

**Summary:** Stormwater management is an important component of environmental sanitation. This tool presents resources on the planning, design, construction and maintenance as well as rehabilitation of drainage systems. It contains comprehensive information on technical, financial and institutional aspects of the implementation of surface water drainage options. Possible causes of failure and the need for participation in planning are explained.

#### Application Within the Planning Process:

**Step 5:** Identification of Service Options

#### Related Tools:

**T15** Compendium of Sanitation Systems and Technologies

**T18** Greywater Management Manual

**Purpose** This tool informs you about issues specifically related to surface water drainage in urban areas. It includes information on

- the factors affecting stormwater flows,
- a recommended programme of action (planning, design, construction and maintenance),
- technical solutions, such as open channels and closed drains, including design calculations,
- construction, rehabilitation and maintenance of drainage systems and
- the need for community participation.

**How to use this tool?** This tool mainly refers to the open-source publication “Surface water drainage for low-income communities,” which was developed by the WHO in collaboration with the UNEP in 1991 (see **Document D19.1**). This

publication provides guidance on the sustainable implementation of surface water drainage programmes and can be used as a manual for the planning (Chapters 1, 2 and 4), construction (Chapter 2.8) or rehabilitation (Chapter 3) of drainage systems.

For further reading, **Book B19.1** is recommended. It provides a comprehensive resource for the planning, design, operation and maintenance of urban stormwater management systems in developing countries. Extensive information helping to understand drainage problems and to evaluate storm drainage system performance is given in **B19.2**. Technologies for the management of household wastewater are discussed in **Tools T15 and T18**.

### Resources

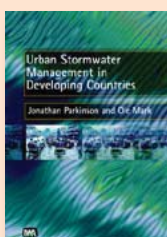


#### Document D19.1:

Cairncross, S. and Ouano, E.A.R. (1991). *Surface Water Drainage for Low-Income Communities*. WHO/UNEP. Geneva, CH.

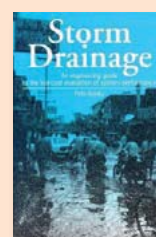
[D19.1.pdf](#)

### Further Reading



#### Book B19.1:

Parkinson, J. and Mark, O. (2005). *Urban Stormwater Management in Developing Countries*. IWA Publishing. London, UK. 218 Pages.



#### Book B19.2:

Kolsky, P. (1998). *Storm Drainage. An Engineering Guide to the Low-Cost Evaluation of System Performance*. IT Publications. London, UK. 134 Pages.