

Reducing Construction Plastic Waste to Landfill

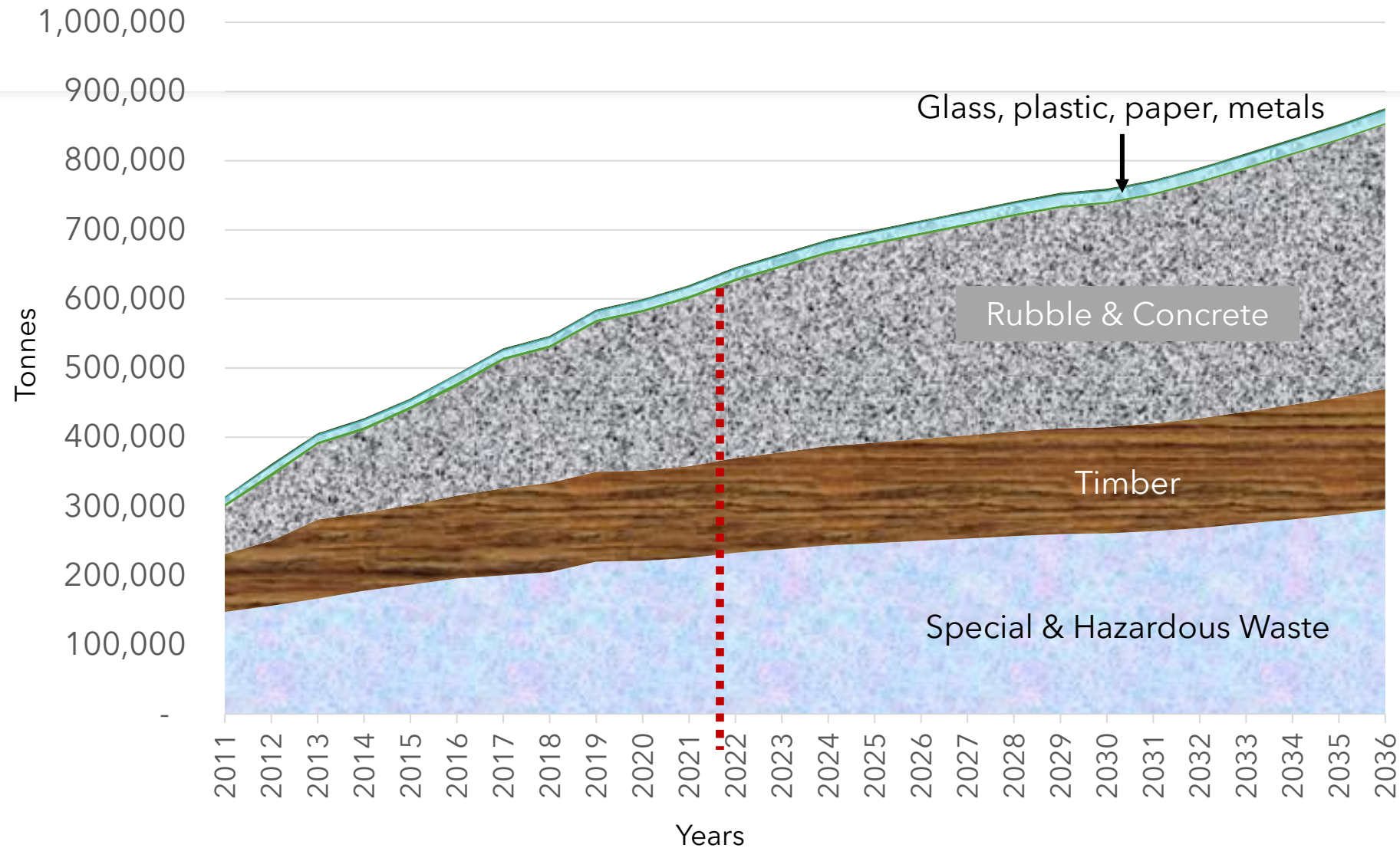
(Making gold from straw!)

