HKGBC 香港綠色建築議會

CONSTRUCTION INDUSTRY COUNCIL 建造業議會

BUSINESS ENVIRONMENT COUNCIL 商界環保協會

HONG KONG CIRCULAR BUILT ENVIRONMENT GUIDEBOOK

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About Us

Hong Kong Green Building Council

The Hong Kong Green Building Council (HKGBC) is a non-profit, member-led organisation established in 2009 and has become a public body under the Prevention of Bribery Ordinance since 2016. The HKGBC strives to promote the standard and development of sustainable buildings in Hong Kong. The HKGBC also aims to raise green building awareness by engaging the government, the industry and the public, and to develop practical solutions for Hong Kong's unique, subtropical built environment of high-rise, high density urban area, leading Hong Kong to achieve carbon neutrality by 2050 and to become a world's exemplar of green building development.

Our passion for a sustainable built environment is the motivating force to achieve our goals. The wide experience and deep insight of our members and experts is the underlying foundation for real results.

Construction Industry Council

The Construction Industry Council (CIC) was formed in 2007 under the Construction Industry Council Ordinance (Cap. 587). The CIC consists of a chairman and 24 members representing various sectors of the industry including employers, professionals, academics, contractors, workers, independent persons and Government officials. The main functions of the CIC are to forge consensus on long-term strategic issues, convey the industry's needs and aspirations to the Government, provide professional training and registration services, and serve as a communication channel between the Government and the construction industry.

Business Environment Council

Business Environment Council Limited (BEC) is an independent, non-profit membership organisation, established by the business sector in Hong Kong. Since its establishment in 1992, BEC has been at the forefront of promoting environmental excellence by advocating the uptake of clean technologies and practices which reduce waste, conserve resources, prevent pollution and improve corporate environmental and social responsibility. BEC offers sustainable solutions and professional services covering advisory, research, assessment, training and award programmes for government, business and the community, thus enabling environmental protection and contributing to the transition to a net-zero economy.

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Foreword

from HKGBC Chairman

Dr CHEUNG Tin-cheung, SBS
Chairman
Hong Kong Green Building Council

On behalf of the Hong Kong Green Building Council (HKGBC), we take great pleasure in presenting the *Hong Kong Circular Built Environment Guidebook*, a resource designed to advance the adoption of circular economy solutions within the building industry.

The HKGBC is dedicated to advancing green and sustainable building practices through active engagement with the government, industry stakeholders, and the public. We strive to raise awareness and develop practical, locally adapted solutions for the built environment. Our efforts are geared towards supporting Hong Kong's goal of achieving carbon neutrality before 2050 and positioning the city as a global model of green building development.

The transition to circular economy is widely recognised as a vital strategy for striving to attain long term sustainability. Aligned with the World Green Building Council's *Circular Built Environment Playbook*, the HKGBC, in collaboration with the Business Environment Council (BEC) and the Construction Industry Council (CIC), is actively exploring the feasibility of implementing circular economy principles and practices tailored to Hong Kong's unique context.

The growing volume of construction and demolition waste—constituting a significant share of the city's overall solid waste—continues to strain Hong Kong's waste management systems. It is imperative for the building industry to critically reassess existing practices and adopt sustainable alternatives. By integrating circular economy concepts into building process, stakeholders can optimise resource use and substantially reduce waste generation.

To this end, the Guidebook presents a comprehensive overview of circular economy strategies across four key pillars: Building and Construction Materials, Design and Retrofit, Regenerate Nature, and Levers for Change. Supported by a diverse collection of local case studies, it serves as a practical and insightful resource for professionals seeking to integrate circular practices into their work.

We extend our sincere gratitude to the Material Circularity Task Force, its dedicated working group, and all case study contributors for their valuable input in shaping this publication. It is our hope that the Guidebook will inspire stakeholders across the building industry to embrace circularity and help forge a more sustainable, resilient city for future generations.

Foreword

from CIC Chairman

Ir Prof. Thomas HO On-sing
Chairman
Construction Industry Council

As Chairman of the Construction Industry Council (CIC), I am honoured to present the *Hong Kong Circular Built Environment Guidebook*. This Guidebook, developed in collaboration with the Hong Kong Green Building Council and the Business Environment Council, represents a significant milestone in advancing sustainability and circularity in Hong Kong's construction industry.

Hong Kong has long been a beacon of innovation and progress. Still, the urgent challenges of climate change, resource scarcity, and waste management compel us to rethink how we design, build, and operate within the built environment. The construction sector generates about 28% of Hong Kong's total solid waste received at landfills. Transitioning to circular practices, such as material reuse, recycling, and design for disassembly, is crucial to reduce reliance on landfills and lower carbon emissions.

This Guidebook aligns with global frameworks like the World Green Building Council's *Circular Built Environment Playbook* but is specifically tailored to address the unique challenges and opportunities here in Hong Kong. It moves beyond theory to offer practical, actionable strategies and share the local innovative practices that we can all adopt. The CIC is proud to be already embedding these principles through our own initiatives, such as the CIC Smart Waste Management Tool that streamlines construction waste management, and the CIC Green Product Certification, which promotes sustainable material selection.

By adopting the principles outlined in this Guidebook, stakeholders can reduce waste generation, extend the life cycle of materials, and contribute to Hong Kong's 2050 carbon neutrality goal. This transition presents not only an environmental imperative but also an opportunity to drive innovation, strengthen industry competitiveness, and unlock long-term economic value, which can create benefits that transcend environmental impact to the social and economic aspects.

I encourage all industry practitioners, policymakers, and stakeholders to explore this Guidebook and join us in transforming Hong Kong's built environment into a global model of sustainability and circularity.

Foreword

from BEC CEO

Mr Simon NG Ka-wing
Chief Executive Officer
Business Environment Council

As Hong Kong advances toward its 2050 vision of carbon neutrality, the built environment has become a crucial frontier. In a city defined by high-density vertical development, the way we design, construct, operate, and decommission buildings has far-reaching environmental consequences.

Globally, buildings and infrastructure now account for nearly half of all extracted raw materials, driving climate change, biodiversity loss, and other adverse environmental impact. What begins as intensive resource extraction and usage could end as massive waste generation, and Hong Kong is facing an enormous challenge at the tail end. In 2023, the city produced an average of 45,560 tonnes of construction waste every day. Of this, 65% went to public fill facilities, 10% to landfills, and only 25% was directly reused. For too long, reclamation and disposal have dominated construction waste management, an approach no longer sustainable as land tightens and the pressure to decarbonise grows.

This means we must view every building not as an endpoint but as part of a continuous cycle of material utilisation. Through smarter design, responsible sourcing, and creative reuse, we can conserve resources, reduce waste, and unlock new business opportunities that benefit both our economy and our environment.

This Guidebook, produced jointly by Business Environment Council (“BEC”), Hong Kong Green Building Council (“HKGBC”), and Construction Industry Council (“CIC”), is designed to illustrate, support, and inspire that transformation. It builds on the World Green Building Council’s *Circular Built Environment Playbook* and tailors global principles to our local context. With twenty local case studies spanning building materials, design and retrofit, nature regeneration, and systemic levers for change, this Guidebook showcases the innovation of Hong Kong businesses and offers practical examples that others can learn from and build upon.

As a membership organisation galvanising business actions towards environmental excellence and net zero in Hong Kong, BEC is committed to advancing this transformation in close partnership with the industry to embed circularity in Hong Kong’s built environment.

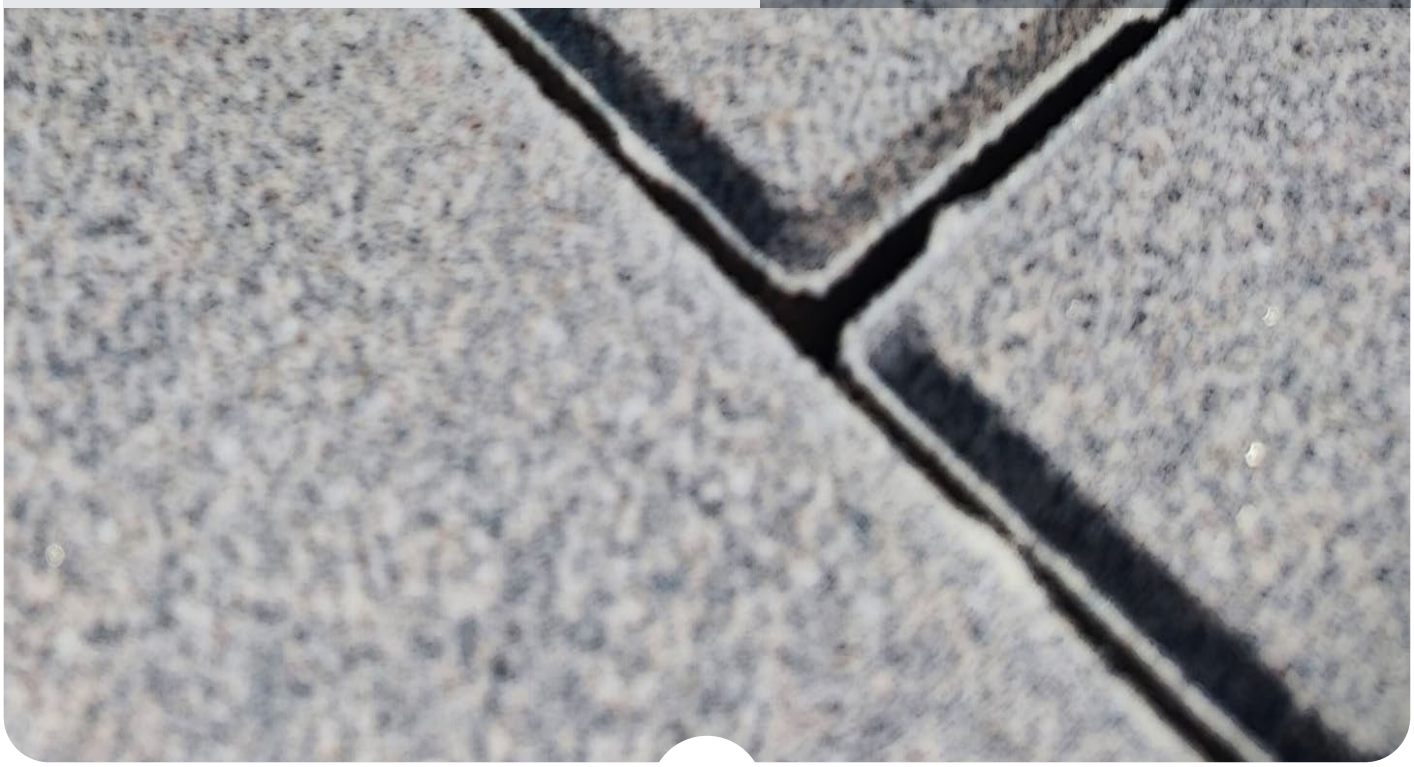
0. Background

0.1 World Green Building Council – Circularity Accelerator

The World Green Building Council ("WorldGBC") announced the release of the *Circular Built Environment Playbook* in May 2023. The publication aims to raise awareness and promote the adoption of circular economy solutions by providing guidance to stakeholders throughout the built environment value chain, enabling them to make sustainable and circular decisions. Through this initiative, the global network of the WorldGBC is actively working towards its goals of resource efficiency and circularity, striving to create a built environment that supports the regeneration of resources and natural systems, while also delivering socio-economic benefits through a circular economy.

In line with the *Circular Built Environment Playbook* framework, this Guidebook specifically focuses on Hong Kong, empowering local building industry practitioners and stakeholders to actively participate in the circular built environment. By extending the contexts to Hong Kong, this Guidebook provides valuable insights and practical strategies for implementing circular practices within the region.

From Linear City to Circular Hub: Hong Kong's Necessary Transition



0.2 Why a Circular Economy?

Our economic model is primarily rooted in a linear 'take-make-waste' system, which operates by extracting finite resources, producing goods, and discarding waste without considering long-term sustainability. This linear approach accelerates the depletion of finite resources and generates overwhelming waste, which collectively exacerbates the triple planetary crisis: climate change, biodiversity loss, and pollution.

In just five years (2016-2021), humanity consumed 582 billion tonnes of materials, nearly matching the 740 billion tonnes used throughout the entire 20th century[1]. Recent estimates reveal that humanity is now consuming natural resources at a rate 1.7 times faster than the Earth can regenerate[2]. This highlights the alarming depletion of resources driven by the unsustainable pace of resource extraction. Specifically, nearly 50% of all raw materials taken from the Earth are used to create buildings and infrastructure[3].

The linear economy also contributes to rising waste generation. According to the Global Waste Management Outlook 2024, municipal solid waste ("MSW") is expected to rise from 2.1 billion tonnes in 2023 to 3.8 billion tonnes by 2050[4]. Meanwhile, approximately 37% of the disposed waste was sent to landfills, while 31% was subjected to open dumping[5]. Apart from MSW, construction and demolition waste accounts for around one-third of the solid waste generated in the world, with most of it being dumped in landfills[6]. Landfill and open dumping contribute significantly to greenhouse gas emissions, primarily through the release of methane, which exacerbates global temperature rise. Additionally, they lead to severe environmental consequences, including water and soil pollution from leakage, air pollution caused by odorous emissions, and land-use changes that destroy habitats, harm biodiversity, and negatively impact the health of nearby organisms.

To tackle these challenges and support sustainable development, the concept of the circular economy, which is recognised as a solution to facilitate better resource utilisation and waste reduction, was introduced. In addition to addressing the environmental issues, transitioning to a circular economy can also reduce dependence on raw materials, create more jobs, and lower costs. Despite widespread promotion and discussion of the circular economy approach, the global economy's reliance on recycled materials has declined, dropping from 9.1% in 2018 to just 6.9% in 2025, a 31% decrease over seven years[7]. This alarming trend highlights the urgent need to take decisive action to mitigate the planetary crisis and ensure a sustainable future.

0.3 Why a Circular Economy in Hong Kong?

Hong Kong remains predominantly a linear city, with limited progress in transitioning to the circular economy[8].

Key aspects of the circular economy, such as eco-design, repair, reuse, refurbishment, and remanufacturing, are not well understood by the public and remain uncommon practices in Hong Kong. This lack of circular practices exacerbates the city's waste management challenges, which have become a critical issue owing to high waste generation, low recycling rates, and heavy reliance on landfills. According to data released by the Environmental Protection Department in 2023, the total quantity of municipal solid waste ("MSW") disposed of in landfills has decreased for two consecutive years, falling to 3.97 million tonnes. The average daily disposal quantity in 2023 was 10,884 tonnes, representing a 2.2% reduction compared to the 11,128 tonnes recorded in 2022[9]. The per capita MSW disposal rate per day also declined by 4.7%, dropping from 1.51 kilograms in 2022 to 1.44 kilograms in 2023[10]. However, these figures remain high compared to other cities such as Seoul (0.99 kilograms[11]) and Taipei (1.09 kilogram[12]). In addition, the daily amount of construction and demolition ("C&D") waste disposed of in landfills increased slightly, rising from 4,128 tonnes in 2022 to 4,428 tonnes in 2023. Heavy reliance on landfills has made them a major source of methane emissions, accounting for 8.5% of Hong Kong's total greenhouse gas emissions[13]. Additionally, landfills pose significant risks of pollution from leakage and consume valuable land resources, further exacerbating the strain on the city's already limited space.

Accelerating the transition to the circular economy is essential for Hong Kong to achieve its 2050 carbon neutrality goal, as outlined in its climate action plan. This shift is critical to reducing negative environmental impacts, increasing local material circulation to reduce reliance on imports, and boosting the recycling industry. Given Hong Kong's densely built environment and high levels of construction activity, adopting circular principles in the built environment is particularly vital to addressing the city's challenges and advancing sustainability.

