A THREE-PART EDITORIAL SERIES

IN THIS SPECIAL Water Wise supplement you will learn about Lovett School, an incredible private school in Atlanta that embraces water conservation within its core vision. Also Brian Vinchesi, an irrigation consultant and EPA WaterSense Partner of the Year, shares how to make every irrigation project a winner.

WATER WISE

PART 1

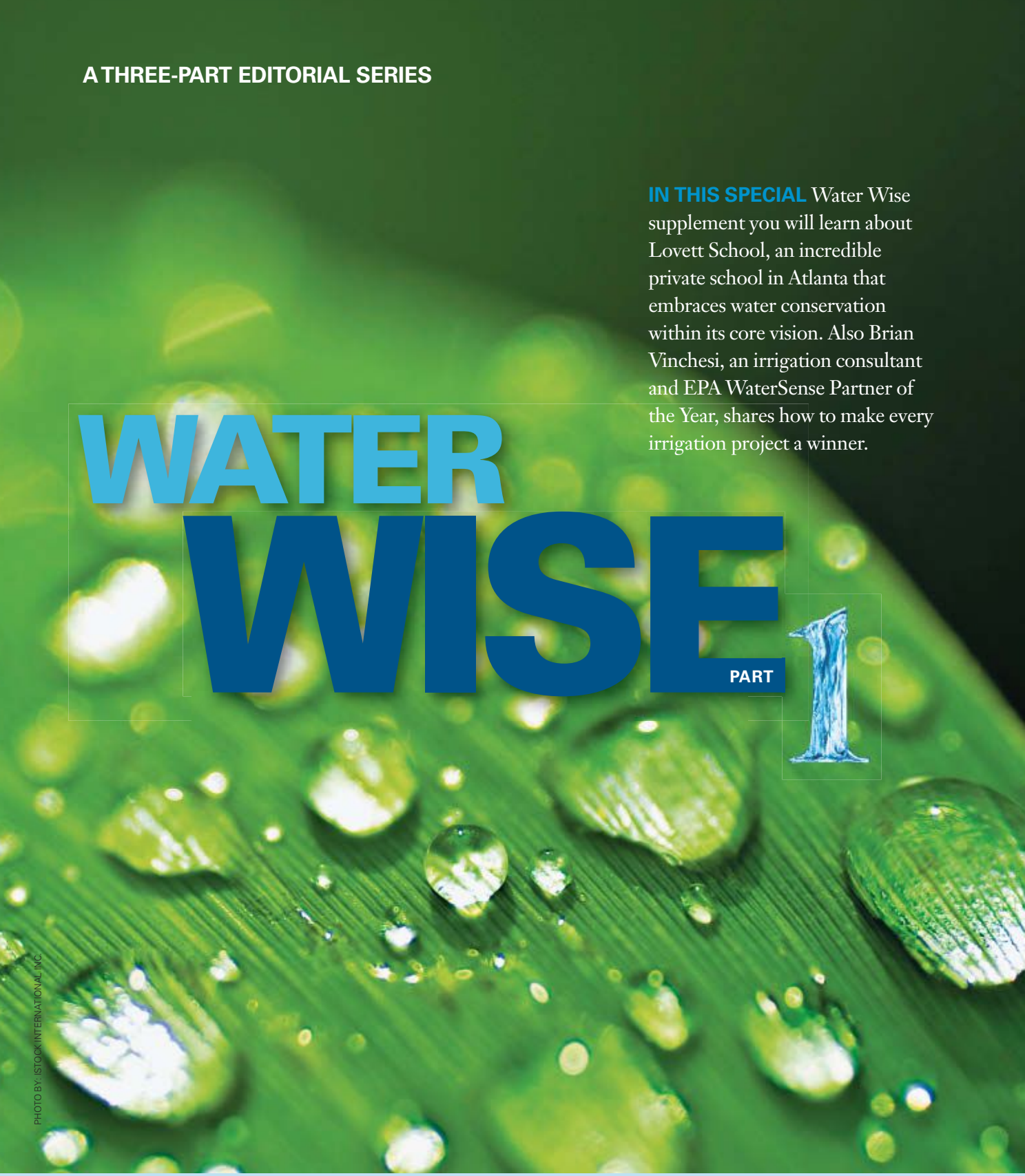


PHOTO BY: ISTOCK INTERNATIONAL INC.

