


LAKE
MACQUARIE
CITY

A hand is holding a large, three-dimensional infinity symbol. The symbol is filled with a vibrant green grass texture and has a dark brown base. On top of the left loop of the infinity symbol sits a small globe of the Earth, showing continents and oceans. The background is a blurred, light-colored surface.

CIRCULAR ECONOMY FRAMEWORK

Lake Macquarie City Council
Circular Economy Framework
Version 1, March 2021





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Scope

The Local Government Act 1993 requires Council decision-making to consider sound financial management, investment in responsible and sustainable infrastructure, principles of ecologically sustainable development and social justice principles. Accordingly, this framework applies to all persons conducting or undertaking business on behalf of Council.

Objectives

In support of Council's Circular Economy Policy, this document outlines a broad approach for the establishment and implementation of a Circular Economy (CE) Framework to build capacity, innovate and showcase Lake Macquarie as a leader in the transition to a low-carbon, circular economy. Council seeks to apply and integrate circular economy guidelines into Council decisions, strategies, plans, processes and projects in line with our values of Leading at all Levels, Working Together and Shaping our Future.

Strategic links [1, 2, 3, 4, 5, 6]

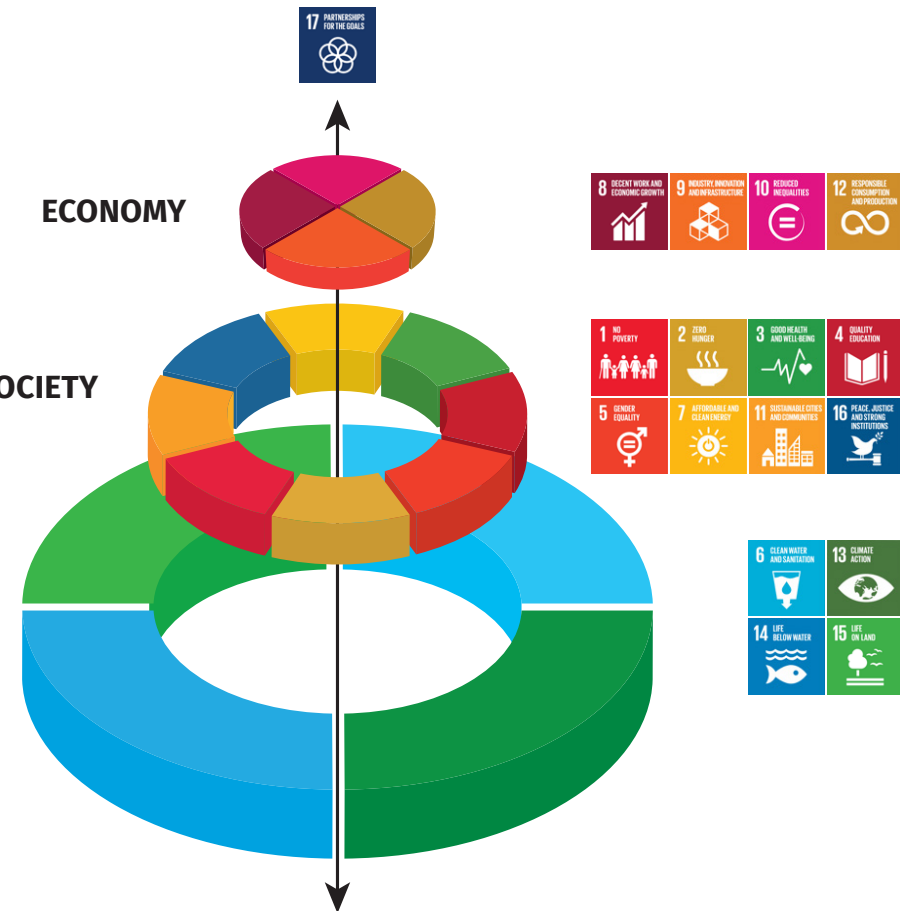
This document provides guidance to enable our operations, our people and our community to be supported to make decisions and undertake activities that are consistent with Australia's commitments to the Paris Climate Change Agreement to limit global warming to two degrees celcius and the integrated framework of the Sustainable Development Goals, as outlined in Figure 1 right. There is an emerging international consensus that a functioning economy and society is founded on an intact and functioning biosphere - defined in 1875 by the geologist Eduard Suess as "the place on earth's surface where life dwells." This implies that human economies and societies are embedded parts of the biosphere which provides the life support systems upon which prosperity and development ultimately rest.

This framework is also in alignment with the four pillars of sustainability, previously endorsed by Council in the current Sustainability Policy where we have committed to "demonstrate leadership by undertaking decision-making through the integrated framework of the Sustainable Development Goals that delivers a whole of Council approach to sustainable policy, infrastructure and services".

BIOSPHERE

SOCIETY

ECONOMY



- ¹ OECD Programme on the Circular Economy in Cities and Regions
- ² BS 8001:2017 Implementation of the Circular Economy in Organizations (BSI, 2017)
- ³ City Governments and their Role in Enabling a Circular Economy Transition, Ellen Macarthur Foundation
- ⁴ Circular City Roadmap – performance monitoring framework (Circular Peterborough)
- ⁵ Analysis of the relations between circular economy SDGs, International Journal of Sustainable Development & World Ecology, Rodriguez-Anton et al (2019)
- ⁶ Relevance of Circular Economy Practices to the SDGs, Schroeder et al, Institute of Development Studies & Collaborating Centre on Sustainable Consumption & Production, (2018), Yale University.

