



Building Out Waste 2021

Tackling waste in
construction and
demolition



Agenda



3.08-3.30pm	Key updates and Context
	Jenny Marshall, Ministry for the Environment
	Adam Durant, Colmar Brunton
3.30-4.35pm	Case Studies
	Paul Young, Twin Solutions
	Emma Foulkes, McConnell Dowell & Michael Backhurst, CRL
	Rachel Trinder, Kāinga Ora
	Tara Moala, Tamaki Regeneration & Adrienne Mendes, iConstruct
	Annette Day, Naylor Love & Terri-Ann Berry, Linda Kestle, Unitec & Julie Roberts, Mitre 10
4.35-4.55pm	Quick fire updates
	Ged Finch, X Frame
	Stephanie Wade, Habitat for Humanity
	Renee Woolcott, Jacobsen
	Kelly Ah Kiau, Re Fab Cabins
4.55-5.00pm	Closing remarks: Mark Roberts, Auckland Council and MC Andy Kenworthy
5.00-5.30pm	Networking

Up next...



Jenny Marshall
Ministry for the Environment



Update from the Ministry for the Environment

Reducing Waste in Aotearoa New Zealand:

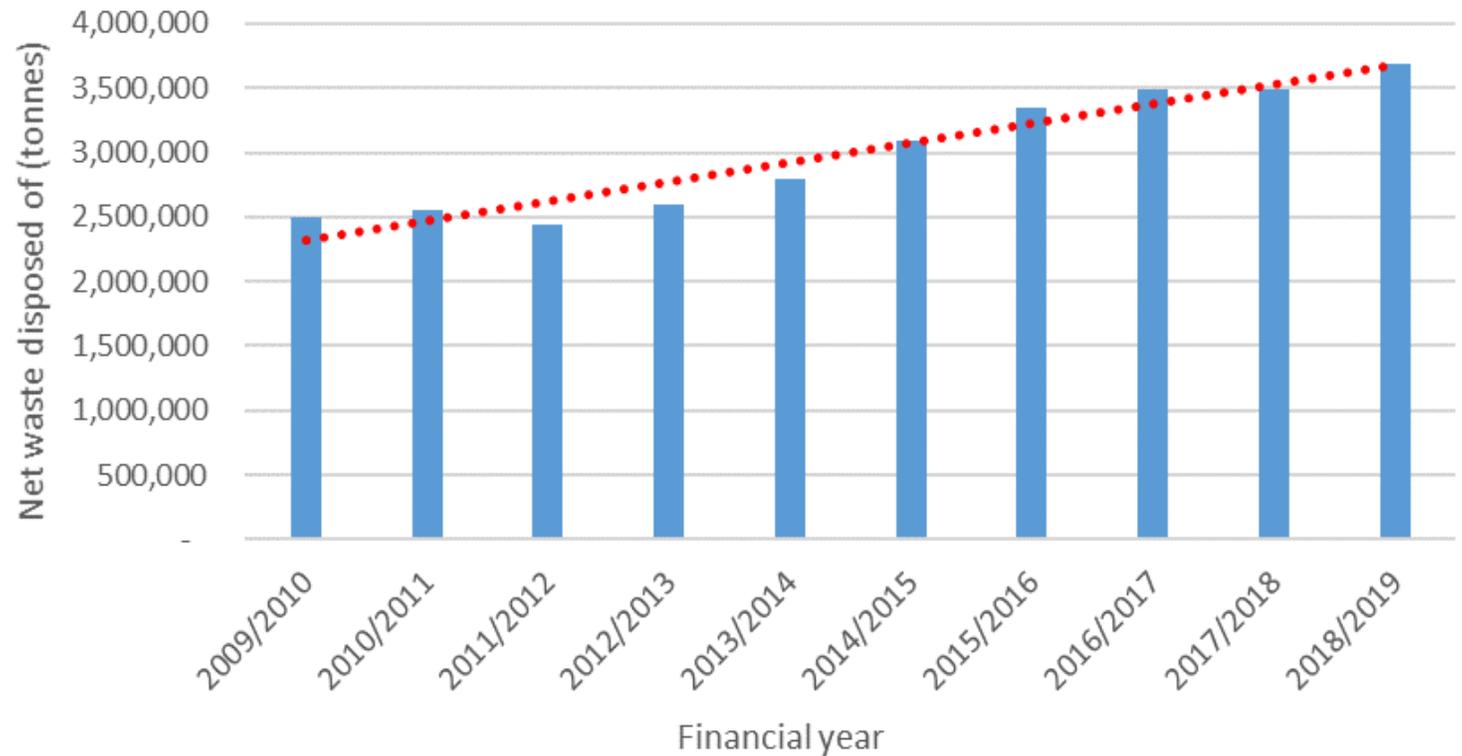
Construction and Demolition Waste

Jenny Marshall

Aotearoa urgently needs to change how it uses materials, and manages them across their life to:

- produce less waste
- reuse and recycle more
- divert materials wherever possible and
- send to landfill only as a last resort

Trends in disposal of waste at Class 1 landfills since 2009



<https://environment.govt.nz/assets/Publications/Files/reducing-waste-a-more-effective-landfill-levy-consultation-document.pdf>

Where do we dispose of construction and demolition waste?

Fill type	Class	Waste that should be accepted at these sites
Municipal landfill	Class 1	Wastes that could discharge contaminants/emissions, disposed of at facilities that also accept household waste
Construction and demolition fill	Class 2	Solid wastes with lower potential for environmental harm, including rubble, plasterboard and other construction and demolition materials
Managed fill	Class 3	Contaminated but non-hazardous soils and other inert materials (e.g., rubble)
Controlled fill	Class 4	Soils and other inert materials with low levels of contamination.
Cleanfill	Class 5	Virgin excavated natural materials such as clay, soil, rock

How much of our waste is construction and demolition?

Composition of waste to Class 1 landfills in 2018	% of total	Tonnes/annum - 2018
Paper	5.9%	218,211
Plastic	8.3%	308,169
<i>Putrescibles - Kitchen & other</i>	9.0%	333,881
<i>Putrescibles - Garden waste</i>	5.7%	212,747
Subtotal - Putrescibles	14.8%	546,627
Ferrous metal	2.7%	99,708
Non-ferrous metal	0.8%	30,438
Glass	1.8%	65,150
Textiles	5.0%	186,035
Sanitary paper	2.5%	91,551
Rubble & concrete	20.1%	744,092
Timber	12.6%	467,664
Rubber	2.1%	77,690
<i>Potentially hazardous - Sewage sludge</i>	1.9%	71,222
<i>Potentially hazardous - Other</i>	21.5%	798,271
Subtotal - Potentially hazardous	23.5%	869,493
TOTAL	100.0%	3,704,828

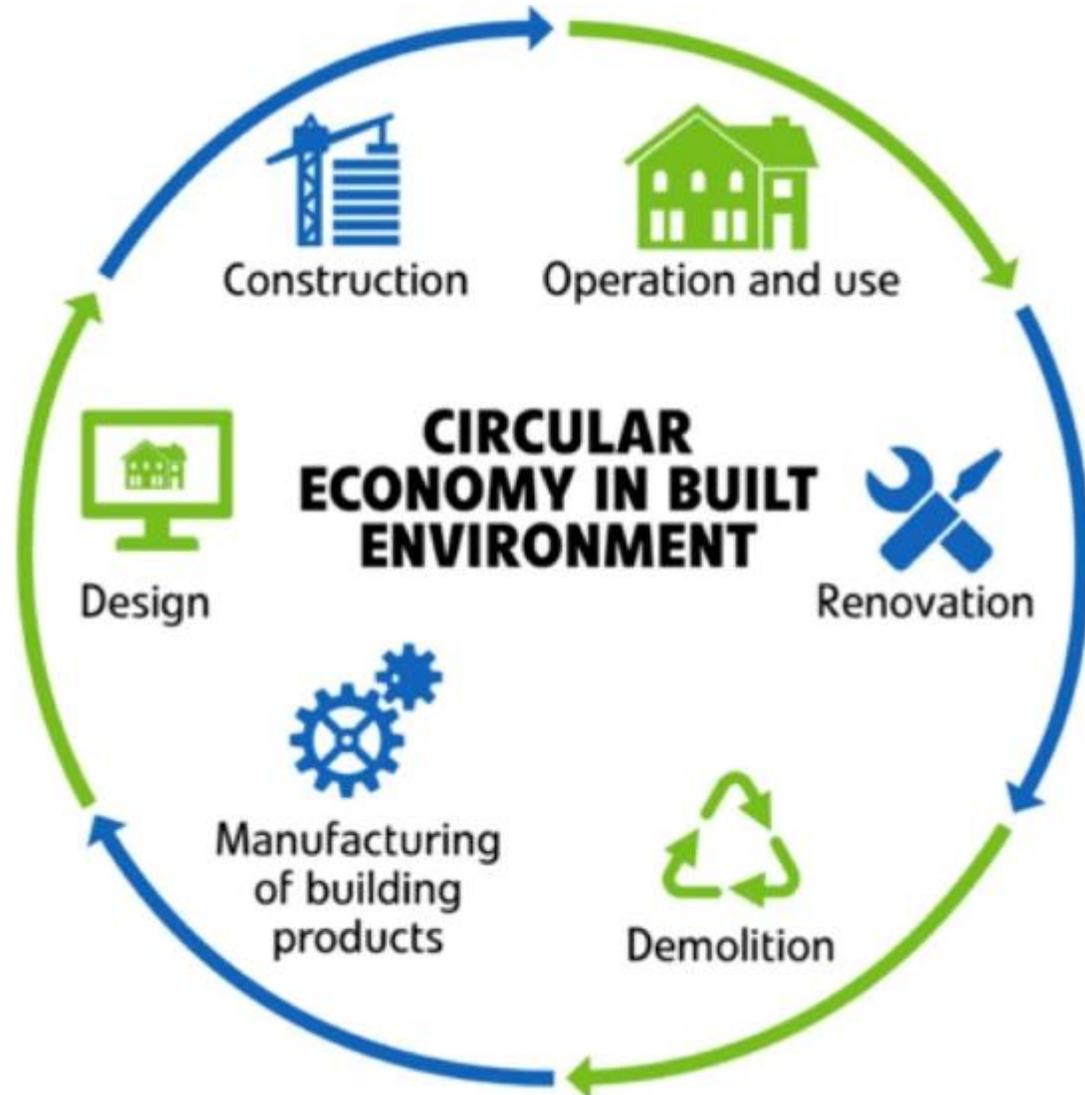
Table 7.2.5 Estimated composition of waste to municipal landfills from 1950 to 2019

Year	Food (%)	Garden (%)	Paper (%)	Wood (%)	Textile (%)	Nappies (%)	Sludge (%)	Inert (%)	Notes
1950-60	17.2	11.0	16.3	7.1	0.5	0.0	2.9	45.0	No nappies
1961-69	17.2	11.0	16.3	7.1	0.5	1.0	2.9	44.0	Interpolation
1970-79	17.2	11.0	16.3	7.1	0.5	2.0	2.9	43.0	Interpolation
1980-94	17.2	11.0	16.3	7.1	0.5	2.7	2.9	42.3	As for 1995
1995	17.2	11.0	16.3	7.1	0.5	2.7	2.9	42.3	National survey
1996	16.9	10.8	16.1	7.9	0.9	2.7	2.9	41.9	Interpolation
1997	16.5	10.6	16.0	8.6	1.3	2.7	2.9	41.4	Interpolation
1998	16.2	10.4	15.8	9.4	1.6	2.7	2.9	41.0	Interpolation
1999	15.9	10.1	15.7	10.1	2.0	2.7	2.9	40.6	Interpolation
2000	15.5	9.9	15.5	10.9	2.4	2.7	2.9	40.1	Interpolation
2001	15.2	9.7	15.4	11.6	2.8	2.7	2.9	39.7	Interpolation
2002	14.9	9.5	15.2	12.4	3.1	2.7	2.9	39.3	Interpolation
2003	14.5	9.3	15.1	13.1	3.5	2.7	2.9	38.8	Interpolation
2004	14.2	9.1	14.9	13.9	3.9	2.7	2.9	38.4	National survey
2005	14.9	9.2	13.4	13.4	3.9	2.9	2.9	39.4	Interpolation
2006	15.7	9.2	12.0	13.0	3.9	3.0	2.9	40.4	Interpolation
2007	16.4	9.3	10.5	12.5	3.9	3.2	2.9	41.4	Interpolation
2008	17.1	9.4	9.0	12.0	3.8	3.3	2.9	42.4	Survey
2009	17.0	9.1	9.4	12.0	4.3	3.2	3.2	41.8	Interpolation
2010	16.9	8.9	9.8	11.9	4.7	3.2	3.4	41.1	Interpolation
2011	16.9	8.6	10.3	11.9	5.2	3.1	3.7	40.5	Interpolation
2012	16.8	8.3	10.7	11.9	5.6	3.0	3.9	39.9	Survey
2013	15.5	7.9	9.9	12.0	5.5	2.9	3.6	42.8	Interpolation
2014	14.2	7.5	9.1	12.1	5.4	2.8	3.2	45.7	Interpolation
2015	12.9	7.0	8.3	12.2	5.3	2.7	2.9	48.6	Interpolation
2016	11.6	6.6	7.5	12.4	5.2	2.6	2.6	51.5	Interpolation
2017	10.3	6.2	6.7	12.5	5.1	2.6	2.3	54.4	Interpolation
2018	9.0	5.7	5.9	12.6	5.0	2.5	1.9	57.3	Survey
2019	9.0	5.7	5.9	12.6	5.0	2.5	1.9	57.3	Assumed same as 2018

National Waste Composition Estimate 2020

<https://environment.govt.nz/assets/Publications/New-Zealands-Greenhouse-Gas-Inventory-1990-2019-Volume-1-Chapters-1-15.pdf> p.375

Time for change: what could the circular economy for construction and demolition look like?



