

Net regenerative regional development: implementation in the master planning stage of a 680 hectares case study

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Abstract: A positive vision for the future of humanity can be the basis for a needed change, a vision of opportunity, abundance and the potential for thriving. Regenerative development can provide a pathway towards this vision. Case studies are beginning to show that when applied, the concepts underpinning regenerative development can accelerate a transition to more equitable, sustainable, post fossil carbon societies. Net Regenerative Regional Development (NRRD) is development that supports the health and vitality of a region through mutually beneficial relationships between all the stakeholders and flows of the system. Though in its infancy in application, NRRD is based on the accumulation of millennia of human knowledge and provides us an opportunity to positively change the often negative future predicted. The potential of NRRD is being investigated using a large project called Seacombe West in Gippsland, Victoria and its masterplanning process. The masterplanning process is being informed by regenerative development theory and the facilitation process by the Living Environments in Natural, Social and Economic Systems (LENSES) framework. This study shows that planning NRRD through the use of LENSES supported the emergence of more holistic and systemic guidelines which informed a masterplan that has greater regenerative potential.

Keywords: Regenerative development; Design process; Large scale project; cross-disciplinary.

1. Introduction

There has been a call from many areas of research and practice for a different approach to sustainable development in the built environment, because many of the social and ecological indicators that underpin our civilisation are being rapidly eroded; that is we are failing at our current approach to sustainability. Led by thinkers in the built environment such as McDonough and Braungart (2002), du Plessis (2011; 2013), Mang and Reed (2012), Lyle (1994), Plaut *et al.* 2011 and Cole (2012b) the call has gone out to approaches that facilitate built environment outcomes that move beyond marginal improvements and shift our focus towards creating vitality. Projects that begin to heal the damage done in the past and create vital relationships that lead to resilience, adaptive and thriving outcomes. As argued by Mang and Reed (2012), Cole (2012a), du Plessis (2012), Hes and du Plessis (2015), Robinson and Cole (2014) and Beer (2016), regenerative development is the leading theoretical framework to facilitate contributive development approaches.

Regenerative development has been defined as *'the process of cultivating the capacity and capability in people, communities, and other natural systems to renew, sustain, and thrive. It is not about maintaining what is, or restoring something to what it was.'* (Plaut *et al.*, 2016). Regenerative development focuses on supporting a system to: (1) identify and reach its full potential; and (2) support the system to change and evolve towards states of increasing health and abundance.

There are examples of the application of regenerative development ideas internationally, but these often tend to be reflections on projects and their outcomes (e.g. Mang and Reed (2012), and case studies found on practitioners' pages such as *Regenesi*s and the *Institute for the Built Environment* (IBE), Colorado State University). While these provide insights into the outputs of regenerative development projects, there is a further need to better understand the process that supports regenerative thinking by contrasting it to business as usual.

The aim of this paper is to evaluate if adopting regenerative thinking from the onset of a project does support regenerative opportunities in developing the masterplan. This is achieved by evaluating the use of a creative facilitation tool called LENSES in the Seacombe West large scale development project (see Section 3.1) in Gippsland, Victoria, Australia. This analysis will assess both the design guidelines emerging from the design charrette facilitated by LENSES, as well as the translation of these guidelines into the masterplan. The latter will be done through a comparison with an earlier masterplanning attempt from 2003, which did not rely on regenerative thinking.

2. Existing regenerative development projects

To date there are very few built projects that have implemented a regenerative development approach throughout the design and construction process. The existing examples tend to reflect on the outcomes as opposed to analysing the process of applying regenerative thinking and contrasting it to business as usual. Moreover, very few studies provide insights for designers, engineers and planners on implementing regenerative approaches across multiple scales—from the building scale to ecosystems.

One project that tested the potential of regenerative development at a large scale is the *Villages* at Loreto Bay; a 6,000-unit mixed-use community development and eco-resort located south of the town of Loreto in Baja California Sur, Mexico (Steinitz *et al.*, 2005; Buntin, 2008; Benne and Mang, 2015). However, it faced economic downturns following the economic crisis in Mexico in 2008, and construction did not go further. According to Benne and Mang (2015) the project had great regenerative potential, however, there were several gaps in the thinking and approach, including following a project-centric approach that disconnected the site from its broader community and context. It lacked a long-term vision of a regenerative future for the site, and had limited context *'for seeing and targeting what was strategically more important for enabling the larger community to grow a healthier more prosperous future'* (Benne and Mang, 2015, p. 49).

