

# Integrated Land Planning: A Welcome Alternative

By Matt Baumgarten

*Municipalities and private-sector development projects are increasingly embracing alternatives to building or expanding, expensive storm water and greywater treatment. One of the surprisingly cost-effective and most innovative of those alternatives is Mother Nature. A number of “green” engineering innovations are utilizing natural systems to accommodate rising treatment demand, and in many cases also create open space, wildlife habitat and other amenities. Biotechnology innovations also are creating more efficient processes through the use of manmade biostrips planted in wetlands and large-scale bioswales and wetlands set within a watershed planning approach that effectively polishes polluted water.*

‘Green’ water engineering creates amenities, reduces treatment costs

## ARTICLE SUMMARY

**Challenge:** Government and private-sector interests continue to seek new, more sustainable and cost-efficient solutions to water quality and water management.

**Solution:** Communities everywhere are looking to sustainable engineering innovations—such as using natural systems, biofilm strips and other creative “landscape-as-infrastructure” approaches.

**Conclusion:** Use of these approaches preserves natural habitats, saves money, reduces infrastructure maintenance needs, and ultimately creates long-term sustainability for our water systems.

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From a large new housing community in Texas to entire new cities in China, engineers, land planners and development organizations are demonstrating that an integrated approach to regional needs can offer a myriad of benefits.

Landscape architects and water resource experts describe the approach as an application of simple, back-to-nature basics in advanced ways. Development, government and community groups understand it through a storm water management doctrine termed low-impact development ([www.lowimpactdevelopment.org](http://www.lowimpactdevelopment.org)). Water in all its forms becomes a resource along a slow journey of multiple benefits.

Integrating natural systems into water and wastewater strategies is nothing new, but the economic advantages and technologies to make it possible for large-scale community-based infrastructure are drawing attention.

### Cross Creek, Texas

West of Houston, a 3,000-acre community called Cross Creek at Stern Ranch is creating new housing, schools, churches, parks and community amenities, including green space and habitat, from its water treatment systems.

Cross Creek’s nom de plume arises from its central natural feature, Flewellen Creek. Its waters flow into the Brazos River, the longest river in Texas and the 11<sup>th</sup> longest in the U.S. The Flewellen Creek restoration, part of Cross Creek’s land-based development concept, resurrected the waterway after decades of neglect as an agricultural drainage way resulted in failing slopes, high sediment content and a greatly denuded natural system practically devoid of healthy plant and animal life native to the region.

The landscape and development team evaluated the restoration as the final integrated tool for accommodating new water infrastructure while recreating a flourishing stream. Traditional development approaches might simply shunt as much rainwater as possible into streets and straightened creeks, quickly speeding degraded effluent out of Cross Creek.

SWA Group’s solution involved the use of natural systems—a 50-acre water quality basin assisting a mechanical treatment plant and strings of large detention basins connecting into the completely restored Flewellen Creek and eventually feeding into the Brazos River and the Gulf of Mexico. During

all points of the water’s Cross Creek traverse, it is exposed to gentle slopes, wetland interfaces, rich no-mow native grasses and large swaths of reforestation. This is done in an effort to slow velocities, reuse water for irrigation purposes, cleanse and “polish” water and stabilize rich organic soils.

It is easy to imagine the residents overlooking this science at work. The person-on-the-street view is that Cross Creek has extensive park-like amenities and green space that also create havens for birds and local wildlife, as opposed to overtly engineered communities where concrete and impermeable surfaces are the rule, not the exception.

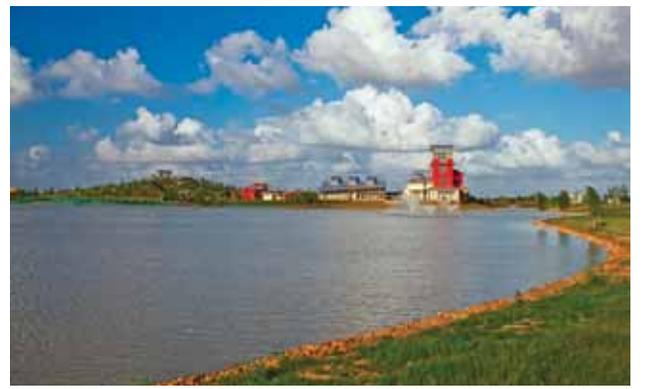
Costs are surprisingly low, if not lower, when long-term comparisons are made. Establishing robust native and naturalized landscapes can be cheap when compared to the price of installing storm water and greywater conveyance and cleansing systems, impervious landscape features and highly maintained turf grasses that require mowing, irrigation and nutrient costs. This is not to say hardscapes and beautiful lawns should be abandoned, but rather each design element should be considered in balance with its aesthetic and financial benefits.