The Circular Economy

INTRODUCTION

Progressing beyond the current take-make-waste extractive industrial model, a circular economy aims to decouple economic activity from the consumption of finite resources and the disruption to natural environments that this system has caused. Underpinned by a transition to renewable energy, the circular model builds economic, social and natural capital through a consistent and robust approach based on three key principles:

1. Design out waste and pollution.

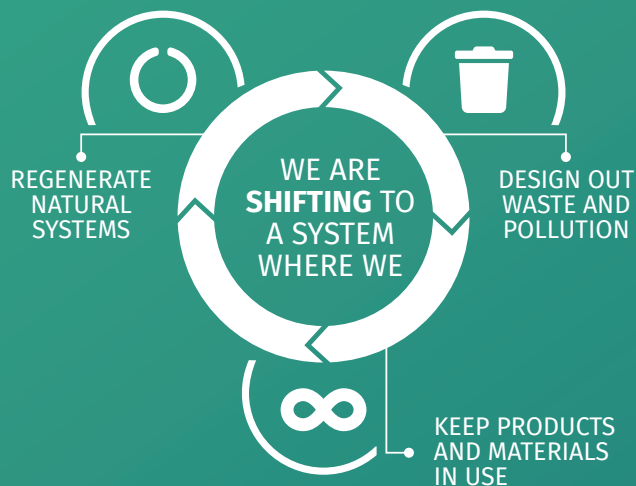
2. Keep products and materials in use at their highest possible value.

3. Regenerate natural systems.

In a circular economy, economic activity builds and rebuilds rather than erodes overall system functioning. The concept recognises the importance of the economy working effectively at all scales – for large and small businesses, for organisations and individuals, globally and locally. Transitioning to a circular economy aims not only to reduce the negative impacts of our current linear economy, it also represents a systemic shift that builds long-term resilience, generates business and economic opportunities, and provides wider environmental and societal benefits.

The transition to a circular economy is gaining significant international momentum and in 2019, the NSW Government developed a Circular Economy (CE) Policy:

“To deliver positive economic, social and environmental outcomes. The circular economy is about changing the way we produce, assemble, sell and use products to minimise waste and to reduce our environmental impact. The circular economy can also be great for business; by maximising the use of our valuable resources, and by contributing to innovation, growth and job creation. Moving to a circular economy will provide long-term economic, social, and environmental benefits for NSW. This transition will generate jobs, increase the robustness of the economy, increase the accessibility of goods, maximise the value of resources, and reduce waste.”



A circular economy approach also aligns with the Community Strategic Plan 2020-2027 vision and values of enhancing our natural environment, and supporting a diverse economy that is resilient and adaptable to change. It also aligns with our value of shared decision making, by working together and empowering our communities to be more sustainable, and to support creativity, new technologies and new ways of thinking.

CIRCULAR ECONOMY IN CITIES AND REGIONS

The Organisation for Economic Co-operation and Development (OECD) states “cities and regions have a critical role to play in the circular transition”^[7]. They hold core responsibilities for solid waste, urban planning and infrastructure, and can leverage long-term investment choices related to energy, water and transport while also being laboratories for innovation and experimentation. Cities and regions are facing significant challenges in responding to the impacts of fossil-fuel transitions, climate change (to infrastructure, insurability, litigation related to planning/zoning decisions) and increasing expectations of communities to take a leadership position in responding to these challenges.

One of our key aims is to shift inefficient linear economic systems to closed loop systems where we are maximising the value from all our resources, optimising use of a range of assets and incorporating ecological impacts in Council’s decision-making.

^[7] The Circular Economy in Cities and Regions, (OECD), 2019



A CIRCULAR ECONOMY FOR THE HUNTER REGION

Lake Macquarie and the wider Hunter Region economy is undergoing significant change. Many of its core activities are currently disrupted (with further disruption projected) by global responses to climate change and impacts caused by COVID-19. However, these challenges also present significant opportunities in areas where Lake Macquarie and the Hunter Region have existing expertise and skills, such as highly skilled technical and creative manufacturing industries that lend themselves to circular economy industries.

A circular economy approach is in strong alignment with other regional initiatives including the Renewable Energy Zone and the recently announced Green Hydrogen Hub. As one of the fastest growing regions in NSW, the circular economy approach provides a framework to deliver on the four pillars of sustainable development previously endorsed by Council in the current Sustainability Policy and the wider implementation of the Sustainable Development Goals (SDGs).

The SDGs for 2030 encourage nations to consider circular economy approaches and call for leading cities to experiment with innovative circular ideas and methods driven by their social, cultural, economic and regulatory contexts.

Applying circular economy principles at a regional level provides a way to build greater resilience within our businesses and communities. There is no “Lake Macquarie economy” separate to the wider regional, national and global economy it is embedded in. A circular economy approach can be applied at micro (product/material), meso (organisational/city) and macro (regional/national/global) levels and at varying scale and pace, but there can be no transition to a circular economy for Lake Macquarie in isolation of the wider economic sphere. For this reason, you will see references to Lake Macquarie and/or the Hunter region throughout the framework based on the level or context that is relevant.

Benefits

A transition to a circular economy for the region would support Council to:

Demonstrate leadership in a circular economy transition

Support economic development by retaining and attracting highly skilled jobs and industries as the shift to a low carbon economy gains pace

Contribute to international goals to protect shared global resources, such as water, air, soil and food

Implement the four pillars of sustainability in Council's Sustainability Policy

Enhance current waste diversion goals

Achieve synergy and alignment with Smart City aspirations, many of which are now integrated with circular economy strategies and metrics.

A circular economy also supports key themes of Council's Environmental Sustainability Strategy and Action Plan (ESSAP) 2020-2027:

Reduce the per capita ecological footprint of the City including GHG emissions and biodiversity targets.

Increase the number of businesses in circular economy-based manufacturing, design, reuse, repair and recycling of materials.

Council tender specifications include recycled, reused and sustainably sourced products, where a functionally and economically viable alternative to new materials is available.

Develop and maintain a Material Flow Analysis with Hunter Joint Organisation (HJO) to identify high value reprocessing opportunities.

