thermal Haven Nest Boxes are designed to restore habitats for hollow-dependent fauna. The design addresses temperature variations within the inner nesting space. Air is used as a thermal buffer to create a stable microclimate and limit extreme temperature variations. Each nest box has a tracking number CNC engraved to the base for easy monitoring.

Products/Ranges:	Thermal Haven Nest boxes
Product Stages Assessed:	Whole of life + In-Use
Product Type:	Habitat restoration
CSI Masterformat:	N/A
Licensed Site/s:	Drouin, Australia
Licence Number:	BIH:TH01:2022:PH
Licence Date:	14th November 2022
Valid To:	14th November 2024
Standard:	GGT International v4.0
Screening Date:	31st October 2022
PHD URL:	globalgreentag.com/certificate/2233



PHD Summary	Inventory Threshold:	Inventory Method:
Percentage Assessed: 100%	100ppm Product Level	Nested Materials

- GreenTag Banned List Compliant.
- GreenTag PHD recognized by WELL™ & LEED™ Material Transparency & Optimization credits included below:
- Meets Green Star™ 'Buildings v1.0' as Recognized for -- Credit 13: Exposure to Toxins.
- Meets IWBI™ WELL™ v1.0 as Recognized for -- Feature 26 (Part 1); Feature 97 (Part 1); as a Compliant Technical Document (Audited) for -- Feature 11 (Part 1); Feature 25 (Part 5), and, meets IWBI™ WELL™ v2.0 as Recognized for -- X07 (Parts 1,3); X08 (Part 2); X11 (Part 2); as a Compliant Technical Document (Audited) for -- X07 (Part 2); X08 (Part 1).
- Meets USGBC LEED™ v4.0 and v4.1 Rating Tool Credit as Recognized for MR Credit: Building Product Disclosure and Optimisation - Material Ingredients - Option 1: Material Ingredient Reporting, Option 2: International ACP - REACH Optimisation.
- Independent third party assessment for worker, user, and environmental exposure to any Carcinogens, Mutagens, Reproductive Toxicant or Endocrine Disruptors.
- Safe for bird and mammal use.



Declared by:
Global GreenTag
International Pty Ltd

David Baggs
CEO & Program Director
Verified compliant with:
ISO 14024 & ISO 17065

Thermal Haven Nest Boxes, Bird Habitats, globalgreentag.com/certificate/2233



1.0 Scope

The Global GreenTag International (GGT) Product Health Declaration (PHD) has been designed to provide an additional level of service to the green product sector in facilitating an easier understanding of both the hazard and risks associated with any certified products, and is intended to indicate:

- Chemical hazards of both finished product and unique ingredients to a minimum level of 100ppm for final product throughout the product life cycle (including any VOC or other gaseous emissions);
- An assessment of exposure or risk associated with ingredient handling, product use, and disposal in relation to established mitigation and management processes;

It is not intended to assess:

- substances used or created during the manufacturing process unless they remain in the final product; or
- substances created after the product is delivered for end use (e.g., if the product unusually degrades, combusts or otherwise changes chemical composition).

GGT PHDs are only issued to products that have passed GGT Standards' certification requirements. The Level of Assessment (BronzeHEALTH, SilverHEALTH, GoldHEALTH or PlatinumHEALTH) of a PHD rating relates ONLY to a Human Health Toxicity Assessment and is declared separately and not equivalent to the overall Bronze, Silver Gold or Platinum Green Tag Certification Mark Tier Levels of LCARate.

1.2 Preparing a PHD

GGT PHDs are prepared in the format of a transparency document which utilizes Hazard Classifications from the UN Globally Harmonised System of Classification and Labelling of Chemicals (GHS). Hazard Classifications are then risk assessed with a focus on the In Use stage for an outcome of Certification. Assessments are undertaken by GGT Qualified Exemplar Global Lead Auditors and subsequently accepted for Certification by the GGT Program Director (also a Qualified Exemplar Global Lead Auditor) under the International Standard v4.0/4.1, Personal Products Standard v1.0/1.1, or Cleaning Products Standard v1.1/1.2 and above Program Rules.

1.3 External Peer Review

Every GGT PHD is independently peer-reviewed by an external Consultant Toxicologist and Member of the Australasian College of Toxicology & Risk Assessment.

2.0 Declaration of Ingredients

Where a manufacturer wishes recognition under a rating program that requires transparency of ingredients, such as LEED™ v4.0 & v4.1, WELL™ v1.0 & v2.0, Green Star™ - the following information is declared from the audit:

Colour	Ingredient Name
Green	Ideal- Low No concerns- ingredient safe at any level based on current known science, % of the ingredient, and relevance to use context'
Yellow	Medium to Low Hazardous Ingredient with minor level of "Issue of Concern" depending on % of the ingredient, hazard level, and relevance to use context'
Orange	Moderate Hazardous ingredient with "Issue of Concern" or "Issue of Concern Minimised" depending on % of the ingredient, hazard level, and relevance to use context'
Red	Problematic (Red): Target for Phase Hazardous ingredient with "Red Light" or "Red Light Minimised" concern depending on % of the ingredient, hazard level, and relevance to use context'
Dark Red	Very Problematic (Dark Red): Target for Phase Very Hazardous ingredient with "Red Light Exclusion" concern depending on % of the ingredient, hazard level, and relevance to use context'
Grey	Uncategorised Not able to be categorised due to lack of toxicity impact information.
Black	Banned Ingredients Petroleum, Parabens plus a wide range of compounds stipulated by cleaning/personal products standards.

Global GreenTag International Pty Ltd (Global GreenTag) is not a medical professional organisation. Global GreenTag does not purport to provide medical advice, and makes no warranty, representation, or guarantee regarding the declaration that it provides in relation to any allergies, chemical sensitivities or any other medical condition, nor does Global GreenTag assume any liability whatsoever arising out of the application or use of any product or piece of equipment that has been chemically assessed by Global GreenTag.

The chemical assessments carried out provide transparent information peer reviewed by a consultant toxicologist regarding the chemical make-up and ingredients of certain materials and products, but such assessments are not to be taken as any form of medical assessment or health advice and are not targeted towards providing specific solutions to allergenic conditions or any other type of medical concerns.

Users must carry out their own investigations if they are concerned about specific medical conditions and the impact of certain products or ingredients in relation to specific medical concerns.

Global GreenTag takes no responsibility and is not liable in any way with respect to any medical or health issues arising from a person's use of materials or products that have been chemically assessed by Global GreenTag. Global GreenTag shall not be liable for any direct, indirect, punitive, incidental, special or consequential damages to property or life whatsoever, arising out of or connected with the use or misuse of any materials or products that have been assessed by Global GreenTag.

2 Product Health Declaration

PHD

Thermal Haven Nest Boxes, Bird Habitats, globalgreentag.com/certificate/2233



Ingredient Name	CAS Number OR Function	Proportion in finished product	GHS, IARC & Endocrine Category	REACH Compliance	Ingredient Assessment	Whole Of Life Assessment	In Use Health Assessment	Comment
Material: Reformed Wood Panel (RWP) - (Weathertex Natural and Primed Panel Base)								
Hardwood timber (Eucalyptus)	Substrate	90-100%	None	OK	█	█	█	Inhaled wood fiber can cause lung cancer under long term occupational exposure. The manufacture uses a wet processing method in a facility where occupational health and safety and environmental management systems are in place. Due to these conditions, occupational exposure is very unlikely to occur. In use, the product poses no health risks. Note: Sawing, cutting, sanding, grinding of wood products may generate sawdust. Wearing appropriate personal protective equipment is recommended to reduce risk during these operations. Recycled Content: from Post-I Nanomaterials: No
Paraffin Wax	8002-74-2	1-5%	None	OK	█	█	█	Workplace health and safety procedures are in place during the manufacturing phase of the RWP boards. Paraffin wax is present in small quantities and is embedded and cured in the final product, further reducing the risk. There are no identifiable risks to the in use phase. Recycled Content: Post-I Nanomaterials: No
Material: RWP Undercoat - (Weathertex Primed Panel only)								
Water	Diluent	0.01-1%	None	OK	█	█	█	There are no identifiable hazards associated this substance. Recycled Content: from Post-I Nanomaterials: Unknown
Talc	14807-96-6	0.01-1%	None	OK	█	█	█	Workplace health and safety procedures are in place during the manufacturing phase of the RWP boards where this substance is cured in the final product. While intact the product poses not risk to users. During use, the primer side faces the internal wall cavity so it is unlikely to pose a risk to bird or mammal users. Recycled Content: Post-I Nanomaterials: Unknown
Titanium Dioxide	13463-67-7	0.01-1%	IARC Group 2B H351 (Carc 2) (Inhalation)	OK	█	█	█	Workplace health and safety procedures are in place during the manufacturing phase of the RWP boards where this substance is cured in the final product. While intact the product poses not risk to users. During use, the primer side faces the internal wall cavity so it is unlikely to pose a risk to bird or mammal users. Recycled Content: Post-I Nanomaterials: Unknown
Proprietary	Additive	0.01-1%	None declared	OK	█	█	█	Workplace health and safety procedures are in place during the manufacturing phase of the RWP boards where this substance is cured in the final product. While intact the product poses not risk to users. During use, the primer side faces the internal wall cavity so it is unlikely to pose a risk to bird or mammal users. Recycled Content: Post-I Nanomaterials: Unknown
Material: RWP Primer - (Weathertex Primed Panel)								
Water	Diluent	0.01-1%	None	OK	█	█	█	There are no identifiable hazards associated this substance. Recycled Content: from Post-I Nanomaterials: Unknown
2-butoxyethanol	111-76-2	0-0.05%	IARC Group 3 H302 (Acute Tox 4) H315 (Skin Irrit 2) H319 (Eye Irrit 2)	OK	█	█	█	Workplace health and safety procedures are in place during the manufacturing phase of the RWP boards. This substance evaporates during the curing processes within the factory and is unlikely to be present in the final product. During use, the primer side faces the internal wall cavity so it is unlikely to pose a risk to bird or mammal users. Recycled Content: Post-I Nanomaterials: Unknown

3 **Product Health Declaration** **PHD**

Thermal Haven Nest Boxes Bird Habitats globalcert.com/certificates/7333



1-(2-butoxy-1-methyl- thoxy)propan-2-ol	29911-28-2	0-0.05%	None	OK				Workplace health and safety procedures are in place during the manufacturing phase of the RWP boards where this substance is cured in the final product. While intact the product poses not risk to users. During use, the primer side faces the internal wall cavity so it is unlikely to pose a risk to bird or mammal users. Recycled Content: Post-I Nanomaterials: Unknown
Material: Wood Reinforcement - Corners								
Victorian ASH Hardwood	Structural	0.05-1%	None	OK				The only hazards associated with this substance are associated with inhaling wood dust through sawing, cutting, sanding, grinding of this product. Wearing appropriate personal protective equipment is recommended to reduce risk during these operations. While whole, this product is not hazardous to human or bird users. Recycled Content: No Nanomaterials: No
Material: Wood Reinforcement - Guard								
Victorian ASH Hardwood	Structural	0.05-1%	None	OK				The only hazards associated with this substance are associated with inhaling wood dust through sawing, cutting, sanding, grinding of this product. Wearing appropriate personal protective equipment is recommended to reduce risk during these operations. While whole, this product is not hazardous to human or bird users. Recycled Content: No Nanomaterials: No
Material: Screws								
Stainless Steel	12597-68-1	0.05-1%	None	OK				There are no identifiable hazards associated this substance. Recycled Content: Non Nanomaterials: Unknown
Material: Sealant								
Beeswax	8012-89-3	0-0.05%	None	OK				There are no identifiable hazards associated this substance. Recycled Content: No Nanomaterials: Unknown

* No GHS H-Statement classification

Comments:
VOC testing for whole product is not available.
Weathertex RWP has a TVOC emissions rate of <0.5mg/m³/hr when tested using ASTM D5116 in 2015. This is within the 0.5mg/m³/hr requirement.