### Lake Houston

In a larger-scale proposal than that at Cross Creek, planners are weighing the idea of enhancing the natural systems above the giant Lake Houston reservoir and watershed, the primary water source for Houston. Still largely at a conceptual stage, the idea is to send a large swath of street drainage and greywater of nearby communities into headwater wetlands, bioswales and grasslands to greatly improve water quality before it enters the lake. Such systems would reduce the currently necessary but extremely expensive water-cleansing efforts of treatment plants that draw from Lake Houston to serve the nation’s fourth-largest city. Money spent on visibly positive land use changes have multiple benefits; sunk-into machinery and systems, to customers, are invisible except for their larger utility bills.

### New South Town, Miyi County, China

One of the largest of many large-scale design projects by SWA is the 1.3-sq-mile New South Town, a city that started construction in December 2009 along the Anning River in south-central China. In developing the urban planning and infrastructure systems serving



an intended population of up to 100,000 people, the regional planning agency welcomed the idea of green technologies with near-term and long-term benefits.

An example that emphasizes the “tech” of bioengineering, thousands of strips of biofilm are being inserted into ponds and marshes to jump-start the filtering process of naturally occurring wetlands. The water passes through these films of living matter and cleanses out impurities even as it encourages growth of other plants that continue the process. The biofilm strips, pioneered by BioMatrix Water of Moray, Scotland, do not supplant the functionality or habitat creation of naturally occurring wetlands; they serve to enhance these systems while replacing higher-maintenance solutions such as gravel filtration and reduces the need for treatment plants.

Another innovation at South Miyi is the incorporation of historic ecologies into the fabric of the new town so that existing drainage patterns, soil composition, vegetation and habitat are utilized to further enhance these systems while still allowing flexibility for future development. The design team, led by SWA Group’s Gerdo Aquino, furthers the notion of landscape as infrastructure and seeks to combine ecological systems and sustainable development into compelling landscapes and more livable communities.

Use of natural systems and advanced landscape architecture techniques have significant long-term benefits for more sustainable communities. Among the approaches and benefits are:

- Preservation of open space and minimal impact on land and natural systems;
- Protection of environmentally valuable systems and processes, especially drainage, vegetation and habitat;
- Incorporation of natural site elements such as wetlands and forests as design elements;
- Decentralization, slowing of and “micromanaging” of storm water;
- Reduction of site-preparation, development and maintenance costs;
- Reduction of storm water management and flooding potential;
- Increased marketability of the housing or real estate development;
- Reduction of infrastructure, utility, street and storm sewer maintenance; and
- Preservation of natural habitats and ecosystems as amenity-laden parks, promenades and green space.

### New & Natural

As government and private-sector interests continue to seek new solutions to water quality and water management, natural systems enhanced by new technology and new

approaches can offer a welcome alternative. Creative approaches, collaborative planning and embracing of nontraditional ideas can provide a world of difference. [www](http://www.wwdmag.com)

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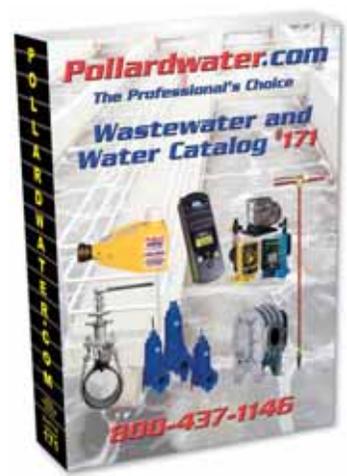
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