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Construction Waste Breakdown



Challenges & Constraints

- Challenges:
 - Turning tide on C&D waste = large task
 - Barriers to implementation:
 - Lack of awareness
 - High level of market activity
 - Busy lives = little change in doing things differently
 - Waste management/minimisation = low level of industry focus
- Constraints:
 - Landfill capacity - Auckland's main site = closing 2028
 - Consenting - no large landfills after 2030
 - Aucklanders requiring action on:
 - Environmental issues, waste minimization, climate change

DoW (2016), *"There are, however, significant challenges in realizing this [waste minimisation] goal."*



True Cost

- Often underestimated
- AUT study (2015):
 - Auckland median house price = \$828,000
- Every new residential build:
 - \$31,000 worth of materials (estimated)
 - 4.5 tonnes per residential home
- WRAP (UK industry body) – true cost of a £160 skip:
 - £1,300 – labour, material value, waste charges, taxes



Waste Disposal Cost

Cost to Auckland C&D sector for year ending 30th June 2019

\$37 million

for rubble and concrete

\$38 million

for special / hazardous waste

\$22 million

for timber

\$100,212,120*

based on average of
Auckland transfer station
pricing (\$180/tonne)

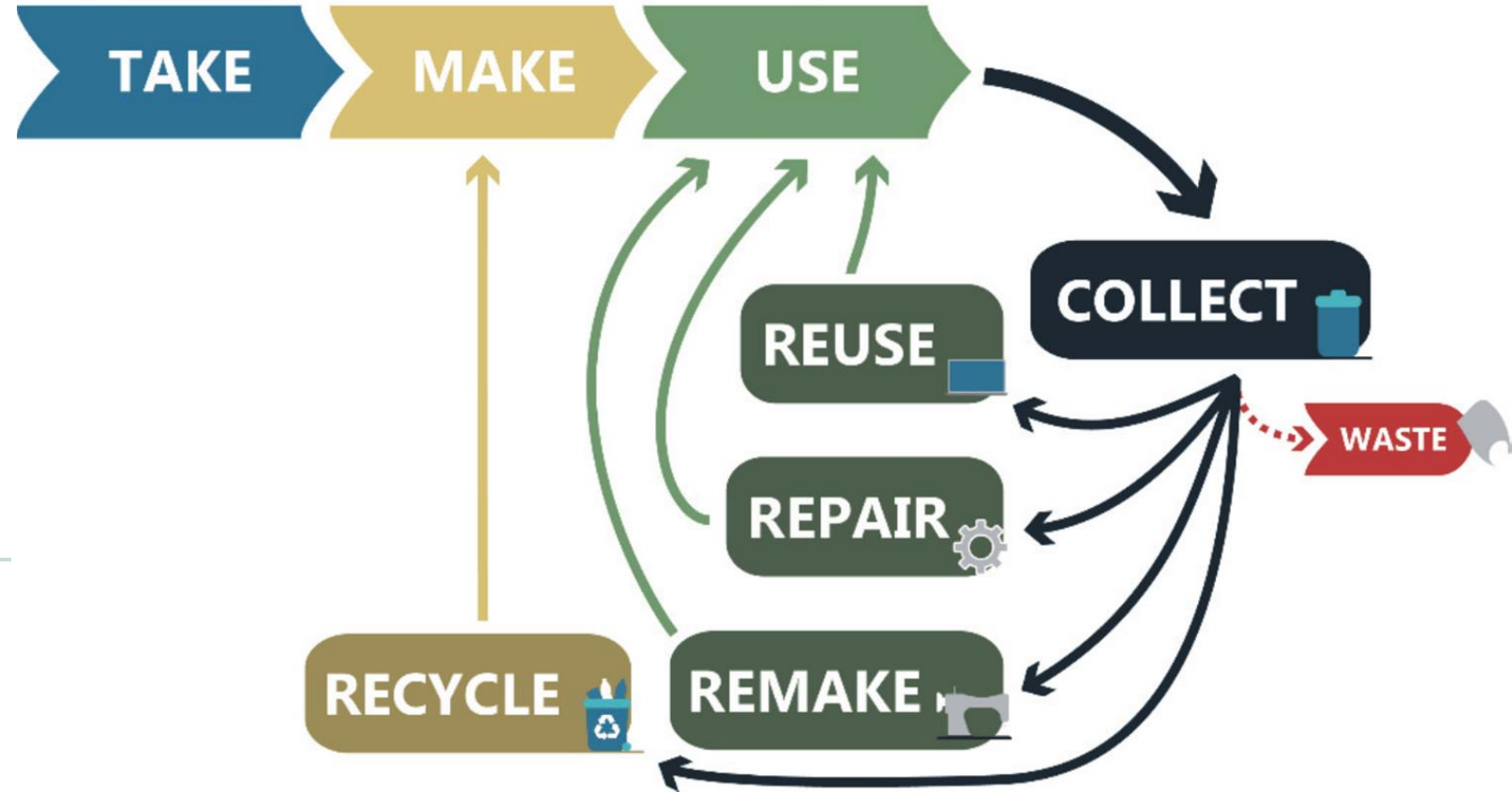
*Excludes estimated 2.2% of waste from KiwiBuild/HLC.