4 Product Health Declaration

PHD

Thermal Haven Nest Boxes, Bird Habitats, globalgreentag.com/certificate/2233



3.

BIODIVERSITY



Bird Habitats
Thermal Haven Nest Boxes®
Drouin Victoria 3818 Australia

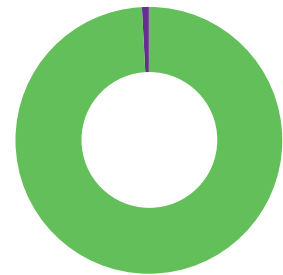


3. BIODIVERSITY = + 25

Bird Habitats sources its engineered wood from Weathertex's off cuts that are too small to be used else where and would be burned under normal circumstances. Both the engineered wood panels and hardwood components are sourced from PEFC certified sources. Beeswax was sourced from an Australian company from both Australia and international sources. As the agricultural practices could not be verified the worst case practices were implemented. The screws were the only material that was not primarily bio based.

Material Score

■ Bio-Based Material	= 8.72 Kg/product
■ Non Bio-Based Material	= 0.08 Kg/product
Total Score for Bio-Based Material	= 26
Total Score for Non Bio-Based Material	= -0.4





4.

CLIMATE
(UPFRONT CARBON)



Bird Habitats
Thermal Haven Nest Boxes®
Drouin Victoria 3818 Australia

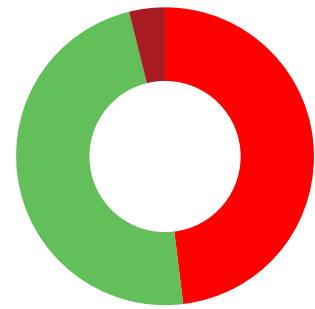


4. CLIMATE IMPACT

CLIMATE IMPACT Score= 97.92

CarbonRATE Results: 0.02%

■ Upfront Carbon	= -0.052 kgCO _{2e} /kg of nest box over 20 years cradle to grave
■ Fossil Fuel	= 2.5 kgCO _{2e} /kg of nest box over 20 years cradle to grave
■ Renewable Energy	= 0 kgCO _{2e} /Result
■ Wind	= 0 kgCO _{2e} /Result
■ Solar	= 0 kgCO _{2e} /Result
■ Thermal	= 0 kgCO _{2e} /Result
■ Wave	= 0kgCO _{2e} /Result
■ Biological Carbon	= -2.5 kgCO _{2e} / kg of nest box over 20 years cradle to grave



Offsets:

■ Carbon only (Renewables) Type/s:	= 0 kgCO _{2e} /Result
■ Offsets: Carbon drawdown	= 0 kgCO _{2e} /Result

No Additional Notes

5.
EPD
EPD:BA



Bird Habitats
Thermal Haven Nest Boxes®
Drouin Victoria 3818 Australia



5A. EPD - ECO PLATFORM COMPLIANT EPD - ISO14025



Global **GreenTag**
International EPD Program
EPD™
Environmental Product Declaration

Bird Habitats Pty Ltd
Thermal Haven Nest Boxes
Drouin Victoria 3818 Australia





Global GreenTag^{Cert™} EPD Program
Environmental Product Declaration
Compliant to ISO 14025
Thermal Haven Nest Box
BH 01 2023EP

Mandatory Disclosures

EPD type	Cradle to grave	EPD Number	BH 01 2023EP
Issue Date	19 Nov 2023	Valid Until	19 Nov 2026

Demonstration of Verification

Product Category Rules (PCR)	Global GreenTag International Platform EPD compliant with the ISO14025 standard [1] impact assessment methodology in reference EN15804 [2] and PCR WNB: 2023. [3]		
<input checked="" type="checkbox"/> Internal	<i>Delwyn Jones</i> 16 Nov 2023	LCA Developed by Delwyn Jones, The Evah Institute	
<input checked="" type="checkbox"/> External	<i>M. Jones</i> 16 Nov 2023	Third Party Verifier ^a Murray Jones Ecquate Pty Ltd	
Communication	This EPD discloses potential environmental outcomes compliant with ISO14025:2010 and independent external verification of this declaration and data ^a ensures it is fit for business-to-consumer communication. [1]		
Comparability	Different program EPDs may not be comparable. Comparability is further dependent on the product category rules and data source used.		
Reliability	LCIA results are relative expressions that do not predict impacts on category endpoints, exceeding of thresholds, safety margins or risks.		
Objectives	To show improved, net-zero, net-positive and regenerative results and timely imperatives to secure viable climate and biodiversity on earth against a background of increasing disasters attributable to anthropogenic climate change.		
Explanations	Further explanatory information is available at info@globalgreentag.com or by contacting certification1@globalgreentag.com .		

EPD Program Operator	LCA and EPD Producer	Declaration Owner
Global GreenTag International Pty Ltd L38, 71 Eagle St., Brisbane QLD 4000 Australia Phone: +61 (0)7 33 999 686 http://www.globalgreentag.com	Ecquate Pty Ltd PO Box 123 Thirroul NSW 2515 Australia Phone: +61 (0)7 5545 0998 http://www.evah.com.au	Bird Habitats Pt Ltd Drouin, Victoria VIC 3818 Australia Phone: +61 (0)438 555 570 https://birdhabitats.com.au





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Program Description

EPD Scope	The scope is cradle to grave A1 to C4 + D as defined by ISO14025. [1]																		
System boundary	The system boundary with nature includes material and energy acquisition, processing, manufacture, transport, installation, use plus waste arising to end of life.																		
Stages included	All known operations and stages in modules A1 to D3 are included.																		
Information Model	Figure 1 depicts A1 to C4 modules inside this cradle to grave system boundary.																		
Model Information	Building Life Cycle Assessment												Beyond system						
Stages	Actual					Scenarios							Benefit & load						
	Product			Construct		Use				End-of-Life									
	A1	A2	A3	A4	A5	B1	B2	B3	B4	B5	B6	B7	C1	C2	C3	C4	D1	D2	D3
Operations Cradle to Grave Fate C₂F & beyond system to Cradle (C₂C)	Resources	Transport	Manufacture	Transport	Construct	Use	Maintain	Repair	Replace	Returbish	Energy use	Water use	Demolish	Transport	Process Waste	Disposal	Reuse	Recovery	Recycling
C₂F	M	M	M	M	M	M	M	M	M	M	M	M	M	M	M	M	0	0	0
C₂Gate+Options	M	M	M	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0

Figure 1 Modules A to C Within the Cradle to Grave System Boundary and D Beyond

Data Sources

Primary Data	Data is from primary sources 2018 to 2023 including manufacturer and supplier standards, logistics, technology, market share and management system in accordance with EN ISO 14044:2006, 4.3.2. All are physically allocated not economically allocated.
A1-A3 Stage inclusions	Operations include all known raw material acquisition, refining and processing plus scrap or material reuse from prior systems; electricity generated from all sources with extraction, refining & transport plus secondary fuel energy and recovery processes. Also, transport to factory gate; manufacture of inputs, ancillary material, product, packaging, maintenance, replacement plus flows leaving at end-of-waste boundary and fate of all flows at end of life.
Variability	Significant differences of average LCIA results are declared.
Chemicals of Concern	Contains no substances in the European Chemicals Agency "Authorised or Candidate Lists of Substances of Very High Concern (SVHCs)".

LCA Data Quality

Data quality parameters are tabled below. Data was <10 years, cut-off & quality complies with ISO14025. [1]

Background	Data Quality	Parameters and Uncertainty (U)			
Correlation	Metric org	U ±0.01	U ±0.05	U ±0.10	U ±0.20
Reliability	Reporting	Site Audit	Expert verify	Region	Sector
	Sample	>66% trend	>25% trend	>10% batch	>5% batch
Completion	Including	>50%	>25%	>10%	>5%
	Cut-off	0.01%w/w	0.05%w/w	0.1%w/w	0.5%w/w
Temporal	Data Age	<3 years	≤5 years	<7.5 years	<10 years
	Duration	>3 years	<3 years	<2 years	1 year
Technology	Typology	Actual	Comparable	In Class	Convention
Geography	Focus	Process	Line	Plant	Corporate
	Range	Continent	Nation	Plant	Line
	Jurisdiction	Representation is Global. Australasia and Pacific Rim			



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System Analysis Scope and Boundaries

Figure 2. shows included processes in a cradle to grave system boundary to end of life fates reuse, recycling, or landfill grave. Stages A1 to 3 model actual operations to acquire, refine, transport, fabricate, coat, use, clean, repair, reuse and dispose of metal, masonry, ceramic, timber, glass, plastic and composites. Stage A4 to C4 are modelled on typical scenarios to forecast operations including those of:

- Mining, extracting and refining resources to make commodities and packaging;
- Acquiring, cultivating, harvesting, extracting, refining produce and biomass;
- Fuel production to supply power and process energy and freight;
- Chemicals use in processing resources, intermediates and ancillaries;
- Process energy, fuel and freight of resources, intermediates and ancillaries;
- Use, cleaning, recoating, repair, recycling, re-use and landfill, as well as
- Infrastructure process energy transformed and material wear loss e.g. tyres.

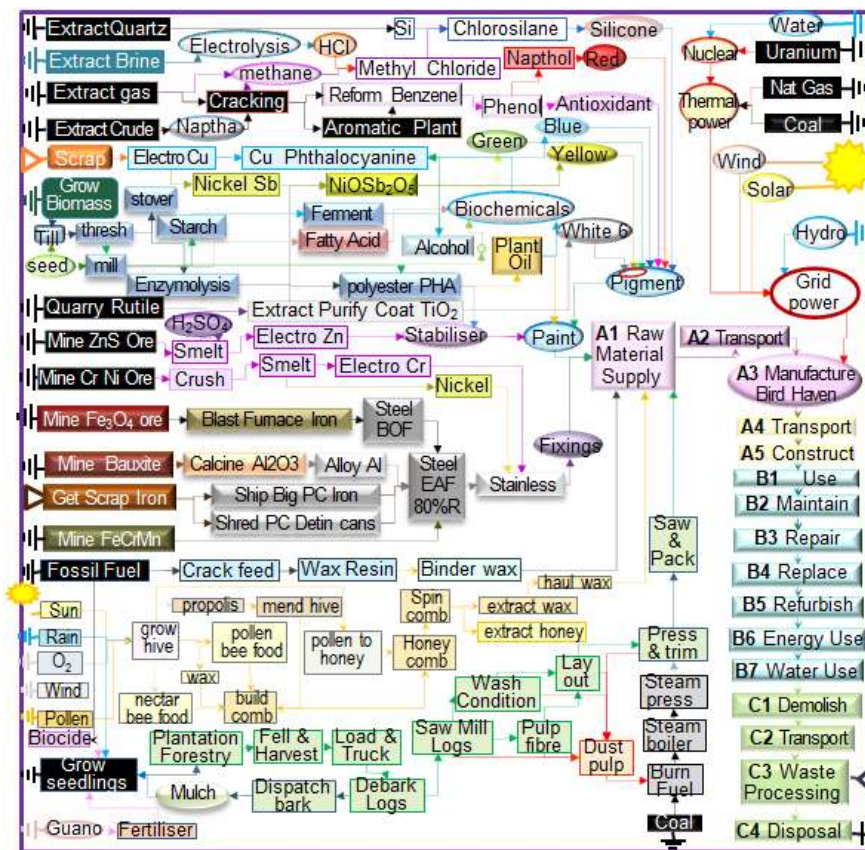


Figure 2. Product Process Flow Chart



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Details of Manufacturer

The declared product Thermal Haven Nest Boxes are designed to restore habitats for hollow-dependent fauna. Bird Habitats manufacture them to restore habitats for hollow-dependent fauna for future generations.

