Keeping your environment growing.

A landscaped and well-maintained exterior environment where you work, live or play improves your sense of well-being. Servest Landscaping understands the importance of creating and maintaining environmentally conscious landscapes for commercial and industrial organisations, recreational, entertainment and retail establishments and the property development market. We have more than 40 qualified horticulturalists, an in-house design team and all the equipment and expertise it takes to make your landscape work for you.
World-class Water Wise landscaping

S

outh African landscapers are internationally acknowledged as experienced professionals who are able to overcome a range of difficult climatic conditions in their bid to create beautiful landscapes. They also appreciate the challenge of landscaping in a country that is officially classified as having a semi-arid climate.

Predictions from climate change experts suggest that even more trying conditions can be expected as world temperatures rise on account of global warming. In South Africa, climate change is also expected to affect annual rainfall distribution patterns which will result in extended dry periods interspersed with excessively wet periods. With an ever-growing population and pressure on the availability of potable water, Rand Water has joined forces with the South African Landscapers Institute (SALI) to promote the concept of Water Wise landscaping.

The likelihood of water demand outstripping supply to the Rand Water footprint between 2013 and 2020 are well documented. The available supply of water in the Vaal River System will only increase when the new Lesotho Highlands Water Project is completed in approximately 2020. This means that everyone, including office parks, golf courses and housing estates, will have to become ever more proficient in managing water usage.

Rand Water’s Water Wise Guide to Landscaping outlines the basic principles underlying the creation and maintenance of Water Wise landscapes. Most of the images used to illustrate these basic principles are from projects submitted by SALI Principal Members for the 2011 Awards of Excellence. Since 2005, Rand Water has sponsored a Water Wise Trophy at this event, and the Water Wise winners are lauded for their efforts.

We hope that the Water Wise ideas, concepts and advice in this publication will be of benefit to everyone who develops, manages or maintains a landscaped environment around factories, mines, office blocks, hotels, casinos, golf courses or housing estates.

Leslie Hoy – Manager, Environmental Management Services, Rand Water

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This publication is a joint venture between Rand Water and the South African Landscapers Institute (SALI), 2011.

Cover: Water Wise and eco-friendly landscaping

Designed and implemented by Marina Landscaping, this garden at the High Constantia Estate in the Constantia Valley in Cape Town was awarded the 2005 Rand Water Water Wise Trophy.

The five hectare site comprises 19 residential units clustered around 2.5 hectares of open space. Marina Landscapes followed the recommendations given in the Environmental Scoping Report and designed a landscape to preserve biodiversity and habitats. The indigenous plantings retain the natural beauty of the site, and resulted in the creation of habitats for a variety of wildlife.

The riverine area at High Constantia was completely cleared of alien invasive plants. This vegetation had been absorbing large quantities of groundwater and reducing water flow in the stream. This area was rehabilitated with indigenous stream and wetland plants. The river has a 10m buffer zone on either side, which provides habitat for plants and animals, creating a biodiversity corridor.

Most plantings comprise local indigenous plants – a total of over 200 different indigenous plant species. Such plants are well adapted to local conditions, and therefore need little if any extra water beyond that provided by the local rainfall. Local indigenous plants are also more likely to survive in the event of a prolonged dry spell with accompanying water restrictions, thereby protecting the property owner’s investment in the landscape.

No bare soil can be seen anywhere on the Estate, as all pathways are covered in mulch and all beds are fully planted. This reduces evaporation from the soil by up to 70%. The private open spaces of residents comprise informal natural landscaped areas to minimise the use of ‘waterholic’ lawn areas. To create a recreational area the meadow field was planted with buffalo grass, a relatively low water usage Cape turf type.

The Estate is now a bird-watcher’s paradise, and is home to many frog and insect species as well as small mammals. The Estate showcases the principles of Water Wise gardening, illustrating how a beautiful landscape can be created that also conserves water, and animal and plant biodiversity.
Landscaping for the future

Landscaping is evolving to deal with issues of water security, which are fast becoming a worldwide concern, particularly in water-short countries like South Africa.

The amount of fresh water on earth is constant, which means that the fresh water available today is exactly the same as it has been for thousands of centuries. And yet in the last 100 years the earth’s population has increased dramatically. From 1.6 billion people in 1900 there are now 7 billion people on earth, and this number is expected to reach 8 billion in 2025. The present population of Africa is 1.03 billion; it is expected to double by 2050.

The increasing demand made on existing water supplies by ever-growing populations is of enormous concern to both governments and water authorities throughout the world. The strain on water supplies was internationally acknowledged at the 1992 United Nations Conference on Environment and Development (UNCED) in Rio de Janeiro. The United Nations deemed it necessary to establish an annual World Water Day – March 22 – to highlight the importance of water conservation and water quality.

In water-stressed South Africa, studies already indicate that, as the population grows, our limited water resources could be fully exhausted within the next 20 years. A variety of programmes have been initiated by both government and water authorities to manage water resources more efficiently and reduce wasteful water usage.

Demand for water
South Africa receives an average rainfall of 495mm, less than half the world’s average of 1050mm. Hence South Africa is categorised as a semi-arid country that is water stressed (see box). There is also an uneven distribution of rainfall across our country, and our hot dry climate causes excessive evaporation. Climate change is also affecting rainfall, with ‘drier dry spells’ and ‘wetter wet spells’ being predicted. And increasingly, South Africa’s limited water resources have to be shared amongst an expanding population, a growing business sector, agriculture and our unique ecosystems, the latter of which generates a large part of our tourism industry.

South Africans have been urged to save water in the workplace and at home. The likelihood of future water shortages is not a fantasy. Reports from the City of Cape Town indicate demand will exceed supply in eight years, and the Department of Water Affairs has predicted that water shortages can be expected in Gauteng and neighbouring regions from 2013, when projected population growth and development will exceed the available piped water supplied to the region. Only in about 2020, when the new Lesotho Highlands Water Project comes on stream, will more water become available to Gauteng.

Landscapes for the future
Water resources and their future availability underpin the very existence of the landscaping industry. Landscape architects, designers, contractors and maintenance specialists, need to design landscapes that suit the new reality of predicted water shortages, and to plan the most water-efficient on-site irrigation.

In this groundbreaking brochure, a joint venture between Rand Water’s Environmental Management Services and the South African Landscaper’s Institute (SALI), the ideas, concepts and tips that will transform landscaping sites into Water-Wise models of progressive excellence are presented. We also celebrate landscapers and landscaping projects which have installed a variety of Water-Wise initiatives. These projects have been recognised by Rand Water and each year the best Water-Wise landscape is awarded Rand Water’s Water Wise Trophy. This prestigious Trophy is presented at the annual SALI Awards of Excellence.

What is water stress?
South Africa is classified as a ‘water-stressed’ country as we have less than 1 700m³ of water per person per year. Unless we begin to use our limited water supplies wisely, South Africa will move into the ‘water-scarce’ category of less than 1 000 m³ per person per year by 2025.
Water Wise landscapes

Rand Water has led the way in promoting the development of landscapes that conserve water.

Rand Water, the main supplier of potable water to Gauteng and neighbouring regions, has promoted water conservation for many decades. Following international trends, the Environmental Management Services of Rand Water has become increasingly interested in quantifying the amount of potable water used in landscapes. (Potable water is water from natural sources that has undergone costly purification processes to render it safe to drink. Delivered through a complex system of pipes and reservoirs, it is often referred to as municipal water).