Large suppliers like demolition companies can get rates much lower – as low as \$95.00/tonne.

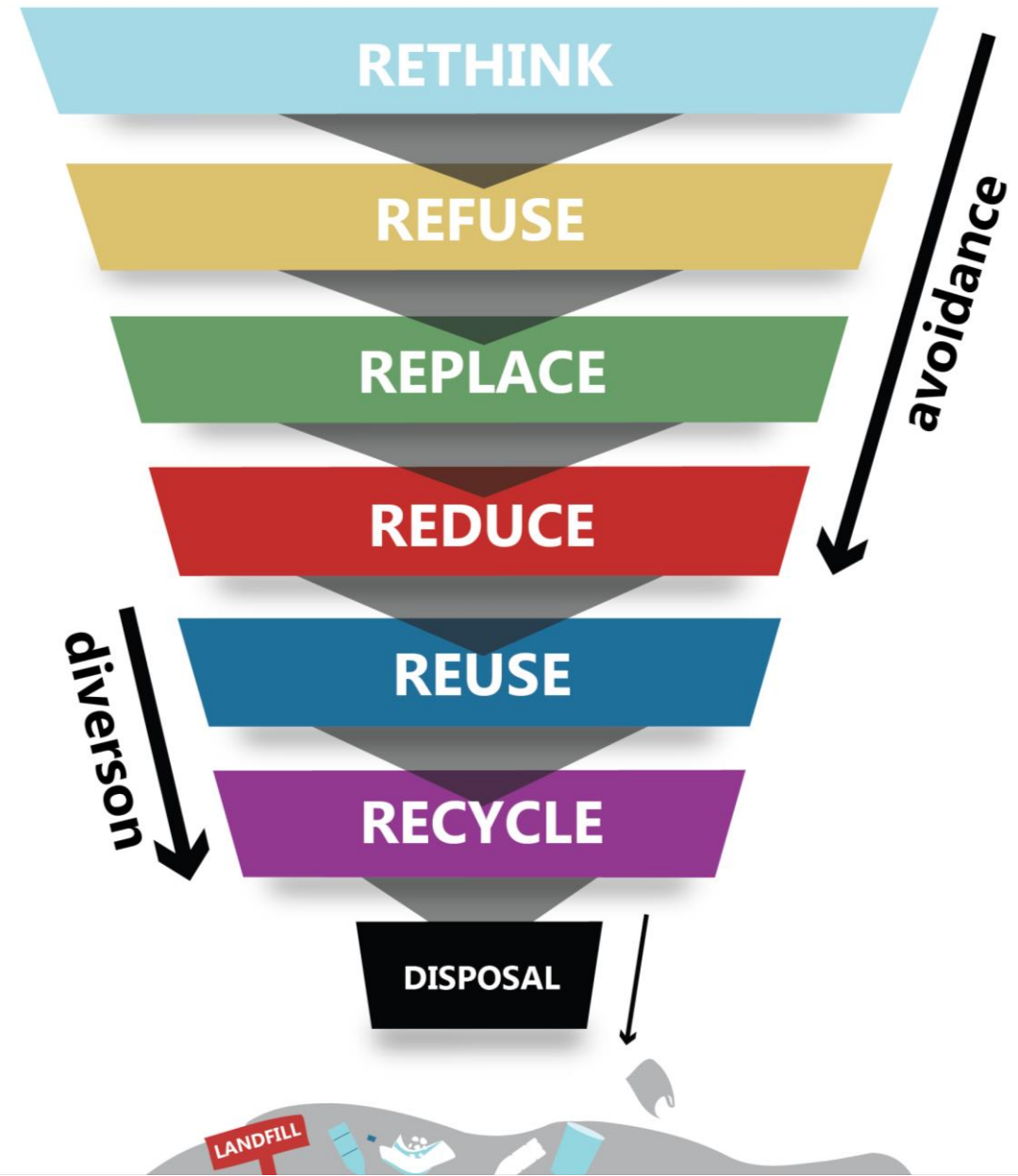
Waste Research

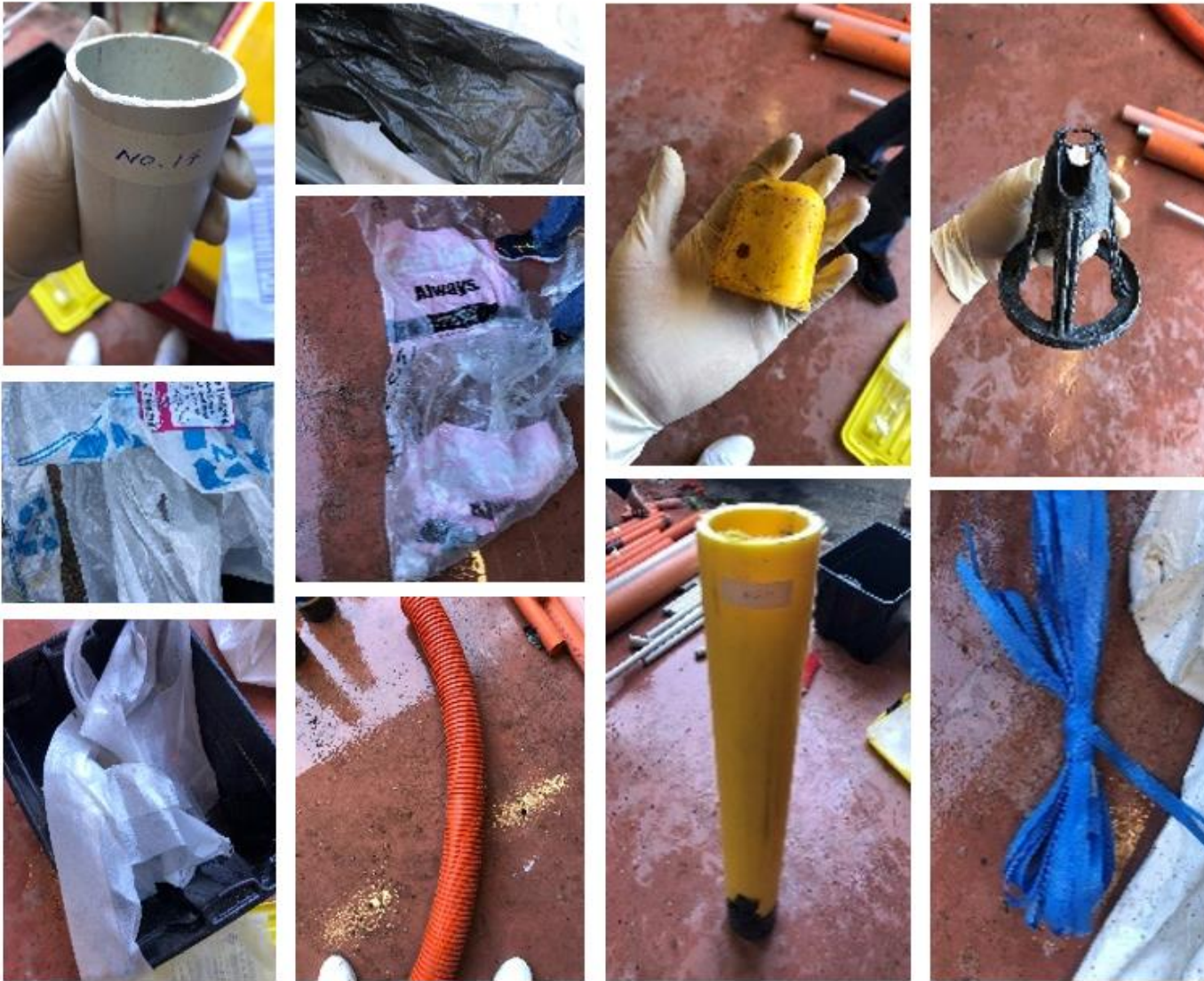


A Circular Economy



The 6 R's





The Issue

- Construction Waste
