Transitioning to Circular Economy Precincts

Jonathan Beckett
Waste Team Lead (NSW)

Lyndell Coates
Senior Waste Consultant

14/05/2024

ASSETS | ENGINEERING | ENVIRONMENT | NOISE | SPATIAL | WASTE

The Project

About the Project

The Mid North Coast Joint Organisation sought to assess the feasibility of establishing a premise-based, waste-derived Circular Economy Centre of Excellence (CE CoE) within the Mid North Coast region of New South Wales.

The Aim

To provide a hub for regional collaboration, fostering new ideas and innovation in how to extract value from waste materials, while creating new innovative business opportunities, jobs and economic benefits across the Mid North Coast region.

Transitioning to a Circular Economy

Transitioning towards a local circular economy requires a shift from linear to circular approaches and behaviours

Strategies		
Smarter product use and manufacture	R0 Refuse	Make product redundant by abandoning its function or by offering the same function with a radically different product
	R1 Rethink	Make product use more intensive e.g. by sharing product
	R2 Reduce	Increase efficiency in product manufacture or use by consuming fewer natural resources and materials
Extend lifespan of product and its parts	R3 Reuse	Reuse by another consumer of discarded product which is still in good condition and fulfills its original function
	R4 Repair	Repair and maintenance of defective product so it can be used with its original function
	R5 Refurbish	Restore an old product and bring it up to date
	R6 Remanufacture	Use parts of discarded product in a new product with the same function
	R7 Repurpose	Use discarded product or its parts in a new product with a different function
Useful application of materials	R8 Recycle	Process materials to obtain the same (high grade) or lower (low grade) quality
	R9 Recover	Incineration of material with energy recovery

Source: Kirchherr et al (2017)

Key Project Components

Opportunity Provided by Waste

- Assessed waste generated within each of the five Mid North Coast local government areas that is managed by Councils
- Included domestic waste collected at the kerb and some self-hauled waste
- Projected tonnages out over 20 years

Visioning

- Identified what a CE CoE for the Mid North Coast region could look like
- Involved stakeholder engagement and a collaborative approach to the project
- Highlighted key areas of opportunity for assessment of infrastructure delivery options
- Identified current circular activities within the region
- Developed a Vision for the CE CoE

Key Project Components

Site Selection

- Worked with all Councils to identify potential sites for a CE CoE
- Undertook a Multi-Criteria Analysis to identify the most preferred site using criteria developed in consultation with the Project Working Group