The involvement of the interdisciplinary team from *Regenesi*s helped grounding the project's aspirations towards being the world's largest green development through proposing a unique project concept that reflected the greater potential of the place. The aim of the regenerative approach was to build a stewardship culture among the community to protect the health of Sea of Cortez. Through the regenerative process in Loreto Bay, new potential for the Greater Loreto region emerged and the emphasis on the role of the site in its broader context led to positive outcomes such as informing new policies governing the protection of estuaries in the region, and bringing the community back together.

Other projects which follow regenerative thinking include the *Omega Center for Sustainable Living* (OCSL) in New York, the Willow School in New Jersey, and the Sustainable Boutique Hotel at Playa Viva,

Mexico. These projects particularly show the potential of applying regenerative thinking at the building scale. While they do lay ground for dialogues on the adoption of regenerative approaches in the design process, their scope limits their potential to engage with the broader system as decisions falling outside the site boundaries can be restrained. The Seacombe West project provides significant scope for documenting the regenerative thinking process of a large scale development.

3. Method

This section describes the case study project, the regenerative development framework used to facilitate the workshops (LENSES) and the overall research strategy. The assessment process used to evaluate the impact of using LENSES is then subsequently discussed.

3.1. Description of the case study: Seacombe West

Seacombe West, located 217 km South-East of Melbourne in Victoria, Australia, is a proposed 680 hectares (6.8 km²) development on Lake Wellington (*Murla* in the Gunai aboriginal language), one of the three interconnected lakes that form the Gippsland lakes. These lakes cover 340 km², are separated from the Bass Strait by a thin sand shore that forms the ninety miles beach, and are fed by seven rivers that carry water from a catchment area of 20,000 km² (Roberts *et al.*, 2012). In addition, many areas along the lakes are protected under the Ramsar convention (Ramsar, 2016) and other wetland and birds protection agreements. The Gippsland lakes are therefore a significant natural feature of the State of Victoria and generate a large economic activity, mainly in terms of agriculture, fishing and tourism. However, these lakes were artificially connected to the sea at Lakes Entrance in 1889 (a connection that requires regular dredging) and since then the entire ecosystem has been affected by increased salinity. Even though Lake Wellington is the least saline of the three lakes (Webster *et al.*, 2001), its biodiversity has rapidly declined over the last decades (Parks Victoria, 2008). The salinity at Seacombe West has also increased after each flood evaporates, leaving a layer of salt on the land. As such the site can no longer serve its past ecological or farming functions. The proposed development intends to work with the changed saline conditions, providing stable habitats while also regenerating the ecological functions of the lost ecosystems of the site. It also aims to enhance its socio-economic activity.

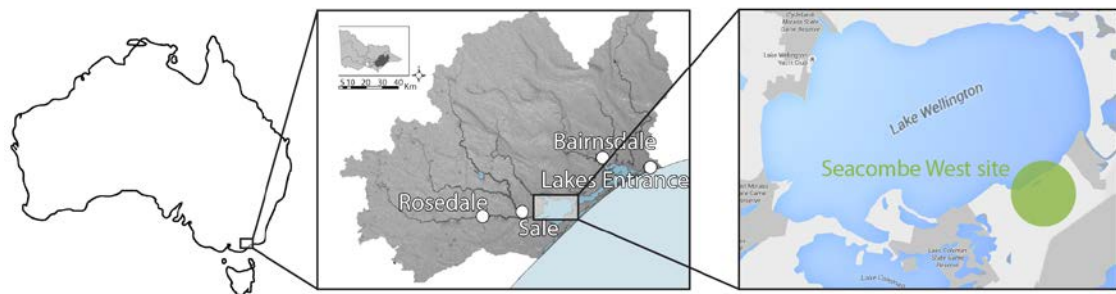


Figure 1: The Gippsland Lakes catchment area and the location of the site on the south-eastern shores of Lake Wellington (Lake *Murla*). Adapted from Love Our Lakes (2016) and Google Maps®.

