tion and explaining the data. Figure 1 is the first page of the report, and Sections 1 to 3 are found on page 1. Figure 2 is the second page of the report, and Sections 4 and 5 are found on page 2.

Section 1: Basic information regarding when and where the test was performed. Also included are the weather conditions during testing.

Section 2: This section has summaries of testing performed and test results. This is the heart of the test report, and contains the information that will likely be of most interest to sports turf managers.

• Testing Method: Testing is typically performed according to guidelines detailed in ASTM F1936. F1936 provides specifications for equipment to be used, how and where tests are to be performed, and field performance requirements.

• Point: Testing points refer to locations on the field where test measurements are performed. Different locations are specified per ASTM F1936 for different types of fields (football, soccer, lacrosse, etc.). Typically eight test points are specified by the method and two additional points are tested at the discretion of our field technician. If desired, additional points can also be tested and reported.

• Total Depth and Infill Depth: This information can provide insight for evaluating problems or trouble areas. Depths are typically not mandated, but turf manufacturer specifications often indicate acceptable fiber lengths, infill material, and infill depths. Total Depth is the depth from the top of the turf to the backing (synthetic fields) or soil (natural turf fields). Worn or lost turf can cause a harder or softer field and impact performance. Infill Depth is the depth of infill materials that are between the turf fibers. Infill is used to provide desired playing conditions, and can act to protect turf fibers. Typical infill materials include sand, rubber, and other materials. Most, but not all, synthetic fields have infill material. Uneven infill depths can lead to varying hardness and performance. Loss of infill may also lead to turf damage, and is a significant cause of variance in field performance.

• Gmax is the maximum value of G encountered during an impact. G is the ratio of magnitude of missile acceleration during impact to the acceleration of gravity, expressed in the same units (G, being a ratio, is unit less). The number reported here is the average of the second and third drop at each test point. The maximum impact level of <200 average Gmax, has been accepted by the U.S. Consumer Product Safety Commission. ASTM F1936 states that: "According to historical data, the value of 200G is considered to be a maximum threshold. Values of 200 Gmax and above are considered values at which life threatening head injuries maybe expected to occur." Project specifications may require a lower maximum impact level. For example, many experts recommend Gmax values no higher than 170 on fields where sports without helmets are played.

• Vo fps: impact velocity, velocity of the missile (in feet per second) as it impacts the surface of the field. This is not a measurement of the turf, but an indicator of whether test was performed properly. If impact velocity is not acceptable our field technician will rerun tests at the test point.

• Tmax ms: time (milliseconds) to impact maximum (Gmax). Used in calculations for Head Injury Criterion.

Section 3: Statements regarding whether Gmax results are less than 200 and that report reflects condition of field. Signed by field technician.

Section 4: Same as section 1. Basic information regarding when and where the test was performed, at the top of page 2.

Section 5: Test results from the individual test drops at each test point.

• Test point location and individual test results with the average (2nd and 3rd drops) are reported for Gmax and Vo fps (impact velocity).

• Drop height is 2 feet. This is the distance that the test missile is dropped during the test procedure. ASTM F1936 states: "The test method incorporated into this specification (Procedure A of Test Method F355), has been used to test the impact attenuation of athletic fields for over 30 years. The development of this 2-ft fall-height method can be traced back to the Ford and GM crash-dummy tests of

>> **Turf Diagnostics technician** measuring field temperature and infill depth as part of a field evaluation.

the 1960's, medical research papers from the 1960's and 1970's, and a Northwestern University study in which an accelerometer was fixed to the helmet of a middle line backer to measure impacts received during actual play. This study found the typical head-impact to be 40 ft/lb, which is equivalent to the impact generated by dropping a 20 lb missile from a height of 2 feet, the requirement specified in Procedure A of Test Method F 355."

• Head Injury Criterion (HIC) is a measure of the likelihood of head injury arising from an impact. HIC is a measurement of impact severity based on published research describing the relationship between the magnitude and duration of impact accelerations and the risk of head trauma. At the 2012 STMA Conference, Dr. Andy McNitt of Pennsylvania State University indicated a near perfect correlation between Gmax and HIC for sports fields (i.e. high Gmax = high HIC; low Gmax = low HIC). HIC is used to assess safety related to vehicles, personal protective gear, and sport equipment. Because there is limited research regarding sports fields, data from the auto industry and others is used to provide insight into injury risk. The higher the HIC value, the greater the risk of injury (see Figure 3 below).

Turf Diagnostics believes that the Gmax values should be the key indicator of field hardness for the turf manager. Individual test points with Gmax above 200 or a Gmax average of greater than 170 for the entire field suggest that maintenance practices, such as grooming and topdressing, are required.

We also believe that the field manager should pay particular attention to infill depth. For consistency in play, infill depth should be uniform over the entire field. Changes to infill depth over time should also be noted. Infill depth tends to decrease over time and should be replenished as part of a synthetic turf maintenance program. ■

Sam Ferro is the president of Turf Diagnostics & Design, which performs field hardness testing on fields throughout the US as well as testing of soils, sands, aggregates and amendments for natural and synthetic turf fields.

