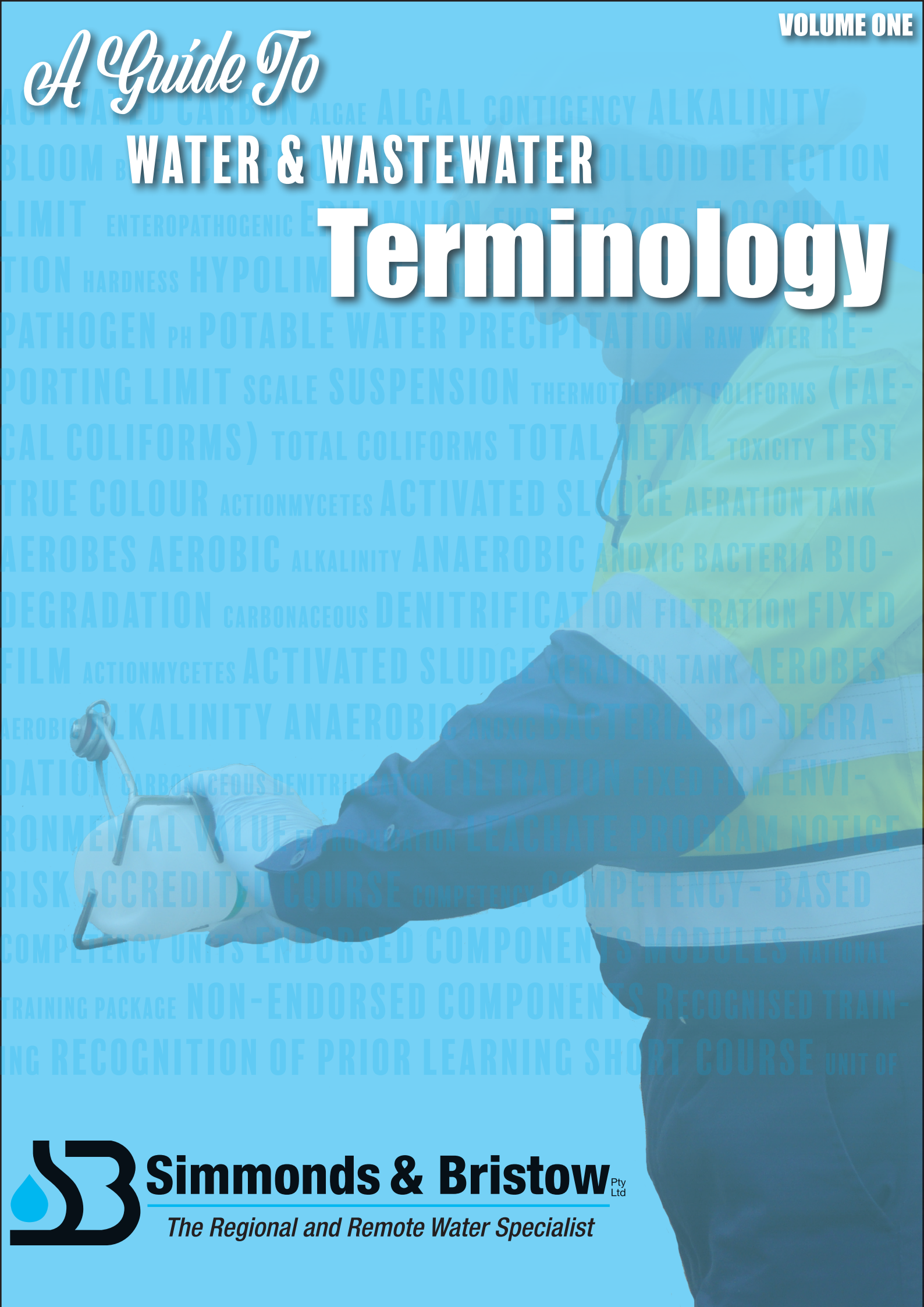
VOLUME ONE

A Guide To WATER & WASTEWATER Terminology



Simmonds & Bristow Pty Ltd

The Regional and Remote Water Specialist

water

acronyms/abbreviations

ADWG	Australian Drinking Water Guidelines
ANZECC	Australia and New Zealand Environment and Conservation Council
APHA	American Public Health Association
AWA	Australian Water Association
AWRC	Australian Water Resources Council
BWEP	Business Water Efficiency Program
DOC	Dissolved Organic Carbon
EC	Electrical Conductivity (measured in µS/cm)
GAC	Granular Activated Carbon
NH&MRC	National Health and Medical Research Council
MF	Membrane Filtration (method for enu meration of bacteria in clean water)
MPN	Most Probable Number (method for enu meration of bacteria in dirty/turbid water)
NATA	National Association of Testing Authorities
ND	Not Detectable
NTU	Nephelometric Turbid Units
PAC	Poly Aluminium Chloride or Powdered Activated Carbon
PAR	Photosynthetically Available Radiation
RO	Reverse Osmosis
SAR	Sodium Adsorption Ratio
SI	Langelier Saturation Index
Spp	Species (plural)
TAC	Trichloroethane
TDS	Total Dissolved Solids (measured in mg/L)
THM	Trihalomethane
USEPA	United States Environment Protection Agency
WEA	Water Efficiency Assessor
WEMP	Water Efficiency Management Plan