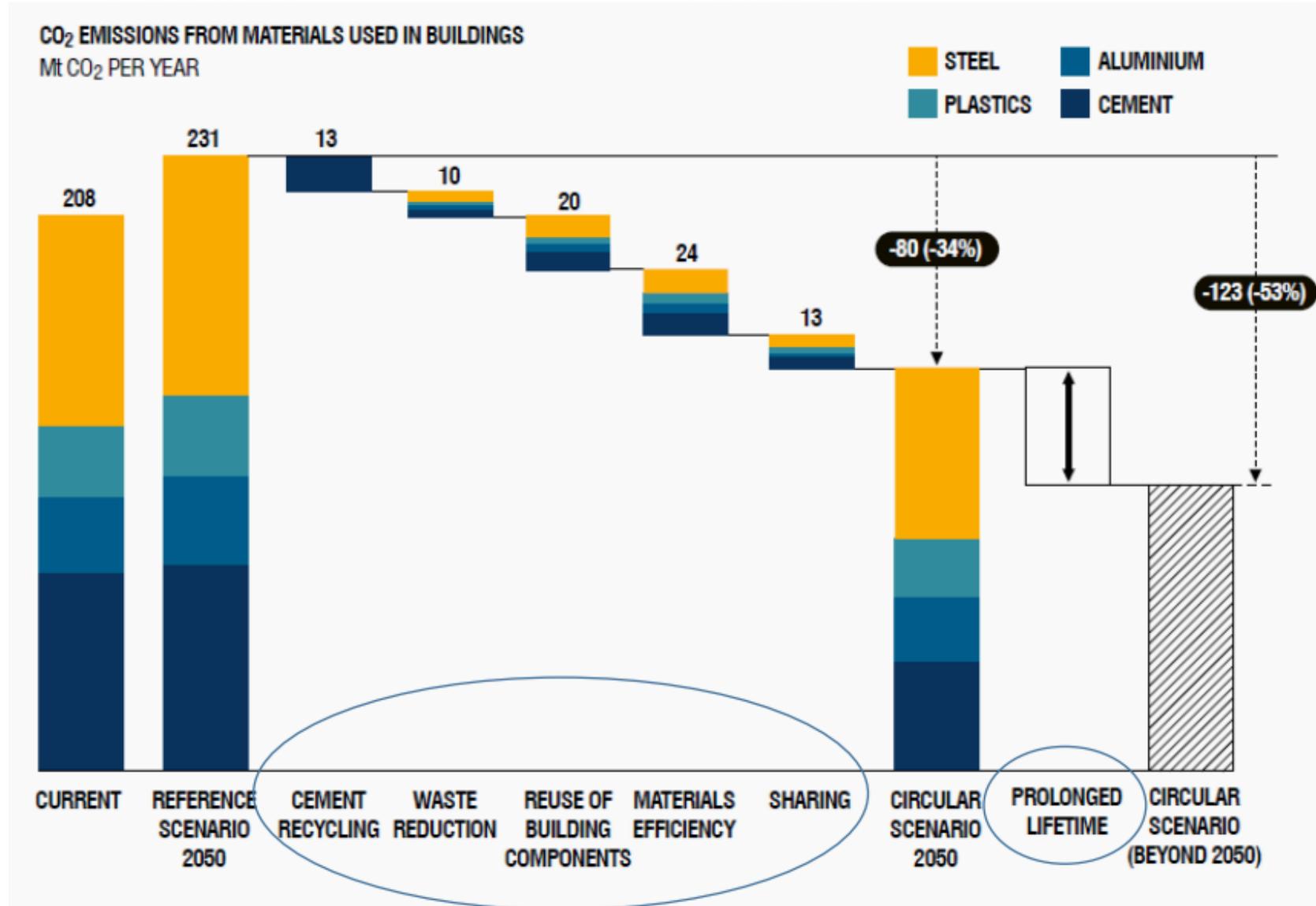
- Prevention of waste
- Extending the lifetime of buildings
- Design for disassembly
- Modularity, repairability and durability
- Use of recycled materials
- Durable, repairable and recyclable materials
- Sharing of facilities and space
- Recycling of energy and water
- Smart renovation
- Avoiding unnecessary demolition
- Sorting, reuse and recycling of demolition waste

<https://ec.europa.eu/transparency/regexpert/index.cfm?do=groupDetail.groupMeetingDoc&docid=35644>

Waste reduction is not the only government driver: emissions reduction is also key

A more circular economy can cut CO2 emissions from building materials in the European Union by 53% by 2050.

<https://www.eea.europa.eu/publications/construction-and-demolition-waste-challenges>



Whole of government response to this issue

- Climate Change Commission's recommendations – June
- Emissions budgets: Government to set the first emissions budgets 2022-2025 by 31/12/2021
- Emission reduction plan: Government to develop a plan that contains policies and strategies to reduce emissions to meet emissions budgets by 31/12/2021
- Infrastructure Commission - 30-year infrastructure strategy - late 2021
- MBIE - Building for climate change – in progress
- Carbon Neutral Government programme - public sector agencies to measure and publicly report on their emissions and to offset any they can't cut by 2025 – in progress

What is the Ministry for the Environment doing?

- Updating Waste Strategy
- Review of the Waste Minimisation Act
- Increased and expanded waste levy
- Improved waste data
- Infrastructure stocktake + 10 year infrastructure plan
- Action and investment plans
- Strategic partnerships

Increased and expanded waste levy

Landfill class	1 July 2021	1 July 2022	1 July 2023	1 July 2024
Class 1: Municipal landfill	\$20	\$30	\$50	\$60
Class 2: Construction and demolition fill (concrete, rubble, plasterboard, timber, and other materials)	-	\$20	\$20	\$30
Class 3: Managed fill Contaminated but non-hazardous soils and other inert materials (e.g., rubble)	-	-	\$10	\$10
Class 4: Controlled fill Soils and other inert materials (e.g., rubble)	-	-	\$10	\$10

2021 Waste Minimisation Funding Round

Strategic outcomes

- Reduce construction and demolition waste

Investment signals

- Re-design construction and demolition materials, products and services to facilitate reduce/reuse of resources
- Improve and enable public and private construction and demolition materials resource recovery services and infrastructure.

Pātai | Questions:



Ministry for the
Environment
Manatū Mō Te Taiao

Waste Minimisation Fund:

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Up next...



Adam Durant
Colmar Brunton



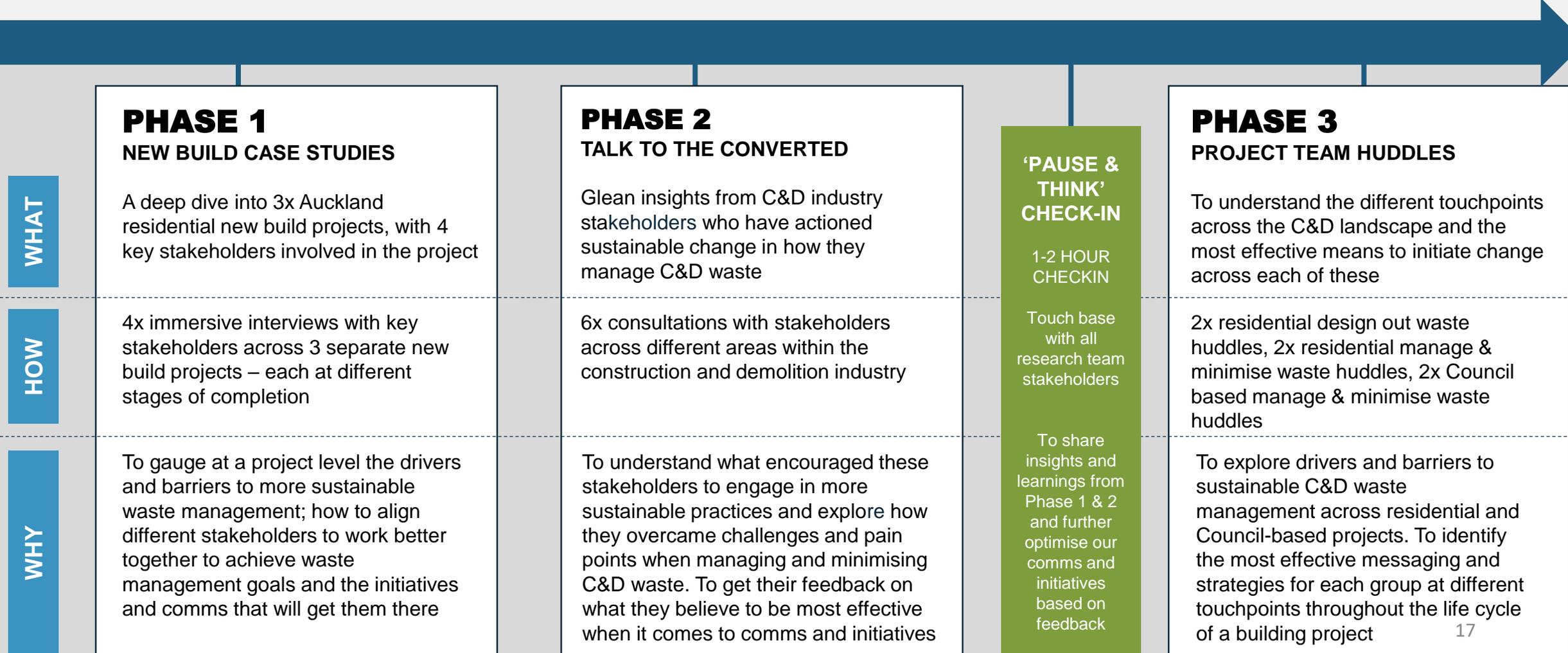
A photograph of two construction workers standing outdoors at a construction site. The worker on the left is wearing a white hard hat, a white respirator mask, and a high-visibility yellow and green safety vest over a white shirt. The worker on the right is wearing a white hard hat, sunglasses, and a high-visibility orange and yellow safety jacket over a grey hoodie. They are standing in front of a wooden fence and a building under construction. In the background, there are trees and a chain-link fence. In the foreground, there is a pile of corrugated metal debris on the ground.

BEHAVIOUR CHANGE FOR SUSTAINABILITY – Executive Summary

MAKING WASTE MORE SUSTAINABLE IN THE C&D SECTOR

What we did...

In order to effectively achieve the objectives, we conducted a three phase qualitative research project. This iterative approach enabled us to uncover insights, while at the same time refining and streamlining our initiatives and communications as we gained feedback from multiple industry players and sustainability action leaders across different build types and project stages. This multi-pronged approach ensured that our behaviour change initiatives would be both meaningful and effective for stakeholders at every level across the industry.



THE INDUSTRY CONTEXT WE'RE WORKING IN...