The design addresses temperature variations within the inner nesting space. Air is used as a thermal buffer to create a stable microclimate and limit extreme temperature variations. Corner profiles create a cavity between external wall, roof, floor panels and the internal nesting space. Ventilated cavities promote air convection to avoid interior overheating and allow for any water ingress to drain. No formaldehyde, glue or plastics are used.

Quality, sustainably sourced materials are used to produce durable nest boxes. The products are designed and made in Drouin Victoria from Australian PEFC-certified hardwood timber 89% home scrap, stainless steel fixings and beeswax. Each nest box is fitted with a stainless steel QR code for easy monitoring.

Product Information

This section provides data required to calculate assessment results factoring different mass and periods.

Brand Name & Code	Bird Habitats
Range Names	Thermal Haven Nest Boxes
Factory warranty	Fit for purpose use
Manufacturer	Thermal Haven Nest Boxes
Factory address	Drouin, Victoria 3818, Australia
Site representation	Made in Australia. Uses are assumed as for Australasia and Pacific Rim
Time	Made in and sold from 2022 for single use
Application	Wildlife nest boxes to incubate, raise and house young until independent
Function	Nesting boxes for wildlife to mate, nest and raise young safely in comfort
Lifetime [5,6]	20 years Reference Service Life (RSL) modelled
Declared unit	8.8kg Thermal Haven Nest Boxes
Functional unit	Thermal Haven Nest Boxes /kg use 20 years cradle to grave

Whole of life Performance

Health Protection	The product does not contain levels of carcinogenic, toxic or hazardous substances that warrant ecological or human health concern cradle to grave. It passed the Ecospecifier Cautionary Assessment Process (ESCAP) and no issues or red-light concerns existed for product human or ecological toxicity.
Effluent	LCI results and ESCAP raised no red light concerns in emissions to water. ¹
Waste	Cradle to grave waste to landfill from operations was non-hazardous.
Environmental Protection	Continuous improvement under the maker's uncertified management system avoids toxics, waste and pollution plus reduce their material and energy use.
Environmental Health Effects	No potential in-use impacts on environment or health are known.

¹ According with national standards in ANZECC Guideline For Fresh & Marine Water Quality (2000)



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Product Components

This section summarises factory components, functions, source nation and % mass share. Product content listed below has a ±5% range and confidence interval 90% certain to contain true population means at any time.

Listing such certainty considers normal resource acquisition, supply chain, sedimentation, seasonal, manufacturing and product variation over this EPD's validity period.

This also allows for intellectual property protection whilst ensuring fullest possible transparency.

Base Material Origin and Detail

Table 2 lists key components by function, type, sources and % mass share. Boxes were not packaged.

Function	Component	Source	Amount
Internal walls	Weatherex natural	Newcastle New South Wales	>50 <51
Exterior walls	Weatherex primed	Newcastle New South Wales	>38 <39
Hardwood Corners	Victorian Ash ²	PEFC ³ Victoria	>9.1 <9.2
Screws & tag	316 Stainless Steel	Germany	>1.0 <1.1
Hardwood Guard	Jarrah ⁴	PEFC South Western Australia	>0.7 <0.8
Coating	Beeswax	Australia	<0.06

This excludes the tree-fixing kit, covered and open landing perch, entrance tunnel, ladder and anti-Myna baffle.

Product Functional & Technical Performance Information

This section provides manufacturer specifications and additional information.

Material quality	>95% PEFC and Global GreenTag International certified sustainable lumber.
Design	Designed to restore habitats for hollow-dependent fauna. Designed to create a cavity between external walls and internal nesting space. Entry hole size, shape and location can be adapted to suit targeted species.
Thermal performance	Ventilated air gaps create a thermal buffer for the occupants. Internally stable microclimate limits extreme temperature variations. Thermal profile results comparable to tree hollows are at https://www.thermalhaven.com.au/research .
Moisture drainage	Cavity vents allow moisture ingress to drain.
Wildlife safety	Low VOC, no plastics, glues or formaldehydes
Health Safety & Environment	Apart from compliance to occupational and workplace health safety and environmental laws no additional personal protection is considered essential for manufacture, use or reuse.
Standard Reference	Test results are available at https://www.thermalhaven.com.au/research .
Practices Reference	https://www.info@birdhabitats.com.au
Effluent	LCI results and ESCAP raised no red-light concerns in emissions to water. ⁵
Disposal	No production waste is sent to river, land or ocean outfalls or council landfills.

² Eucalyptus Marginata

³ Programme for the Endorsement of Forest Certification

⁴ Eucalyptus delegatensis and Eucalyptus regnans

⁵ According with national standards in ANZECC Guideline For Fresh & Marine Water Quality (2000)



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Scenarios Descriptions

This section defines modelling stages scenarios A4 to D3 beyond actual operations in module A1 to A3.

Module	Type specified	Amount	Type specified	Amount
Construct				
A4 Transport factory to depot then to site	Steel Sea Shipping	13,000	85% Capacity	Full back load
	Wood Interstate Rail	1300 km	85% Capacity	Full back load
	Box 25t semi-trailer	200 km	85% Capacity	No back load
	Box 2 to 5t vans	20 km	85% Capacity	No back load
A5 Install	Renewable Power	100%	Rain water	100%
	VOCs indoors	0%	Packaging & Waste	0%
Building Modules				
B1 Use	VOCs	0%	No other flows in box	0%
B2 Maintain	Nest fit for purpose	0%	Nesting wildlife	100%
B3 Repair	Nest fit for purpose	0%	No other flows	0%
B4 Replace	Nest fit for purpose	0%	No other flows	0%
B5 Refurbish	Nest fit for purpose	0%	Nesting wildlife	100%
B6 Energy use	Wildlife nest off grid	0%	Solar and wind energy	100%
B7 Water use	Wildlife nest off grid	0%	Rain, dew and forage	100%
End of Life Modules				
C1 Demolish	Fit for purpose nest	0%	No other flows for box	0%
C2 Transport	Fit for purpose nest	0%	No other flows for box	0%
C4 Disposal	Fit for purpose nest	0%	No other flows for box	0%
Beyond System Boundary Modules				
D1 Reuse	Fit for purpose nest	100%	No other flows for box	0%
D2 Recover	Fit for purpose nest	0%	No other flows for box	0%
D3 Recycle	Fit for purpose nest	0%	No other flows for box	0%



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Environmental Impact Terminology

Environmental impacts contributing to risks of social and ecological issues and collapse are tabled below with common names and remedies given for each indicator.

<p>Global warming forcing Climate Change</p>	<p>Greenhouse gases absorb infra-red radiation. This heat reduces thermal energy differentials, from equator to poles, forcing ocean current and wind circulation to blend and regulate climate. Weakly blended “lumpier” weather has more frequent, extreme heat wave, fire-storm, cyclone, rain-storm, flood and blizzard events. Accumulation of carbon dioxide, natural gas methane, nitrous oxides and volatile organic compounds from burning fossil fuels causes global warming. Forest and wilderness growth absorbing air-borne carbon in biomass can drawdown such accumulation. Urgent renewable energy reliance is vital in time to avoid imminent tipping points and the worsening “<i>climate emergency</i>”.</p>
<p>Ozone layer depletion</p>	<p>Stratospheric ozone loss weakens the planet’s solar shield so more shorter wavelength ultraviolet (UVB) light reaching earth damages plants and increases malignant melanoma and skin cancer in humans and animals. Chlorofluorocarbons, hydrochlorofluorocarbons (HCFC), chlorobromomethane, hydrobromofluorocarbons, carbon tetrachloride, methyl chloroform, methyl bromide and halon gas cause ozone layer loss. To repair the “<i>ozone hole</i>” reliance on ozone-safe refrigerants, aerosols and solvents is essential to avoid further its depletion and enable accumulation of naturally-formed ozone.</p>
<p>Acidification</p>	<p>Acidification reduces soil and waterway pH, impedes nitrogen fixation vital for plant growth and inhibits natural decomposition. It increases rates and incidence of fish kills, forest loss and deterioration of buildings and materials. Chief synthetic causes of “<i>acid rain</i>” are emissions of sulphur and nitrogen oxides, hydrochloric and hydrofluoric acids and ammonia from burning fossil fuels polluting precipitation of rain and snow worldwide.</p>
<p>Eutrophication of terrestrial, freshwater and marine life</p>	<p>Eutrophication from excessively high macronutrient levels added to natural waters promotes excessive plant growth that severely reduces oxygen, water and habitat security for aquatic and terrestrial organisms across related ecosystems. Chief synthetic cause of “<i>algal blooms</i>” is nitrogen (N, NO_x, NH₄) and phosphorus (P, PO₄³⁻) in rain run-off over-fertilised land catchments.</p>
<p>Photochemical ozone creation</p>	<p>Tropospheric photochemical ozone, called “<i>summer smog</i>” near ground level, is created from natural and synthetic compounds in UV sunlight. Low concentration smog damages vegetation and crops. High concentration smog is hazardous to human health. Chief synthetic causes are nitrogen oxides, carbon monoxide and volatile organic compounds (VOC) pollutants. Avoiding reliance on dirtiest coal fuel and volatile chemicals has reduced smog incidence in many areas globally.</p>
<p>Depletion of minerals, metals & water</p>	<p>Abiotic depletion of finite mineral resources increases time, effort and money required to obtain more resources to the point of extinction of naturally viable reserves. This can limit access to available, valuable and scarce elements vital for human-life. The youth movement “<i>extinction rebellion</i>” calls on adults to secure climate, reserves and biodiversity for current and future generations.</p>
<p>Depletion of fossil fuel reserves</p>	<p>Abiotic depletion of resources by consuming finite oil, natural gas, coal and yellowcake fossil fuel reserves leaves current and future generations suffering limited available, accessible, plentiful, essential valuable as well as scarce raw material, medicinal, chemical, feedstock and fuel stock. Approaching “<i>peak oil</i>” acknowledged fossil fuel reserves are finite and the need for decision-makers to act to avoid market instability, insecurity and or oil and gas wars.</p>





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Module A1 to C4 Cradle to Cradle Inventory and Damage Impact Results

Table 1 shows impact and inventory results, units with descriptions and references to methods.

Table 1 A1-3 to C4 Impact & Inventory Results/Functional Unit

Result	Units	A1-D3	Description of Methods
Climate Change biogenic	kg CO _{2eq}	-2.5	GWP sequestered from air [4]
Climate Change luluc	kg CO _{2eq}	1.3E-04	GWP land use & change [4]
Climate Change fossil	kg CO _{2eq}	2.4	GWP fossil fuels [4]
Climate Change total	kg CO _{2eq}	-5.2E-02	Global Warming Potential [4]
Stratospheric Ozone Depletion	kg CFC _{11e}	3.0E-09	Stratospheric Ozone Loss [5]
Photochemical Ozone Creation	kg NVOC _e	1.1E-02	Summer Smog [6]
Acidification Potential	mol H ⁺ _{eq}	3.1E-03	Accumulated Exceedance [7]
Eutrophication Freshwater	kg P _{eq}	2.8E-06	Excess freshwater nutrients [8]
Eutrophication Marine	kg N _{eq}	5.5E-04	Excess marine nutrients [9]
Eutrophication Terrestrial	mol N _{eq}	1.7E-02	Excess nutrients to land [8]
Fossil Depletion	kg Sb _{eq}	1.8	Abiotic Depletion minerals [9]
Mineral and Metal Depletion	MJ _{ncv}	1.9E-04	Abiotic Depletion fossil fuel [10]
Water Scarcity Depletion	m ³ _{WDP_{eq}}	3.9E-03	Water Deprivation Scarcity [11,12]
Net Fresh Water Use	m ³	2.4E-02	Lake, river, well & town water
Secondary Material	kg	1.2	Post-consumer recycled (PCR)
Secondary Renewable Energy Use	MJ _{ncv}	2.9	PCR biomass burnt
Primary Renewable Feedstock Material	MJ _{ncv}	23	Biomass retained material
Primary Renewable Energy Used	MJ _{ncv}	1.5	Biomass fuels burnt
Total Primary Renewable Energy	MJ _{ncv}	25	Biomass burnt + retained
Secondary Fossil Energy Use	MJ _{ncv}	0.02	PCR fossil-fuels burnt
Primary Fossil Feedstock Material	MJ _{ncv}	2.9	Fossil feedstock retained
Primary Fossil Energy Use	MJ _{ncv}	26	fossil-fuel used or burnt
Total Primary Fossil Energy Use	MJ _{ncv}	29	Fossil feedstock & fuel use
Hazardous Waste Disposed	kg	3.1E-03	Reprocessed to contain risks
Non-hazardous Waste Disposed	kg	7.5E-02	Municipal landfill facility waste
Radioactive Waste Disposed	kg	1.4E-18	Most ex nuclear power stations
Components For Reuse	kg	0.18	Product scrap for reuse as is
Material For Recycling	kg	0.03	Factory scrap to remanufacture
Material For Energy Recovery	kg	1.2E-05	Factory scrap use as fuel
Exported Energy Electrical	MJ _{ncv}	0	Uncommon for building products
Exported Energy Thermal	MJ _{ncv}	0	Uncommon for building products