1 https://reports.circularity-gap.world/cgr-global-2024-37b5f198/CGR+Global+2024+-+Report.pdf
2 https://www.footprintnetwork.org/2024/07/21/earth_overshoot_day_2024/
3 https://www.bbc.com/future/article/20211215-the-buildings-made-from-rubbish
4 https://wedocs.unep.org/bitstream/handle/20.500.11822/44939/global_waste_management_outlook_2024.pdf?sequence=3
5 https://datatopics.worldbank.org/what-a-waste/trends_in_solid_waste_management.html
6 https://www.sciencedirect.com/science/article/abs/pii/S2352710223019046
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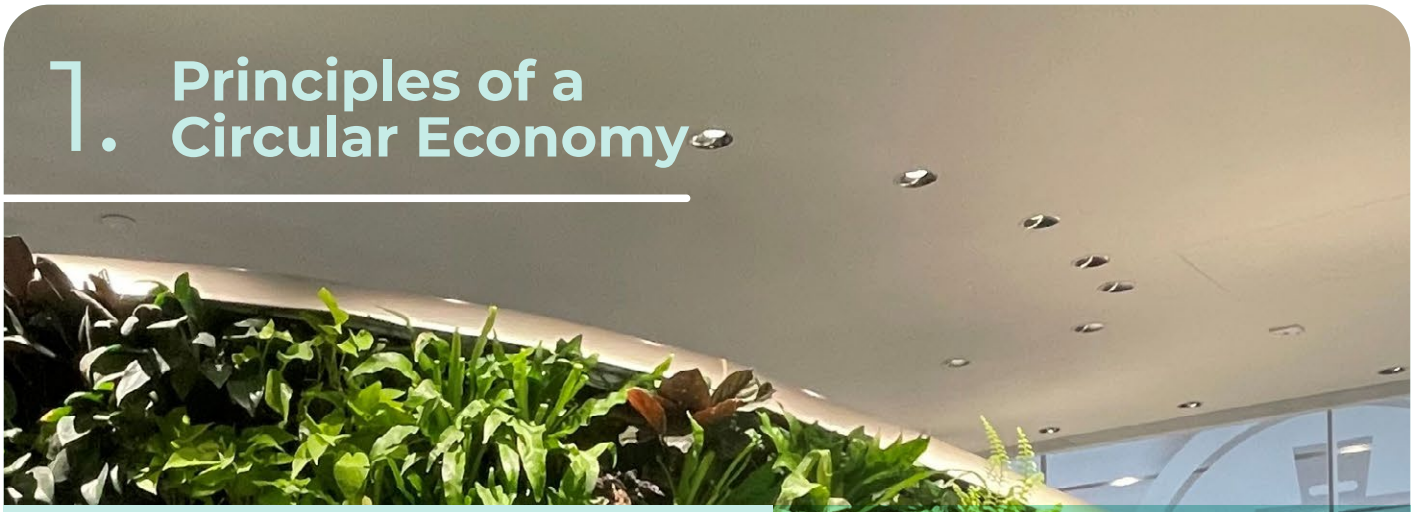
13 https://cnsd.gov.hk/wp-content/uploads/2025/04/Data-Tables_2023_AR5_Sector-r2_clean.pdf

1. Principles of a Circular Economy

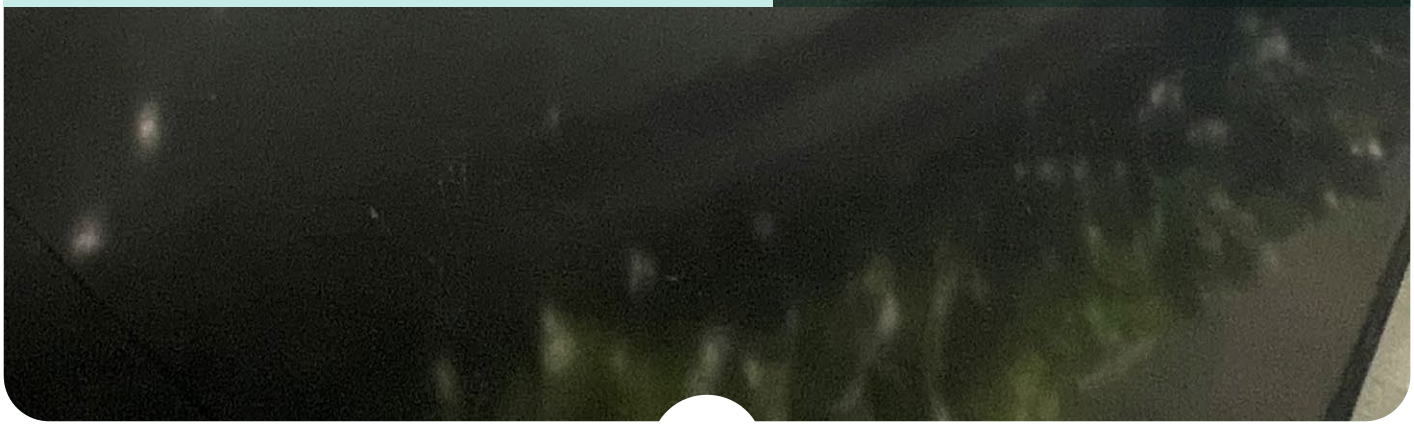


Rethinking Everything: The Foundation of a Circular Built Environment

1.1 What is a Circular Economy?

In contrast to linear economic models that dispose of resources after their initial functional use, a circular economy aims to optimise resource utilisation and minimise waste throughout the entire life cycle. In the built environment, this approach involves the following stages:

- **Manufacturing Stage:** Emphasise the use of local, alternative, and reused materials, particularly those obtained from existing buildings or assets through deconstruction. Prioritise the use of renewable energy sources and adopt efficient practices for natural resource usage, such as water.
- **Design Stage:** Prioritise energy efficiency and incorporate passive design strategies. Promote the generation and utilisation of renewable energy, implement water harvesting techniques, and encourage the regeneration of nature. Give preference to locally sourced, reused, or alternative materials. Design buildings for ease of maintenance, disassembly, and deconstruction, and choose non-toxic materials to facilitate future reuse and circulation.
- **Construction Phase:** Utilise low embodied carbon construction processes, such as modular construction. Implement higher performance standards for construction waste management. Prioritise the use of sustainable materials and products throughout the decision-making processes.
- **Operational Phase:** Maintain buildings effectively to extend the lifespan of assets and their components. Minimise waste generation and restore and protect natural capital on-site.
- **Retrofit Stage:** Retrofit all assets according to higher sustainability performance standards. Prioritise reuse over demolition, and prefer alternative, renewable, reused, or recycled materials for asset renovations.
- **End-of-Life Stage:** Prioritise full disassembly and deconstruction to enable the reuse of all building materials, products, and components. Avoid demolition and landfilling of building components.



1.2 A Circular Economy for the Built Environment

While the concept of circularity has gained popularity in recent years, the truth is that buildings have inherently embodied circular principles for centuries. Ideas like urban mining, buildings serving as material banks, and design for disassembly may seem like novel concepts, but in reality, people have been reusing and repurposing building materials throughout history. Unfortunately, in our relatively recent past, we have overlooked these sustainable building practices and have instead caused significant environmental harm.

Currently, the circular use of materials and products is not progressing in the right direction. Estimates from 2023 indicate that the world is only 7.2% circular, which is a decrease from 8.6% in 2020 and 9.1% in 2018. This downward trend highlights the need for urgent action to reverse the environmental damage caused by our neglect of circular principles. By embracing and implementing circular practices, we can restore the balance and sustainability that buildings have inherently possessed for millennia.

1.3 A Definition for a Circular Building

A circular building is designed to optimise resource utilisation and minimise waste throughout its entire life cycle. This is achieved through various strategies, including:

- Utilising durable products and services made from secondary, non-toxic, sustainably sourced, renewable, reusable, or recyclable materials.
- Promoting space efficiency over time by incorporating shared occupancy, flexibility, and adaptability into the building design.
- Prioritising longevity, resilience, durability, easy maintenance, and reparability of building components and systems.
- Facilitating the disassembly, reuse, or recycling of embedded materials, components, and systems when the building reaches the end of its life.
- Conducting life cycle assessments (LCA) and life cycle costing (LCC) to evaluate the environmental impact and cost-effectiveness of the building throughout its lifespan.
- Ensuring readily available digital information, such as building material passports, to enable efficient tracking and management of building materials and their environmental characteristics.

1.4 A Circular Value Chain in the Built Environment

Enabling circular solutions at scale in the built environment requires the active involvement of all stakeholders along the value chain. It is essential for every actor to embrace the necessary actions and become "circular-ready," as this sets the stage for creating a thriving regenerative economy that operates within the limits of our planet. By collectively adopting circular practices and working towards sustainable market conditions, stakeholders can drive the transition towards a more sustainable and circular built environment, benefiting both the economy and the environment.

1.5 Assessment Frameworks for Circularity in the Built Environment

Multiple frameworks and tools have been developed globally to assess and promote circularity in the built environment. These methodologies enable stakeholders to evaluate material flows, resource efficiency, and life cycle impacts while supporting the transition from linear to circular practices. After reviewing various assessment approaches (summarised in the table below), this *Hong Kong Circular Built Environment Guidebook* adopts the WorldGBC's *Circular Built Environment Playbook* as its foundational framework. The Playbook's comprehensive strategies emphasise material efficiency, design for disassembly and regenerative solutions, and provide actionable guidance for policymakers, designers, and industry practitioners.

The Circular Built Environment Playbook

Author/Publisher: World Green Building Council

- The Playbook outlines strategies to transition from linear to circular practices in buildings and cities, emphasising material efficiency, design for disassembly/reuse, and nature regeneration, supported by global case studies and calls to action for policymakers, businesses, and designers to scale sustainable solutions.

Link: *https://worldgbc.org/article/circular-built-environment-playbook/*

A Framework for Circular Buildings: indicators for possible inclusion in BREEAM

Author/Publisher: Dutch Green Building Society (DGBC), Metabolic, SGS Search and Circle Economy

- A framework outlines a strategic approach to designing and constructing sustainable buildings by integrating circular economy principles, which identifies key impact areas of materials, energy, water, biodiversity, health, and social value and proposes practical strategies (Reduce, Synergise, Supply, Manage) with measurable indicators for inclusion in BREEAM standards to enhance resource efficiency and long-term building performance.

Link: *https://www.circle-economy.com/resources/a-framework-for-circular-buildings*

Circular Building Assessment Prototype (CBA)

Author/Publisher: Buildings as Material Banks (BAMB)

- A methodology and digital tool under development assesses circularity in buildings, comparing material flows, reuse potential, and environmental impacts by integrating BIM data, automated quantity extraction, and predefined material attributes to evaluate design scenarios against conventional construction practices.

Link: *https://www.bamb2020.eu/post/cba-prototype/*

Circularity Calculator

Author/Publisher: IDEAL & CO Explore (endorsed by Ellen MacArthur Foundation)

- A digital tool evaluates circularity in product design, enabling users to analyse material flows, reuse potential, and cost impacts through adjustable scenarios, with functionality for importing Bill of Materials data and comparing strategies to optimise recycling, remanufacturing, and value retention.

Link: https://circularitycalculator.nl/

Cradle to Cradle (C2C) Certified™

Author/Publisher: Cradle to Cradle Products Innovation Institute

- A globally recognised, multi-attribute certification standard evaluates products across five sustainability categories, including material health, circularity, clean air & climate, water & soil stewardship, and social fairness, ensuring safe, circular, and responsibly designed solutions aligned with ISO 14024 for environmental labelling.

Link: https://c2ccertified.org/

Denmark Circularity Indicator Framework

Author/Publisher: Denmark Circularity Foundation

- A framework measures the nation's transition to a circular economy, quantifying material flows, resource efficiency, and CO_2 impacts across key sectors like construction, manufacturing, and food systems, while identifying gaps and opportunities to improve on Denmark's 4% circularity rate and align with global sustainability targets.

Link: https://www.circularity-gap.world/denmark

DGNB Toolbox "Circular Building"

Author/Publisher: Deutsche Gesellschaft für Nachhaltiges Bauen (DGNB) German Sustainable Building Council

- Practical resources include checklists, case studies, and certification criteria, implementing circular economy principles in construction, and emphasising resource efficiency, deconstruction planning, and material reuse to enhance sustainability performance within the DGNB certification framework.

Link: https://www.dgnb.de/en/sustainable-building/circular-building

ISO 59020

Author/Publisher: International Organization for Standardization

- An international standard provides requirements and guidance for measuring and assessing circular economy performance across economic systems, enabling organisations to evaluate resource efficiency, circular flows, and sustainability impacts through consistent indicators and methodologies.

Link: https://www.iso.org/standard/80650.html

Madaster Circularity Index

Author/Publisher: Madaster Foundation

- An indicator quantifies a building's circularity (0-100%) by assessing material flows during construction and end-of-life phases, incorporating correction factors for data completeness and detachability, while identifying unknown elements to improve accuracy in measuring reuse, recycling, and waste reduction potential.

Link: https://docs.madaster.com/us/en/platform-pages/building/circularity.html

Material Circularity Indicator (MCI)

Author/Publisher: Ellen MacArthur Foundation

- A quantitative tool assesses product-level circularity by analysing material inputs (virgin/recycled sources) and end-of-life outputs (recovery/recycling rates), enabling companies to identify supply chain opportunities and benchmark performance against circular economy principles.

Link: https://ellenmacarthurfoundation.org/material-circularity-indicator

National Circularity Assessment Framework for Buildings

Author/Publisher: GlobalABC, Government of Finland, UNOPS, UNEP and UN-Habitat

- A comprehensive tool designed to evaluate and enhance circularity in the building and construction sector, providing measurable indicators to minimise resource extraction, reduce environmental impacts, and improve socio-economic outcomes, aligned with global sustainability goals like the SDGs and Paris Agreement.

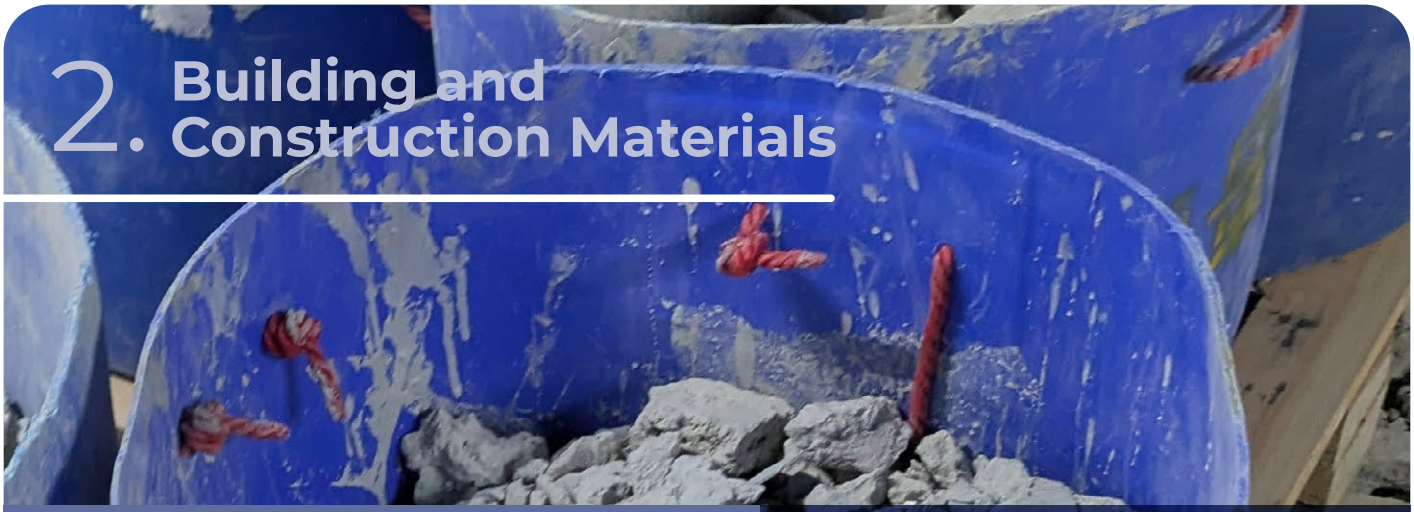
Link: https://www.oneplanetnetwork.org/programmes/circular-built-environment/National-Circularity-Assessment-Framework

Technology-Material-Design (TMD) Circularity Assessment Framework

Author/Publisher: Ericson K.S. Lau, Daniel W.M. Chan, Benjamin I. Oluleye and Timothy O. Olawumi (2025)

- A structured evaluation tool integrates smart technologies (e.g., BIM, IoT), sustainable material metrics (e.g., recyclability, embodied energy), and circular design principles (e.g., modularity, adaptive reuse) to quantify building circularity, optimise resource efficiency, and guide policy and industry decision-making toward a zero-waste construction sector.

Link: https://doi.org/10.20944/preprints202502.1982.v1



2. Building and Construction Materials

All materials and buildings contribute to carbon footprints through resource extraction, production, and repurposing. The construction industry faces a surge in material use, necessitating alignment with global carbon budgets. Circular materials, both conventional and alternative, offer eco-friendly options through resource efficiency. Greater adoption of circular principles is vital to curb emissions and promote sustainable practices in construction.

This chapter explores the significance of building and construction materials to illustrate the potential of circular economy practices in the built environment. Key industry recommendations include driving circular material use to promote sustainability, reducing resource consumption by reusing existing materials, and localising the supply chain to benefit both the environment and local economies.

Waste is a Design Flaw: Valuing Every Resource

2.1 Digital Material Passports

Concept
A material passport details building materials' characteristics and value for reuse and recycling in larger markets. Developed primarily in Europe, it includes tools like Life Cycle Analysis and Environmental Product Declarations. Digital databases track products for refurbishment or reuse, promoting transparency and showcasing materials' residual value, turning buildings into material banks.

Case Study

CIG Green Product Certification
The CIC Green Product Certification evaluates building materials and products across sustainability criteria, including carbon footprint, toxicity, and ecosystem impacts. By mandating transparency, certified products' data, such as GHG emissions and resource efficiency, is publicly accessible, mirroring Digital Material Passports that track materials' life cycle value. This fosters informed decisions for reuse, recycling, and low-carbon procurement, advancing circularity in construction.
Link: https://cicgpc.hkgbc.org.hk/

2.2 Buildings as Material Banks

Concept
Every component within a building holds value, often discarded in landfills or for energy recovery during renovations or demolition. Embracing buildings as "material banks", materials become resources for reuse, recycling, or upcycling in a circular economy, fostering demand for repurposed building elements and necessitating precise material documentation.

Case Study

Material Exchange Platform
CIC Material Exchange Platform (CIC MEx) is a web-based waste-to-resources match-making marketplace for buying, selling, exchanging or giving away used construction products or materials in construction. It connects stakeholders, including contractors, suppliers, clients and even recyclers, to optimise the reuse and recycling of construction waste. Users can list and source any construction materials they wish to trade or give away or exchange in the material pool, and all the material flows will be logged for subsequent analysis, measuring how much waste has been diverted from disposal. The primary goal of this platform is to foster a culture within the industry to view waste as a resource, contributing to the circular economy. The platform will be launched in 2026.