3.2. Overall research strategy

The authors have led and organised a series of workshops with the key stakeholders of the project in order to facilitate regenerative thinking from the early stages of design. The results of each workshop were carried forward to the next as depicted in Figure 2. The fourth and final workshop organised consisted of a design charrette over 2 days, with 40 participating experts in water management, engineering, landscape architecture, architecture, construction, governance, biology, sociology, economics, arts and other fields. Aboriginal, government and local community representatives were also present. This workshop, which was facilitated mainly by Professor Brian Dunbar, one of the creators of LENSES, generated a number of design guidelines that were provided to the design team for consideration in developing the masterplan.

As shown in Figure 2, this paper focuses on (1) the transfer of regenerative thinking from Workshop 4 to design guidelines; and (2) discussing the translation of these guidelines into the masterplan.

This will evaluate whether using a regenerative thinking framework to facilitate the workshops (see Section 3.3) supports guidelines that match the systems thinking. Discussing if these guidelines are in turn reflected in the final masterplan can help reveal if outputs from the workshops are taken on board by the design team or if a business-as-usual mentality prevails. The LENSES framework was used to facilitate the workshops and is also used to analyse the design guidelines that emerged from Workshop 4. This is further described in Section 3.3. It is important to note that the project is still at the masterplanning stage and whether this will lead to a regenerative built outcome is currently unclear. An analysis of a built project would provide a more robust analysis but this is not possible at this stage.

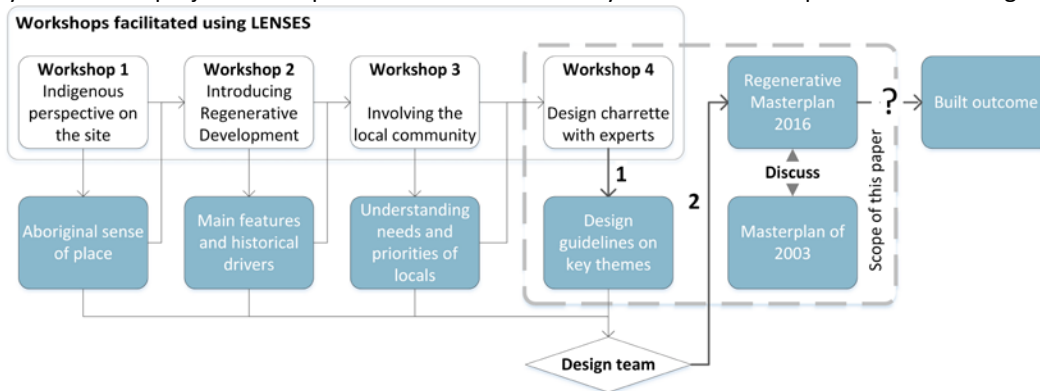


Figure 2: Overall process of the project and scope of this paper

3.3. Description of the LENSES framework

LENSES stands for Living Environments in Natural, Social and Economic Systems. The aim of this framework is 'to facilitate tangible, actionable and contextually based solutions that support and create healthy, natural, social and economic systems' (Plaut *et al.*, 2012, p. 113). As depicted in Figure 3, LENSES is represented by a circular disk that consists of a series of overlaid lenses, each representing a certain set of information. The outermost lens (the Foundation Lens) outlines the guiding principles of the project. The intermediate lens (in blue) is the Flow Lens and represents the range of flows across the project. These can be physical or abstract. Both the flows and the guiding principles of the project have

been defined by the stakeholders during Workshops 1-3 (see Figure 2), and there is always a blank space left for additional flows/guiding to be added. In the centre of the framework lays the Vitality Lens, which contains the two spheres of degenerative and regenerative design and prompts the workshop participant to think about how to create benefit or regenerative opportunities for each flow. Artefacts of this model are printed or made for workshops and each lens can rotate around its centre, allowing stakeholders to test how each flow relates to each guiding principle and if it is regenerative or degenerative. This visual representation is a tool that helps structure the thinking during the workshops and allows the stakeholders to have all the key flows and principles in an organised manner.