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Life Cycle Assessment Method

LCA Author	The Evah Institute is described at www.evah.com.au .
Study Period	Factory data was collected from 2022 to 2023.
LCA Method	Compliant with ISO 14040 and ISO 14044 Standards
LCIA method	ReCiPe 2016 Life Cycle Impact Assessment (LCIA)
Scope	Cradle to fate including all supply chain phases and stages depicted in Figure a
Phases	The LCA covered all known flows in all known stages cradle to end of life fate.
Assumptions	Use is to typical Australian wildlife conservation professional practice.
Scenarios	Use, cleaning, maintenance plus disposal and re-use were scenario-based using Facility Management Association denoted and published typical operations.
Processes	All known processes are included from resource acquisition, water, fuel & energy use, power generation & distribution, freight, refining, intermediates, manufacture, scrap re-use, packing and dispatch, installation, use, maintenance and landfill. All significant waste and emission flows from all supply chain operations used to make, pack and install the product are included.
System Boundary	Figure 3 depicts A1 to C4 operations inside this cradle to grave system boundary.

Model Information	Actual		Scenarios												Beyond system to Cradle				
	Building Life Cycle Assessment					Use							End-of-Life		Benefit & load				
Stages	Product			Construct		Fabric							Operate		End-of-Life		Benefit & load		
Modules	A1	A2	A3	A4	A5	B1	B2	B3	B4	B5	B6	B7	C1	C2	C3	C4	D1	D2	D3
Operations Cradle to Grave Fate C ₂ F & beyond system to Cradle (C ₂ C)	Resources	Transport	Manufacture	Transport	Construct	Use	Maintain	Repair	Replace	Returbish	Energy use	Water use	Demolish	Transport	Process Waste	Disposal	Reuse	Recovery	Recycling
C ₂ F	M	M	M	M	M	M	M	M	M	M	M	M	M	M	M	M	0	0	0
C ₂ Gate+Options	M	M	M	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0

Figure 3 Life Cycle Assessment Operations Scope Cradle to Grave

Evah industry databases cover all known domestic and global scope 1 and 2 operations. They exclude scope 3 burdens from capital facilities, equipment churn, noise and dehydration as well as incidental activities and employee commuting. Electricity supply models in active databases are updated annually. As each project is modelled and new data is available the databases are updated. They are then audited by external Type 1 ecolabel certifiers. The databases exist in top zones of commercial global modelling and calculating engines. Quality control methods are applied to ensure:

- Coverage of place in time with all information for each dataset noted, checked and updated;⁶
- Consistency to Evah guidelines for all process technology, transport and energy demand;⁷
- Completeness of modeling based on in-house reports, literature and industry reviews;
- Plausibility in 2 way checks of LCI input and output flows of data checked for validity, plus
- Mathematical correctness of all calculations in mass and energy balance cross checks.

⁶ Jones D G (2004) LCI Database for Commercial Building Report 2001-006-B-15 Icon.net, Australia

⁷ Evah Tools, Databases and Methodology Queensland, Australia at <http://www.evah.com.au/tools.html>



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Data Sources Representativeness and Quality

Primary data used for modelling the state of art of each operation includes all known process for:

- Technology sequences;
- Energy and water use;
- Landfill and effluent, plus
- Reliance on raw and recycled material;
- High and reduced process emissions;
- Freight and distribution systems.

Primary data is sourced from client annual reports and publications on corporate locations, logistics, technology use, market share, management systems, standards and commitment to improved environmental performance. Information on operations is also sourced from client:

- Supply chain mills, their technical manuals, corporate annual reports and sector experts, and
- Manufacturing specifications websites and factory site development license applications.

Background data is sourced from the International Energy Agency, IBISWorld, USGS Minerals, Franklin Associates, Boustead 6, Plastics Europe, CML2, Simapro 9.5, EcolInvent 3.9 and NREL USLCI model databases. Information on operations is also sourced from:

- Library, document, NPI and web searches, review papers, building manuals and
- Global industry association and Government reports on best available technology (BAT).

For benchmarking, comparison and integrity checks inventory data is developed to represent BAT, business as usual and worst practice options with operations covering industry sector supply and infrastructure in Australia and overseas.

Such technology, performance and license conditions were modelled and evaluated across mining, farming, forestry, freight, infrastructure and manufacturing and building industry sectors since 1995.

As most sources do not provide estimates of accuracy, a pedigree matrix of uncertainty estimates to 95% confidence levels of Geometric Standard Deviation² (σ_g) is used to define quality as in Table a.⁸

No data set with >±30% uncertainty is used.

Table a Data Quality Uncertainty (U)

Correlation	Metric σ_g	U ±0.01	U ±0.05	U ±0.10	U ±0.20	U ±0.30
Reliability	Reporting	Site Audit	Expert verify	Region	Sector	Academic
	Sample	>66% trend	>25% trend	>10% batch	>5% batch	<1% batch
Completion	Including	>50%	>25%	>10%	>5%	<5%
	Cut-off	0.01%w/w	0.05%w/w	0.1%w/w	0.5%w/w	1%w/w
Temporal	Data Age	<3 years	≤5 years	<10 years	<15 years	>16 years
	Duration	>3 years	<3 years	<2 years	1 year	<1 year
Geography	Focus	Process	Line	Plant	Corporate	Sector
	Range	Continent	Nation	Plant	Line	Process
Technology	Typology	Actual	Comparable	In Class	Convention	In Sector

⁸ Evah Institute data quality control system accords with UNEP SETAC Global LCI Database Quality 2010 Guidelines



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Supply Chain Modelling Assumptions

Australian building sector rules and Evah assumptions applied are defined in Table b.

Table b Scope Boundaries Assumptions and Metadata

Quality/Domain	National including Import and Export
Process Model	It is typical industry practice with currently most common or best (BAT) technology.
Resource flows	LCI uses regional data for resource mapping, fuels, energy, electricity and logistics.
Temporal	Project data collated over the previous 4 years represents averages over the last year.
Geography	Jurisdiction is of the declared client, site, regional, national, Pacific Rim then Europe.
Representation	It represents the declared client, their suppliers and energy providers to each cradle.
Consistency	All known operations are modelled according to operations with closest proximity.
Technology	The industry supply chain modelled is typical recent Pacific Rim technology and practice.
Functional Unit	A 20 or 60 year period of typical service life, use, cleaning and disposal/kg or m ² applies.
System Control	
Primary Sources	Client and supplier mills, publications, websites, specifications and manuals are used.
Other Sources	Recent IEA, GGT, Simapro, IBIS, Ecolnvent sources used and cited in the LCA reports.
Data mix	Power grid and renewable shares are updated according to the latest IEA reports.
Operational	Company data is used for process performance, product share, waste and emissions.
Logistics	Local data is used for power, fuel mix, water supply, logistics share & capacity.
New Data Entry	New data is entered by current researchers at Malaika LCT, Evah and GGTI.
Data Generator	All via current manufacturers, Evah, GGTI, IBIS and others is cited and in LCA reports.
Data Publisher	Publishers include the Evah Institute, GGTI and designated clients only.
Contributors	All professional and personal contributors are cited in Evah & GGTI records.
Data Flow & Mix	
System Boundary	All known resources and emissions are modelled from Earth cradles to end of life fate.
System flows	All known flows are modelled from and to air, land, water and community sources &
Capital inclusions	Natural stocks Δ , industry stockpiles Δ , capital wear Δ , system losses and use
Arid Practice	Dry technology adopted; Water use is factored by 0.1 as for e.g. mining.
Transportation	Distance >20% than EU; >20% fuel efficient larger vehicles, load & distance
Industrial	Company or industry sector data for manufacturing and minerals involved
Mining	All raw material extraction is based on Australian or Pacific Rim technology.
Imported fuel	The fuel mix is from nearest sources such as UAE, SE Asia, Canada or New Zealand.
Finishes	Processing inputs with finishing burdens are factored in otherwise that is denoted.
Validation	
Accuracy	10 th generation study is ± 5 to 15% uncertain due to some background data.
Completeness	All significant operations are tracked and documented from the cradle to grave.
Precision	Tracking of >90% flows applies a 90:10 rule sequentially to 99.9% and beyond.
Allocation	All is allocated to co products on reaction stoichiometry by energetic or mass fraction.
Burdens	All known resource use from & emissions to community air land, water are included.
Plausibility	Results are checked and benchmarked against BAT, BAU & worst practice.
Sensitivity	Calculated U is reported & compared to Bath U RICE & Ecolnvent libraries.
Validity Checks	Checks are versus Plastics Europe, Bath U RICE & or Industry LCA Literature.



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LCIA Methodology References

- [1] ISO 14025:2010 Environmental labels and declarations – Type III – environmental declarations - Principles and procedures
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5B. EPD: BENEFIT ADDENDUM REPORT





Other Information

The United Nations (UN) Nature Positive (N+) Program provides global impetus for EPDs to consider gain versus loss in climate and biodiversity security [27, 28, 29]. But the reach of most LCIA methods such as the leading ReCiPe is modelling damage and depletion from maxima to zero as depicted on the left-hand side of in Figure 7 [29, 30, 31, 32]. Conventional LCIA models environmental damages to e.g. climate and loss of human health, ecosystem quality and resource supply [32, 33].

The reach of N+, however extends scientific sightlines beyond zero damage to quantify benefits, gains and regeneration [33, 34], 35. Other information in N+ EPDs sight beyond damage to define additional information on net-positive benefit outcomes including many gains depicted on the right-hand side of Figure a [30 to 32].

Figure 4 depicts the ReCiPe LCIA method modelling damage, depletion and loss versus the Evah Life Cycle Benefit indicators (LCBA) method modelling benefit, repletion and gain to assess net-loss and net-gain of climate security, human wellness and resource supply viability [33 to 36].

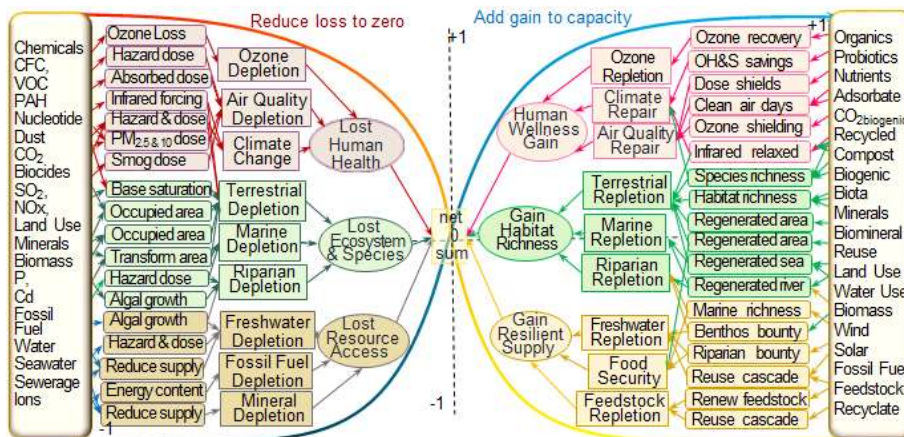


Figure 4 ReCiPe LCIA of damaging loss versus Evah LCBA of beneficial gain

Such extended assessment is applicable to empower communication and reduce barriers for regenerative and nature-positive initiatives. LCA of benefits offers community, government and business a new environmental science tool with examples of methods to measure gains in accelerating restoration and climate security.

