

CALL FOR PARTNERS



Implementing a New Human Settlement Theory Harmonising the Urban Metabolism with the Natural Metabolism through the design of Circular Economy Innovation Hubs

Background

In a review of literature related to *Healthy Built Environments* (Kent, J. et al 2011, UNSW), three key themes emerged:

- Getting people active,
- Connecting and strengthening communities and
- Providing healthy food options.

Yet Barton (2009) argued that “current research into the relationship between health and the built environment is hampered by the inadequacy of human settlement theory” and that such a theory “will be based in eco-system theory, linking human activity and well-being with development processes, the structure of the built environment and the natural biogeochemistry”.

Growing interest in regenerative development and biophilic design illustrates the need to harmonise human activities with the natural environment. Considering our complete dependence on environmental services, each development should seek to enhance the viability of such services rather than simply aiming to minimise harm. Meanwhile, the energy transition, growing interest in urban agriculture and research into water sensitive cities are all changing the way we think about human settlements.

Inter-disciplinary research is also informing the development of interconnected infrastructure. In 2011, the World Economic Forum published *Water Security: The Water-Energy-Food-Climate Nexus* and noted that: “water is, quite literally, hitched to everything else” and “Water security is the gossamer that links together the web of food, energy, climate, economic growth, and human security challenges...”. Biggs et al. (2015) argued for the nexus to be viewed from a ‘sustainable livelihoods’ perspective and that this more holistic approach will contribute to sustainable development targets while also promoting equity amongst individuals and communities.

The principal industry partners, PolisPlan (and their development arm Beautyity Developments), have proposed a new settlement theory based on the nexus between water, food, energy and the built environment and the principles of the Circular Economy—systems thinking, life-cycle planning and zero waste. Rather than ever more congested cities and deprived rural townships, they propose a distributed and connected network of nodes described as ‘Circular Economy Innovation Hubs’.

This project seeks to advance the creation of a replicable process for the development of such hubs by working with Local Governments and researchers to build a policy framework—including strategies and development controls—that supports the implementation of this approach.

Some of the challenges:

- Integrating a new approach to land development into the land use planning framework
- Integrating a new approach to land development into a whole-of-ecosystem strategy
- Integrating food, water and energy infrastructure into design of urban environment
- Exploring how the internet is transforming life and work
- Translating nutrition plans to agricultural plans for a discrete population and determining land and water demand for various agricultural plans
- Integrating micro-factory technologies and business models for converting waste to resources into the social and economic system
- Developing land tenure and governance systems that support and enable collaboration, sharing and stewardship of the land

“Imagine the world as a network of water-holes; places where, in exchange for a few hours of work, you could access all your basic needs and then spend most of your time on the things you were passionate about. Imagine also that you were free to move between waterholes or free to stay as long as you wish.”

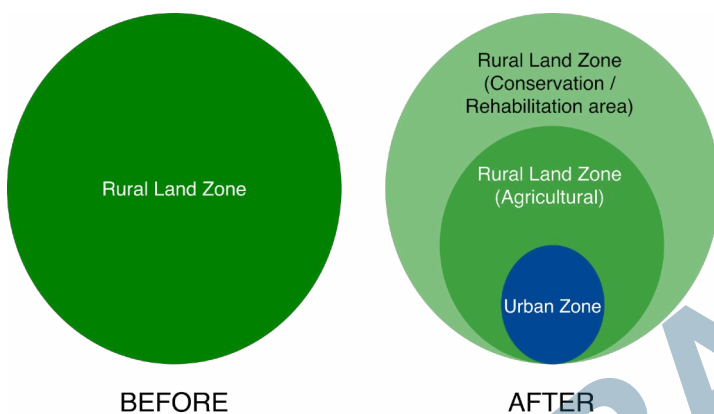
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Project Managers
BeautyityDevelopments.com.au

PROPOSED DELIVERABLES

Local Government Strategy

In order for any land development to occur, it must be consistent with the local community's vision for the future as expressed in the Local Authority's long term strategic plans. We wish to partner with supportive local governments to develop the language that could be included in local strategic documents. For example:

- Explicitly supporting the rezoning of land to enable regenerative, adaptive and cyclic development. This would be subject to clear controls such as optimal infrastructure provision requirements before land can be rezoned for urban purposes.
- Defining the environmental service implications and performance requirements of development
- Developing a framework for advancing smart city technologies, so that these support people and place rather than technology providers.
- E-change as an opportunity for regional areas



No more than 10 to 15 percent of the site (and max. 5 hectares) to be rezoned for urban purposes to accommodate up to 200 people.