The industry is fragmented. On any one project there are a **number of different stakeholders** coming and going at all times

If we want to have traction we need to **go big and broad to reach all industry people** to ensure behaviour change is long term and sustained

We are working with **busy, time poor people**. We can't expect them to invest resource into something where the benefit/payoff is not clear

Everyone is under pressure, both time and money wise, so any **change needs to benefit them not us** – if it's not **tangible and substantial** they're not interested

There's **no silver bullet for changing behaviour** around C&D waste. Change will need to be **incremental**, supported **external market structures** and **backed by regulation**

Any change needs to **clearly articulate the industry benefits**, ensure **external market structures in place** that provide the capability to act sustainably, and **be backed by regulation**

SPOTLIGHT ON SUSTAINABILITY

The C&D environment doesn't enable people to live by their values like they can at home...

People **feel guilty** about their unsustainable behaviour but also **feel like their hands are tied** - there are no viable alternatives. This has **created a social norm of behaviour** within the industry which justifies inaction

There's a heightened sense of risk when it comes to sustainability... but no sense of reward

Counter risk with reward: **1. Make the uncertain certain** (cost/benefit). **2. Clear pathways** (processes/support/risk mitigation). **3. Reward for effort** (financial/ commercial benefits)

It's easy to justify not taking ownership of C&D waste – it's always someone else's problem (home owner/ design team/ PM/ project team)

When nobody feels fully responsible, blame becomes spread out/ diluted. **If we want people to take interest in managing waste effectively, we need to provide strong financial incentives to do so**

C&D waste isn't top of mind when considering sustainability in the industry. When homeowners think about it they're thinking about aesthetics / efficiency – waste isn't on the radar

This is a matter of education. Once homeowners are made aware of the connection they get it. But they need to be told.

There's no silver bullet for changing behaviour around C&D waste

It needs to be **incremental** (prime/ educate/ build), **layered** (multiple initiatives), **supported** (external market structures) and **top down** (people don't have the time/ resources/ inclination to initiate themselves)

BUT... People in the industry are willing... There's an emotional connection... It's something that they're implementing in their home lives... And it's driving day to day choices

Almost everyone we spoke to accepts that **sustainability is a problem that needs to be addressed.** And some people are **creating their own workarounds** (stock piling / selling additional materials)

TO OVERCOME THE BARRIERS TO SUSTAINABLE BEHAVIOUR CHANGE... 3 KEY PRIORITIES NEED TO BE MET

Time is where money can be won or lost – any new initiative needs to show a tangible financial benefit against the time invested

Money trumps all – it's the first consideration when any change is presented - the dollars need to stack up!

There needs to be external support for people to change their ways – the alternate solution needs to be EASY to implement and financially viable



Any proposed changes will be ultimately dismissed unless justified against one or more of these three proof points

These **three priorities** and sustainable waste practices are seen as being at odds with one another, which is a major deterrent to change



The **practicalities** of managing waste sustainably **takes more time, costs more money and requires more effort**



And this is further exacerbated by a **fear of the unknown...** and feeling that they're being burdened with the responsibility and cost of implementing change

“Why should it all be on my shoulders? There's only so much more we can do before we end up out of pocket and out of business”

TO UNDERSTAND THE JOB TO BE DONE – ALL ASPECTS OF A C&D PROJECT LIFECYCLE MUST BE CONSIDERED



Proof/ Efficacy	Contracts	Regulation	Project Team	Social Norms	The Site	Services	Materials
<p><i>“The jury is out on whether there is money to be made by managing waste effectively”</i></p> <ul style="list-style-type: none"> No established reporting system to show efficacy No case studies Cost of numerous bins = high Need substantial waste to justify separating/ diverting Single build – 1 skip works best 	<p><i>“Just because it’s in the contract doesn’t mean it will be enforced”</i></p> <ul style="list-style-type: none"> Contracts being skim read Contractors doing it their way/ as it’s always been done Low awareness of new clauses in contracts (within / outside council) e.g. REBRI No checks on contract adherence/ accountability 	<p><i>“C&D waste is a regulation free zone, nobody’s checking”</i></p> <ul style="list-style-type: none"> No regulation beyond separating concrete/ brick/ soil Personal preference rather than enforced (whether added to contract) No incentive/ fines to influence behaviour Who’s job is it to regulate? No feedback loop for reinforcement 	<p><i>“I would like to do more but it’s out of my hands”</i></p> <ul style="list-style-type: none"> People agree that change is needed in C&D industry, BUT... No incentive to actively think about it Nobody doing it dilutes responsibility Nobody knows what happens waste once it leaves the site – not being confronted Homeowner not involved in decisions around waste 	<p><i>“It’s hard enough for me as woman in a site meeting to hold my place besides bringing up waste management... I’d be laughed at”</i></p> <ul style="list-style-type: none"> Being a zero waste company / organisation / tradie is not on trend Doesn’t have the crisis factor like plastic e.g. straws Lack of media spotlight Lack of awareness of the accumulative extent of situation 	<p><i>“The site itself is one of the greatest barriers to implementing changes”</i></p> <ul style="list-style-type: none"> Only enough space on site for one bin No storage available for off-cuts/additional materials – easier to throw away/ buy again later Number of stakeholders involved makes it difficult to implement / coordinate a system 	<p><i>“There’s no services out there that I know of, if I want stuff taken off my hands it’s one more job”</i></p> <ul style="list-style-type: none"> External market structures needed to support change don’t exist or are in their infancy Low awareness of services that accept / pay out for unwanted materials beyond scrap metal Price for scrap can be too low – not worth the effort 	<p><i>“We need to deal with recycling like we do with at home”</i></p> <ul style="list-style-type: none"> New materials need to solve a real problem to be considered - waste is not a ‘problem’ Designers not using ‘standard’ sizes No return on products once opened/ multiple layers of packaging Stewardship schemes not widespread/ low awareness

COUNCIL CAN PLAY AN INTEGRAL ROLE IN DRIVING INDUSTRY CHANGE... BUT THEY CAN'T DO IT ALONE



Proof/ Efficacy

Contracts

Regulation

Project Team

Social Norms

The Site

Services

Materials

- **Case studies as proof points** for how it can be done / how money can be saved through more sustainable practices
- **Provide project specific case studies** that detail exact financial returns
- **Step by step guides and links to resources/suppliers**
- **Partnerships with education / industry leaders is a MUST** for credibility, quality control and reach e.g. MBIE, Unitec, BECA

- **Drive usage of WARR (Waste Avoidance and Resource Recovery Plan)** for construction contracts with a clear incentive for implementation
- **A culture of ignoring contracts** and avoiding the repercussions due to time constraints means that policing / enforcement will be key to ensuring adherence / entitlement to incentives

- **Positive reinforcement:** Incentivise desired behaviours in a way that encourages team work/breaks bad habits i.e. points system, construction site rewards,
- **Negative reinforcement:** Rule enforced across every site with regular onsite checks and monitoring and penalties for behaviours not in line with sustainability protocols

- **Raise the alarm bells...** make real what people have conveniently chosen to ignore
- Enable people to make the change by **showing them how to do it**
- **There is high appeal for making sustainable practices part of training compliance**
- **Arm home owners** with the right info/empower them to have waste discussion with their builders e.g. Building out Waste

- **We need a culture change like what happened with H&S**
- We need to **create the same emotional intensity** toward waste that people feel toward sustainability in general
- **Clearly communicate the impact C&D waste** has on climate change, NZ streams and what making a change can do for the environment

- **An onsite waste management mental shortcut system** to drive/ engrain positive behaviours easily
- **Use the domestic system as a starting point** for best practice for on site waste management
- **Multi bin options that work for small sites** – a colour code system as per domestic waste, extended to include other C&D waste
- **Skips with multiple compartments**

- **Support the growth of external market structures** – entrepreneurialism in the C&D Waste space
- **Growing the skills needed** – e.g. expert deconstruction in a quick time frame
- **Encourage contractors to provide more than one option** of pricing/ services for waste management and let the customer decide
- **Drive awareness of CivilShare App**

- **Education around the minimisation of materials in the planning stages.** Design around standard material sizes to reduce wastage
- **Designs using standard product sizes** can help with wastage of both product and budget
- **Working with suppliers to reduce waste on packaging without putting material at risk / return packaging**

FOR FURTHER INFORMATION PLEASE CONTACT

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Up next...



Paul Young
Twin Solutions





Sustainability and Innovation Report

Junk Run Ltd

Client	Twin Solutions Ltd
Date of project	2 nd October 2020 to 27 th April 2021
Location	3 Beaconsfield St, Devonport, Auckland 0624, New Zealand.

Junk Run's mission is to send junk to a better place through innovation, sector collaboration, smart business processes, a focus on commercially sustainable business, and a strong environmental philosophy.

JUNK RUN
HOME • COMMERCIAL • CONSTRUCTION



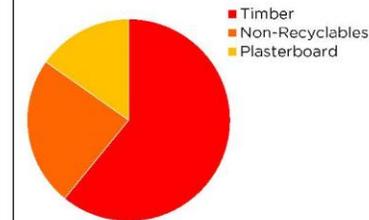
Sending your junk to a better place!

Twin Solutions Ltd

achieved **76% diversion of waste** from landfill.

This was made possible as a result of your smart and sustainable choice to join the waste revolution with Junk Run.

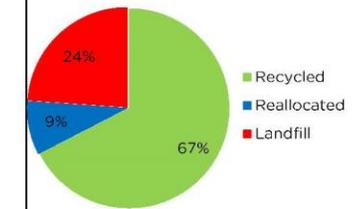
Junk Run collected a total of **46 m³** of materials, totalling an estimated **9.2 tonnes**



Breakdown of materials collected (m³)

- 28 m³ of timber collected, 24m³ recycled and 4 m³ reallocated into the community for reuse
- 11 m³ of non-recyclable waste sent to landfill (predominantly comprised of sweepings)
- 7 m³ of Gib recycled

Junk Run successfully diverted **35 m³**, weighing an estimated **7 tonnes** away from landfill



Diversion

- 5 m³ of material was reallocated
- 83 m³ of waste was recycled

Junk Run Innovation

- This Diversion rate was achieved by sorting, separating and diverting the items to our strategic partners to be recycled.
- Junk Run had our full team of people working across 8 accumulative labour hours within the 6 collections.
- Junk Run has a strong environmental philosophy and is constantly striving to find smarter ways to reduce waste to landfill.
- By continuing to use Junk Run for all your inorganic waste needs you're not only doing the right thing for the environment and the community, but you will also have great stories to tell your stakeholders.

Health, Safety and Environment notes:

- There were no health, safety, or environmental concerns.

Signed as a true and correct* by Ruth Boyes General Manager  and Fionna Gotts CEO 

*All data comes from our real time recording system after manual sorting, separating and loading by our trained team.

Thank you for sending your junk to a better place!



Up next...