glossary of terms

Langelier	Actual pH less the pH at which the water is saturated with calcium carbonate
Micro-filtration	Process of passing water through porous membranes in the form of sheets or tubes to remove suspended and particulate material down to 0.2µm in diameter
Pathogen	A disease causing organism
pH	A measure of the acidity or alkaline nature of a solution
Potable Water	Water fit for human consumption
Pre-cipitation	The formation of solid particles in a solu tion (The settling out of small particles)

glossary of terms

Activated Carbon	Adsorptive carbon particles or granules which have a high capacity to remove trace and soluble components from solution
Algae	Microscopic aquatic chlorophyll bearing plants/blooms
Algal Contigency	A plan to monitor and control algal growth/bloom
Alkalinity	The capacity of a solution to neutralise acid
Bloom	An unusually large number of organisms per unit of water, usually algae, made up of one or a few species
Buffer	A solution containing a weak acid and its conjugate weak base, the pH of which changes only slightly when acid or alkali is added
Carcinogen	A substance that induces cancer in a living organism
Coagulation	The process of destabilisation by charge neutralisation (the precursor to flocculation)
Colloid	Particles which are between 0.1µm and 1nm in diameter, and cannot settle out of solution by the force of gravity
Detection Limit	The lowest concentration which can be detected but not quantitated
Entero-pathogenic	Capable of producing disease in the intestines
Epilimnion	Uppermost layer of water in a lake
Euphotic zone	The region in a water body which extends from the surface to a level at which pho tosynthesis fails to occur because of reduced light penetration
Flocculation	The process of bringing together the destabilised particles from coagulation process to form a large agglomeration or floc
Hardness	A measure of the concentration of cal cium and magnesium ions in water (expressed as mg/L calcium carbonate equivalent)
Hypo-limnion	Region of a water body extending from below the thermocline to the bottom of the water body
Raw Water	Surface or groundwater available as a source of drinking water which has not received any treatment

wastewater

acronyms/abbreviations

ADWF	Average dry weather flow
BNR	Biological nutrient removal (normally both nitrogen and phosphrus)
BOD5	5 day biochemical oxygen demand
COD	Chemical oxygen demand
DAF	Dissolved air floatation
DAFF	Dissolved air floatation filter
DO	Dissolved Oxygen
EQ	Equivalent Person
FM Ratio	Ratio of food to microorganisms
MBR	Membrane bio-reactor
MBBR	Moving bed bio-reactor
MLSS	Mixed liquor suspended solids concentration
MLVSS	Mixed liquor volatile suspended solids concentration (active biomass)
MCRT	Mean cell residence time, refer to sludge age
NFR	Non-filterable residue, refer to SS
NH3-N	Ammonia Nitrogen
NO2-N	Nitrite Nitrogen
NO3-N	Nitrate Nitrogen
NOx	Oxidised Nitrogen (nitrate + nitrite)
PDWF	Peak dry weather flow (3 x ADWF)
PWWF	Peak wet weather flow (5 x ADWF)
RAS	Return activated sludge – sludge re cycled back to the aeration tank
SSV	Settle sludge volume (after 30 minutes), or Stirred Specific volume
SS or TSS	(Total) suspended solids
SVI	Sludge volume index
TKN	Total Kjeldahl nitrogen
TOC	Total organic carbon
TP	Total phosphorus
TOG	Total oil and grease
TN	Total nitrogen
UASB	Upflow anaerobic sludge bed reactor
VFAs	Volatile fatty acids
VSS	Volatile suspended solids

glossary of terms

pH	Measure of hydrogen ion con centration in the solution
Protozoa	Single-cell microorganisms, present in activated sludge, which feed on bacteria
Quiescence	Period in which no aeration occurs
Recycle ratio	ratio of feed flow to recycle flow rate
Rotifers	multi-celled micro-organisms that feed on bacteria and protozoa

