

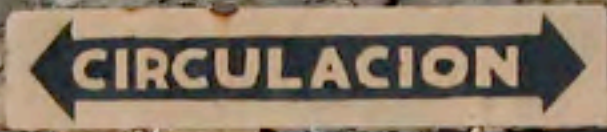
Urban Metabolism

The Importance of Water Flows to the Modern City

Andy Karvonen, The University of Texas at Austin

Metabolism (from Greek - to change)

The chemical changes in living cells by which energy is provided for vital processes and activities and new material is assimilated.



People

Goods

Information

Energy

Water

Air

Materials

40% of extracted raw materials are for building construction and renovation

33% of municipal waste streams are comprised of construction and demolition waste

Energy

36% of U.S. energy use is devoted to residential and commercial buildings

Water

12% of fresh water supplies and 88% of potable water supplies are consumed to support domestic and commercial building needs

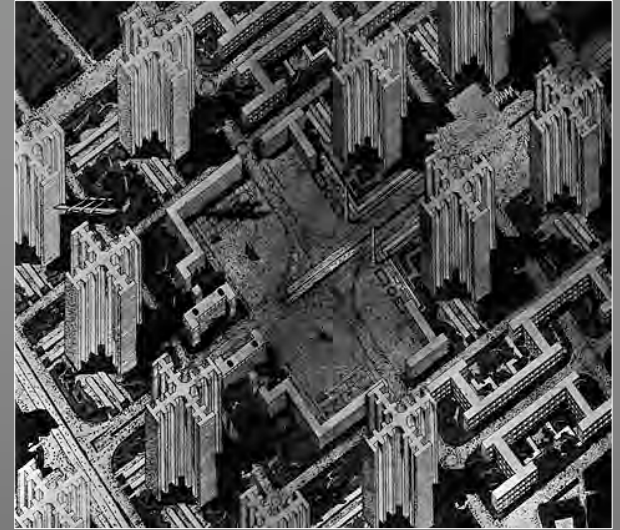
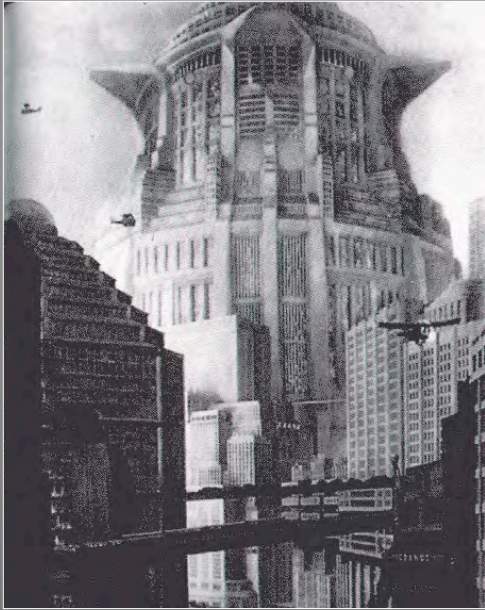
Air

30% of U.S. greenhouse gas emissions come from residential and commercial building operations

60% of ozone-depleting substances are generated in building construction and operation

Commerce

20% of U.S. economic activity is related to the design, construction and operation of buildings



City as machine



City as organism

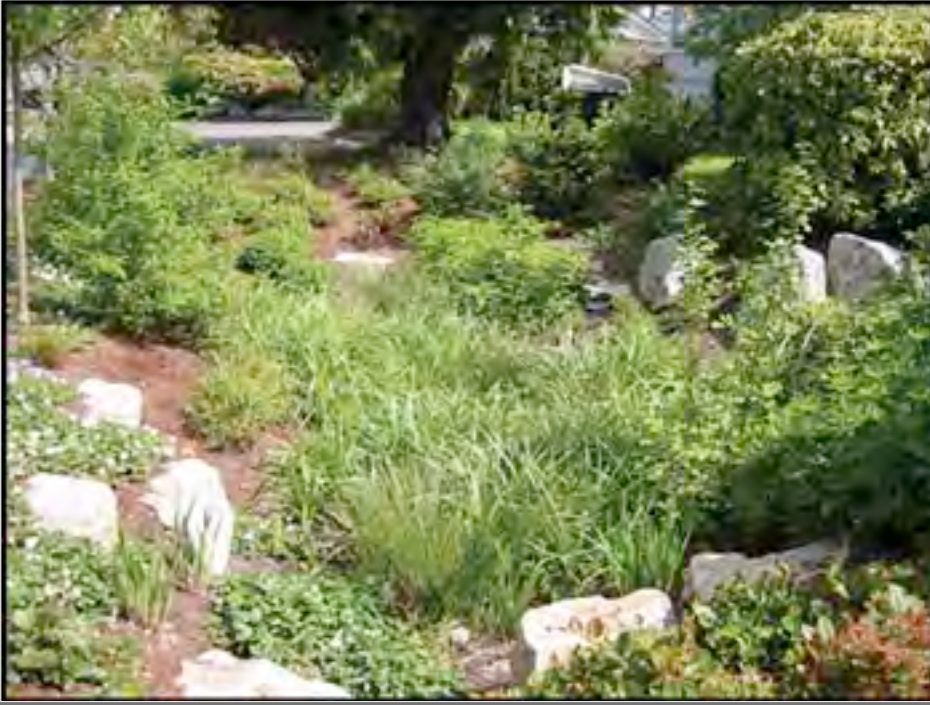
Stormwater as a
contested issue



PARADISE...OR PARKING LOT?

YOU DECIDE. VOTE.

Photo: Lynn Houbec



“What makes the metropolitan approach particularly promising for sustainability is its scale of action and exchange; it is big enough to capture key ecological, social, and economic **interdependencies** yet small enough to provide a sense of place and social embeddedness. It is an optimal scale at which to integrate governance, social diversity, economic development, and environmental protection.”

- Lamont Hempel

References

Gandy, Matthew. "Rethinking Urban Metabolism: Water, Space and the Modern City." *City* 8, no. 3 (2004): 363-379.

Hempel, Lamont C. "Conceptual and Analytical Challenges in Building Sustainable Communities." In *Toward Sustainable Communities: Transition and Transformations in Environmental Policy*, ed. Daniel A. Mazmanian and Michael E. Kraft, 43-74. Cambridge MA: MIT Press, 1999.

Melosi, Martin. "The Historical Dimension of Urban Ecology: Frameworks and Concepts." In *Understanding Urban Ecosystems: A New Frontier for Science and Education*, ed. Alan R. Berkowitz, Charles H. Nilon and Karen S. Hollweg, 187-200. New York, NY: Springer, 1999.

Moss, Timothy. "Flow Management in Urban Regions: Introducing a Concept." In *Urban Infrastructure in Transition: Networks, Buildings, Plans*, ed. Simon Guy, Simon Marvin and Timothy Moss, 3-21. Sterling, VA: Earthscan, 2001.

Rosen, Christine Meisner, and Joel Arthur Tarr. "The Importance of an Urban Perspective in Environmental History." *Journal of Urban History* 20, no. 3 (1994): 299-310.

Spirn, Anne Whiston. *The Granite Garden: Urban Nature and Human Design*. New York, NY: Basic Books, 1984.

Strang, Veronica. *The Meaning of Water*. New York, NY: Berg, 2004.