Identify and develop low carbon and circular economy opportunities for the Local Government Area (LGA).

Embed sustainable design and optimise Council assets to increase recycled content in construction materials and achieve reductions in finite materials use.

A Circular Economy Framework

Council's Circular Economy Framework:

Establishes a formal, structured process to support the development of a circular economy vision and action plans

Provides an iterative methodology for the implementation of a circular economy approach to support the transition of Lake Macquarie and the wider region from a linear to a circular economy

Facilitates the co-design of Circular Economy Action Plans to implement the Circular Economy Framework across departments and clusters

Supports the development of goals, metrics and targets in the transition to more circular cities and regions, where relevant.

Structure

Development and implementation of a Circular Economy Framework involves significant system change which requires consultation, capability-building and potentially revision of some of Council’s existing policies and processes. Further elements that are under development to support the framework are the Circular Economy Policy and the upcoming review of the Waste/Circular Economy Strategy.

Shifting an organisation from linear to circular takes time and resources among a wide range of stakeholders. A series of 10 workshops was held across a wide group of Council stakeholders to gain feedback and insights on the framework. It is acknowledged that some teams and departments have different levels of sustainability maturity and appetite for leading innovation, and therefore may go at different speeds. The implementation framework was specifically chosen to support that.

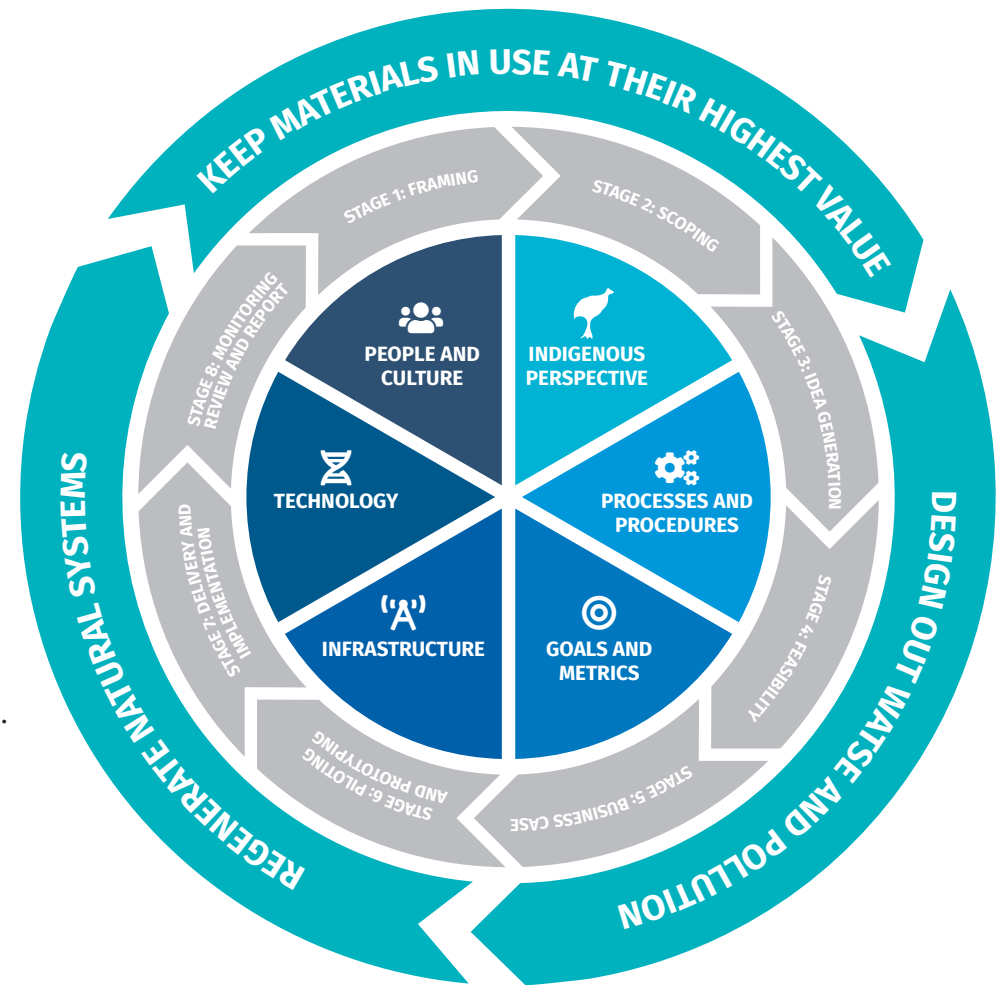
The framework (pictured right) is structured as follows:

OUTER GREEN RING – three key principles (adopted from the Ellen Macarthur Foundation) which are becoming the universally accepted basis of strategies and frameworks in transitioning to a circular economy (the why).

MIDDLE GREY RING – eight stages of implementation derived from the British Standard for Implementing CE in Organisations (the how). This provides a flexible, iterative and staged approach to implementation of a Circular Economy Framework.

INNER BLUE RING - six key focus areas are based upon the Circular Economy Framework for Peterborough Council in the United Kingdom, who have been recognised as a pioneering city in the World Economic Forum’s report on Circular Economy in Cities (the what).

The intended approach is to step through the co-design of Circular Economy Action Plans with teams and departments that will be responsible for implementing agreed targets and timeframes. This will include using the eight-stage implementation process to identify which focus areas are relevant to their area of influence, identify circular economy opportunities and barriers, and map out what resources and capability-building is necessary to deliver them.



TRANSITIONING LAKE MACQUARIE INTO A CIRCULAR-SMART CITY BY 2050

Implementation plan

Elements of the Implementation Plan outlined below are taken from BS 8001: 2017: Framework for implementing the principles of the circular economy in organizations – Guide. This standard has been developed by the British Standards Institute to provide implementation methodology to organizations transitioning to a circular economy approach.

