



### 05. Design

#### Regenerative Design

Dr. Ir. Nico Tillie  
*Research Fellow, chair of Urban Ecology*  
*Department of Urbanism*

The term “*regenerative*” describes processes that restore, renew or revitalize their own sources of energy and materials. Regenerative design uses *whole systems thinking* to create resilient and equitable systems that integrate the needs of society with the integrity of nature. Some argue that regenerative design *goes a step further than sustainable design*. In a regenerative system, feedback loops allow for adaptability, dynamism and emergence to create and develop resilient and flourishing eco-systems. A key distinction of regenerative design is that *recognition and emphasis of the “co-evolutionary, partnered relationship between human and natural systems” and thus the importance of project location and place*.

Architectural design and engineering explorations can contribute substantially to the development of a model that considers cities as urban ecosystems developing towards ecocities. Every design intervention should improve the quality of life for all and improve environmental performance: *a building should serve as a “catalyst for positive change.”* A project does not end with the completion of construction and certificate of occupancy, instead the building serves to enhance the relationships between people, the built environment and the surrounding natural systems over a long period of time.

So, how can we translate the leading principles into site specific spatial design, spatial quality and spatial experience? How can we create the conditions in a so-called balanced system? How can we develop this?

There are at least three levels of design approaches for Regenerative Design or Urban Ecology Design.

The first one, is the *Systems design interventions level*. It looks at natural and/or urban cycles, flows and interventions such as water, or elements like phosphorus, nitrogen or carbon cycle. Obviously, urban systems intervene in the natural ones. However, the natural and agricultural layers might give us clues and potentials for bio-based materials as well as systems of water, nutrient, and carbon recycling. For example, a city built in a natural system extracts water from the aquifer, uses the water, cleans the water and then disposes it into the river or sea.

The second level is the *Networks and Habitat interventions level*. Each habitat is a home for certain species. Small design interventions can create conditions for different habitats, think of small dams that allow an area to be flooded twice a day or allowing grazing. A more direct step is digging a pond or at building level creating a green roof or use bioreceptive materials. Habitats and biotopes are an outcome of the underlying flows,



## Circularity for Educators

actions and maintenance. Let's go back to the water in the city example: every day the ground water or aquifer lowers with its negative effects on the total system. Why not use and clean the water and then replenish the aquifer? A relation between building, usage, cleaning and infiltration is required. This then becomes a synergistic design task.

Finally, the third level is the *Species design interventions*. This leads to more biodiversity. Important to understand is that biodiversity is diversity in species, genes as well as habitats. There are different toolboxes around for nature inclusive design. What nest box is best for which species of bird or bat or a bee hotel? It is interesting to think in complete bio-walls. Animal aided design is an approach by Weisser covering all life stages of an organism. For example from caterpillar and its preferred plant species, to butterfly. In general, designing for animals relates to three aspects: Safety, Food, Reproduction, and often variation in planting is also advised.

To wrap up, Regenerative Design or Urban Ecology Design, is not just for nature, and the birds and the bees! It is situated in the alliance of landscape architecture, urban planning, civil engineering and architectural design intervention. Think for example how many new green buildings have green balconies and green roofs. Great design, but lets take this to the next level. More buildings could function as urban ecoducts, with green housing connecting parks, ecology and people, organically integrating humans in their environment and the three levels of regenerative or urban ecology design.