JOHN MASCARO'S PHOTO QUIZ

Answers from page 17

These marks on this soccer field are obviously tire tracks, but how they got there is the real story. In this part of the world, soccer is a national sport. In early November, this soccer complex had a freezing rain followed by several inches of snow. The field club was faced with a situation where a game had to be played on this stadium field within the next couple days and the snow had to be removed. The Sports Turf manager advised the club against clearing the snow; it was not until after they saw the damage that they truly understood why! Since the turf had received ice first, the snow removal began with shovels and the pieces came out like blocks if lifted carefully as not to damage the grass. These blocks were then loaded onto a trailer pulled by a small tractor and removed from the field at the only access gate causing the tire damage seen in the photo. Once the Sports Turf Manager saw that the tires were started to damage the grass, this operation was stopped immediately. Since the air temperatures were now above freezing, it was decided to use the rounded edges of an upside down springbok rake to aerate and break up the snow, allowing the sun and air to melt on its own. It worked perfectly and the since the damage was caught early, it was minimal.

Photo submitted by Phil Sharples, owner of Technical Turf Consulting Ltd and contracted as Stadium & Surfaces Director at Gabala Field Club located in Qabala, Azerbaijan and now at Galatasaray FC in Turkey.

If you would like to submit a photograph for John Mascaro's Photo Quiz please send it to John Mascaro, 1471 Capital Circle NW, Ste # 13, Tallahassee, FL 32303 call (850) 580-4026 or email to john@turf-tec.com. If your photograph is selected, you will receive full credit. All photos submitted will become property of *SportsTurf* magazine and the Sports Turf Managers Association.

A contemporary view of recycled water irrigation

Most of us are familiar with the term "Black Gold" as another name for oil, and we may have heard of "Blue Gold" used in some quarters in reference to water. Without question, humanity is polluting and wasting water even as its need for water grows with increasing population. Thus, just as it appears that wars today are fought over oil, future wars may be fought over water.

Agronomists generally do not play the roles of economist, diplomat, or soldier. We can, however, try to educate, and sometimes the topics we broach have large consequences. The use of recycled or reclaimed water is, I believe, such a topic. And considering the critical water needs of today's world, I would like to assign to recycled water the term Purple Gold, after the color officially used to designate all equipment contacting it.

Having worked with this resource for over 30 years, evaluating its potential for turfgrass and landscape irrigation, I have witnessed its quality increase significantly. As quality has increased, both the value and the use of recycled water have also risen dramatically. I believe recycled water, already deserving of the name Purple Gold, will be recognized as such society-wide in the near future. Already, in the face of increasingly common drought, habitat erosion, and the escalating cost of potable water, recycled water is the Purple Gold of urban landscape irrigation. In light of recycled water's importance, a review of its qualities and of the management practices needed to use it successfully is in order.

Although three-quarters of the earth's surface is covered with water, only a minute fraction of all the water on earth is both readily available and of sufficient quality to be suitable for human use, including irrigation of agricultural crops and landscape plants. In fact, it is estimated that only 0.02% of all water on earth is fresh and immediately available, i.e., could be used with relative ease and with minimal energy input and expense. That small fraction of earth's water includes rain and snow-melt stored in lakes and reservoirs, as well as water available in rivers. More than 99% of earth's water is in its oceans or locked in polar ice caps and glaciers. Converting water from these sources to potable form is highly energy-dependent and expensive. Yet fresh surface and ground water together are being rapidly depleted due to industrial and agricultural use and direct human consumption. Population growth accelerates and exacerbates the potable water scarcity.

In most cases, turf and landscape irrigation is not a priority for municipalities during droughts. Severe restrictions on turfgrass and landscape irrigation during droughts are common, including complete shutdown of golf course or park irrigation. Irrigation with recycled water is therefore a viable means of coping with drought, water shortages, and/or the rising cost of potable water. Currently, large volumes of recycled water are used to irrigate golf courses, parks, roadsides, landscapes, cemeteries, athletic fields, sod production farms, and other landscape sites. Interest in recycled water irrigation also increases as more and better-quality treated sewage water becomes available.

Today, most sewage treatment plants produce high-quality recycled water suitable (as far as human-pathogen content is concerned) for additional uses such as golf courses, parks, athletic fields, and other urban landscape sites. In certain southwest desert areas of the United States, most golf courses (and associated landscapes) may use only recycled (or other degraded-quality) water for irrigation. In a larger context, recycled water is now the irrigation source for approximately 15% of US golf courses and close to 35% of courses in southwestern states. These figures are rapidly increasing, as are those for all other commercial, institutional, and industrial sites irrigated with recycled water.

"Recycled water" refers to water that has undergone one cycle of (human) use and then received significant treatment at a sewage treatment plant to be made suitable for various reuse purposes, including turfgrass irrigation. Several other terms are also used for recycled water, among them: reclaimed water, reuse wastewater, effluent water, and treated sewage water. Sewage treatment takes raw sewage with all of its suspended matter and pathogenic organisms and converts it into clear, reclaimed water that looks as good to the human eye as any potable water. In almost all cases, recycled water is thoroughly disinfected before leaving the treatment plant. Disinfection greatly reduces (or entirely eliminates) the human disease-causing organisms and expands the irrigation uses of recycled water.

However, "dissolved" solids (salts) still remain and are of concern if the water is to be used for irrigation. It is technically possible to remove all of the dissolved salts from sewage water, using techniques such as reverse osmosis. Reverse osmosis, in fact, is used on a small scale at a few golf courses to remove almost all dissolved solids from water. However, the expense is such that very few treatment plants in the world currently use it. Therefore, most of the recycled water available for irrigation is only tertiary treated and may contain high concentration of salts.