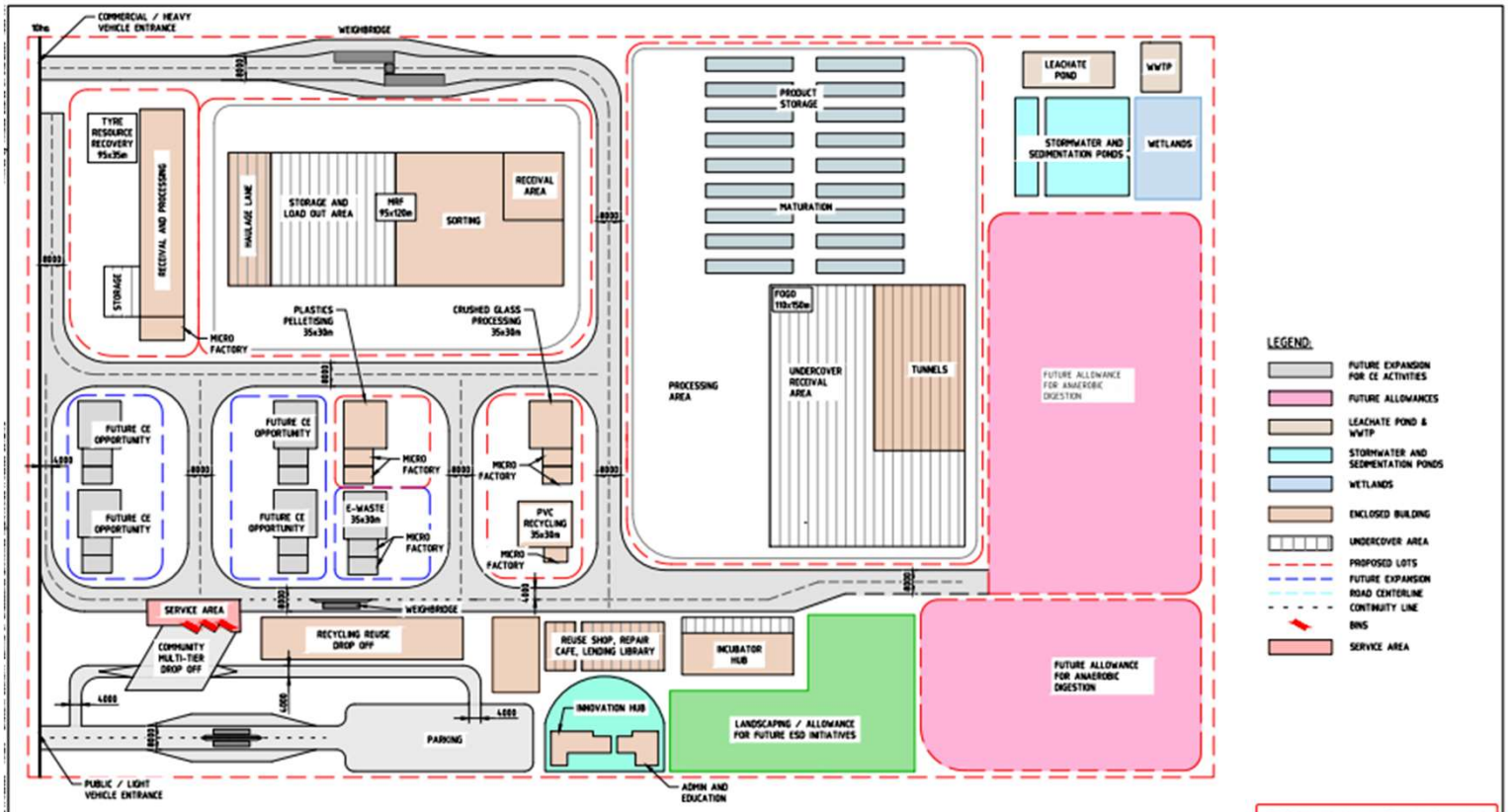
Site Concept Plan

- Developed a conceptual plan to show what the CE CoE could look like – including technologies, processes and general layout
- Facility sizing was based on 2042 projected tonnages

Multi-Criteria Analysis

The following criteria were used to evaluate potential sites:

- Lot Size
- Proximity to Highway
- Future Growth
- Fire Safety
- Airport Safety
- Separation Distances
- Susceptibility to Flooding
- Topography
- Transport
- Site Land Uses
- Surrounding Land Uses
- Land Use Separation Distance
- Land Ownership
- Current Site Features
- Siting



GENERAL ARRANGEMENT

SCALE: 1:1250

PRELIMINARY ONLY
NOT FOR CONSTRUCTION

25m 0m 25m 50m

1:1250 @ A3

talis consultants

Client: Mid North Coast Joint Organisation mncjo

NOTES

1. This drawing is the property of Talis Consultants Pty Ltd. It is a confidential document and must not be copied, used, or its contents divulged without prior written consent.
2. DO NOT SCALE, use figured dimensions only. If in doubt please contact Talis Consultants.
3. Parts of this drawing is intended to be in COLOUR. Black & White Printing may cause errors or omissions. If this 'text' is not GREEN, please contact Talis Consultants

No.	Date	Drwn	Chk	Amendment / Issue	App.
A	01.12.2023	VS	AB	PRELIMINARY ISSUE	

Project: CIRCULAR ECONOMY CENTRE OF EXCELLENCE

Title: GENERAL ARRANGEMENT

Scale: 1:1250 @ A3		Date: 01.12.2023	
Drawn: VS	Checked: AB	Approved:	
Job No.: TW23030	Dwg. No.: C-100	Rev.: A	
Filename: TW23030-001.DWG			

Key Project Components

Project Governance and Service Delivery Models

- Identified different governance/service delivery models applicable to a CE CoE, which included:
  - Individual Council owned and operated
  - Councils form a company
  - Private company owned and operated
  - Public Private collaboration