The framework has the flexibility to cater for a range of teams while keeping alignment to overarching aims and principles.





Although the framework has been presented in a sequential manner, it is typical for organisations (and even different departments) to move back and forth as their level of circularity maturity develops.






BS 8001:2017 - EIGHT STAGE FLEXIBLE FRAMEWORK

Working through this eight-stage framework will assist in developing and embedding a Circular Economy approach for Council. Each of the stages are further elaborated and have proposed activities outlined. Activities will need to be contextualised to what is salient and can have impact within specific organisations. For this reason, staff will be supported by the Circular Economy Lead to unpack issues that are relevant and within their sphere of influence and to develop Circular Economy Action Plans for implementation. This work is captured in Stages 1-3 outlined in the Implementation Plan right.

Not all initiatives will require Feasibility Studies or full Business Cases. This will depend on the scope and costs of the proposed activities.

<p>STAGE 1 FRAMING</p> 	<p>1. ASSESS CURRENT STATE OF PLAY</p> <ul style="list-style-type: none"> Identify resources used and managed across the organisation and associated risks and opportunities, e.g. Materiality Assessment, Supply Chain review Review existing initiatives to leverage synergies for circular opportunities 	<p>2. STAKEHOLDER MAPPING</p> <ul style="list-style-type: none"> Identify internal and external stakeholders relevant to the Circular Economy Map synergies or barriers to implementation 	<p>3. GENERATE INTERNAL AWARENESS</p> <ul style="list-style-type: none"> Communicate and engage around CE Articulate benefits of what a CE approach could provide
<p>STAGE 2 SCOPING</p> 	<p>1. IDENTIFY SYSTEMS FOR ENGAGEMENT</p> <ul style="list-style-type: none"> Define and agree on the system boundary Map the system using material flows, value networks Identify key areas for intervention from a circular perspective 	<p>2. UNDERSTAND CURRENT VISION</p> <ul style="list-style-type: none"> How can the CE support or undermine LMCC long term value proposition Explore future state (e.g. back-casting or future-state mapping) Map assumption and their likely stability going forward and impacts on short, medium and long-term options 	<p>3. AGREE VISION AND HIGH-LEVEL STRATEGY</p> <ul style="list-style-type: none"> Define vision and level of CE ambition Map changes needed to deliver the vision Devise a CE program – assign ownership for key workstreams
<p>STAGE 3 IDEA GENERATION</p> 	<p>1. DEFINE GOALS AND CLEAR BRIEFS/TOPICS FOR EXPLORATION</p> <ul style="list-style-type: none"> Align these with problems/ opportunities identified in earlier stages 	<p>2. IDENTIFY AND PRIORITISE CE PROJECTS</p> <ul style="list-style-type: none"> Generate options that would progress CE vision and ambition Agree decision-criteria to prioritise CE projects Identify key risks, assumptions, barriers (e.g. market context, emerging trends, existing value proposition, strategic fit, stakeholder interests, timelines, ability to reduce resource intensity) 	
<p>STAGE 4 FEASIBILITY</p> 	<p>1. UNDERTAKE FEASIBILITY ASSESSMENT</p> <ul style="list-style-type: none"> Identify level of feasibility assessment needed for projects identified in Stage 3. This could be very basic, high level or a more detailed feasibility for larger projects. 	<p>2. REVIEW AND CONFIRM OPTIONS</p> <ul style="list-style-type: none"> Ensure alignment of options against CE vision, strategy and objectives Evaluate capability and appetite of key stakeholders and address any identified concerns 	

STAGE 5 BUSINESS CASE 	1. DEVELOP DETAILED BUSINESS CASE <ul style="list-style-type: none"> • Decisions on initiatives should be pushed down as low as possible within the organisation • Consider resourcing and risk framework • Relevant teams to programme CE projects into annual Operational Plans • For larger, inter-departmental projects, develop detailed business cases if required • Ensure alignment with CE vision, goals and objectives • Agree CE performance metrics for approved projects 		
STAGE 6 PILOTING & PROTOTYPING 	1. ESTABLISH OWNERSHIP AND GOVERNANCE <ul style="list-style-type: none"> • Identify projects that would benefit from piloting before full scaling and wider implementation • Determine who needs to be involved at what level for pilot trials (e.g. encouraging innovation at all levels aligned to the enterprise risk framework and encouraging disseminated decision-making and action) 	2. CONDUCT AND REVIEW PILOT <ul style="list-style-type: none"> • Use consistent methodology for trialling, monitoring and final close out • Define criteria for pilot to be considered for BAU • Capture lessons learned (from both successful and unsuccessful trials) 	
STAGE 7 DELIVERY & IMPLEMENTATION 	1. DEVELOP AND EXECUTE IMPLEMENTATION PLAN <ul style="list-style-type: none"> • Develop and execute plan for roll-out of CE Program • Identify and close CE capability gaps • Agree roles & responsibilities for key outcomes • Establish resourcing levels for long-term transition • Ensuring identified actions, impacts and outcomes are managed and appropriate internal controls are in place. 	2. MECHANISMS TO MEASURE PROGRESS OVER TIME <ul style="list-style-type: none"> • Establish review processes and timeframes to track against vision and programme 	
STAGE 8 MONITOR, REVIEW, REPORT CASE	1. MONITORING & MEASUREMENT <ul style="list-style-type: none"> • Monitor progress against objectives and targets • Foster a learning culture of continuous improvement • Ensure feedback is incorporated and informs future planning 	2. REPORTING <ul style="list-style-type: none"> • Publish progress towards stated goals and objectives • Consider aligning to CE national and international reporting 	3. CELEBRATE SUCCESS





Key focus areas

The table below outlines the six key focus areas with some general information included in the System Component in a Circular City and the Enabling Condition sections. The KPIs/ Milestones and the Timeframes sections are blank and the Circular Economy Lead (and the wider Environmental Systems team, where relevant) will work with each department to co-design their Circular Economy Action Plan and agreed goals and targets. Actions from these plans should then be included in the Delivery Program and Operational Plan, or a departmental business plan, for implementation. Appendix 1 has some examples of KPIs and Milestones that other councils have developed previously when using this framework - they are a guide only to trigger ideas and discussion.