Turfgrass is particularly well suited to irrigation with recycled water. Among landscape plants, turfgrasses can absorb relatively large amounts of nitrogen and other nutrients often found in elevated quantities in recycled water, a characteristic that may greatly decrease the odds of groundwater contamination by recycled water. Equally important, turfgrass plantings are generally permanent and their growth is continuous, providing a stable need for continuously produced recycled water. Presently, most of the turfgrass irrigated with recycled water grows on golf courses. However, recycled water irrigation is increasing on sports fields, in parks, on many industrial and institutional landscapes, and on sod production farms.

Most municipalities require signage (usually colored purple) to inform the public of the presence of recycled water. These efforts are intended to prevent anyone from ingesting or otherwise using the water directly, to avoid any risk, however slight, of contact with human pathogens. The color purple is now broadly accepted as the official color for recycled water conveyance equipment. Almost all irrigation system components are now available in purple, including pipes, sprinkler heads, valves, and irrigation boxes.

POTENTIAL CHALLENGES

Despite sound reasons for using recycled water for turfgrass irrigation, there are legitimate concerns about possible injury to turfgrass and other landscape plants due to the salt content and other characteristics of reclaimed water. During irrigation, dissolved salts and other chemical constituents move with water into the plant rootzone. Recognizing the problems that may arise from this and understanding their remedies allow turfgrass managers to make use of this valuable irrigation resource, the Purple Gold, in spite of potential challenges.

Recycled waters usually contain higher amounts of dissolved salts than most other irrigation water sources. Salt accumulation in the soil is the most common concern. Ordinarily, a long period of irrigation passes before salt builds up in the soil enough to actually injure plants. Besides saline irrigation water, insufficient natural precipitation, inadequate irrigation, and poor drainage all increase the likelihood of creating saline soil conditions.

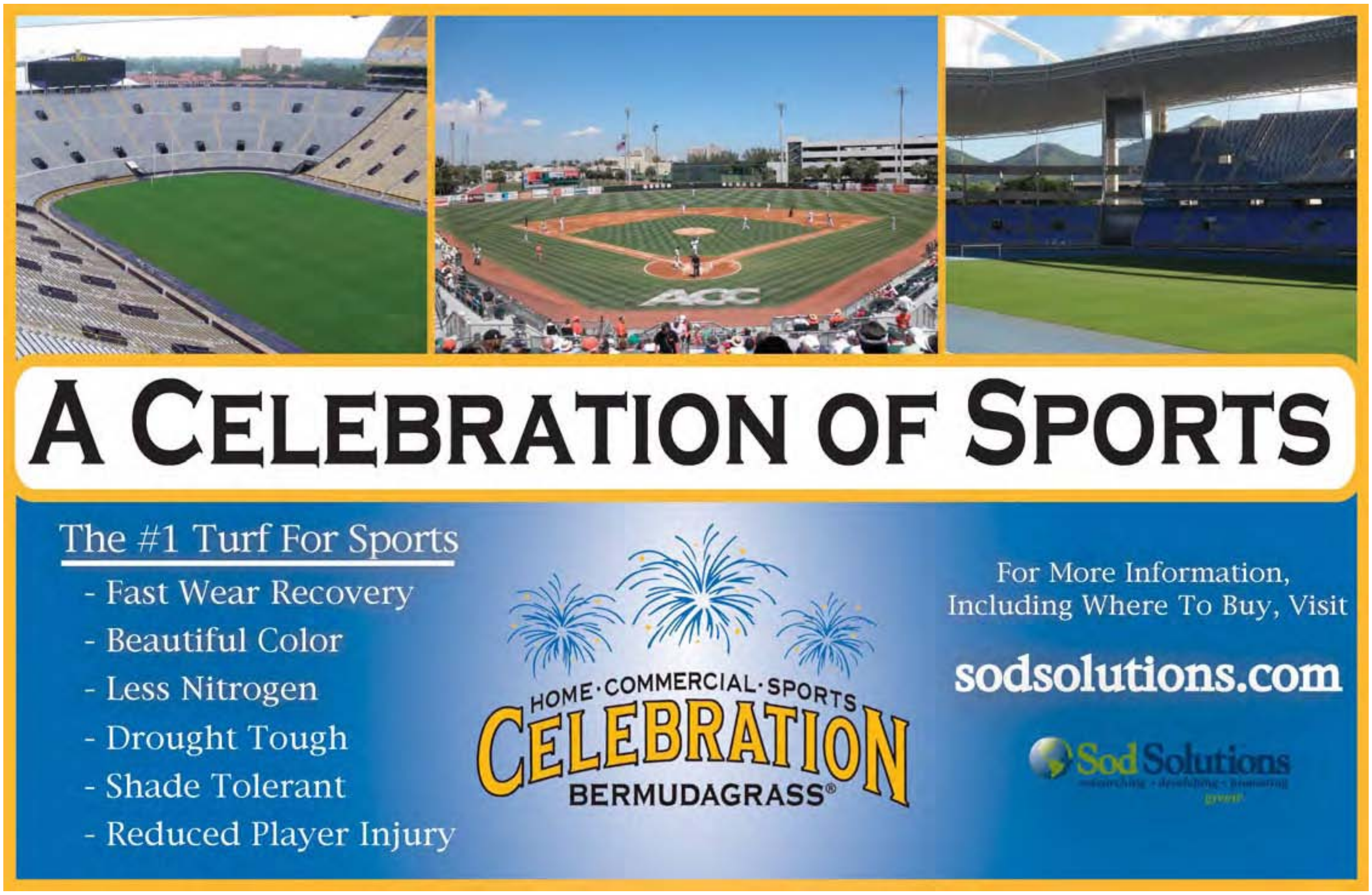
Generally, salinity becomes a problem for turfgrass when the total quantity of soluble salt in the rootzone is high. The rate at which salts accumulate to these levels in a soil depends on their concentration in the irrigation water, the amount of water applied annually, annual precipitation, and the soil's physical and chemical characteristics. Once rootzone salinity builds to harmful levels, several problems may occur. Salinity may inhibit water absorption by plant roots (due to the high osmotic potential of the soil water solution) and cause plants to appear drought stressed despite the presence of adequate water within the rootzone. For such osmotic stress symptoms, the term physiological drought is often used. High salinity can also cause some ions (e.g., sodium) to be absorbed by the plant in high enough quantities to cause tissue burn or to compete with other essential elements, creating nutritional imbalances. In most cases, injury caused by high water/soil salinity is due to a combination of these factors.