Interest in water efficient landscapes began in the 1970s, when research in the semi-arid, south-western states of the USA indicated that irrigation of landscapes in these dry regions accounted for about 50% of total domestic water use. The severe drought in these regions in 1977 resulted in the imposition of water restrictions which impacted negatively on landscapes. Subsequent research demonstrated that, if a specifically designed low water usage landscape was installed (instead of high water usage European-inspired plantings), and irrigated with precision, landscape water usage could be reduced by about 70%.

Rand Water and the Water Wise campaign

During the drought of 1994/5, Rand Water launched a Horticultural Forum as part of their campaign to highlight the importance of Water Wise gardens, landscapes and recreational facilities in the Gauteng region. Shortly thereafter the Water Wise brand was launched. Since then, Rand Water have launched numerous Water Wise initiatives and developed Water Wise demonstration gardens at the Delta Park Environmental Centre in Victory Park in Johannesburg and the Walter Sisulu National Botanical Gardens in Roodepoort.

A Rand Water-Wise Trophy was donated to the South African Landscapers Institute in 2000 and is awarded annually to the landscape company that has designed the most Water-Wise landscape (see page 34). This award is an accolade of recognition for the winning landscapers and is highly prestigious, as it guarantees the future clients of these landscapers a team fully conversant with Water Wise landscaping principles.

Landscaping professionals and plant growers are now well aware of the need to create Water Wise landscapes that conserve water. Rand Water researchers continue to keep the general public, as well as professionals, informed about water conservation by means of magazine and newspaper articles, brochures, informative talks, and the Water Wise website. (Visit www.randwater.co.za and click on the Water Wise logo).

Rand Water’s researchers have also identified the water needs of a wide range of plants, and continue to be right up to date with the latest water saving techniques and products. These findings are of major interest to South African landscapers, who are at the forefront of innovative design. The following pages highlight research which focuses on the many ways that the water needs of an attractive landscape can be reduced to the absolute minimum.

Become a water steward

Water conservation can serve as an integral part of corporate sustainability practices, or the ‘greening’ of a business. Many often think of ‘greening’ as a technique that focuses on energy savings, but it is important to not forget the importance of ‘saving blue’. Not only is water a limited natural resource, but there is also a fundamental water-energy connection as the treatment and delivery of water requires a great deal of energy.

Being an active water steward is one more way to enhance a company’s image and improve employee pride and motivation. Besides positive PR, an organisation will benefit with cost savings, including lower maintenance and equipment replacement costs, in addition to reductions in water bills.

A number of prestigious organisations provide guidelines on how businesses can practice environmental conservation in general, including water conservation. These include the American Audubon Cooperative Sanctuary Programme, the International Organisation for Standardisation and the South African Heritage Environmental Management Company. All give recognition for achievement of their objectives.

In every business or factory there are simple steps that can be taken to conserve water. These include fixing leaks, installing low-flow showerheads, installing high efficiency toilets, installing Water Wise landscaping and recycling processed water. However, the best savings will occur if a business creates an overall water management plan.

The three best practices for all organisations are:

- Have a goal to save water;
- Identify and implement water efficiency measures;
- Monitor savings and progress.

LEFT: Businesses can conserve water by installing an attractive Water Wise pavement planting rather than simply lawn as shown here at the entrance of the Waterfront Office Park in Cape Town. Landscapers: Greenacres Landscapes. (Pic: Courtesy of SAND) FAR LEFT: Launched in March, 2011, the Water Wise garden at the Walter Sisulu National Botanical Gardens includes water harvesting techniques, hydro zoning, indigenous low water plants and a variety of mulching techniques. It also proves that water wise gardens can be enormously attractive.

“One of the most difficult things is not to change society, but to change yourself”

- Nelson Mandela
Rand Water’s Water Wise Guide to Landscaping

Basic principles of Water Wise landscaping

Water Wise landscaping is an approach to landscaping that focuses on water conservation. Climate-appropriate plant choice and efficient irrigation are key factors. Others are grouping plants with similar water requirements together in different hydro zones, watering just enough to meet plant needs, and installing non-water consuming areas, such as paved or gravelled sections. The use of local indigenous or other low water usage introduced plants is a priority.

Being Water Wise does not necessarily imply only one particular landscape style. Rather, it is a concept of water conservation that may be applied to landscapes of any style, from formal to informal in layout, to contemporary or traditional in appearance.

A Water Wise landscape is cost efficient

During construction of the Echo Edge apartment building in Port Elizabeth the vegetation on an adjacent steep slope suffered damage. The area was re-vegetated, and berms and swales were constructed to slow down and manage fast-flowing stormwater that would otherwise have flowed unrestricted into the Baakens Valley Nature Reserve, carrying with it valuable topsoil, and causing serious soil erosion to the valley walls. Landscaping: Ulterior Design.

Eight rules for Water Wise design

• Plan and design to conserve municipal water and harvest free rainwater.
• Remove declared alien invader plants – they over-consume water and destroy habitats.
• Create practical turf areas of manageable sizes and shapes, and select appropriate grass types.
• Zone the landscape into different hydro zones and group plants according to their water usage. Make the low water usage zone as large as possible. Thereafter, determine how much and how often to water through the seasons.
• Use soil amendments such as compost, manure and water retentive polymers.
• Use mulches, especially in high and moderate waterering zones.
• Irrigate efficiently with properly designed systems, and by applying the right amount of water at the right time.
• Maintain the landscape appropriately by mowing, pruning and fertilising properly.

Planning and design

Planning involves identifying the client’s preferences, intended uses and goals for the landscape. These goals are then combined with the environmental features of the property to create a map. This ‘synthesis map’ is refined by applying both standard and Water Wise design principles to create an attractive landscape.

Planning to make the best use of site assets and limitations is important. At the Mount Grace Hotel in Gauteng, sloping ground permits water to be harvested in a dam. Landscaping: Servest Landscaping. (Pic: Courtesy of SALI)

A retention pond slows down floodwater

A Water Wise landscape is simply one in which basic principles of water conservation have been applied right from the start – although any existing landscape can be altered to make it Water Wise.

The best time to convert an existing landscape to one that is Water Wise is when it needs a revamp. If building alterations are to be carried out, this is also a good time to reassess the landscaping.

Planning involves identifying the client’s preferences, intended uses and goals for the landscape. These goals are then combined with the environmental features of the property to create a map. This ‘synthesis map’ is refined by applying both standard and Water Wise design principles to create an attractive landscape.

Planning to make the best use of site assets and limitations is important. Assets may include views, rocky outcrops, a boggy area suitable for wetland plantings, areas with sunlight or shade, as well as existing vegetation.

Design principles include scale, balance, interest, harmony and continuity. Three additional design considerations that are important in Water Wise design are:
• Dividing the area into different hydro zones.
• Creating shaded areas to help preserve moisture in the soil.
• Creating windbreaks to prevent wind drying out the soil.

Implementing a plan may involve site grading, creating berms and swales to harvest rainwater, preparing and amending soil to make it more water-retentive, planning and installing an irrigation system, constructing no water usage hard landscaping surfaces, planting up high water usage, medium water usage and low water usage hydro zones, mulching and maintenance.

“As both population and water demands increase, and existing water supplies correspondingly decrease, the cost of potable water will increase.”

Leslie Hoy, Rand Water
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Plan different hydro zones

Different plants have different water needs so plan and plant accordingly

The key design principle of a Water Wise landscape is to group plants with similar water requirements in the same area. A landscape can have four hydro zones: a high water usage zone, a moderate water usage zone, a low water usage zone and a no water usage zone. This approach allows for small areas of high water and medium water usage plants, but at the same time results in water savings of between 30% and 80%.