Each focus area is aligned with relevant elements of the SDG framework. Appendix 2 has a comprehensive mapping of specific SDG targets to the six key focus areas.

RELEVANT SUSTAINABLE DEVELOPMENT GOAL (SDG)

SYSTEM COMPONENT IN A CIRCULAR CITY

ENABLING CONDITIONS

KPIS/MILESTONES

TIMEFRAMES

GOALS & METRICS



Circular Goals - city goals and ambitions facilitate Lake Macquarie being circular by 2050. Goals direct a city's progress and we need to ensure we're moving in the right direction. We need to establish and agree to our vision to be operating as a circular city by 2050.

Clear aims and objectives for creating a circular city will drive our progress, with clear measures of success identified and publicly reported against (aligned where relevant with the SDGs).

KPIs:
Pending co-design in CE Action Plans

Milestones:
Pending co-design in CE Action Plans

Pending co-design in CE Action Plans

PEOPLE & CULTURE



Circular People and Culture - citizens, organisations, schools and other stakeholders actively participate in our Circular City, and are realising the benefits. People are at the heart of cities. Today, 54 per cent of the world's population live in urban areas and by 2050, 75 per cent of people will live in cities.

The current linear economy has significant impacts on how people live and interact with others and the city environment. People living in cities can face negative impacts from today's take-make-waste economy, such as air, water, biodiversity and noise pollution.

Economic research has demonstrated that the existing linear economy has deepened socio-economic inequalities and continues to fail to meet many people's needs across the whole of society.

- People are better connected to each other and resources/ assets through the sharing economy, and have opportunities to share skills and participate in community sharing activities.
- People are empowered with the necessary information, skills and services to make better use of the materials and resources in the city, from repairing products to realising circular business opportunities.
- Conditions are in place (e.g. training programs, circular procurement) to support the creation of highly skilled jobs within the circular economy.
- Strong city-wide collaboration across all sectors, with stakeholders involved in co-designing demonstration projects and the overall development of the CE Action Plans where appropriate.
- Individuals, businesses, community groups and others have access to the support required to make changes towards the circular economy.
- Development of a Circular Tourism guideline for local business.

KPIs:
Pending co-design in CE Action Plans

Milestones:
Pending co-design in CE Action Plans

Pending co-design in CE Action Plans

RELEVANT SUSTAINABLE DEVELOPMENT GOAL (SDG)

SYSTEM COMPONENT IN A CIRCULAR CITY

ENABLING CONDITIONS

KPIS/MILESTONES

TIMEFRAMES

INDIGENOUS PERSPECTIVE



Combining the contemporary idea of a circular economy with the worldviews preserved by Indigenous people through generations could offer a path to a more prosperous global economy. The essence of the circular economy – understanding the interconnectedness of everything, and building cycles of continual regeneration – have long been found in Aboriginal, Māori and Pasifika peoples of Australia, New Zealand and the Pacific Islands.

Pending development with Aboriginal Community Development Office and Local Aboriginal Land Council.

Pending development with Aboriginal Community Development Office and Local Aboriginal Land Council.

Pending co-design in CE Action Plans

INFRASTRUCTURE



Circular Infrastructure - innovation-led physical and digital infrastructure that enables us to make the most of local materials and resources.

Growing populations in cities put increasing pressures on urban infrastructure. Within key related sectors, including mobility and the built environment, resources are not fully utilised resulting in both economic losses and negative environmental impacts. For example:

- The average office in OECD is used for only 35-50 per cent of working hours, whilst the average car is parked for 92 per cent of the time.
- Traffic congestion has negative impacts on productivity, costing billions in lost productivity globally every year.

- Infrastructure is designed and constructed with CE principles, such as modularity, adaptability and material reuse.
- City assets (including buildings and infrastructure) are collaboratively managed to maximise synergies between different assets.
- Infrastructure is in place to enable digital connectivity.
- Increase the scale of renewable energy in the City

KPIs:
Pending co-design in CE Action Plans

Milestones:
Pending co-design in CE Action Plans

Pending co-design in CE Action Plans

RELEVANT SUSTAINABLE DEVELOPMENT GOAL (SDG)

SYSTEM COMPONENT IN A CIRCULAR CITY

ENABLING CONDITIONS

KPIS/MILESTONES

TIMEFRAMES

TECHNOLOGY



Circular Technology - digital technology provides the information and connectivity to enable a city that is more restorative and regenerative.

Digital technology can support the circular economy through radical virtualisation, dematerialisation and greater transparency of resource and product flows. Many cities are currently challenged by a lack of available data on urban resource flows to make informed decisions. Through digital technologies such as asset tagging, networks of sensors and geospatial mapping, cities have the potential to collect and analyse data on assets and resources (including people), map flows, identify key areas of structural waste and inform more data-driven decision making.

- Infrastructure is in place to create an intelligent ‘digital nervous system’ to enable virtual modelling of urban systems and effective urban planning for the circular economy.
- As part of the digital nervous system, city stakeholders are digitally empowered to identify circular opportunities using city data, stimulating innovation and create new value with the data.
- Feedback is systematically used to drive improvements in resource use within organisational and urban systems.
- Digital solutions enable the sharing of assets/resources and circular flows of materials (e.g. apps).
- Smart City strategies are integrated with the Circular Economy approach.

KPIs:
Pending co-design in CE Action Plans

Pending co-design in CE Action Plans

Milestones:
Pending co-design in CE Action Plans

PROCESSES & PROCEDURES



Circular Processes & Procedures - city-level processes and procedures operate across systems, breaking down siloed-thinking, to facilitate the development of the circular economy.