Rain Bird: Innovative products and initiatives for a better world

ACCORDING TO A recent article in the *New York Times*, the Southwestern United States is on the verge of a critical situation. Not only are water levels in Lake Mead too low to supply the area's burgeoning population, these same low water levels also diminish the Hoover Dam's ability to generate electricity. Unless the drought ends or water is diverted from other sources, the economic implications could be severe.

The Southwest provides just one example of the impact water has on each of us — in ways as personal as our monthly water bill and as public as our global economy. Around the world, the realities are staggering. Only 1 percent of the world's water is fresh — the only portion suitable for human consumption. Meanwhile, the demand for this relatively small amount of water is growing exponentially. As a result, 47 percent of the world's population will be living in areas of "high water stress" by 2030.

These facts are taken directly from Rain Bird's latest white paper, "Water Conservation and the Green Industry," a publication that examines the social and economic factors behind water conservation and their cumulative effect on the green industry. Our white paper series is just one example of our continued focus on The Intelligent Use of Water™. We understand the vital role water plays in a healthy, sustainable environment — and a healthy economy. As a result, we continue to innovate and develop spray heads, nozzles, controllers and drip irrigation systems that apply water in the most effective and efficient manner possible.

Our commitment extends beyond our products to initiatives aimed at educating the industry and the community about the need to conserve water. Now in its fourth year, Rain Bird's Intelligent Use of Water Awards will provide a total of $50,000 worth of grants in $1,500, $5,000 or $10,000 categories to deserving water conservation and environmental sustainability projects worldwide. Through the annual Intelligent Use of Water Summit, Rain Bird brings together some of the world's leading experts on water, irrigation and conservation to openly discuss and debate water-related issues.

We are dedicated to environmental stewardship, and this commitment is woven into the very fabric of the Rain Bird organization. In the future, we will continue to develop both products and initiatives that have the potential to inspire responsible, informed choices about the way we all use water each and every day.

RAIN BIRD

Understanding water's worth

The best new source of water to meet our future needs will be the water we save now.

BY **RON HALL**
EDITOR-AT-LARGE

WE AS A SOCIETY, and especially those of us in the Green Industry, are starting to comprehend water's true worth. While we have a long way to go, we now realize that we must do a better job of preserving water quality and conserving our freshwater resources. We're becoming aware of the irreplaceable role of fresh water to our society's economic vitality and to the health of our Green Industry.

Author Stephen Solomon, in his recently published book, *Water, The Epic Struggle for Wealth, Power and Civilization*, traces mankind's dependence and use of water — from the first ancient, irrigated agrarian civilizations in the Middle East's Fertile Crescent to the rise of the United States as a global superpower. He makes the point that the economic dominance achieved by our society in the 20th century can be attributed, in no small part, to the abundance and productive use of our freshwater resources.

Accounting for approximately 6% of the world's population, the United States and Canada are blessed with a disproportionally large supply of its available fresh water. We use this precious resource to drive turbines in our massive dams, and for cooling and producing electricity in our power plants producing enormous amounts of energy that we parlay into industrial production. We use water from our rivers and our aquifers to make deserts bloom into gardens and to transform prairies into massive grainlands.

Who can dispute that much of California's incredibly productive agriculture industry is a gift of the Colorado River, while huge farms in our Plains states, one of the world's top grain-producing regions, owe their productivity to water drawn from the massive Oglalla Aquifer.

PHOTO BY: ISTOCK INTERNATIONAL INC.

But there's a price to pay for drawing upon this bounty.

We're now faced with an overdrawn Colorado River, shrinking aquifers and, in the case of some of our fastest-growing regions, grossly inadequate water storage capabilities and crumbling infrastructure. Apart from providing our drinking, cooking and sanitation needs, the lack of an ample and reliable supply of fresh water threatens the economic base of our nation and, of course, our industry.

