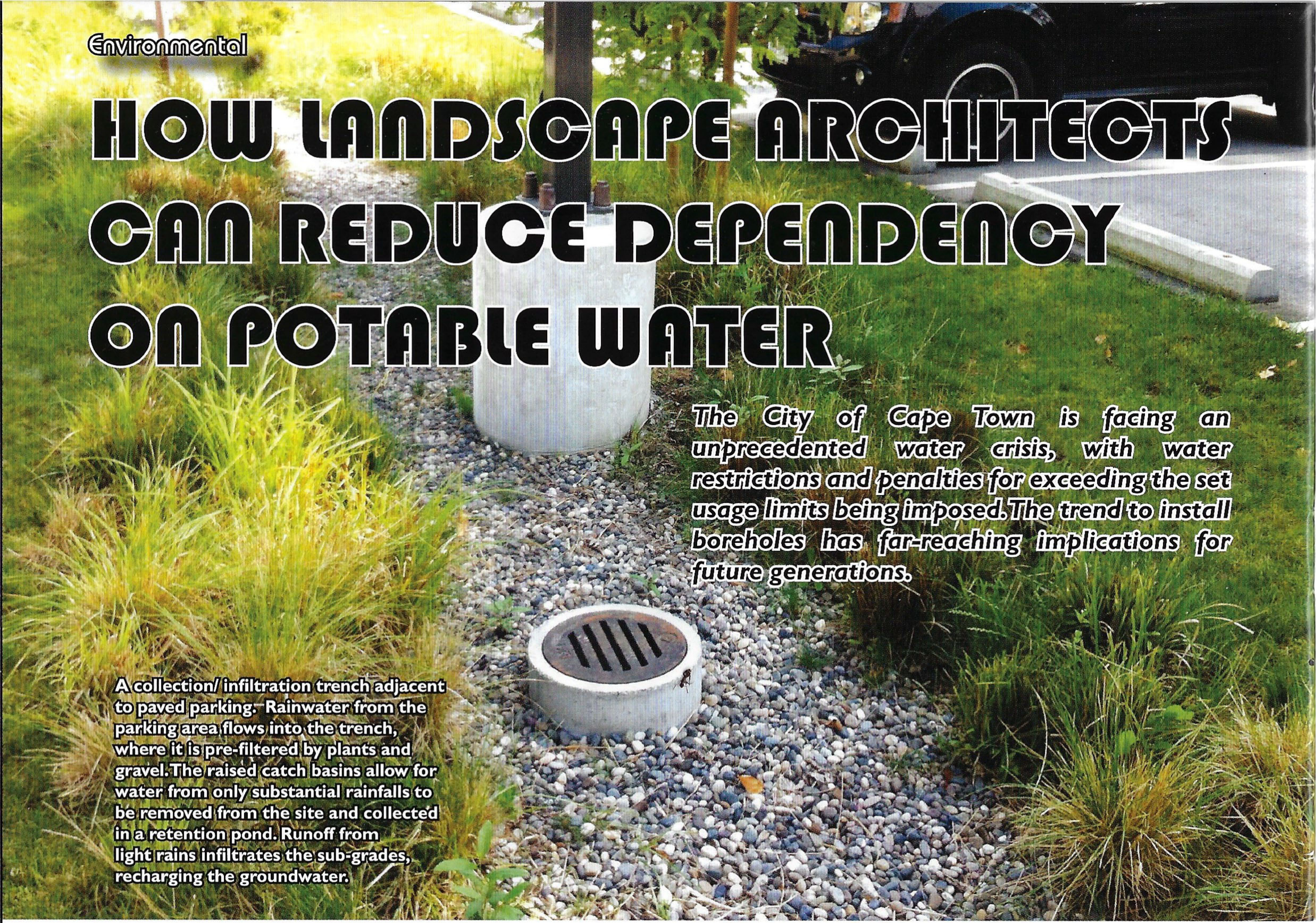


HOW LANDSCAPE ARCHITECTS CAN REDUCE DEPENDENCY ON POTABLE WATER

The City of Cape Town is facing an unprecedented water crisis, with water restrictions and penalties for exceeding the set usage limits being imposed. The trend to install boreholes has far-reaching implications for future generations.