If the amount of water applied to turf (irrigation plus precipitation) is higher than evapotranspiration and drainage is provided, then salt movement is downward. Conversely, salt movement is upward if evapotranspiration exceeds water applied. In the latter case, salt drawn to the surface gradually accumulates to levels toxic to turfgrasses and other plants. Diagnosing water/soil salinity problems always begins with chemical analysis of the irrigation water and soil.

Generally, waters of acceptable quality for turfgrass irrigation have electrical conductivities of less than 0.7 dS/m. Waters with soluble salt levels above 3 dS/m may injure turfgrass and are not recommended for irrigation. Recycled irrigation water with salt levels up to 3 dS/m may be tolerated by some turfgrass species, but only on soils with good permeability and subsoil drainage, which allow a turfgrass manager to leach excessive salt from the rootzone by periodic heavy irrigations.

For agronomic purposes, in addition to salinity, recycled waters must also be evaluated for their sodium, chloride, boron, bicarbonate, and nutrient content, as well as pH and suspended matter. Each of these elements affects plant growth. Managers can request that labs test their samples for the specific elements they know are likely to cause injury to plants. With test results in hand, managers use published guidelines to determine if their conditions are problematic and, if so, in what way.

Sodium content is as important to recycled water quality as salinity. Although sodium can be directly toxic to plants, its most frequent deleterious effects on plant growth are indirect through its effect on soil structure. The high sodium content common to recycled water can cause deflocculation (dispersion) of soil clay particles or breakdown of soil structure, reducing soil aeration and water infiltration and percolation.



Waterlogging and soil compaction are common results of excess sodium. In such conditions, direct sodium toxicity may also eventually occur.

Because calcium (Ca) and magnesium (Mg) flocculate clay particles, while sodium disperses them, the ratio of these elements to each other in irrigation water provides a measure of likely soil permeability resulting from irrigation with a particular water. That said, the effect of sodium on soil particle dispersion (i.e., permeability) is counteracted by high electrolyte (soluble salts). Thus, the likely effect of a particular irrigation water on soil permeability is best gauged by assessing the water's SAR in combination with its ECw.

Recycled waters usually contain a wide variety of other elements in small concentrations. Some of these elements are toxic to turfgrasses and other plants if they accumulate in the soil to sufficient levels. The most common toxicities are due to accumulations of sodium, chloride, and boron. Plant roots absorb sodium and transport it to leaves, where it can accumulate and cause injury. Symptoms of sodium toxicity resemble those of salt burn on leaves. Sodium toxicity is often of more concern on plants other than turfgrasses, primarily because accumulated sodium is removed every time grass is mowed.

Chloride (Cl), in addition to contributing to the total soluble salt content of irrigation water, is another ion that may be directly toxic to landscape plants. Although not particularly toxic to turfgrasses, it affects many trees, shrubs, and ground covers. In sensitive plants, chloride toxicity causes leaf margin scorch in minor cases and total leaf kill and abscission in severe situations. Fortunately, chloride salts are quite soluble and thus may be leached from well-drained soils with good subsurface drainage.

Recycled water may also contain boron (B), a micronutrient essential for plant growth in very small quantities. Injury from excess B is most obvious as necrosis on the margins of older leaves. Turfgrasses are more tolerant of boron than any other plants grown in the landscape.

pH, a measure of acidity, is valued on a scale of 0 to 14. Water pH is easily determined and provides useful information about water's chemical properties. Although seldom a problem in itself, a very high or low pH indicates that water needs evaluation for other constituents. On the pH scale, pH 7 represents neutral (i.e., water with a pH of 7 is neither acidic nor alkaline.) Moving from pH 7 to pH 0, water is increasingly acidic; moving from pH 7 to pH 14, water is increasingly basic (or "alkaline"). The desirable soil pH for most turfgrasses is 5.5 to 7.0; the pH of most irrigation water, however, ranges from 6.5 to 8.4. Depending on the soil on which grass is grown, an irrigation water pH range of 6.5-7 is desirable. Recycled water with a pH outside the desirable range must be evaluated for other chemical constituents.