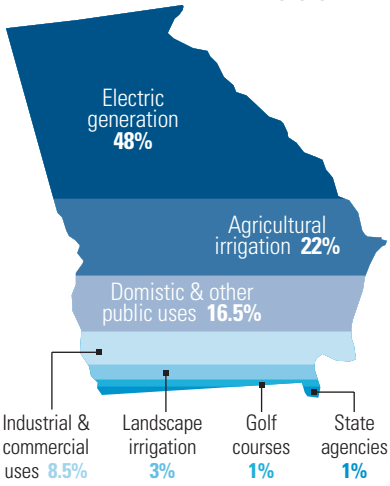
Few cities in the United States know this better than Atlanta, the Southeast's economic powerhouse that suffered a four-year drought that ended in the winter of 2008-09, ironically (and perhaps predictably) with flooding.

Atlanta's huge challenge

You can't be blamed for wondering how a region that averages 50 in. of precipitation annually (compare this to the 4 in. annually in Las Vegas) can end up with just a few months supply of drinking water during the height of its recurring droughts, a huge problem considering the region's 5 million people. The short answer: lack of storage.

You also can't be blamed for being curious as to why Atlantans pay more for water than people in any other large American city — 108% more than New York and $144 more than San Antonio, TX. The answer again is simple: the $4.1 billion price tag for upgrading the city's antiquated water and sewer system.

North Georgia's water issues, which the state is now belatedly attacking, offer a stark example of lack of foresight, planning and, perhaps, political will in securing water to meet future economic growth and development. And yes, Georgia, like much of the rest of the United States, will continue to add people, homes, industries and businesses.



Source: The University of Georgia Cooperative Extension

Meanwhile, the amount of available fresh water (at least at an affordable cost) will remain constant or, in some regions, become even more stressed.

"We know we have to start construction now and plan for future droughts," says Dr. Mark Risse, professor and coordinator of Extension Engineering, University of Georgia. And, says Risse, future droughts are inevitable, ticking off the list of those plaguing Georgia during the last 30 years (1981, '86-'88, '98-'02 and '06-'09), the period of the region's explosive growth and development.

It's unlikely Atlanta will soon be getting a significant new source of water storage in the form of a reservoir. The cost and the time it takes to perform environmental studies and obtain necessary permits will see to that. The region's best — and likely, only — source of new water will be the water it saves through conservation.

Risse says that adoption of the State Water Plan in February 2008 ignited a flurry of activity to alert Georgians to the very real need to use water more wisely. These include programs directed specifically at the landscape industry such as:

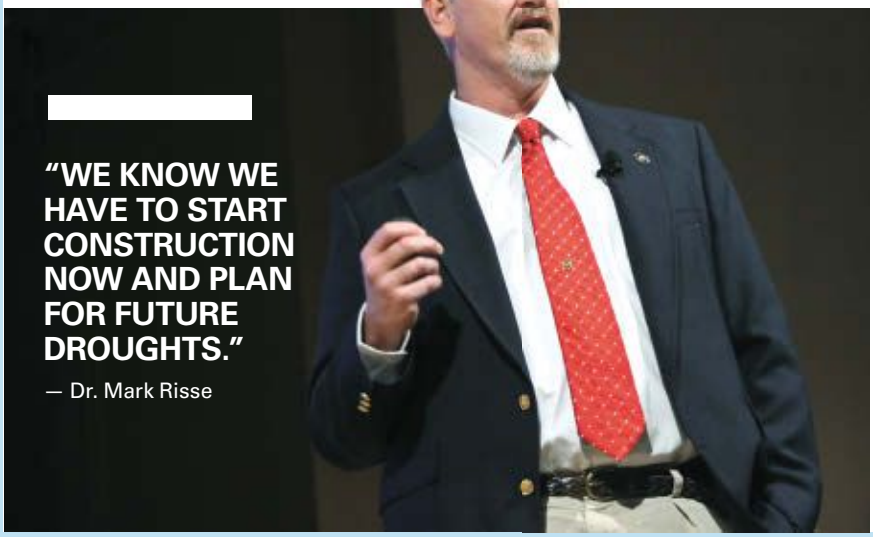
› Implementing educational programs for customers;

› Offering customers checklists of practices and processes for certifying water-efficient landscapes; and

› By 2012, recommending standards for design, installation and maintenance of irrigation systems and certifying landscape professionals.