Plan different planting zones

For greatest water conservation most of the landscape should be designed as low water usage and no water usage zones. Make the moderate water usage zones relatively small, and the high water usage zone even smaller.

Also take into account the following:

- Plan no or low water usage zones for windy exposed areas and the heat-collecting hot areas adjacent to the north- or west-facing walls of buildings.
- Make use of areas where rainwater temporarily collects for medium water usage zones or a wetland area.
- It is more water efficient to plant high water usage ‘3 drop’ plants in containers and group the containers together to create a focal point.

Four zones

Apply the four zones principle to conserve water.

No water usage zone

Make this hydro zone as large as possible. It comprises mainly of hard landscaping surfaces such as paved or gravel areas and parking areas that need no water. However, established local indigenous trees and shrubs, as well as many succulent species can be included in this zone.

Low water usage or ‘1 drop’ plant zone

Make this hydro zone large. The plants for this area are those that thrive mainly on the local rainfall. They tend to be local indigenous plants. Once established, they only need a little, if any, watering. In summer water only once every four weeks. In winter water only once every eight weeks.

Water Wise landscapes promote biodiversity

Water Wise landscapes recognise the value of local indigenous plants that are naturally adapted to prevailing weather conditions and rainfall. And, quite logically, local indigenous plants provide a habitat for a wide variety of local wildlife.

As ever-expanding cities destroy natural habitats and wetlands, many local plants and animals are becoming endangered, to the extent where extinction is a possibility. To highlight this new millennium threat, the United Nations declared 2010 the International Year of Biodiversity.

Businesses can become 21st century ‘heroes’ by commissioning a landscape that conserves water and also provides a haven for wildlife. Practical advantages are a reduced water bill, little or no lawn mowing, and less fertilisation and maintenance.

The predominantly indigenous plantings in the 43 hectare Veld Estate of the Woodlands Office Park is home to a wide variety of wildlife. Landscapers: Servest Landscapers.

(Pic: Courtesy of SALI)
A well planned Water Wise landscape results in water savings of between 30% and 80%.

Choose the correct plants for each hydro zone.

1. '1 Drop' plants for low water usage zone:
   Once established, these plants do not need water except during very hot dry spells. Local indigenous plants are an ideal choice. Only water in winter if they show signs of distress. Established local trees and shrubs, as well as most succulents, will not need any extra water. Some examples are:
   - **Trees**: Acacia spp., tree aloe, Buddleja spp., wild olive, karee, bush willows, Celtis africana, Dovyalis zeyheri, Enythrina lysistemon.
   - **Shrubs**: Abelia, carissa, confetti bush, euryops, felicia, lavender, rosemary, Plecnranthus neochilus, philodendrum, plumbago, Indian hawthorn, strelitzia, Cape honeysuckle.
   - **Perennials**: Agapanthus, asparagus ferns, elivia, Cape thatching reed, Diets spp., gaura, blue statice (Limonium perrenz), Tulbaghia violacea.
   - **Groundcovers**: Arctotis, stalked bulbine, hen-and-chickens, erigeron, trailing gazania, Plectranthus spp., trailing osteospermum, Sutera spp., star jasmine, vygies.
   - **Bulbs**: Fan-leaved boophane (Boophane disticha), Crinum spp., Ornithogalum thyrsoides.

2. '2 Drop' plants for medium water usage zone:
   Once established these plants do not need much water during the rainy season, except during very hot dry spells. Water once a month during the dry season. Some examples are:
   - **Trees**: Silver birch, leopard tree, Juniperus spp., Platyctilytus orientalis cvs., Melaleuca bracteata, deciduous oaks (Quercus spp.), Populus simoni.
   - **Shrubs**: Aucuba, buxus, coprosma, cordyline, euphea, Cytisus varolata, Duranta cvs., Freynia tropica, gardenia, hisbiscus, box honeysuckle (Lonicera nitida), forest bell (Mackaya bella), mahonia, nandina, roses, Solanum rantonnetii, Viburnum species.
   - **Perennials**: Shasta daisy, discia, dianthus, hellebores, Hemerocallis spp., kniphofia, New Zealand flax.
   - **Groundcovers**: Corex spp., Festuca spp., Liriope spp., mondo grass, lamb’s ear, snow-in-summer (Cerastium tomentosum).

3. '3 Drop' plants for high water usage zone:
   Once established these plants need regular watering every 3 days in summer, and more often during hot dry spells. Water at least once a week during the dry season. Some examples are: Azaleas, camellias, tree ferns, fuchsias, Cape fuchsia, white arums (Zantedeschia aethiopica), Camellia hybrids, dahlias, acorus, Ajuga spp., creeping Jenny (Lysimachia spp.), Lamium spp., baby’s tears (Soleirolia soleirolii), all winter flowering bulbs and annuals.
Design Water Wise surfaces

Instead of putting down lawn on flat landscape surfaces, install low water usage alternatives

The materials used to cover the ground surface of a landscape have great bearing on the potential water conservation of a property.

A low water usage surface

Plant low-growing ‘1 drop’ ground covers. Evergreen ground covers are best as they look good all year round. Large swathes of just a few plant species with contrasting foliage are particularly effective. Low water usage ground covers include dwarf agapanthus, stalked bulbine, dymondia, trailing gazania, trailing osteospermum and wild garlic (for sun); and Asystasia gangetica, Asparagus densiflorus, hen-and-chickens, Drimiopsis maculata, variegated plectranthus and sutera (for shade).

A no water usage surface

Plant local Cynodon lawn varieties. Most exotic lawn varieties are high water usage plants. To conserve water and minimise maintenance reduce or eliminate lawn areas. Select indigenous Cynodon varieties that are naturally dormant in winter and thrive on local rainfall only.

Permeable surfaces are preferable

Surfaces that are water-permeable are always preferable to impermeable paved areas. A permeable surface is one that allows rainwater to percolate through it into the soil beneath. Such water remains cleaner and less polluted than stormwater that has flowed over impermeable surfaces such as roads and pavements. Polluted water is detrimental for natural ecosystems and makes the provision of piped drinking water more expensive.

Examples of permeable hard-scalping surfaces are:
- Permeable concrete pavers. These are a good choice for under large trees, driveways and parking areas.
- Gravel and small pebbles.
- Spaced flagstones with pebbles in the gaps. Use for pathways and terraces.
- Spaced flagstones with a very low-growing Water Wise ground cover planted in the gaps.
- Pine bark nuggets or shredded bark for paths in informal natural or indigenous areas.

Where impermeable paving is unavoidable, install it in such a way as to direct rainwater into adjacent planted areas. This can be achieved by means of a slightly sloping surface that is barely detectable, or in the case of a driveway, with judiciously positioned and very slightly sloped berms.

Where large areas are already paved, install infiltration basins planted with trees. Micro-organisms and root systems in the soil act as filters and clean stormwater as it travels down through the soil.
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Mulching dramatically reduces water loss from the soil due to evaporation, so that less frequent watering is required. Which mulch to choose and the depth of the applied mulch depends on the landscape theme, availability of various mulches and the local climate.

**Types of mulch**

- **Organic mulches.** These come from plant and animal sources and are the best sort of mulch because, as they break down, they enrich the soil. Examples are compost, fruit pips, nut shells, bark nuggets, wood chips, cobs and autumn leaves. Organic mulches need to be topped up regularly.

- **Inorganic mulches.** These are substances or materials that do not break down and enrich the soil, but help keep moisture in the soil. Examples are gravel, pebbles, stone chips and pavers. As they can store heat they need to be used judiciously; they are most suitable in shady areas.