Beyond its visual representation, facilitating workshops using LENSES focuses on systems thinking, allowing regenerative outcomes to emerge, and cross-disciplinary knowledge exchanges. Stakeholders build their own lens during the initial workshops and then use the resulting model to guide the design charrette. In this project, the aim of LENSES was strictly to facilitate workshops that enable the emergence of regenerative thinking. The outcomes of the charrettes rather than the artefact were then used by the design team to devise the masterplan. In other projects LENSES has been used to drive regenerative outcomes in projects as diverse as town planning, building design, education, personal growth, organisational development and others. This demonstrates its polyvalence. More information on LENSES can be found in Plaut *et al.* (2012) and Plaut *et al.* (2016). Some of its limitations are discussed in Section 5.2. In this paper, the authors have also used the LENSES framework to qualitatively assess the design guidelines that emerged from Workshop 4, as presented in Section 3.4.



Figure 3: Visual representation of the LENSES framework, adapted to the Seacombe West project and highlighting hypothetic flows (in green) that are addressed in a design guideline from Workshop 4

3.4. Evaluating if using LENSES helps support regenerative design outcomes

As described in Section 3.2, this paper focuses on assessing the design guidelines resulting from Workshop 4 and on the masterplan provided by the Design team. The combination of these two assessments will help inform if LENSES does support regenerative design options.

During Workshop 4, the participants were divided into six multidisciplinary teams, each focusing on a different aspect of the project. These teams were organised around themes of: (1) land and water, (2) ecosystems, (3) built environment planning, (4) built environment systems, (5) governance, people, money and culture, and (6) vision and inspiration. Each team produced an A0-sized landscape poster

(see Figure 4) summarising their ideas and presented these to the audience. This paper analyses these design guidelines based on both the posters and the video recordings of the presentations and identifies which of the flows are covered (see Figure 3 for an example). This analysis does not trace back the design guidelines to the use of LENSES directly (correlation does not imply causation). However, it can be considered that potentially regenerative outcomes that cover multiple flows and use a systems-based approach have been encouraged by the use of LENSES. In order to verify this, the authors have conducted an online survey of ten questions which has been completed by 28 (out of 40) participants (70%). While presenting and discussing the results of this survey are beyond the scope of this paper, some of its findings will be used to support the results.

The second part of the study focuses on the comparison of the proposed masterplan for Seacombe West, which has been produced by the design team. That is, comparing the masterplan of 2016 to the 2003 version would help investigate if using LENSES does help lead to regenerative alternatives. This was done by identifying a regenerative approach based on the definition of Net Regenerative Regional Development as: *development that supports the health and vitality of a region through mutually beneficial relationships between all the stakeholders and flows of the system*. Key aspects were identified according to Robinson and Cole (2014), Plaut *et al.* (2012) and du Plessis (2012): Humans as co-evolutionary and co-creators of their environment with nature; looking at how nature works and using this to inform the design; the world is ever changing so design for adaptability and impermanence; creating regenerative potential physically and mentally; looking at nested system; not setting goals but processes that will help the place adapt; and looking at what is unique to a place and what it can contribute to the greater whole. This analysis will be based on the documents available for the two masterplans including the proposed program, project phasing, goals, layout and particular design strategies. Results are presented and discussed in Section 4.

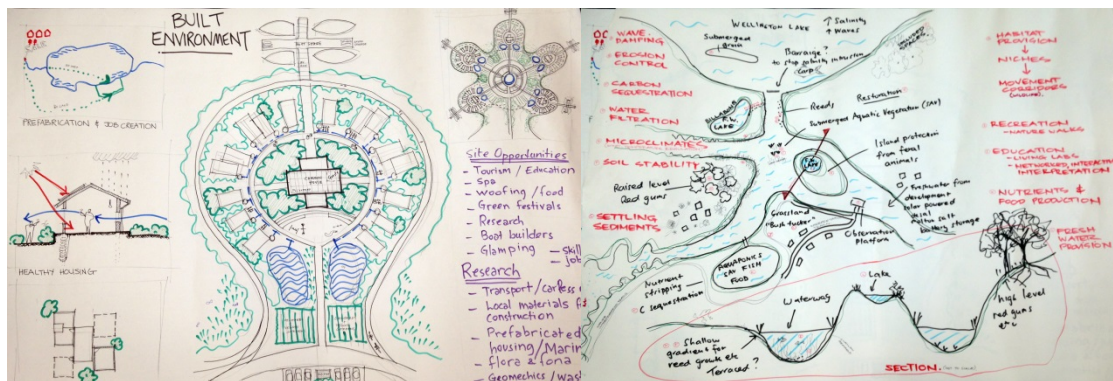

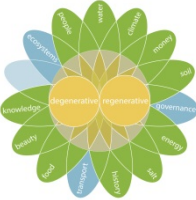
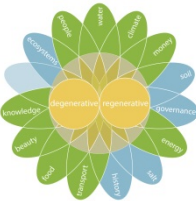
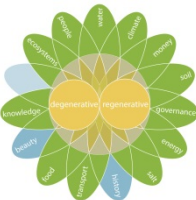