Using LCBA in conjunction with conventional LCIA modelling of damages allows LCA modelling of damages to and beyond of zero climate, health, ecosystems and supply losses to beneficial gains in e.g. climate, wellness, biodiversity and supply security.

Reaching to quantify and show positive gains well beyond the negative and zero loss outcomes, LCBA enables a truer market assessments. The capacity to report positive metrics can also reduce prevalent greenwashing and reliance on bad news that has disempowered scientifically valid communications and efforts to engage community action.



Environmental Benefit Terminology

Key environmental benefits contributing to ecological regeneration of climate and biodiversity security are tabled below with common names and responses for each indicator.

Climate Security	Reliance on renewable energy is vital to restore thermal energy differentials, from equator to poles. Differential forcing of ocean current and wind circulation blends and regulate climate to reduce extreme weather events. Forest, wilderness and algal growth can drawdown such gasses. Carbon banked in standing forests, detritus, roots and soils brakes climate change. Greenhouse gas drawdown and sequestration in product biomass is vital for "Climate security" .
Water Security	"Water security" arises from conservation and recycling as well as reliance on renewable and reclaimed biomass to avoid climate-change-induced drought. Hectares of intensive forest and plantings stabilise rain catchment and ground water table levels. Ground mulches retain soil hydration and reduce water stress.
Ozone Repletion	Repairing the planet's stratospheric ozone solar shield protects plants, humans and animals allowing them to be "sun-safe" for longer in the outdoors. Ground level oxygenation via growing plants and algae is a chief way to enable accumulation higher level naturally-formed Ozone. Restoring the ozone layer also depends on use of ozone-safe refrigerants, aerosols and solvents
Buffered air, land and waters	Acid rain-free air-sheds are safer for natural terrestrial, aquatic and urban communities. Buffered air-pH supports healthy soil and waterways, nitrogen fixation vital for plant growth and natural decomposition. Safe pH supports health of fisheries, forests, buildings and materials. Chief ways to enhance "natural-rain" are reliance on renewable fuels and power supply.
Oxygenated terrestrial and aquatic life	Nutrient and oxygen availability balances in natural waters promotes healthy plant growth, water and habitat security for aquatic and terrestrial organisms across related ecosystems. Chief ways to enhance healthy waterways is to tightly control slow-release fertilisers avoiding synthetic nutrients in rain run-off land catchments.
Sweet-air	Smog-free air in summer near ground level when most people live and breathe outside is generated by plants and avoiding or filtering pollutants. Sweet-air enables healthy vegetation, crops and humans to thrive. Chief ways to enhance sweet-air are reliance on low-emission renewable energy and non-volatile chemicals.
Resource Repletion	The extinction rebellion youth movement calls on governance to secure climate, material reserves and biodiversity for current and future generations. Chief ways to ensure resource repletion include investing in sustainably managed "circularity" , recycling, renewables and reclaimed biomass. This retains accessible, plentiful, essential valuable raw material, medicinal, chemical, feedstock and fuel stock.
Biodiversity Security	Extensive bushland, biodynamic and organic agriculture plus standing forests offer natural land use ranges and corridors for wildlife, herds and flora "biodiversity" : <ul style="list-style-type: none"> • habitat bird, bee, pollinator, avian, worm biome, shelter, forage and grazing • leaf & litter forage enhance soil condition, mulch, nutrition and retention, • soil microbiota, detritus-feeders and biotic refuges reduce temperature stress • CO_{2e} sequestered in natural habitat, biomass & soil braking climate change.
Ecological Wellness	Human ecological health benefits flow from reliance on renewable and reclaimed biomass instead of fossil fuel. Chief ways to enhance "wellness" include avoiding particulates and pollution, smog, volatile organics and carcinogens. Climate and ozone security and safer air-sheds ensue for natural terrestrial, aquatic and urban communities.



Life Cycle Benefit Assessment Reference Framework

This section summarises the LCBA framework of measures metrics and indicators. Local and global human wellness, habitat regeneration and supply resilience and circularity outcomes are framed against United Nations Sustainable development goals (UN SDG)s [16 to 32]. LCBA reaches beyond zero loss to show gains in climate, wellness, biodiversity and supply security.

LCA framework of LCBA indicators

Benefit Layer	Exposure & Jurisdiction	Unit/annum	Local	Global	UN	Circularity
Healthy Able Life Years (HALY)		HALY/capita		benchmark	SDG	% Capacity
Local Shelter	Household shelter	m ² GFA	m ² GFA	UN eq		Housing
Fresh Food	Affordably nourished	kJ	kJ UN eq	UN eq		Nutrition
Fresh Air	Oxygen indoors	kg O ₂	kg O ₂	O ₂ C1750		Oxygenation
Clean Air	PM _{2.5} dust-free	µg PM2.5	µg PM2.5	PM C1750		Decongestion
Sweet Air	VOC free indoors	IAQ	µg VOC	VOC C1750		Inhalation
Sun Safety	Ozone layer repair	kg O ₂ outdoors	O ₃ stratosphere	O ₃ C1750		Ozonating
Time in Nature	100 days recreation pppa	R&R Ha	R&R Ha	Ha C1750		Free-time
Medical Access	Paramedic Care	hours	hours to aid	hours to aid		Medic-access
Work Dignity	>30hrs paid work/week	hours	\$ _{eq} /hour	km UN eq		Secure-work
Fresh Water	Potable rain hydrated	m ³	l rain	rain C1750		Potability
Supply Energy & Resource Viability (SERV)		SERV/capita		metric		% Capacity
Viable Water	Refill local reservoirs	m ³ freshwater	l/km	Rain C1750		Freshwater
Viable Air	Photosynthetic Cities	kg O _{2e100}	O ₂ urban	O ₂ C1750		Oxygenation
Viable C-bank	Resink Carbon in product	kg CO _{2e100}	kg	CO _{2e100}		Bank-carbon
Viable Energy	Reliance on renewable	kg renewed	MJ/gross	oil eq		Renewability
Viable Food	Reliance on local food	kJ km	kJ kl	UN eq		Food autonomy
Viable Supply	Refuel local reserves	kg feedstock	km/gross	oil eq		Autonomy
Viable Mineral	Recycle scarce material	MJ elemental	MJ km access	oil eq		Mineral security
Viable Feedstock	Recycle material & scrap	MJ recycle	MJ gross	oil eq		Recyclability
Viable Disaster	Reserved sustenance	t back-up	t UN eq	UN eq		Recoverability
Viable Shelter	Refuges in disasters	bed pc	m ² GFA	GFA		Safe havens
Positive Ecosystem ReFormation (PERF)		PERF/Ha		C1750 mark		% Capacity
Natural Access	Nature parks & tracks	m ² R&R	Access	Local reach		Natural Access
Urban Bounty	Pre-urban carrying capacity	t flora/GFA	Species	capacity		Greenspace
Soil Carbon	Carbon banking	kg CO _{2e20}	kg CO _{2e20}	kg CO _{2e20} C1		Soil-Carbon
Climate Brakes	Carbon drawdown	t CO _{2e20}	Soil CO _{2e}	Worms		Climate safety
Plants & Algae	Carbon drawdown	t CO _{2e100}	Biomass	Algae		Climate security
Aquatic Stock	Species rich range	t frog stock	Species	Frogs		Aquatic bounty
Marine Stock	Species richness & range	t fish stock	Species	Whales		Marine bounty
Wildlife Habitat	Corridor & refuge range	biomes	Species	Apex species		Linked Ranges
Terrestrial Stock	Rich flora & fauna range	t Terrastock	Species	Bears		Wildlife rich
Avian Stock	Species rich refugia	t Avistock	Richness	Birds		Abundance
Pollinator stock	Species richness & range	t Beestock	Species	Bees		Biodiversity
Nature Reserve	Scarce reserves restocked	t Reserve	Resources	Capacity		Reserves



Global GreenTag International
ISO 14025 Compliant EPD
Benefit Addendum

Thermal Haven Nest Box
BH 01 2023EP

Background on the Life Cycle Benefit Assessment Period

Some materials and practices inherently promote wellness and like medicine others inherently destroy illness. Thermal Haven supply chain and nesting reports confirm a range of inherently positive outcomes /kg. The functional unit is a kilogram of the nest box used over 20 years cradle to grave.

Positive and net-positive gains and benefits can offset damages and loss. Benefits from less and avoided impacts and gains arising from properties inherent within a component or utility can also be additive. For example biomass generating more clean oxygen while drawing down carbon dioxide from air enacts braking on greenhouse gas forcing of anthropogenic climate change. Together they increase wellness.

In the data period from 2017 to 2023 that this EPD covers, however, many worst-ever-recorded and widespread natural and social disasters also disrupted supply chains locally nationally and globally. After widespread worst ever recorded natural and social disasters from 2017 to 2023, few benefits were expected for the geographical area near Newcastle in New South Wales (NSW) where most Thermal Haven lumber was sourced. They also devastated Much of Victoria where the other timber was sourced.

A report from the NSW Department of Primary Industries described historic social and natural disasters impacts on natural land, bush, urban, air and aquatic and marine environments 2017 to 2020 [32].

After the most severe drought in 250 years, in November 2019 the NSW state's worst bushfire season in 250 years began when more land was burnt than all 25 years previously. 'Black Summer' bushfires caused extensive and severe emergencies.

By late summer and autumn widespread rains caused extensive flooding in NSW coastal drainages with many towns having their highest daily rainfall on record. For the rest of 2020 much of NSW received well above average rainfall [32]. Such fire, rain and flood runoff meant record pollution impacts of most freshwater, estuarine and coastal waterways [32 and 33].

In 2020 with COVID-19, international and state borders were closed which severely restricted people's movement within Australia [34 and 35]. By mid-2020 local recreational activity increased mainly because when people could not travel to work or far from home went out to exercise locally where permitted.

Despite compelling positive results shown in the following section this EPD also illustrates that nature positive outcomes are imperatives for regeneration to combat devastating natural disasters in recent years attributable to anthropogenic climate change [15].

After widespread worst-ever recorded natural and social disasters from 2017 to 2023 locally, nationally and globally disrupted security no benefits were expected from:

- urban stock of flora in parks, walls and greenspace for urban life.
- aquatic stock of frogs in rivers, lakes and dams, aquatic life and
- marine and fish stock in nearby estuaries, bays and oceans for marine life.

Through 2019/20, with near normal recreational fishing activity rates NSW finfish and invertebrate catch compositions and key species relative importance were stable [31]. Catch levels for many species varied with lower catches for most species. Compared to 2017/18 some common species catches were

- worst minus 50% Golden Perch, 52% Murray Cod, 54% Grey Morwong, 66% Australian Bass and 68% Rainbow Trout.
- lower loosing 35% Dusky Flathead, 43% Sand Flathead and 43% Mulloway.
- higher with additional 5% Snapper 13% Sand Whiting, 14% Bream and 27% Silver Trevally.

Positive benefit, gain and circularity results for a particular outcome type at levels ranging from

- improvement $\leq 100\%$ damage not offsetting loss.
- net-zero 100% gain or loss offsetting damage.
- net-gain $\geq 100\%$ benefit exceeding damage and loss.
- regenerative $\geq 200\%$ benefit and gain beyond and loss

The results in the next sections illustrate if, how and why nature positive wellness, ecosystem and supply benefits arise from reliance on renewable energy and resource circularity.



