

Seeing Waste *Differently*

Improving Waste Composition Monitoring
through Scalable Visual Analysis

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Intro & Aim

Material Insights has been formed to develop a new approach to composition monitoring for landfills and transfer stations.

Our aim is to provide accurate and consistent data that can be used for reporting and decision-making.

The waste sector needs data it can trust — scalable, standardised, and cost-effective composition monitoring that works in the real world.



The Material Insights team at Waitakere Resource Recovery Park



Current Approach

The industry currently relies on two established Solid Waste Analysis protocols



Procedure One - Domestic SWAP

Physical sort and weigh



Procedure Two - Disposal Facility SWAP

Physical sort and weigh or visual identification and volume estimation by surveyor.



Example of a load of construction & demolition waste

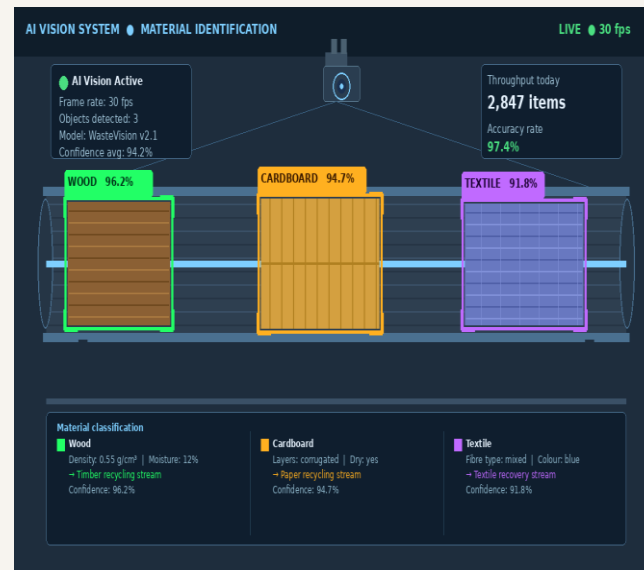


What's Currently in the Market

Object recognition is already being applied in the manufacturing sector – but has a critical limitation when it comes to waste.

- Used extensively in manufacturing facilities to identify material types and defects at speed
- Auckland Council uses it to detect contamination in kerbside recycling streams
- Currently no object recognition tools available for waste compositional analysis

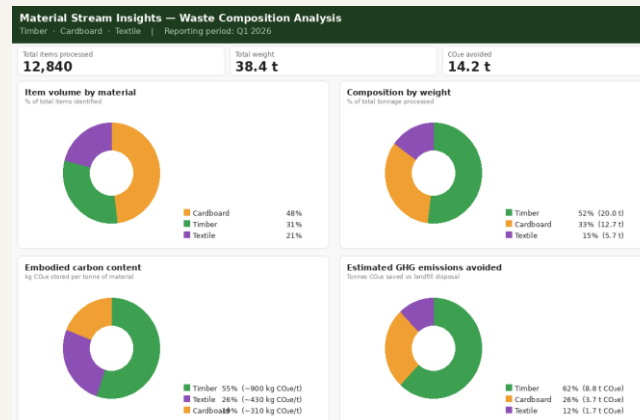
⚠️ Key gap: Good at identifying objects, but unable to accurately convert to volume or weight



What We Are Developing

A visual analysis product to give operators a scalable snapshot of waste composition.

- Provide real-time snapshots and trends on current composition of incoming waste
- Feed directly into reporting requirements
- Enable data-driven business decisions — reducing guesswork
- Support client reporting frameworks such as Green Star



Composition dashboard concept — turning images into actionable data

The difference: We don't just identify objects — we convert visual data into useable volume and weight metrics.



Product Attributes

Our product is being designed to meet four essential criteria for real-world adoption:



Quality of Data

Consistent & accurate
composition results



Affordability

Cost-effective for
operators



Scalable

Works on both small
and large sites



Operational Efficiency

Minimal disruption
to existing operations



Progress to Date

We are undertaking an initial proof of concept trial in partnership with Auckland Council.