Figure 4: Posters from the built environment planning (left) and ecosystems (right) teams, Workshop 4.

4. Results and discussion

Table 1 presents the analysis of the design guidelines proposed by the six different groups from Workshop 4. Results show a broad coverage of flows in almost every group. The identified flows that were covered ranged from a minimum of 5/15 (33%) to a maximum of 13/15 (87%) with an average of 9.6 flows (64%) covered across the six teams. It is important to note that these flows are not generally considered together, e.g. knowledge, money, ecosystems, people, transport and water.


Table 1: Analysis of the design guidelines of different working groups during Workshop 4

Group	Main design guidelines	Considered flows
Land and Water	Improve the quality of the entire site through land works, including elevating land for development, creating waterways and separating fresh from saline water and stabilising edges with landscaping elements to prevent erosion. Inland fresh water bodies (see also Ecosystems) would support local ecosystems and biodiversity. Potential solar power desalination plants with excess freshwater fed back into the lake to help reduce salinity. A thriving boating community.	
Ecosystems	Enhancing and regenerating the current ecosystem by generating a range of microclimates through different wind exposures and land masses (e.g. islands, secluded spaces, elevated red gums and others), creating fresh water lakes and billabongs within the site, minimising salt intrusions through micro-barrages with fish gates and creating isolated islands as refuge for fauna and flora. This is done in conjunction with producing food through submerged algae and aquaponics as well as enhancing knowledge transfer through living labs, interactive workshops and nature interpretation trails.	
Built Environment Planning	A fractal design that is centred around a common house and space where public amenities are provided. Modular prefabricated, carbon positive (if achievable) homes that are made locally from local materials where possible to encourage job creation and local industries. A car-free environment with cycling lanes, boat sharing, public buses and solar-powered boats. Buildings as catalysts for the ecosystem.	
Built Environment Systems	A modular and scalable centralised plant that simultaneously treats energy, waste, water, greenhouse gas emissions and other environmental flows. Processes include recycling, composting, urine diversion, a range of renewable energy technologies, waste carbon dioxide and heat used to grow food in greenhouses. Share all data openly to enhance knowledge sharing.	
People Governance Money Culture	A spiral of innovation including equity in the community, innovative investment modelling focused on experience and crowdfunding, teaching through events, video games and an annual festival of ideas all within a bottom-up participatory governance approach.	
Vision and inspiration	Developing a sense of stewardship within the community with a main focus on contributing to the place, caring for the land, family and for life as well as fostering a collective sense of responsibility. This will be supplemented by an experiential learning, a living academy and transdisciplinary collaborations including the community and a range of stakeholders, such as universities, art centres, government, local industries and others. A particular emphasis is made on inclusivity, championing aboriginal culture and developing tolerance of all cultures. Exports would be knowledge, experience and local products.	

The breadth of aspects covered by each team and the proposed guidelines do reveal a strong tendency for systems thinking. Moreover, the presented guidelines tend to improve the overall performance of the system in terms of flows by minimising waste (in a broad sense) and simultaneously improving the livelihood of the community. This type of thinking is characteristic of regenerative development. This observation is supported by the survey results on the question ‘*On a scale from 1 to 5, can you score how well you felt LENSES developed a shared understanding of the potential of regenerative development?*’, to which the average response score of participants was 4/5. From these observations, it seems that LENSES can fulfil its aim of facilitating regenerative design workshops by supporting the emergence of regenerative and systems thinking.

Table 2 compares the 2003 masterplan of the site with its 2016 counterpart, delivered by the design team which received the design guidelines emerging from Workshop 4.