Cradle to Cradle Results: Improved Negative Outcomes

Table a lists improved but still net-negative damage and loss including for:

- wellness from inhaling 21% cleaner, 21% clearer, 37% safer 55% fresher and 67% sweeter air without synthetic particulates toxins, acidic and volatile chemicals that protected respiratory function and avoided premature death and acid rain on communities.
- ecosystem security with 95% more forage, food and feedstock for wildlife and human communities.
- supply viability with 0.1% recovered energy, 2.4% recovered biomass, 10% renewable fuel and 16% renewable energy, 27% PCR content, 80% renewable feedstock plus recovery of 80% fuel and 90% feedstock plus 90% water returned to seedlings and ground

Table a. Improved Wellness, Ecosystem and Supply Outcomes/Functional Unit)

Wellness	Results	Supply	Results	Ecosystem	Results
Cleaner Air	0.8µg PM _{2.5}	Energy recovery	0.2 MJ ncv	Water to earth	2.2 litres
Clearer air	2.8E-04 g C ₂ H ₂	Recovered fuel	23 MJ ncv	Viable Biofuel	3.0 MJ ncv
Toxic-free air	2.4E-07 g 1,4DBE	Renewable energy	4.5 MJ ncv	Renewing feedstock	23 MJ ncv
Fresher IAQ	0.013g NM VOC	Feedstock for reuse	26 MJ ncv	Forage growth	27 MJ ncv
Sweeter Air	6.1E-03 mol H ⁺ _{eq}	Minerals for reuse	1.2kg	Biodiversity	27 MJ ncv

Cradle to Cradle Results: Net-zero Outcomes

Table b lists benefits that offset damage to yield net-zero gain or loss including for:

- Wellness via log moisture returned to air and nature space for human rest, recreation & forage
- Climate and Supply security via Carbon sequestered in forest plant, lichen & moss biomass
- Ecosystem fresh forage regrowth for animals, birds, bees, terrestrial forest stock for land dwelling biodiverse fauna & flora wildlife and working humans, arial wildlife stock in forest forage for birds, butterflies, bats, bees, insects & pollinators plus extensive soil to full height forest habitat & forage security plus biodiversity security for wildlife

Table b. Net-zero Wellness, Climate, Ecosystem and Supply Gain or Loss/kg Functional Unit)

Wellness	Results	Climate & Supply	Results	Ecosystem	Results
Air Humidity	1 litre	Photosynthesis	2.5kg CO _{2e100}	Wildlife Range	0.006 m ² /yr
Oxygenation	1.4kg O ₂	Food Security	54,000 kJ	Biodiverse Habitat	0.006 m ² /yr

Cradle to Cradle Results: Nature Positive Net-gain

Table c shows net-positive gained exceeding damage and loss in 150% oxygenation to air 20-year, near term 20-year embodied carbon 150% climate brake force, 190% forest security via retained biota, seed, fibre & soil biomass plus longer 100 year term 196% Carbon banked in forest soil, roots and biomass.

Table c. Net-gains in Wellness, Climate and Ecosystem Security /kg Functional Unit)

Wellness	Results	Climate	Results	Ecosystem	Results
Climate Brake	3.1 kg CO _{2e20}	Climate Bank	4.9 kg CO _{2e100}	Forest Security	54 MJ ncv

Cradle to Cradle Results: Nature Positive Regeneration

Table d shows net-positive regenerative benefits and gains including for

- Wellness via 200% % photosynthetic oxygen to breathe and Stratospheric Ozone refill,
- climate repair via 200% Carbon drawdown by leaf, algae and microbiota, 248% biomass drawdown
- supply viability 355% water for seedlings, near term 248% Carbon drawdown in forest long term

Table d. Regenerative Human Wellness (HALY/Functional Unit)

Wellness	Results	Supply	Results	Climate	Results
Oxygenation	4.5kg O ₂	Water reuse	25l H ₂ O	Climate Brake	6.2 kg CO _{2e20}



Interpretation of Cradle to Cradle LCBA results /kg Functional Unit

These sections report circularity and benefit assessment results ranging from improvement, net zero, net-gain to regenerative.

Unlike linear primary and fossil fuelled operations, inherent benefits arise from reliance on renewable, recycled, reused and or recyclable component circularity in supply.

Improvement $\leq 100\%$ damage not offsetting loss

Figure 5 depicts improved wellness from cleaner, clearer fresher, safer and sweeter air enabling respiration and visibility. These improvements flow from operations avoiding 21% particulates, 21% summer smog, 55% synthetic volatile chemicals, 37% toxins and 67% acid.

Improved supply charted in Figure 7 is from reliance on:

- renewable 10% fuel, 16% energy and 80% feedstock
- recovered 2.4% biofuel, 27% PCR and 80% fuel
- recoverable 90% feedstock and water to seedlings

Net-zero 100% gain or loss offsets damage

Net-zero gain or loss in supply viability charted in Figure 7 is from 100% log humidity return to air.

Net-zero ecosystem loss charted Figure d reflects forestry 100% sheltering biodiverse wildlife, 100% retained Carbon in plant, lichen & moss, 100% ground for biodiverse fauna & flora and 100% high forage for birds, insects & pollinators.

Nature positive net-gain $\geq 100\%$ exceeds loss

Net-gain Climate security d in Figure 6 arose from 150% CO₂e embodied in certifiably sustainable product and 196% Carbon bank 100 years in forest soil.

Ecosystem net-gain in Figure 7 depicts 190% forest seed, fibre & soil biomass generation 195% forage, food and feedstock biomass generation.

Nature positive regeneration $\geq 200\%$ gain beyond loss

Regenerative wellness in Figure 5 arises from 200% more photosynthetic Oxygen for breathing and 200% more O₂ flows to and refill Stratospheric Ozone increasing sun-safe time outdoors.

Figure 6 charts regenerative climate security from 248% CO₂e drawn down brakes on climate forcing in the near 20 year term.

Figure 7 depicts supply regeneration via 355% freshwater recovery.

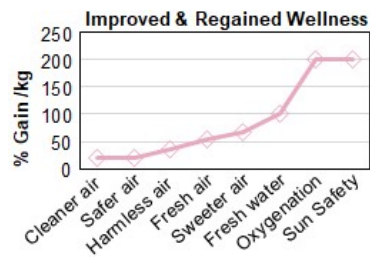


Figure 5 Wellness Outcomes/kg F unit

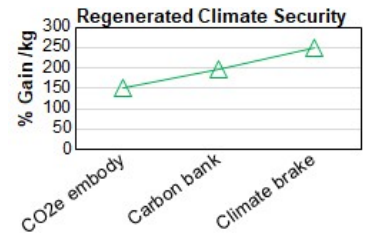


Figure 6 Climate Security/kg F unit

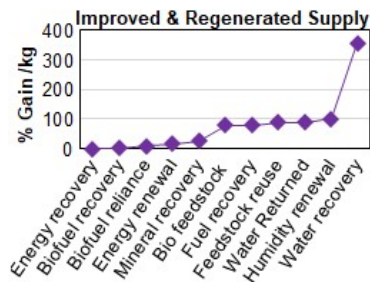


Figure 7 Supply Security/kg F unit

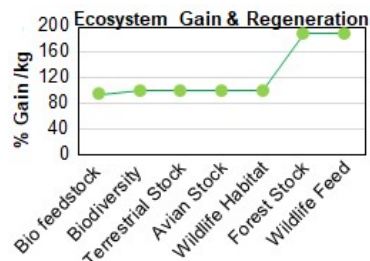


Figure 8 Ecosystem Security/kg F unit



Finally Thermal Haven LCBA and % circularity results coverage across the Nature Positive LCBA framework and UN SDGs is shown in Table e. From a possible 32 it shows 28 results which is an 87.5 % completeness. Missing results were all due to natural and social disasters.

The four results are missing because the LCA period occurred while the COVID epidemic devastated wellness measures in work dignity and access to medical care. Unprecedented nationally-extensive and devastating wildfires and floods also prevented Positive Ecosystem Refill (PERF) measures of:

- Natural access to forests & tracks as some had and still have restricted access;
- Marine stock species richness & range which varied from significantly higher to much lower and
- Urban nature and scarce reserves stocks suffered devastating biodiversity losses.

Table E1 Summary of LCBA results /kg Functional Unit

Benefit Layer	Exposure & Jurisdiction	Unit	Circularity
Healthy Able Life Years (HALY)		HALY/kg	% Capacity
Clean Air	PM _{2.5} dust-free	µg PM _{10+2.5}	21% Decongestion
Sweet Air	VOC free indoors	µg VOC	55% Inhalation
Fresh Food	Affordably nourished	kJ	100% Nutrition
Time in Nature	100 days recreation pppa	R&R Ha	100% R&R space
Fresh Water	Potable rain hydrated	l rain	100% Potability
Local Shelter	Household shelter	m ² GFA	200% Housing
Fresh Air	Oxygen indoors	kg O ₂	200% Oxygenation
Sun Safety	Ozone layer repair	kg O _{2 outdoors}	200% Ozonating
Supply Energy & Resource Viability (SERV)		SERV/kg	% Capacity
Viable Mineral	Recycle scarce material	MJ _{ncv}	27% Mineral security
Viable Energy	Reliance on renewable	MJ _{ncv}	80% Renewability
Viable Feedstock	Recycle material & scrap	MJ _{ncv}	80% Recyclability
Viable Supply	Refuel local reserves	MJ _{ncv}	90% Autonomy
Viable Food	Reliance on local food	kJ _{ncv}	95% Food autonomy
Viable Disaster	Reserved sustenance	MJ _{ncv}	95% Recoverability
Viable Shelter	Refuges in disasters	MJ _{ncv}	100% Safe havens
Viable C-bank	Resink Carbon in product	kg CO _{2e100}	150% Bank-carbon
Viable Air	Photosynthetic Cities	kg O _{2e100}	200% Oxygenation
Viable Water	Refill local reservoirs	l _{water}	355% Freshwater
Positive Ecosystem ReFormation (PERF)		PERF/kg	% Capacity
Plants & Algae	Carbon drawdown	kg CO _{2e100}	100% Climate security
Aquatic Stock	Species rich range	kg frog stock	100% Aquatic bounty
Wildlife Habitat	Corridor & refuge range	MJ biomes	100% Linked Ranges
Terrestrial Stock	Species rich refugia	kg Terrastock	100% Wildlife ⁹ rich
Arial Stock	Species rich refugia	kg Avistock	100% Abundance
Pollinator stock	Species rich range	kg Beestock	100% Biodiversity
Climate Brakes	Carbon drawdown	kg CO _{2e20}	150% Climate safety
Carbon banking	Soil Carbon	kg CO _{2e100}	196% Soil-Carbon

In conclusion this EPD shows improvement, net-zero, and some compelling nature positive regenerative results against a background of increasing and devastating natural disasters attributable to anthropogenic climate change. It declares what, where and how nature positive outcomes are imperative for regeneration to secure viable climate and biodiversity on earth in the near and long term future.

⁹ Most NSW koala sightings are near Port Stephens, Newcastle, Cessnock and Taree. <https://hunterlandcare.org.au/fauna-feature-koalas>



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- ISO 14015:2001 EMS: Environmental assessment of sites & organizations (EASO)
- ISO 14020:2000 Environmental labels & declarations — General principles
- EN ISO 14024:2000 Environmental labels and declarations - Type I environmental labelling-Principles and procedures (ISO 14024:1999)
- ISO 14025:2010 Environmental labels and declarations – Type III – environmental declarations - Principles and procedures
- ISO 14031:1999 EM: Environmental performance evaluation: Guidelines
- EN ISO 14040:2006, Environmental management - LCA - Principles and framework (ISO14040:2006)
- ISO 14044:2006 EM: LCA: Requirement & guideline for data review: LCI; LCIA, Interpretation results
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- EN 15643-2, Sustainability of construction works - Assessment of buildings - Part 2: Framework for the assessment of environmental performance
- EN 16449, Wood and wood-based products - Calculation of the biogenic carbon content of wood and conversion to carbon dioxide
- ISO 15686-1:2011 Buildings & constructed assets Service life planning Part 1: General principles
- ISO 15686-2:2012 Buildings and constructed assets - Service life planning - Part 2: Service life prediction procedures
- ISO 15686-8:2008 Buildings and constructed assets - Service-life planning - Part 8: Reference service life and service-life estimation
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ISO/TS 21931-1:2010 Sustainability in building construction -Framework for methods of assessment of the environmental performance of construction works - Part 1: Buildings

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Further and explanatory information is found at

<http://www.globalgreentag.com/>

or contact:

certification1@globalgreentag.com



Global GreenTag^{Cert™} EPD Program
Environmental Product Declaration
Compliant to ISO 14025

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6.