Is Atlanta doing enough to secure its water future — the key to its continued economic growth? Are the rest of us?

Maybe or maybe not. But the example set by new development in the region, projects such as the remaking of Atlanta's Lovett School campus (featured on page 19 in "Water Lessons") shows that we're aware of our water issues and taking steps to meet them. LM



"WE KNOW WE HAVE TO START CONSTRUCTION NOW AND PLAN FOR FUTURE DROUGHTS."

— Dr. Mark Risse

PHOTO COURTESY: RAIN BIRD

Students take a hands-on approach to environmental issues in addition to their more traditional studies at Atlanta's independent coeducational Lovett School.

PHOTO COURTESY: LOVETT SCHOOL

Water lessons

Atlanta's Lovett School shines as an example of intelligent environmental design, construction and wise use of its energy and water resources.

BY **RON HALL** EDITOR-AT-LARGE

DIRTY HANDS aren't frowned upon at the Lovett School, an independent, co-educational day school of approximately 1,500 students in the Buckhead neighborhood of Atlanta. Students investigating and studying the school's natural areas and gardens are a common sight on its 103-acre campus. Even primary school students at Lovett School get grime beneath their fingernails as part of the broader environmental education.

Urban water management — efficient irrigation and innovative drainage in particular — figures large on the school's environmentally sensitive campus, which hugs the bank of the Chattahoochee River. The wooded campus features three school buildings constructed within the past decade, several older structures, a 0.33-acre pond, a small meandering creek, gardens and sports fields for 60 school teams, including two new grass sports fields.

In almost every respect, Lovett can be described as green.

The most major recent addition to the campus, apart from its new baseball and softball fields, is the Portman Family Middle School, which opened in August 2009. Its 5,000-sq.-ft. green roof, apart from helping to cool the building during Atlanta's hot summers and keeping it cozier in winter, serves as a living classroom for students who regularly gather in small groups to study around tables under the shaded plaza adjacent to its roof garden.

The garden is one of many cutting-edge innovations the school has embraced to use resources as efficiently as possible, including water, says irrigation consultant Bob Scott, who helped design and oversee the installation of the site's water-saving landscape features.

"Early in the planning process, I recommended that we develop an overall and bigger picture to deal with water at the campus," says Scott, president of Irrigation Consultants Inc., Conyers, GA. "We ended up doing a master plan for water usage and conservation. We started by prioritizing the water at the site, and our first priority was to harvest whatever storm water we could."

For example, the middle school's

roof surface provides much of the irrigation water required by the garden. Precipitation falling onto the roof is collected, along with the building's air conditioning condensate, and directed into a 10,000-gal. aluminum tank at the base of the building, explains Scott. During periods of dry weather, that water is pumped back onto the roof and used in the green roof's low-volume system. Or, it can be used to irrigate plants surrounding the school.

The installation of the green roof was handled by national landscaping company ValleyCrest Landscape Cos., which was involved with many other landscape construction projects at the site during the decade-long process of upgrading Lovett School's campus.

"From our point of view, the logistics of how to access a roof is always a challenge, including how to get the material to the roof in a safe manner," says Brian Prantil, branch manager of the Southeast Region for ValleyCrest. "There were many other considerations for this project, as well, such as installing the correct, lightweight soil and installing the irrigation, in terms of the long-term maintenance of the green roof — and taking into account the water needs of the plants, which are different from other landscape areas at the school.

"There are increasing concerns about how to irrigate plant material without wasting water," he adds, noting that solutions include "the use of elements, such as cisterns; using plant material that doesn't require extensive maintenance, including native or adaptive plants; and making sure plants are located in the proper locations and in the correct soils."

The green roof and other energy and water-conserving design elements contributed to the middle school earning a Leadership in Energy and Environmental Design (LEED) Gold Certification by the U.S. Green Building Council. The school learned of the designation in August.