Case Study

iBEAM Unison
iBEAM Unison platform supports Buildings as Material Banks principles by leveraging BIM data for sustainability analysis and life cycle insights, though it does not explicitly create Digital Material Passports. Its focus on streamlining BEAM Plus certifications and material tracking via BIM lays groundwork for future integration of circular economy frameworks, such as documenting material reuse potential which is a key aspect of material banking.
Link: https://ibeam.hk

2.3 Locally Sourced Materials

Concept
Localising the supply chain offers significant environmental and economic benefits by reducing energy consumption and emissions associated with material production and transportation. By sourcing materials locally, carbon footprints decrease, positively impacting climate change. This approach also fosters entrepreneurship, potentially creating job opportunities for marginalised groups like women and young individuals entering the workforce.

Case Study

EcoPark
EcoPark, Hong Kong's recycling hub operated by the Environmental Protection Department, transforms local waste (wood, plastics, glass) into resources. By processing materials within the city, it supports locally sourced materials, slashing transport emissions and fostering a circular economy. This reduces reliance on imports, bolsters local recycling industries, and creates jobs, aligning sustainability with community-driven economic growth.
Link: https://www.ecopark.com.hk/

2.4 Responsible and Healthy Materials

Concept
Global organisations advocate for environmentally friendly, healthy, and low-carbon products to facilitate a circular economy. Initiatives like "Mindful Materials" and the GBCA (Green Building Council of Australia)'s "Responsible Products Framework" establish criteria based on industry standards like EPDs and HPDs, emphasising impacts on people, place, and planet. Despite variations, consensus is growing on the essential attributes of responsible products.

Case Study

CIG Green Product Certification – Environment Label
The upgraded scheme of CIC Green Product Certification groups the assessment criteria of each product category into five labels, namely Carbon, Resource, Environment, Performance and InnoSmart label. The Environment Label recognises products that prioritise both human health and environmental protection. Products awarded this label have demonstrated a commitment to responsible manufacturing and creating healthier, and eco-friendly offerings.
Link: https://cicgpc.hkgbc.org.hk/

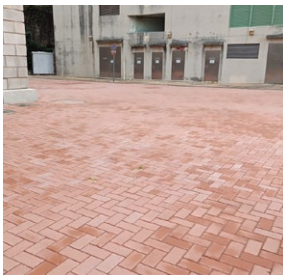
2.5 Urban Mining and Material Cascading

Concept
Urban mining involves reclaiming materials from city waste streams, treating urban waste as valuable resources for monetisation. Demolition practices often hinder material separation. Material cascading enhances resource efficiency by reusing products for maximum economic value across life cycles, prioritising reuse over energy recovery to minimise carbon emissions. This concept demonstrates the sequential use of materials applicable to construction materials in the built environment.

Case Study (1)

Upcycling Waste Glass at Murray House
Murray House transformed 33,800 recycled glass bottles into 13,500 paving bricks via Material Take-back—collecting site waste for local remanufacturing. Partnering with recyclers, glass was upcycled into durable, low-carbon pavers, reused on-site. This closed-loop process reduces landfill waste, avoids production emissions, and exemplifies circularity by reintegrating materials into construction.

Before



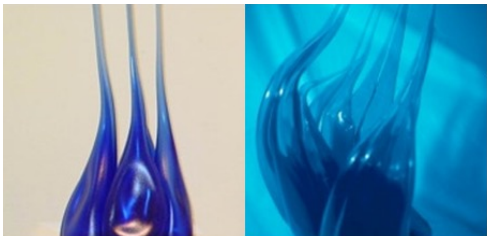
After

Case Study (2)

Upcycling Waste Glass at Landmark Atrium
The Landmark Atrium ("LMA") renovation exemplifies urban mining by upcycling waste glass into high-value pavers and art, embodying material cascading (maximising resource value before downcycling). Collaborating with local artists and institutions, it reduces carbon footprints, supports community economies, and showcases sustainable construction through circular practices, turning waste into functional, culturally resonant assets.

Demolished glass and concrete from LMA

Recycle concrete and powdered glass into concrete blocks and resend to LMA



Glass artwork from the upcycling of demolished glass

Case Study

Y·PARK
Y·PARK, Hong Kong's yard waste recycling centre, processes local fallen trees and garden debris into wood boards, chips, and compost. By transforming locally sourced materials on-site, it reduces landfill reliance, cuts transport emissions, and supports circular reuse, turning regional waste into construction or landscaping resources, advancing carbon neutrality and sustainable urban management.
Link: *https://www.ypark.hk/*

2.6 Material Take-Back

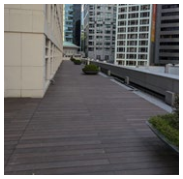
Concept
Material take-back initiatives, typically led by manufacturers or retailers, involve collecting used products from consumers to reintroduce them into the production cycle. This process, often done in partnership with logistics and processing firms, reduces the need for new materials, promotes better design for reuse, and offers various benefits such as improved customer relationships, cost savings through secondary material supply, access to critical raw materials, reduced risks related to hazardous substances, and lowered environmental impacts.

Case Study

Smart Waste Management Tool
CIC Smart Waste Management Tool digitises C&D waste data handling, enabling stakeholders to input, validate, and approve disposal records. It generates monthly iBEAM-compliant summaries, forecasts waste, suggests reduction strategies, and provides plan templates. The dashboard visualises trends and tracks progress, enhancing compliance, transparency, and efficiency in waste management. The tool supports material take-back by tracking and optimising waste data, identifying reusable materials, and aligning waste reduction strategies with circular economy practices.
Link: *https://smartwaste.cic.hk*

Case Study (3)

Resource Recovery of Demolished Timber & Broken Concrete
The Prince's Building renovation employs Material Take-back to recycle 900m² of timber into decking accessories and broken concrete into partition blocks via EcoPark and local manufacturers. This diverts waste from landfills, reduces virgin material demand, and lowers carbon emissions, exemplifying circular construction through resource recovery and closed-loop reuse. Collaboration with recyclers fosters sustainable practices and circular economy principles.



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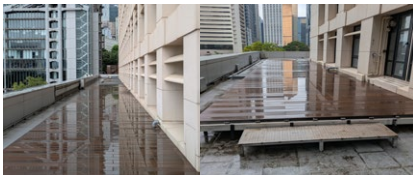


After

Before

After

Case Study (4)

Upcycling Plastic Waste to Low-carbon Bricks
EcoBricks transform non-recyclable plastics into durable construction materials, replacing 50% of natural aggregates in concrete. Aligning with Material Take-back, they divert mixed/composite plastics from landfills, repurposing waste into certified, low-carbon bricks. The cold-process production avoids emissions, reduces mining impacts, and cuts embodied carbon, supporting circularity by reintegrating waste into building cycles.

Water Barriers Shredded

EcoBricks

2.7 Carbon-Storing Materials

Concept
Carbon storage in construction materials is crucial for meeting net-zero carbon goals in the built environment. Using tools for embodied carbon accounting can help prioritise materials that store carbon over those that emit it. Carbon can be stored in building materials through bio-based products, derived from living organisms, or mineral carbonation processes where carbon dioxide reacts with minerals to create stable carbonates for construction use.

Case Study (5)

Carbon-neutral Structural Biochar Concrete
Biochar aggregate for concrete converts biomass waste into carbon-storing materials via pyrolysis and densification, locking in CO_2. Core-shell encapsulation reduces water absorption (<20%) and boosts strength (>7 MPa). Used in structural-grade concrete (C40 strength, >52 MPa), it achieves net-zero emissions (<-10 kg CO_2e/m^3), offsetting cement's carbon footprint while transforming waste into durable, climate-positive building materials.

Raw loose biochar

Carbon-neutral Structural Biochar Concrete

3. Design and Retrofit

Building and infrastructure designers have the potential to challenge conventional practices by promoting innovative designs that encompass an asset's entire life cycle. Embracing circular design and construction presents environmental and socio-economic advantages when executed with appropriate strategies. This approach necessitates a holistic view from stakeholders to ensure long-term considerations for the procurement, maintenance, and retention of building elements' value across multiple life cycles.

This chapter advocates for circular building design by urging stakeholders to shift from short-term to long-term thinking. It emphasises designing for reuse over multiple lifetimes, disassembly, and deconstruction to eliminate waste. Implementing circular economy principles aims to minimise material usage and achieve zero-to-landfill targets efficiently.

Build for Tomorrow: Designing Out Waste & Designing In Value

3.1 Design for Reuse Over Multiple Lifetimes

Concept

Focuses on creating buildings with inherent adaptability and resilience, enabling adaptive reuse across changing societal needs. By prioritising flexible layouts, modular systems, and durable structural frameworks, buildings evolve through retrofitting instead of demolition. This approach minimises embodied carbon from new construction, extends life cycle utility, and aligns with net-zero goals by preserving and repurposing existing structures, transforming them into dynamic assets for future generations.

Case Study

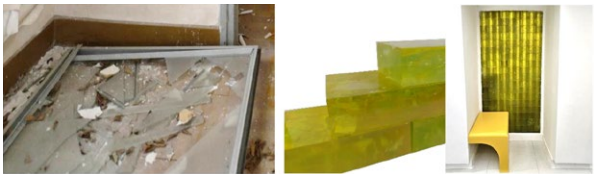
HKGBC Retrofitting Guidebook

HKGBC Retrofitting Guidebook outlines strategies for holistic building retrofits, energy audits, system optimisation, and future-proofing upgrades, to extend building life cycles. By prioritising adaptable infrastructure, resilient systems, and compliance with sustainability codes, it supports design for reuse over multiple lifetimes, enabling structures to evolve with minimal demolition. This reduces embodied carbon and aligns retrofits with long-term circular economy goals.

Case Study (6)

Hong Kong Repertory Theatre Education Hub

HKREP Education Hub revitalises a 1902 heritage building to a theatre education centre through adaptive reuse, preserving its structure while upcycling materials (e.g. converting window glass into glass blocks). Material audits and modular updates extend its lifespan across generations, exemplifying design for reuse over multiple lifetimes. This sustainable transformation fosters community engagement and ecological stewardship, blending historical preservation with modern functionality.



Upcycling existing window glass to glass blocks for new wall construction

Case Study (7)

ATAL Tower

ATAL Tower, transformed from an industrial building via Hong Kong's Revitalisation Scheme, exemplifies Design for Reuse Over Multiple Lifetimes by retaining 90% of its structure. Smart systems (BIM, AI) optimise MEP efficiency and predict future needs, while adaptable green spaces ensure flexibility. This extends lifespan, reduces embodied carbon, and supports evolving functions through modular, tech-driven sustainability.

3.2 Design for Disassembly and Deconstruction

Concept

Designing for the disassembly and deconstruction of buildings aims to recover the asset's residual value at the end of its life cycle. This approach transforms buildings into material banks, simplifying maintenance, retrofitting, and reuse. Prioritising reuse and recycling over demolition is crucial to reduce waste. Deconstruction, involving selective dismantling, retains the original value of components. Simplifying design with fewer parts and standardised fasteners eases disassembly. Training in disassembly techniques is essential for efficient building component reuse.

Case Study

Green Design Guide for Material Resources Optimisation in Building Life Cycle

This Green Design Guide tackles Hong Kong's building material waste by optimising resource use across the construction life cycle. It integrates Business Process Reengineering and Building Information Modelling in design, promotes efficient construction methods, adaptable designs for future needs, and "Design for Demolition" to prioritise material reuse. Recommendations span planning, construction, occupancy, and demolition to minimise waste holistically. The Guide aligns with "Design for Disassembly" by prioritising deconstruction planning, simplified components, and material reuse over demolition to recover value at life cycle end.

Link: https://www.hkgbc.org.hk/eng/engagement/guidebooks/green-design-guide/green-design-guide.jsp

Case Study

Nam Cheong Street Modular Social Housing Project ("Nam Cheong 220")

Nam Cheong 220, Hong Kong's first transitional housing project using modular integrated construction (MiC), was relocated from Sham Shui Po to Tai Po for reuse. Designed for modular adaptability, standardised components ensure disassembly ease, material durability, and extended lifespan. MiC reduced construction time to under a year, housing 94 households. Emphasising circular construction principles, it prioritises closed-loop resource use, minimising waste while supporting sustainable, multi-lifetime social housing solutions. The project demonstrates scalable, future-ready design for repeated redeployment.

Link: https://mic.cic.hk/en/ProjectsInHongKong/3

3.3 Design Out Waste

Concept

To implement a circular economy, efficient resource use and waste reduction are paramount. Sustainable waste management, emphasising reuse, recovery and recycling, is crucial. Planning for minimal waste generation and efficient waste handling and utilisation is key. Transparent data on material recovery and destinations is essential for achieving a zero-to-landfill goal and fostering sustainable waste practices. Waste of other resources like food waste, water, heat and other forms of energy can also be eliminated by design.

Case Study (8)

Standard Chartered Bank Building, Gala Place

SCBB, Gala Place exemplified Design Out Waste by upcycling carpets, ceramic tiles, and century-old timber into new interiors, while reusing 4,439 furniture items (donated to NGOs/colleagues). This circular approach diverted 603,186 kg CO_2e and 180,881 kg of landfill waste, prioritising resource efficiency and zero-waste goals through sustainable material choices and transparent reuse strategies.

Converting hundred-year-old tree trunks as reception counter

Case Study (9)

Hang Seng Bank Headquarters

Hang Seng Bank Headquarters employs Design Out Waste by reclaiming over 50% of landfill-bound materials. Repurposing 210 tonnes of granite/glass into art installations and diverting 210 tonnes of construction waste via sorting, it transforms demolition debris into high-value elements like bamboo-themed screens and granite pools, prioritising closed-loop material cycles to minimise landfill reliance and advance circular construction practices.

Bamboo-themed screen

4 Regenerate Nature

A regenerative model mimics natural systems, emphasising sustainability for both people and the planet. Current global practices threaten biodiversity and exceed environmental limits. A circular economy could alleviate this by reducing material use. Public awareness is driving businesses to address biodiversity crises.

This chapter explores how the built environment can promote the regeneration of natural systems through widespread implementation of circular economy solutions in line with industry calls to action. Drawing inspiration from nature's efficiency, our city can adopt nature-based solutions to close material loops and enhance the connection between urban areas and natural systems. Emphasising water conservation and quality throughout the building life cycle, including reporting water usage during construction and operation, is vital for sustainable practices.

Beyond Less Harm: Building that Gives Back to Nature

4.1 Inspiration and Implementation of Nature-Based Solutions

Concept

The built environment draws on nature for inspiration, aiming to minimise waste and ensure sustainable development. Nature-Based Solutions (NBS) in real estate enhance resilience and reduce resource consumption. These solutions lower energy usage, improve urban environments, and increase climate resilience, especially in coastal areas, nurturing ecosystem regeneration.

Case Study (10)

Reuse of Rainwater

Reuse of Rainwater, as exemplified by the case study of One Causeway Bay, embodies Nature-Based Solutions by mimicking natural water cycles. Captured stormwater irrigates landscapes and cools buildings, reducing potable water use by over 50% while easing drainage burdens. This closed-loop system cuts urban flooding risks and operational costs, showcasing how NBS can transform cities into climate-resilient, resource-efficient ecosystems.

Rainwater recycling system

4.2 Nature's Efficiency: Utilising Essential Matter Only

Concept

Honeycomb-like structures in bones inspire efficient building practices. By thoughtful design, locally sourcing materials and emphasising resource renewal, structures can be designed with reduced material requirements, lessening dependence on rare or non-renewable resources extracted from distant locations.

4.3 Embracing Resilience Over Performance Optimisation

Concept

From the intricate architecture of a spider's web to the flexibility of a bamboo plant, nature has perfected the art of building structures that can withstand external pressure. For instance, the spider's web is not only strong enough to catch prey, but also has the ability to absorb and disperse the force of wind or rain, preventing it from collapsing. Similarly, the bamboo plant's hollow, yet flexible, stem allows it to bend without breaking during storms. By understanding the principles behind these structures, we can design and build resilient buildings and infrastructure.

4.4 Natural Decomposition: The Simplicity of Materials in Nature's Cycle

Concept

Nature simplifies materials for easy decomposition, unlike human-made complex and challenging-to-recycle objects. Envision composite materials with fibres and matrices of a single material but arranged uniquely. Upon reaching their lifespan, these products seamlessly revert to raw materials, fostering reusability and sustainability.

4.5 Nature's Resource Efficiency: Multifunctional Utilisation in the Natural World

Concept

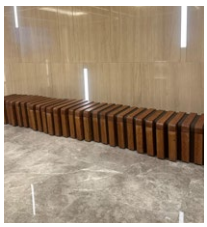
Living organisms utilise multifunctional solutions, such as a tree's leaf acting as a solar panel, evaporator, and insulating parasol. These solutions are redundant and decentralised. Designing buildings based on these principles promotes longevity and versatility, allowing structures to serve multiple purposes throughout their lifespan.

Case Study (11)

Local Reclaimed Wood

Local Reclaimed Wood demonstrates Nature's Resource Efficiency by repurposing typhoon-felled urban trees into architectural elements like reception counters and benches. This approach minimises transport emissions, maintains carbon storage, and showcases multifunctional use of materials—turning potential waste into valuable resources while supporting sustainable construction and local circular economies.

Typhoon-felled urban trees



Repurpose typhoon-felled urban trees into reception counters and benches

Case Study (12)

Oyster Shell Upcycling

Oyster Shell Upcycling exemplifies Nature's Resource Efficiency by transforming restaurant waste into cement raw material, replacing over 17 tonnes of mined limestone. The shells' high calcium carbonate content (91%) mirrors natural mineralisation processes, reducing landfill burdens and quarrying impacts. This circular innovation demonstrates how urban waste streams can emulate ecosystems' multifunctional resource use, creating industrial value from discarded biomaterials.

