

# URBAN WATER MANAGEMENT

## Managing natural surface runoff water and exercise

*Handré Brand, retired psychologist, shares an interesting case of managing water as a plot owner.*



*Water being distributed to the surrounding shrubs.*

According to the Latin phrase *adastra per aspera*, it is possible that something better could develop from a difficult or delicate situation. Unexpected future positive outcomes can result from current unpleasantness.

At the time (January 1980) when we bought our property, which is located on a downwards slope in a crescent with a street front, natural surface rainwater flowed freely from the four adjoining plots higher up in the area over our garden area, especially in the winter months. It made a natural turn followed the slope and thereafter the stream moved across my neighbour's plot towards the street.

The flow of the water was nowhere artificially directed or channelled. It flowed spontaneously down the slope, with the shortest logical route down the street and the municipal storm water drainage system. Twenty years later, my neighbour next

door sold her property and circumstances changed drastically. A solid brick wall was installed on the boundary line by the new owner. The result was that the natural flow channel of the surface groundwater was disturbed and our plot was consequently converted into a potential stormwater catchment area. The diagram below, according to Kane (2012), explains how run-off rainwater flows on a slope very efficiently.

Before buildings are erected on a plot, the interflow is stronger compared to the surface and base flow. As improvements are made in the form of physical structures, the natural surface flow increases proportionally to the intermediate and base flow that flattens out. Before construction takes place, plants and the natural soil surface absorb a large percentage of the surface water, and the runoff is consequently limited. After construction has taken place, the absorption capacity of the surface is significantly reduced. As a result, the surface runoff increases,

which poses a significant risk of flooding for adjacent plots lower 'downstream'.

Environmental assessments by municipal engineers and the preparation of stormwater management plans can prevent and eliminate this type of problem situation. In our case, however, we were dealing with an existing scenario. All properties were existing structures already completed during the seventies. However, the new boundary wall, which was legal and permissible according to municipal regulations, created an unforeseen natural surface water run-off problem.

I immediately visited the four adjacent neighbours where the natural runoff originated, explained the situation and everyone kindly agreed to contribute financially to install a channel and underground pipe system on our plot to direct the run-off surface water in the direction of the street's storm water drainage system. The surface water problem was thus solved through sober, open communication and good neighbourliness.

The Western Cape, with its dry summers and sporadic rain showers during winter, makes one think twice if a fast-flowing and healthy stream of surface water flows over your garden area from time to time only to disappear into the street's storm water pipeline. This is clearly an untapped potential water source.

The result was that a groundwater catchment dam (length 3 metres, width 2 metres and depth 1.5 metres and approximately 9000 litre capacity) was built in the flow channel of the water, with the overflow or outlet (11 cm in diameter) opening back into the underground channel so that the surplus water can flow out to the street. An Italian DAB pump, which drains almost all water carefully and delicately from the concrete floor of the catchment dam, was connected to different lengths of garden hoses and thus the water is distributed to strategic points in the garden.

The 'storage containers' to which the water is pumped from catchment dam consist of four 240L wheely bins. The containers are placed at four strategic points in the garden from where the water is distributed to the surrounding shrubs by means of two watering-cans, or a sprinkler (Photos 2 and 3).

Before the run-off rainwater ends up in the catchment dam, sand grains and other items with weight such as small stones are first deposited in two sand traps or wells.

The following remarks are important to ensure the success of this system:

- Careful supervision and continuous management of the process, as well as of the water quality is extremely important.
- No municipal regulation may be violated in the process.
- The right amount of chlorine must be applied during the winter months to guarantee the water quality over a long period of time. However, the chlorine content of the water should be zero immediately before application in the garden in summer. The water should not contain any chlorine before application to plants, lawns, shrubs and trees. The regular expert testing and analysis of surface groundwater collected and stored in this way is therefore

strongly recommended.

- There are also other excellent disinfectants (e.g. Biodox) available on the market that contain natural antimicrobial ingredients, and can be used well to purify wastewater in such a reservoir.
- The groundwater collection dam is regarded as an additional water source to roof water. The latter is normally is collected by means of gutters from where the flow is directed to upright water tanks. If the average inflows are compared the catchment dam inflow is much faster than the roof inflow. This has the advantage that the catchment dam can regularly (also during the winter) be emptied and the water can be used for all kinds of diverse purposes (e.g. washing cars, flushing toilets), while the roof water in separate tanks can be stored as an additional precious commodity for the hot summer months.
- Mosquitoes are controlled by covering the catchment dam with fine graded shade net. The cement floor is regularly cleaned with a hard yard broom after the catchment dam has been pumped empty.
- During the summer months, the rainwater of the catchment dam, which is pumped to the four wheely bin containers, is used by means of the two watering-cans to water orchids, shrubs and trees in the garden as well as the plants on the pavement. The weight of the water in the watering-cans and the distances over which this weight is carried serve as an excellent additional and collaborate exercise to hiking and mountain biking.

Water should always be seen and managed as a scarce and precious resource and commodity. As explained in this article, the management and storage of both surface and roof water is an activity that can add value to any property. If physical exercise can be combined with this process as an additional outcome, the whole undertaking makes so much more sense and also contributes to personal wellness.

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## References

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