Emma Foulkes
McConnell Dowell
&
Michael Backhurst
City Rail Link



City Rail Link building New Zealand's biggest transport project to date

Building Out Waste 2021: Tackling waste in construction and demolition

Date: 29 April 2021



**MCCONNELL
DOWELL**

6 YEARS of Creative Construction

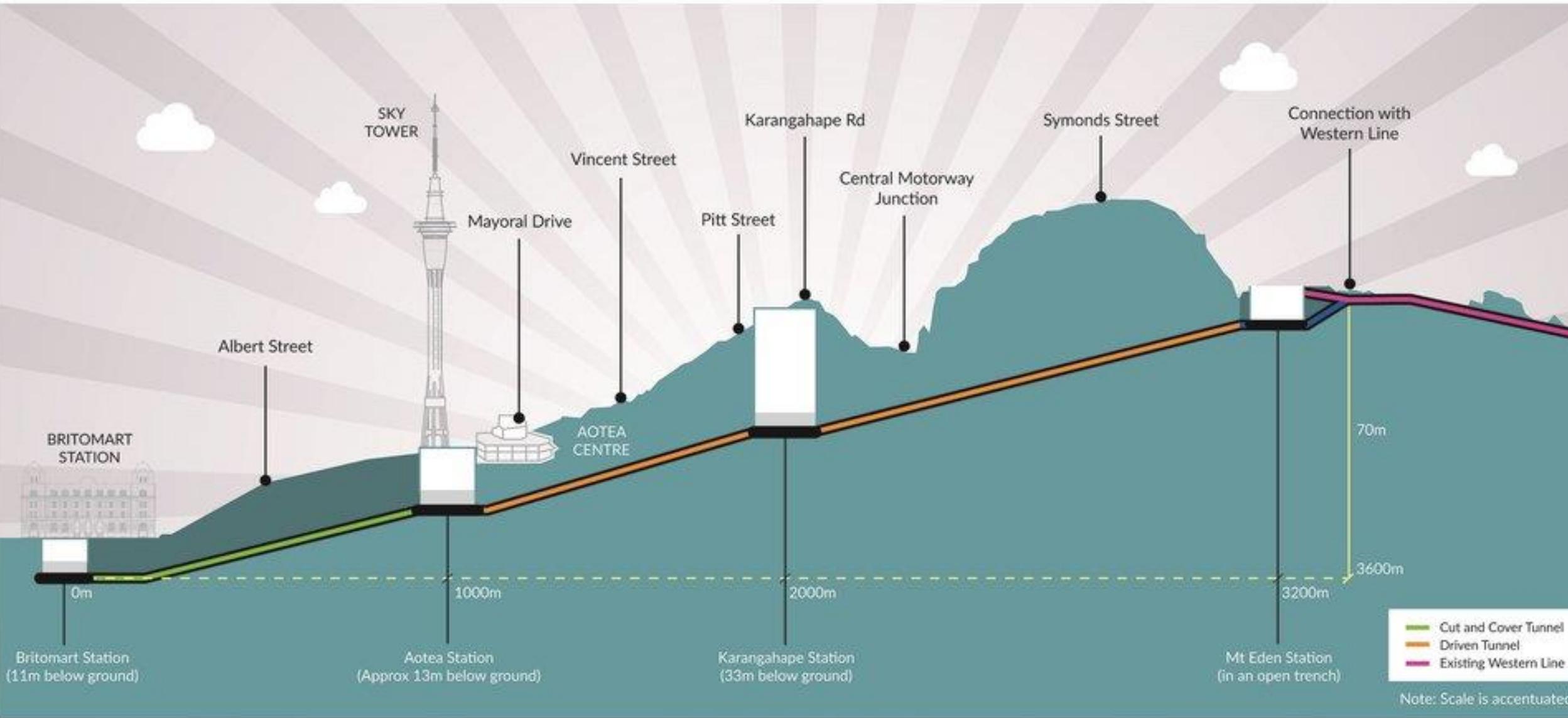


CRL/Underground Track
 Existing Track
 New/Redeveloped CRL Stations
 Existing Stations

CityRailLink.co.nz

cityraillink

Overview of the City Rail Link



CRL Contracts



Currently Already Let/Under Construction:

- Contract 1 - Britomart Station/Lower Queen St
- Downtown Shopping Centre (DSC)
- Contract 2 - Albert St (Customs to Wyndham St)
- Contract 6 - Mt Eden Stormwater Main

Contract 3 - Alliance:

- Stations and Tunnels
- Western Line connection
- Rail Systems

- Contract 9 - Britomart East

Wider network improvements (not shown):

- Strand & Otāhuhu improvements
- Newmarket improvements
- Henderson improvements

Drone footage of C2 site



The statistics – waste diversion on C2



Spoil



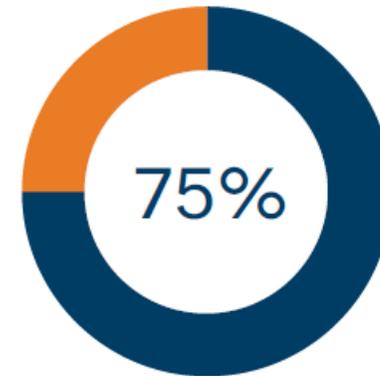
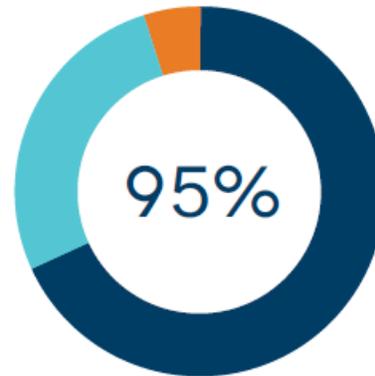
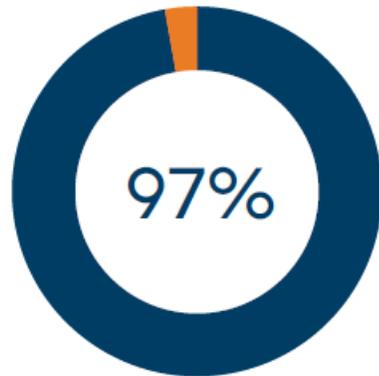
Construction & Demolition



Office Waste

Total %

C2
176,947
Tonnes



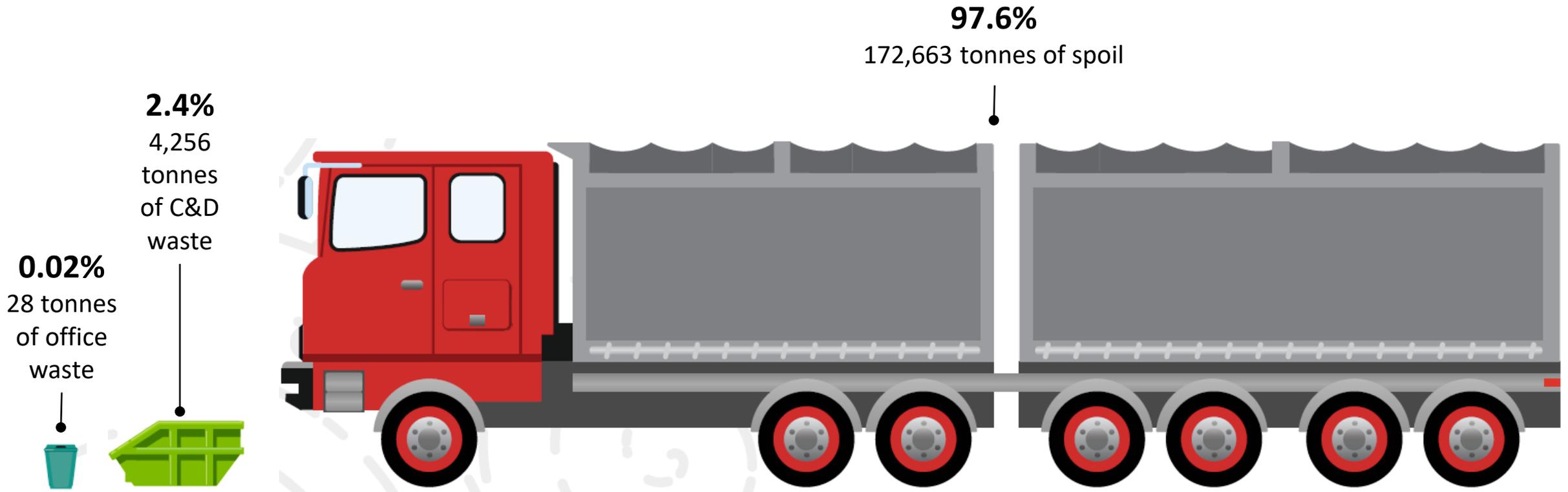
97%

■ Recycled ■ Reused ■ Landfill



The statistics – waste diversion on C2

- Spoil is by far the biggest source, followed by construction and demolition (C&D)
- Office waste is a very small fraction of total waste
- ALL CRL projects have produced over 600,000 tonnes of waste (to date)



Key Client Objectives

- Embracing the Auckland Council zero waste vision
- ISCA/IS rating driving consideration of infrastructure sustainability on all aspects of the project, including waste management
- Early Contractor Involvement (ECI) - requirement to produce a Waste Avoidance and Resource Management Plan (reviewed annually)
- Contractual Key Result Areas (KRAs) - including minimum IS rating and waste diversion targets:
 - Spoil – 95% diversion
 - Construction and Demolition (C&D) waste – 90% diversion
 - Office waste – 60% diversion
- Monitoring and reporting
 - Monthly site audits
 - Monthly contractor reports including progress against waste targets



The Waste Hierarchy





Hazardous Materials / Substance	Specific task / activity it is required for
PVC Solvent Cement	PVC Pipe Joining
Epoxy Resin for Chemical Anchoring	Chemical Fixing of Fittings

Note: the above list is not intended to be exhaustive, and is limited to the scope of work as identified at the time of the Risk Register Workshop.

13 SUSTAINABILITY

The works will consider opportunities to improve sustainable outcomes during planning, design, procurement and delivery of the works in accordance with the Sustainability Management Plan.

Table 13A Opportunities for Sustainability

Opportunity/ Initiative	Feasibility
Existing Basalt Kerb Blocks are to be removed and cleaned and made available or re-use to Auckland Transport	Feasible and allowed for in current pricing schedule with sub contractor
Existing Street Furniture to be removed and returned to asset owner for re-use where possible	Feasible and allowed for in current pricing schedule with sub contractor
Removal of Hoarding Skins and providing to the client for re-use	Feasible
Eliminate 3% addition of cement to base course layer	Feasible – already approved for trench profile where structural fill has been placed to deep level
Place new services in existing trench profile – reduce construction effort for placing new services in crowded footpath	Possible – need to liaise with asset owners
Use recycle Water to fill up Water Filled Traffic Barriers	Feasible for as long as treatment system is in place and hoses can reach barriers.



REUSE



REUSE



CIVIL SHARE

Search all listings

CATEGORY: None

LOCATION: [input field]

SORT: Latest

SELL/HIRE: All

PRICE: Minimum Maximum

	AUCKLAND Maxi Culvert Connectors \$POA
	AUCKLAND x3 Maxi culverts 375mm ID \$POA
	AUCKLAND 2x Maxi culverts 450mm ID \$POA
	AUCKLAND Concrete pipes \$POA



RECYCLING



Keys to Success & Lessons Learnt

- Education
- Be open to opportunities identified along the way
- Measure and monitor
- Embed into procurement
- Improve onsite separation to utilise product stewardship schemes

CONNECTUS SITE REPORT

Name: Gareth Company: F/S
 Date: 10/07/20 Time: 12:20

Hazard Environmental
 Good Stuff Suggestion

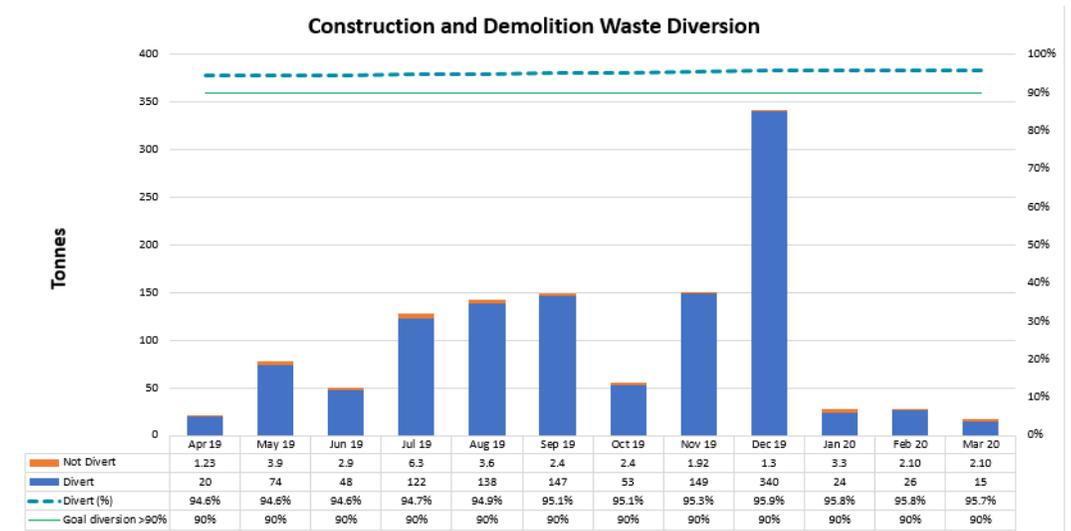
What did you see?
 Organised with Local mp adriana christie to pick up 7 pallets. she will re use them to make furniture and donates money to charity. will organise again for the future

Where did you see it?
 wolf street

What did you do about it?