- Annual quantity (by 2012) of C&D waste (of 40 countries)
 - 3 billion tonnes
 - 10-50% total municipal solid waste contribution
- In Auckland, approximately 40% of waste to landfill = C&D waste



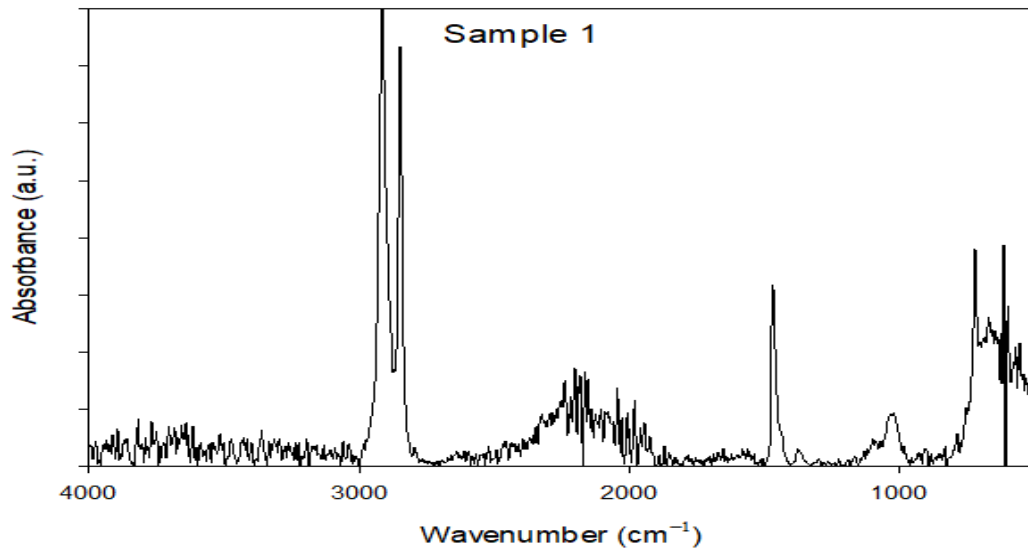
Plastic Waste

- Auckland Landfills per year = 25,000T (plastic)
 - Approx 30,000m³
- Little incentive to avoid landfill
 - Current levy = \$20/T
- On-site separation
 - Rare
 - Lack of standardisation
- Issues for construction plastic waste
 - No clear recycling endpoints
 - No transportation system once sorted