"In the last 10 years, we have replaced our major educational spaces with up-to-date and more energy-efficient facilities," says Jeff Rountree, director of plant operations. "When we replaced our high school and our elementary schools, we were interested in building to LEED standards. Those two buildings just missed it by a couple of points each, so we dug our heels in a little bit deeper and

continued on page 22

Top: Students gather on the shaded middle school roof garden plaza to study or socialize.

Center: This above-ground cistern collects air conditioning condensate and rainwater from the green roof and stores it until it's needed to irrigate the roof garden.

Bottom: This naturalized creek captures runoff and empties it into a 0.33-acre pond.

PHOTOS COURTESY: IRRIGATION CONSULTANT SERVICES, INC.

BEATING THE HIGH COST OF SPORTS FIELD IRRIGATION

Sports fields *must* have water. But the cost of watering them is becoming an issue for grounds maintenance budgets. Turfgrass sports fields require irrigation to maintain plant health and healing, so playing surfaces stand up to the pounding they get from game play. Synthetic turf fields require less water than their natural counterparts for cleaning and cooling, but they do require water nevertheless. Apart from irrigation, sports fields must also drain.

Building sports fields that can be irrigated efficiently and drain promptly is a science. Building them so they disperse, capture, store and reuse the water that nature provides them approaches art. The new softball and baseball fields at Lovett School can be described as state of the art, and feature a system to capture rainwater and reuse it for irrigation.

Eric Holland, co-owner of Precision Turf LLC, Buford, GA, explains that rainwater falling on the fields drains into 4-in. drain lines on 30-ft. centers. The fields' sand cap construction has a 6-in. rootzone over a permeable gravel base. They are turfed with Tifway 419 Bermudagrass. Water falling on them filters through the grass and the gravel sub-base before draining into a 250,000-gal. underground cistern. Rainwater from elsewhere on the campus, including runoff from parking areas, is also naturally filtered before it also drains into the underground cistern.

"Ever since we had the drought of 2007 and 2008, everybody is looking at alternative sources of irrigation water," says Holland, whose company installed the fields.

Irrigation consultant Bob Scott, owner of Irrigation Consultants Inc. in Conyers, GA, oversaw the project just as he has nearly everything related to irrigation at the site over the course of the decade-long campus renovation.

"Early in the process we got with engineers and other people to take a serious look at water harvesting," says Scott, past president of the American Society of Irrigation Consultants. "Everyone liked the idea of an underground cistern, but they realized athletic fields take a lot of water. The civil engineers then began developing the storm water system that empties into the underground holding cistern."

The underground cistern is connected to a 50,000-gal. storage tank located beyond the outfield fences between the baseball and softball fields. When a level control within the cylindrical metal tank indicates the tank is running low on water, a pump within the underground cistern replenishes it. During an extended dry spell, water for irrigation can also be drawn from a 0.33-acre pond located on the campus and pumped to the above-ground tank.

Previously, a pump drew water from the nearby Chattahoochee River to replenish the campus pond. Today, the captured rainwater also decreases the need for potable water from Atlanta.

Jeff Rountree, director of plant operations for Lovett, knows the importance of irrigation for providing green, healthy turfgrass and a safe playing surface for young athletes. Lovett provides sports facilities for more than 60 school teams.

Rountree, who has 42 people on his staff, says Lovett School has four main natural grass sports fields: one each for football, baseball, softball and lacrosse. A natural turf, multi-sport field is available when the turfgrass on one of the others is rested or renovated. The school is also installing a synthetic turf sports field. It will be irrigated with eight water cannons.

"Last year, we came out of a long drought. It was difficult to maintain our sports fields. If turf can't be watered and the grass dies, the ground can turn into concrete," says Rountree, who was born and raised 20 miles from the school where he has worked for 34 years. "Fortunately, we could draw water from a well, and we could maintain all of our fields with the well water. We have a 600-ft. deep well on campus. It gives us enough water so that at night when demand for irrigation is low, we can pump water and replenish our pond."

The Lovett School has an extensive irrigation system on campus, with pumping stations custom-built by WaterTronics.

Rountree says the next big improvement will be automating the campus irrigation, which means integrating the site's nine irrigation clocks.

