

Table of Contents

Executive Summary.....	i
Acknowledgements	xi
List of Figures	xvii
List of Tables	xxi
List of abbreviations.....	xxiii
1 AN INTRODUCTION TO WATER EFFICIENCY	1
1.1. Sustainable cities	3
1.1.1. Commercial initiatives	4
1.2. Domestic Water Use World-Wide.....	5
1.2.1. Some international experience with water demand reduction	6
1.2.2. Water efficiency in the United States.....	10
1.2.3. Efficient Water Use in Australia	16
1.3. Labelling water efficient devices.....	19
1.3.1. The Australian Labelling System	19
1.3.2. WaterSense: The US water efficiency labelling system	20
1.3.3. Support for product labelling in the UK.....	21
1.3.4. Eco-Labelling.....	21
1.4. Domestic and Commercial Water Use in South Africa	25
1.4.1. Trends in Water Consumption in South Africa	27
1.4.2. Examples of sustainable homes in South Africa	33
1.4.3. The Waterwise Campaign	36
2 WHAT DOES THE MARKET OFFER?.....	37
2.1 What is a water efficient device?	37
2.2 Availability of Water Efficient Devices in South Africa	41
2.2.1 DWAF and JASWIC booklet entitled 'A to Z' of Water Saving Devices.....	41
2.2.2 The CSIR web-site version of the 'A to Z' booklet.....	41
2.2.3 Article in the IOPSA Plumbing Africa magazine	42
2.2.4 Examples of water efficient toilets systems available in South Africa	44
2.2.5 Waterless urinals.....	47
2.2.6 Cistern volume reducing devices	49
2.2.7 Toilet stops	50
2.2.8 Water efficient showers	50
2.2.9 Water efficient taps.....	52
2.2.10 Water Efficient Public Standpipes	53
2.2.11 Greywater Recycling Units	55
2.2.12 Availability of water efficient devices in South Africa.....	58
2.2.13 Websites.....	59
2.2.14 Questionnaire Survey	62
2.2.15 Visits to plumbing outlets.....	65
3 INSTITUTIONAL EXPERIENCE WITH WATER EFFICIENCY	74
3.1 Prisons	74
3.1.1 International benchmarks	74
3.1.2 South African prisons	76
3.2 Hospitals.....	79
3.2.1 The use of water efficient devices within hospitals.....	80
3.2.2 Estimating potential savings	81
3.2.3 Comparison to a UK benchmark	82
3.2.4 Recommendations	83
3.3 Universities	84

3.3.1	Stellenbosch	84
3.3.2	University of Cape Town	86
3.3.3	North-West University (formerly Potchefstroom)	88
3.3.4	The University of the Witwatersrand	88
3.4	Schools	89
3.4.1	Hilton College	89
3.4.2	President High School	90
3.5	Transport hubs	90
3.5.1	Airports	90
3.5.2	Service Stations	91
3.6	Shopping malls and the hospitality sector	92
3.6.1	ISO 14000	92
3.6.2	Heritage Environmental Rating Programme	93
3.6.3	Examples of Hotels which have successfully implemented best practices	95
3.6.4	Shopping Malls	99
3.7	Sports and Recreational facilities	102
3.7.1	Virgin Active Green Gyms	102
3.7.2	The Royal Golf Course, Johannesburg	103
3.7.3	The Pezula Golf course and the Sparrebosch Estate	104
3.8	Zoological Gardens	104
3.8.1	National Zoological Gardens of South Africa, Pretoria	104
3.8.2	Zoological Gardens, Johannesburg	104
3.8.3	Tygerberg Zoo, Cape Town	105
3.8.4	Table Mountain Cableway	106
3.8.5	South African National Biodiversity Institute (SANBI)	108
4	MUNICIPAL EXPERIENCE WITH WATER EFFICIENCY AND WATER SAVING ...	109
4.1	Namibia	109
4.1.1	Namibia's Water Policy	111
4.1.2	Windhoek	113
4.2	Water demand management in South Africa	125
4.2.1	Water demand management in the City of Cape Town	125
4.2.2	Hermanus, Western Cape	139
4.2.3	Water demand management in Gauteng	143
4.2.4	Water demand management in eThekweni	146
5	A REVIEW OF MUNICIPAL BYLAWS RELATING TO WATER EFFICIENCY	148
5.1	Introduction	148
5.2	Bylaws reviewed	149
5.3	Model Water Services Bylaws	150
5.4	Key Water Conservation Measures Identified	150
5.4.1	Standards for Quality and Installation of Pipes and Fittings	151
5.4.2	Water Use Restriction	151
5.4.3	Prevention of Inefficient or Wasteful Water Use	151
5.4.4	Water Saving Measures: Potable Water	152
5.4.5	Offences	155
5.5	Building Codes	155
6	WATER EFFICIENT DEVICES IN SOUTH AFRICA: A SURVEY OF DOMESTIC USER KNOWLEDGE AND ATTITUDES	156
6.1	Introduction	156
6.2	Limitations of the domestic survey	158
6.3	Results from the Domestic Survey	159

6.3.1	Uptake of water efficient devices.....	159
6.3.2	Reasons for the low uptake of water efficient devices.....	161
6.3.3	Potential for increasing uptake of water efficient devices.....	164
6.3.4	Rainwater harvesting and grey water recycling.....	168
6.3.5	Summary of findings.....	170
7	ARCHITECTS AND WATER EFFICIENCY: A SURVEY OF ATTITUDES AND PRACTICES.....	171
7.1	Methodology.....	171
7.1.1	Limitations of the study.....	172
7.2	Results.....	172
7.2.1	Criterion for selecting plumbing fixtures.....	172
7.2.2	Considering water efficiency in design.....	172
7.2.3	Information sources.....	174
7.3	Analysis.....	174
7.3.1	A comparison of the architects responses with plumbing supply stores.....	175
7.3.2	A comparison with the CSIR study.....	176
8	THE ECONOMICS OF WATER EFFICIENT DEVICES.....	178
8.1	The Payback Period.....	178
8.2	Some worked examples of payback period.....	179
8.3	A discussion of water efficient devices economics at the household level.....	183
9	WATER EFFICIENCY: GETTING THE MESSAGE OUT.....	188
9.1	Databases as tools for public information dissemination.....	189
9.1.1	A-Z of Water Saving Devices.....	189
9.1.2	Autospec and Specifile.....	191
9.1.3	Examples of databases on Water Efficient Devices.....	191
9.2	Development of a new South African website dedicated to Water Efficiency.....	193
10	CONCLUSIONS AND RECOMMENDATIONS.....	199
10.1	Water efficient devices in the overall water conservation context.....	199
10.2	The status and use of water efficient devices in South Africa – survey results.....	200
10.3	South African municipal bylaws and Water Efficient Devices.....	202
10.4	The economics of fitting or retrofitting Water Efficient Devices.....	203
10.5	Methods of disseminating information about Water Efficient Devices.....	203
10.6	Recommendations for increasing the status and use of water efficient devices.....	204
	References.....	209

Appendix A

An example of educational material used in appealing the public to reduce water use

Appendix B

Specification standards for water efficient devices

Appendix C

Case Study: The status and use of water efficient devices in hospitals

Appendix D

Average daily water demand figures for South African prisons

Appendix E

A comparison of municipal bylaws dealing with water conservation and water efficiency

Appendix F

Domestic User Survey Questionnaire

Appendix G

Built Environment Professionals Survey: Questionnaire

Appendix H

Covering letter and Questionnaire sent to retail and wholesale plumbing agents

Appendix I

Report on visits to four plumbing outlets in Gauteng

Appendix J

Notes on system operating pressures