Land Tenure for Access & Ownership

Although the design will provide residents with private spaces and facilities, there will be a range of spaces and facilities that are collectively owned. Given the intended flexibility of design and fluidity of movement of individuals through the site, the demarcation of private from shared ownership by subdividing the land is not considered appropriate for this design.

Compare and contrast the strengths and weaknesses of existing models for collective land ownership, including strata title, community title, company title, Community Land Trusts, Multiple Occupancies and any others.

Determine the most appropriate approach, not just for residents who wish to be settled for an extended period but also for nomads, travellers and other visitors who might stay for a shorter period.

Community & Stakeholder Engagement

Develop a methodological framework for community engagement in each of the project elements, in particular:

- To engage the community in the development of a common, locality specific vision that will remain viable and sustainable into the future
- To identify appropriate localities for this form of development
- To compare different governance systems
- To identify nutrition needs, desires and expectations
- To co-create the built environment
- To support the waste minimisation strategies
- To development a land tenure system that aligns with the governance model

Locality Planning

Develop the methodological framework for identifying appropriate localities within a Local Government Area and/or bioregion where this form of development could occur, by considering the following issues:

- The needs of the natural environment, such as environmental flows in waterways and the need for restoration
- Local indigenous knowledge and heritage
- Which environmental conditions will optimise the capacity to provide water, energy and food.
- Strategies for community engagement
- Connection to and integration with existing townships to support these communities
- Strategies to identify economic opportunities in and around the Innovation hub
- Current planning strategies and population expectations

Building & Landscape Design

Current approaches to regulating and designing the built environment, such as floor space ratios, building height controls, setbacks, open space and sustainability rating requirements are not useful for this form of development. The objectives seek to maximise the aesthetic quality and functionality rather than to regulate minimum standards. Also, the design aims to regenerate the land and have a positive impact on the environment, not just minimise the impacts.

Develop performance-based criteria (rather than prescriptive controls) to manage and enable these outcomes to be achieved and adaptively managed over the lifespan of the development.

Commons Governance

Given that there will be a range of spaces and facilities that are collectively owned and accessible to many, a system of managing these commons will be required.

Rather than regulating minimum standards, restricting access or demanding fee for service, the purpose is to manage the water, food, energy and built spaces to guarantee an abundance for all residents.

Develop a constitutional framework for inclusion in the land tenure documents that supports incoming residents to manage their assets in common.

LINEAR ECONOMY:

Converting natural resources into waste...



CIRCULAR ECONOMY:

*Striving for Zero Waste
Systems Thinking
Life-Cycle Planning*

PROPOSED DELIVERABLES

Water & Energy Micro-grid

Renewable energy generation and water harvesting, storage and distribution will be tailored to the geography and climate of each development site. Work with local authorities to determine what controls should be developed. Consider as a minimum:

- Review planning provisions related to Water Sensitive Urban Design
- Review of development contributions plans as they relate to water management
- Review infrastructure plans for water supply and sewerage systems (including water demand and on-site supply)
- Review requirements for connection to the electricity grid
- Identify requirements for the management of blackwater and enabling alternative toilet designs
- Identify requirements for onsite water and energy storage capacity and design options based on onsite demand
- Identify requirements for environmental services including flows to connected waterways and biodiversity maintenance.

Transport & Traffic Planning

The objective of transport and traffic planning in this project is to facilitate the transition to a non-fossil fuel dependent transport system, while also maximising the opportunity for vehicle sharing.

Develop a conceptual transport planning methodology:

- for movement within the site,
- for local connections to the adjoining township and
- to provide shared assets for long distance transport.

The methodology would acknowledge the relatively high number of internal economic activities and provide:

- an internal transport system, vehicle exclusion zones and opportunities for bikes, Segways, carts and the like
- selection of vehicle types based on the ability to generate fuel on site, such as electric vehicles or vehicles powered by biofuels produced by on-site bio-digesters

Determine likely vehicle movements to and from this form of development to inform discussions with traffic authorities and to enable the preparation of a traffic impact assessment.

