# CLIMATE CHANGE BUSINESS JOURNAL®

*CCBJ Awards 2019 & Executive Review*

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## Environmental Consulting & Technology Takes Leadership in Green Stormwater Infrastructure

Headquartered in Gainesville, Fla., **Environmental Consulting & Technology, Inc.** (ECT) is a 31-year-old, employee-owned firm specializing in the resolution of complex environmental issues through cost-effective project planning, management, applied engineering, and scientific expertise. The company maintains 22 offices in 10 U.S. states and employs more than 200 full-time staff, including professional scientists, engineers, planners, landscape architects, and management consultants. ECT offers services in five service lines, including natural resources, water resources, air quality, site assessment & remediation, and performance assurance & compliance.

*Sanjiv Sinha, Ph.D., P.E., is a Senior Vice President & Water Resources National Director. Dr. Sinha is well known for his work on the emerging applications of market-based options, including public-private partnerships within the green stormwater infrastructure sector. He is a recipient of the 2019 CCBJ Business Achievement Award.*

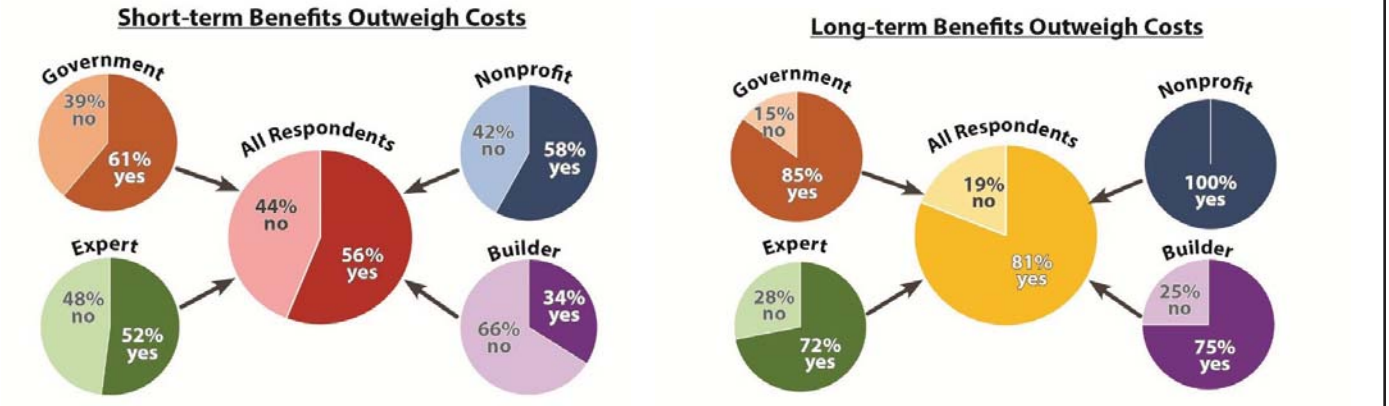
*Jason Cooper, PLA, is a Landscape Architect who has led the integration of green infrastructure systems and restorative design principles around the Great Lakes region and beyond. His design portfolio is comprised of headquarters for Fortune 500 companies as well as leading municipal agencies, more than 50 park and recreation facilities, sustainable downtown streetscapes, and many natural area restoration projects.*

**CCBJ: What is GSI and why is it important today?**

Sinha: Green Stormwater Infrastructure (GSI) is the multi-functional site design practice that meets traditional water quality and quantity standards required by many stormwater ordinances. It also helps projects meet advanced rating systems such as LEED and Living Building Challenge. The practice addresses both the quantity and quality of stormwater runoff from developed sites. With more than 25 years of experience designing and researching these systems, ECT helps our clients implement their green goals in cost effective ways. Examples of GSI features include bioretention systems and rain gardens, green roofs, native landscape systems, porous pavements, rainwater harvesting, and wastewater reuse. These features can help manage rainwater while providing wildlife habitat and enhanced open space.

Use of Green Stormwater Infrastructure (GSI) is playing an increasingly important role in balancing the development and protection of our shared natural resources, as well as a means to comply with regulatory requirements. As access to clean, fresh water decreases and changing weather patterns cause more flood events, we will require new solutions to manage rainwater runoff. GSI strategies receive and treat rainwater runoff where it falls. This decentralized approach uses innovative strategies such as permeable pavement and green roofs to integrate water treatment and storage with other functional elements in a development. It can save land for other uses which is particularly useful in dense urban environments.