4.6 Regenerative Urban Development: Reversing Climate Crisis and Biodiversity Loss

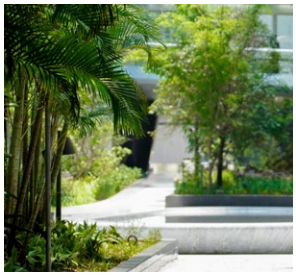
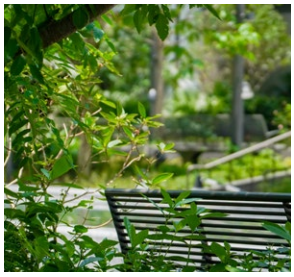
Concept

Urban expansion exacerbates climate change and biodiversity loss. Cities, major consumers of resources, can combat these issues. Regenerative urban planning focuses on replenishing resources like food, energy, and water locally. By integrating nature into city design, urban areas can become more self-sufficient and resilient, promoting community well-being.

Case Study (13)

Biodiverse Garden

Taikoo Square at Taikoo Place exemplifies Regenerative Urban Development by integrating more than 70,000 sq. ft. of additional green space with over 260 native/exotic plant species (20% native), promoting urban biodiversity. A number of feng shui woodlands tree species were procured from the Kadoorie Farm and Botanic Garden in 2018, and they were carefully taken care of from seedlings in the garden nursery and transplanted to Taikoo Square in 2024. These plants restore habitats for wildlife while mitigating heat island effect, increasing rainwater retention and enhancing air quality. This nature-based approach marks the next stage of Swire Properties' sustainability journey as they advocate nature-based solutions to address biodiversity loss and to fight climate change.


Green space

Case Study (14)

Urban Native Woodland

With more than 200 species of flowers and trees at CIC-Zero Carbon Park, as Hong Kong's first urban native woodland since its opening in 2012, the area's natural heartland brings in birds and other animals start creating a very biodiversified environment, to make it become a lush and vibrant sanctuary for visitors to relax in. CIC-ZCP creates a paradigm shift towards sustainable living, and functions as "green lungs" for the high-density environment, breathing clean air and new life into Hong Kong.

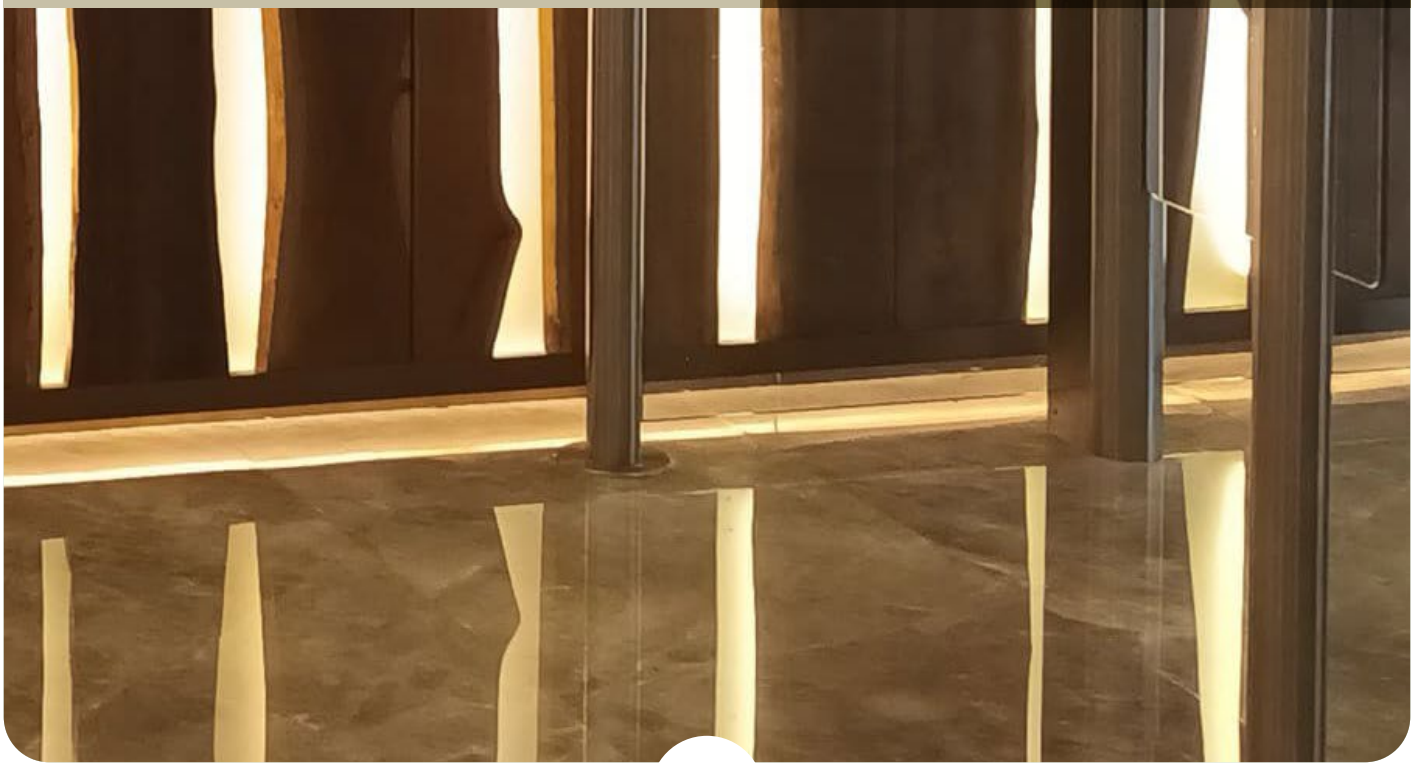

CIC-Zero Carbon Park

5. Levers for Change

Shifting the System: The Business, Finance & Policy of Circularity

For a widespread shift towards sustainability, stakeholders throughout the supply chain need to embrace circular practices. A systemic transformation demands active participation from all sectors. Establishing a strong value proposition is essential to engage actors in the built environment, spanning public and private domains.

This chapter explores vital strategies to expand circular economy solutions in line with industry demands. It emphasises the necessity of implementing new business models like product-as-a-service and remanufacturing. Enhancing data availability and incentivising participation in circular value chains through ESG reporting is crucial. Certification schemes should align with circular principles, while education and skills development are key to fostering a circular mindset. Collaborative partnerships across the value chain are essential for driving circular economy initiatives forward.



5.1 Product as a Service

Concept

The adoption of innovative business models, like Product as a Service, plays a vital role in promoting the circular economy and cultivating a closed-loop system. Service-oriented models enhance product utilisation by offering the "use" of products instead of outright procurement, encouraging suppliers to extend product lifespans through reuse.

Case Study (15)

WEEE · PARK

WEEE · PARK demonstrates Product as a Service by refurbishing and donating over 10,000 e-waste appliances (e.g., TVs, fridges) to low-income families, extending product life cycles through reuse. Its service-oriented model—collecting, detoxifying, and redistributing electronics—prioritises access over ownership, reducing virgin resource demand and fostering circularity while offering social value through community-centric solutions.

Case Study (16)

O·PARK2

O·PARK2 embodies Product as a Service by offering continuous waste-to-resource conversion over a 15-year operational contract. It provides renewable energy (45 GWh annually) and organic fertilisers as ongoing services, while maintaining self-sufficient heat/water systems. This service model transforms waste treatment into a circular utility, prioritising long-term resource recovery over single-use outputs and fostering industrial symbiosis.

5.2 Circular Procurement

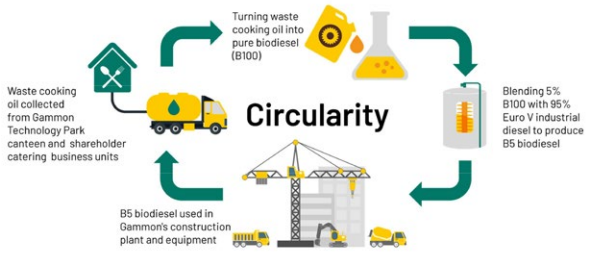
Concept

Consumers exert influence through selecting reused, recycled, and nontoxic items to promote circular practices. A persuasive value proposition is essential for a widespread shift, demanding united endeavours from businesses and individuals. Procurement stands as a pivotal avenue to integrate circular economy principles on a large scale.

Case Study (17)

Circular Procurement for Construction

Circular Procurement for Construction prioritises resource loops, as seen in Gammon's initiative converting local waste cooking oil (WCO) into B5 biodiesel for machinery. Partnering with Jardines, ASB Biodiesel, and Chevron, this cross-sector model diverts WCO from landfills, cuts fossil fuel reliance, and establishes a closed-loop supply chain—demonstrating how procurement can drive sustainability, reduce emissions, and foster industrial symbiosis in construction.



Waste to energy

5.3 Corporate Leadership

Concept

Leadership in advancing the circular economy demonstrates socio-economic benefits such as cost savings and resource security. Measurable strategies create a compelling business case, fostering mass-market interest through knowledge-sharing and reporting. Organisations can enhance ambition and normalise circular economy practices across sectors.

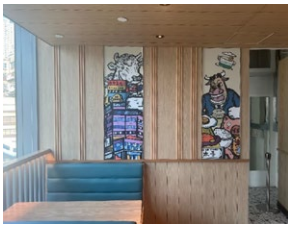
Case Study (18)

Link's Tenant Fit-out Circular Model

Link's Tenant Fit-out Circular Model prioritises material reuse during tenant transitions, extending the lifespan of ceilings, flooring, partitions, and furniture. By collaborating with tenants to redesign spaces using retained elements, it reduces fit-out waste (e.g., 4 tonnes saved in one case), lowers costs ($2M saved), and cuts carbon emissions. This closed-loop approach aligns with circular economy principles by minimising landfill reliance and fostering resource-efficient retail ecosystems.

Before

After



Before

After

5.4 ESG Frameworks

Concept

ESG is gaining prominence in mainstream finance, showcasing the worth of sustainability. Factors like renewable energy and waste management influence ESG ratings. The circular economy is recognised as a solution to global challenges. Using data-driven tools, ESG reporting can accelerate circular practices. Businesses leverage ESG to promote circularity through robust reporting, innovation, and industry collaboration.

Case Study (19)

Swire Properties' Embodied Carbon Management Strategy

Swire Properties was the first developer in Hong Kong to adopt low-carbon specifications for new development projects. It actively collaborates with suppliers to identify opportunities for enhancing sustainability across the supply chain. This includes promoting circularity by prioritising material reuse—such as PFA and GGBS concrete and reclaimed steel—and assessing cradle-to-gate environmental impacts through Environmental Product Declarations (EPDs). Technologies like Building Information Modelling (BIM) are leveraged to minimise construction waste. To drive embodied carbon reduction from construction materials, Swire Properties has set Science-Based Targets (SBTs), aiming to reduce embodied carbon emissions by 25% by 2030, compared to a 2016/18 baseline.

In 2024, with the support of HKUST, Swire Properties completed embodied carbon calculation for Six Pacific Place, showing that the upfront embodied carbon emissions of Six Pacific Place were 19,601 tonnes of CO_2e, and 637 kg of CO_2e per square metre construction floor area. An 18% decrease in carbon intensity is achieved compared to our 2016-2018 baseline year. This was attributed to:

- 100% of low-carbon concrete procured had CIC Green Product Certification
- 65% of rebar procured contained more than 60% recycled content
- Grid power was connected during construction and no on-site generators were used, minimising noise and air pollution and reducing site carbon emissions.

5.5 Sustainable Finance Drivers

Concept

The evolving investment landscape underscores sustainable finance as a significant trend. Companies gravitate towards ESG-focused funds, reflecting a rising interest in sustainable practices. Demonstrating robust supply chains and ethical records enhances resilience against environmental and reputational risks. Mitigating climate and societal challenges is crucial for asset protection and portfolio sustainability.

Case Study

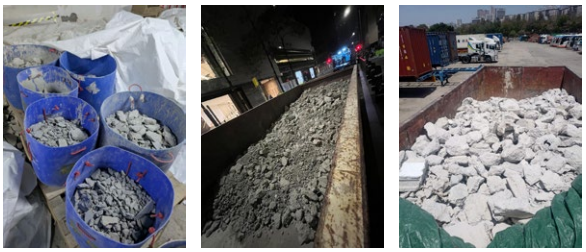
CIC Sustainable Finance Certification Scheme

CIC SFCS aims to provide a common framework and user-friendly assessment system to facilitate the application of sustainable finance for the construction industry in Hong Kong and the Greater Bay Area.

Case Study (20)

Circular Economy Model

Gammon's Circular Economy Model converts concrete waste into aggregates via partnerships (e.g., Tiostone), reducing landfill reliance and emissions. Aligned with Sustainable Finance Drivers, it enhances ESG appeal for green investments, strengthens supply chain resilience, and lowers climate risks, key for attracting ESG-focused funds and ensuring long-term financial viability through ethical resource loops.



Concrete waste

6. Case Studies of Hong Kong Circular Practice

HKGBC, CIC and BEC do not conduct their own assessment of the case studies included in this Guidebook. The results presented here are those shared by the case study contributors and their project team. HKGBC, CIC and BEC staff have scrutinised the findings and asked for follow-up where necessary to ensure the accuracy of the details provided, but cannot attest to their accuracy. HKGBC, CIC and BEC encourage readers of this Guidebook to engage with the case study contributors where questions or clarifications arise.

Circularity In Action: Proven Pathways for Hong Kong

Number	Building / Project Name	Circular Initiative
1	Murray House, Stanley Plaza	**2.5,** 2.7, 3.1, 5.2
2	Landmark Atrium	2.3, 2.4, **2.5,** 5.2
3	Prince's Building	2.5, **2.6,** 5.2
4	Hong Kong Gold Coast	2.5, **2.6,** 3.3
5	Biochar Aggregate and Concrete	**2.7**
6	Hong Kong Repertory Theatre Education Hub	2.2, 2.5, **3.1,** 3.3
7	ATAL Tower	**3.1**
8	Standard Chartered Bank Building, Gala Place	2.2, 2.3, 2.4, 2.6, 3.1, **3.3**
9	Hang Seng Bank Headquarters	2.4, 2.6, 3.1, **3.3,** 4.1, 4.6
10	One Causeway Bay	2.3, 2.4, **4.1,** 4.3
11	Towngas Headquarters Building	2.3, 2.4, **4.5**
12	The Langham, Hong Kong & Eaton HK	2.5, 2.6, 3.3, 4.1, **4.5**
13	Taikoo Square at Taikoo Place	4.1, 4.5, **4.6**
14	CIC-Zero Carbon Park	2.3, 2.6, 4.5, **4.6,** 5.2
15	WEEE · PARK	2.5, 2.6, **5.1**
16	O·PARK 2	2.5, 3.3, **5.1**
17	Waste Cooking Oil to Biodiesel	2.3, **5.2,** 5.3
18	Link's Hong Kong Retail Properties	3.1, **4.3**
19	One Taikoo Place, Two Taikoo Place, Six Pacific Place, EIGHT STAR STREET	2.2, 2.4, 2.5, 2.6, 3.1, 4.3, 5.2, **5.4**
20	Turning Concrete Waste into Blocks and Pavers	2.6, 5.2, **5.5**

Circular Initatives:

Building and Construction Materials	
2.1	Digital Material Passports
2.2	Buildings as Material Banks
2.3	Locally Sourced Materials
2.4	Responsible and Healthy Materials
2.5	Urban Mining and Material Cascading
2.6	Material Take-Back
2.7	Carbon-Storing Materials
Design and Retrofit	
3.1	Design for Reuse Over Multiple Lifetimes
3.2	Design for Disassembly and Deconstruction
3.3	Design Out Waste
Regenerate Nature	
4.1	Inspiration and Implementation of Nature-Based Solutions
4.2	Nature's Efficiency: Utilising Essential Matter Only
4.3	Embracing Resilience Over Performance Optimisation
4.4	Natural Decomposition: The Simplicity of Materials in Nature's Cycle
4.5	Nature's Resource Efficiency: Multifunctional Utilisation in the Natural World
4.6	Regenerative Urban Development: Reversing Climate Crisis and Biodiversity Loss
Levers for Change	
5.1	Product as a Service
5.2	Circular Procurement
5.3	Corporate Leadership
5.4	ESG Frameworks
5.5	Sustainable Finance Drivers

Paving the Way with Recycled Glass

CASE STUDY (1) – Murray House, Stanley Plaza

Building Owner:
Link Asset Management Limited

Building Name:
Murray House, Stanley Plaza

Description of the Building:
Stanley Plaza is a unique lifestyle destination situated on the picturesque waterfront of Stanley on Hong Kong Island's south side, adding to Stanley's well-known main street and heritage landmark Murray House.

Information of Circular Practice

Circular Initiatives: 2.5, 2.7, 3.1, 5.2

Circular Practice:
A paving renovation project was undertaken at Murray House in Stanley Plaza to address safety concerns caused by the deterioration of existing outdoor blocks. The weathered and uneven surface presented a potential hazard to visitors and tenants, necessitating a prompt and effective solution. The project involved a partnership with the local company Tiostone to implement an innovative, sustainable paving system using bricks manufactured from recycled materials.

Project Details:
- Period: December 2024
- Location: Murray House, Stanley Plaza
- Total Working Area: 270m^2
- Bricks Utilised: 13,500 Tiostone bricks, each meticulously crafted from 2.5 recycled glass bottles blended with cement, totalling 33,800 recycled glass bottles used

Circularity:
The project demonstrated a practical model of a local circular economy. Glass waste collected from the site and other locations by the designated recycler, Baguio, was supplied to Tiostone as raw material for brick production. The newly manufactured bricks were then installed at their point of origin, Murray House, effectively closing the waste loop on the same property and minimising transportation emissions.