A collection/ infiltration trench adjacent to paved parking. Rainwater from the parking area flows into the trench, where it is pre-filtered by plants and gravel. The raised catch basins allow for water from only substantial rainfalls to be removed from the site and collected in a retention pond. Runoff from light rains infiltrates the sub-grades, recharging the groundwater.

If borehole water extraction exceeds the speed of its natural recharging process, these underground aquifers can dry out over time. The problem is further compounded in urban areas, where traditional approaches to storm water management have significantly slowed down the recharging process. Shortage of ground water further increases the landscape's dependency on irrigation systems for survival.

Resolving the water crisis requires a multi-disciplinary approach to find sustainable alternatives to decrease our dependency on potable water.

As 'stewards of the land', landscape architects have a critical role to play as they have the necessary skills and insight to assist city officials and end users in implementing technologies and design ideas that can significantly reduce consumption. It is the profession's responsibility to rise to the occasion and effectively contribute to resolving the water crisis. By working closely with urban planners and civil engineers, we should promote and facilitate cost-effective and sustainable solutions.

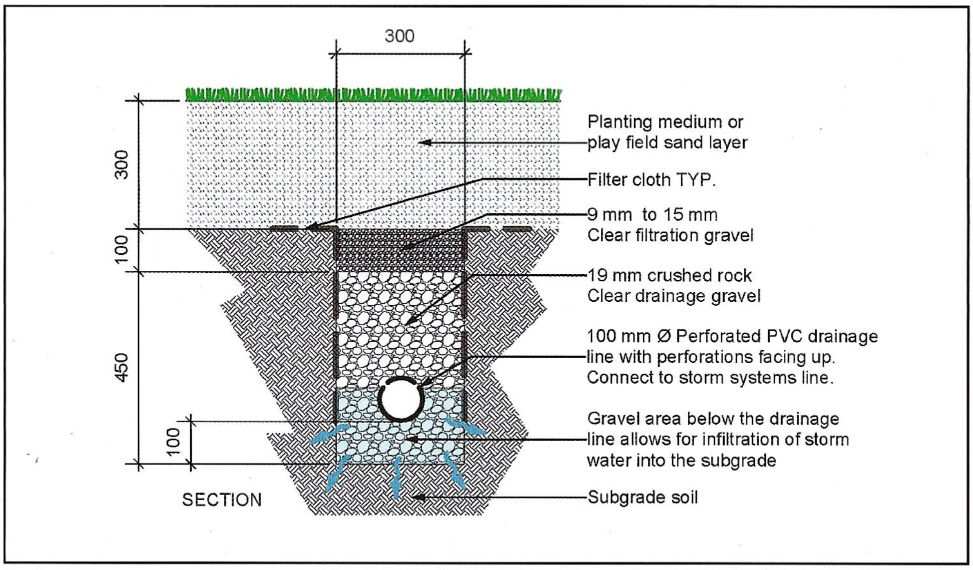
Harvesting rain water, recycling grey-water, installing water efficient irrigation systems, reducing loss of water due to evaporation or leaks from water features and improving water infiltration into the soil to recharge ground water are some of the more obvious initiatives that can help in effectively reducing the consumption of water supplied through municipal systems and private boreholes.

Landscape architects need to:

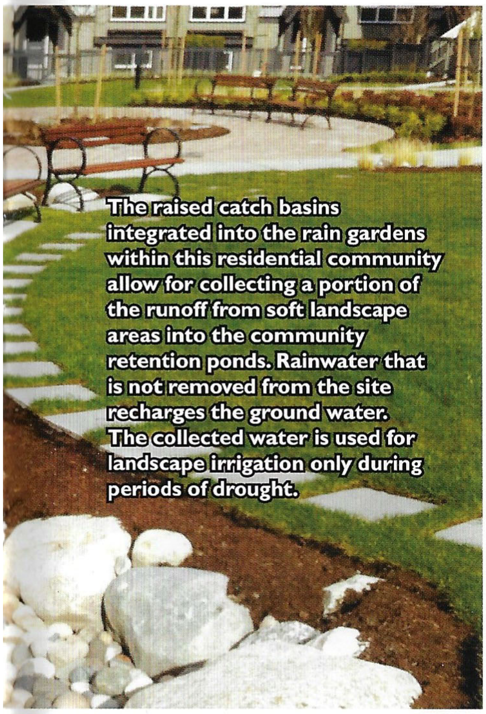
- influence the current practice of removing bulk storm water from urban environments;
- promote a well-balanced ecosystem that allows for storm water infiltration; and
- facilitate substituting a portion of potable water with recycled grey water or harvested rain.

Investing in rainwater harvesting systems, temporary detention ponds, water recycling systems, bio-filtration and infiltration trenches within urban landscapes will maximise the long-term benefits of these initiatives and simultaneously reduce our dependency on the city's potable water supply.

Using harvested rain or recycled grey water is a perfect replacement for irrigation, various construction and maintenance procedures, topping up ponds and swimming pools, flushing toilets or other daily activities that require water.



This drainage section was specially designed for maximising water infiltration into the sandy subgrades. The natural grass sports complex equipped with this simple drainage solution does not require a large and costly system to remove runoff from the 12 playing fields, and more importantly allows for maintaining pre-construction water quality and levels at the natural wetland adjacent to the site.



Saving initiatives

The following are some of the most significant fresh water saving initiatives that landscape architects should promote:

Rainwater infiltration: This can be done via a number of simple and cost effective techniques that facilitate water infiltration. For example, a PVC drain line in a gravel-filled trench may be installed ± 10 cm above the bottom of the trench. This allows rainwater from small rain events to sink into the subgrades instead of being removed by the pipe. In another example, a shallow bio-filtration trench together with a series of narrow gaps along the curb, allows storm water from the road to be cleaned and infiltrated into the ground or stored for future use. A series of small detention and retention ponds combined with infiltration trenches can also slow down a turbulent runoff, while helping to replenish local aquifers.

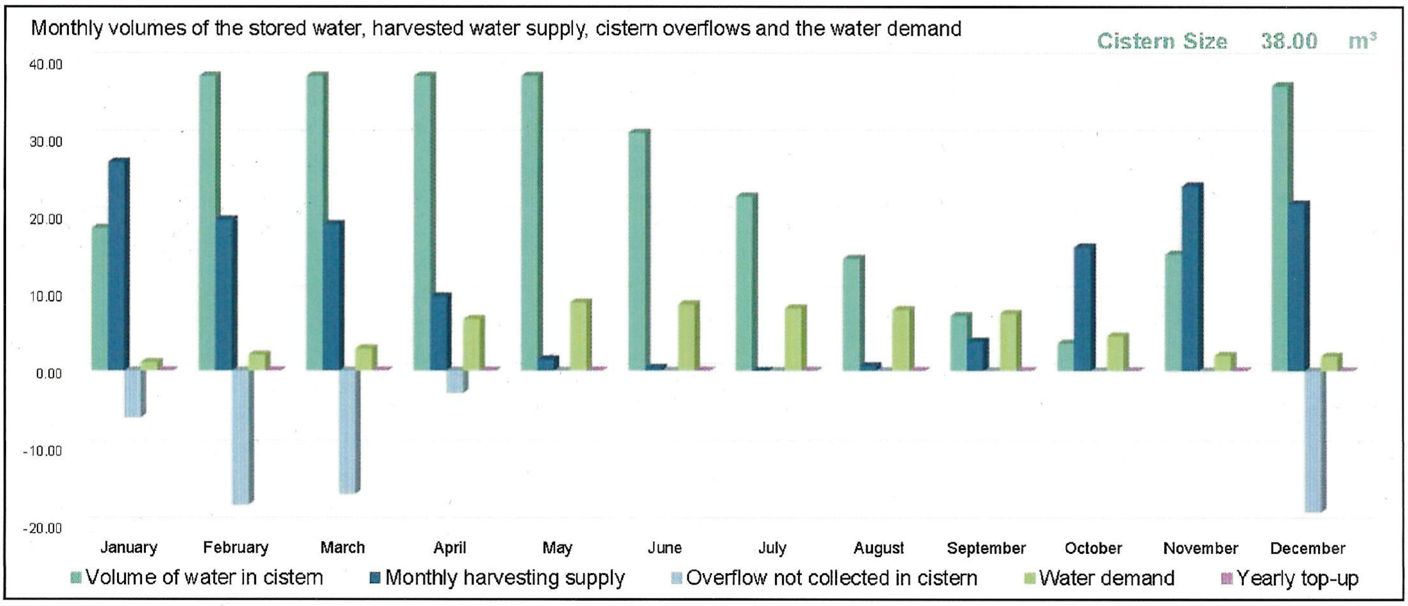
Rainwater harvesting: Non-potable water stored in surface ponds or a system of above or underground tanks can be collected from roofs, paved areas and even from soft landscapes. Calculating the optimal size of the collection tank is based on estimating the volume of water that can be harvested from the selected area and comparing it to the pre-calculated water demand based on the desired water use e.g. irrigation. A large volume of stagnant water in a tank may easily become polluted without regular monitoring and maintenance. In order to reduce pollution in stored water, any new water added to the tank should be pre-filtered from debris such as leaves, sticks, trash, etc. by running it through various strainers or sumps. In addition, a second stage of filtration, completed after the water is collected, is necessary to remove all small particles or even invisible pollutants and organisms that may quickly make the collected water unusable for its intended purpose or may damage the plumbing system. A small water feature incorporated into a rainwater harvesting system may be the best mechanism to monitor the filtration process and the desired purity of the stored water.