The bicarbonate (HCO3) and, to a lesser degree, carbonate (CO3) content of recycled irrigation water also deserves careful evaluation. Recycled waters are especially prone to excessive levels of bicarbonate. High bicarbonate levels in irrigation water increase soil pH and may affect soil permeability; combining with calcium and/or magnesium, bicarbonate precipitates as calcium and/or magnesium carbonate, both of which increase the SAR of the soil solution.

Generally, recycled water with an RSC value of 1.25 meq/L or lower is safe for irrigation, water with an RSC between 1.25 and 2.5 meq/L is marginal, and water with an RSC of 2.5 meq/L and above is probably not suitable for irrigation.

Recycled water can also be high in nutrients, whose economic value may be an important consideration. Nitrogen, phosphorus, and potassium, all of which are essential to turfgrass growth, are the primary nutrients present in most recycled waters. Even if the quantities of nutrients in a given recycled water are small, they are efficiently used by turfgrass because they are applied frequently and regularly. In most cases, turf obtains all the phosphorus and potassium and a large part of the nitrogen it needs from recycled water. Sufficient micronutrients are also supplied by most recycled waters. Water chemical analysis must therefore be thoroughly evaluated to determine the kind and amount of each nutrient applied through irrigation; the turf's fertility program can then be adjusted accordingly. Most agricultural testing laboratories will provide the nutritional contents of recycled water upon request.

Recycled water quality varies significantly among sewage treatment plants as well as on a seasonal basis, and it must be analyzed individually and regularly. There are very few recycled water sources that are absolutely unsuitable for turfgrass irrigation. Furthermore, the nature and magnitude of potential problems with a specific water will depend on its interaction with climate and soil chemistry and physics.

Soil physical characteristics and drainage both play important roles in determining a rootzone's ability to handle salinity. Soil characteristics must be evaluated along with water quality to determine if irrigation-induced problems are likely. Fine-textured soils (clays) are more likely to accumulate salts than coarse-textured soils (sands). Also, layering in the rootzone that interferes with drainage (and therefore salt leaching) can lead to water-induced plant injury despite irrigating with seemingly acceptable recycled water. In other words, lack of drainage leads to salt buildup. Soils already saline or sodic are obviously more likely to contribute to salinity injury due to recycled water irrigation, regardless of their drainage characteristics. Application of excessive fertilizer can also contribute to the salt load and may create salinity problems where the salt load from recycled water alone may not be high enough to cause damage.

POTENTIAL SOLUTIONS

If water salinity, sodium, and other chemical components are potential problems, management is key to agronomic success. Following is a list of management practices that can be used to address potential recycled water irrigation challenges.

Select salt-tolerant turfgrass species. If salinity problems are expected with recycled water irrigation, salt-tolerant grass species should be considered for planting. Salt tolerance of turfgrasses is usually expressed in relation to the salt content of the soil. Soils with an ECe below 3 dS/m are considered satisfactory for growing most turfgrasses; soils with an ECe between 3 and 10 dS/m can support a few moderately salt-tolerant turfgrass species, while soils with an ECe higher than 10 dS/m will support only very salt-tolerant grasses.

Apply extra water to leach excess salts below the turfgrass rootzone. Extra irrigation water needed to leach salts below the turfgrass rootzone, thus preventing salt buildup to toxic levels, is referred to as the leaching requirement or fraction.

A leaching requirement is based on the recycled water's salt content and the salt tolerance levels of the grass (expressed in ECe) at the site. For example, if a turfgrass species with salt tolerance of not more than 2.5 dS/m is irrigated with a recycled water with an electrical conductivity of 1.2 dS/m, 10% more water than is dictated by evapotranspiration alone must be applied to leach salts out of the rootzone.

Any changes in a system's input, such as rainfall, can affect the amount of water that must be applied for leaching. As the Leaching Requirement increases (and therefore more salt leaching occurs), salt accumulation in the rootzone decreases. As a result, highly saline recycled water may be used successfully for irrigation in high rainfall areas, while the same water may cause severe salinity damage to turfgrasses in arid and semi-arid locations.

Provide drainage. Clearly, successful leaching requires adequate drainage. In all cases where recycled water is used for irrigation, good drainage is essential. Drainage can be natural or can be improved by installing tile drains. An example of a site where drainage must be improved: a golf course with greens built on modified native soils (i.e., push-up greens) converting to recycled water for irrigation. The course can either rebuild greens on a sand-based rootzone mix or install an effective drainage system to provide for salt leaching. The objective is to keep percolated saline water below the turfgrass rootzone.

Modify management practices. Certain management practices may alleviate the deleterious effects of salinity. On golf greens, especially, reducing or removing accumulated surface organic matter (thatch) is crucial under recycled water irrigation. Thatch and mat layers stop the flow of water (and salts) through the soil and impede leaching of salts. On golf greens with a uniform rootzone profile, drainage is often adequate for salt leaching. However, if a given golf green rootzone profile indicates excessive organic matter (thatch) accumulation or, worse, the existence of a layering problem within the soil profile, then every effort must be employed to remove thatch or eliminate layering prior to the initiation of recycled water irrigation. Aeration (particularly useful on golf course greens and sports fields) punches through impermeable layers, facilitating faster and better water movement through the soil profile. Aerators remove soil cores at regular intervals. Cores should be removed from the soil surface of golf greens and similar specialty turf, and holes should be topdressed with sand. Often, just spreading sand over the aerated surface fails to fill the holes. Sweeping, brushing, or blowing sand into the holes left by aeration ensures optimum sand application. Holes should be filled all the way to the soil surface to provide channels for water percolation through the layers of sand/organic matter.