- **Living mulches.** Ground covering plants serve the exact same purpose as other types of mulch, and may be preferable for aesthetic reasons. Low water usage ground covers are the most Water Wise choice.

**The benefits of mulch**

- Mulch reduces soil temperature, so less water is lost to evaporation.
- It promotes good root growth by retaining moisture in the root zone.
- It suppresses water-consuming weed growth by keeping out the light.
- Mulch provides winter protection in cold climates, preventing frost damage to roots.
- It reduces exposure to wind, which results in less moisture loss through evaporation.
- It controls erosion by softening the impact of falling water and slowing it down so that it can soak into the soil before running off.

**Benefits of organic mulch**

- Organic mulch eventually breaks down and improves the quality and water-holding capacity of soil near the surface.

A properly mulched landscape can save between 50 to 70% water, as the water in the soil cannot evaporate so quickly.

“A 5cm layer of leaf litter reduces evaporation by 45–65% depending on the type of leaf”
Tips for organic mulch use

- Organic mulches must at least be 5-8cm thick for normal soil and 8-12cm for a sandy soil. With clay soils 2-4cm is sufficient under normal conditions.
- During dry or cold periods the level of mulch needs to be thicker than during wet periods to protect plant roots.
- As organic mulches break down in the decay process, they need to be replenished. Compost decomposes in two to four months, whereas bark chips last about two years before being broken down.
- In spring, after the last frost, it may be necessary to pull mulch back from emerging plants, especially small perennials.
- If a particular mulch creates a nitrogen deficiency, correct by adding a solution of ammonium sulphate, dried blood or rock phosphate.

Leaf litter is ‘in’

Maintenance services often think they are doing the right thing by ruthlessly clearing beds and borders of fallen plant debris for the sake of neatness. This practice is outdated in landscapes of the future as bare soil inevitably loses its moisture content. A 5cm layer of leaf litter reduces evaporation by 45-65% depending on the type of leaf; pine is the best.

ABOVE: Mulching is highly effective in retaining moisture in the soil. Shown here is the Houghton Golf Course entrance in Johannesburg. Landscaping: Horticare. (Pic: Courtesy of SALI)

BELOW: An inorganic rock mulch has been utilised at the Dept of Health Offices in the North West. Landscaping: Amadiba Horticultural Services. (Pic: Courtesy of SALI)

BELOW LEFT: A living mulch is just as effective as inorganic and organic mulches. Choosing low water usage groundcovers with soil retentive roots is the best choice for sloping ground. Landscaping: Servest Landscapers. (Pic: Courtesy of SALI)
Harvest rainwater

Water is a precious resource that should not be wasted and certainly not thrown away. And yet, by not making the most of free rainwater, it is, in effect, being thrown away. Rather than letting this free water run off a property, use it to irrigate the landscape by directing the water to where it is needed, such as a high water usage zone, a wetland or a pond. Alternatively, it can be stored in water tanks for later use. Collecting rainwater for use in a landscape is known as rain harvesting.

Harvest rainwater from the roof

Collecting rainwater from the roof is the most efficient means of harvesting water. Every 1 m² of roof generates one litre of water from 1 mm of rainfall. Put differently, in a region with South Africa’s average annual rainfall (464 mm per annum), 464 litres (0.46 kilolitres) of free water can be harvested per year per 1 m² of roof.

To find out how much rainwater in litres can be harvested from a particular roof per year multiply the area of the roof in m² (or the ground area of the building) by the amount of rainfall your area receives per year in mm. Allow for 15% wastage. Deduct this amount from your annual water usage to see how much less water you would be paying for annually.

**By using water wisely up to 50% of landscape irrigation water can be saved**

Construct berms and swales

Swales (shallow depressions) and berms (slight ridges that are higher than the adjacent surface area) that are carefully positioned in a landscape, harvest water by keeping rainwater from a heavy downpour from being lost to runoff. They are particularly beneficial on a sloping site.

A berm at the lower edge of a slightly sloping lawn area will harvest water for the lawn. Very slight concrete berms on a solid surface driveway can direct runoff into an adjacent high or medium water usage zone. And a swale that collects runoff rainwater can be the basis of a wetland or pond area (see page 20).

Terrace slopes

The rainwater that falls on slopes is all too easily lost to runoff. In the process it erodes the soil, taking off the fertile top layer. Terracing sloping ground to create level areas of soil is a Water Wise practice. By constructing terraces rainwater runoff is slowed down, permitting more water to soak into the soil. This makes terraced areas ideal for plantings. In addition, a multi-level terrace makes an attractive landscape feature.

Direct rainwater into ponds and dams

Rainwater from gutters and hard surfaces can be directed into decorative ponds, storage dams or water tanks. Such water features are set to become a characteristic of future landscapes. On a practical level, the water in dams can be used for irrigating the landscape.
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With the ever increasing pressures on natural resources and the sure indication that demand for water in South Africa will outstrip supply by 2025, the landscaping industry is being transformed from a primarily aesthetic service to one that impacts the very sustenance of life on our planet.
The landscaping industry can lead the way in educating both corporates and homeowners on the important role of rainwater harvesting to secure the future of both the planet and the landscaping industry. Substituting rainwater for all water applications excluding drinking water could result in a potable water saving of around 50% of all domestic water consumption, and more than 80% of consumption in corporate and public buildings, thus relieving the immense stresses placed on municipal water supplies (not to mention the accompanying water bills!).

It is no wonder that rainwater harvesting, in conjunction with water wise, sustainable landscapes and permeable paving is amongst the top 10 international landscaping trends.

**Principles of water wise landscaping**

1. Plan and design for water conservation.
2. Green retaining walls by building small out-pockets and planters on the sides to absorb water and reduce run-off.
3. Reduce impervious surfaces by, for example, replacing solid driveways with porous alternatives.
4. Interplant flagstone walkways with creeping groundcovers, such as thyme, which will help to slow stormwater flow and create a more aesthetic space.
5. Design green spaces between hard surfaces (patios, walkways and parking lots) and building edges.
6. Include the installation of JoJo rainwater harvesting tanks in the landscape design. With the variety of sizes, stylish options and fashionable colours available, smaller sized tanks can be unobtrusively positioned under decks, alongside walkways or vertically against a wall. Alternatively, consider underground water storage tanks. JoJo Tanks have a wide range to suit this application.

**Landscaping going even greener**

With the ever increasing pressures on natural resources and the sure indication that demand for water in South Africa will outstrip supply by 2025, the landscaping industry is being transformed from a primarily aesthetic service to one that impacts the very sustenance of life on our planet.
THE MARBELOUS MARBLELINE

We have to think green
There’s no question that “green living” has taken hold in South Africa. Increasingly people are becoming concerned about the adverse effects they might be having on the environment, and even more are taking steps to reduce their negative impact. A JoJo rainwater-harvesting tank is simply the smartest way to green your home and garden and reduce your carbon footprint.

Saving water begins at home
Indications are that demand for water in South Africa will outstrip supply by 2025. Rainwater harvesting tanks, the latest status symbol of eco-savvy homeowners are not only available in a variety of stylish options and fashionable colours, they also offer quick, easy and cost-effective access to a completely FREE source of water, rain!

To win, follow these three easy steps

1. Go to our JoJo Tanks Facebook page
2. Make sure that you are a fan
3. Comment on our competition status

AND

Watch this space! You could be the lucky winner of a JoJo Marbleline™ valued at R2100.00 and cash to the value of R1500 to contribute to delivery and installation. Ensure that your details are correct so that we can contact you, should you be the winner. The competition closing date is 31 August so do not pass up on this fabulous opportunity to win the latest trendiest green product!