Do you believe this card requires further action?
 Yes No

PLEASE HAND THIS CARD TO YOUR SUPERVISOR



Wrap-up

Learnings from C2 project applicable to ongoing CRL projects and construction industry:

- Waste Avoidance and Resource Management Plan driving good waste management throughout project
- Buy-in and education of all staff on importance of waste hierarchy (from senior management to workers on site)
- Consideration of waste avoidance and re-use (especially during procurement)
- Client audits (including regular site visits)
- Set challenging (but achievable) waste targets, ongoing reporting and monitoring against these
- Integrate waste objectives and prompts into existing systems and documentation e.g. audits, inspections
- Don't give up on making suggestions and putting options in front of clients



The statistics – waste diversion on C3



Spoil



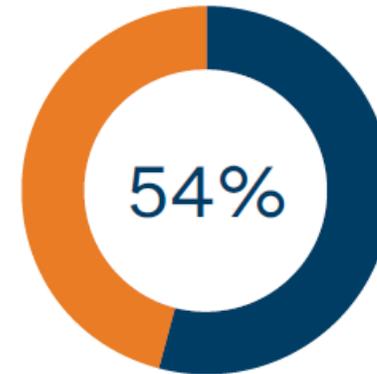
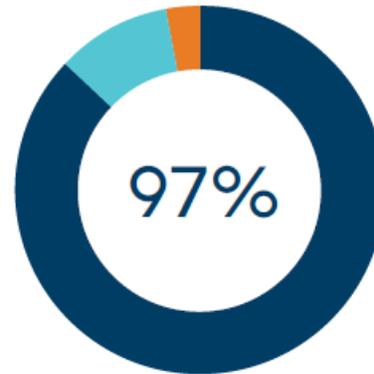
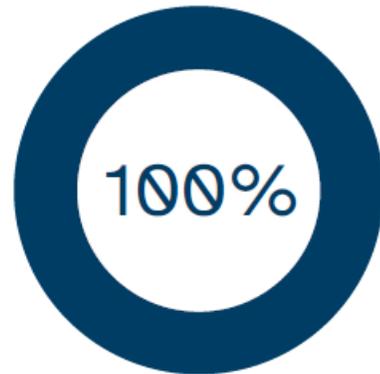
Construction & Demolition



Office Waste

Total %

C3
323,297
Tonnes



99.6%

■ Recycled ■ Reused ■ Landfill





CityRailLink.co.nz



CityRailLink

**M^cCONNELL
DOWELL**



**of Creative
Construction**

mcconnelldowell.com



Up next...



Rachel Trinder
Kāinga Ora



Building out Waste 2021

Rachel Trinder

Waste Minimisation & Site
Clearance Lead



Introduction... Rachel Trinder

Waste Minimisation Site Clearance Lead

- Newly created role sitting under both Sustainability and Building Innovation and Standards teams within Construction and Innovation Group.
- Oversee shift in disposal of Kāinga Ora homes from demolition to relocation and deconstruction to ensure delivery on organisation environmental and sustainability goals.
- Set and monitor waste minimisation targets across demolition and construction activity
- Create and monitor construction waste minimisation, relocation, deconstruction and demolition procedures/policies for the organisation.



More information on our sustainability team and goals can be found on our website

<https://kaingaora.govt.nz>



Kāinga Ora Site Clearance Waste Minimisation Programme

Sustainability Goals

- Sustainability is a key priority of our construction strategy document Building Momentum – our construction plan for future homes.
- What's more our legislative requirements relating to the environment are outlined in the Kāinga Ora Homes and Communities Act 2019 and the Climate Change Response (Zero Carbon) Amendment Act 2019.



Sustainable communities



Quality and affordable



Partnering with Māori



Dignity and independence



Environmental wellbeing



System transformation

Driving sustainability through site clearance

- Kāinga Ora has adopted the waste minimisation hierarchy within our redevelopment site clearances, thereby committing to relocating existing homes as the first option, followed by deconstruction and then demolition (with landfill diversion clauses in place) .
- We no longer refer to the word ‘demolition’ and have changed the title of our procedures to ‘site clearance’ as demolition is no longer the sole methodology we use to clear our sites.
- We have set a target to divert 80% of site clearance materials (*by weight*) from landfill on all redevelopment projects in Auckland. Diversion targets for other regions will follow.
- Our relocation programme also has a national target to relocate 7% of houses (from redevelopment areas).



“Working together with our partners, we need to ensure our homes are not only sustainable in their built form, but also in terms of how they are lived in, and how we will take them down one day.”

A Diversified Contractor Panel

- A new site clearance panel will be established in May. It contains three subcategories being house relocation, deconstruction and demolition contractors.
- It follows extensive engagement with industry partners whose feedback supports the need for change within the industry.
- The panel contracts contain waste minimisation targets, landfill diversion reporting requirements as well as the introduction of Broader Outcomes clauses. In this way, our developments have a positive enduring legacy, both in terms of the industry and local communities.
- A request for information for those interested in joining our regional deconstruction panel will be released shortly. We will seek to find out about local capability, as well as key infrastructure and capacity constraints. Together, we aim to help the industry develop and grow for the benefit of future New Zealanders.



Partnerships are critical if Kāinga Ora is to support greater sustainability within the Industry.

Success through deconstruction pilots

- Recent Kāinga Ora deconstruction pilots exceeded expectations. The first project, at Martin Ave, Mount Albert, deconstruction company Green Way achieved **85%** diversion from landfill (surpassing the **80%** target)
- The next two projects, Highbury Triangle and Elm Street were managed by deconstruction company TROW Group. Both these Avondale projects saw approximately **90%** of materials diverted from landfill.
- At Highbury Triangle, labour totalled 8,956 hours and at one point there were 44 workers on site. Despite this, the project was completed two weeks early and costs were comparable to traditional demolition costs.

Broader Outcomes through deconstruction

- The benefits of the Highbury Triangle and Elm Street pilots went far beyond waste minimisation, cost and timeframes. TROW Group employed five locals to work on the projects and sent thirteen 40 cubic metre shipping containers of reusable materials to Tonga. These materials either helped re build schools, churches and houses in cyclone prone areas or were sold to benefit Tongan communities.
- TROW Group also ran a pop up market at Elm Street, during the Highbury Triangle deconstruction stalls were provided for free, with the aim of promoting Pasifika and Maori businesses while encouraging sustainability and entrepreneurship.



Next Steps

Site Clearance Waste Minimisation

New Policy and Procedural Documents Finalised and Published

New Site Clearance Panel contractors sign new contracts and are Inducted into Kāinga Ora.

Landfill diversion reporting data is collected and monitored

Construction Waste Minimisation

Formal Construction Waste Minimisation Programme Plan is to be established.

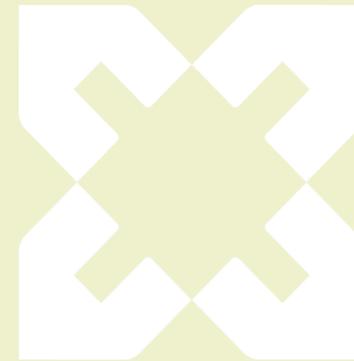
Plans to address all phases where waste is produced, starting at design.



Q & A

*Additional questions can be submitted to:
rachel.trinder@kaingaora.govt.nz*

**Ngā mihi
Thank you**



Up next...



Tara Moala
Tamaki Regeneration
&
Adrienne Mendes
iConstruct



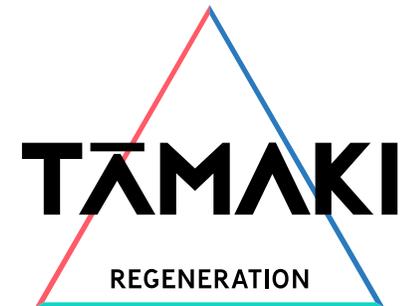
REPURPOSING TĀMAKI HOUSES

APRIL 2021

OUR SPEAKERS TODAY:

Adrienne Mendes (iConstruct)

Tara Moala (Tāmaki Regeneration)



TRC ASPIRATIONS

September 2020:

To trial deconstruction and refurbishment on four of our old houses, to understand if they are viable options to include in our programme.

February 2021:

For as many of our old housing stock to be repurposed as possible.



Our Phase 1 Partners



**INDEPENDENT
CONSTRUCTION**
iconstruct.nz



**Tara Moala –
Service and System Designer**



**Glen Harding-Ruma – Director
Adrienne Mendes-Underwood – Project Manager**



Our Phase 1 Partners



Richard Hutchinson – Co-owner / CEO
Pete Rowlands – Operations Manager



Claude Dewerse –
Founder / Director



Mark Roberts -
Senior Waste Planning
Advisor

Relocation of houses



Relocation of 112 Taniwha St

- 112 Taniwha St**
- 1950's home
 - 100 m²
 - 2-piece move
 - Deconstructed



8 Concord situated on piles

- 8 Concord Pl**
- 1980's home
 - 84.7 m²
 - 3 bedroom
 - 1-piece move



Relocation of houses to Tainui Rd Yard

- 16B Concord Pl**
- 1980's home
 - 78.4 m²
 - 2 bedroom
 - 1-piece move

Refurbishment Process



Protecting floors



Wallpaper stripped, walls sanded, lined and painted



Exterior of 8 Concord PI

Refurbished houses

8 Concord Place



16B Concord Place



<https://relocatablehouses.co.nz/>

Deconstruction Process



112 Taniwha St
1950's Native Timber-built home

- Safety 1st Removals
- Deconstruction was simple



Day 3 of deconstruction

- De-nailing, itemising and stacking timber took most of labour time



Some of the salvaged material

- Rimu
- Matai cladding
- Tawa Flooring
- Wooden windows and doors

Health and Safety

Integral to the project

- H&S Management Plan – with help from Envision
- SSSP
- JSAs for all activities
- ConstructSafe Training for students
- Weekly toolbox talks



The project has reported no injuries or incidents

Benefits

Social

Refurbishment:

- Work experience for Tāmaki College students
- Work for local contractor
- Generating income for local business



Deconstruction:

- Work experience for students and construction professionals
- Work for Māori/Pasifika contractor – Safety 1st Consultants
- Generating local income from recovered material
- Potential to supply new salvage yard hoping to be set up in Tāmaki

Benefits

Cultural

- A sense that the homes are not going to waste
- Giving the houses and people associated with them, the dignity they deserve
- Furniture made from deconstructed material
- Finding opportunity in the face of change

Environmental

- Repurposed 2 x houses
- Deconstructed 1 house and distributed materials
 - Primarily wood
 - Windows



The Blessing

Learnings

Refurbishment

- Choose houses carefully and be prepared
- Lead-in time prior to tenant vacating is key
- Balancing financial and social outcomes

Deconstruction

- Deconstruction is very doable
- Processing of material needs additional skills
- Confidence in NZ native timber market



When dealing with a complex system, it is better to conduct a range of smaller innovations and find ways to constantly evaluate and learn from the results and adjust the next steps rather than to work to a set plan.

<https://learningforsustainability.net/post/complicated-complex/>



NEXT STEPS

- **Creating a new system where every possible Tāmaki house will be repurposed** - that will place social, environmental and community outcomes at the forefront of the Construction + Demolition Industry.
- Share our experience and learnings with others in the C+D industry, encouraging as much shifting in the current system as possible.



Up next...