***How GSI Users View Benefits of Green Stormwater Infrastructure: Take the Long View***




*Source: Figures reproduced from "A survey of barriers and opportunities to adopting green stormwater infrastructure in Michigan," Avik Basu, Sanjiv K. Sinha, and Donald D. Carpenter, Michigan Sea Grant Report MICHU-20-502, 5 pp, January 2020*

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**CCBJ: Can you describe ECT's award-winning GSI projects?**

Cooper: ECT's Integrated Design & Engineering Studio offers value to our clients through the combination of civil engineering, landscape architecture, and ecological services. Our cross-disciplinary, climate-resilient approach engages each team member to collaborate on creative solutions that thoughtfully integrate with the landscape and associated buildings, and helps our clients implement their green goals in cost effective ways.

ECT supports the widespread adoption of voluntary rating systems to encourage sustainable development. Programs such as the U.S. Green Building Council's (USGBC) LEED Rating System, the Sustainable Sites Initiative (SITES), and the Living Building Challenge promote responsible design and provide a benchmark for tracking the performance of projects. To date, ECT has completed a large number of LEED projects as well as many SITES and Living Building certified projects. A detailed list is available on the ectinc.com website under LEED awards.

**CCBJ: Is GSI really a viable solution for many cases or is it mostly a pipedream?**

Sinha: Faced with mounting infrastructure construction costs and more frequent and severe weather events due to climate change, cities across the country already are managing the water pollution challenges of stormwater runoff and combined sewer overflows through GSI to mimic, maintain, and/or restore natural hydrological features in the urban landscape. When utilized properly, GSI can obviate the need for more expensive pipes, storage facilities, and other traditional "grey infrastructure" features, so named to acknowledge the vast amounts of concrete and other materials with high embedded energy necessary in their construction. GSI can also provide substantial co-benefits to city dwellers, such as cleaner air, reduced urban temperatures, and improved quality of life associated with recreation areas and wildlife habitats. With a good plan in place, a community can lay the groundwork to improve quality of life, protect the environment, improve public health, become economically stronger, and prepare for climate change impacts.

Unfortunately, while the short- and long-term benefits are now clearly documented (see Benefits chart on this page), there still are many barriers to the use of large-scale GSI, such as (see Barriers chart overleaf).

Uncertainty about maintenance and long-term performance are perceived to be the highest barriers to the use of GSI. In the cost category, installation and maintenance costs are key concerns. In the political category, acceptance among local leaders, municipal staff, and practitioners are big barriers which is closely followed by conflicting codes and ordinances.

**CCBJ: Are there definitions and standards for GSI?**

Cooper: Yes, many stormwater regulating agencies have their own design specifications and performance standards. These mostly focus on permeable pavement and bioretention facilities which are very similar to traditional detention basins, but they use special engineered soil and are underdrained. Many states and larger cities also issue standards for GSI for use in public projects.

**CCBJ: Is there a governing body or association that oversees GSI standards and promotes best practices?**

Cooper: Yes, GSI is a heavily debated subject at all levels of government and pri-

vate practice. Nearly every jurisdiction has advisory committees that review current standards and practices and recommend regulatory frameworks. Certain practices, like green roofs, have national ANSI standards for certain aspects of the design. Many professional societies, like the American Society of Landscape Architects and the American Society of Civil Engineers, organize workshops and publish research on GSI.

**CCBJ: You use the term distributed GSI. Is that like distributed energy?**

Cooper: Yes, it is. GSI is a distributed stormwater management approach, i.e., not centralized like an underground tunnel. GSI strategies are designed to accept rainwater where it falls. We should note that most impervious surfaces in our urban areas can be re-designed with GSI so that nearly every surface is permeable and water receiving (i.e., green roofs can cover buildings, parking lots can be constructed of permeable pavement, etc.).

**CCBJ: We assume permeability is one of the key attributes of GSI.**

Cooper: Yes, permeability is key and most GSI strategies use surfaces that are permeable. The permeable nature of strategies such as bioretention slow rainwater runoff down and allow it to cool and be filtered of pollutants. This also encourages infiltration into the soil and recharge of underground aquifers where that is possible.