Grey water recycling: A good example of recycling grey water is recovering the backwash from sand filters of a pool system or from a playground splash pad for an irrigation system. Water collected from showers or the laundry may require only minor processing before it can be re-used. A simple bio-filtration pond or trench may be sufficient to remove pollutants from grey water, making it suitable for non-potable consumption.

Water efficient irrigation systems: Plants that have no access to ground water (e.g. those on green roofs) require an irrigation system. A drip irrigation system installed entirely below the surface of the ground allows for minimising water waste through eliminating splash, and providing water directly to the plant's root zone. Other water saving technologies (i.e. a weather station) allow for controlling the watering cycles based on the local weather conditions.

Efficient water features: Wind, sun exposure and high water temperature increase evaporation from water surface; therefore, location of the pool affects its water efficiency. Other water saving techniques include selecting appropriate waterproofing systems, reducing the splash from water jets by installing a wind detector, reducing a pool surface area or installing a pool cover, ensuring proper filtration and treatment of water that minimises the need for replacing water in the system.

Use of indigenous plant material: Plants that grow naturally in a specific region are adapted to surviving local climatic conditions. Therefore, indigenous plants may not require additional watering via an



This graph represents the complexity of the rainwater harvesting calculations aimed at designing the optimal size for a water collection cistern. It incorporates the monthly runoff supplies from rain, water demands for the selected water needs, collected water level at the beginning of each month and the potential water collection surplus or additional water top-ups, if needed.

irrigation system unless they grow within uniquely harsh environments such as under a roof or with no access to ground water. Eliminating access to water from even the most drought-tolerant plants will always result in their deterioration.

Finding creative solutions

Professional landscape architects with multi-disciplinary skills are experienced in finding creative solutions to even the most complex multi-lateral problems. Solving some of these problems requires complicated analyses of site specific conditions, calculations based on data collected from multiple sources and modelling of various design options. Ultimately, regardless of the project limitations, landscape architects strive to find the best possible design solutions that meet the needs of the project, protect the environment and deliver healthy and attractive landscapes. **lsa**

Text and photos supplied by Pawel Gradowski, Managing Director, LASquare Landscape and Aquatic Architecture. Tel 072 655 0911

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