Table 2: Comparison of the 2003 and 2016 masterplans of Seacombe West

Aspect	2003 Masterplan	2016 Masterplan
Layout	https://dx.doi.org/10.6084/m9.figshare.4197903	https://dx.doi.org/10.6084/m9.figshare.4197918
Staging	<p>Stage 1: The island between the eastern entrance and the new town centre. “Best blocks first in best dressed” thinking</p> <p>Stage 2 & subsequent stages: to steadily move away from Stage 1 dependent largely on rate of sales.</p> <p>Stage 3: including the resort and golf course will then follow</p>	 <p>Start with one aspect, the safe harbour and 200 non-permanent homes, initial civil work for safe harbour and ability to test the concept of raising the land to support restoration of past ecosystem. This will inform how the site can evolve.</p>
Goals	Create a boating-led development, similar to the kind of developments at the eastern end of the Lakes system such as Paynesville. Out of 11 goals the last one was to provide wildlife refuges.	Ecological restoration, ecological reserve, staging to allow ongoing learning, fresh and saline water areas. Innovation in finance, ownership and community. Increasing investment of nutrients and soil building throughout the site. Washing away the salt over time. Design of more resilient ecosystems.
Underpinning thinking	Farm land which was of poor quality for agriculture or environment but was suitable for a canal development to meet boating demand in early 2000s. Redress the salinity issue resulting from Lake water inundation, as well as using funds to provide Wildlife Reserve to preserve endangered small marsupials. Creating employment and investment into financially depressed Wellington Shire.	Asking what can the development do to help the whole region achieve a higher level of resilience. Asking if restoration is enough, looking instead to create vital viable systems. Looking at all the flows across the site and where they go beyond its boundaries as well as asking how to create benefit. Looking at ecological systems as a model – such as creating niches.
Housing strategy	Environmentally sustainable design – passive, resource efficient.	Modular prefabricated transportable houses, carbon positive

The comparison in Table 2 shows significant differences in the staging, goals and underpinning thinking of the project. The regenerative development thinking seems to have permeated the staging and goals and some of the guidelines provided from Workshop 4 seem to be taken into account, notably in terms of enhancing ecosystems. Another aspect is the similarity in the housing strategy: the current masterplan proposes 'carbon positive' buildings which are on level above the 2003 proposition. Technological solutions do not seem to be significantly affected by a regenerative approach.

5. Discussion and conclusion

This study supports the findings of the integrated design literature (Reed and 7group (Organization), 2009), which shows that bringing many experts around the table at the beginning of a project often leads to a more robust, thorough, inclusive and well thought-out project. In this case it is expected that the outcome of the masterplan has the potential to be a more regenerative one compared to the 2003 version, as it focusses on identifying the flows and how the design can enable critical relationships that give a place vitality, viability and evolutionary potential (Mang and Haggard, 2016).

Using the LENSES framework reveals that the benefits of the integrated process were achieved. The workshop outcomes also created the potential for rich socio-ecological systems to emerge and evolve. The masterplan has evolved considerably from 2003. However, it is critical to highlight that the masterplan is not fixed. After phase 1 (the safe harbour and 200 houses) the project may change because the best research, professional advice and assumptions of what could work at Seacombe West may not unfold as expected. Yet, the underpinning thinking is specifically about adaptation in time: unpredicted outcomes will be integrated in the site management and future development. The creative input from experts regarding critical flows could help support the resilience of the project over time.

As any research work, this study suffers from a number of limitations, including the small sample size of participants (40) and the preliminary stage of the project. Also, the results are based on the case study project of Seacombe West and are valid only for this project. Other projects might result in different findings in terms of the effectiveness of the LENSES framework and the translation of the design guidelines into the masterplan. It is also important to note the potential significant role of the actual workshop facilitator in delivering a regenerative alternative. The bias resulting from the composition of participating stakeholders should also be further evaluated. For example, the strong presence of academics in Workshop 4 might have supported the systematic inclusion of knowledge transfer propositions across all groups. In addition, the differences observed between the 2003 and 2016 masterplans could be due to a range of factors other than the design guidelines proposed at the end of the workshops. These factors include the composition of the design team, the questions asked and the general design culture at that time. Yet, despite these limitations this study is one of the first to analyse the process underpinning the emergence of a regenerative design and it provides insights for future similar projects.

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