

Contents

1 Rethinking Infrastructure Design	1
1 Introduction	1
2 Climate Change	4
3 What Is Wrong with Existing Systems?	5
4 What Is the Multiple-Use Water Services Concept?	7
4.1 Reduced Pluvial Flood Risk	10
4.2 Water Pollution	11
4.3 Alternative Water (Re)Sources	12
4.4 Urban Heat Island	13
4.5 Air Pollution	17
4.6 Droughts	18
4.7 Urban Agriculture	18
4.8 Urban Amenity and Blue-Green Corridors Increase Amenity and Urban Health: Job Creation, Reduce Antisocial Behaviour and Crime.	19
4.9 How MUS Aligns with and Supports the Concept of Sustainability	21
5 Conclusions	22
References	24
2 What Are the Main Options for Applying the Multiple-Use Water Services Paradigm?	27
1 Introduction	27
2 Wastewater Reuse and Recycling	27
2.1 What Are the Main Components and Costs Related to Grey Water Reuse?	28
2.2 Why Grey Water Recycling?	29
3 Urban Green Spaces	29
3.1 What Is the Cost-Benefit?	29

4	Rainwater Harvesting	30
4.1	New Build Versus Retrofit	31
4.2	What Is the Cost?	31
5	Green Roofs and Green Walls	32
5.1	What Are Green Roofs?	32
5.2	What Are the Risks and Costs Associated with Green Roofs?	32
5.3	What Are Green Walls?	34
5.4	Green Walls Used for Wastewater Treatment	35
5.5	What to Consider Before Applying Green Walls and Façades?	35
5.6	Why Green Roof and Green Wall Systems?	36
6	Urban Agriculture	36
6.1	What Are the Challenges Regarding Water Conservation?	37
7	Decentralised Systems to Manage and Reuse Storm Water Run-off On-site	38
7.1	What is Decentralised Storm Water Management?	38
7.2	What Are the Typical Schemes and Techniques?	39
8	Integrating Multiple-Use Perspectives	44
9	The MUS Approach in a Rural Context	52
9.1	What Is the MUS Approach?	52
9.2	Why Apply MUS?	52
10	How Can We Calculate the Value of MUS Systems?	54
10.1	An Ecosystem Services Approach	54
10.2	An Ecosystem Approach for Decision-Making	55
10.3	Economic Valuation of Ecosystem Services	56
10.4	How to Value Ecosystem Services?	56
10.5	How Can Economic Valuation Assist Policymaking?	59
11	Tools for Supporting Multiple-Use Water Services	61
	References	65
3	Case Studies Illustrating the Multiple-Use Water Services Options	69
1	‘Four Alls for All’: Policy Act on Decentralised Water Supply Through Rainwater Harvesting and Management Systems in Seoul	69
1.1	What Is the Challenge?	70
1.2	What Is the Policy Framework?	70
1.3	What Is the Way Forward?	71
1.4	What Are the Benefits of Implementing DRMS?	71
1.5	Benchmarking Example: The Star City Rainwater Harvesting and Management System	71

- 1.6 Additional Demonstration Projects in Seoul 73
- 1.7 Which Are the Lessons Learned and Success Factors
in the Case of Seoul?. 74
- 2 Water Sensitive Urban Design in Lynbrook Estate, Melbourne,
Australia 75
 - 2.1 What Was Implemented in Lynbrook?. 75
 - 2.2 What Were the Challenges?. 76
 - 2.3 Was the Project Successful? In What Way? 77
 - 2.4 What Can We Learn from the Case of Lynbrook Estate? 77
- 3 Green City, Clean Waters: The Vision of Philadelphia. 78
 - 3.1 What Is the Case?. 79
 - 3.2 What Was the Way Forward?. 79
 - 3.3 What Tools and Techniques for Green Stormwater
Infrastructure Have Been Used? 80
 - 3.4 What Are the Benefits Foreseen Following These
Multiple-Use Water Services Strategies? 81
 - 3.5 What Can We Learn from Philadelphia? 82
- 4 Integrated Water Recycling in Brisbane, Australia. 82
 - 4.1 What Are the Main Features?. 83
 - 4.2 What Were the Strengths? 84
 - 4.3 What Were the Challenges? 84
- 5 BedZED: Zero Energy Development 85
 - 5.1 What Was the Aim of the Project? 85
 - 5.2 What Are the Main Features? 86
 - 5.3 What Were the Strengths? 86
 - 5.4 What Were the Main Challenges and Results?
(Shirley-Smith and Butler 2008) 86
 - 5.5 Which Are the Key Lessons? 87
- 6 Multiple-Use Water Services: Winrock’s Experience
in Africa and Asia 87
 - 6.1 Multiple-Use Water Services (MUS) 87
 - 6.2 Nepal 87
 - 6.3 Tanzania 88
 - 6.4 The WA-WASH Project. 89
 - 6.5 What Are the Lessons Learned from Winrock’s Experience
in MUS? 90
- References 91



<http://www.springer.com/978-3-319-06274-7>

Rethinking Infrastructure Design for Multi-Use Water
Services

Maksimović, Č.; Kurian, M.; Ardakanian, R.
2015, XI, 92 p. 66 illus. in color., Softcover
ISBN: 978-3-319-06274-7