Annette Day

Naylor Love

&

Terri-Ann Berry & Linda Kestle

Unitec

&

Julie Roberts

Mitre 10



PLASTIC MINIMISATION CONSTRUCTION PROJECT

A RESEARCH GRANT FROM AUCKLAND COUNCIL'S WASTE MINIMISATION INNOVATION FUND (WMIF)

LINDA KESTLE, TERRI-ANN BERRY, GERMAN HERNANDEZ, ANNETTE DAY, SIMON BURDEN & JULIE ROBERTS



TACKLING WASTE ISSUES

- The Opportunity:
 - Waste Minimisation Group organised by Sustainable Business Network (SBN) and Auckland Council
- Funding:
 - Waste Minimisation Innovation Fund (WMIF)
- Plastic Minimisation Construction Project (PMCP)
 - Aims
 - Duration – February 2020 – June 2021



THE PROJECT

- The Team
 - Linda Kestle (Principal Investigator)
 - Terri-Ann Berry (Director ESRC)
 - German Hernandez (Research Assistant)
 - Ashveen Nand (Plastics Analyst)
 - Annette Day & Callum Morrison (Naylor Love)
 - Simon Burden & Julie Roberts (Mitre 10)
 - Steve Grace (Green Gorilla)



MITRE 10





NAYLOR LOVE

PILOT PROGRAMME – PLASTIC COLLECTION

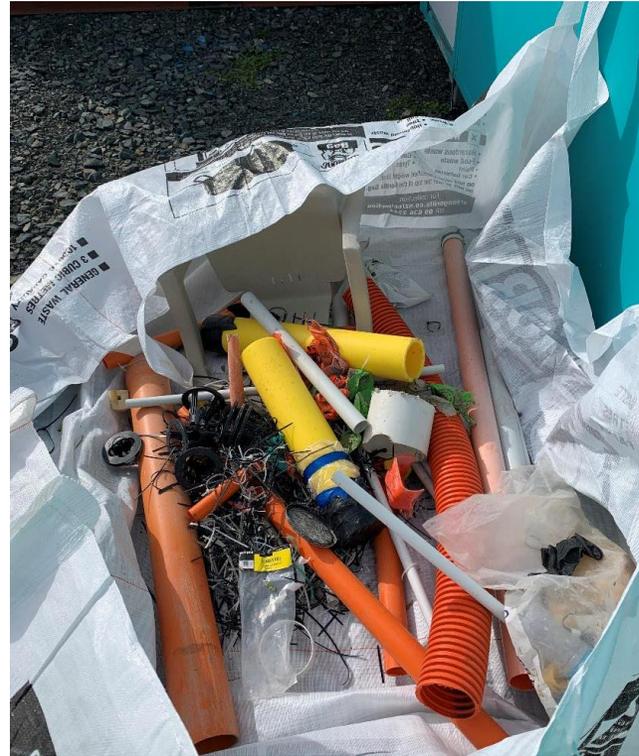
- Sustainable Strategy 2020 – Concentration on waste management
 - Improve – waste partners and on-site management of materials
 - Reduce construction waste to landfills.
- Construction plastic – one of worst single stream waste materials
 - Unable to fully recycle,
 - Reuse = remade into further plastic products,
 - Will not breakdown.
- Naylor Love Staff:
 - Do not feel good about waste,
 - Want to do something but think it will cost more to create “waste avoidance” mentality.
- Proved collection of plastic construction waste as a single stream is possible.
- Remove plastic packaging on bought materials by buying better.



COLLECTED CONTENTS



On-site collection



On-site collection contents



Team at Audit I



Audit I



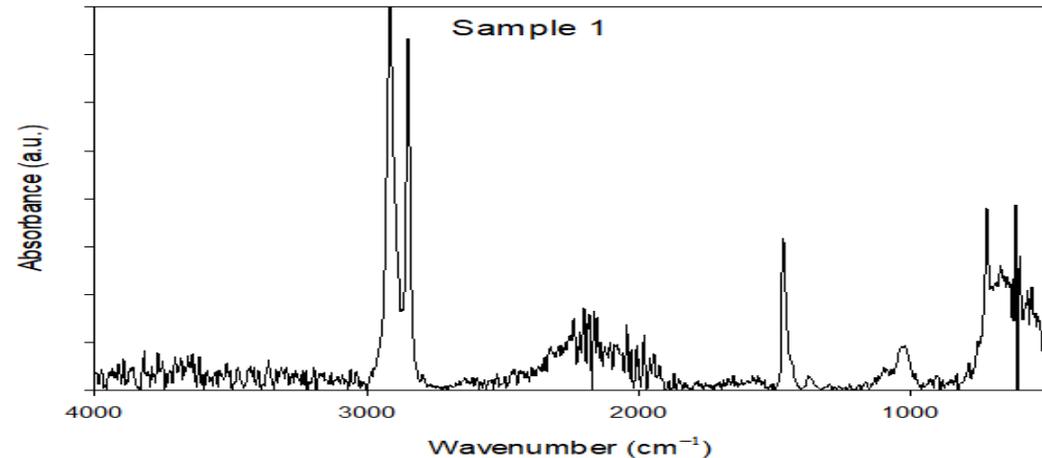
AUDIT I – THE RESULTS & SCIENCE OF IT

PROJECT METHODS

- Placement of plastic specific bins on 3 of Naylor Love's construction sites.
- Monthly progress meetings with the team at Naylor Love's offices
- Two separate audits and analysis of plastic types and volumes.
- Literature review and draft report underway, as research and results progress.



AUDIT I – SPECTROPHOTOMETER CHARACTERISATION

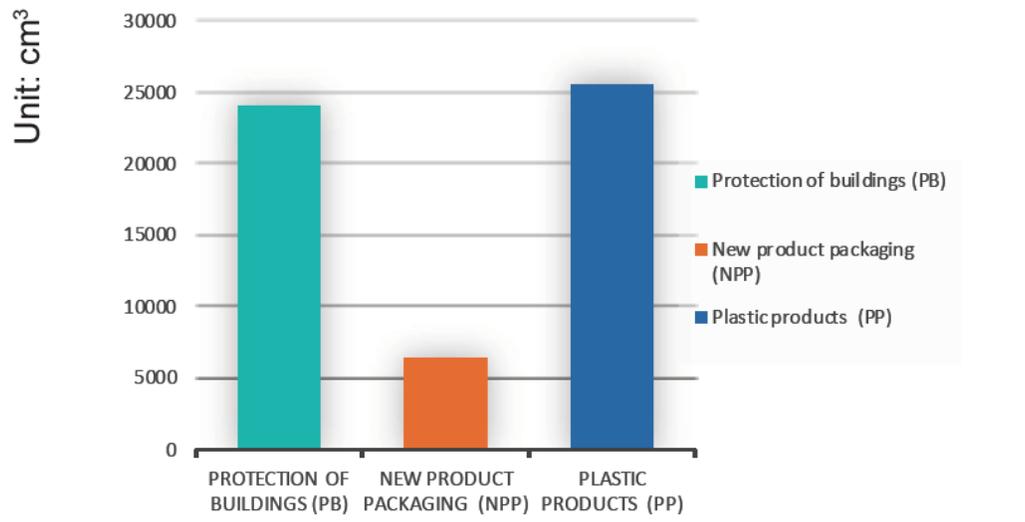


- Samples were characterized using a Bruker Vertex 70 FTIR spectrophotometer.
- The spectra of the samples were recorded as an average of 16 scans.

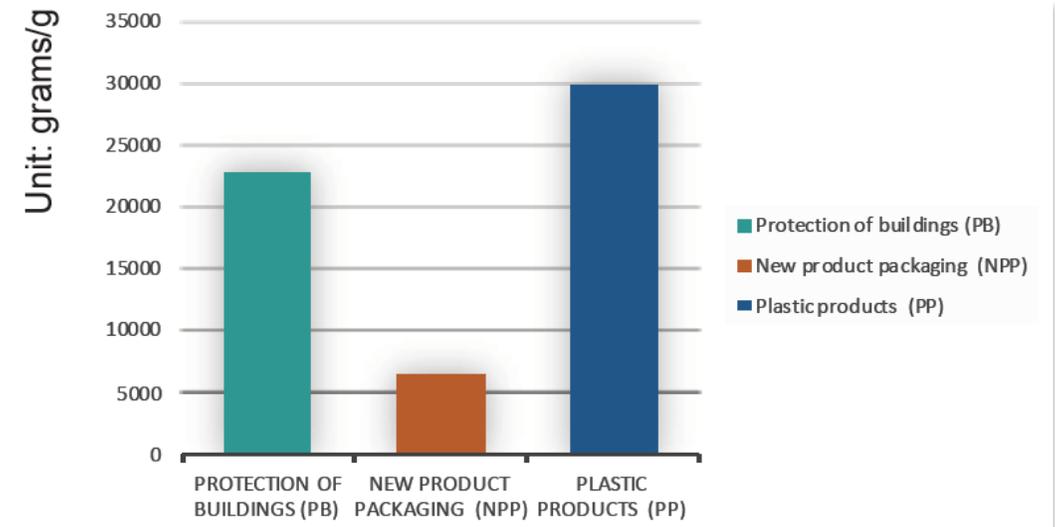
- Polyethylene (with ethylene-vinyl acetate)
- Prominent FTIR features 2920, 2850 – C-H stretch
- 1470, 730 – CH₂ bend, rock
- 1000 – C-O stretch

AUDIT I – PLASTICS WASTE GENERATION

Plastic waste **VOLUME** generated on construction sites by use



Plastic waste **MASS** generated on construction sites by use



Plastic waste quantification

Type of Plastic	Total Volume (m ³)	Total Mass (kg)
PE	4.6 × 10 ⁻²	43.1
PP	7.36 × 10 ⁻⁴	0.67
PVC	1.4 × 10 ⁻²	19.1
PA	5.07 × 10 ⁻⁴	0.67
Total	6.1 × 10 ⁻²	63.5



MITRE 10

SUPPLY CHAIN INVOLVEMENT & IMPACTS

- Were sending excessive amounts of plastic to customers.
 - Either – do not know how to refuse the plastic,
 - Or – thought it was normal for the NZ building and construction industry.
- Mitre 10 Tradehub: (*online customer portal*)
 - Option built where customers had to choose to have materials wrapped and packaged in plastics.
- 12-months & 13,091 online trade orders later:
 - 97% - supplied unwrapped,
 - 3% supplied wrapped.
- Change can be made when there are people passionate enough to care and ask simple questions.





IMPACTS & NEXT STEPS

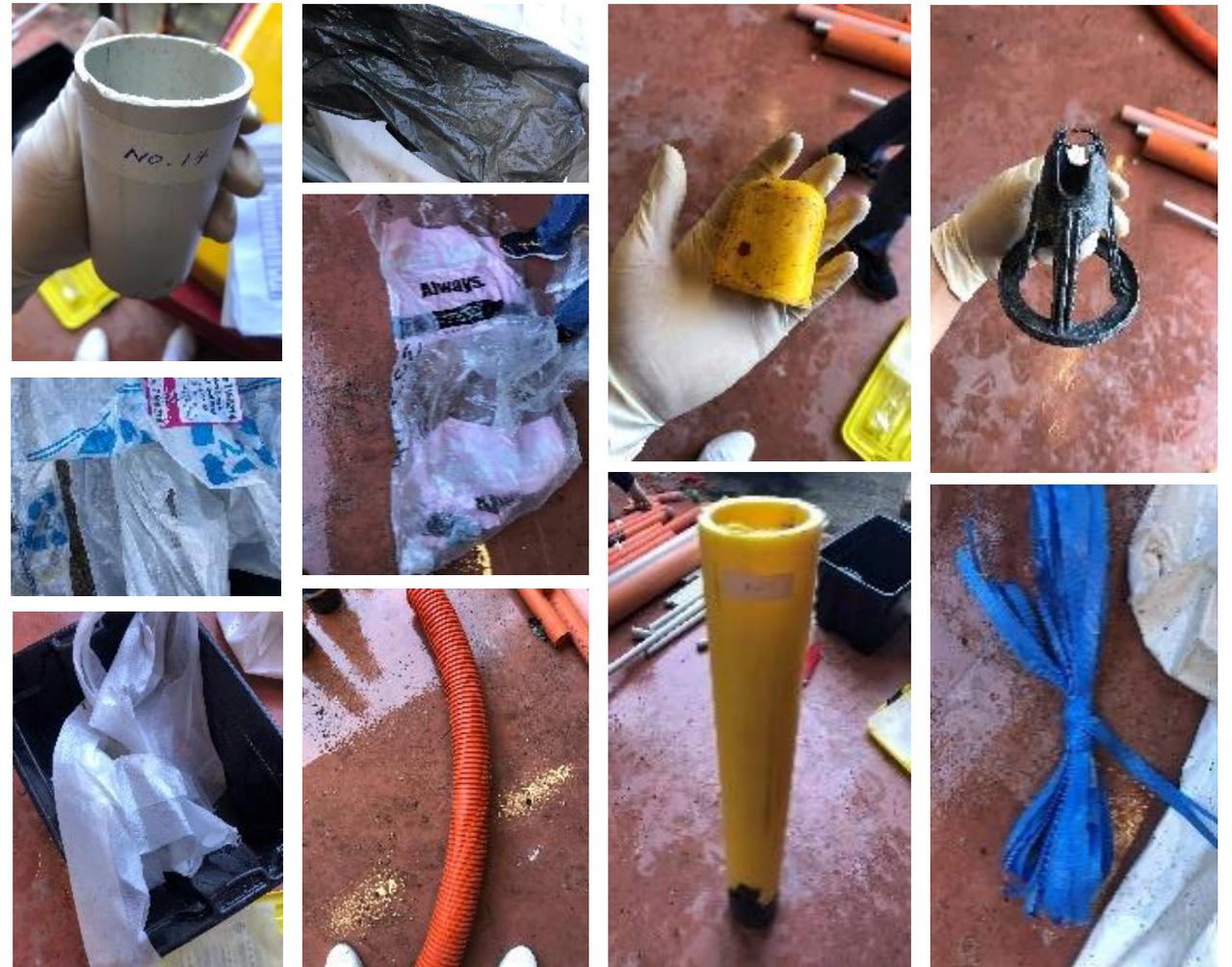
INDUSTRY IMPACTS

- Naylor Love successes:
 - Design and trial of permanent plastic collection bins (with Unitec collaboration),
 - Training and information posters for Naylor Love's staff on- and off-site.
- Mitre 10 successes:
 - Supply chain changes around plastic packaging.
- Strong connections and relationships built
 - Annette Day & Naylor Love,
 - Simon Burden – Mitre 10, and
 - Steve Grace – Green Gorilla.
- *Special thanks to Annette Day – For her personal and professional drive to minimise plastics going to landfill from Naylor Love's construction sites, to make this a rich and impactful research project!*



NEXT STEPS – END OF 2021 & POTENTIALLY BEYOND?