Feasibility Assessment

- Undertook a feasibility assessment of the CE CoE, which included:
  - Risk assessment
  - Identifying high-level capital and operating costs

Considerations When Transitioning to a Circular Economy

A Phased Approach to Transition

PHASE 1

Collaborative Council Action – Developing Circular Waste Initiatives

PHASE 2

Building a Circular Economy Ecosystem + Creating a Governance Structure

PHASE 3

Design and Construct the Circular Economy Hub – following detailed investigation

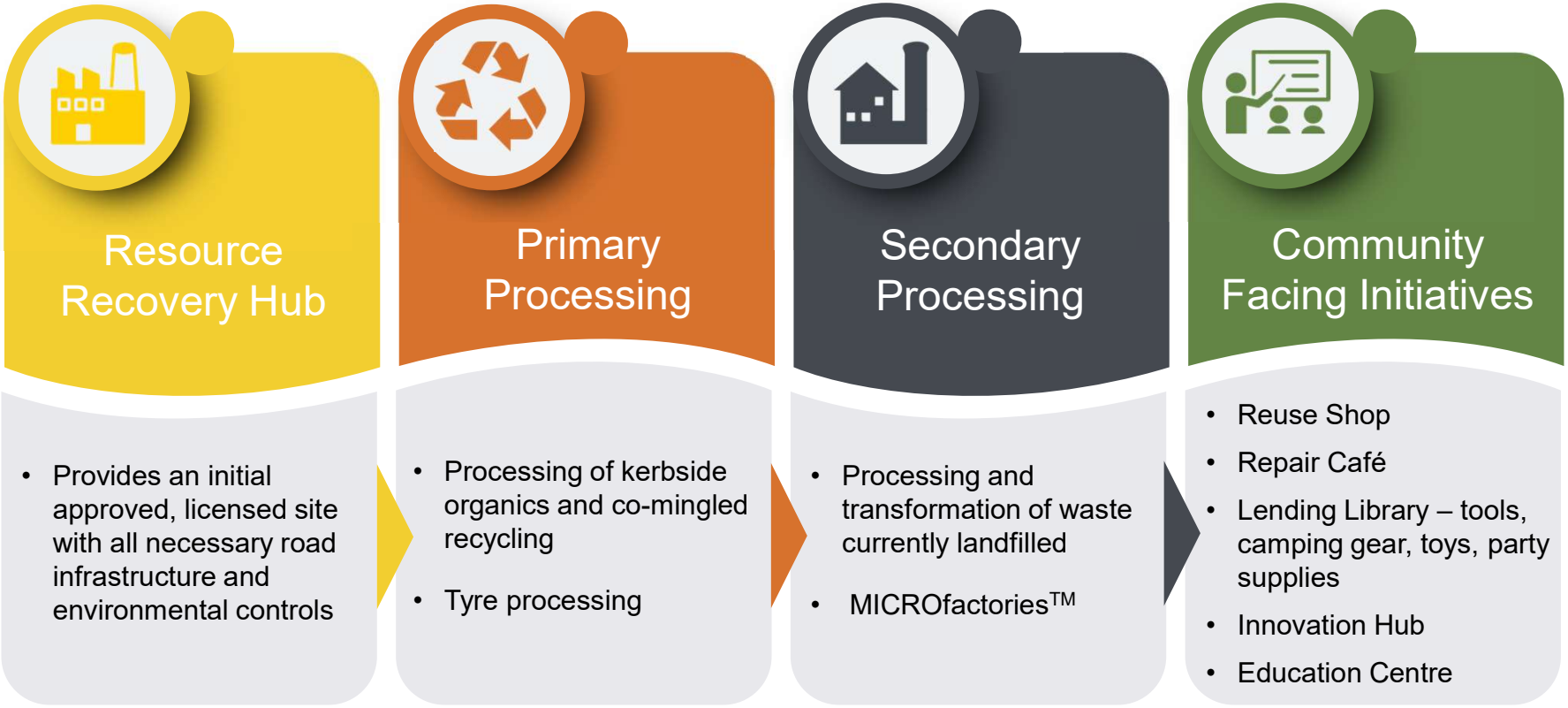
Phase 1 Activities

Opportunity (Waste Stream)	Activity (Infrastructure + Technology)	Regional Data Aggregation 2042 (TPA)
REUSE		
New and disposed (including repaired) tools, camping equipment, toys and party supplies	Lending Library – sealed building using manual sort and point of loan	920
Various – clothing, furniture, toys, homewares, sporting goods, office furniture and equipment	Reuse Shop – sealed building using manual sort and point of sale	9,176
Various – clothing, furniture, electrical appliances, bicycles, crockery, appliances, toys	Repair Café – sealed building using manual sort and point of sale	1,147
RECYCLE		
Building materials (timber, concrete, wood pallets, plasterboard)	Covered hardstand - sorting, under-cover storage and point of sale	17,596
RECOVER RESOURCES		
Mixed Waste Sorting - C&D waste	Covered hard stand - mechanical sorting	23,699
Mixed Waste Sorting - Self haul mixed waste	Covered hard stand - mechanical sorting	22,348
RECOVER ENERGY		
Landfill gas recovery	Covered hardstand – gas powered turbine	N/A

Phase 3 Activities

Opportunity (Waste Stream)	Activity (Infrastructure + Technology)	Regional Data Aggregation 2042 (TPA)
REUSE		
Various, including plastics, glass, textiles (such as polyester and other non-product stewardship materials), corflute signs, ceramics, E-Waste and more	MICROfactories™ (under licence to SMaRT Centre, UNSW) – within a sealed building using proprietary technology	20,922
Rubber tyres (car, tractor, industrial tyres and other less conventional rubber sources (wheelbarrow, motorcycle, bike tyres, conveyor belts)	Rubber crumb plant – hard stand and covered areas using proprietary technology	145
Renewable energy infrastructure (solar and wind) – waste produced from end of useful asset life disposal	Covered hardstand - proprietary technology	1,458