"We hope to be able to tie them into a central control system next year to help us use water even more efficiently," he says. *— RH*

Much of the irrigation water required to irrigate Lovett School's two new sports fields comes from captured rainwater.

continued from page 20
worked very hard in choosing and using materials, means and methods to achieve a higher level of LEED certification for our middle school."

A collaborative project

While the school's faculty, staff, students, parents and other supporters celebrated the Gold recognition, it wasn't the planners' main goal when the school's major renovation process began more than a decade ago. Their larger vision has always focused on providing students with modern, state-of-the-art facilities to prepare them for the ever-changing career needs and opportunities of the 21st century. The other part of their vision included elevating the school's facilities — buildings and campus — to a new level of environmental sustainability.

Like all projects of this size, its many different components required the talents of many professionals and contractors, and everybody following the spirit (if not the exact dictates) of the original master plan. Conditions, as in all sizable projects, called for some modifications as work progressed, says Scott.

Several experienced architecture firms took up the challenge of fulfilling the school's vision, including the Atlanta-based landscape architecture firm of Hughes, Good, O'Leary & Ryan Inc. (HGOR). Its involvement began more than a decade ago as it partnered with committees comprised of school officials and a diverse group of other firms and professionals in crafting the project's master plan.

Landscape architect Lauren Standish of HGOR says creating the visionary plan and obtaining the necessary permits and authorizations for the project took more than two years. Only then could moving dirt at the site begin. The ambitious scope of the project required it be approached step by step, a process that has lasted more than a decade and is just now winding down, says Standish, who served as project director for HGOR on the site.

The school's makeover began ambitiously with the construction of a 300-space parking garage, which opened up more green space on campus. It continued in phases, month after month and year after year, with the construction of the new upper school, then the building of the new lower school and, finally, the new middle school, now in its second year of use. HGOR partnered with and relied upon the services of experienced contractors, such as ValleyCrest and irrigation consultant Scott, throughout the project.

"Our overall role was to make the vision of the landscape architect and the school a reality," says ValleyCrest's Prantil. "Lovett spent a great amount of time thinking through what its vision was going to be, and it was our job to put in exactly the installation it wanted and expected."

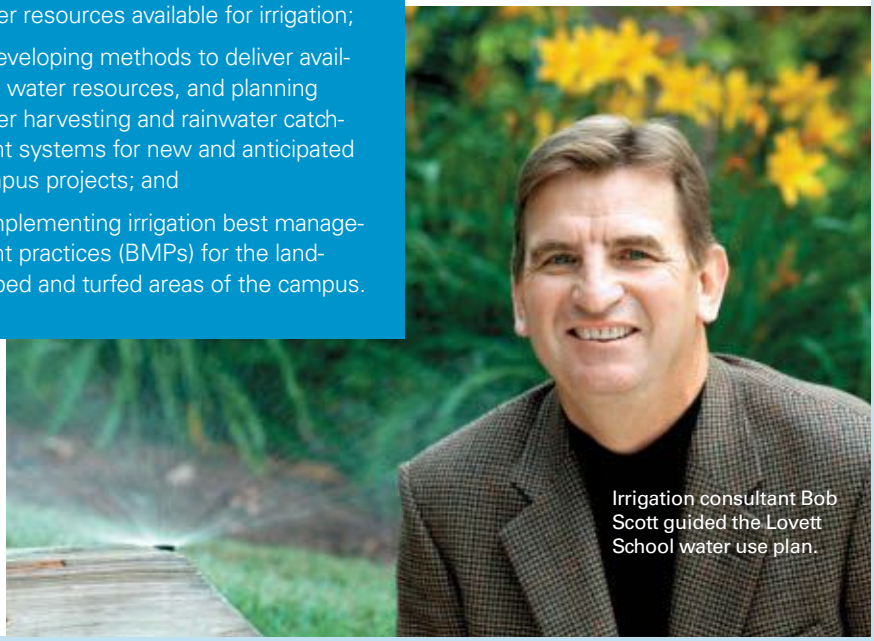
This was also Scott's role on the Lovett School project — making sure the school's vision, at least in terms of irrigation and outside water use, was being realized.

"Perhaps the biggest challenge in a project like this is getting and keeping an overview of the project's goals, and also keeping everyone aware of those goals, keeping everyone informed," he says. "This includes the client, the design teams, the construction teams, and making sure it all remains tied together.