1

Partnership Established

Collaborating with Auckland Council to undertake a proof-of-concept trial.

2

Waitakere Trial Site

Trial undertaken at the Waitakere Resource Recovery Park — a real operational environment.

3

C&D Waste Sampled

Focused on construction & demolition waste — trialing identification of timber, cardboard, and textiles.



Waste delivery in action at the Waitakere Resource Recovery Park



What Have We Learnt

The trial surfaced four key insights shaping our next phase of development:



Weighbridge Integration is Critical

Access to weighbridge data is essential for accurate volume-to-weight conversions.



Object Recognition Data Base and Accurate Conversion Factors

Requires extensive database for object recognition and validated conversion rates.



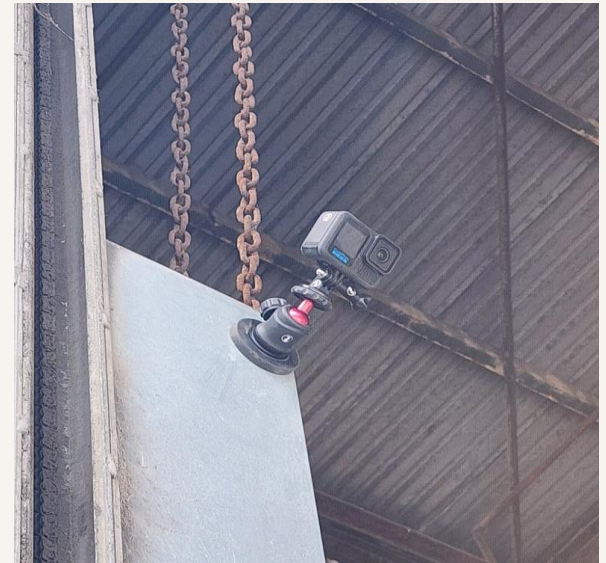
Image Volume & Timing

Sufficient images must be captured across the full vehicle unload sequence to represent materials accurately.



Camera Placement Matters

The number and position of cameras directly determines coverage and recognition accuracy.



Camera mounted in the facility during our trial



Next Steps

Building on our proof of concept to date, here is what comes next:



Complete Proof-of-Concept Trial

Analysis learnings from the Waitakere trial and develop software.



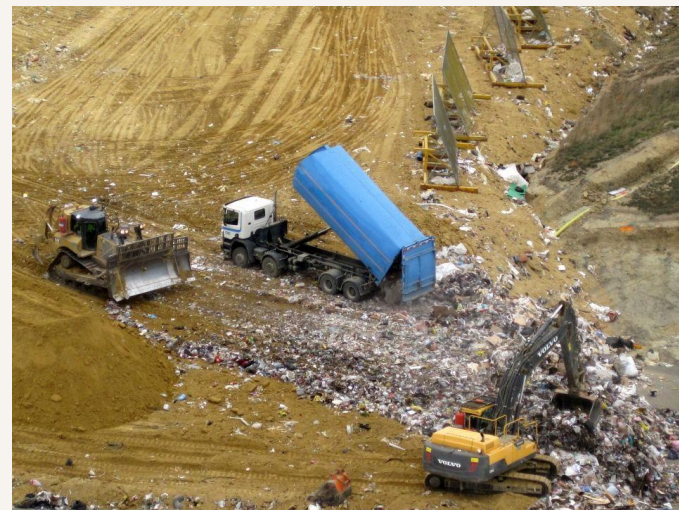
Expanded Trials

Once proof-of-concept is complete, undertake trials at larger privately owned transfer stations and landfill sites across New Zealand.



Reporting Tools & User Interfaces

Design and develop operator-facing dashboards, reporting tools and data security protocols



Landfill site — the scale of the challenge



Get Involved

Interested in being part of a trial, or just wish to be updated as we develop the next stage? Get in touch:

info@materialinsights.co.nz

Thank You