Project Highlights:
- Environmental Impact: TiO_2 APR (Carbon-Capture) Paving Blocks reduce air pollutants and enhance air quality by not generating greenhouse gases during production.
- Waste Reduction: The use of recycled materials in the blocks helps reduce construction waste in landfills, promoting a more sustainable construction process.
- Innovation: It showcases the potential of upcycling materials for construction purposes.
- Local Economic Support: The initiative reinforced the local circular ecosystem by leveraging local recyclers, manufacturers, and vendors, thereby supporting Hong Kong's circular economy objectives.
- Quality Assessment and Control: The selection of materials for this project was preceded by a two-year period of rigorous quality assessment focused on enhancing the durability of upcycled construction materials.

Benefits to the Project:
It demonstrates the functional viability of upcycled materials in demanding construction applications.

Benefits to the Industry:
This practice promotes cross-sector collaboration that enhances resource efficiency, encourages innovation, and advances sustainable methodologies across the supply chain.

Benefits to the Environment:
The process achieves a reduction in demand for virgin materials, thereby minimising resource extraction.

Name of consultant / contractor / manufacturer: Tiostone Environment Limited

Costs: HK$520,000 **Material Saving:** 13,500 bricks **Carbon footprint:** 150 kg CO_2e avoided by sending glass bottles to the landfill

Year of completion: 2024

Divert, Upcycle, Reintegrate

Crushed Glass from removed shopfront & facade

Upcycled Glass Giftset

Recycled Glass Sandbag

CASE STUDY (2) – Landmark Atrium

Building Owner:
The Hongkong Land Limited

Building Name:
Landmark Atrium

Description of the Building:
Landmark Atrium is an iconic luxury shopping mall in Central, Hong Kong. As a key part of the transformation plan for Tomorrow's CENTRAL, it embodies a commitment to sustainability through extensive green measures. These initiatives include a comprehensive strategy for material use and waste management which demonstrates a strong sense of eco-consciousness while elevating the retail and lifestyle experiences for customers.

Information of Circular Practice

Circular Initiatives: 2.3, 2.4, 2.5, 5.2

Circular Practice:
Throughout the renovation work, adherence to in-house carbon reduction targets with a target of at least 22% reduction in embodied carbon was maintained. The use of green concrete and green rebar contributed to reduced transportation emissions and energy consumption, supporting a more sustainable construction process. Locally sourced concrete, infused with injected recycled CO_2 and certified as a CIC Green Product was utilised for structural work, which both supported the local economy and demonstrated reduced embodied carbon across material manufacturing and construction processes. A comprehensive carbon management plan was provided to subcontractors to ensure effective carbon tracking and optimised material use in meeting carbon reduction targets.

The project adhered to Green Procurement Guidelines and referenced international frameworks like the WorldGBC's *Circular Built Environment Playbook* and the 10R framework to enhance circularity, incorporating materials with high recycled content, such as structural steel with weighted 90% recycled content, and prioritising those with Environmental Product Declarations (EPDs) for life cycle impact transparency and Health Product Declarations (HPDs) for health and safety. These circular procurement criteria, including the use of locally sourced materials, were integrated into contract specifications, with contractors monitoring material submissions and procurement during A&A works to ensure compliance with sustainability targets. The renovation exemplified urban mining and material cascading by upcycling concrete and waste glass from on-site demolition into high-value building materials through collaborations with local institutions. Glass was crushed into powder and repurposed into concrete blocks for use as partition walls, maximising resource utility. Also, crushed glass has been integrated into glass artwork to enhance sustainability by creating gift sets inspired by local artistry. By engaging local expertise, the project fostered community involvement and supported the regional economy, further promoting environmental responsibility.

Benefits to the Project:
By referencing HKL's in-house Green Procurement Guidelines and the WorldGBC's 10R framework, the project integrates concepts for A&A work to promote a more sustainable built environment:

- Re-evaluating traditional building methods to identify sustainable practices enables a comprehensive plan for material use and waste management through reusing exisiting materials and using recycled and locally sourced options.
- Upgrading sanitary fitments and building service systems enhances operational efficiency and significantly reduces carbon emissions.
- Recycling glass and repurposing it into craftwork, concrete blocks, and sandbags creates opportunities for reusing materials, addressing end-of-life considerations effectively.

Benefits to the Industry:

- Encouraging cooperation between manufacturers, contractors, and local communities, circular practices improve resource pooling and knowledge exchange.
- Fostering more robust supply chains that are less susceptible to worldwide disruptions by relying on locally produced and repurposed products.

Benefits to the Environment:

- Using recycled and locally sourced materials significantly reduces transportation emissions and the carbon footprint of new material production.
- Developing a method to recycle demolished glass into concrete blocks and sandbags on-site creates opportunities to reuse and minimise construction waste for future generations.
- Upcycling demolished finishes into community living spaces facilitates material reuse, helping to reduce and repurpose waste.
- Promoting recycling and repurposing practices significantly diverts construction and demolition waste from landfills.

Name of consultant / contractor / manufacturer:
- Allied Environmental Consultants Limited (Sustainability Consultant)
- Gammon Engineering and Construction Company Limited (Main Contractor)
- Aedas (Architect)

Carbon footprint: 22% reduction

Year of completion: 2026

From Demolition Debris to Premium Resources

CASE STUDY (3) – Prince's Building

Building Owner:
The Hongkong Land Limited

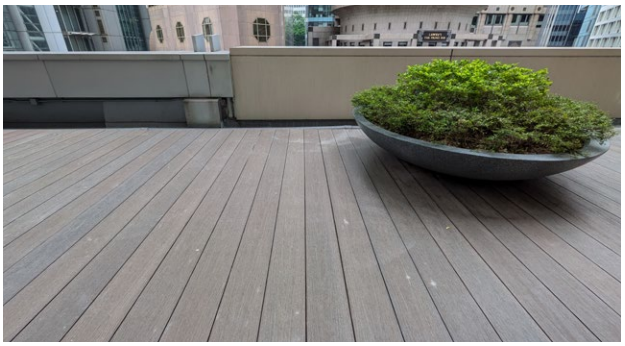
Building Name:
Prince's Building

Description of the Building:
The Prince's Building Podium Conversion Project, part of Hongkong Land's "Tomorrow's CENTRAL" initiative, involves the comprehensive redevelopment of the retail podium from Basement to 5/F. The project aims to elevate the architectural quality, structural performance, and overall retail experience in alignment with the LANDMARK brand.

Information of Circular Practice

Circular Initiatives: 2.5, 2.6, 5.2

Circular Practice:
This circular practice has advanced material circularity through two key initiatives: the recycling of demolished timber decking and the processing of broken concrete from Prince's Building. It involves systematic recycling of demolished timber decking and broken concrete through a material take-back programme in collaboration with processing partners, reducing the need for new materials and enabling reuse by both the manufacturer and the project team.



At Prince's Building, approximately 900m² of timber decking was removed from the fourth-floor flat roof and transferred to EcoPark for recycling. The material was subsequently transformed into timber decking accessories, supporting sustainable resource management.

Moreover, several hundred tonnes of broken concrete from demolition work were sorted and sent to a local partition block manufacturer, Sincere Building Materials Limited. The material was recycled into partition concrete blocks. The project utilised products from the same manufacturer to improve process efficiency and support a cohesive circular economy.

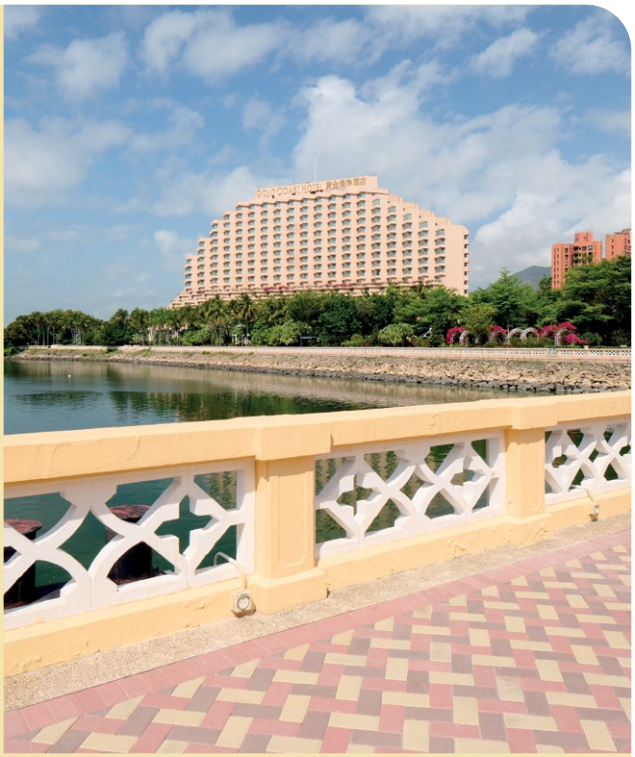
Benefits to the Project:
This initiative improved project efficiency by reducing waste management requirements and diverting material from landfills and public fill. It also decreased the need for new materials in product manufacturing. By demonstrating a commitment to circularity, the practice enhanced project value while establishing a benchmark for future sustainable construction projects.

Benefits to the Industry:
This practice fosters cross-sector collaboration with recycling and manufacturing partners, supplying recycled materials and stimulating innovation in the application of reclaimed resources. Such partnerships promote industrial circularity and encourage circular procurement practices through the specification and use of recycled materials. This approach sets a beacon example and encourages other companies to adopt similar methods, thereby fostering a more resilient and sustainable supply chain.

Benefits to the Environment:
Environmentally, these initiatives significantly reduce waste directed to landfills and public fill and minimise the carbon footprint associated with material production. By recycling timber decking and broken concrete, the practice conserves natural resources and lowers demand for virgin materials.

Name of consultant / contractor / manufacturer:
- Gammon Construction Limited (Demolished timber decking and broken concrete provider, timber decking accessories and partition concrete block user)
- Sincere Building Materials Limited (reprocessing broken concrete into partition concrete blocks)
- EcoPark (reprocessing demolished timber decking into timber decking accessories)

Turning Plastic Waste into Building Blocks



CASE STUDY (4) – Hong Kong Gold Coast

Building Owner:
Sino Group

Building Name:
Hong Kong Gold Coast

Description of the Building:
Hong Kong Gold Coast is a large-scale, integrated waterfront development spanning several hectares of landscaped greenery. It accommodates over 2,000 residences and provides a comprehensive range of recreational facilities. The precinct has implemented a sustainability initiative, "Gold Coast Green Journey," which includes the installation of solar panels and smart water dispensers, alongside educational programmes and a green upcycled room showcasing handmade upcycled items, to promote environmental practices.

Information of Circular Practice

Circular Initiatives: 2.5, 2.6, 3.3

Circular Practice:
This circular practice involves the deployment of construction materials manufactured with recycled content, utilising a closed-loop system that converts local waste into resources. EcoBricks' entire production and waste processing occurs within Hong Kong, offering a circular solution built on local waste, local production, and local use.

Its first-of-its-kind manufacturing process upcycles all types of plastic waste, including mixed and composite plastics, providing a scalable solution for the city's unrecycled material. A full ISO 14040 Life cycle Assessment demonstrated a 99% reduction in cradle-to-gate carbon emissions compared to traditional building materials. The 100% cold production process requires no heating, emits

no pollutants, and replaces up to 50% of natural aggregates in concrete with local plastic waste. Certified to international standards for performance, the lightweight bricks reduce habitat destruction from mining and lower the carbon footprint from shipping aggregates. The minimal processing also results in less energy usage and lower embodied carbon emissions. The solution has received wide recognition, including a Gold Medal at the 2022 Geneva International Exhibition of Inventions.

Benefits to the Project:
The project at Hong Kong Gold Coast utilised over 15,000 EcoBricks, upcycled from 5,400 kg of plastic waste recovered from 560 used washing machines. To date, the application of EcoBricks has upcycled over 40 tonnes of plastic waste through the deployment of more than 132,600 bricks.

Benefits to the Industry:
Investment in sustainable materials like EcoBricks supports innovation and the development of new solutions that advance sustainable building practices. The product offers the industry a certified, high-performance building material that addresses the challenge of plastic waste.

Benefits to the Environment:
The production system provides a fully circular, local solution for managing plastic waste within Hong Kong. The technology demonstrates a 99% reduction in cradle-to-gate embodied carbon emissions compared to traditional building materials. The process reduces habitat destruction from mining and lowers carbon emissions associated with shipping natural aggregates.

Name of consultant / contractor / manufacturer: EcoBricks Limited

Costs: Sino Group purchased EcoBricks at the same cost as conventional bricks. Thus, there has been no extra cost incurred to achieve carbon savings.

Material Saving: EcoBricks can recycle any plastic waste (types 1-7 plastic). Material saving by using plastic waste has been 115 tonnes of virgin aggregates with 40 tonnes of plastic waste (plastic is much lighter than aggregate).

Carbon footprint: Carbon emission savings for all projects under Sino Group to date amount to 16.2 tonnes.

Year of completion: 2021-present

Concrete That Captures Carbon

CASE STUDY (5) – Biochar Aggregate and Concrete

Project Owner:
Nano and Advanced Materials Institute

Project Name:
Biochar Aggregate and Concrete

Description of the Project:
Converting biomass wastes to biochar aggregate and concrete for circular utilisation and sustainable green construction.

Information of Circular Practice

Circular Initiatives: 2.7

Circular Practice:
The circular practice involves converting biomass waste into biochar aggregate for use in concrete production. This process outlines a circular economy model for converting biomass waste into a functional construction material with a negative carbon footprint.

The practice begins with the pyrolysis of biomass waste, a thermal decomposition process that converts organic material into biochar. This diversion from landfill disposal prevents the release of methane, a potent greenhouse gas. The resulting biochar is subsequently processed through a densification technology, which increases its carbon storage density by more than a factor of two, thereby enhancing its carbon sequestration potential.

A core-shell encapsulation technology is then employed to transform the densified biochar into a synthetic aggregate. This encapsulation addresses the inherent challenge of high water absorption in porous biochar, reducing it to below 20% by weight. A concurrent outcome of this process is a significant increase in the aggregate's mechanical strength, achieving a crushing strength greater than 7 MPa, which is more than 50 times that of raw biochar.

The resulting high-performance biochar aggregate possesses an embodied carbon value of less than -200 kg of CO_2 equivalent per tonne. This negative value allows it to be used as a component in concrete to directly offset the carbon footprint of the cementitious materials within the mix.

Through specific concrete formulation, this biochar aggregate can be utilised to produce structural-grade concrete with a compressive strength exceeding 52 MPa (C40 classification). The final concrete product achieves a net negative embodied carbon footprint, quantified as less than -10 kg of CO_2 equivalent per cubic metre. This combination of structural performance and a negative carbon footprint makes it suitable for broad application in construction, contributing to carbon-neutral objectives and sustainable building practices.

Benefits to the Project:
This circular practice enables the project to achieve a high rate of material recycling and significant carbon dioxide reduction within its concrete mix, all while meeting requisite structural performance standards.

Benefits to the Industry:
It provides the construction industry with a novel methodology for the sustainable management of biomass waste and a mechanism to increase the recycled content in concrete production.

Benefits to the Environment:
The practice reduces the volume of biomass waste directed to landfills, decreases the demand for natural aggregates extracted for concrete, and lowers the net carbon emissions associated with concrete production.

Name of consultant / contractor / manufacturer: Nano and Advanced Materials Institute

Costs: 496 RMB/tonne for biochar core-shell aggregate; 757 RMB/m^3 for carbon-neutral structural biochar concrete

Material Saving: Saving 1600kg natural aggregate per cubic metre of conventional concrete

Carbon footprint: -214 kg CO_2e/tonne for biochar core-shell aggregate; -26.5 kg CO_2e/m^3 for carbon-neutral structural biochar concrete

Year of completion: 2025

Historic Heritage, Circular Future

CASE STUDY (6) – Hong Kong Repertory Theatre Education Hub

Building Owner:
Hong Kong Repertory Theatre Ltd.

Building Name:
Hong Kong Repertory Theatre Education Hub

Description of the Building:

Hong Kong Repertory Theatre Education Hub revitalised a historical building located at 7 Cox's Road at Jordan first constructed in 1902. The proposed centre is a showcase of an innovative sustainable heritage revitalisation project in Hong Kong which not only reinvigorates the historic space but also transforms the existing building into a sustainable centre for theatre education. The proposed centre is a 3-storey Grade II building situated at the heart of the city and hidden by high-rise residential buildings. It has served as an educational place since the 1920s and will be continued in the 21st Century.

Information of Circular Practice

Circular Initiatives: 2.2, 2.5, 3.1, 3.3

Circular Practice:

The original three-storey structure was constructed as a private residence in the 1900s. The building underwent a series of transformations over the decades to accommodate various uses such as staff quarters, a school, and an education centre. While the building's structure was maintained, the internal layout was modified and modernised to suit its multiple uses. Past and present users of the building share the same vision to preserve and enhance its value while redesigning it for new purposes. The building's lifespan has been extended through the efforts of generations. These circular initiatives are adopted:

- Adaptively reusing the existing building structure
- Conducting a materials audit to identify existing materials for reuse, recycling and upcycling
- Upcycling existing window glass to glass blocks for new wall construction

In the latest renovation, not only was the building structure preserved, but also some existing building materials were retained, reused, and upcycled for the new centre.
A comprehensive material audit was conducted to identify potential "waste" for redesign to give them a second life. For instance, the existing aluminium windows were replaced with soundproofing IGU windows to suit the new centre's use for theatre education. The existing window glass was collected by a local supplier to be upcycled and used to create a new glass block wall. The collected glass was broken into pieces and mixed with a designated colour of resin to form the glass blocks. These glass blocks were utilised to construct a new wall in the centre to comply with the latest regulations and create a new learning space for the students.