Public procurement and the purchasing of services, works and supplies cover about 12 per cent of OECD gross domestic product (GDP). Consequently, leveraging public procurement has an immense power to stimulate the circular economy.

- Circular public procurement policies adopted across Council.
- CE principles embedded in city processes and leadership of city-wide change is embedded in the roles of senior management across Council.
- CE is embedded in the City’s strategic economic priorities

KPIs:
Pending co-design in CE Action Plans

Pending co-design in CE Action Plans

Milestones:
Pending co-design in CE Action Plans



Roles and Responsibilities

The following table outlines proposed key roles and responsibilities as per below:

ROLES	RESPONSIBILITIES														
Council	<ul style="list-style-type: none"> • Make informed and evidence-based decisions. 														
Executive	<ul style="list-style-type: none"> • Review and endorse the Circular Economy Framework • Review and consider CE recommendations from staff • Advocate on behalf of Council and escalate a CE approach to government and industry forums where appropriate. 														
SLN/Managers	<ul style="list-style-type: none"> • Embed circular economy into department plans, operations and activities • Provide tangible support for circular economy including ensuring appropriate resources, competencies and budget alignments are in place • Some areas of the framework are more relevant to particular departments than others, as outlined below. The Circular Economy Lead will support key stakeholders to implement the CE Framework through CE Action Plans. <table border="1" data-bbox="443 683 1736 1008"> <thead> <tr> <th>Focus Area</th> <th>Key Stakeholder</th> </tr> </thead> <tbody> <tr> <td>People & Culture</td> <td>PCR, ACT and Community Engagement</td> </tr> <tr> <td>Indigenous Perspective</td> <td>Social & Community Planning and Community Engagement</td> </tr> <tr> <td>Infrastructure</td> <td>Assets, City Projects, Waste Services and City Works</td> </tr> <tr> <td>Technology</td> <td>Asset Optimisation team and Smart City Lead</td> </tr> <tr> <td>Processes & Procedures</td> <td>ES, Business Improvement and Procurement</td> </tr> <tr> <td>Goals & Metrics</td> <td>ES and Waste Services</td> </tr> </tbody> </table>	Focus Area	Key Stakeholder	People & Culture	PCR, ACT and Community Engagement	Indigenous Perspective	Social & Community Planning and Community Engagement	Infrastructure	Assets, City Projects, Waste Services and City Works	Technology	Asset Optimisation team and Smart City Lead	Processes & Procedures	ES, Business Improvement and Procurement	Goals & Metrics	ES and Waste Services
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Infrastructure	Assets, City Projects, Waste Services and City Works														
Technology	Asset Optimisation team and Smart City Lead														
Processes & Procedures	ES, Business Improvement and Procurement														
Goals & Metrics	ES and Waste Services														
Circular Economy Lead	<ul style="list-style-type: none"> • Maintain the ongoing implementation and further development of the CE framework • Ensure the development and provision of circular economy training • Ensure the organisation is supported in its implementation of CE Action Plans where required. • Modify CE processes, resources, capabilities and skills as required • Develop network of CE Champions (both internal and external) including: <ul style="list-style-type: none"> • State and Federal agencies • Local Government procurement providers • Product certification (e.g. Life Cycle Assessment) professionals • Research institutions. 														
Manager, PCR	<ul style="list-style-type: none"> • Support CE capability building programmes and initiatives where required. 														
Procurement	<ul style="list-style-type: none"> • Provide support for scoping, framing and procurement support to deliver on CE action plans and targets. 														



Appendices

APPENDIX 1 - Sample KPIs & Milestones

The below table provides examples of KPIs and Milestones that other councils^[8] have developed previously when using this framework. They are a guide only to trigger ideas and discussion.

SYSTEM COMPONENT IN A CIRCULAR CITY	ENABLING CONDITIONS	KPIs/MILESTONES
GOALS & METRICS		
<p>Circular Goals - city goals and ambitions facilitate Lake Macquarie being circular by 2050. Goals direct a city's progress and we need to ensure we're moving in the right direction. We need to establish and agree to our vision to be operating as a circular city by 2050.</p>	<p>Clear aims and objectives for creating a circular city will drive our progress, with clear measures of success identified and publicly reported against (aligned where relevant with the SDGs).</p>	<p>KPIs – enabling conditions:</p> <ul style="list-style-type: none"> Awareness of CE among businesses as monitored by the current Environmental Attitudes Survey. Progress made against KPIs (continual improvement) <p>Milestones:</p> <ul style="list-style-type: none"> CE ambition included and monitored in the ESSAP Circular City Roadmap complete and published online Develop and agree a list of research areas with academic partners Circularity indicators/metrics developed at project, organisational and city-wide levels
PEOPLE & CULTURE		
<p>Circular People and Culture - citizens, organisations, schools and other stakeholders actively participate in our Circular City, and are realising the benefits. People are at the heart of cities. Today, 54 per cent of the world's population lives in urban areas and by 2050, 75 per cent of people will live in cities.</p> <p>The current, linear economy has significant impacts on how people live and interact with others and the city environment. People living in cities can face negative impacts from today's take-make-waste economy, such as air, water, biodiversity and noise pollution.</p> <p>Economic research has demonstrated that the existing linear economy has deepened socio-economic inequalities and continues to fail to meet many people's needs across the whole of society.</p>	<ul style="list-style-type: none"> People are better connected to each other and resources/ assets through the sharing economy, and have opportunities to share skills and participate in community sharing activities. People are empowered with the necessary information, skills and services to make better use of the materials and resources in the city, from repairing products to realising circular business opportunities. Conditions are in place (e.g. training programs, circular procurement) to support the creation of highly skilled jobs within the circular economy. Strong city-wide collaboration across all sectors, with stakeholders involved in co-designing demonstration projects and the overall development of the CE Action Plans where appropriate. Individuals, businesses, community groups and others have access to the support required to make changes towards the circular economy. Development of a Circular Tourism guideline for local business. 	<p>KPIs – outcome/impact focused:</p> <ul style="list-style-type: none"> Awareness of CE among citizens Number of jobs within the CE Number of maker and resource sharing facilities in the city (e.g., makers spaces and 'libraries of things') Number of schools that include circular economy in their curriculum Circular Economy Champions scheme established Amount of household waste produced Rates of illegal dumping <p>Milestones:</p> <ul style="list-style-type: none"> Network of maker spaces, repair cafés established Mechanism for communities to share skills, knowledge, spaces and tools Network of 'Library of Things' established across the city Simple, easy-to-follow lesson plans to develop CE skills used in schools Circular Skills Academy established locally – mentorship programme for CE skills Mechanism established to enable citizens to set up their own community-based CE projects Basic intro to CE principles in schools Circular Office campaign launched in Lake Macquarie