- Onehunga School
 - Plastic audit from start to finish
- Expansion to current collaborative work with industry partners – *Proposal in 2021*
- *Would you be keen to join us?*
 - esrc@unitec.ac.nz



Various items from Audit 1

QUESTIONS?



Team at the November Progress Meeting

Up next...



Ged Finch
X Frame



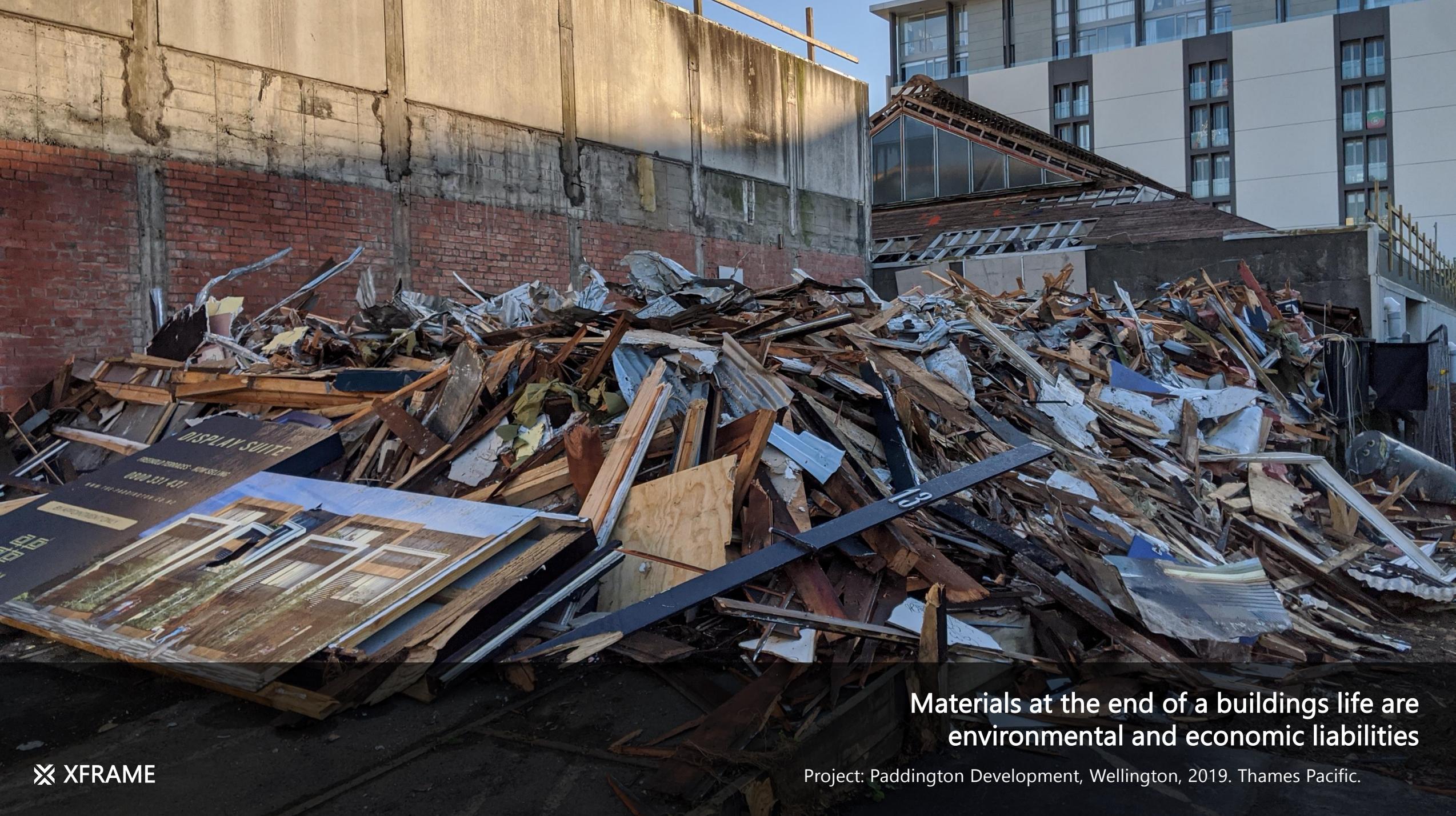
XFRAME

Building without waste. Building for the future.

Ged Finch – ged@xframe.com.au
ged.finch@vuw.ac.nz



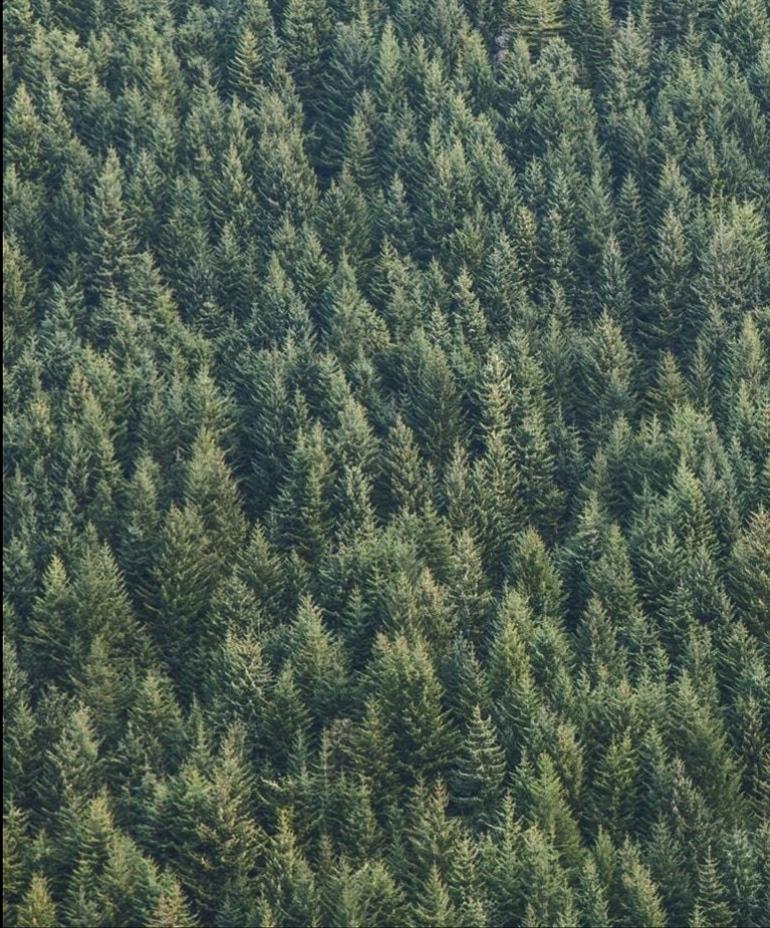
Largest consumer of raw materials
Largest producer of solid waste
39% of carbon dioxide emissions



Materials at the end of a buildings life are environmental and economic liabilities

Project: Paddington Development, Wellington, 2019. Thames Pacific.

XFrame – Building for the future.



Locally grown and sustainably harvested timber.



High value-add local material and product manufacturing.

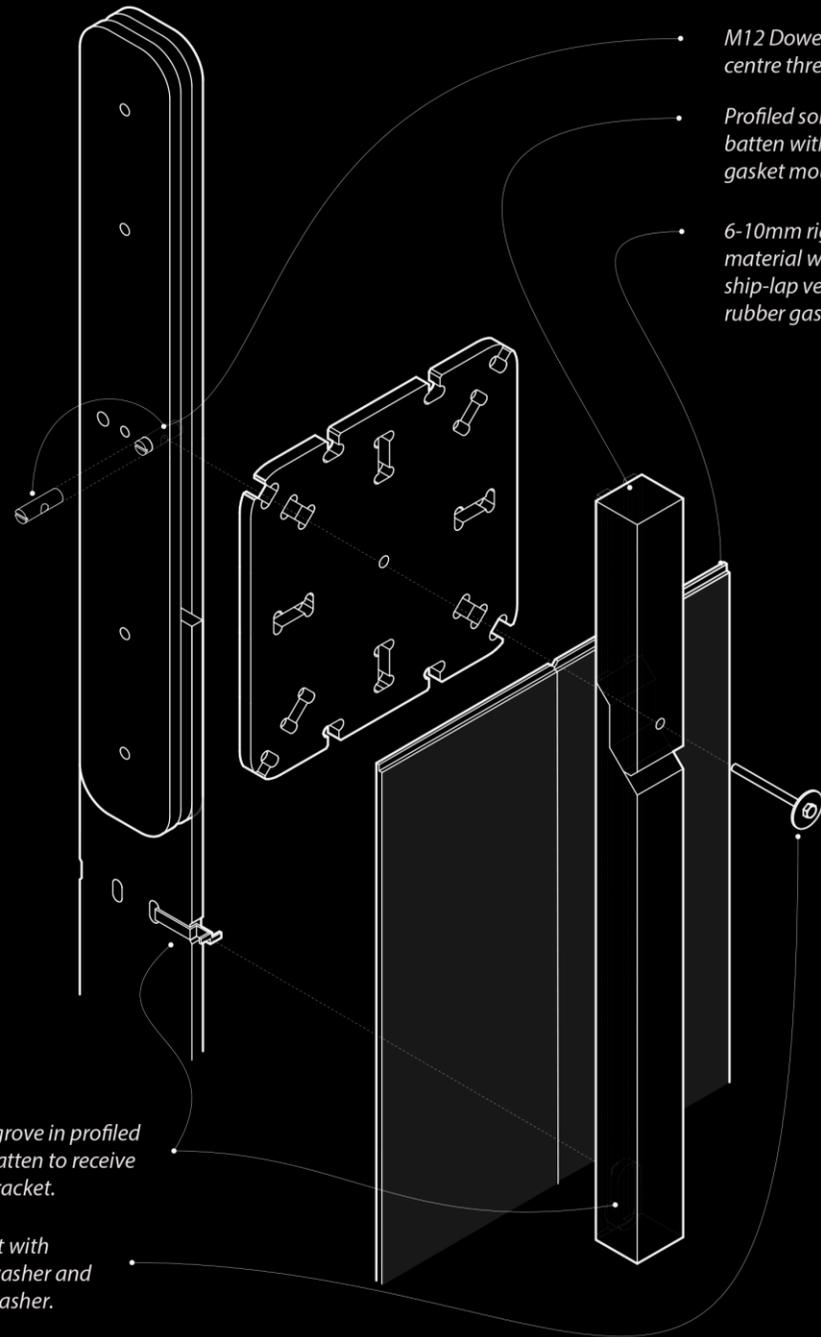


High-performance, waste free and future ready buildings.



XFrame Solution Agenda

- Reconfigurable and adaptable in place.
- Simple in its design and construction.
 - *12 Standard Parts*
- 25% Less Material.
- Self-Braced.
- Carbon Negative.
- Layer Independent.
- Scalable.
- Platform Technology.



M12 Dowel Nut with M8 centre thread.

Profiled solid timber cavity batten with rubber bubble gasket mounted on rear.

6-10mm rigid sheet material with 50% rebated ship-lap vertical seam and rubber gasket.