"In the end, of course," he adds, "you want everything in the project to work as it was designed, and you want it to perform and be efficient for a long time. And, obviously, you're also working to make sure it ends up providing the client, in this case, the school, with a tangible payback. When you conserve water, and in this case we're harvesting and saving rainwater and runoff, you're providing a tangible payback." LM

THE IRRIGATION CONSULTANT'S ROLE AT LOVETT

- Working with the owner during development of the master plan;
- Analyzing the existing irrigation systems on the campus, determining irrigation demands of the various systems around the campus, and identifying water resources available for irrigation;
- Developing methods to deliver available water resources, and planning water harvesting and rainwater catchment systems for new and anticipated campus projects; and
- Implementing irrigation best management practices (BMPs) for the landscaped and turfed areas of the campus.



Irrigation consultant Bob Scott guided the Lovett School water use plan.

PHOTO COURTESY: IRRIGATION CONSULTANT SERVICES, INC.; ILLUSTRATION (RIGHT) BY: ISTOCK INTERNATIONAL INC.

11 steps to a great irrigation project

Follow this 'recipe' for working with general contractors, landscape architects and landscape designers, and you're on your way to making every large landscape irrigation installation a winner.

BY **BRIAN E. VINCHESI**, LEED AP, CID, CIC, CLIA, CGIA, GWM-L

If you have been in the irrigation contracting business for very long, you've had successful and unsuccessful projects. There's a good chance your first unsuccessful project may have been your first irrigation system installation. Looking back, I know mine could have been done better, especially the first one. It was also the landscaper's first irrigation system installation; need I say more?

There are several keys to having a successful irrigation installation project. At the residential level, you have control, and you make all the decisions. If it's wrong, it's your fault; there is no finger pointing. However, in larger systems that you may have provided design/build services or especially professionally designed systems (irrigation consultant, landscape architect or civil engineer), there are a large number of places where things can go awry — and quickly.

In many cases, these problems may not be your fault, but you're the one left holding the bag. There's a learning curve, and you must educate yourself about these more detailed systems for them to be successful. In other words, educate yourself before bidding, not after.

Communication is vital, regardless of the size of the project. The more you communicate with whomever is overseeing your work and/or paying you, the better off the results of the project will be. You cannot overcommunicate, as long as you are being professional and have legitimate questions, concerns or gripes.

Step by step

What follows is my recommended procedure to follow to make sure each project is both successful and profitable:

1 **Do your due diligence.** Take the time to look at the irrigation plans, read the specifications and study the details to understand exactly how to install the irrigation system. First, look for things that you and/or your crew are not used to doing. Your staff will either need to be trained on the new procedures, or be reminded to do it differently. Spend the necessary time to understand what's expected before putting shovels into the ground. You'll be surprised how much more smoothly jobs will go if you thoroughly understand the plan. It also makes it easier to get your money and get out at the end of the project.

2 **Get the necessary clarifications.** As you study the plans, specifications and details, look for inconsistencies between the specifications and the plans, and especially between the specifications and the details. Is there missing information? Pieces missing? Equipment not specified? Is there something on the plan that makes no sense, or makes the plan unworkable? Will you be able to install it the way it is designed or specified?

Remember, at the end of the job, it's still your responsibility to have a working system. Finger-pointing works much better at the beginning of the project, before anything is installed, than at the end — when it just plain doesn't work or no one wants to pay for it.

PROVIDING A LANDSCAPED SITE WITH IRRIGATION THAT KEEPS PLANTS HEALTHY AND ATTRACTIVE BUT ALSO MAKES EFFICIENT USE OF WATER REQUIRES A CAREFULLY CRAFTED PLAN.

3 **Specify your submittals and substitutions.** If you're not used to professionally designed commercial work, the submittal process will be new to you. The specifications will require that you submit a product sheet for each and every product that was specified or is to be included in the irrigation system. Submittals are also where you would request substitutions from the equipment that is specified. However, submittals must be understood and prepared. Poorly prepared submittals are a red flag to both the general contractor and the professional designer that you don't understand the specifications or the design, and/or you're not qualified to install it.