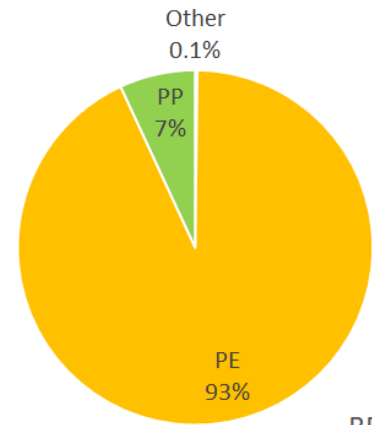
Waste Auditing



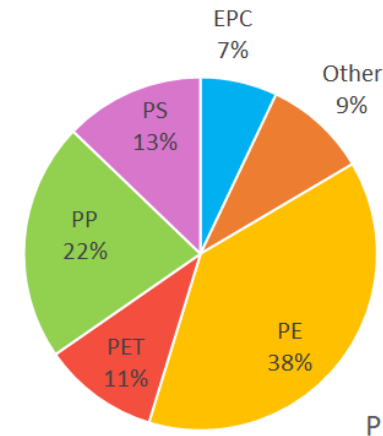
Plastic Type



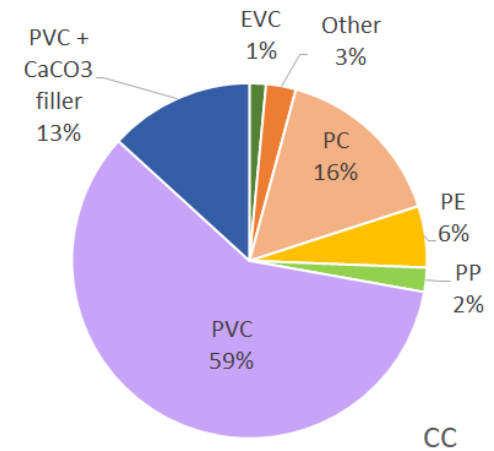
Samples were characterized using a Bruker Vertex 70 FTIR spectrophotometer.



BP



P



CC

- Polyethylene (PE) (yellow)
- Polyvinyl chloride (PVC) (lilac)
- Polypropylene (PP) (green)



Plastic Uses

- Building protection
 - (e.g., shrinkwrap, damp proof membranes, carpet protectors)
- Product packaging
 - (e.g., cling film wrap, bubble wrap, plastic bags)
- Construction components
 - (e.g., PVC pipe offcuts, tape, power points, light fittings)

Answer: Construction Components!

Novel Solutions

Mitre 10 ordering: opt-in checkbox

Reducing unnecessary packaging

Mitre 10 is working with industry bodies in reducing unnecessary waste on building sites.

Please note: Some Timber and Panels are often wrapped in plastic for protection from the weather and transport damage.

☒ **NO** - I do not wish these products to be wrapped. *Note: In the case of expected bad weather the store will contact you with options.*

☐ **YES** - I want these products wrapped.

Mitre 10 – Tradehub Tickbox

Outcome:
97% - Unwrapped
3% - Wrapped

Reusable Timber Pack Covers



Naylor Love – Timber Pack Covers

Difficult Wastes

Hardie Board

- No recycling options
- No response
- Avoid?



Building Wrap

- Must be free of contaminants
- Fold and sort immediately



Dan Band/Strapping

- Yet to find recycler
- High volume, low mass
- Not all the same (PP, PE, PET)
- Reusable alternative?





Hazardous Wastes

- Please 'Check before you chop!'
- Recycling has risks - particularly demolition work
- Asbestos exposure during home renovation is an increasing problem
- Mesothelioma Support & Asbestos Awareness Trust (MSAA)
 - Please support us to support them



Mesothelioma Support & Asbestos Awareness Trust



Supporting mesothelioma patients, their carers and family

Our Team

Our board and volunteers

Connect

Patients, Carers and Family

Get Involved

Donate or help out

www.msaatrust.org.nz

PVC PIPES



Environmental Solutions
Research Centre



On-Site Separation

- Sorting of wastes
 - Clear signage and bags
 - Dedicated space on site for bags
 - Immediate sorting to avoid contamination and mixing
- Management of site staff and sorting
 - Training of staff including sub-contractors
 - Presence (and continuous monitoring) by an on-site manager