Substituting rainwater for all water applications excluding drinking water, could result in a potable water saving of around 50% of all domestic water consumption, and more than 80% of consumption in corporate and public buildings thus relieving the immense stresses placed on municipal water supplies (not to mention the accompanying water bills!)

For more information: (011) 325 6006
or www.jojotanks.co.za or
www.jojotanks.mobi
The choice of an irrigation system and how it is implemented in different hydro zones has a great impact on the efficiency of water use on any site.

**Automatic systems**
The most efficient irrigation system—and certainly the least time-consuming—is an irrigation system with an automatic controller that allows for the different hydro zones to be accounted for depending on received rainfall. It is quite feasible to switch off the irrigation system for a few days. Linking a rain sensor into the automatic system ensures that irrigation will be halted automatically during rainy periods (see box).

**Drip versus sprinklers**
From a Water Wise perspective, drip irrigation is preferable to sprinklers and lawn pop up systems. A drip irrigation system emits 2-15 litres of water per hour, whereas a sprinkler system emits 2-7 litres per minute. Research in the dry south-western states of America has shown that drip irrigation has a high level of water efficiency. Water drips directly into the soil, so there is less waste of water compared to sprinkler systems that spray water above the soil, where droplets are often blown away by the wind, or evaporate. Drip irrigation is particularly good for mulched areas because it does not wash away the mulch.

Drip irrigation is ideal for large shrubberies, as there is no interference from foliage and therefore no dry spots. Plants that are vulnerable to fungal attack, such as roses, benefit from this form of irrigation as the foliage does not get wet during irrigation. Awkwardly shaped and narrow areas, where conventional sprinklers waste water by over-spraying, will also benefit from drip irrigation.

**Install a rain sensor**
An easy way to prevent overwatering is to install a rain sensor to override the automatic watering system during rainy weather. A rain sensor simply senses rainfall. Once a designated amount of water has been detected, it shuts down any regularly scheduled irrigation and makes sure that you do not have a public relations disaster on a rainy day.

**References**
- Landscape Irrigation Association of South Africa (LIASA) on tel: 021-558-4989; Email: info@liasa.co.za; website: www.liasa.co.za

Efficient irrigation

A properly designed and maintained irrigation system both conserves water and promotes a thriving landscape.
It wastes water to over-irrigate plants that grow well with minimum water. In fact, many such plants will die if overwatered.

**Code of Standards**

The Landscape Irrigation Association of South Africa (LIASA) has a Code of Standards Manual for the design, installation and management of irrigation systems. The aim is to assist contractors, dealers, specifiers, developers, architects and building managers in the correct application, installation and maintenance of landscape irrigation systems for South African conditions.

Now in its 3rd edition, the Manual was compiled by a team of local irrigation experts to ensure an efficient and trouble-free system. Included in the manual are tables which offer guidelines for soil infiltration rates and average irrigation requirements. There is also information about how to take into account the prevailing climatic conditions. Formulas for calculating the precipitation rates of all sprayheads (microsprays and cone heads), rotating sprinklers (mini to large) and emitters (bubblers and drippers) are included, as well as potable water flow testing methods and equipment.

Any LIA professional has access to this Manual and can advise building managers on any excessive use of water relative to the area under irrigation.

“*The crisis of our diminishing water resources is just as severe – if less obviously immediate – as any wartime crisis we have ever faced*”

Jim Wright, US Representative at Water Conference
To become a water manager requires the assistance of a professional team of irrigation and landscaping consultants who can set in place systems that allow for monitoring the water usage in the various hydro zones on a property. A well planned system will reduce water usage and save time and money.

For example, irrigation specialists take into account the following:

- Turf areas are irrigated differently from shrub borders.
- South and east exposures need less frequent watering than north and west exposures.
- Slopes need to be irrigated more slowly than flat surfaces.
- The need to use a number of emitters around the drip line of trees, where the roots are, rather than just one next to the trunk.

**Best irrigation practices**

Maximum water conservation can be achieved by applying the following:

- Set automatic systems correctly and adjust them as conditions change.
- Water only as frequently as your plants need it. The different hydro zones have different water requirements and require different watering schedules.
- Water less frequently but more deeply. This encourages deep root growth that sustains the plant during dry periods. Frequent watering causes a plant to develop roots in the first few centimetres of soil only, so in dry periods they cannot use water deeper down in the soil profile. This is particularly true of lawns.
- Water-train trees and shrubs. By gradually changing from frequent shallow watering to less frequent but deeper watering schedule, permanent plants can be ‘trained’ to need less water.
- Water in the early morning or late afternoon to reduce water loss to evaporation. In the hot summer months from October to February, avoid watering between 10h00 and 14h00 when evaporation rates are high. In winter, morning irrigation is best.
- Adjust the irrigation programme according to the season. Plants need less water during the cool winter season than during the hot summer months.
- If the sky is cloudy, irrigation can be reduced by as much as 50%.
- Avoid irrigating during windy weather as high winds blow away water delivered by sprinklers and prevent proper coverage.
- Turn off the system if rain is irrigating the landscape sufficiently.
- If water from a sprinkler system puddles instead of sinking into the soil, change the programme to deliver the required amount of water in two sessions rather than one session.

**Best maintenance practices**

Once an irrigation system is installed it needs to be checked at least twice a year to make sure it is performing well. Particularly in the case of sprinkler heads, plant growth over time may call for adjustments to the system.

- Check it for overall coverage. If planted up areas are not being comprehensively irrigated, adjust the system. This may mean replacing heads, adding more heads, or changing heads to do a more efficient job.
- With the system on, observe places that are receiving water where it is not needed. Overlaps onto paved areas may result in considerable water waste. Overwatering trees and shrubs may lead to diseases.
- Check all water connections in the irrigation system at least twice a year for leaks.
- Replace all old worn washers.
- Monitor sprinkler heads for any misalignment, and adjust the sprinkler heads as is necessary.

“Water conservation is something we all should practice. It’s too precious a resource to waste”

– American Water Works Association
“Between earth and earth’s atmosphere the amount of water remains constant. There is never a drop more, and never a drop less”
Linda Hogan in Northern Lights, 1990

Rainfall facts and figures

A comprehensive knowledge of local rainfall averages, soil absorbency and rate of flow of irrigation systems are all part and parcel of efficient irrigation.

Once the landscape is divided into separately irrigated zones, each with its own appropriate planting, hard landscaping and irrigation lines, irrigation can be fine tuned to achieve maximum water conservation.

Observation is vital

Once new plants have been established, careful observation of prevailing weather conditions and daily observation of the condition of the plants are the key to adjusting your irrigation programmes efficiently.

Observe how plants react to increasing or decreasing their irrigation schedule. Most plants only need water when they start to wilt. However, some plants look wilted during the day, but actually have plenty of water at their roots and will recover in the evening. If your plants are still wilting at night, they need water.

How much water do plants need?

• Different plants require different irrigation schedules. Depending on their size, water needs to penetrate the soil to different depths at each watering. Irrigate long enough for water to penetrate to the root zone, but no deeper. Deep infrequent irrigation is preferable to shallow frequent irrigation. Check the soil moisture depth after watering – use a long screwdriver, soil tube, or moisture meter. Irrigate as follows:
  - Depth of 30cm: Small plants, such as lawn, groundcovers and perennials;
  - Depth of 60cm: Medium plants, such as shrubs;
  - Depth of 90cm: Large plants, such as trees and large shrubs;

• Make sure to replace water lost to evaporation in the high water usage zone. High water usage ‘3 drop’ plants require 10mm of water every three days, in summer you need to put down 10mm plus the 15mm or so that has evaporated over those three days – a total of 25mm. In winter, only 15mm is required every week.