Create submittals to identify the products (and the features of the products) that you are planning on installing. Be as exact as possible. Substitutions aren't a good idea if the specifications detail exactly what products are to be used. If the specification says "or approved equal," substitutions might be possible.

Your supplier can help you with properly preparing submittals. Install what was approved on the submittals. It's generally a bad idea to install products other than what you submitted.

Last but not least, submittals obviously have a cost to them. Include that cost in your bid.

4 **File your request for information (RFI).** Once you've bid the project, the best way to ask questions is through a formal process using an RFI. File the RFI with the general contractor, and the responsible party will respond to it in writing. An RFI is still an excellent way to clarify inconsistencies or ambiguities after you have been awarded the project, but before installation. You cannot file an RFI after you have performed the work.

5 **Adjust to changes and change orders.** Many times, the landscape designer or architect will change the landscape design during construction. He or she may change it slightly, or make major changes. It's not uncommon for an irrigation contractor to install a system as per the irrigation design and pay no attention to those changes. The result is an inefficient irrigation system that doesn't match the landscape. Communicate and understand potential changes before they occur, so you can adjust the irrigation system accordingly.

Make sure the landscape architect/designer understands the implications of changing the landscape before installing any irrigation. File a change order. Ideally, you'd file the change order before you do the work, but many times that isn't possible. Again, regularly communicate with the general contractor. This will help the change order process — especially when they are filed after the fact — go more smoothly. Never anticipate you will be paid for work you have done if there was not a change order approved ahead of time.

6 **Flush.** There's nothing worse than having a new landscape that needs to be watered if sprinklers repeatedly clog and don't properly operate. Ideally, the system will be complete and there will never be

a clogged nozzle or an inoperable sprinkler. Spend the proper time flushing the system to make sure everything is operational. This may keep you from getting called back to the site.

Also, unclog nozzles on a regular basis through the first month of operation. Specifications often require the irrigator to be responsible for clogged nozzles for 30 to 90 days after the system is complete.

PHOTO COURTESY: EWING IRRIGATION

Adjust arcs. Just as you properly flush the system so you do not get clogged nozzles, take the necessary time to adjust the sprinkler arcs so they're properly watering what they're intended to water. Make sure none of the arcs are watering the hardscapes. Every time you have to come back to adjust something, it costs you money, but it also shows the general contractor and/or the owner that you didn't install the job properly.

8 **Create an irrigation schedule.** Even though you may not be required to provide (or program into the controller) an irrigation schedule for the project, it would be prudent to do so. After all, you want the irrigation system to be properly scheduled as much as the property owner does.

9 **Provide a record, normally known as built drawings, at the completion of the installation.** A good record drawing gives everyone a good understanding of what was installed and where. Record drawings should indicate sprinkler model and nozzles installed, zone valve locations and wire and pipe routing and sizing.

10 **Provide an operating and maintenance (O&M) manual.** Most commercial projects and professionally designed irrigation systems require an O&M manual. Topics might include startup procedures, winterization procedures, approved submittals, a suggested irrigation schedule, a list of supply houses, a written warranty statement and a list of numbers to call for service. The manual may also include the controller unit's operating and maintenance instructions and any other significant items in the system.

11 **Know the warranty requirements of the specifications.** A one-year warranty is standard, but an extended warranty might be required. Account for the costs of any extended warranties in your bid. Be aware the warranty of many projects require you perform a first-year winterization and spring start-up.

Every item and procedure listed in this article will cost you — either financially or with your time/effort. But taking shortcuts or not following the plan may result in an even larger cost: the bad impression it leaves with a landscape architect/designer and the property owner.

Follow the plan I've laid out in this article, use quality materials, install the project as it's been designed and chances are you'll end up with a successful project — and you'll get paid. LM

VINCHESI *is president of Irrigation Consulting, Inc., Pepperell, MA, a member of the American Society of Irrigation Consultants, a WaterSense Partner of the Year and a board member of the Irrigation Association. Contact him at bvinchesi@irrigationconsulting.com.*

Next month, learn how initiatives such as Sustainable Sites (SITES) and WaterSense will shape landscape irrigation.