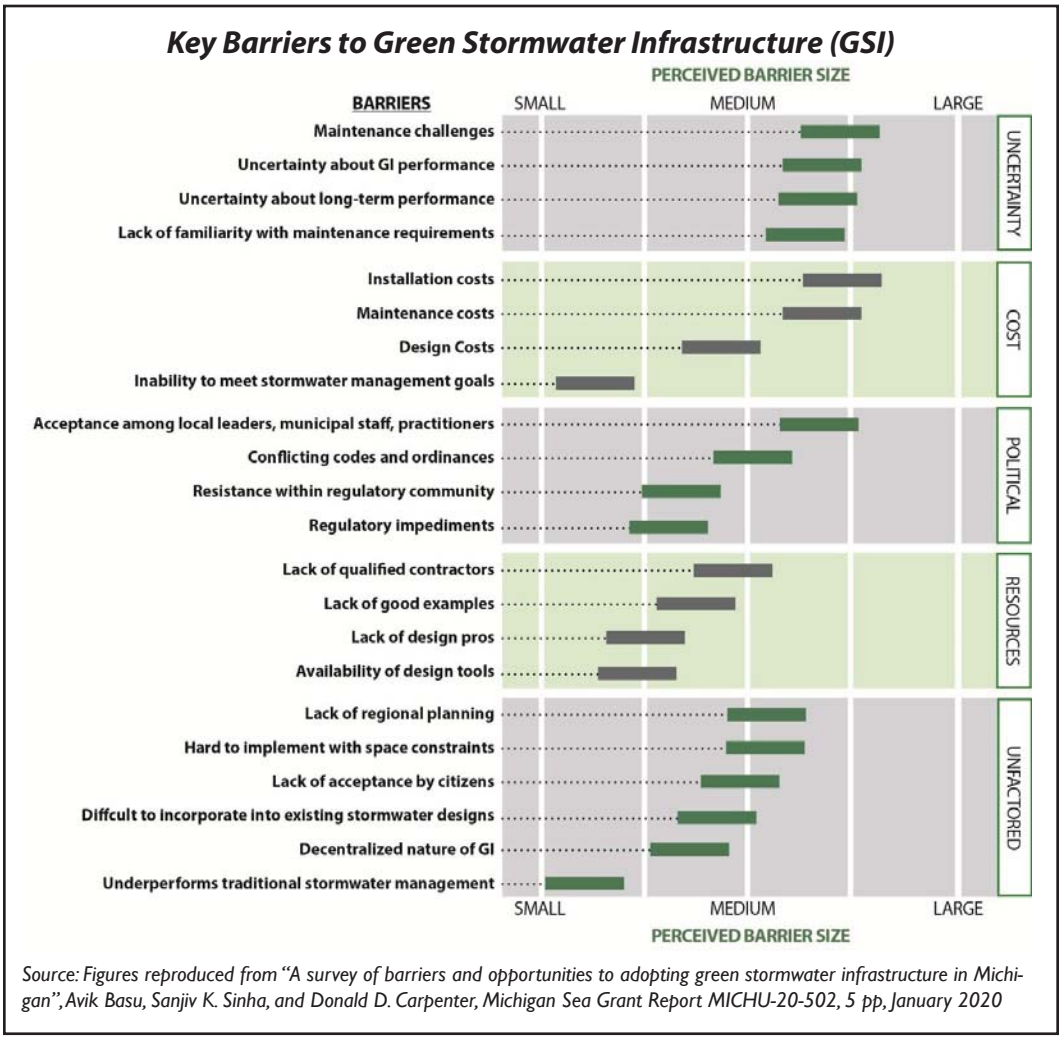
**CCBJ: So how does one know green infrastructure is better than gray infrastructure? Are there any metrics, and can you provide a few examples?**

Sinha: Green infrastructure provides more benefits than traditional grey infrastructure. In addition to the runoff volume and rate controls which traditional gray infrastructure provides, green infrastructure can also provide infiltration, evapotranspiration, habitat, beautification, and long-term cost savings (as mentioned previously). Not every GSI practice provides all these benefits, and not every GSI practice is suited to all projects. Many GSI practices have higher upfront construction costs, so their benefits need be weighed against the cost.

Three ECT projects that demonstrate the successful implementation of green infrastructure include: Johnson Controls Corporate Headquarters where 30,000 gallons of rain runoff is captured and reused for toilet flushing; Cardinal Campus Green Office Park where the robust GSI approach across the low lying 9-acre site was one of the reasons the property could be developed; and Iowa State College of Design King Pavilion which is the state of Iowa's first LEED Platinum higher education building.

**CCBJ: What other key attributes of GSI are driving its implementation? GHGs, water quality, habitats, other natural resource measures?**

Cooper: The effectiveness of GSI to address stormwater runoff volume, rate, and water quality are the biggest drivers for its use. There are other benefits for certain applications. Bioretention practices are often promoted for their ability to replicate the full suite of historic hydrologic processes, including infiltration and evapotranspiration. Practices such as bioretention and green roofs are vegetated and so offer the

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opportunity to introduce habitat for native plants and animals which can be important in developed urban areas. Other practices, such as permeable unit paving have been shown to offer a long-term cost savings over conventional practices like asphalt paving. This is due to the longer lasting pavers and the less frequent maintenance for them when compared to asphalt.

Sinha: I conclude with a message to the environmental industry community that we work with many of the readers of EBJ and we welcome continued engagement on GSI topics from everyone.

Finally, Jane Goodall said: "You cannot get through a single day without having an impact on the world around you. What you do makes a difference, and you have to decide what kind of difference you want to make."

I quote her to put our work in perspective. Of all the things one could work upon, we are associated with GSI as it helps us restore the planet and leads us to a more resilient future. What a privilege it is for me to make a good living while pursuing innovation on such a fascinating topic! ☼