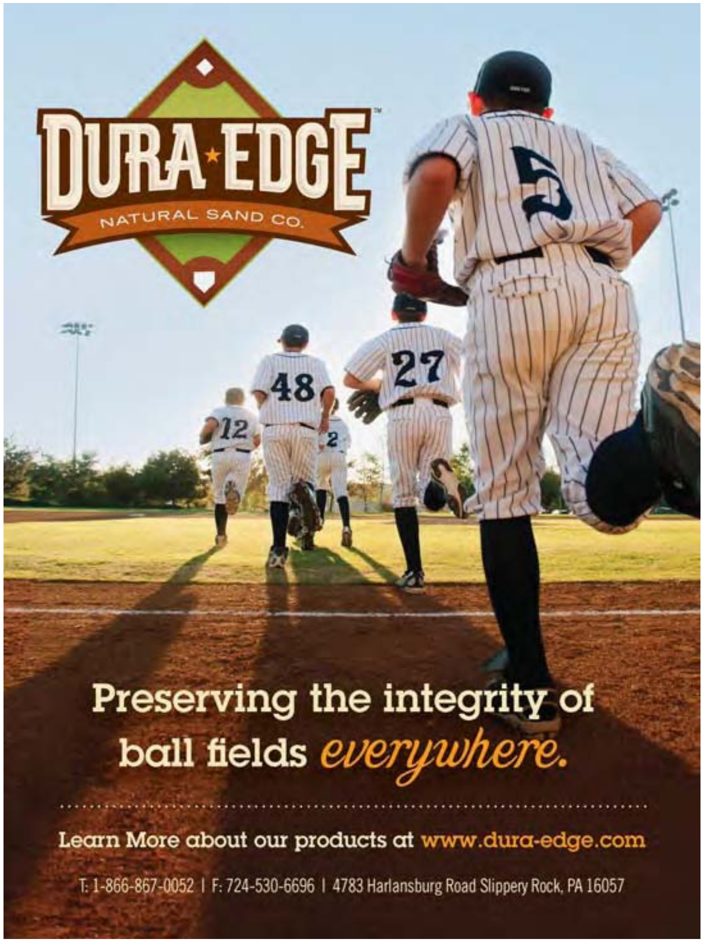
Modify the rootzone mixture. Where turfgrasses are grown on soils with minimal natural drainage (e.g., heavy clay soils, soils with a hard pan or clay pan) and recycled irrigation water is high in salts or sodium, total modification of the rootzone mixture may be necessary. Sand-based golf greens or sports fields generally drain well and can tolerate recycled waters that may be too saline for irrigation on heavy clay or compacted soils.

Blend irrigation waters. Frequently, poor-quality water can be used for irrigation if better-quality water is available for blending. The two waters can be pumped into a reservoir to mix them before irrigation. Although the resulting salinity will vary according to the type of salts present and climatic conditions, water quality should improve in proportion to the mixing ratio.

Use amendments. Applying soil and water amendments, such as gypsum (calcium sulfate), calcium chloride, sulfur, and sulfuric or N-phuric acids, can aid in reducing the negative effects of sodium and bicarbonate. They may also help with improving water/soil pH and partially help with salinity control. These amendments increase the soil supply of calcium, either directly, as in the case of gypsum and calcium chloride, or indirectly, as in the case of sulfur and sulfuric or N-phuric acids. Sulfur and sulfur-containing fertilizers applied to soils naturally high in calcium may make calcium more soluble. Once available, calcium can then replace sodium on clay particles, preventing excess sodium accumulation. Subsequent leaching will flush sodium salts out of the rootzone. The amount of sulfur amendment required depends on a soil's sodium content, SAR of the irrigation water, the quantity of water applied, soil texture, and type of amendment.

The impact of bicarbonate on pH may also be reduced by applying an acidifying fertilizer, such as ammonium sulfate, as part of a regular fertil-

Continued on page 49



F.O.Y.
Field of the Year

Level of Submission: Schools/Parks
Category of Submission: Baseball
Head Sports Turf Manager: Michael Brouillard
Title: Grounds Manager
Education: Masters Degree
Field of Study: Horticulture Science/Business
Full Time Staff: Jorge Morales/Crew Leader, George Baumgardt/Leisure Services Supervisor
Students/Interns, Part-Time and Seasonal Staff: Salvador Gutierrez, Jose Torres, Isidro Gonzalez and Rigoberto Mendez

Village Green Park, Northbrook, IL Park District

SIMMONS FIELD

Original construction date: 1949

Size: 58,935 sq. ft.

Other uses: Winter Carnival, traveling Vietnam Memorial Wall, 2010 staff softball game, July 4th Police vs. Fire Dept. softball game and fall soccer

Variety(s) of turfgrass(es): Kentucky bluegrass and perennial ryegrass

Overseed: Overseed infield and outfield in the late summer to early fall (August 15) at a rate of 2-3 lbs./1,000 sq. ft. of Athletic seed mix 60/40. 20% Rugby II Kentucky Bluegrass(KBG), 20% Geronimo KBG, 20% Appalachian KBG, 20% Patriot 4 Perennial Ryegrass and 20% Keystone 2 Perennial Ryegrass. Application method for the infields includes core aerating followed by broadcasting seed with a rotary EarthWay spreader, setting #14. The outfield is aerated and seeded with 153 lbs. of grass seed mix.

Mix composition: 37% Sand 63% other

Other mix: 32% Silt, 31% Clay

Drainage: No system

Recent renovations: Renovated in past 2 years. Inspected and replaced base pegs, pitching rubber, home plate, pitching mound repair, added clay/soil conditioner, added crushed limestone screenings to coaches boxes, players benches and bleachers, aerated, overseeded, sodded worn areas, fertilized, rolled up foul ball nets, removed bad soil, filled tire ruts, replaced batting circles, repaired fences, and edged the clay infield, coaches boxes and warning track.

Why was the field renovated?

The field is renovated each fall after athletic activities but needed costly repairs in 2010 after two diesel spills from trucks bringing heavy rides onto the field for Northbrook Days, an annual 5-day community festival. In 2011, heavy rains and flooding occurred at the end of the festival, and tow trucks and an end loader were needed to remove the rides that were stuck on the field. The signature field is out of commission until the grass is established, next spring.

Challenges: A tremendous amount of work is needed to maintain the Village Green ball field, the home of Northbrook Baseball (Little League) since the 1950s. The season never really ends for the crew, who monitor the field monthly, maintaining and replacing equipment as needed. Plans are set and training occurs, preparing for another year of baseball, softball and special events.

The challenges of getting the field ready are compounded by its other uses, including Northbrook Days. The Northbrook Civic Foundation holds that fundraising event in the park every summer, with carnival rides on the ball field. The 87th annual event attracted about 55-thousand people, and heavy rains soaked the field in 2011. The combination of foot traffic, weight of the rides and saturated soil caused major damage to the field. Tow trucks and a tractor had to drag the rides from the field, leaving tire ruts and mud everywhere and little turfgrass remaining.

The challenge to the crew was to continue its regular schedule, adding the required field restoration. The crew had to sod 47% of the field that was torn up, using 2,650 rolls of sod and 107 cubic yards of soil to fill the tire ruts. For aesthetic reasons, the field had to be finished before the next park event, five weeks later.

Another challenge came from Northbrook Days in 2010, when there were two diesel spills on the field. The cleanup cost $45,080 plus another $2,210 in restoration costs for the field. About 30% of the annual materials budget was spent renovating the field, in addition to the cost of the cleanup. As a precaution, the grounds crew prepared a spill kit to have on-site this year.

To protect the turfgrass, the Park District bought 80 turf mats for $16,000 and borrowed another 75 this year. Because of the rains, the mats became covered in mud and did little, if anything, to protect the turfgrass. Removing the mats was difficult, since the mud added to their weight of 84 pounds. They had to be pried from the ground and pressure washed.

Another challenge this year was removing as much of the water as possible to dry the field before the repair work could begin. The signature field is out of commission until the turfgrass is reestablished, forcing fall soccer games to be played on other fields, for the second year in a row.

SportsTurf: What channels of communication do you use to reach coaches, administrators and users of your facility? Any tips on communicating well?

Brouillard: The Northbrook Park District has a well thought-out communication plan that consists of printed material, email, text messages, phone calls and website updates. One athletic supervisor schedules and coordinates use of the ball fields and serves as the contact for customers, coaches, maintenance crews and staff.

Each season, the Park District's Recreation Guide and website provide initial information about scheduled field use. On a daily basis, I communicate field conditions to the athletic supervisor by phone or email, by 7am on weekends and 2pm on weekdays. We record field conditions and cancellations on a weather hotline that customers can call, we update game schedules on our website, we send text messages to reach coaches, and we notify parents or players by email.

Throughout the year, the Parks and Leisure Services Departments meet bi-weekly to share information and determine how to best serve our customers' needs. I also meet with the athletic supervisor before a tournament to discuss preparation schedules and special requests.

After leagues and recreation programs end, the Park District sends surveys to participants to capture feedback as part of our commitment to providing outstanding programs and services. To promote environmental stewardship and reduce the use of paper, we conduct our surveys online. The District also conducts in-house surveys to measure internal customer satisfaction; the results show how well each department is doing and which areas need improvement.

Feedback and follow-up are essential in helping to improve our service delivery. Timely communication is critical for disseminating information, ensuring accuracy, providing customer service and building relationships.

SportsTurf: What are your specific job responsibilities? What do find most enjoyable? What task is your least favorite and why?

Brouillard: My job consists of directing the day-to-day grounds operations with about 16-20 part-time and seasonal employees. My responsibilities include the management of all District grounds; maintenance of athletic fields, trees, prairie and outdoor ice rinks; seasonal flower and holiday light displays; special event setup (tents, picnic tables and trash

Monthly maintenance and fertility programs

JANUARY

The Crew Leader completes the routine Monthly Athletic Field inspection and checks the nets for any loads of snow or ice.

FEBRUARY

The Crew Leader completes the routine Monthly Athletic Field inspection and checks the nets for any loads of snow or ice. **EQUIPMENT:** Before the season starts, the mechanics begin going through the equipment to get it ready.

MARCH

Routine Monthly Athletic Field inspection and inspection of bleachers. **SPRING FIELD SETUP:** On March 30, the athletic crew completes the spring setup on the baseball field. The setup consists of setting out the pitching nets, raising the foul ball nets, rolling the field, painting the foul ball lines, cleaning the dugouts, and putting out the trash and recycling cans.

APRIL

Routine Monthly Athletic Field inspection. **CORE AERATION:** Due to the amount of traffic on the soil and the texture of our soil, the field will be aerated 3 times per year - in April, August (after Northbrook Days) and October. **MOWING:** Start mowing for 28 weeks, twice per week as needed. **SOIL TEST:** Test soil before fertilizing.

The following is a list of items to complete during each field prep for a game: Water the infield using a 1" garden hose to moisten the clay, fill the holes, drag the clay infield and the warning track, expose the correct hollywoods, rake edges, chalk lines, paint lines once per week in the turfgrass, and pick up trash. **MATERIALS USED:** 15 bags of calcined clay; 7 bags of chalk are used to mark the foul ball lines on the infield.

MAY

Monthly athletic field inspection continues. **FERTILIZATION:** The fertilization of the athletic field is divided into four applications of 25-0-5 PCSCU turf fertilizer. The first application of 1 lb. Nitrogen will be in May 2011, followed by 1 lb. N in Aug 2011 (after Northbrook Days), 1 lb. N in September 2011 and 1 lb. N in November 2011. **HERBICIDES:** A postemergent broadleaf systemic herbicide will be spot treated on the turfgrass to control identified weeds listed on the label at the indicated application rate. A minimum of two applications will be applied, the first in early May, followed by another application in September. Apply non-selective herbicide in other areas. **IRRIGATION START UP:** Monthly adjustments throughout the year. Prep for scheduled games. **MATERIALS:** 204 lbs of fertilizer used, Chalk 15 bags, Paint 4 buckets, Calcined clay 15 bags

JUNE

Monthly athletic field inspection continues. **IRRIGATION:** Monthly adjustment and inspection. Prep for scheduled games. **MATERIALS:** Chalk 14 bags, Paint 4 buckets, Calcined clay 10 bags

JULY

Monthly athletic field inspection continues. **IRRIGATION:** Monthly adjustment and inspection.

Prep for scheduled games. **MATERIALS:** Chalk 12 bags, Paint 4 buckets, Calcined clay 5 bags

AUGUST

Monthly athletic field inspection continues. **IRRIGATION:** Monthly adjustment and inspection. **FERTILIZATION:** The fertilization of the athletic field is divided into four applications of 25-0-5 PCSCU turf fertilizer. The first application of 1 lb. Nitrogen will be in May 2011, followed by 1 lb. N in Aug 2011 (after Northbrook Days), 1 lb. N in September 2011 and 1 lb. N in November 2011. The fertilizer will be applied with a rotary EarthWay broadcast spreader, setting #16 or as calibrated. **OVERSEEDING:** Overseed the lawn at 2-3 lbs KBG/1,000 sq. ft. **MATERIALS:** 204 lbs of fertilizer used, Calcined clay 5 bags, 153 lbs. grass seed / 60% KBG & 40% perennial ryegrass, & 107 cu yds soil

SEPTEMBER

Monthly athletic field inspection continued. Also, inspect fencing for budgeting for repairs next year. **IRRIGATION:** Monthly adjustment and inspection. **FERTILIZATION:** The fertilization of the athletic field is broken out into four applications of 25-0-5 PCSCU turf fertilizer. The first application of 1 lb. Nitrogen will be in May 2011, followed by 1 lb. N in Aug 2011 (after Northbrook Days), 1 lb. N in September 2011 and 1 lb. N in November 2011. The fertilizer will be applied using a rotary EarthWay broadcast spreader, setting #16 or as calibrated. **HERBICIDES:** A postemergent broadleaf systemic herbicide will be spot treated on the turfgrass to control identified weeds listed on the label at the indicated application rate of 3 pints per acre. A minimum of two applications will be applied, the first in early May followed by another application in September. Apply non-selective herbicide. **MATERIALS:** 204 lbs of fertilizer used.

OCTOBER

Monthly athletic field inspection continues. **FALL FIELD RENOVATION:** Repair worn areas, pick up lock boxes, pitching screens, trash cans and roll up the nets. **IRRIGATION SHUT DOWN:** Winterize the irrigation system to avoid freezing. **MATERIALS:** 44 Rolls of sod, 13 cu yds. of crushed limestone screenings, 40 bags of calcined clay

NOVEMBER

Monthly athletic field inspection continues. **FERTILIZATION:** The fertilization of the athletic field is divided into four applications of 25-0-5 PCSCU turf fertilizer. The first application of 1 lb. Nitrogen is in May 2011, followed by 1 lb. N in August 2011 (after Northbrook Days), 1 lb. N in September 2011 and 1 lb. N in November 2011. The fertilizer will be applied with a rotary EarthWay broadcast spreader, setting #16, or as calibrated. 204 lbs fertilizer used

DECEMBER

Monthly athletic field inspection continues