

# Sprinklers on Diamonds: Designing Irrigation for Safety and Efficiency

**W**e tapped the American Society of Irrigation Consultants (ASIC) regarding product selection and key design elements for irrigating baseball parks. They forwarded us to a couple of pre-eminent irrigation consultants who relish the challenging task of designing baseball park irrigation.

Jeff Bruce is president of Jeffrey L. Bruce & Company in Kansas City, MO, whose firm has engineered irrigation for Jacobs Field, home of the Cleveland Indians, Victory Field AAA Baseball Stadium for the Indianapolis Indians, Camden Riversharks AA Stadium in Camden, NJ, and Canal Park AA Baseball Stadium, home of the Akron Aeros.

And, Doug Macdonald, with Aqua Engineering, in Fort Collins, CO, which has designed irrigation for Doubleday Field in Cooperstown, NY (see page XX), Dodger Stadium in Los Angeles, and Kauffman Stadium, home of the Kansas City Royals.

**ST: What makes sprinkler head selection so important in baseball fields in particular? What are the key site parameters in picking products?**

**JB:** "You have to balance the amount of irrigation equipment on the athletic surface with a uniform irrigation distribution for proper turf growth. The intent is to minimize the potential of athlete injury on the equipment.

"Baseball diamonds are unique; they're not configured in a rectangle like other sports fields. Therefore, head placement for uniformity becomes more difficult. It's harder to tweak head locations. We opt for sprinklers that provide high application rates of water to load the sand system and minimize the operation time, so we design accordingly. If you cut your wetting cycle in half, you reduce the opportunity for disease.

**DM:** "Sports field applications impose cleaned, high-volume use. So, irrigation has to be installed with a small exposed surface area to avoid injuries and damage. We design with turf heads that provide a good distribution profile for good uniformity. Good nozzle selection also is important. One, because it enables us to adjust arc and radius along the infield border; and two, it enables the turf manager to make minor adjustments in the field.

"There have been times when we've selected pop-up rotors that allow us to set the exposed surface of sprinklers slightly below grade, which also prevents player injuries. As a rule, we minimize the number of heads in the field to avoid player injury. That is a paramount concern for any athletic field."

**ST: Do you always spec big turf rotors? Is there ever a need for smaller rotors, pop-up sprays or drip?**

**JB:** "For the outfield and infield, we generally spec identical large turf rotors. Most fields have their collar behind home plate and that space varies between 15 and 25 feet. This is the most challenging area, so we use some of the smaller turf rotors there with stainless-steel sleeves."

**DM:** "It depends on the application. We use the largest stainless steel, rubber-covered rotors we can with acceptable uniformity, those with a 50-70 foot throw radius. We try to use medium-radius turf rotors between the base line and the fenced area, where spacing is tighter. But that's really the only area we use those."

**ST: How much of a role does soil and turf type have in selecting and**

**installing heads and riser assemblies?**

**JB:** "Soil plays the larger part. If it's a tight soil, we have to match precipitation rates with the growing medium's infiltration rate. We can't put on more water than the field can absorb. Native-soil fields need lower volume heads.

"Another consideration is sand-based fields. Sugar sands in Florida can 'stick-up' sprinkler heads. The sand grains get caught between the sprinkler's wiper seal and riser, so as the head goes up and down, the sand scores the riser and can get caught - leaving the head sticking up.



"If your sports field base is composed of rounded sand, it's like growing turf through BBs. The surface turns into a volleyball pit. Good sand-based fields use angular sand because it locks up and stays put. However, this can have a degrading value on the head. In a high sand environment, stainless steel heads protect against that.

"Generally, though, we look at using plastic sprinklers that flush on the up and down stroke. The high-density polyethylenes are pretty durable and equal or exceed the durability of old brass heads.

"For installs, we specify swing joints because they hold equipment more vertical. If large rotor heads aren't correctly compacted, when they throw 50-60 feet they are exerting that same pressure around the back of the heads. They begin to wobble and donuts form around the head, which create surface irregularities and player hazards."

**DM:** "Both play into it for sure. We want to utilize sprinklers that allow the turf manager to match the application rate to the infiltration rate of the field. Most of the manufacturers are making plastic-type sprinklers. They've gotten away from



'iron-body' heads. Rubber covers are the standard for protecting the athletes. Plastic has become the industry standard.

"We always use swing joint assemblies on sports turf applications, unless a client insists on spray heads outside of playing area, then we might go to a different riser."

**ST: What about design? What are some of the key design elements in selecting and placing sprinkler heads?**

**JB:** "Always keep equipment away from high activity areas, sprinkler heads and other irrigation equipment should in no way interfere with the field of play. For example, you don't want heads placed on the home-plate side of first base, rather on the second-base side. You don't want an athlete to slide into any base and catch a sprinkler head.

"And, you never want valve boxes in the field of play. Typically, the boxes are buried under a warning track, so they don't interfere with 'traffic' and they provide a cleaner presentation. If that's not possible, I like to spec them outside the fence.

"We use predominantly part-circle arcs, because clay is very unforgiving when over watered. A critical area is the outfield lip. This seems to be the most dangerous location for heads. There's a tendency to groom the skin and push 'leftovers' out onto the grass when grooming. Over time this builds a lip along that line, which can affect sprinkler performance. Also, balls tend to hit and careen off that lip so you don't get a true play, which makes it dangerous to the outfielder.

"So you design to water the skin and the outfield differently, with two different zones. You have to isolate the irrigation system for the lip from rest of the turf. This is the most critical liability issue in baseball."

**DM:** "Head placement has to be a key design element. You have to strike that balance between the injury aspect and effective coverage. We use as few sprinklers as possible to achieve good coverage uniformity. We use part circles around the field perimeters, and adjust distribution arcs for the baselines, to avoid overspray. We want to keep the baselines as dry as possible, but there will be some water along the edges to ensure proper sprinkler coverage.

"Irrigation control is critical, so we design valving for the laterals to provide as much control as possible around the crown of the infield, and then valve the warning tracks and the sides separately. We also try to provide separate control valves that allow the turf manager to isolate right, center and left field."

**ST: Tell me about head placement. Is there an accepted industry standard on where heads should be placed on the diamond?**

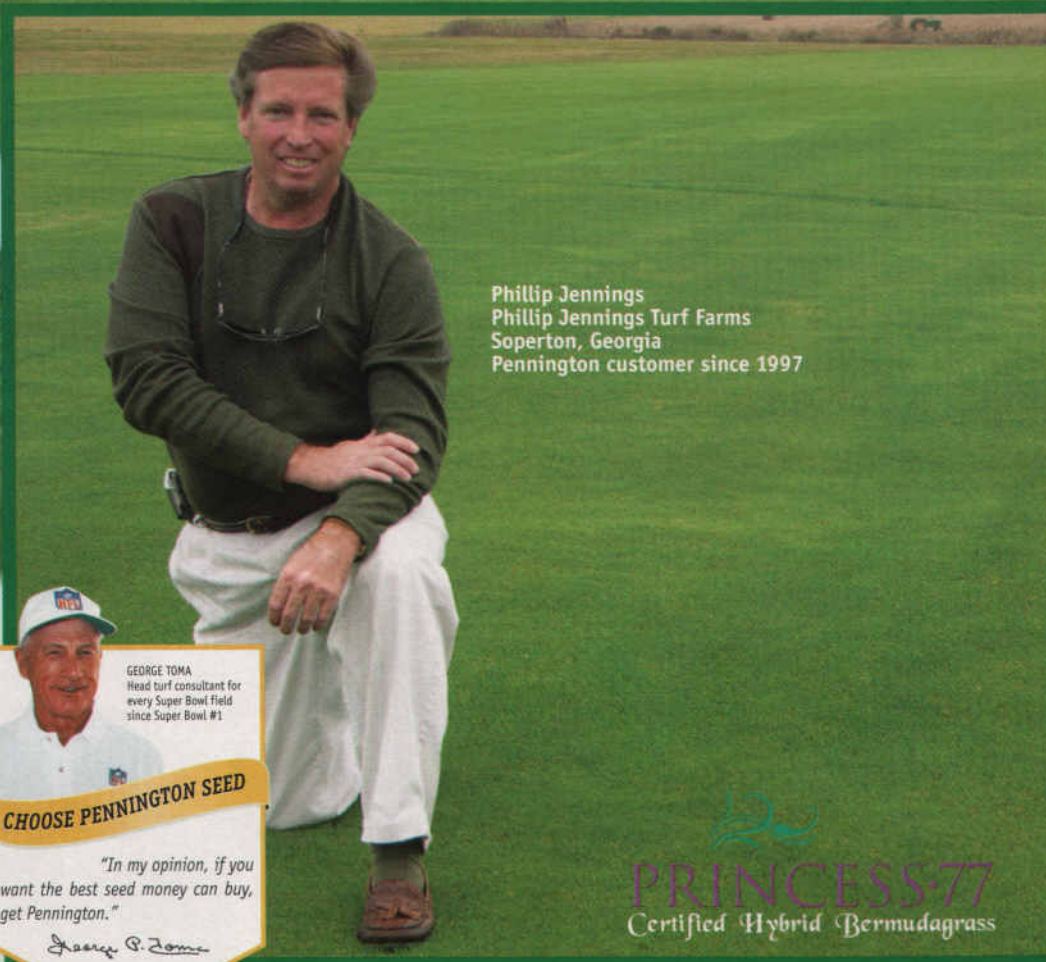
**JB:** "The industry pretty much has come to a standard approach. The standard head placement seems to be one head at each corner of the diamond, and one behind the pitching mound, all large rotors. Outfields vary in size and perimeter, so you have to design irrigation for those individually.

"Invariably, you'll find that you have to subtly compromise somewhere in your head spacing. So we strictly adhere to standard spacing of the outside heads. Then, we start in the center of the field and work a triangular grid pattern out toward the edges, and where you give it up is where the edge meets the center field pattern. If you're going to compensate coverage uniformity, add sprinkler heads and re-space, don't short the heads and get hot spots.

"I should say, too, that it's fundamental to only use equipment recommended by manufacturer for that use. If you spec or install big golf heads with a high pan size, and someone gets injured, it's your problem. Sprinkler heads for sports turf facilities are designed for safety and performance. Remember, injury prevention absolutely is the greatest concern."

**DM:** "There is a relative standard to the size and configuration of baseball fields. Generally, part-circle sprinklers around the perimeter of the outfield, and a two- or three-row system for the full-circle sprinklers perform best. In most cases we provide a high-speed rotary system to syringe the infield mix, which enables the turf manager to drag out the infield. Placing heads in a turf infield, we usually split the difference between the bases along the baseline. That's four heads in the infield. There's some overspray, but it minimizes conflicts with the athletes and maintains a safe playing surface. We also try to avoid placing sprinklers where base runners will be

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"We typically try to provide a mainline loop outside of the ball field fence, then run laterals under the fence and warning tracks. Usually, there's a quick coupler behind the pitcher's mound for hand watering. Valve boxes are placed outside the fence wherever possible, or flush against the bottom of the fence.

"So, we do have kind of a process to laying out a field, but it really depends on the field. We try to design the system where one side of the field mirrors other - left field and right field. It's easier to stake and install that way, too. We try to minimize sprinkler heads and maximize coverage and control."

**ST: What should a sports turf manager look for in a design and installation?**

**JB:** "Sports fields are layered-growing-medium systems. They're constructed very deliberately with gravel, sand, a rootzone, and turf. An irrigation consultant and contractor have to understand that. These field systems are much more surgical. You don't want to contaminate what they've created. I think it's critical that all professionals involved have experience in these types of installations; they require different irrigation equipment and design.

"A good design and installation is more important than the variability of products on the market. If you design properly around a quality piece of equipment, system performance is built in. So, look at the support of the irrigation distributor. Who's got your back? Who's going to run out at 11 at night and get you a head or a valve? We tend to look at those items and issues.

"The goal of any irrigation system is to apply the minimum amount of water necessary to finish the job. Put as little down as needed to accomplish what you want to accomplish. For baseball parks, you combine that with minimizing the irrigation equipment on the field, for safety."

**DM:** "For a performance irrigation system, look for a consultant who has experience in sports turf applications and is familiar with available products. Because needs vary from site to site, they really should select equipment that has good local manufacturer support and is specifically designed for a sports turf application. And, the designer shouldn't use a cookie-cutter approach. The irrigation consultant and contractor should understand the game of baseball, how it is played, where the players stand, move and run, as well as how the field typically will wear. They should put a premium on the safety of the players." **ST**

*The American Society of Irrigation Consultants (ASIC) was formed in 1970. Its members are committed to representing the client in providing independent irrigation consulting services for the effective use and management of water and other natural resources. For more information about ASIC or its members, call 508/763-8140 or visit [www.asic.org](http://www.asic.org).*

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# Fenway Park gets new irrigation system

**A** new Toro irrigation system was part of an overall turf renovation project at Fenway Park late in 2004, which began with the excavation of 16.4 million pounds of soil. The upgrade was prompted by a number of concerns, including improved safety and playability of the surface, but also because the turfgrass had been so demanding to grow.

"That turf had certainly served its time, but it was old, and built like fields used to be built," said David Mellor, Director of Grounds at Fenway. "We had no automatic irrigation and very limited drainage. It was a heavy soil, so once it reached its capacity of water retention, there was no place for the water to go. It was a challenge to have the proper amount of water, especially in that soil."

Mellor chose Toro because of his long-standing relationship with the company and his local distributor, Turf Products Corp (TPC).

Toro's TR70XTP series rotors were installed in the outfield surface. Other short-radius rotors and spray heads were installed around uniquely shaped parts of the Fenway field, such as the bullpens and foul areas.

For its zone valves, Mellor chose 220 Series Brass with EZ-Reg pressure regulation to maintain matched pressure throughout their field and obtain the most uniform application. A Custom Command Series 36-station metal controller controls the entire system.

"It's like night and day," said Mellor. "With the flexibility, the throw pattern, being able to adjust its arcs, it certainly helps with the uniqueness of an athletic field layout. The field will be healthier because of the efficient and more uniform application of water dispersing from the heads versus hand watering. . . also having an automated system that comes on at 2 or 3 in the morning, or being able to syringe something on a hot day will help increase our efficiency."

Renovating the surface and improving the drainage also enabled Fenway to remove the crown in the field - something once common on such playing surfaces. "We have a flat infield and center field now," said Mellor. **ST**

*This article was supplied by Canyon Communications, [www.canyoncomm.com](http://www.canyoncomm.com).*

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