glossary of terms

Actionmycetes	Filamentous bacteria commonly associated with scum formation
Activated sludge	Microbial biomass used to treat sewage
Aeration tank	Tank used for aerobic sewage treatment
Aerobes	Bacteria which require aerobic conditions to survive
Aerobic	When free dissolved oxygen is present
Alkalinity	A measure of the pH buffering capacity of a solution
Anaerobic	When no free dissolved oxygen or bound oxygen is present
Anoxic	When oxygen is present but is bound in compound form (nitrates, sulphates etc)
Bacteria	Single-cell microoganisms of the order of 2µm in size
Bio-degradation	Breakdown of contaminants by microbial action
Carbonaceous	Referring to organic carbon
Denitrification	Process of biochemical conver-sion of nitrate to nitrogen gas
Filtration	Process to remove particles of various sizes using a screen or filter
Fixed Film	Process whereby bacteria are fixed to media over which waste water flows
Flocculation	Coalescence of finely divided particles into larger particles (flocs)
Hydraulic Detention Time	Time for which liquid is held in the aeration tank
Inhibitor	Usually a chemical compound which retards bacterial growth
Mixed Liquor	Mixture of raw sewage with re turn activated sludge, refer to Ac tivated sludge
Nitrification	Process of biological conversion of ammonia to nitrate
Nitrifiers	bacteria which obtain their growth energy by the process of nitrification
Nitrogenous	Referring to nitrogen
Organic	Referring to a compound which consists primarily of carbon
Sludge age	time period the sludge is held in the aeration tank
Stabilisation	Process by which volatile matter is converted to non-volatile matter

training

acronyms/abbreviations

ANTA	Australian national training Authority
ACTRAC	Australian Committee for Training Curriculum
AQF	Australian Qualifications Framework
AQTF	Australian Quality Training Framework
CBT	Competency Based Training
DTIR	Qld Department of Training and Indus trial Relations
ITAB	Industry Training & Advisory Body (State and National)
NFROT	National Framework for the Recognition of Training
NUEITAB	National Utilities & Electrotechnology ITAB
QUSITAB	Qld Utilities ITAB
RCC	Recognition of Current Competency
RPL	Recognition of Prior Learning
RTO	Registered Training Organisation
VETEC	Vocational education, Training and Employment Commission (Qld Accredita tion Authority)
VET	Vocational and educational Training Sector
WITA	Water Industry Training Association (State based)

glossary of terms

Recognition of Prior Learning Determination, on an individual basis, of the compe tencies obtained by a perso through previous formal training, work experience and/or life experience and the advanced standing the learner is entitled to as a result of these competencies

Registered Provider A public or non-government training provider for example TAFE, commercial college, indus try or enterprise, registered to deliver recognised training

Short Course A course that contains nationally accredited units but only leads to a partial completion of a nation ally accredited course

Unit of Competency Specified learning outcomes which consist of the elements of competency and their performance criteria as identified in nationally endorsed compe tency standards

glossary of terms

Accredited Course An accredited course is a sequence of vocational education and training which is consistent with the NFROT principles for accreditation and which leads to a qualification

Competency A specified level of knowledge and skill required to perform one's job OR Speci fied standards of knowledge and skills and their standards applica tion within an occupation or industry, described at various levels

Competency-Based Focusing on the skills gained by an indi vidual trainee rather than on the training process itself

Competency Units A group of competencies required to achieve a particular task

Endorsed Components Components of the package officially endorsed by ANTA (i.e. Competency units, assessment materials etc.). These must be complied with.

Modules Learning segments, complete in them selves, used within VET and which incor porate one or more competencies

National Training Package Competency units required to achieve qualifications ranging from AQF2 to AQF6 in the Water Industry

Non-Endorsed components Components of the package not officially endorsed by ANTA (i.e. Curricula, training materials etc.). These components are guidelines only

Recognised Training Refers to accredited courses, recognised training programs and short courses and skills acquisition, formal and informal. That are related to the attainment of competencies leading to a qualification or statement of attainment

Workshop A course (a) that does not contain a component of an accredited course; and (b) for which a person completing the course does not receive an award/qualifi cation