The project not only preserves the building's authenticity but also promotes community engagement through accessible spaces. It achieves ecological restoration through tree preservation and native planting, making it a model for sustainable heritage revitalisation that benefits the cultural fabric and the community.

Benefits to the Project:

- Upcycling the abandoned window glass to construct new glass block wall to reduce waste.
- Education and demonstration to future generations on how to reuse "waste"

Benefits to the Industry:

Demonstration of upcycling existing abandoned materials at site to reuse in new project.

Benefits to the Environment:

Reduction of waste produced in the change of use of building.

Name of consultant / contractor / manufacturer: Tony Ip Green Architects Ltd.

Costs: HK$55M **Material Saving:** glass, timber, metal, concrete **Year of completion:** 2023

Smart, Adaptive, and Built to Last

CASE STUDY (7) – ATAL Tower

Building Owner:
Analogue Holdings Limited

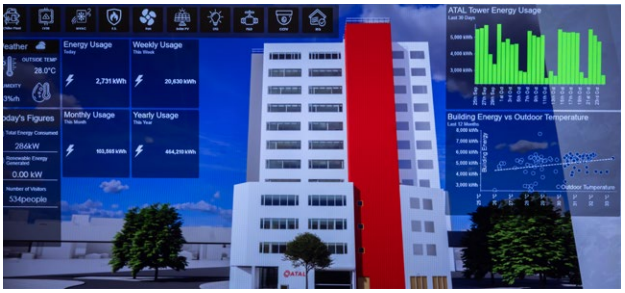
Building Name:
ATAL Tower

Description of the Building:
ATAL Engineering Group's 12-storey headquarters was constructed under the HKSAR Government's Revitalisation Scheme for Industrial Buildings. The facility includes office space, training centre, innovation corner, car park, and gym facilities.

Information of Circular Practice

Circular Initiatives: 3.1

Circular Practice:
Smart heart sustainability is a key design theme of the development. To extend the lifespans of mechanical, electrical, and plumbing (MEP) systems, a smart building platform monitors the energy consumption of various equipment, including chillers, water pumps, photovoltaic pavers, and lighting controls. The platform also presents three-dimensional Building Information Modelling (BIM) graphics on the system dashboard, providing a comprehensive view of the building's operations. By leveraging artificial intelligence (AI) and systematically collected data over time, a unique database is created, enabling accurate prediction of future building operations and early fault detection.



DigiFusion - Offering tailor-made Smart Building Platform

In addition to enhancing MEP equipment performance, the design prioritises the creation of a comfortable environment that accommodates diverse lifestyles and multiple lifetimes. The office space is enriched with indoor plants and greenery, allowing occupants to enjoy views of trees and open skies through large windows, effectively blurring the lines between indoor and outdoor spaces. This connection to nature cultivates a vibrant environment that promotes well-being and productivity.

Moreover, the installation of DigiFusion Internet of Things (IoT) sensors throughout the building allows for real-time monitoring of the indoor environment across different sections. When integrated with the DigiFusion smart building platform, these sensors enable the system to adjust performance dynamically, ensuring optimal comfort and efficiency for all occupants. This adaptability is particularly important for accommodating the needs of a diverse workforce, whether they are engineering professionals, administrators, or technicians. By addressing the varying requirements of different lifetimes, the development not only enhances individual comfort but also fosters a sense of community and connection among its occupants.

By focusing on these goals, the development aims to create a sustainable environment that not only meets the needs of current occupants but also considers future generations, promoting a harmonious relationship between the built environment and nature.

Benefits to the Project:
It promotes cost savings, operational flexibility, and sustainability while enhancing the development's long-term value and structural resilience.

Benefits to the Industry:
This approach supports broader sustainability goals while simultaneously enhancing economic performance, fostering innovation, and strengthening competitive market positioning.

Benefits to the Environment:
The practice contributes to environmental sustainability by reducing material waste, conserving natural resources, and promoting a healthier ecosystem.

Name of consultant / contractor / manufacturer: ATAL Building Services Engineering Limited

Material Saving: Over 90% of the existing structure being reused.

Year of completion: 2024

Redefining Luxury with Circular Interiors

CASE STUDY (8) – Standard Chartered Bank Building, Gala Place

Building Owner:
Hang Lung Properties

Building Names:
Standard Chartered Bank Building, Gala Place

Description of the Buildings:

Standard Chartered Bank Building: A prestigious Grade A building located in the heart of the financial district in Central and distinguished by its superb architectural design that melds the artistic with the practical – located adjacent to the Central MTR Station and the interchange station of the Island Line and Airport Express railway. With such unrivalled accessibility plus a superb view of Victoria Harbour, the Standard Chartered Bank Building is an ideal office location.

Gala Place: Located at the junction of Dundas Street and Nathan Road in Mongkok, Gala Place houses a diverse array of merchants and attracts high footfall. It showcases a curated portfolio of services and products, including chic fashion, outdoor gear, lifestyle items, beauticians, gym, figures and toys, watches, and a variety of enticing food and beverage offerings. Together, these retailers and service providers have made Gala Place a hotspot for Mongkok's trendy and fashionable consumers, providing a convenient, one-stop shopping experience.

Information of Circular Practice

Circular Initiatives: 2.2, 2.3, 2.4, 2.6, 3.1, 3.3

Circular Practice:

The circular practice focuses on reducing material consumption, reusing existing resources, and recycling waste generated during large-scale office renovation projects.

1. Use of innovative and sustainable design and materials such as:
   - Upcycled carpet products
   - Red-list free mineral wool and wood flooring
   - Upcycled ceramic tiles for washroom wall finish
   - Upcycled hundred-year-old tree trunk converted as reception counter for both Standard Chartered Bank Building and Gala Place
   - Sustainable materials (bamboo) used for feature ceilings
2. Reuse, Recycle and upcycle 4,439 items of office furniture in collaboration with partner
   - Donate 467 items of office furniture to 33 non-profit organisations
   - Give away 212 items of office furniture to 129 colleagues for free
   - Together avoided 603,186 kg CO_2e, which is equivalent to 3,603 flights from HK to Singapore
   - Together avoided 180,881 kg of landfill, which is equivalent to 101 units of HK Taxi

Benefits to the Project:

The circular practice enhanced the project's sustainability profile by significantly reducing material consumption and waste generation through the strategic reuse and upcycling of resources.

Benefits to the Industry:

This practice establishes a precedent for implementing substantial circular economy principles in large-scale office renovations.

Benefits to the Environment:

The initiative diverts substantial waste from landfills and contributes to the conservation of natural resources.

Name of consultant / contractor / manufacturer: Renovation Consultant: Hassell, Oval Partnership
Renovation Contractor: Artwright, Pretterior
Office recycling contractor: Sustainable Office Solutions

Costs: Collaboration with Partner to treat pre-used furniture: HKD 1.3 million

Material Saving: 180,881 kg office furniture

Carbon footprint: 603,186 kg CO_2e

Year of completion: 2024

Where Finance Meets Regenerative Design

CASE STUDY (9) – Hang Seng Bank Headquarters

Building Owner:
Hang Seng Bank Limited

Building Name:
Hang Seng Bank Headquarters

Description of the Building:
Located in Central's CBD, Hang Seng Bank Headquarters offers panoramic harbour and Mid-Levels views and is directly linked to public transit and key business hubs via elevated walkways.

Information of Circular Practice

Circular Initiatives: 2.4, 2.6, 3.1, 3.3, 4.1, 4.6

Circular Practice:

- Material Take-Back: The project diverted over 50% of landfill-bound materials through reuse and recycling of more than 210 tonnes of granite and glass panels.
- Design for Reuse Over Multiple Lifetimes: Evergreen Bamboo Spirit on the third floor incorporates reclaimed glass panels with a bamboo motif, while the ground-level landscape uses upcycled granite to create a reflective mirror pool. More than 30-year-old glass & granite were reassembled as a new design feature, demonstrating thoughtful stewardship of resources.
- Inspiration and Implementation of Nature-Based Solutions: A green wall is suspended above a reflective mirror pool on the ground floor. Outdoor garden on the third floor utilises diverse plant species.

- Regenerative Urban Development: The project incorporates 4,500 sq. ft. of greenery, and utilises patented technology by combining aquatic microalgae reactors with natural processes to efficiently lower indoor CO_2 levels, enhance air quality, and support sustainability.
- Responsible and Healthy Materials: The project utilises sustainable materials, including FSC-certified plywood, gypsum boards with recycled content, and zero carbon emission carpet – ensuring both environmental responsibility and the well-being of colleagues.

Benefits to the Project:

The implementation of advanced technologies contributed to a reduction in the project's CO_2 emissions. Achieving LEED and WELL Platinum certification demonstrates the project's adherence to international standards for environmental performance and occupant well-being, establishing it as a recognised benchmark in sustainable design. Through material innovation and upcycling initiatives, approximately 210 tonnes of demolition waste were diverted from landfills and repurposed into high-value architectural features.

Benefits to the Industry:

The project is the first financial institution partnering with City University of Hong Kong to develop an energised pedal. It provides an industry benchmark for the integration of innovative technologies and sustainable practices in commercial construction.

Benefits to the Environment:

The project diverted approximately 210 tonnes of construction waste from landfills through systematic sorting and management. Integrated smart systems, including optimised MVAC and efficient lighting, achieved a more than 20% reduction in total energy consumption. The introduction of 4,500 sq. ft. of green space in the Central Business District helps mitigate the urban heat island effect. It establishes a new perspective for sustainable banking facilities and demonstrates tangible progress toward the carbon net-zero commitment.

Name of consultant / contractor / manufacturer:
Project Manager: Jones Lang LaSalle Limited
Quantity Surveyor: Arcadis Hong Kong Limited
Interior Designer: Woods Bagot Asia Limited
Landscape Designer: Ko Landscape Architect Limited
MEP Engineer: Vigor (M&E) Engineering Consultants Limited
Main Contractor: YearFull contracting Limited
Facade Contractor: Fruit Design & Build Limited
Fit-out Contractor: Diligence (VAB) Consultants Limited & Jadex Contracting Limited
LEED & WELL consultant: BEE Incorporations
Lift Contractor: Otis Elevator Company (H.K.) Limited

Material Saving: Approx. 150,000 kg

Year of completion: 2025

Harvesting Rainwater for a Greener Skyline

CASE STUDY (10) – One Causeway Bay

Building Owner:
One Causeway Bay Limited

Building Name:
One Causeway Bay

Description of the Building:
One Causeway Bay is a Grade A office building currently under development on the former site of the Excelsior Hotel along the Causeway Bay harbourfront in Hong Kong. The structure comprises 25 office floors, three retail levels, and a three-story underground car park. Completion is scheduled in 2025.

Information of Circular Practice

Circular Initiatives: 2.3, 2.4, 4.1, 4.3

Circular Practice:
A key factor in achieving significant embodied carbon reduction for the project was the use of green reinforcement bars, with approximately 80% of rebars manufactured from scrap steel. These were sourced from Turkey and Taiwan, with the latter helping reduce transportation emissions. The project also localised its supply chain for concrete and façade materials during the superstructure phase. All concrete used was certified CIC Green Product Platinum and sourced within Hong Kong, while façade materials were procured from Mainland China. A preliminary life cycle assessment was conducted during schematic design, and carbon management tracking was implemented to ensure alignment with a target of at least 40% reduction in embodied carbon.

The project adhered to green procurement guidelines by incorporating circular-based criteria into contract specifications, including requirements for Environmental Product Declarations (EPD) and Health Product Declarations (HPD) for materials such as green concrete, green steel, gypsum blocks, and recycled aluminium.

Rainwater harvesting systems supply irrigation and cooling tower makeup water, reducing potable water use by at least 50% for landscaping. This approach also lessens dependence on treated water, improves energy efficiency, and reduces strain on public drainage. Onsite green areas and rainwater retention improve stormwater management, while tanks sized for 70% of annual rainfall mitigate flood risk, enhancing climate resilience and supporting natural water cycles.

Benefits to the Project:
- Embodied Carbon Reduction: Using green rebar sourced from Turkey and Taiwan, and localising the supply chain for concrete and façade materials, contributes to reducing the project's carbon footprint. Life cycle assessment and carbon tracking ensured adherence to reduction targets.
- Stormwater Management: Harvested rainwater was used for irrigation and makeup water of cooling tower, reducing potable water demand and operating costs while supporting sustainable water management.

Benefits to the Industry:
By referencing HKL's Green Procurement Guidelines, One Causeway Bay incorporates criteria like EPD and HPD into its procurement, setting a benchmark for sustainable material sourcing. This encourages suppliers and other stakeholders in the construction industry to align with environmentally sustainable practices.

Benefits to the Environment:
- The use of green materials and local sourcing significantly cuts down transportation emissions and embodied carbon, directly contributing to mitigating climate change.
- The stormwater management system restores the natural water cycle by reducing the strain on local drainage systems and closing resource loops.
- Repurposing stormwater strengthens resilience against water scarcity and promotes sustainable urban development, reducing the ecological footprint of urbanised areas.

Name of consultant / contractor / manufacturer: HKL (Project Management) Limited (Project Manager)
Allied Environmental Consultants Limited (Environmental Consultant)
Gammon Engineering and Construction Company Limited (Main Contractor)

Costs: Approx. HK$4.5 billion **Year of completion:** 2025 (scheduled)

Local Timber, Lasting Legacy

CASE STUDY (11) – Towngas Headquarters Building

Building Owner:
The Hong Kong & China Gas Company Limited

Building Name:
Towngas Headquarters Building

Description of the Building:
Headquarters with offices, warehouses, carpark and workshop areas.

Information of Circular Practice

Circular Initiatives: 2.3, 2.4, 4.5

Circular Practice:
Selection of regional recycled lemon-scented gum wood for bench and reception counter in G/F Lobby Renovation

- Use of lemon-scented gum wood that is environmentally sustainable as it is recycled from the redeveloped areas, Fan Kam Road, New Territories. It contains significant recycled content with relatively low environmental impacts and results in lower embodied energy. It was considered at the early stages of planning and design of G/F Lobby Renovation.
- Reusing wood can significantly reduce CO_2 emissions. As wood is reused, the stored carbon remains sequestered, preventing it from being released back into the atmosphere.
- The whole production was conducted in Hong Kong, including source of wood, manufacturing, transportation and usage.
- The use of locally sourced materials helped minimise the environmental impacts arising from transportation.

Closed-loop circularity can be achieved by implementing a system where reclaimed timber is continuously reused and recycled into new products without significant degradation in quality. This involves:

1. Collection and Salvage: Fallen trees were collected from the Fan Kam Road section between San Tin and Sheung Shui, where it was reclaimed due to regional development in recent years.
2. Processing: The collected timber is processed using eco-friendly methods to preserve its quality and natural beauty.
3. Manufacturing: The processed timber is then crafted into new products, which is the bench at the entrance lobby and decorative panels at the reception.
4. Reuse and Recycling: At the end of their life cycle, these products can be disassembled, and the timber can be reused or recycled into new products, maintaining a continuous loop.
5. Community Workshops: Participating in community workshops that promote sustainability and environmental awareness through the use of reclaimed timber.

The reclaimed timber products exemplify circularity by transforming fallen trees into high-quality, sustainable products. For example, fallen trees were upcycled into a sculptural concierge counter, showcasing the potential of reclaimed timber in creating functional and artistic pieces.

Benefits to the Project:
The use of regional recycled lemon-scented gum wood for bench and reception counter in G/F Lobby Renovation which supplement ESG sustainability for Towngas Headquarters Building.

Benefits to the Industry:
As a role model to demonstrate the use of environmentally friendly products in terms of reuse of locally sourced recycled lemon-scented gum wood in Hong Kong.

Benefits to the Environment:
Mitigate environmental impacts arising from transportation, i.e. reduce CO_2 emissions to atmosphere.

Name of consultant / contractor / manufacturer: HK Timberbank

Material Saving: 584 kg of waste wood

Carbon footprint: 1,094 kg CO_2e

Year of completion: 2023

From Restaurant Shells to Foundation

CASE STUDY (12) – The Langham, Hong Kong & Eaton HK

Building Owner:
Great Eagle Group

Building Name:
The Langham, Hong Kong & Eaton HK

Description of the Building:
The Langham, Hong Kong and Eaton HK are the two hotels in Hong Kong where discarded oyster shells are collected from hotel restaurants and converted to sustainable raw materials for cement production.

Information of Circular Practice

Circular Initiatives: 2.5, 2.6, 3.3, 4.1, 4.5

Circular Practice:
The circular practice revolutionises cement production by converting food waste for use as a manufacturing input. Discarded oyster shells, generated from restaurant and hotel operations, are repurposed as an alternative and sustainable raw material for the cement production process.

The practice diverts this specific waste stream from general landfill disposal. The operational procedure involves the collection, cleaning, and interim storage of the shells at the hotels prior to their transportation to a local cement manufacturing plant. At the facility, the processed shells are incorporated into the raw material mix, replacing a portion of the traditionally quarried limestone used in cement clinker production.

As of August 2025, this process has resulted in the diversion of over 17 tonnes of oyster shell waste generated from the 2 hotels. The conversion of this material into usable cement products demonstrates an application of industrial symbiosis, contributing to waste reduction, enhanced resource efficiency, and the promotion of circular material flows.