Annual rainfall averages

The average annual precipitation of the entire surface of our planet is estimated to be about 1050mm per year. Not one of South Africa’s cities or provinces receives this amount. We live in a dry country with limited water resources. Water is a resource that is more valuable than gold or diamonds. Use it wisely.

Source: http://www.environment.gov.za/enviro-info/prov/rain.htm

Average city annual rainfall figures in mm

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| Northern Cape                  | 202                     |
| Western Cape                   | 348                     |
| North West                     | 481                     |
| Limpopo                         | 527                     |
| Free State                     | 532                     |
| Eastern Cape                   | 552                     |
| Gauteng                         | 668                     |
| Mpumalanga                      | 736                     |
| KwaZulu-Natal                  | 845                     |

Source: South African Weather Bureau

Average provincial annual rainfall in mm

Nearly 91% of South Africa falls within the United Nations’ definition of affected drylands. These are extraordinarily dry areas where the rainfall is low, and the potential evaporation is high.

Source: South African Weather Bureau

LEFT ABOVE: South Africa’s landscapers are able to create stunning low water usage landscapes that look good all year round, as shown here at the Holiday Inn Express in Woodmead, Sandton.
Landscaping: Servest Landscaping. (Pic: Courtesy of SALI)

LEFT: As appreciation for South Africa’s natural flora and fauna steadily increases, developers of large country properties are striving to preserve the natural vegetation, which has adapted over millions of years to local climatic conditions, and needs very little irrigation or maintenance. Shown here are the grounds of the Mount Grace Hotel in the Magaliesberg. Maintained by Servest Landscaping it was recognised as a Silver Award winner in the Water Wise Category. (Pic: Courtesy of SALI)
Create a wetland

Wetlands help to keep water clean and also to conserve water.

The term ‘wetland’ refers to a section of land that is waterlogged – either permanently or seasonally. Wetlands provide an ecological habitat for the birds and wildlife of a particular area, but they are also a valuable environmental resource that can be used to prevent flash floods by slowing down and storing the water from heavy downpours.

Preserving a natural wetland or constructing a new wetland in an urban or industrial landscape helps to compensate for the loss of valuable natural wetlands. Throughout the world, it is now quite common for golf courses to include a wetland. This often feeds into a dam that harvests water for irrigating the turfed areas. Now industrial and commercial landscapers are following this water-friendly trend with a wetland appropriate to the size of the landscape. (See box)

A well-designed wetland is a highly attractive feature in a landscape. Many lovely plants like the moist soil of a bog area. Some, such as sedge (Cyperus spp.), scarlet river lily (Hesperantha coccinea) and white arum (Zantedeschia aethiopica), grow with their roots in the waterlogged soils at the edge of a pond or in submerged containers in a pond. Others, such as red-hot pokers (Kniphofia spp.), clivias and arums, like moist soil and can be planted at the edge of the bog.

The low lying area of a sloping property can be utilised to create an ecologically friendly wetland supplied with harvested rainwater as demonstrated at the High Constantia Estate in the Western Cape. Landscaper: Marina Landscaping (Pic courtesy of SAJ).

A small wetland has been constructed at KwaMaritane in the North West Province. Landscaping: Top Turf. (Pic: Courtesy of SAJ)

A well-designed wetland is highly attractive in a landscape. Many lovely plants like those of a bog area. Some, such as sedge (Cyperus spp.), scarlet river lily (Hesperantha coccinea) and white arum (Zantedeschia aethiopica), grow with their roots in the waterlogged soils at the edge of a pond or in submerged containers in a pond. Others, such as red-hot pokers (Kniphofia spp.), clivias and arums, like moist soil and can be planted at the edge of the bog.

Wetlands are a valuable environmental resource that can be used to prevent flash floods by slowing down and storing the water from heavy downpours.

**Constructed wetlands at the Cradle of Humankind**

With plenty of land available, a natural water purification system for all wastewater at the Maropeng Hotel and the Tumulus visitor centre in the Cradle of Humankind World Heritage Site in Gauteng was viable. All wastewater, including sewage, is fed through a series of constructed wetlands. The wetlands were designed and constructed by Lindros Whole Earth Consultants, and handle 110 kilolitres of effluent per day.

Initially the effluent is passed through a debris trap where all non-biodegradable materials are filtered out. The wastewater is then channeled into underground septic tanks where anaerobic digestion takes place.

The overflow from the septic tanks is led into an automatic dosing siphon chamber where it is partially cleaned through the process of phytoremediation. A second dosing siphon directs this water into a similar series of second stage wetlands. Phragmites is the main phytoremediation agent in these wetlands.

Finally the water passes through two more wetland areas that contain a greater diversity of plant species that were chosen to eliminate any remaining harmful bacteria. At three points in the system the effluent is dosed with micro-organisms to further cleanse it. The cleaned effluent is available for irrigation or for infiltration into the natural water cycle.

**Reference:**

**Purifying waste water**

Wetlands can also ‘clean’ polluted water by the process of phytoremediation. The diverse bacterial communities and particular plants in a wetland benefit from the high nutrient load of polluted water. They ‘take up’ the pollutants, leaving the water clean. Wetlands are capable of biodegrading nutrient-laden domestic sewage and even toxic industrial effluents.

The ‘green’ building movement of the last decade takes into account the use and purification of wastewater from a property, be it residential, commercial or industrial.

Fairly large wetland areas are necessary to purify effluent water – water from baths, sinks, dishwashers, washing machines and even sewage – generated by a hotel development, or the polluted wastewater from a factory process. Where viable, this technique is increasingly being used, for example, at golf course estate developments.

**References:**

Wise up on water features

It is possible to have an attractive pond or fountain that does not waste water.

In recent years a dramatic water feature, either indoors or outdoor, has become fashionable in prestigious commercial properties. In today’s more ecologically aware world the question arises about whether they are appropriate in a water-short country.

The answer is: It depends on the type of water feature and how it is managed.

A water feature is Water Wise when water lost to evaporation, to adjacent areas, and to leakage is kept to an absolute minimum. Below are some guidelines:

• Locate a water feature in the shade where evaporation rates are less.
• Locate a water feature where it is sheltered from the wind.
• A water feature at the entrance of a building is more Water Wise if it is positioned inside the building rather than in a sunny or windy position outside the entrance doors.
• Place one water feature strategically, to form a focal point, rather than several scattered around the property.
• Aim for a water feature of minimum size with maximum effect.
• Reduce the size of the surface areas of water to reduce evaporation.
• Make a constructed pond deep as a shallow pond loses more water to evaporation than a deep pond. One metre is a good depth to aim for.
• Avoid extravagant high-pressure movement in fountains and waterfalls as these have high evaporation rates.
• A water feature where water drips or bubbles is more water efficient than one which sprays water.
• If a fountain is the chosen water feature, choose a sprayer that produces coarse droplets rather than a fine spray – the latter lose more water to evaporation than the former.

A ‘dry’ river

Consider constructing a ‘dry river bed’ as an illusionary water feature. A layer of pebbles with a few strategically placed boulders, together with some bank-side plantings of low water usage trees with dry season interest and clumps of grass-like plants can be most attractive. The dry river bed and edges can be planted up with local perennials and bulbs which are dormant in the dry season but spring to life when the rains arrive.

Be Water Wise with swimming pools

One of the most vital ways to reduce evaporation from swimming pools is to place a cover over it. A new case study has demonstrated that a thermal pool cover reduces water loss to evaporation by up to 98%. Filtration and energy consumption are also reduced by 50%. A cover also extends the swimming season by keeping the water temperatures higher, and reduces the amount of chlorine needed to keep the water clean. In Namibia, these benefits have been recognised and, by law, swimming pools have to be covered whenever they are not in use.