Nutrition and Food Systems

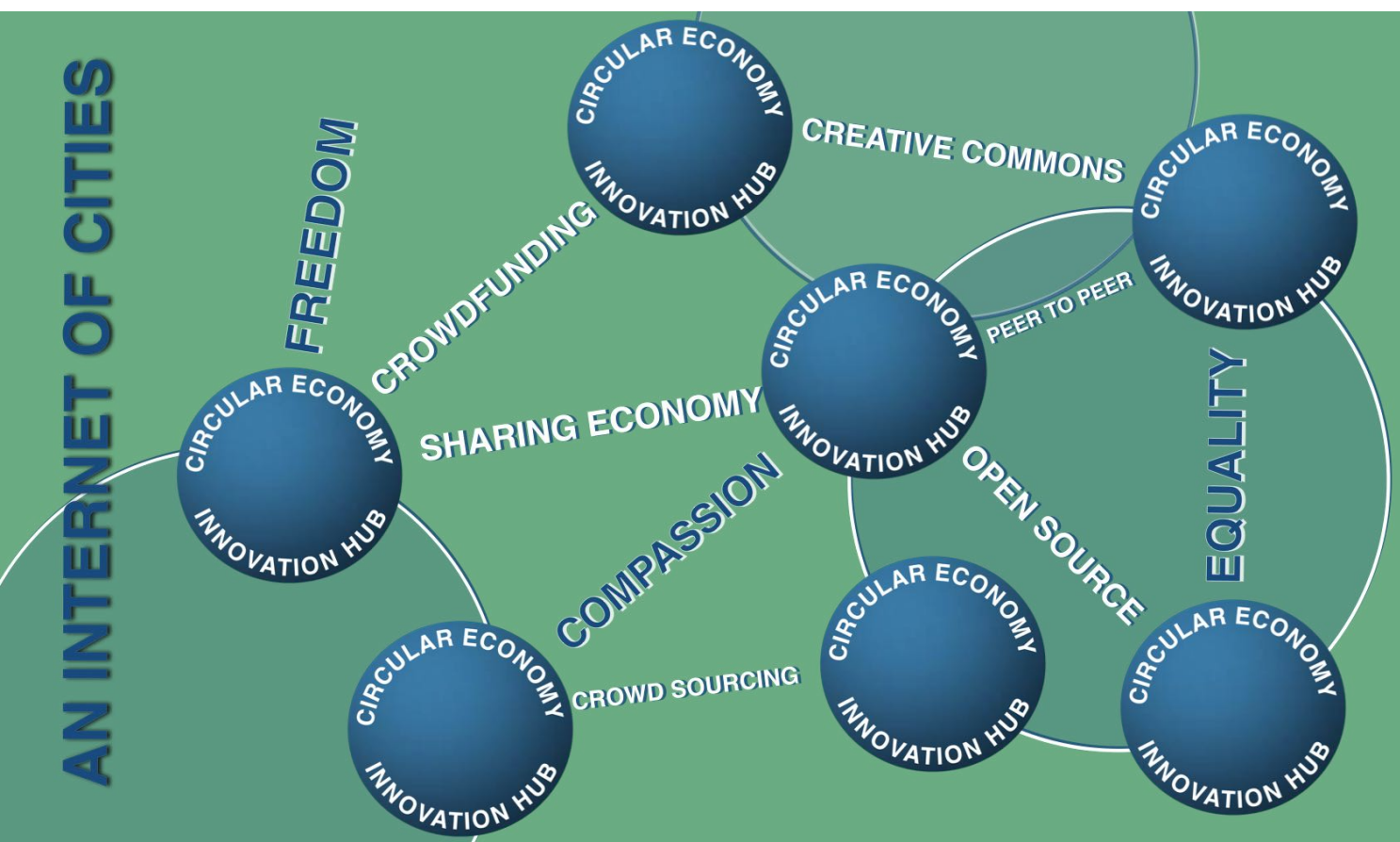
Develop the methodological framework for converting nutrition plans into agricultural plans for a discrete population, generally along the following lines:

- Identify a range of nutrition plans, including vegan, vegetarian and various meat intake diets
- Identify appropriate integrated polyculture agricultural methods and associated expected yields from each
- For a given demographic of 200 individuals, convert nutrition plans into agricultural plans
- Determine land, energy, and water demand
- Work with Local Governments to prepare development controls, including minimum lot size for development and water quality and quantity controls.