Benefits to the Project:
With high purity of calcium carbonate content in oyster shell equivalents to 91% of that in limestone, this pilot project demonstrated that oyster shell is a suitable material to replace limestone for the manufacturing of cement products. Oysters have a growing cycle of 4-5 years, which is significantly shorter compared to the geological formation of limestone that takes millions of years. This project also promote the practice of clean recycling and participation of hotel guests and the public.

Benefits to the Industry:
This practice brings significant industry-wide benefits by promoting the use of rapidly regenerating materials, integrating upcycling initiatives in local manufacturing processes, and establishing a closed-loop circularity model to foster innovative cross-sectoral collaboration among developer, hospitality sector and cement manufacturer.

Benefits to the Environment:
The use of discarded oyster shells as the source of calcium carbonate for cement production can lessen the burden of landfills in Hong Kong and reduce environmental degradation induced by limestone mining.

Name of consultant / contractor / manufacturer: Green Island Cement Group is our industry partner for this project

Costs: Incorporated into daily operation

Material Saving: Discarded oyster shells are collected for replacing limestone as the alternative sustainable raw materials for cement manufacturing process.

Year of completion: Ongoing; pilot project was completed in 2024

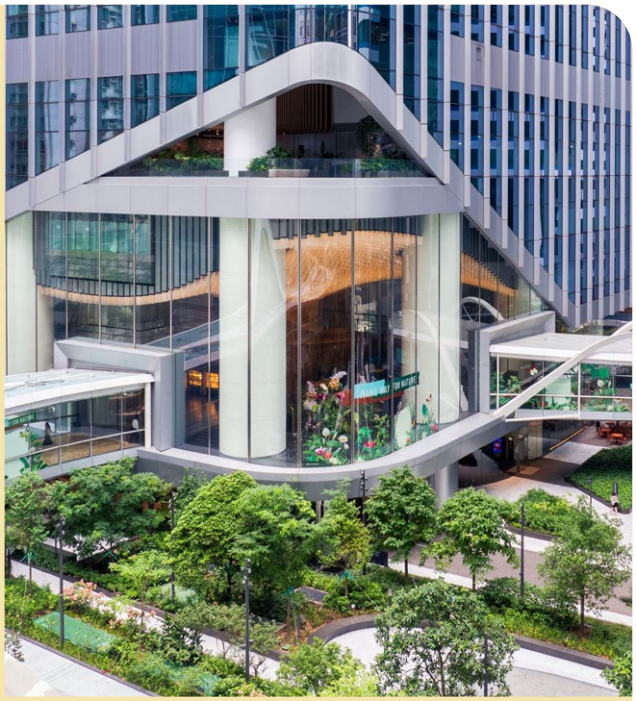
Cultivating an Urban Oasis for Biodiversity

CASE STUDY (13) – Taikoo Square at Taikoo Place

Building Owner:
Swire Properties

Building Name:
Taikoo Square at Taikoo Place

Description of the Building:
Taikoo Square is part of Taikoo Place's redevelopment project. The addition of over 70,000 sq. ft. of green open space to Swire Properties' Global Business District means 30% of Taikoo Place's total site area is now covered in greenery. This nature-based solution not only promotes urban biodiversity, but also reduces the heat island effect, improves rainwater retention, and improves district air quality.



Information of Circular Practice

Circular Initiatives: 4.1, 4.5, 4.6

Circular Practice:
Taikoo Square, together with Taikoo Garden and Taikoo Piazza, includes over 260 native and exotic plant species and features a higher-than-average ratio (over 20%) of native species compared to the average urban landscape in Hong Kong. Introducing native species rarely found in urban areas cultivates a richer diversity of plants at Taikoo Square, and makes it more attractive to birds, butterflies, and other insects and animals by providing suitable habitats and food sources. Certain native species are also difficult to source, as they are not commonly found in local nurseries. Various species planted were grown from seedlings since 2018 at the Kadoorie Farm and Botanic Garden.

Benefits to the Project:
Biodiversity is a key focus area in Swire Properties' Sustainable Development (SD) 2030 Strategy. Recognising the crucial role nature plays in fostering vibrant and resilient communities, the Company created its Biodiversity Policy in 2019, aiming to fully integrate biodiversity considerations into its operations and developments. Biodiversity Guidelines for Hong Kong were also completed in 2023 to provide specific recommendations to enhance biodiversity in Swire Properties' existing portfolios and new developments. Taikoo Square reinforces the Company's commitment to promote urban biodiversity using nature-based solutions. Biodiversity considerations were incorporated from the design stage – the 260 native and exotic plant species selected promote biodiversity by providing habitats and food sources. The biophilic design implemented at Taikoo Square also further contributes to improved microclimate, increased rainwater retention, and enhanced air quality.

Benefits to the Industry:
Taikoo Square connects people with nature by offering a green open space for the community to enjoy. It also serves as an exemplar of biodiversity being considered in the design, construction, and maintenance of a built environment. To raise awareness of the importance of biodiversity, the Company has collaborated with Outdoor Wildlife Learning Hong Kong (OWLHK) to curate Taikoo Square biodiversity tours, which give tenants and the public an in-depth introduction to Taikoo Square's design and a variety of handpicked native and exotic plant species. The species' value in terms of biodiversity and a socio-cultural standpoint are highlighted during the tour. A dedicated website has been created to showcase information for the general public's learning: *https://biodiversity.swireproperties.com/*.

Benefits to the Environment:
The selection of plant species for Taikoo Square drew inspiration from Hong Kong's "feng shui woodlands", areas celebrated for their rich biodiversity and traditional preservation of native flora. The meticulously chosen plant species – including 4 native species which were grown from seedlings since 2018 at the Kadoorie Farm and Botanic Garden – were planted in a naturalistic manner to attract wildlife. This increases the vertical layering between the groundcover, shrubs and trees; providing wildlife with more cover and feeding opportunities. Multidimensional landscapes of differing sizes and heights mimic natural ecosystems, providing niches that allow for different species to thrive. The plantings form a green corridor that facilitates the movement of birds, butterflies and other insects from Taikoo Square to neighbouring parks, such as Mount Parker and Quarry Bay Park, creating a more interconnected urban habitat. Regular ecological assessments have been conducted to continuously monitor species diversity and abundance, allowing for adaptive management strategies. Results from the recent survey indicates that there is a significant increase in the number of bird species. In the winter survey of the present study, 14 bird species were recorded, compared to the 8 species recorded in 2020. Breeding activities were also observed.

Name of consultant / contractor / manufacturer:
- Lead Landscape Architect: Gustafson Porter + Bowman
- Executive Landscape Architects: Urbis Limited
- Education component – Taikoo Square biodiversity tour curation and delivery: Outdoor Wildlife Learning Hong Kong

Year of completion: 2024

Giving Fallen Trees a Second Life

CASE STUDY (14) – CIC-Zero Carbon Park

Building Owner:
Construction Industry Council

Building Name:
CIC-Zero Carbon Park

Description of the Building:
CIC-Zero Carbon Park ("CIC-ZCP") is the first zero carbon building in Hong Kong under the Construction Industry Council in collaboration with the HKSAR Government. CIC-ZCP is designed with emphasis on sustainability and low-carbon living, acting as a test bed for state-of-the-art eco-building design and ongoing technological advancement. Beyond its role as an exhibition and information centre, CIC-ZCP continually optimises its technologies to showcase the importance of green building design both locally and internationally.

Information of Circular Practice

Circular Initiatives: 2.3, 2.6, 4.5, 4.6, 5.2

Circular Practice:
The circular practice involves the repair of a timber trellis using reclaimed wood, diverting waste material from landfills and extending its life cycle through practical reuse.

The timber trellis, constructed in 2012, exhibited significant wear and deterioration from prolonged environmental exposure. To address this in a manner demonstrating circular economy principles, CIC-ZCP initiated a repair project focused on material reuse. The primary strategy involved utilising upcycled timber, sourced from local typhoon-damaged trees in Hong Kong, to repair the structure's major defects. This approach diverted waste from landfills, extended the lifespan of the existing trellis, and reduced the demand for virgin materials.

Benefits to the Project:
This circular practice delivers several key benefits to the project. Primarily, it enhances the sustainability profile of the CIC-ZCP by providing a tangible, real-world demonstration of circular economy principles within the construction sector. The initiative serves as an operational case study, showcasing a practical methodology for waste reduction and resource efficiency. Furthermore, it generates positive publicity and educational value, positioning the project as an exemplar of innovative and environmentally responsible resource management.

Benefits to the Industry:
This practice provides the construction industry with a replicable model for implementing circular economy principles. It offers a validated case study on the use of upcycled materials for building maintenance and repair, contributing practical knowledge and reducing the perceived risk of adopting such methods. By proving the concept's viability, it encourages wider adoption across future projects.

Benefits to the Environment:
This approach reduces environmental impact by diverting waste from landfills and minimising demand for virgin timber, thereby lowering the project's carbon footprint and fostering sustainable resource management.

Name of consultant / contractor / manufacturer: Y·PARK and its operator, i.e. Associated Engineers, Ltd. (Hong Kong)

Costs: Material & Treatment: HK$200,000 **Material Saving:** 150 nos. of timber logs from fallen trees in typhoon

Carbon footprint: Estimated to reduce approximately 2,000 kg CO_2 as compared to using conventional timber **Year of completion:** 2025

Powering a Second Life for E-Waste

CASE STUDY (15) – WEEE • PARK

Building Owner:
Environmental Protection Department of Hong Kong SAR Government

Building Name:
WEEE · PARK (Waste Electrical and Electronic Equipment Treatment and Recycling Facility)

Description of the Building:
WEEE · PARK is a 30,000 sq. m., e-waste recycling facility featuring green spaces, energy-efficient technology, and solar panels for sustainable operations.

Information of Circular Practice

Circular Initiatives: 2.5, 2.6, 5.1

Circular Practice:
The organisation operates a comprehensive service for collecting Regulated Electrical Equipment (REE) from the public and organisations. Collected items are transported to regional centres for sorting before being processed at the WEEE · PARK facility. There, advanced technologies detoxify, dismantle, and crush the waste to extract valuable secondary raw materials. This process exemplifies a circular economy: polyurethane from refrigerators is used as an alternative fuel in cement production; recovered plastics are transformed into low-carbon eco-bricks for construction; and refrigerants are purified for potential reuse. Furthermore, functional appliances are refurbished and donated to families in need. This integrated approach has successfully recycled over 128,000 tonnes of material and given more than 10,000 appliances a second life, turning waste into resources and supporting the community.

Benefits to the Project:
Implementing circular practices within a business project significantly enhances brand image and drives cost savings. By adopting these principles, an organisation can position itself as socially responsible, attracting environmentally conscious consumers and fostering customer loyalty. This positive brand perception differentiates the organisation in the marketplace and strengthens its competitive advantage. Furthermore, circular practices lead to substantial financial benefits. By recovering and selling valuable materials and reducing waste disposal expenses, operational costs are lowered while new revenue streams are created.

Benefits to the Industry:
By demonstrating viable recycling and refurbishment processes, the project encourages wider industry adoption of e-waste circularity, which enhances operational efficiency and reduces costs. It serves as a resource for sectors like construction seeking to implement sustainable practices, such as the green procurement of secondary materials. A prime example is the use of eco-bricks made from recycled plastic, which significantly reduces a building's embodied carbon and diverts waste from landfills. This circular approach helps the industry meet waste-management targets, lower disposal costs, and demonstrate exemplary resource stewardship under schemes like the Construction Waste Disposal Charging Scheme, collectively contributing to a more sustainable future.

Benefits to the Environment:
These circular e-waste practices deliver significant environmental advantages by systematically diverting waste from landfills, thereby conserving valuable space. The process rigorously contains and neutralises toxic materials during recycling, preventing harmful emissions and safeguarding ecosystems and public health. Furthermore, by transforming waste into valuable secondary raw materials, the system substantially reduces the demand for virgin resources. This substitution directly lowers the greenhouse gas emissions and minimises the extensive ecological footprint associated with the extraction and processing of new raw materials.

Name of consultant / contractor / manufacturer: ALBA Integrated Waste Solutions (HK) Ltd

Material Saving: Around 128,000 tonnes

Carbon footprint: By producing recycled materials that avoid virgin resource emissions and preventing the release of potent refrigerants, these circular operations have reduced Hong Kong's carbon footprint by over 480,000 tCO_2e.

Year of completion: 2018

Transforming Food Scraps into Energy

CASE STUDY (16) – Organic Waste Treatment Facilities Phase 2

Building Owner:
Environmental Protection Department of Hong Kong SAR Government

Building Name:
Organic Waste Treatment Facilities Phase 2

Description of the Building:
Organic Waste Treatment Facilities Phase 2 (O·PARK2) utilise anaerobic digestion bioprocess technology to convert organic waste into biogas. This biogas is used to generate electricity while recovered heat is reused within the system. The facility has achieved a Provisional Platinum rating under the BEAM Plus New Buildings certification.

Information of Circular Practice

Circular Initiatives: 2.5, 3.3, 5.1

Circular Practice:
This circular practice employs anaerobic digestion technology to convert food waste into biogas for electricity and nutrient-rich fertiliser, transforming waste into renewable resources. The O·PARK2 facility processes up to 300 tonnes of food waste daily using anaerobic digestion. It incorporates Hong Kong's first dedicated food waste pretreatment system with hammer mill technology to remove inert contaminants and improve processing efficiency. The plant uses BIM and DfMA for system integration, optimising layout and reducing physical footprint.

Key outputs include:
- Generation of electricity via biogas and combined heat and power
- Production of organic fertiliser from processed waste
- Onsite wastewater treatment with UF/RO technology for water reuse
- Centralised air pollution control using negative pressure technology

The facility diverts 110,000 tonnes of food waste annually, reduces CO_2 emissions by 67,000 tonnes per year, operates on self-generated electricity, recycles water, and maintains advanced odour management.

Benefits to the Project:
- Promoted the use of Green Roofs and green spaces within the project design.
- In terms of heat reuse, the facility is self-sufficient as heat is reused within the digester tanks and granulation to ensure the appropriate conditions to facilitate are maintained.
- In terms of electricity reuse, the 3 CHP engines installed at the O·PARK2 site ensure that not only will the facility remain self-sufficient on a day-to-day basis, but significant excess renewable electricity will be produced too.

Benefits to the Industry:
- The emphasis on circularity can drive innovation in waste treatment technologies and sustainable practices, leading to new business models and market opportunities.
- The project sets an example for the industry of the transformative potential of integrating circular economy principles, showcasing how innovative approaches can enhance operational efficiency and environmental responsibility.

Benefits to the Environment:
- Develop customised system for handling waste reception, inert separation, food waste transfer and storage.
- Design sophisticated system for the treatment of effluent according to the highest environment standards.
- For carbon capture, the project targets 100% capture of carbon within the treatment process.

Name of consultant / contractor / manufacturer: Jardine Engineering Corporation

Carbon footprint: Reduces 67,000 tonnes CO_2/year **Year of completion:** 2024

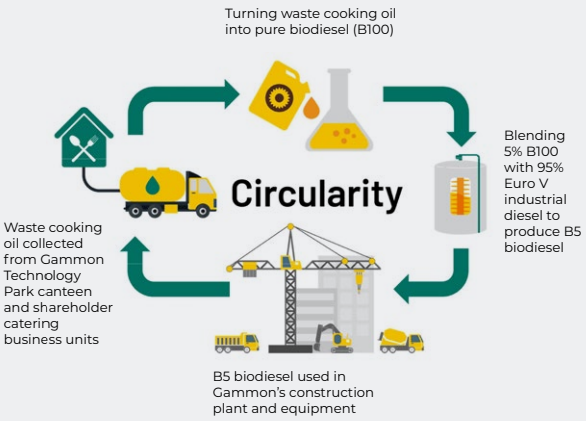
Fuelling Construction with Circular Energy

CASE STUDY (17) – Waste Cooking Oil to Biodiesel

Project Owner:
Gammon Construction Limited

Project Name:
Waste Cooking Oil to Biodiesel

Description of the Project:
A cross-sector circular economy model has been established between the construction and food and beverage sectors, creating a financially viable system for converting waste cooking oil into biodiesel for use in construction plant, machinery, and equipment.



Information of Circular Practice

Circular Initiatives: 2.3, 5.2, 5.3

Circular Practice:
In Hong Kong, locally collected waste cooking oil (WCO) is typically exported to overseas markets due to favourable pricing. As a significant user of B5 biodiesel for construction plant and equipment, the company's supply chain was previously importing feedstock from overseas to compensate for the inadequacy of local WCO, which was then processed into biomass. To address this incongruity, a local WCO supply chain was established to produce biodiesel for domestic use.

WCO is now collected from the canteen at Gammon Technology Park and from the food-related business units of value chain partner Jardines. Partners ASB Biodiesel Hong Kong Limited and Chevron Hong Kong Limited collect and reprocess the waste cooking oil into B5 biodiesel for use in construction plant and equipment. This initiative now sources over 80% of its B5 biodiesel from local fuel circularity.

Benefits to the Project:
The use of B5 biodiesel supports the circular economy by converting low-cost feedstocks into higher-value products, ensuring a consistent and sustainable fuel supply while decreasing dependence on fossil fuels. This practice also mitigates environmental pollution by diverting waste cooking oil from landfills and preventing its improper disposal.

Benefits to the Industry:
This circular practice fosters cross-sector collaboration and establishes a viable business case, encouraging companies to reconceptualise resource flows and invest in innovative technologies for converting waste into valuable resources. It enhances industry-wide efficiency and reduces waste through the sharing of best practices and the development of integrated solutions. This collaborative approach drives investment in sustainable initiatives while strengthening overall industry resilience by reducing reliance on virgin materials and mitigating transition risks in the shift to a low-carbon economy.