Plastics Audit Catalogues

Polyethylene - LDPE, 4



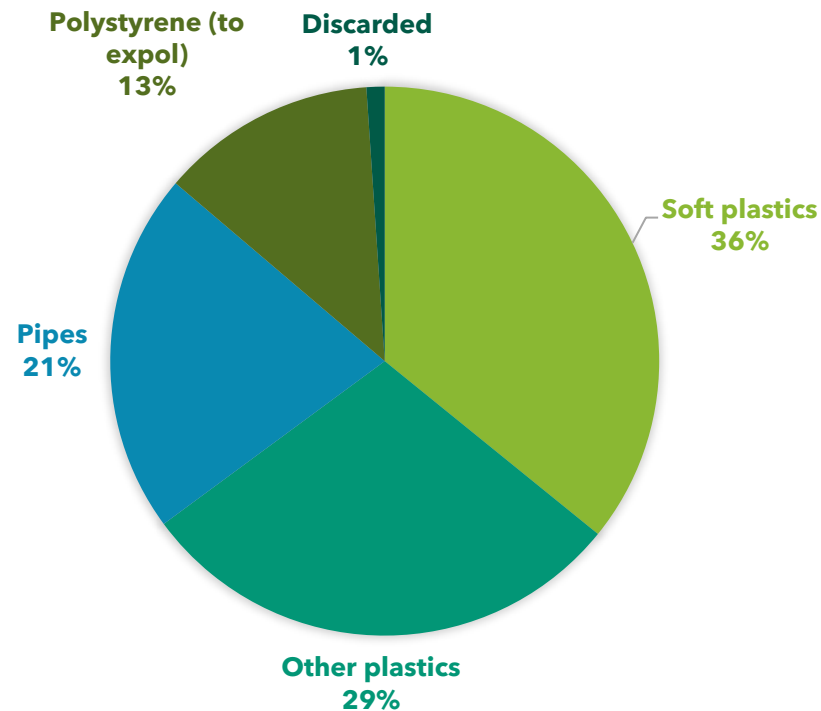
Polypropylene - PP, 5



Polyethylene - HDPE, 2

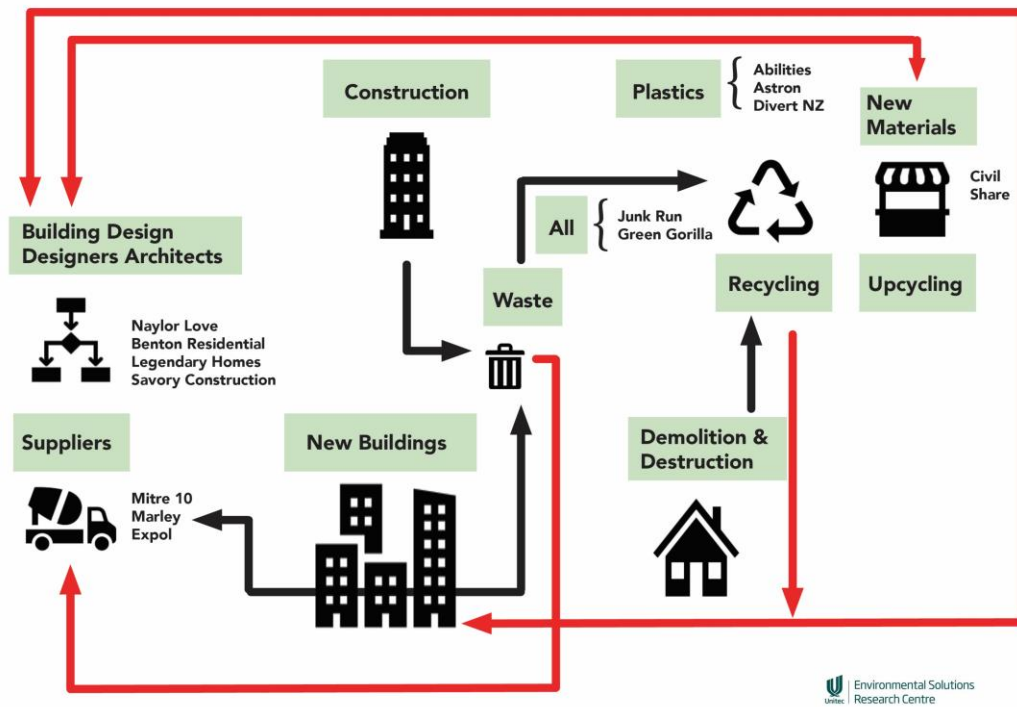


BENTON PLASTIC WASTE GENERATED BY MASS (SO FAR)



Preliminary Results

- Plastics reused:
 - Polypropylene (cable reels) - 6.3kg
- Plastic recycled:
 - Polystyrene - 46.5kg
 - Soft Plastics - 87.3kg
 - Pipes - 78kg
 - Polypropylene - 1.4kg
- Total plastics reused or recycled = 60%!



Future Work

- Test best practice on-site separation methods
- Build upon nationwide catalogue of waste recyclers
- Investigate transportation issues from site to recycler
- Create easily accessible education information for site workers and public



Thank You!

- With thanks to our partners
- Especially to our funders
 - BRANZ, Mitre 10, Plastics NZ & Marley
- Any questions? esrc@unitec.ac.nz

