Stop the Squander

Capturing storm runoff for irrigation reuse

By Jonas Z. Sipaila & William A.T. McCully, P.E.

A community with limited water resources. Sound familiar? Two outdated yet ingrained philosophies of infrastructure design that greatly affect water use inefficiency and localized flooding are:

1) Domestic water supplies for indoor and outdoor use must be of drinking water quality; and
2) Storm water is a waste product that must be shed off a property as quickly as possible.

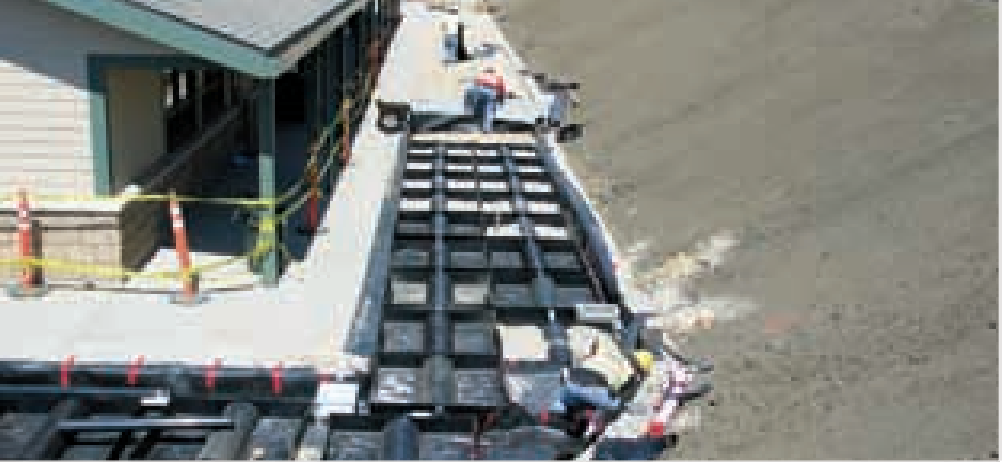
Both philosophies evolved to extensive regulation and construction standards for expensive infrastructure procedures and systems.

Case in Point

The following case disproves these two water-use myths. The challenge was to irrigate 130,000 sq ft of all-season, durable, multiuse grass play fields at a community school where water volume, delivery pressures and logistics were not feasible to deliver the water resources for conventional systems. The unique solution provides a water conservation system that utilizes the harvest and storage of rainwater runoff and efficient, nonpressurized subsurface irrigation.

Cambria, Calif., is a small coastal community that in 2002 was at a crossroads to expand a planned expansion of an elementary school and grounds. Land costs in the community proper were prohibitive; the only available land was in the outskirts of the town, where steep coastal foothills presented site development and erosion challenges. Furthermore, the added elevation rise prevented the delivery of an adequate volume and pressure of irrigation water to the site.

The Coast Unified School District—under a bond measure and with



The subsurface irrigation system functions as a collector, water distributor, filtration system and irrigation system.

assistance from the California State Allocation Board for Proposition 47—contracted architecture and civil engineering services from RRM Design Group and soil engineering from Earth Systems Pacific to provide plans to solve the development objectives and satisfy the stringent water quality and erosion mitigation demands of the California Coastal Commission.

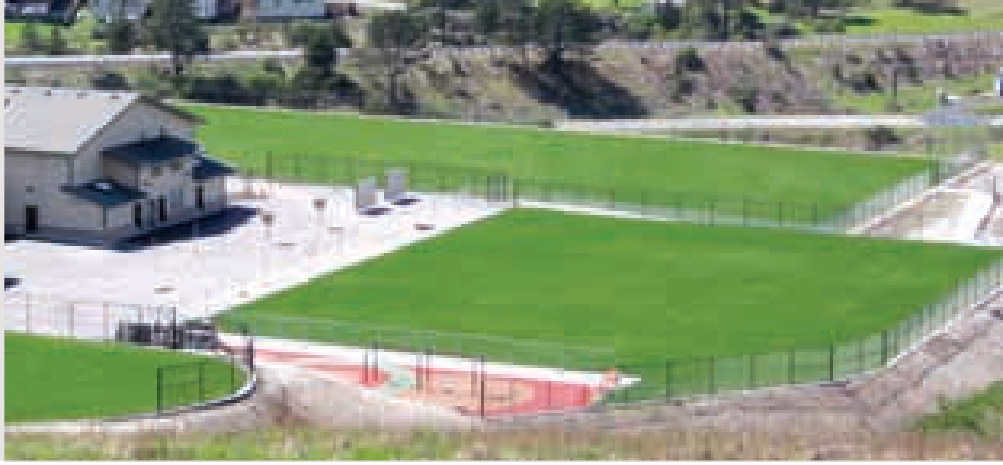
The main player in this conservation game was a subsurface irrigation system developed by Rehbein Environmental Solutions Inc. The EPIC system delivers 100-percent-efficient, nonpressurized subsurface irrigation. It is a versatile player that acts as a collector, water distributor, filtration system and irrigation system all in one.

As irrigation requirements in this system are reduced by better than 50 percent over conventional practices, so is the required volume of storage. In the Cambria school application, all of the storm water runoff from the 12-acre campus's hardscape is collected and stored in a 2.2-million-gal subsurface detention basin. This is achieved via linear pipe underneath the main 87,000-sq-ft playing field.

Sufficient water is collected during seasonal rains (23 in. per year, on average) to supply all of the campus's irrigation needs for the rest of the year. The property has no runoff issues, even for 100-year storm events, and it is off the supply grid for irrigation water.

Making Greater Use of Management

The Cambria school application is a sustainable project that harvests



The system collects sufficient water to irrigate the campus's 130,000 sq ft of all-season, durable, multiuse grass play fields for the rest of the year.

free rainwater during the rainy winter months and stores it in an underground chamber system until it is needed for irrigation. The storage system does not use up additional land space, is not subject to evaporation and does not promote algae growth to compromise water quality. Prefiltration through the EPIC profile prior to storage minimizes sediment accumulations in the reservoir in the long term.

This innovative, low-impact development design shows how large institutional facilities can be self-sustainable by changing the way they look at storm water. Capturing every last drop provides sufficient irrigation water for an entire campus's landscaping needs, and not just for a week or month but for year after year. The process helps an end-user avoid runoff issues and truly promotes a "green" bottom line.

The best parts of this design solution are its functional simplicity, low-tech/low-maintenance components, reduced water usage, storm water management benefits and potable water supply savings for drinking—not landscaping.

A Sustainable Water Future

As this design concept is being replicated across the country, imagine that water sustainability is a reality on such a large scale for school campuses. Imagine if every new school playing field and commercial and residential development were self-sustainable in terms of water usage for all landscaping.

The ability to effectively control storm water movement through biological sand profiles provides opportunities to prefilter, collect, store and reuse valuable and free rainwater for secondary uses and

Rainwater and runoff are collected and stored in a 2.2-million-gal subsurface detention basin until needed for irrigation.

benefits. Modifying this versatile best management practice (BMP) to many applications changes both the philosophical approach and desired outcome in many designs, including linear BMPs in shoulder and ditch applications, wet-to-dry pond retrofits, environmental filter strips around parking lots and intensive rooftop gardens and planter boxes.

The technologies for water sustainability are here. Do we have the political vision to take advantage of them? SWS

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