environmental

acronyms/abbreviations

ARM-CANZ	Agriculture & Resource Management Council Australia New Zealand
ASS	Acid Sulfate Soils
BTEX	Refers to a suite of aromatic pollutants, specifically benzene, toluene, chloroben zene, ethylbenzene, xylene
NRW	Department of Natural Resources and Water
EA	Environmental Authority (licence or approval)
EIS	Environmental Impact Statement
EMP	Environmental Management Program
EMR	Environmental Management Register
EPA	Environmental Protection Agency
EPA 1994	Qld Environment Protection Act (1994)
EPP	Environmental Protection Policy, e.g. water, noise, air, waste
ERA	Environmentally Relevant Activity
ESD	Ecologically sustainable development
IEMS	Integrated Environmental Management System
M-EDLI	Model for Effluent Disposal using Land Irriga tion
M-USIC	Model for Urban Stormwater Improvement Conceptualisation
NE-PC	National Environmental Protection Council (con sisting of Australia's environment Ministers)
NE-PM	National Environmental Protection Measure
NOx	Gaseous pollutants consisting of oxides of nitro gen, i.e nitrogen monoxide, dioxide and trioxide
NPI	National Pollutant Inventory
OC/OPs	Organochloride and Organophosphate pesticides
PAH	Polycyclic aromatic hydrocarbon
PCB	Polychlorinated biphenyl
SBMP	Site Based Management Plan
SB-SMP	Site Based Stormwater Management Plan
SECP	Soil Erosion Control Plan
SPO-CAS	Suspension peroxide oxidation combined acidity and sulphate method
SOx	Gaseous pollutants consisting of oxides of sul phur, i.e. sulphur, monoxide, dioxide, trioxide
TPH	Total petroleum hydrocarbons: ranging from hydrocarbons with six carbon atoms (C6) to those with thirty-six carbon atoms (C36)
LOR	Limit of Reporting

glossary of terms

Authorised person Authorised officer of a local gov ernment or the Department of Environment

Ecologically Sustainable Protecting the environment while allowi ng for the development that improves total quality of life, both now and in the future

Environ-ment Includes ecosystems, people, communi ties, natural and physical resources, quali ties and characteristics of locations

Environ-mental harm Adverse or potential adverse effect on an environmental value

Environ-mental value Quality or physical characteristic of the environment

Eutroph-ication Enrichment of surface waters with nu trients, primarily phosphorus, causing abundant aquatic growth

Leachate Water that has passed through soil or other solid and therefore con tains soluble material from that soil

Program Notice Prescribed form submitted to the De partment of environment when there has been an act or omission that has caused or threatened environment harm

Risk Likelihood x Consequence of a certain event occuring

services

offered by simmonds & bristow

Engineering, Environmental & Scientific Services

- Treatment plant design
- Treatment plant commissioning and testing
- Treatment plant optimisation & validation studies
- Performance evaluations & audits
- Operations & servicing of treatment plants
- Operator support & troubleshooting advice
- Compliance reporting
- Site investigations
- Blue-green algae investigations
- Risk & hazard assessment
- Environmental plans & assessments
- Water quality monitoring
- Litigation support
- EPA licensing

Modelling

- Wastewater treatment plants
- Water treatment plants
- Stormwater treatment
- Wastewater irrigation & irrigation design
- Water balance
- Hydrology
- Water distribution
- Sewage network & hydraulics

Training

- Sewage & wastewater treatment plant operator training
- Drinking & industrial water treatment plant operator training
- Swimming pool operator training
- Environmental awareness
- Sampling & environmental compliance

Plant Operate & Maintain

- Relief operators
- Sampling
- Routine monitoring

water and wastewater trivia

- Domestic households traditionally produced on average 200 – 300L wastewater per person per day. In SE QLD this has been reduced to 180 - 200L per person per day through drought induced social change.
- About 80% of the world is covered by water or ice.
- Only 1% of the world's water is suitable for human needs (97% is salt water in the ocean and 2% is ice).
- The human brain is 75% water.
- A man's body is 60-65% water (measured as a percentage of body weight) and a woman's is 50-60% water. Men tend to have more muscle, and muscle tissue contains a large amount of water.
- The human body loses 3-3.5 litres of water in an average day. This may be increased by exercise and climatic conditions.
- Less than 1% of the treated drinking water produced by water authorities is actually consumed by people. Most is used for lawns, showers, toilets, laundry, etc.
- An average person can survive for nearly two months without food, but less than a week without drinking water
- Less than 1% of the water treated by public water systems is used for drinking and cooking.
- Four litres of gasoline can contaminate approximately 2.8 million litres of water.
- About 25,700 litres of water is required to grow a day's food for a family of four.

How much water is used (on avergae) in general household activities?

- Toilet flush (single flush cistern) - 12 litres
- Toilet flush (dual flush minimum) - 3-5 litres
- Bath - 100 litres
- Shower (10 minutes) - 200 litres
- Dishwasher load - 50 litres
- Washing machine load - 150 litres
- Brushing teeth with tap running - 5 litres
- Hand basin per use - 5 litres
- Garden sprinkler per hour - 1000 litres
- Garden dripper per hour - 4 litres
- Car Washing with hose - 200 litres
- Hosing driveway - 100 litres
- Total daily consumption per household - 900 litres

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