[8] © Opportunity Peterborough, Peterborough Council, UK

SYSTEM COMPONENT IN A CIRCULAR CITY**ENABLING CONDITIONS****KPIS/MILESTONES****INDIGENOUS PERSPECTIVE**

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INFRASTRUCTURE

Circular Infrastructure - innovation-led physical and digital infrastructure that enables us to make the most of local materials and resources.

Growing populations in cities put increasing pressures on urban infrastructure. Within key related sectors, including mobility and the built environment, resources are not fully utilised resulting in both economic losses and negative environmental impacts. For example:

- The average office in OECD is used for only 35-50 per cent of working hours, whilst the average car is parked for 92 per cent of the time.
- Traffic congestion has negative impacts on productivity, costing billions in lost productivity globally every year.

- Infrastructure is designed and constructed with CE principles, such as modularity, adaptability and material reuse.
- City assets (including buildings and infrastructure) are collaboratively managed to maximise synergies between different assets.
- Infrastructure is in place to enable digital connectivity.
- Increase the scale of renewable energy in the City

KPIs – outcome/impact focused:

- Volume of non-municipal waste reduced
- Proportion of energy in the city produced from renewable sources
- Water use (use of non-potable fit for purpose sources)
- Material-related carbon emissions
- Proportion of recycled content in construction

Milestones:

- Energy Recovery Facility operating in the city
- Establish evidence base for the economic, social and environmental benefits of circular infrastructure
- CE Planning guide developed for co-design process with end-users/ stakeholders developed

SYSTEM COMPONENT IN A CIRCULAR CITY**ENABLING CONDITIONS****KPIS/MILESTONES****TECHNOLOGY**

Circular Technology - digital technology provides the information and connectivity to enable a city that is more restorative and regenerative.

Digital technology can support the circular economy through radical virtualisation, dematerialisation and greater transparency of resource and product flows. Many cities are currently challenged by a lack of available data on urban resource flows to make informed decisions. Through digital technologies such as asset tagging, networks of sensors and geospatial mapping, cities have the potential to collect and analyse data on assets and resources (including people), map flows, identify key areas of structural waste and inform more data-driven decision making.

- Infrastructure is in place to create an intelligent 'digital nervous system' to enable virtual modelling of urban systems and effective urban planning for the circular economy.
- As part of the digital nervous system, city stakeholders are digitally empowered to identify circular opportunities using city data, stimulating innovation and create new value with the data.
- Feedback is systematically used to drive improvements in resource use within organisational and urban systems.
- Digital solutions enable the sharing of assets/resources and circular flows of materials (e.g. apps).
- Smart City strategies are integrated with the Circular Economy approach.

KPIs - enabling conditions:

- Available output from sensors across the city
- Number of city-wide datasets available for use
- Number of circular opportunities realised from city data

Milestones:

- Business-2-Business (B2B) sharing economy platform established
- Baseline mapping/audit completed of what data we already have and what we don't have (gaps)
- Digital connectivity established for sensor interoperability
- City-wide sustainable data platform established

PROCESSES & PROCEDURES

Circular Processes & Procedures - city-level processes and procedures operate across systems, breaking down siloed-thinking, to facilitate the development of the circular economy.

Public procurement and the purchasing of services, works and supplies cover about 12 per cent of OECD gross domestic product (GDP). Consequently, leveraging public procurement has an immense power to stimulate the circular economy.

- Circular public procurement policies adopted across Council.
- CE principles embedded in city processes and leadership of city-wide change is embedded in the roles of senior management across Council.
- CE is embedded in the City's strategic economic priorities

KPIs:

- Proportion of public procurements that include circular economy requirements
- Proportion of engineering guidelines to supporting use of fit for purpose CE materials




Milestones:

- Internal CE working group established
- Public procurement policies aligned with CE principles
- Digitally enabled feedback systems are in place














APPENDIX 2 - Circular Economy and Sustainable Development Goals Mapping

The below table is a comprehensive mapping of specific SDG targets to the six key focus areas.