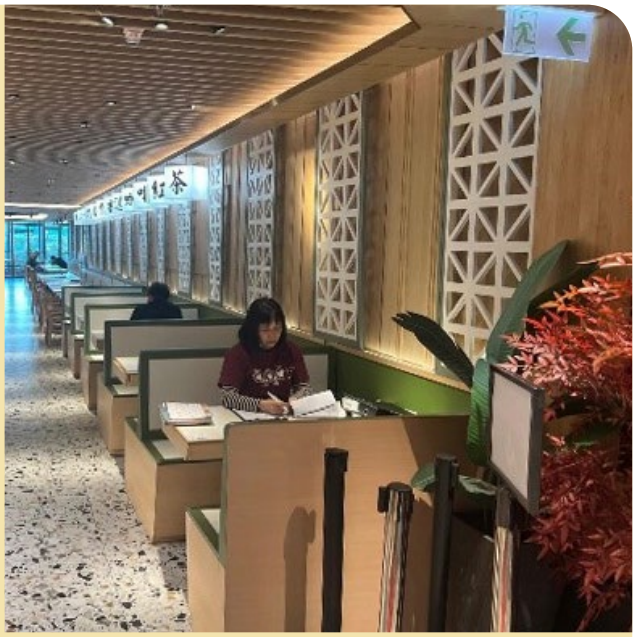
Benefits to the Environment:
This circular practice plays a critical role in slowing the consumption of natural resources and reducing greenhouse gas emissions. The initiative helps minimise waste and prevents environmental pollution that would otherwise result from improper handling of waste cooking oil, while simultaneously supporting the transition toward a circular economy.

Name of consultant / contractor / manufacturer: Gammon Construction Limited (WCO provider, and B5 Biodiesel user)
Jardines' food-related business units (WCO provider)
ASB Biodiesel Hong Kong Limited (reprocessing WCO to pure biodiesel)
Chevron Hong Kong Limited (blending pure biodiesel with ordinary diesel to produce B5 biodiesel)

Carbon footprint: LCA indicates that the carbon footprint of WCO-based biodiesel is 40% lower than that of 1st generation biodiesel.

Year of completion: The initiative was established in 2023, with progress tracked annually thereafter.

Waste-Free Tenant Transitions



CASE STUDY (18) – Link's Hong Kong Retail Properties

Building Owner:
Link Asset Management Limited

Building Name:
Link's Hong Kong Retail Properties

Description of the Buildings:
Link's 98 Hong Kong retail properties including 6 destination, 35 community and 57 neighbourhood retail properties.

Information of Circular Practice

Circular Initiatives: 3.1, 4.3

Circular Practice:
Change in tenancy can result in a large amount of waste when tenant fit-out materials are disposed, often before the end of their physical useful life. Link prioritises creative reuse of tenant fit-out elements to extend the useful life of materials, creating environmental benefit whilst saving time and/or cost for both incoming and outgoing tenants. This approach is facilitated through collaborative engagement with tenants, guided by a dedicated handbook, and involves a formal assessment of departing tenants' fixtures.




By frequently waiving the standard requirement to return a unit to a bare shell condition, Link enables incoming tenants to incorporate viable existing elements, such as ceilings, flooring, and partitions, into their new designs. This practice extends material life cycles, diverts waste from landfill, reduces fit-out costs and timelines for tenants, and minimises operational disruption, thereby creating environmental and economic value across tenancy transitions.

In one recent restaurant case (approx.4 ,000 square feet), a tenant reused retained ceiling, flooring, selected partitions and furniture to yield the following benefits.

For the Departing Tenant (based on tenant estimates):
- Time Savings for Reinstatement: Approx. 1 month
- Reduced Waste: Approx. 4 tonnes of waste was saved by waiving the bare shell reinstatement requirement. This diversion from landfill prevented an estimated 4.9 kg CO_2e

For the Incoming Tenant (based on tenant estimates):
- Lower Fit-out Cost: Approx. HK$2,000,000 was saved by reusing retained fit-out elements
- Time Savings for Fit-out: 2 months
- Extended Lifetime of Reused Materials: 2 to 3 years (aligning with a typical lease term)

For the Landlord and Community:
- Reduced Downtime: 3 months

Benefits to the Project:
This practice reduces costs and time for both departing and new tenants during fit-out transitions.

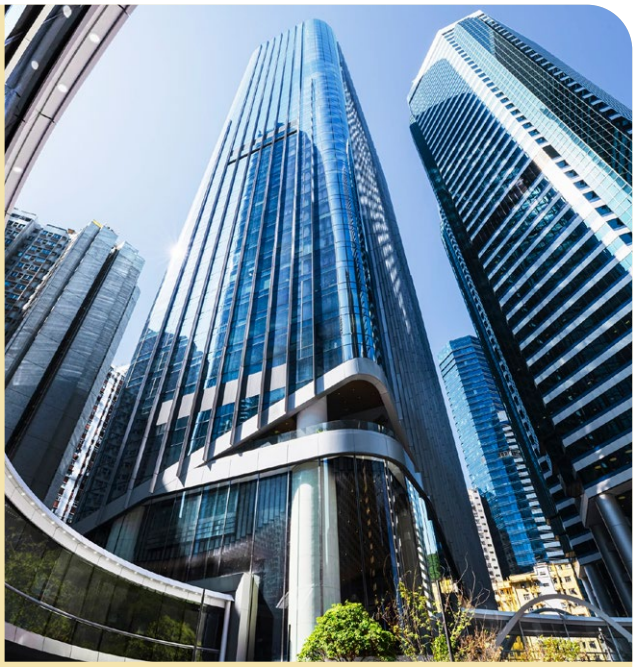
Benefits to the Industry:
It encourages retail and F&B operators, along with their designers, to incorporate materials reuse into new shop/ restaurant designs.

Benefits to the Environment:
It extends the useful lifetime of materials, thereby reducing the volume of waste sent for recycling or to landfill.

Name of consultant / contractor / manufacturer: Link Asset Management Limited

Year of completion: 2024

Engineering Out Embodied Carbon



CASE STUDY (19) – One Taikoo Place, Two Taikoo Place, Six Pacific Place, EIGHT STAR STREET

Building Owner:
Swire Properties

Building Names:
One Taikoo Place, Two Taikoo Place, Six Pacific Place, EIGHT STAR STREET

Description of the Buildings:
One Taikoo Place, Two Taikoo Place, and Six Pacific Place are sustainable, triple Platinum-rated office towers, and EIGHT STAR STREET is a BEAM Plus Platinum-rated residential development.

Information of Circular Practice

Circular Initiatives: 2.2, 2.4, 2.5, 2.6, 3.1, 4.3, 5.2, 5.4

Circular Practice:
Swire Properties conducted its first embodied carbon pilot study at One Taikoo Place in 2019 with technical support from the Hong Kong University of Science and Technology. Analysis revealed nearly 90% of the building's carbon emissions were embodied carbon from materials. The study informed subsequent strategies across multiple projects:

- At Two Taikoo Place, Building Information Modelling was used to optimise material usage and prefabricated structural item and E&M systems were considered to minimise waste generation.
- Six Pacific Place utilised 100% Platinum-certified concrete and 65% of rebar procured contained more than 60% recycled content
- EIGHT STAR STREET employed structural optimisation and modular construction techniques

The company achieved an 88% material recycling rate during demolition for Two Taikoo Place, implementing a systematic approach to material tracking and storage for future projects. During design phases, BIM optimisation and specification of high-recycled content materials further reduced embodied carbon. Construction operations were electrified where possible, with battery storage systems and grid power replacing diesel generators across multiple projects.

Benefits to the Project:
Adopting circular practices significantly reduced embodied carbon and material use. At Two Taikoo Place, a high material recycling rate of over 88% was achieved where broken concrete from the substructure of the existing old building was sent to other sites for alternative disposal and to be used as backfilling materials. Six Pacific Place utilised certified green concrete, cutting embodied carbon by 27% and construction site electrification has reduced power consumption by 66%, reducing on-site emissions through adoption of grid electricity. Both projects attained top-tier sustainability certifications under LEED, WELL, and BEAM Plus. Tools developed during the EIGHT STAR STREET and One Taikoo Place's carbon assessment were later used in Swire Properties' other new development projects.

Benefits to the Industry:
Swire Properties collaborated with HKUST and the National University of Singapore to publish research papers on embodied carbon studies by studying its One Taikoo Place and EIGHT STAR STREET projects. The research revealed that Scope 3 emissions, particularly from concrete and steel, constituted approximately 90% of total carbon emissions in commercial buildings. The EIGHT STAR STREET study developed a comprehensive life cycle assessment for residential buildings, demonstrating how Modular Integrated Construction and Design for Manufacture and Assembly can reduce emissions. These studies provide industry benchmarks and methodologies for quantifying and mitigating embodied carbon in both commercial and residential developments.

Benefits to the Environment:
Swire Properties' carbon management strategy, incorporating low-carbon concrete recycling and low-carbon material procurement, supports its net-zero target. At Two Taikoo Place, concrete and steel were recycled. Six Pacific Place used certified concrete and grid power, achieving a 27% embodied carbon reduction and 66% lower power consumption.

Name of consultant / contractor / manufacturer:
- National University of Singapore: Partner for EIGHT STAR STREET's whole life cycle carbon assessment
- HKUST: Partner for One Taikoo Place's cradle-to-site carbon footprint

Year of completion: One Taikoo Place: 2018, EIGHT STAR STREET: 2022, Two Taikoo Place: 2022, Six Pacific Place: 2023

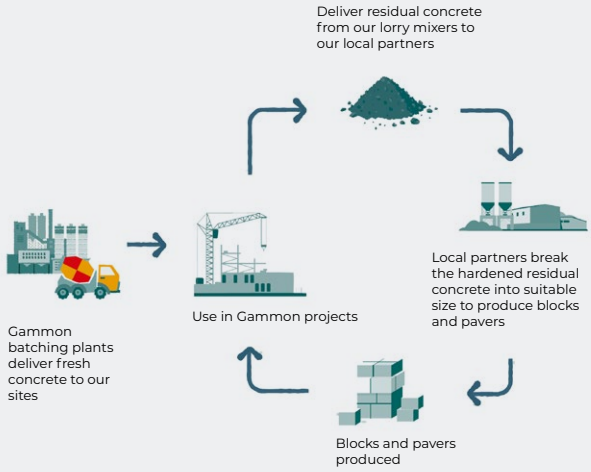
On-Site Concrete Waste, Remade On-Demand

CASE STUDY (20) – Turning Concrete Waste into Blocks and Pavers

Project Owner:
Gammon Construction Limited

Project Name:
Turning Concrete Waste into Blocks and Pavers

Description of the Project:
A company-wide initiative spanning multiple construction projects that recycles concrete waste into blocks and pavers, undertaken in collaboration with local material processing firms.



Information of Circular Practice

Circular Initiatives: 2.6, 5.2, 5.5

Circular Practice:
Gammon commenced its new initiatives in 2024 centred on recycling concrete waste into blocks and pavers through collaborations with local material processing firms.

Working alongside local companies such as Tiostone Environmental Limited and Sincere Building Materials Limited, Gammon collects residual concrete from its lorry mixers and processes it into granular form, replacing traditional aggregates. This approach diverts concrete waste from landfills and closes the material loop by repurposing waste into construction materials for reuse in projects.

These initiatives illustrate how circular economy models can integrate environmental responsibility with commercial viability in sustainable construction practices.

Benefits to the Project:
The use of recycled materials enhances project sustainability while maintaining quality standards. This approach reduces waste management requirements, diverts material from landfills and public fills, and lowers disposal costs. The integration of recycled content also fosters innovation in design and demonstrates a commitment to environmentally responsible practices.

Benefits to the Industry:
Collaboration with processing partners creates a robust network for resource recovery, encouraging wider adoption of similar practices. This collective effort enhances supply chain resilience, decreases reliance on virgin materials, and promotes circular procurement strategies across the sector.

Benefits to the Environment:
Repurposing construction waste into new materials significantly reduces landfill and public fills deposits and lowers the carbon footprint associated with raw material extraction and production. The practice conserves natural resources and reduces environmental degradation, supporting broader sustainability objectives.

Name of consultant / contractor / manufacturer:
- Gammon Construction Limited (residual wasted concrete provider, into blocks and pavers user)
- Tiostone Environmental Limited and Sincere Building Materials Limited (reprocessing residual wasted concrete into blocks and pavers)

Glossary

Adaptive Reuse

The process of repurposing an existing building for a new function while retaining its historic or structurally significant elements. This strategy extends the building's lifespan and reduces the embodied carbon associated with new construction.

Bio-based Materials

Products derived from living organisms or biological processes, such as timber, bamboo, hemp, or bio-based plastics. These materials often store carbon and are typically renewable and biodegradable.

Biological Loop

One of the two fundamental cycles in a circular economy (see also: Technological Loop). This loop concerns materials that are biodegradable and can safely re-enter the natural environment, nourishing living systems after use. In construction, this involves using rapidly renewable, non-toxic, and compostable materials (often referred to as "consumables"). The focus is on sourcing these materials responsibly and ensuring they can be returned to the biosphere without causing environmental harm.

Building Information Modelling (BIM)

A digital process involving the generation and management of digital representations of physical and functional characteristics of a building. BIM data supports circularity by enabling detailed material tracking, design for disassembly, and life cycle management.

Circular Economy

An economic system aimed at eliminating waste and the continual use of resources. It contrasts with a traditional linear economy (take-make-waste) by closing resource loops through strategies like reuse, repair, refurbishment, and recycling.

Close the Loop

A fundamental principle of a circular economy where waste and pollution are designed out of systems, and materials are kept in continuous use. In building, this means designing structures and selecting materials with their entire life cycle in mind—from sourcing and construction to disassembly and reuse. The goal is to eliminate the concept of "waste", transforming it into a resource for a new cycle, thereby creating a closed-loop system that mimics natural cycles and reduces the demand for virgin resources.

Cradle to Cradle

A sustainable design framework that models human industry on natural processes, where materials are viewed as nutrients circulating in healthy, safe metabolisms. It assesses products across five categories: material health, product circularity, clean air & climate protection, water & soil stewardship, and social fairness.

Deconstruction

The careful, systematic disassembly of a building to maximise the recovery of materials, components, and elements for reuse and recycling, as opposed to destructive demolition.

Design for Disassembly (DfD)

A design approach that ensures buildings and products can be easily taken apart at the end of their useful life, enabling components and materials to be recovered and reused or recycled.

Embodied Carbon

The total greenhouse gas emissions generated throughout the life cycle of a building material, including extraction, manufacturing, transportation, construction, maintenance, and end-of-life disposal.

End-of-Life (EoL)

The stage in a product or building's life cycle when it is no longer used for its original purpose. In a circular economy, the EoL stage is planned for through strategies like deconstruction and material recovery.

Environmental Product Declaration (EPD)

A standardised, third-party verified document that transparently communicates the environmental life cycle impact of a product.

Life Cycle Assessment (LCA)

A comprehensive methodology for evaluating the environmental impacts associated with all stages of a product's life, from raw material extraction through materials processing, manufacture, distribution, use, repair and maintenance, and disposal or recycling.

Life Cycle Costing (LCC)

A financial evaluation method that assesses the total cost of ownership of a building or product over its entire lifespan, including initial capital costs, operating, maintenance, and end-of-life costs.

Material Bank

The concept of viewing a building as a repository of valuable materials that can be harvested, reused, or recycled at the end of its service life.

Material Cascading

The process of using a material multiple times for different purposes, each time extracting its maximum value, before eventually recycling it. The quality of the material may decrease with each use (e.g., structural timber becoming particle board).

Material Passport (Digital)

A digital document or dataset containing detailed information about the composition, origin, and properties of materials used in a building. It facilitates future disassembly, reuse, and recycling by providing a record of material value.

Modular Integrated Construction (MiC)

A construction method where free-standing integrated modules (with finishes, fixtures, and fittings) are manufactured in a prefabrication yard and then transported to site for installation. MiC supports circularity through factory precision, reduced waste, and design for disassembly and relocation.

Nature-Based Solutions (NBS)

Actions to protect, sustainably manage, and restore natural or modified ecosystems that address societal challenges (e.g., climate change, water security) effectively and adaptively, while simultaneously providing human well-being and biodiversity benefits.

Regenerative Design

A design approach that seeks to not only minimise harm but to have a net-positive impact on the environment and society, actively restoring and revitalising ecosystems and communities.

Reuse

Using a product or component again for the same or a similar purpose without significant processing, which retains its form and embodied energy. This is prioritised over recycling in the waste hierarchy.

Technological Loop

One of the two fundamental cycles in a circular economy (see also: Biological Loop). This loop concerns materials that are not biodegradable, such as metals, plastics, glass, and concrete. The goal is to keep these technical materials in a continuous cycle of use through strategies like reuse, repair, remanufacturing, and recycling. This requires designing products and buildings for easy disassembly and recovery, maintaining the material's value and quality for as long as possible.

Urban Mining

The process of reclaiming raw materials from anthropogenic stocks, such as buildings, infrastructure, and electronic waste, treating cities as sources of valuable resources.

Upcycling

The process of transforming waste materials or unwanted products into new materials or products of higher quality or environmental value.

Waste Hierarchy

A prioritisation of waste management strategies from most to least environmentally preferred: Prevention, Reuse, Recycling, Recovery (e.g., energy), and Disposal (landfilling).

Zero-to-Landfill

A waste management goal that aims to divert all waste generated by a project or operation from landfill through reduction, reuse, recycling, and recovery strategies.

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