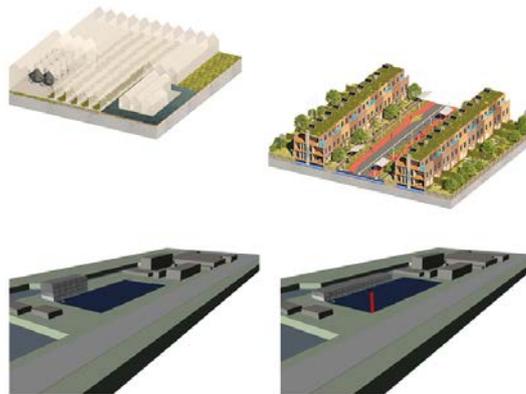
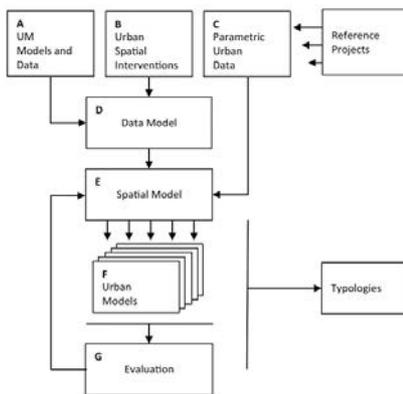


Spatializing Urban Metabolism – Analysing the spatial relationship between urban metabolism and urban design through a parametric design study

Keywords: Urban Metabolism, Urban Design, Parametric Design, Design Study

Department of Urbanism/Chair of Environmental Technology and Design

Area of Research: Urbanism



Research Summary: The project aims to analyze the spatial relationship between urban metabolism and urban design, providing input for the planning and design of sustainable urban environments. Urban metabolism is a concept that relates urban environments to ecosystems. The concept allows to measure inputs and outputs of a defined urban system and to draw conclusions on the efficiency of the system on resource use and waste production. Thereby, the concept can play a role in making urban environments more resource-efficient and less waste-avoiding. In the field of urban design, different types of spatial interventions have a direct influence on the consumption of resources and the production of waste and pollution in the urban environment. Building density influences energy consumption, paving influences rainwater retention and urban green influences the local climate. Specific interventions, such as PV-cells or wind turbines for energy generation or helophyte filters for waste water management require space and have an influence on the spatial quality of their urban environment. While these influences are known, there is a gap in knowledge on the spatial relation between the size and scale of interventions and their effect on the urban metabolism. What needs to be done, and on which scale to improve the metabolism of a given area? And what is possible, within the given spatial restrictions? Through a series of parametric design studies, this spatial relation is illustrated and analyzed. The output aims to provide heuristic knowledge for urban design practice.

Research Methodology: The spatial relation is analyzed through a series of parametric urban design studies. Two urban areas are used as reference projects, which provide input for the design studies and serve as a test area for the outcomes: Buiksloterham in Amsterdam-North and the currently developed Floriade area in Almere.

Key Publications: Maas, W., Hackauf, U., & Haikola, P. (2010). Green Dream: How Future Cities Can Outsmart Nature. Rotterdam: nai010 publishers.
Timmeren, A. van, & Hackauf, U. (2014). Metropolitan FarmCity Reciprocities: Towards interconnected urban and peri urban farming typologies. In *Why We need small cows: Ways to design for urban agriculture* (pp. 99–134). VHL University Press.
Hackauf, U. (2015). City pig farm A design-based research on urban livestock farming. In *Flowscapes* (Vol. 3, pp. 181–204).



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Main Question:

What is the relation between (1) the urban metabolism of an urban environment, (2) the urban form and program of that environment, and (3) form and size of spatial interventions, which improve the urban metabolism?

Deliverables:

Parametric urban typologies

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