Another way to use water wisely is to fill the pool only when necessary. Use a timer on the tap as a forgotten running hose can waste about 1 000 litres of water per hour.

Source: Landscape SA magazine, May 2011, pg 41

“Less than 1% of all the water on Earth is available for human consumption”
Water Wise container gardening

Growing plants in containers is highly water efficient.

Containers are popular for enhancing the appearance of indoor spaces and large outdoor paved areas. And containers themselves can serve as focal points in an outdoor or indoor setting, particularly when they are large. Currently large geometrically shaped containers are highly popular as they complement the present trend of neomodernist architecture and design.

Growing plants in containers is recommended Water Wise practice, providing certain guidelines are followed.

- **Type of container.** Avoid containers that are porous and lose water through evaporation. If you already have porous pots, such as terracotta, line them with polythene or sealant, making sure to leave a hole for drainage.
- **Container size.** Make sure your pot is the right size for the chosen plant. Choose a container that allows for root growth. When a large container is required for impact, but the plant does not need so much space, to conserve water, fill the large container with lightweight packing material and put a smaller pot containing the plant on top.
- **Soil.** For healthy and thriving container plants, choose a good quality potting mix high in organic matter. Enhance the water and nutrient-holding capacity of the soil by adding water-retaining granules.
- **Fertiliser.** Use slow-release fertilisers and foliar fertilisers that provide a regular supply of fertiliser over a period of time. Organic fertilisers are also recommended as they do least harm to underground water supplies.

- **Watering requirements.** Containers enable water to be used efficiently by the grouping of plants with similar water requirements together. In outdoor containers, group high water usage ‘3 drop’ plants such as ferns, azaleas, camellias and fuchsias together, and plant Water Wise shrubs in a different grouping of containers.

  Use low water usage plants in outdoor containers as much as possible, especially if the containers are against hot north- or west-facing walls.

  For indoor containers, make groupings of ‘3 drop’ subtropical plants such as palms, schleffera, peace lily and crotons. Alternatively, group ‘1 drop’ frost tender succulents such as the striking Euphorbia ingens and Pachypodium species. The water wise plants will not require watering as frequently as the ‘waterholics’. (See page 7 for the water requirements of different plants).

  Position indoor container plants away from any draughts, and away from direct sunlight.

  Water efficiently. The high water usage subtropical plants so popular as indoor plants, both in containers or in an indoor garden area, require regular watering as they like moist soil. Avoid automatically applying water to a plant that wilts a little during the heat of the day – it’s normal. Rather test the soil first. Push a finger into the soil up to the first knuckle joint. If the soil feels damp at that depth and sticks to your finger, the plant does not need water.

  Place drip trays under containers of high water usage plants – these will collect surplus water which the plant will draw up as the soil dries out.

  The most water efficient method of watering container plants is by drip irrigation, as this ensures that the water is distributed slowly throughout the soil, rather than soaking through it. Otherwise water them slowly, by hand.

- **Apply mulch.** This will reduce water loss through evaporation. When planting up containers leave a 5cm gap below the top of the container to allow for mulch. Keep the mulch about 3cm away from plant stems to avoid possible fungal problems.
Water Wise management of buildings

Water stewardship can be implemented in the kitchen, canteen and ablution facilities of any commercial and industrial building.

It has been calculated that the average commercial building uses approximately 37% of its municipal water in amenities (kitchenettes and showers), 26% through leaking taps, running toilets etc., 31% in water-cooled air-conditioning units, 3% food production, 2% cleaning and 1% irrigation (depending on land use). An immediate saving of at least 25% can be achieved by simply fixing and managing leaking amenities.

Commercial buildings can save water by implementing modern plumbing systems and water management regimes aimed at reducing water consumption. Leaking taps, valves and pipes are another contributing factor to water wastage. A project carried out by the National Building Research Institute of the CSIR maintains that overall water consumption can be cut by as much as 40% without any inconvenience. The findings suggest that a small building can save at least 260 litres per day or 7 800 litres per month by using water more efficiently, while larger buildings can save much more.

Hot water management

Many litres of cold water are wasted whilst waiting for taps to run hot water in kitchens, ablations and change rooms. Investigate ways in which to capture or divert this water elsewhere. Insulating foam or other forms in insulating material wrapped around pipework will assist in keeping the water warmer for longer and prevent freezing in winter. Geysers and hot water heating systems should be placed as close as possible to where the water is used to prevent prolonged running of cold water.

Geyser have an expansion valve built into the system to prevent the geyser from bursting. As the cold water heats up it expands causing pressure within the storage cylinder. The expansion valve will open should this pressure exceed a certain level. When the expansion valve opens, extra water will run through a pipe onto the outside of the building. This water should be captured in a container and reused for washing or can be diverted and used for a nearby drip irrigation system or into a water feature.

An immediate saving of at least 25% can be achieved by simply fixing and managing leaking amenities.

1 Flow control showerheads should be fitted in change rooms and ablution facilities to reduce water consumption. Pic: Schmidt
2 Ablution taps and plumbing fixtures should be inspected regularly for damage — ideally, conventional taps should be replaced with pop-up or sensor activated. Pic: Schmidt
3 Regularly inspect the mains water meter to monitor the building’s water consumption. Pic: Schmidt
4 Leaking taps must be repaired as soon as possible. Pic: Otto
5 A worn flange from a toilet cistern which needs to be replaced.

Ablutions and showers

With all the water-saving ideas, concepts and products available today, there is no reason why water cannot be used efficiently in bathrooms. Products such as flow control regulators, toilet cisterns with reduced water capacity, toilet floats and even aerators are now readily available. Hotels can encourage less water usage with a ‘water stewardship’ notice in each bathroom. In dry countries top brand hotels politely suggest that guests reuse their towels to save on laundry water.

Water wastage from basin taps in the toilet facilities of hotels, tourist venues, restaurants and factories can be reduced by...
installing taps that deliver a fixed amount of water per press. Motion sensor activated taps can be installed in public bathrooms with high traffic flow. These only switch on when someone washes their hands close to the sensor and automatically turn off when they move their hands away.

An example in the United States highlights the potential water savings:

By installing 30 tap aerators, a commercial building in Brookline, Massachusetts, could reduce water consumption by 190,000 gallons (719 kilolitres) per year. The cost of the devices and labour was approximately $300 and the savings for the retrofit are estimated at $1,250 per year – a payback of 2 months.

Using a shower is considered more effective than bathing when it comes to saving water. Manufacturer’s now design a versatile range of water saving showerheads which are specially designed to save water while at the same time giving maximum efficiency in terms of its spraying capability. Aerator systems are also available for showerheads which will reduce water flow.

**How to detect leaks in the plumbing system**

There are a few ways to determine if you have leaking pipes on your property:

- The easiest way is to check your mains water meter; although this will be very difficult in big commercial or public properties where there is continuous use of water. However, on a smaller scale, if all the taps and valves are turned off and there are no leaking taps or cisterns within the building, then the meter will not turn. Calculate how much water you’re losing by recording the meter reading and timing it for 60 minutes/one hour. If everything is turned off but the meter is still running, then there is a leaking pipe on your side of the property.