WATER FOOTPRINT



Bird Habitats
Thermal Haven Nest Boxes®
Drouin Victoria 3818 Australia

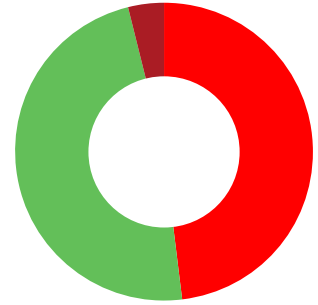


6. Water Footprint

Final Score: 10%

Water source by use (Cradle to Fate/Kg)

	Litres	Percentage
Public Supply	= 8953	= 33%
River Canal	= 102	= 0%
Sea	= 301	= 1%
Unspecified	= 11669	= 43%
Well	= 5831	= 22%
Total	= 26855	= 100%





6. SITE WATER CIRCULARITY AND BALANCE

No water used for the manufacturing process

% Water Circularity	= NA
% Circular Water Inflow	= NA
% Circular Water Outflow	= NA

- Usage
- Emissions

Site Water Inflow

	Amount (%)
Circular	
■ Collected Rainwater	= [0%]
■ Seawater	= [0%]
■ Water from the local watershed, Surface water (rivers, ponds, lakes, reservoirs) and ground water wells	= [0%]
■ Third-Party reclaimed water	= [0%]
Linear	
■ Fossil Water (Linear)	= [0%]

Site Water Outflow

	Amount (%)
Circular:	
■ Water is being recycled for beneficial use such as for agricultural, municipal or industrial purposes	= [0%]
■ Water returned to local watershed (appropriate quality that makes it readily available for environmental, social, agricultural or industrial purposes.	= [0%]
■ Product water that stays within the local basin	= [0%]
Linear	
■ All water NOT returned to the local watershed (evaporation, contained in waste products (i.e. sludge etc.)	= [0%]
■ Water returned to local watershed (inappropriate quality)	= [0%]
■ Water that is discharged into the sea	= [0%]



7.

ETHICAL SUPPLY CHAINS

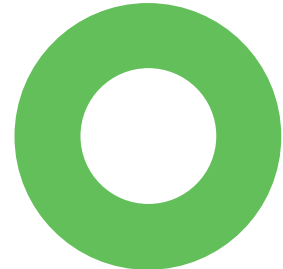


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Thermal Haven Nest Boxes®
Drouin Victoria 3818 Australia

7. ETHICAL SUPPLY CHAINS = 0

7A) International Labor Organisation (ILO) Compliance

■ Compliance with ILO Conventions = 100%



- YES | Freedom of Association and Protection of the Right to Organise Convention, 1948 (No. 87)
- YES | Right to Organise and Collective Bargaining Convention, 1949 (No. 98)
- YES | Forced Labour Convention, 1930 (No. 29) (and its 2014 Protocol)
- YES | Abolition of Forced Labour Convention, 1957 (No. 105)
- YES | Minimum Age Convention, 1973 (No. 138)
- YES | Worst Forms of Child Labour Convention, 1999 (No. 182)
- YES | Equal Remuneration Convention, 1951 (No. 100)
- YES | Discrimination (Employment and Occupation) Convention, 1958 (No. 111)
- YES | Occupational Safety and Health Convention, 1981 (No. 155)
- YES | Promotional Framework for Occupational Safety and Health Convention, 2006 (No. 187)

Notes section



7B. MODERN SLAVERY RISK ASSESSMENT

Modern Slavery Transparency Declaration



Overall Weighted Score

0.97

Data Quality Score	Risk Assessment Results	Average Score	
1.33	DECEPTIVE RECRUITING	0.75	1.04
1.33	TRAFFICKING	0.75	1.04
1.33	SERVITUDE	0.75	1.04
1.33	FORCED LABOUR	0.75	1.04
1.33	FORCED MARRIAGE	0.75	1.04
1.33	DEBT BONDAGE	0.75	1.04
1.33	CHILD LABOUR	1.50	1.04
1.33	DISCRIMINATION	1.25	1.04
1.33	EQUAL REMUNERATION	1.00	1.16
1.33	FREE ASSOCIATION + COLLECTIVE BARGAINING	1.33	1.33
Weight Total			0.97

Compliance

Bird Habitats | Thermal Haven Nest Boxes®

Thermal Haven Nest Boxes are designed to restore habitats for hollow-dependent fauna. The design addresses temperature variations within the inner nesting space. Air is used as a thermal buffer to create a stable microclimate and limit extreme temperature variations. Each nest box has a tracking number CNC engraved to the base for easy monitoring.

Products Covered:

Thermal Haven Nest Boxes® including all size variations. This assessment does not include

Licence site/s: Drouin, Australia
 Licence Number: BIH:TH01:2023:MS
 Screening date: 17th November 2023
 Valid to: 17th November 2023

This declaration is a part of company's Modern Slavery Statement and hence it is to be read in conjunction with other documents.

Company Structure Description:

Bird Habitats is a Family Partnership dedicated to their daughter Rose. Rose's Legacy of Love aims to ensure future generations can enjoy the biodiversity in Australia. Bird Habitats have a sustainable procurement policy which gives preferences to suppliers that minimise their environmental and human health impacts and a Modern Slavery Policy to monitor supply chain ethics. Thermal Haven Nest Boxes® are manufactured in Victoria, Australia from materials supplied by Australian based companies and greater than 99% of the raw materials originate from Australia.

Company MS Statement: Yes Company MS Policy: Yes

Overview Of Product Supply Chain Assessment

4	100%	100%
Of direct suppliers	Of suppliers evaluated	Suppliers risk assessed/ desktop assessed
0	100%	0
No of suppliers at High Risk	Suppliers audited (unannounced)	Cases of non-conformance/ modern slavery

Content Declared Accurate for and on behalf of:

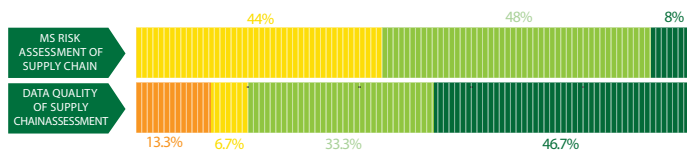
Bird Habitats

Katrin McMahon
Partner
Chris McMahon
Partner



Content Verified by:
Global GreenTag International Pty Ltd

Risk Assessment & Data Quality Summary



ASSESSMENT BASED ON 1% INCREMENTS ACCORDING TO COLOUR CODE KEY ON PAGE 2 & 3.

Dr Nana Bortsie-Aryee
Program Director

David Baggs
Chief Executive Officer

Bird Habitats

Verified by GLOBAL GREEN TAG INTERNATIONAL PTY LTD



Verification Methodology

1.0 Scope

The Global GreenTag's Modern Slavery Product Declaration is a facilitation service designed to provide the subject company with an additional level of robustness to their declaration in compliance with Modern Slavery Acts that:

- Provides a third party verified Modern Slavery assessment of product supply chains to the extent possible;
- Provides assessment transparency and gives a quick evaluation overview;
- Uses simple easy to understand colour keys to explain risks;
- Identifies Modern Slavery risks and how they are mitigated (or not);
- Promotes and recognises manufacturers and suppliers willing to be 100% transparent as the Leaders they are;
- Provides plain language explanations of any recognised or assumed Modern Slavery in the supply chain;
- Provides guidance on the 'level of reliability' attached to risk assessments undertaken from 'onsite audit' to 'research based' verification;
- Provides reporting suitable for aggregating into company level reports for companies caught by relevant Acts, especially for companies with large procurement portfolios and mandatory legislative reporting requirements.

The GreenTag MSD is ultimately the subject Company's Modern Slavery declaration on their product Supply chain and is declared as such by a competent public officers of the subject company.

2.0 Preparing a MSD

GGT MSD is prepared after reviewing numerous documents including, but not limited to, the Australian Government's guidance for reporting entities, UK Modern Slavery Act, QLD HRA, Australian Council of Superannuation Investors' (ACSI) Modern Slavery Risks, Rights & Responsibilities, and ETI and ERGON's Managing Risks Associated with Modern Slavery: A Good Practice Not for the Private Sector. Verifications are undertaken by GGT Qualified Exemplar Global Lead Auditors and are reviewed by both the GGT Program Director (also a Qualified Exemplar Global Lead Auditor) and the subject Company's Executive Management.

3.0 Assessment

Global GreenTag will map product supply chain and collect evidence from the supply chain to the extent possible. Company and its suppliers are requested to submit their procurement policies, quality statements, corporate policies, employment policies and contracts, Non-conformance registers, Human Resource policies, Modern Slavery policy, etc. These documents are reviewed and an explanation on any identified MS issues is requested from company/supplier. Based on the information and further evidence received from Company and its suppliers, Global GreenTag will verify each supplier and determine their compliance to MS from 'Low Risk' to 'Undetermined Risk', see table 1 for 5 scale code. The data quality of the supply chain assessment will be classified from 'Onsite audit' to 'No data available or Obscure Supply Chain', see table 2

Table 1: MS Risk Assessment of Supply Chains

Risk Identified	Colour
Best Practice Performance - Supplier has really strong policies in place to avoid Modern Slavery and reports transparently on any non-conformances. Suppliers have demonstrated history of strong positive performance outcomes achieved. Improvement on a previously non-compliant situation or the absence of negative impacts are not regarded as positive impacts.	+2
Low Risk - Supplier has strong policies in place to avoid Modern Slavery and reports transparently on any non-conformances. Improvement on a previously non-compliant situation or the absence of negative impacts are not regarded as positive impacts.	+1
Compliance - Supplier have no conflicting policies related to Modern Slavery. Suppliers are compliant to local laws and international ILO core 8 conventions. Any identified 'Modern Slavery non-conformances*' has been actioned and are committed to put stronger policies in place.	0
Medium Risk - Suppliers have commitment to avoid Modern Slavery. The identified local law non-conformances has been actioned and are committed to put stronger policies in place. The policies are improving.	-1
High Risk - Suppliers identified with conflicting Modern Slavery policies in place and has high risk of potential MS activities or identified MS activities without any further actions to prevent it. Identified non-conformance to local law or MS without any actions to improve the situation.	-2
Undetermined Risk (Risk Indeterminable) - No or insufficient data to conclusively determine Modern Slavery	-2

Table 2: Data Quality of Supply Chain Assessment

Criteria	Data Source		Timeliness	Representativeness
	Primary Data	Secondary Data		
+2	Audit – Onsite	Report from well-established, well-documented reliable sources	Data from current period	Data directly from the company/ source/ supplier
+1	Audited – Desktop. Statutory declarations with supporting documents as evidence	Report from a well-established, well-documented reliable source	Data from previous year	Data from other sites of the company in same region
0	Statutory declarations cross-checked with region based research/ secondary reports	Independent but similar claims made by various sources	Data from 2 years ago	Data from other sites of the company in other regions
-1	Research based data	Research based data. Unverifiable claims found on websites, twitter, social media, etc	Data from 3 years ago	Data from other companies in same region/ area/ production conditions
-2	No data available or Obscure supply chain. Assumption based	No data available or obscure supply chain. Assumption based	Timeline unknown or more than 3 years ago	Average country data / average industry data / data from third parties

Above tables 1 and 2 are adapted and adopted from Social LCA methodology.