CE FRAMEWORK FOCUS AREA	SDG	SDG TARGET #
GOALS & METRICS		<p>8.2 Achieve higher levels of economic productivity through diversification, technological upgrading and innovation, including through a focus on high-value added and labour-intensive sectors</p>
		<p>8.4 Improve progressively, through 2030, global resource efficiency in consumption and production and endeavour to decouple economic growth from environmental degradation, in accordance with the 10-year framework of programmes on sustainable consumption and production, with developed countries taking the lead</p>
		<p>8.9 By 2030, devise and implement policies to promote sustainable tourism that creates jobs and promotes local culture and products</p>
		<p>11.6 By 2030, reduce the adverse per capita environmental impact of cities, including by paying special attention to air quality and municipal and other waste management</p>
		<p>12.1 Implement the 10-year framework of programmes on sustainable consumption and production, all countries taking action, with developed countries taking the lead, taking into account the development and capabilities of developing countries</p>
		<p>12.2 By 2030, achieve the sustainable management and efficient use of natural resources</p>
		<p>12.3 By 2030, halve per capita global food waste at the retail and consumer levels and reduce food losses along production and supply chains, including post-harvest losses</p>
		<p>12.4 By 2030, achieve the environmentally sound management of chemicals and all wastes throughout their life cycle, in accordance with agreed international frameworks, and significantly reduce their release to air, water and soil in order to minimise their adverse impacts on human health and the environment</p>
		<p>12.5 By 2030, substantially reduce waste generation through prevention, reduction, recycling and reuse</p>



CE FRAMEWORK FOCUS AREA	SDG	SDG TARGET #
PEOPLE & CULTURE		<p>4.4 By 2030, substantially increase the number of youth and adults who have relevant skills, including technical and vocational skills, for employment, decent jobs and entrepreneurship</p> <p>4.7 By 2030, ensure that all learners acquire the knowledge and skills needed to promote sustainable development, through education for sustainable development and sustainable lifestyles, human rights, gender equality, promotion of a culture of peace and non-violence, global citizenship and appreciation of cultural diversity and of culture's contribution to sustainable development</p>
		<p>12.8 By 2030, ensure that people everywhere have the relevant information and awareness for sustainable development and lifestyles in harmony with nature</p> <p>12.b Develop and implement tools to monitor sustainable development impacts for sustainable tourism that creates jobs and promotes local culture and products</p>
		<p>13.3 Improve education, awareness-raising and human and institutional capacity on climate change mitigation, adaptation, impact reduction and early warning</p>
INDIGENOUS PERSPECTIVE		<p>10.1 By 2030, progressively achieve and sustain income growth of the bottom 40 per cent of the population at a rate higher than the national average</p>
		<p>10.2 By 2030, empower and promote the social, economic and political inclusion of all, irrespective of age, sex, disability, race, ethnicity, origin, religion or economic or other status</p>
		<p>10.3 Ensure equal opportunity and reduce inequalities of outcome, including by eliminating discriminatory laws, policies and practices and promoting appropriate legislation, policies and action in this regard</p>
		<p>11.4 Strengthen efforts to protect and safeguard the world's cultural and natural heritage</p>
	<p>17.17 Encourage and promote effective public, public-private and civil society partnerships, building on the experience and resourcing strategies of partnerships</p>	

CE FRAMEWORK FOCUS AREA	SDG	SDG TARGET #
INFRASTRUCTURE		<p>6.3 By 2030, improve water quality by reducing pollution, eliminating dumping and minimising release of hazardous chemicals and materials, halving the proportion of untreated wastewater and substantially increasing recycling and safe reuse globally</p> <p>6.4 By 2030, substantially increase water-use efficiency across all sectors and ensure sustainable withdrawals and supply of freshwater to address water scarcity and substantially reduce the number of people suffering from water scarcity</p> <p>6.6 By 2030, protect and restore water-related ecosystems, including mountains, forests, wetlands, rivers, aquifers and lakes</p> <p>6.b Support and strengthen the participation of local communities in improving water and sanitation management</p>
		<p>7.1 By 2030, ensure universal access to affordable, reliable and modern energy services</p> <p>7.2 By 2030, increase substantially the share of renewable energy in the global energy mix</p>
		<p>9.1 Develop quality, reliable, sustainable and resilient infrastructure, including regional and transborder infrastructure, to support economic development and human well-being, with a focus on affordable and equitable access for all</p> <p>9.3 Increase the access of small-scale industrial and other enterprises, in particular in developing countries, to financial services, including affordable credit, and their integration into value chains and markets</p> <p>9.4 By 2030, upgrade infrastructure and retrofit industries to make them sustainable, with increased resource-use efficiency and greater adoption of clean and environmentally sound technologies and industrial processes, with all countries taking action in accordance with their respective capabilities</p> <p>9.5 Enhance scientific research, upgrade the technological capabilities of industrial sectors in all countries, in particular developing countries, including, by 2030, encouraging innovation and substantially increasing the number of research and development workers per 1 million people and public and private research and development spending</p>
		<p>11.a Support positive economic, social and environmental links between urban, peri-urban and rural areas by strengthening national and regional development planning</p>
		<p>13.1 Strengthen resilience and adaptive capacity to climate-related hazards and natural disasters in all countries</p>

CE FRAMEWORK FOCUS AREA	SDG	SDG TARGET #
TECHNOLOGY		<p>8.2 Achieve higher levels of economic productivity through diversification, technological upgrading and innovation, including through a focus on high-value added and labour-intensive sectors</p>
	PROCESSES & PROCEDURES	<p>8.7 Take immediate and effective measures to eradicate forced labour, end modern slavery and human trafficking and secure the prohibition and elimination of the worst forms of child labour, including recruitment and use of child soldiers, and by 2025 end child labour in all its forms</p>
<p>11.b By 2030, substantially increase the number of cities and human settlements adopting and implementing integrated policies and plans towards inclusion, resource efficiency, mitigation and adaptation to climate change, resilience to disasters, and develop and implement, in line with the Sendai Framework for Disaster Risk Reduction 2015-2030, holistic disaster risk management at all levels</p>		
<p>12.7 Promote public procurement practices that are sustainable, in accordance with national policies and priorities</p>		
<p>17.14 Enhance policy coherence for sustainable development</p> <p>17.16 Enhance the global partnership for sustainable development, complemented by multi-stakeholder partnerships that mobilise and share knowledge, expertise, technology and financial resources, to support the achievement of the sustainable development goals in all countries, in particular developing countries</p> <p>17.17 Encourage and promote effective public, public-private and civil society partnerships, building on the experience and resourcing strategies of partnerships</p>		



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