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**Install Water Wise plumbing systems**

When building or renovating plan for a water-efficient water supply system. Consider the following:

- Install medium sized baths – 1 500mm or 1 650mm is an adequate length.
- Fit flow-controlled shower heads or fit a flow controller behind the showerhead.
- Install wash basin taps with aerator outlets. The aerator mixes air with the water, resulting in a lower flow rate (5-20 litres per minute), which splashes less and feels soft on the skin.
- Install toilets that have cisterns with a maximum capacity of nine litres. However, also consider the Aquasave – a toilet suite with a 4.5 litre cistern capacity. Manufactured by Vaal Potteries, the Aquasave is endorsed by Rand Water.
- Keep hot water pipe ‘dead legs’ to a minimum. A ‘dead leg’ is the length of pipe between the water heater and a single fitting which has to be drained of cold water before the hot water reaches the outlet. ‘Dead legs’ should not exceed the following limits: 15m for a 15mm diameter pipe; 8m for a 20mm diameter pipe; 5m for a 25mm diameter pipe.
- If the kitchen is remote from the water heater, install a small (15 litre capacity) or instantaneous type of water heater above the sink. This is preferable to having a long length of pipe, which has to be drained of its cold water every time hot water is required.

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**We all know the importance of a good plan**

What exactly does Turf-Ag do? We keep South Africa green, irrigating soccer fields, golf courses, farms, nurseries, schools, cricket pitches, corporate office parks, magnificent gardens and beautiful verges everywhere. Turf-Ag is also totally committed to water conservation and sustainable business practice. Turf-Ag imports and distributes superior quality international and local irrigation systems. We pride ourselves on giving excellent before-sales and back-up service and we only deal with reliable, high quality, warrantable products. But above all, Turf-Ag’s young, dynamic team of innovative, friendly, service orientated, irrigation experts will guide you from start to finish with your projects. We offer a complete one-stop solution for all your irrigation needs. Starting with system design in our fully-equipped design offices in Cape Town and Gauteng, to technical support and back-up, that makes irrigation refreshing simple. This is why year after year we are acknowledged by some of the industry’s most coveted international awards.
- Look out for unexplained damp or wet patches around the building. Another telltale sign of a leaking pipe is rising damp or consistent moisture on a section of the building walls.

Plumbing companies also offer professional leak detection services and can map out and trace your underground pipework. If there is a leak, knowing where to dig will save you time and unnecessary expense. Leaks commonly occur on joints and bends in the pipe system, after building alterations — especially where heavy vehicles were active or compactors used, as well as in very old pipework which may have corroded.

**How to fix a leaking tap**

Leaking and dripping taps are another contributing factor which wastes large amounts of water over time. The cause is often a worn washer or rubber O-ring and these can easily be replaced at minimal cost. All dripping taps on the property should be repaired immediately the drip is detected.

- Turn off the mains water valve before dismantling the tap. Once the main valve is turned off, open the tap to alleviate water pressure.
- Carefully dismantle the tap casing – be careful not to scratch or damage the silver or chrome finishing. Depending on the type of tap, you will need to remove the handle screw to dismantle the handle and shroud in order to access the valve. The valve includes the copper piece inside the tap which has a rubber O-ring as well as a washer. The O-ring and washers often wear down or split with regular use, and this is when the taps leak or drip.
- Using a small flat screwdriver; remove the old washer and O-ring and replace with the new ones.
- When reassembling the tap, make sure all the components are seated properly, or else the O-ring or washer could tear. The tap should also be in the ‘open’ position when reseating everything, so that when the components are tightened, the washer is not forced excessively into the flange.

**Reversing a regular free-flow shower head to a water saving shower head**

Many shower head manufacturers now market water saving shower heads which can save up to 50% of the water used with conventional shower heads. New aerating and water flow technology ensures that sufficient water is ejected through the shower spout or rose, but using only half the amount of water compared to a normal shower if measured over the same time frame.

**Converting a full-flush toilet to a dual-flush system**

Old buildings can make substantial water savings by converting the old toilet systems into water saving dual-flush systems. The older cisterns hold between 9–12 litres of water; and when flushed, use all the available water in a single flush. If the toilet is flushed on average 20 times during the day, it could amount to 240 litres. If there are 10 toilets in the building, this quickly adds up to 2 400 litres. Taken over the year, an incredible 876 000 litres or 876 kilolitres of municipal water is flushed away.

Modern cisterns generally hold around 6 litres of water; so by simply converting to a dual-flush system, water savings of 86% could be achieved. Converting a full-flush toilet to a dual-flush system is simple and cost-effective, and reduces unnecessary waste.

**How to test a toilet for leaks**

There are a number of signs that a toilet needs some repairs, but many toilets leak without conspicuous indications of trouble. Here are some of the obvious signs of a leaking toilet:

- If you have to hold the handle down to allow the tank to empty.
- If you see water running over the top of the overflow, you definitely have a leaking refill valve. If you are unsure whether or not water is running over the top of the overflow pipe; sprinkle talcum powder on top of the water in the tank, and you can clearly see whether or not it is.
- If you can see water trickling down the sides of the toilet bowl long after it’s been flushed.
- If water drips out of the refill tube into the overflow pipe.
- If a toilet turns the water on for 15 seconds or so without you touching the handle (otherwise known as the phantom flusher).

**Testing for leaks using coloured dye**

Even if your toilet doesn’t have any of the above signs, it’s still possible that it is leaking. These leaks are known as ‘silent leaks’, because they usually go undetected. There is an easy test you can do that will positively tell you whether or not your toilet is leaking. And if the test shows that the toilet is leaking, there is a second test that tells you what part inside the cistern is responsible and needs fixing.

- Remove the cover on the toilet cistern and carefully set it aside so it can’t be accidentally knocked over and cracked (some commercial and industrial buildings have toilets with cisterns built into the walls or connected directly to a plumbing pipe without a cistern). Remove any cleaners or detergents that colour the water and begin the test with clear water in the cistern as well as in the bowl.
- You’ll need some dye. Hardware stores often sell dye capsules or tablets, but food colouring or instant coffee works fine. Another suggestion is to use several tablespoons of a powdered fruit drink mix. Now put enough dye in the tank water to give the water a deep colour. Wait 30 minutes and make sure nobody uses the toilet. In 30 minutes if you find
any of the dyed water is now in the toilet bowl - your toilet is leaking. A properly operating toilet will store water in the tank indefinitely without any water running into the bowl.

Water on the floor around a toilet is certainly a problem. It can be dripping off a sweaty toilet cistern during humid weather; it can mean the wax sealing ring under the bowl has disintegrated, or the bowl is cracked; or it can mean the connections under the cistern are leaking.

So for now, let’s say you’ve done the dye test and found your toilet is leaking. You now have to find out which part is the culprit – the flush valve or the refill valve. And there’s another simple little test that points to the perpetrator of the crime.

• Draw a pencil line on the back wall of the cistern on the inside at the waterline. Then turn the water supply off, either under the cistern or at the main shutoff valve and wait 20 to 30 minutes. If the water level remains at the pencil mark, then the leak is occurring at the refill valve. If the water level falls below the pencil mark, then the leak is in the flush valve.

Another test:
If you have determined the leak is at the flush valve and you replace the ball, flapper, seal or whatever and it still leaks, there is one more test to further try and pinpoint the problem. This time turn the water off to the toilet before going to bed. In the morning, check the water level. If there’s about 2.5cm in the bottom of the tank and the water level is even with the edges of the seat, the leak is either a bad stopper (ball, flapper or whatever) or a damaged seat. On the other hand, if the tank is almost entirely empty and the water level is below the edges of the seat, the problem is a damaged gasket under the flush valve. This means the cistern may have to be separated from the bowl in order to get to the connections.

SOURCE: Information provided from http://www.toiletology.com

REFERENCES: