Due to increasing labor costs, the need for specialized equipment, and the lack of adequately trained personnel, municipalities throughout the Garden State are increasingly relying on commercial contractors to apply pesticides, fertilizer, and lime, perform aerification, and conduct overseeding on sports fields.

Municipal administrators are often provided with a one-size-fits-all maintenance plan developed by contractors that involves redundancy, poorly timed applications, use of unadapted turfgrass species and/or varieties, and applications of nutrients and lime without soil testing.

Municipalities are challenged to maintain safe playing surfaces under intense field use and, combined with heightened public concern over pesticides applied on municipal properties, it is imperative that contracted maintenance plans be site-specific. These plans ensure that cultural practices are such that good turfgrass cover can be maintained and that pesticide applications are part of an integrated pest management (IPM) program.

**New Jersey case study**

An elected municipal official contacted me in the summer of 2006 to evaluate a maintenance plan provided by a contractor. This plan had been in place for several years on a high-profile sports field. The municipal official wanted to determine whether the protocol for the field should be continued or adjusted for 2007. Furthermore, a similar plan was needed for a neglected field in the municipality.

Soil testing had not been performed recently on either field and the protocol submitted by the contractor did not provide for it. Thus, applications of fertilizers containing phosphorous (P) and potassium (K) as well as lime were being made in the absence of soil testing (Table 1). Soil samples from the two municipal fields were analyzed by the Rutgers Soil Testing Laboratory with results indicating that soil P and K were 286 and 359 lbs/acre, respectively, and soil pH was 7.7 for the high profile field (Figure 1). The repeated applications of complete fertilizer (nitrogen [N], P, and K) and lime increased soil P, K, and soil pH to above-optimal levels.

In contrast, soil test results for the neglected field indicated below-optimal soil P and K levels (11 and 134 lbs/acre, respectively), and an acidic soil pH (5.2) (Figure 2). Additionally, soil calcium (Ca) was below optimal (129 lbs/acre) and soil magnesium (Mg) was in the optimal range (254 lbs/acre).

As a result, the revised maintenance plan does not specify routine applications of P, K, and lime to the high profile field; however, the plan does allow a complete starter fertilizer at the time of overseeding (Table 1). The new fertilization plan focuses on N to ensure adequate turfgrass growth and recovery. The revised plan for both the high profile and neglected fields specify applications of a 30% water insoluble nitrogen (WIN) fertilizer. This is a more effective method of applying N at a rate of 1.0 lb N/1000 ft² compared to a completely water-soluble N source. Fertilizer and lime quantities...
for the neglected field were based on recommendations made in the soil test reports. Calcitic lime (as opposed to dolomitic) was specified for the neglected field as the soil test indicated soil Ca to be deficient.

**Addressing pesticide applications**

The initial contract specifications called for four applications of a broadleaf herbicide between late spring and early fall (Table 1). The initial contract did not, however, provide for preventative control of white grubs. In recent years, New Jersey sports fields have been decimated by white grubs and animals that forage for grubs in early fall; thus, new specifications that replaced redundant broadleaf applications with a preventative white grub control application was clearly justified.

The initial contract plan for preemergence crabgrass control did not fit the municipality’s needs given the differences in turfgrass cover present on the high profile and neglected fields. The high profile field had been re-established with sod within the last year and turfgrass cover was greater than 90%; thus, a preemergence herbicide applied in the spring made sense because spring overseeding was not required (Table 1). However, the second (split) application specified in the initial plan was eliminated because of perennial ryegrass overseeding scheduled for late summer, taking note that the preemergence herbicide label stated that overseeding was not recommended until 4 months after a split application.

In contrast, the neglected field had less than 50% cover and a spring overseeding was needed; therefore, a preemergence herbicide that
would negate overseeding efforts could not be recommended. Given the history of the field and prevalence of crabgrass, it was determined that a postemergence herbicide applied in early summer was the best option for crabgrass control. The labels for quinclorac (Drive) and fenoxaprop (Acclaim Extra) require 28 days between emergence of perennial ryegrass and herbicide application.

Choosing turfgrasses for overseeding

Municipal Department of Public Works employees described the annual overseeding conducted by the contractor as unsuccessful. While intense field use contributes to the difficulty in maintaining turfgrass cover, the use of turfgrasses not adapted for sports fields only compounds the problem. Records provided by the contractor to the municipality indicated that the seed used for overseeding was comprised of nearly 40% annual ryegrass and 20% creeping red fescue by weight (Table 2). The mixture did contain perennial ryegrass and Kentucky bluegrass but the varieties were not stated.

The lack of overseeding success was at least partially attributed to this seed mixture. Annual ryegrass is a poor choice for sports field use given the expectation for perennial turfgrass cover. The poor traffic tolerance of creeping red fescue also makes this seed mixture a poor choice for these municipal fields.

Because heavy use on the neglected field was anticipated soon after spring renovation procedures, perennial ryegrass was the only species that could be used successfully. The slow establishment rate of Kentucky bluegrass and tall fescue make the successful use of these species unrealistic for this field. Additionally, the rapid germination and establishment rate of perennial ryegrass is highly desirable for a spring seeding to compete against simultaneously germinating summer annual weeds.

Fortunately, the municipality was willing to close the neglected field during the spring to aid turfgrass establishment. Field use was to be transferred to the high profile field; thus plans for the greater-than-normal use on the high profile field were needed. Consequently, overseeding in conjunction with core aerification was scheduled in late summer on the high profile field (Table 1).

A commercially available perennial ryegrass seed blend that contained the traffic tolerant varieties “Citation Fore” and “Manhattan 4” was located (Table 2). These are top performing perennial ryegrass varieties based on tests of simulated wear and compaction in Rutgers turfgrass trials during 2002-2003. Gray leaf spot disease can devastate young stands of perennial ryegrass; therefore, it was necessary to consider gray leaf spot resistance in variety selection. “Paragon GLR” perennial ryegrass was recommended for the seeding blend since this variety has good resistance to gray leaf spot, and the variety was available at a local distributor.

It was strongly recommended that the municipality assume responsibility for overseeding these heavily trafficked fields with the perennial ryegrass blend mentioned and that over-
seeding be conducted as a routine practice. Sports field managers across New Jersey are successful at maintaining turfgrass cover on high-traffic fields by repeatedly overseeding perennial ryegrass with rotary-type spreaders and allowing athletes to “cleat-in” the seed.

The revised contracted maintenance recommendations will increase the budget requirements for the Municipality. Increased labor costs and municipal budget shortfalls often result in either spending freezes or cuts to sports field maintenance budgets. However, public expectations for playability, safety, and aesthetics, as well as substantially greater field use, require municipalities to consider increased expenditures and/or redirection of existing expenditures.

Brad Park is Sports Turf Research & Education Coordinator, Rutgers University, and a member of the Sports Field Managers Association of New Jersey Board of Directors. He can be reached at park@aesop.rutgers.edu.
Over the years I've had the unique privilege of traveling around the globe to help in the design, construction and maintenance of a wide variety of athletic fields that have hosted major events. My team was an integral part of the design and construction of the baseball and softball fields for the Summer Olympics in Sydney, Australia in 2000 and again in Athens, Greece in 2004. Today, we are involved with the development of athletic fields in Beijing, China for the preparation of the 2008 Summer Olympics.

Beyond the rich cultural experiences that these projects have delivered, each has also provided valuable insight about the nature of how people work together to accomplish a common goal. Whether these achievements are the result of Olympic spirit, or a desire to meet the aggressive construction deadlines required of a host city, the speed of execution and quality of work consistently amazes me.

**Olympic baseball creates excitement**

The first Olympic baseball game in Athens...
2004 attracted more than 10,000 fans brimming with anticipation. After the wind up and delivery of the first pitch, the umpire called a strike. The fans erupted. Then came the second pitch. After a similar wind up and delivery, the umpire called a ball. Again, the crowd erupted.

For many of the fans in attendance that day, the game was their first exposure to the sport of baseball. Although they were not yet familiar with the rules, the energy at the ballpark highlighted the sheer excitement the game creates.

Although the 2008 Beijing Olympics are still many months away, the excitement is palpable. During my last trip to Beijing, I enjoyed speaking with Olympic organizers and members of the field construction crew who became visibly animated when describing the positive impact the Olympics will have on the community. It is fun to be involved with the Olympics and to play a role in sharing the game of baseball with new fans and people that are excited about the sports turf industry.

As I've observed from my experiences with other sports turf design projects, team
collaboration is a critical element to success. Athletic turf construction projects involve a wide range of constituents beyond those directly performing the work. At the international Olympic level, constituents may include state and local policy-makers, competition committees, sponsors, and a host of others who are connected in some way. My work in Beijing and at previous Summer Games has made me realize that the Olympics influence people to become better international communicators by creating dialogue opportunities across cultural lines.

Working with the people in China involves more than just the agreement we have regarding the fields, but it is also about developing friendships. Building these new friendships require a better understanding of the language and in my spare time I am enjoying my second class to learn Mandarin Chinese. Beyond the fact that I think it is a beautiful language, especially in the written form, I am looking forward to meaningful dialogues with the construction team and international stakeholders with whom I am working in preparation of the 2008 Beijing Olympics.

With the abundance of specialized field equipment available to sports turf professionals today, I was surprised to learn that the field construction teams in Beijing didn’t have access to specialized turf equipment used in the West. Some equipment was obtained through American distributors operating in China; however, other types of equipment needed to help expedite the construction of the fields simply weren’t available.

When I spoke with officials about the equipment limitations, I learned that much of the construction was going to be completed by manual labor. As explained to me, China is able to overcome equipment shortages through the sheer scale of its labor force. The individual labor going into the production of the Olympic fields in Beijing is astounding. From this perspective, it is easy to understand the attractiveness of the Chinese labor market for international companies with heavy manufacturing requirements.

**Turf and clay selections**

Beijing’s weather patterns are a lot like New York City’s. Given the similarities, we discussed a variety of grassing options for the fields that would simulate the high performance of New York’s professional
ball fields. After our initial meeting, it was determined that we would need to seed the fields rather than sod them, since China does not have the appropriate equipment for harvesting sod and the type of sod they have is not conducive to baseball.

First we considered bluegrass but were advised by the local turf professionals that it was not suitable for a baseball field due to the extremely hot summers in China and because bluegrass varieties tend to succumb to fungus problems. Next, we considered using native zoysias but, after a lengthy discussion, determined that due to the turf's variety its ability to respond quickly from game play damage would be low.

Next we considered Bermudagrass, but after talking it over with the local turf professionals, we decided against it after learning Bermudagrass doesn't stand up well to China's winter months. At that point I described some of the more winter hardy Bermudas that are being developed in the states, which led to the agreement that I would research more Bermudagrass options and propose a plan.

Upon returning to the states I spent some time with local sod farms in the Washington D.C./Virginia area and was impressed with the Riviera Bermuda. After giving Gene McVey, CEO of Johnston Seed a call, Riviera Bermuda seed was on its way to the Olympics.

For the infield clays, we wanted to use similar blends used at top U.S. ballparks; consisting of approximately 10% silt, 60% sand and 30% clay. The search for distributors was not easy; as with many other international field construction projects, we started by asking local golf courses and brick manufacturers for possible sources. After asking around, we were fortunate to connect with local pottery manufacturing companies who had many of the materials we needed to create the right composition. Testing of the materials is ongoing but we are close. As for the mound and plate clays they may have to come from the States.

Continuous learning

Trends in sports turf construction and maintenance are constantly changing. Today, I am particularly amazed by the wide variety of materials that are being used to construct high

Continued on page 30
quality athletic fields. From the development of new types of polymer based clays to synthetic topdressings, the technological innovation that is happening in the sports turf construction and maintenance industry is astounding! Even equipment is becoming better specialized to help serve specific sports.

The International Olympic Committee (IOC) has done an outstanding job of recognizing these types of innovations and incorporating these ideas into a “playbook” that is passed from one host city to the next with instructions and timelines for when construction should begin on different types of projects. By sharing examples of what has and hasn’t worked, each new project can be executed with greater efficiency and make better use of new technologies. The Beijing team has embraced the best practices and is on track to develop outstanding new fields for the 2008 Summer Games.

Beijing is a wonderful city that will undoubtedly host a vibrant and memorable Olympic Games in 2008. It is exciting to be involved with the construction of fields that will expose a new segment of fans to the game of baseball and I cannot say enough about the hospitality and character of those involved with the planning and construction process.

That being said, I want to express how lucky I feel to be able to live in the U.S. Our country has vast resources, modernized equipment, and limitless possibilities. A baseball game on a warm summer evening enjoyed by friends and family provides an opportunity to relax and reflect on the simple pleasures of friendly competition against the backdrop of a well-manicured field.

I strongly believe that my friends in China will embrace this game if not for the sport, but for the same reasons we as Americans do. Those in the sports turf industry make a valuable contribution to the quality of life we enjoy in the U.S. and I am proud to count myself among the professionals who have dedicated a career to this pursuit.

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Distributor's diary: renovation in New York

By John A. Halloran

Clifton Park (NY) Baseball hosted last year's Babe Ruth League World Series.
February 6, 2006: Jerry Francis, Eastern New York Commissioner of Babe Ruth Baseball, calls to say that Clifton Park Baseball had been awarded the 13-15 Year Old Babe Ruth World Series to be held August 18-25. Jerry tells me that plans exist to replace sod on their entire infield after their regular season ends in mid-July. I thought this was a bad idea since it would be risky with high temperatures and killer July dew points. Jerry said he would pass the advice along.

June 5: Joe Harris, head groundskeeper at Doubleday Field in Cooperstown, calls to say that he spoke with a Clifton Park coach who had a game there and was admiring the conditions. He asked Joe for some help with their field project for the World Series and he offered that I was the person to talk to.

I followed up with the coach and he said he would pass the information along to Bruce Cramer, president of Clifton Park Baseball. I did not hear anything back from them so I wasn’t sure the message got passed along. Meanwhile I was working on a utility vehicle deal with an old contact that was still involved with Clifton Park.

August 2, 10 AM: Received the call I had been expecting since February. Clifton Park Baseball was having some issues regarding the field rehabilitation and asked if I would meet
The author’s homemade tool that helps in getting a 1-inch drop per foot when completing the front of a new mound.

With high temperatures having been in the nineties and dew points in the mid-seventies I fear the worst for their sod.

I thought it would be a good idea to take a look at conditions before the meeting. The sod was, much to my surprise, in great shape. There was a little unevenness one side, but overall a very good effort. Since my contact had led me to believe I was being called about the turf, not the skinned area, I was beginning to wonder why I was being called!

**August 2, 7 PM:** Met with Bruce Cramer. I said they did a very nice job on the sod replacement and the only potential issue he may have was bringing more infield material in to seal his new sod edges. Also, the entire infield skin needed to be raised about 2”.

Then Bruce showed me some fairly coarse brick chips that he wanted to use for the infield surface. I said everyone would love the way it looked but it would play horribly. The coarseness would create bad hops and tear the kids up when they slid.
I suggested incorporating Soilmaster Select Infield Conditioner into his existing, locally blended infield mix. Also, the pitchers mound would have to be completely re-built. I offered to supply the infield conditioner and mound clay bricks and assist them with the project. (I own a home made tool that helps in getting the one inch drop per foot when completing the front of a new pitcher's mound.)

**August 7:** Confirmed with Bruce Cramer delivery of products and commencement of work for the following evening. Bruce informs me that his son, Bruce Jr., wants my job! An architecture major, Bruce and his father spent time with legendary groundskeeper George Toma in Fort Myers last spring so both are excited about field maintenance. Thank you, Reverend Toma!

**August 8, 8 AM:** Delivered 13 tons of Pro's Choice product, which was moved onto the infield skin by forklift. Ten skids were spaced from first to third. We are using 3/4” plywood to protect the newly installed bluegrass turf sod (from Saratoga Sod Company in Stillwater, NY).

**August 8, 6 PM:** Soilmaster was spaced on infield surface and bags were cut open and emptied by parents and players. Soilmaster was blended into existing local infield mix by using two Toro Infield Pros with Rahn groomers. I had them water the infield skin area heavily. I plan on stopping in the morning to see what it looks like.

I told Bruce Jr. to pick out a stripe pattern for the infield turf that we would stick with for the entire tournament. It was almost like I gave him homework! I told keep it simple but I wanted a decision by tomorrow evening. I plan on leaving a Greensmaster 1600 to use for the entire tournament in order to give a professional look to this new diamond that is shaping up very nicely.

**August 9, 9 AM:** Met with Town of Clifton Park Buildings and Grounds Maintenance Director Mike Handrehan. Mike was impressed by how much we had accomplished the previous night. I also updated Jerry Francis, Eastern New York State Babe Ruth & Cal Ripken Commissioner, on the progress made on the fields at Clifton Park. Jerry was working the Cal Ripken World Series at the Ripken Complex in Aberdeen, MD. Jerry asked if I could e-mail some pictures of the progress we are making so he could show them to the Babe Ruth officials who were with him there.

**August 9, 6 PM:** Installed Pro Mound bricks around home plate with members of the 15-year-old Clifton Park All-Star team. J requested a four way pitching rubber that I will fill with concrete since I don’t like pitching rubbers to move around. I’ve always done it and had very good luck.

I blended the Soilmaster in the first base line as well as around the home plate area. Both first and third baselines and the home plate area have been made smaller for hand tool maintenance. No infield drag is narrow enough to groom these areas; they were designed intentionally to be maintained by hand tools only.
How many youth league volunteers does it take to start a 3/4-ton walk behind vibratory roller? The correct answer is four! One to rev the truck up that the jumper cables are attached to. One to spray starting fluid into the intake of the engine. One to jump the starter solenoid with a screwdriver and one (me) to tap the starter with a hammer to entice the starter to engage the flywheel! After about 30 minutes we got the roller started and rolling on the infield skin and boy is everyone happy with the results. This field is really starting to shape up very nicely.

**August 10, 6 PM:** An abbreviated work night due to rain. We were able to bring most of the base material for the mound over the plywood protected new sod before it began to rain. I was also able to fill the inside of the pitching rubber with concrete. This will be ready to install Friday evening when I return to assist them. In the mean time they should keep adding base material to the mound area and compact with a tamper.

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Bruce Sr. & Jr. and I decided the mound height will be 10 inches though we might start a little bit higher to take settling into consideration. Bruce Jr. is set on mowing the infield turf at 1.25". I told him this would be possible only if we are able to roll the new sod, now one month old, in order to make it smoother. After the tournament we would aerate the sod to alleviate any compaction caused by the roller and play.

When work is completed we will treat his turf with granular wetting agent and use Milorganite organic fertilizer with 4% iron content to give them the color that they are looking for.

**August 11**: We discovered the dimensions of the diamond were off. We had 90'5" home to first and 127'8" to second base. Mysteriously, home to third was a perfect 90 feet! Base anchor movement went better and quicker than expected. Bruce Jr., a few young lads and I were able to set home plate and clay brick the pitchers mound achieving the desired 1" drop per foot with my homemade mound gauge.

Bruce Jr. was unable to mow the straight line in the turf, which we had discussed earlier in the week. I had some fun with that! He hasn’t yet shared his preferred mowing pattern with me.

Most of my work is done at this point. I will return later to apply granular wetting agent and organic fertilizer as soon as the game field is mowed down to 1.25". Not bad, a full 7 days to go before the tournament and the field could be made playable by morning.

**August 13**: Intended to stop, take a few pictures and make a quick getaway. Instead I spent about 4 hours helping to roll the infield turf and foul ground with the vibratory roller. Even though the sod was installed a little more than a month ago I felt a little nervous about rolling the turf but it was a trade off we had to make. It’s the old athletic field dilemma: playability versus turf welfare! The unevenness of the newly installed turf necessitated the rolling.

Bruce Jr. will mow this evening at 1.5" with a rotary mower in two directions and then run a good watering since we started to see a little wilt in the afternoon. He confided in me that he was a little nervous about establishing a pattern and use of the walk behind greensmower overall. It seems as though just like professional sports can look somewhat easy on TV, professional grounds keeping can look easier than it is as well. At least until you try to do it!

**August 14**: Arrived at Clifton Commons to meet Bruce Jr. and establish a stripe pattern with the Greensmaster 1600, at a mowing height of 1.25". Applied Milorganite at the rate of 1 pound of nitrogen per 1,000 square feet. Applied wetting agent at the rate of 3.5 pounds per 1,000 square feet. The wetting agent application was applied just in time as some localized dry spots were starting to form.

**August 15**: Blended some of their local infield mixture with the Soilmaster in some of the areas that needed tightening. We mowed the infield and foul ground areas at 1.25" twice. Painted outfield lines and chalked infield foul lines and batters boxes. At this point there was only one thing to say: "Play Ball!"

**John Halloran** is the commercial salesman for golf and grounds accounts in the Capital District Area for Grassland Equipment and Irrigation Corp., Latham, NY. He has been an STMA member for 10 years and has been a long-time volunteer for area youth baseball leagues.