Modelling of Material & Energy Flows

Develop a methodological framework for identifying, categorising and analysing the material and energy flows in a local government area (LGA). The aim is to inform policy in the following areas:

- Waste minimisation and resource management for the LGA
- Identification of Circular Economy business models and technologies for converting waste into resources or new products
- Support local economic development by identifying demand from external sources that could be satisfied by local businesses or community groups

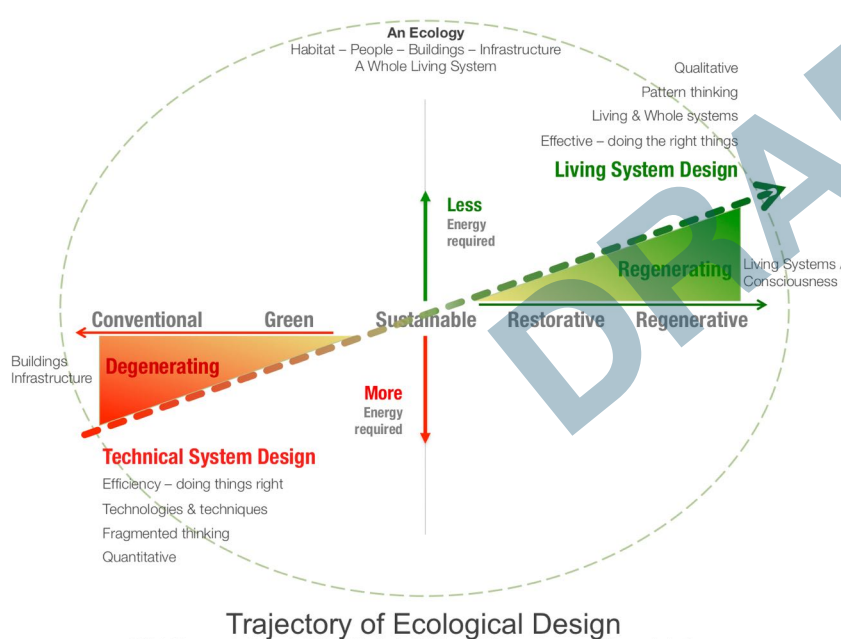


Seeking Industry and Local Government partners: Collaborate with us

We invite you to join this collaborative project. Whilst there is a significant level of research at the core of the project, some components will simply fund consultants or project team members to undertake modelling or to increase awareness of new paradigms in planning and land use development.

Some components of the research will be included in an Australian Research Council (ARC) Linkage program grant funding application. This scheme allows funding from partner organisations to leverage additional funding from the Federal Government. **Every dollar from partner organisations can leverage up to four dollars from the ARC.** Contributions are eligible for the AusIndustry R&D tax concession allowing deductions of up to 125% of qualifying expenditure incurred on R&D activities.

How would a budget like this work? For a total cash research budget of up to \$300,000 per annum (up to \$900,000 over three years), three partners could each contribute \$20,000 cash per annum and \$60,000 partner in-kind contributions. With this partner investment, the ARC cash contribution would total up to \$240,000 per annum.



What do I need to do next?

If you decide to support the ARC funding bid, we will require a **non-binding Expression of Interest** on letterhead (maximum 2 pages) **by 30 Xxx 2018**. We would be grateful for an opportunity to discuss how we can co-develop this proposal with you to ensure it suits your needs.

Our Project Team

- Professor Marcus Foth, Professor of Urban Informatics, QUT Design Lab (Urban Interaction Design, the intersection of people place and technology)
- Associate Professor Ron Johnstone, University of Queensland, School of Earth and Environmental Sciences (Ecological Systems analysis)
- Associate Professor James Ward, University of South Australia, School of Natural and Built Environments (Land and Water demand analysis for agricultural plans)
- Dr Simon Toze, Research Director CSIRO, Liveable, Sustainable and Resilient Cities (Integrated Energy and Water Micro-grids)
- Dr. Anthony Halog University of Queensland, School of Earth and Environmental Sciences (Industrial Ecology, urban metabolism and Circular Economy)
- Dr. Evangeline Mantzioris, University of South Australia, School of Pharmacy and Medical Sciences (Nutrition and Food Sciences)
- Ms. Laurel Johnson, University of Queensland, School of Earth and Environmental Sciences (Social planning, mobility planning, local government planning)

Project Managers:

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Co-creating a new paradigm for regenerative land development