Bird Habitats

MSD Modern Slavery Transparency Declaration™
Verified by Global GreenTag International



Executive Summary

Tier 1 (Direct) Suppliers

2 Tier 1 Suppliers out of 4 have publicly available policies addressing modern slavery and are externally audited for the fundamental ILO conventions. 1 supplier had a code of conduct that specifically address modern slavery. For the remaining 1 supplier for which no information was found, assumptions were made based on the geographical location of the supplier and similar companies within the region.

3 Tier 1 Suppliers out of 4 have publicly available policies regarding discrimination but only 2 can provide evidence of compliance. For the 1 remaining supplier assumptions were made based on the geographical location of the supplier and similar companies within the region.

3 Tier 1 Suppliers have policies addressing freedom of association and collective bargaining rights but only 2 of these recognise collective bargaining in negotiations. For the 1 remaining suppliers, assumptions were made based on the geographical location of the supplier and similar companies within the region.

3 Tier 1 Suppliers out of 4 have publicly available policies regarding equal remuneration but only two have transparent pay scales and provide evidence of a living wage. For the 1 remaining suppliers, assumptions were made based on the geographical location of the supplier and similar companies within the region.

Tier 2+ (Indirect) Suppliers

Both wood suppliers have a PEFC Chain of Custody certification on the provided products. This includes an audit of suppliers and requires the Fundamental ILO conventions to be followed and are considered not a risk. The two primer suppliers were identified however no relevant information was found on them. No additional information was found on the beeswax and screw tear 2 suppliers.

Actions Taken as a result of investigations:

High Priority Tasks

- Obtain data and documentation from Tier 1 Suppliers for which no data was available on forced labour, trafficking in persons, servitude, debt bondage, deceptive recruiting labour or services, worst forms of child labour.
- Obtain data and documentation from Tier 1 Suppliers for which no data was available on discrimination, equal remuneration, freedom of association and collective bargaining.

Whistleblower Provisions? No

GGT disclaimer: As required by various legislation this document constitutes risk assessment and as such does not guarantee that Modern Slavery does not occur in the supply chains described herein. It is issued in good faith and is determined to be as accurate as possible at the date of issuance and is part of a continuous improvement and reporting process and will vary overtime with ongoing consultancy with supply chain.

Global GreenTag provides supply chain verification and research services for manufacturers providing product level declaration for customers asked to provide responses to MS Act & QLD Human Rights.

GGT MSD document is a product level declaration.

The document is owned by the subject company. The IP inherent in the document is owned exclusively by Global GreenTag International Pty Ltd.

As a product level statement, this document is issued in support of those companies undertaking required or voluntary Modern Slavery reporting or publication.



Table 3: Applicant and Manufacturer: Bird Habitats
3.1 Assessment for Slavery (including deceptive recruiting for labour or services, trafficking in persons, servitude, forced labour, forced marriage and Debt bondage).

Component	Assessed	Full Compliance	Risk Assessed Outcome	Data Quality Outcome	Company Name commitments/ goals
Applicant and Manufacturer	100%	Y	+1 The company has a Modern Slavery Policy and a PDCA system in place.	+1.66 Current primary data directly from the company.	Y

3.2 Assessment for Child Labour

Component	Assessed	Full Compliance	Risk Assessed Outcome	Data Quality Outcome	Company Name commitments/ goals
Applicant and Manufacturer	100%	Y	+1 The company has a Modern Slavery Policy and a PDCA system in place.	+1.66 Current primary data directly from the company.	Y

3.3 Assessment for Discrimination

Component	Assessed	Full Compliance	Risk Assessed Outcome	Data Quality Outcome	Company Name commitments/ goals
Applicant and Manufacturer	100%	Y	0 The company has a Non-Discrimination Policy in place.	+1.66 Current primary data directly from the company.	Y

3.4 Assessment for Equal Remuneration

Component	Assessed	Full Compliance	Risk Assessed Outcome	Data Quality Outcome	Company Name commitments/ goals
Applicant and Manufacturer	100%	Y	+1 The company has a Non-Discrimination Policy in place which includes equal remuneration and a living wage.	+1.66 Current primary data directly from the company.	Y

3.5 Assessment for Freedom of Association

Component	Assessed	Full Compliance	Risk Assessed Outcome	Data Quality Outcome	Company Name commitments/ goals
Applicant and Manufacturer	100%	Y	+1 The company has a freedom of association policy that recognises collective representation.	+1.66 Current primary data directly from the company.	Y

Table 4: DIRECT SUPPLIERS: Thermal Haven Nest Boxes®
4.1 Assessment for Slavery (including deceptive recruiting for labour or services, trafficking in persons, servitude, forced labour, forced marriage and Debt bondage).

Component	No. of Suppliers	As-sessed	Full Compliance	Risk Assessed Outcome	Data Quality Outcome	Company Name commitments/ goals
Engineered Wood Panels	1	100%	Y	+1 The company has a PDCA system based policy publicly available. Operates in country that has ratified this ILO convention. Audited externally for PEFC chain of custody compliance.	+1.66 Current primary data directly from the company.	Y
Hardwood Guard and Corners	1	100%	Y	+1 The company has a policy publicly available. Operates in country that has ratified this ILO convention. Audited externally for PEFC chain of custody compliance.	+1.66 Current secondary data from ILO and verified through desktop research.	Y
Screws	1	100%	Y	0 The company has a policy publicly available. Operates in country that has ratified this ILO convention.	+1.00 Current secondary data from ILO and verified through desktop research.	Y
Beeswax	1	100%	Y	0 The company operates in country that has ratified this ILO convention. Similar companies in the area have found low risk of slavery.	-0.33 1 year old research based data using region based information.	Pending

4.2 Assessment for Child Labour

Component	No. of Suppliers	As-sessed	Full Compliance	Risk Assessed Outcome	Data Quality Outcome	Company Name commitments/ goals
Engineered Wood Panels	1	100%	Y	+1 The company has a PDCA system based policy publicly available. Operates in country that has ratified this ILO convention. Audited externally for PEFC chain of custody compliance.	+1.66 Current primary data directly from the company and reliable secondary sources.	Y
Hardwood Guard and Corners	1	100%	Y	+1 The company has a policy publicly available. Operates in country that has ratified this ILO convention. Audited externally for PEFC chain of custody compliance.	+1.66 Current secondary data from ILO and verified through desktop research	Y
Screws	1	100%	Y	0 The company has a policy publicly available. Operates in country that has ratified this ILO convention.	+1.00 Current secondary data from ILO and verified through desktop research	Y
Beeswax	1	100%	Y	0 The company operates in country that has ratified this ILO convention. Similar companies in the area have found low risk of slavery.	-0.33 1 year old research based data using region based information.	Pending



4.3 Assessment for Discrimination

Component	No. of Suppliers	As-sessed	Full Compliance	Risk Assessed Outcome	Data Quality Outcome	Company Name commitments/goals
Engineered Wood Panels	1	100%	Y	+1 The company has a PDCA system based policy publicly available. Operates in country that has ratified this ILO convention. Audited externally for PEFC chain of custody compliance.	+1.66 Current primary data directly from the company and reliable secondary sources.	Y
Hardwood Guard and Corners	1	100%	Y	+1 The company has a policy publicly available. Operates in country that has ratified this ILO convention. Audited externally for PEFC chain of custody compliance.	+1.66 Current secondary data from ILO and verified through desktop research.	Y
Screws	1	100%	Y	0 The company has a policy publicly available. Operates in country that has ratified this ILO convention.	+1.00 Current secondary data from ILO and verified through desktop research.	Y
Beeswax	1	100%	Y	0 The company operates in country that has ratified this ILO convention. Similar companies in the area have found low risk of discrimination.	-0.33 1 year old research based data using region based information.	Pending

4.4 Assessment for Freedom of Association

Component	No. of Suppliers	As-sessed	Full Compliance	Risk Assessed Outcome	Data Quality Outcome	Company Name commitments/goals
Engineered Wood Panels	1	100%	Y	+1 The company has an Enterprise Agreement in place that recognises the collective representation of organised workers. Operates in country that has ratified this ILO convention. Audited externally for PEFC chain of custody compliance.	+1.66 Current primary data directly from the company and reliable secondary sources.	Y
Hardwood Guard and Corners	1	100%	Y	+1 The company has an Enterprise Agreement in place that recognises the collective representation of organised workers. Operates in country that has ratified this ILO convention. Audited externally for PEFC chain of custody compliance.	+1.66 Current secondary data from ILO and verified through desktop research.	Y
Screws	1	100%	Y	0 The company has a policy publicly available. Operates in country that has ratified this ILO convention.	+1.00 Current secondary data from ILO and verified through desktop research.	Y
Beeswax	1	100%	Y	0 The company operates in country that has ratified this ILO convention. Similar companies in the area recognise collective bargaining.	-0.33 1 year old research based data using region based information.	Pending

4.5 Assessment for Equal Remuneration

Component	No. of Suppliers	As-sessed	Full Compliance	Risk Assessed Outcome	Data Quality Outcome	Company Name commitments/goals
Engineered Wood Panels	1	100%	Y	+2 The company has an Enterprise Agreement in place with transparent pays scales and remuneration criteria.	+1.66 Current primary data directly from the company and reliable secondary sources.	Y
Hardwood Guard and Corners	1	100%	Y	+2 The company has an Enterprise Agreement in place with transparent pays scales and remuneration criteria.	+1.66 Current secondary data from ILO and verified through desktop research	Y
Screws	1	100%	Y	0 The company has a policy publicly available. Operates in country that has ratified this ILO convention.	+1.00 Current secondary data from ILO and verified through desktop research	Y
Beeswax	1	100%	Y	0 The company operates in country that has ratified this ILO convention.	-0.33 1 year old research based data using region based information.	Pending

Limitations & Uncertainties:

Tier 2 suppliers were excluded due to:

- Lack of data
- The majority of these suppliers are for wood components which are already risk assessed for the Mandatory ILO compliance through their PEFC.



8.

SOCIAL BENEFITS



Bird Habitats
Thermal Haven Nest Boxes®
Drouin Victoria 3818 Australia



8. SOCIAL BENEFITS = 0

8A) SOCIAL BENEFIT PROGRAMS = 0

Social Benefit programmes in planning but implementation incomplete. No points awarded.



8B) INDIGENOUS ENGAGEMENT BENEFIT PROGRAMS = 0

Indigenous Benefit programme in planning but implementation incomplete. No points awarded.



9.

INNOVATION



Bird Habitats
Thermal Haven Nest Boxes®
Drouin Victoria 3818 Australia



9. INNOVATION = 10

The innovation inherent in Thermal Haven Nests is rated 'High' and given the maximum score for 'Leadership in Innovation' for the following reasons:

1. Disruptive innovation in the thermal design achieving near natural log-hollow temperature performance even in full sun/;
2. High levels of recycled & PEFC Chain of Custody Certified wood and wood-fibre content;
3. High levels of inherently designed circularity of materials;
4. Zero human and environmental toxicity;
5. Highly innovative glue-free construction and identification methodology for regular scientific reporting of nest-box occupation success;
6. Intended Social Benefit model of delivery via local community groups and a not-for-profit Benevolent Foundation organisational structure.



10.

LCARate™ RESULTS



Bird Habitats
Thermal Haven Nest Boxes®
Drouin Victoria 3818 Australia



10. LCARate™

Thermal Haven was awarded a Gold level LCARATE with a total score of -0.01. It was awarded points for synergy through bibliophilic design, thermal insulating design and tracking numbers for data collection. It uptakes 0.05 kg of CO2 equivalent units per box which is better than 100% of the current worst case alternative. Also contributed only 60% of the impacts of a business as usual product when using the Eco Point Life cycle assessment summary method.