FOGO	Currently covered hard stand - In-Vessel Composting but technologies employing a more circular approach (such as Dry AD) may become a future sustainable EfW option	45,365
RECOVER RESOURCES		
Co-mingled recyclables (paper, cardboard, glass, plastics)	Currently within a sealed building - Materials Recovery Facility (MRF) but technologies employing a more circular approach may become a future sustainable option	33,202
Ex-MRF Recyclates Processing – such as crushed glass, plastics processing	Within a covered or sealed building – reprocessing using proprietary technology	1,677
RECOVER ENERGY		
Landfill gas recovery from landfill existing facilities	Covered hardstand – gas powered turbine	N/A
Possible future consideration – **Biogas recovery from FO/FOGO**	Within a sealed building – processing using proprietary technology	

Developing the Circular Economy Hub



Investigations Required

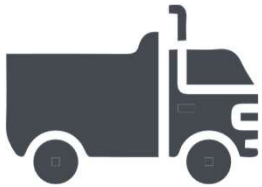
1

Whole-of-life landfill costs

2

Commercial value of primary processing outputs and marketing arrangements

3



Road transport requirements and costs

4

Greenhouse gas impacts

5

Number of Circular Economy sites and format – physical, virtual, pop-up?

Other Considerations

- Existing contractual commitments – waste contacts
- How best can waste streams be agglomerated?
- Role of waste-to-energy in a Circular Economy Hub?
- How can logistics costs be minimized?
- Only a physical Hub? Or includes virtual or pop-up options?
- Target low hanging fruit first
- How will the Hub be financed?
- What funding is available?
- Potential for partnerships

Developing a Circular Platform

Some key question to ask when transitioning from a linear to a more circular economy

What is the Circular Economy – what does it mean for your organisation?

What elements should it include?

What circular activities are currently happening in your area/region?

Where are you on the transition pathway now?

Key Takeaways

Transitioning to a Circular Economy takes time

Where are you on the transition pathway now?

Consider a phased approach to transition

What materials will be included in the Hub? What role will waste to energy play?

What investigations are required to support the transition?

Understand funding opportunities available

Questions

Thank you

Jonathan Beckett
Waste Team Lead (NSW)
Jonathan.Beckett@talisconsultants.com.au
0417 498 287