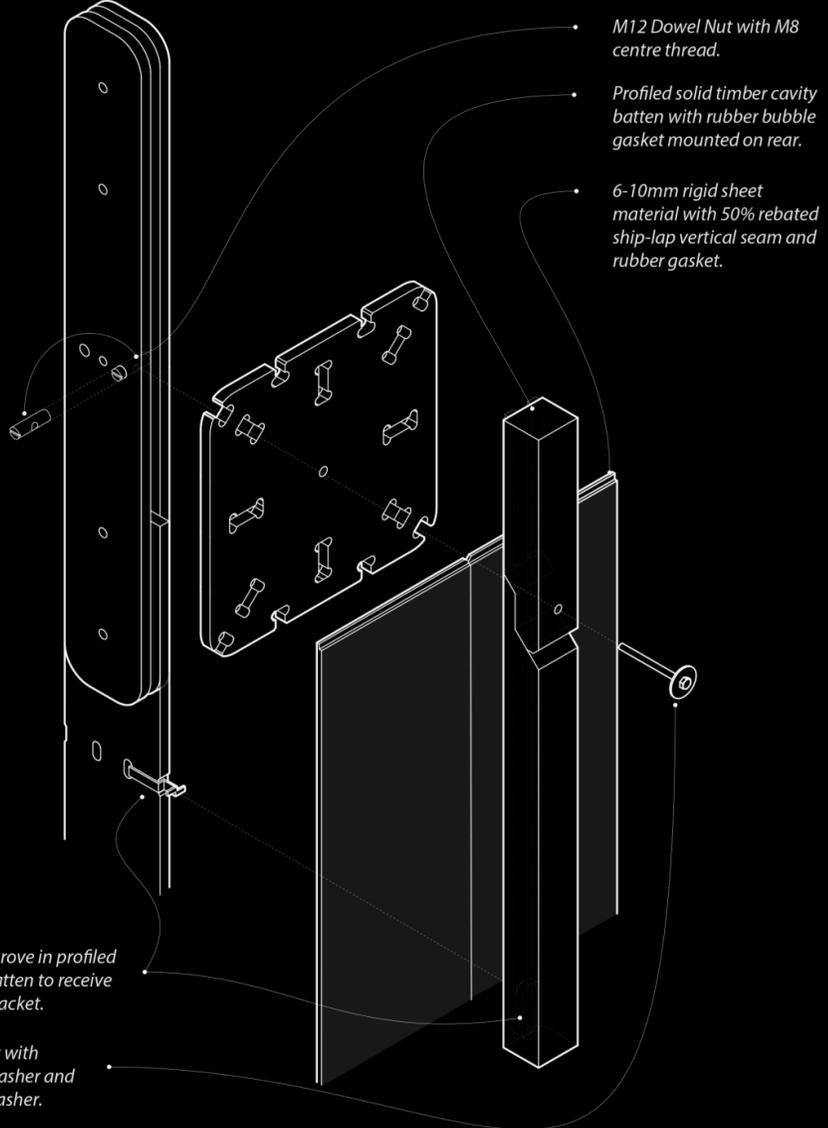
T-Slot rebated groove in profiled timber cavity batten to receive intermediate bracket.

100mm M8 bolt with 32mm penny washer and 16mm EPDM washer.



T-Slot rebated groove in profiled timber cavity batten to receive intermediate bracket.

100mm M8 bolt with 32mm penny washer and 16mm EPDM washer.





CNC Manufacture



CNC Manufacture



Plywood Structural Parts



CNC Manufacture



Plywood Structural Parts



Structural Panels



CNC Manufacture



Plywood Structural Parts



Structural Panels



Completed Buildings











Waste Reduction Impact Potential

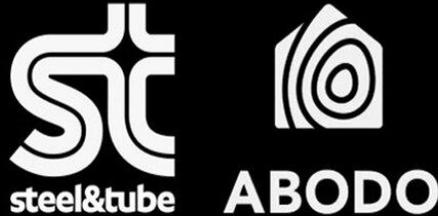
- For every 150m² house built using XFrame 24,750kg of carbon dioxide is sequestered.
- At the time of construction XFrame reduces waste production by more than 85%
- XFrame has been demonstrated to enable up to 95% of all deployed building materials to be directly repurposed (end-of-life waste).
- XFrame can be deconstructed and its parts made ready for reuse in two thirds less time than conventional building methods.



Strategic Partners:



Industry and Project Supporters:



Up next...



Stephanie Wade
Habitat for Humanity



Building Out Waste

29th April 2021





Building Relationships – suppliers & retirement homes



Pickup free or deliver to our Otara site



Upcycling Champions



The Pallet Project



Curtain Bank – Rags to Bags



Otara Maara Kai - Landspace

(Otara Kai Village, supported by Zealandia, Central Landscape Supplies (ET), Local Council Board)



Developing On Site Waste Plans - Volunteer Days

Contact Details:

Stephanie Wade

stephanie.wade@habitat.org.nz

Ph 0800 422 4828

www.habitat.org.nz

Any questions?

Up next...



Renee Woolcott
Jacobsen





TACKLING FLOORING WASTE WITH
COLLABORATION

Jacobsen[®]



The Problem across the entire industry

Waste from Off Cuts

At point of installation
Varies depending on type of project and product

Approx
8%

Estimated total flooring market size

9 Million

per year

**Huge range of
products in market,**
composition, suppliers and parts to the value chain

**Everything becomes
waste at end of life**

**Flooring waste can't
be separated and
recycled by existing
recyclers**

Jacobsen's Challenge



Sustainable
Business
Awards
Finalist 2020



We aren't manufacturers, or installers.

We work with many supply partners and product types.

But, we are best positioned in the value chain to enable recycling of waste flooring.

How might we take 'waste' flooring and reform it into something of the most value possible?

Jacobsen's Challenge



Sustainable
Business
Awards
Finalist 2020

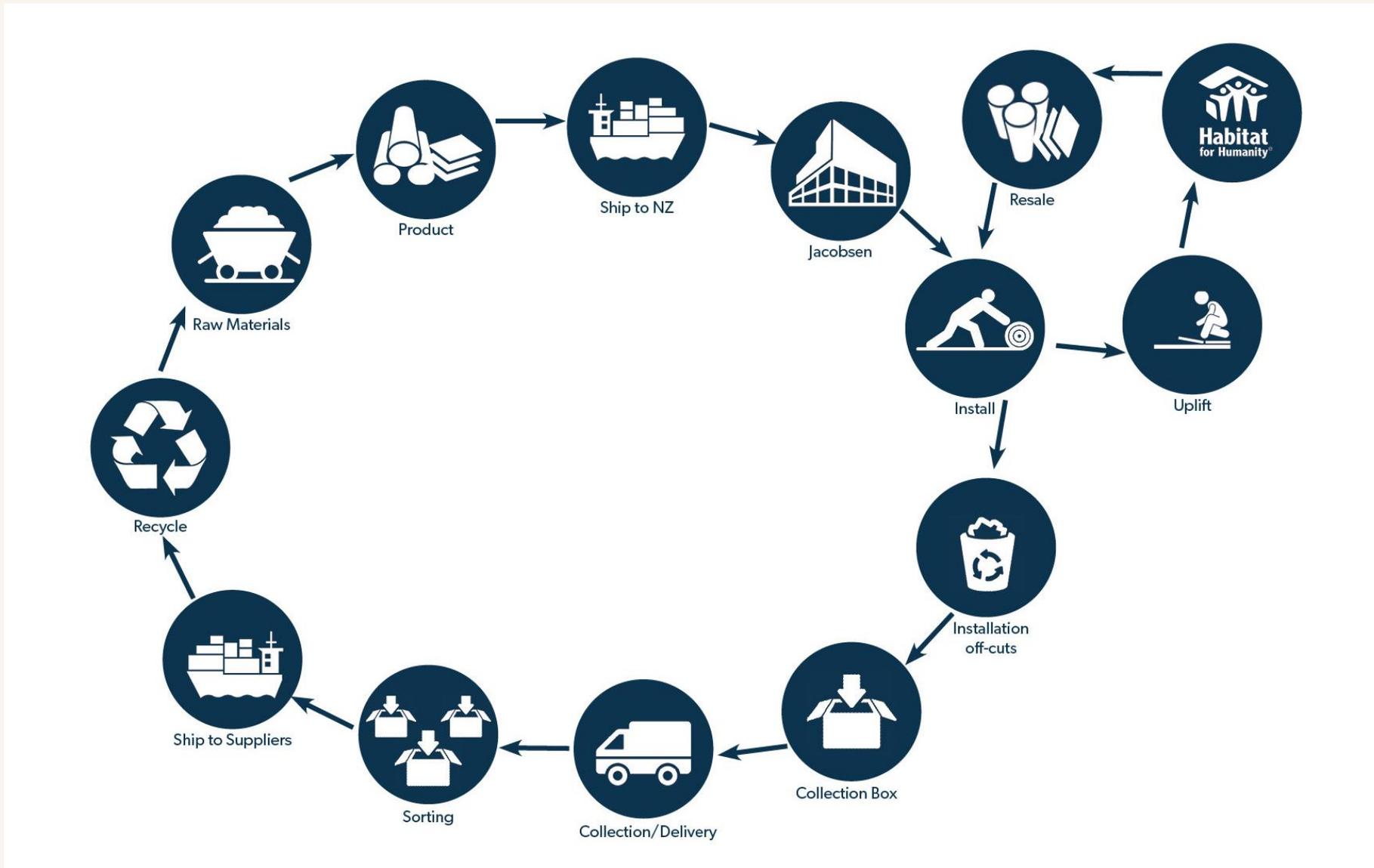


We aren't manufacturers, or installers.

We work with many supply partners and product types. Often far away from manufacturing plants.

But, we are best positioned in the value chain to enable recycling of waste flooring.

How might we take 'waste' flooring and reform it into something of the most value possible?



Making it easy for installers



Sustainable
Business
Awards
Finalist 2020



Partnering to enable Re.Use

Ensuring we prioritise Re.Use where possible is important to us.

We are proud to partner with Habitat for Humanity and donate used carpet tiles to their restores.



Sustainable
Business
Awards
Finalist 2020



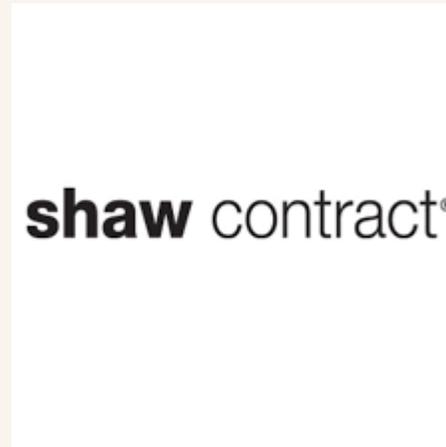
Partnering with our Suppliers



Sustainable
Business
Awards
Finalist 2020



NZ Model is paving the way
for Australian product
stewardship



Our focus on installation
waste as well as end of life
has meant Shaws is
extending their recycling



NZ is a global first for them
to trial recycling with
partners outside of their
home markets

What Are Our Challenges?

Changing the BAU system with all stakeholders

- Installers
- Specifiers
- Developers / End Users

Growing the program with more installers, more suppliers and more products

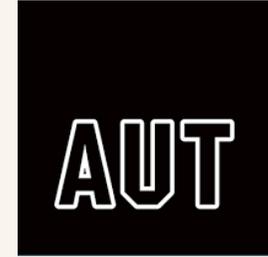
Contaminated Waste



Sustainable
Business
Awards
Finalist 2020



Skip the Skips



Supported by the Waste Minimisation Fund and



Objective: Develop methods for **reducing the qty** of material entering the waste stream as a result of residential construction.

Working with Kainga Ora projects to measure baseline waste on an existing site, and then have an intervention workshop and put in place reduction measures and monitor and measure new site.

Other Critical Focus Areas

- Who we source from, What we source and What we promote
- Longevity of product and maintenance requirements
- The Operations of our Business (Emissions & Waste)
- Our Team Culture and Education
- Constantly being proactive to look for better outcomes for our planet and people



Thank you



Jacobsen[®]



Up next...



Kelly Ah Kiau
Re Fab Cabins





REFAB
CABINS

OH,
WHAT A WASTE





OUR
UNITED VISION



OUR
CHALLENGES



LET'S BUILD
OUR **FUTURE TOGETHER**

Thank you!

