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# Update on drainage for new field construction

HEN LAYING THE GROUND-WORK (on paper, at least) for a new synthetic turf field, a new owner has the opportunity to create the field of his dreams. The array of options available can bump up the 'wow' factor of any facility, including upgraded seating, a press box, a high-tech scoreboard and facility-wide WiFi.

So where does drainage come in? (crickets chirping)

Unfortunately, because it's invisible (but still represents a significant investment) drainage just might fall to the bottom of the priority list if an owner isn't knowledgeable. But as field builders will be glad to point out, it doesn't matter how great the seats are, or how easy it is to stream results or how nice the scoreboard is—if the field isn't draining well enough to be playable when the time comes.

"It's important for field owners to take a long-term approach when it comes to construction," says Darby McCamy of Sporturf in Dalton, GA.

"Even at the end of the turf's useful life, when it is time to replace the field" says Ed Norton of Norton, Holcomb and Partners in Birmingham, AL, "the base and drainage system should still be functioning as they were designed to do."

#### **MORE THAN SURFACE DEEP**

Poor drainage is not just an aesthetic problem, nor is it simply a game-day issue. The usefulness of the ▲ THIS PHOTO, taken during construction of a sports field, shows piping at the entrance to the drainage chamber. Note the crushed rock beneath the pipe, which helps filter water vertically. All photos courtesy of Stantec, Boston, MA

field and its long-term performance hinge on the dependability of the drainage system. When water remains on the subgrade for too long, it may cause the subgrade to become unstable and allow the base to move. It may even allow water to back up through the base and onto the surface, washing out the infill or stretching the carpet.

#### WHAT FALLS ON THE SURFACE...

Synthetic fields generally drain well, but not without help. Ideally, the only water to fall on the field should be rainwater or water put on by the irrigation/cooling system. Make sure water does not drain, run or drip onto the field from a track, or from bleachers, dugouts, overhangs that cover seating or any other source. Because water that enters the field in these ways may carry silt and other particulates, it has the potential, over time, to cause problems with the drainage system, and the playability, of the field itself.

Site drainage; that is, the drainage that works around the outside of the field itself, may include interceptor drains, catch basins and retention ponds, as well as other measures used to harvest and disperse storm water. For now, though, the focus is on the subsurface drainage systems; that is, those that are installed beneath sports fields.

An experienced field builder can advise an owner on

## **JOHN MASCARO'S PHOTO QUIZ**

#### Answers from page 17

THE BROWN RECTANGULAR AREA with a green center is the result of a party. When the Golf Industry Show was in San Diego this past January, Petco Park (home of the MLB San Diego Padres), located right across the street from the convention center, was a prime location for several events during the show. In addition to hosting numerous tours and some equipment demonstrations, Petco Park also was the site of a large reception put on by one of the major mower manufacturers. The event featured live music, several bars, tables and chairs set up in the infield and the outfield. Several food stations were also set up at various locations around the field. The rectangular area in the photo was where one of the more popular food stations was located and the green area is where a table and a grill were located. The brown area was caused by people standing to pick up their food. The sports turf manager was not upset about the damage as the field was scheduled for a complete renovation about 2 weeks after this event was held.



Thanks to Luke Yoder, Sports Turf Manager at Petco Park in San Diego, for allowing me to take these pictures.

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.



### FASTEST SPORTS TURF DRAINAGE IN THE INDUSTRY!

Hydraway flat drain is a great product. When Alpine was first introduced to Hydraway, we subjected it to our usual field test to be sure that it would not crush during the athletic field installation process. The drain was laid on a concrete surface and our large grader drove over it several times. The Hydraway did not crush and maintained its flow capabilities. We have been using Hydraway as our standard flat drain ever since — Grove Teates

President, Alpine Services, Inc

Alpine Services, Inc. Preminer Athletic Fullis. For All sports

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▲ A LAYER OF AGGREGATE is smoothed into place as part of the field construction process.



▲ LEFT: This cross-section shows the flat underdrain prior to installation in a field under construction. **RIGHT:** Sports field under construction showing the gravel drainage material.



▲ FINISHED FIELD, showing new turf surface and game lines.

the various options available, and can give guidance on which choices best suit the site, the climate and the intended use of the field. Also on the list of considerations: the financial resources and commitment of the owner, time constraints for field construction, the annual amount of rainfall and when it is likely to come, and local codes and regulations regarding stormwater management.

"The availability and quality of the rock used is important," adds McCamy, "as it can be expensive to haul rock for hundreds of miles. Be careful of any wide fluctuations in the price of the base when turf prices remain consistent. Pricing that is too low could be a red flag pointing to skimping on quality with a lower grade stone. When that happens, your field stops draining properly and in some cases mini-sink holes can form over time."

"The stone drainage layer is typically made up of two layers of stone," notes Norton, "a base stone ranging in size from 1" down to 3/8" and a thin layer of a finer finish stone on top to achieve the desired planarity of the field. The size shape and hardness of the stone is very important. Angular stone will interlock and give the field a more stable base than a rounded stone. The hardness and soundness of both the base and finish stone should be tested prior to use."

In addition to having a builder's expertise, a design professional can provide guidance on pipe diameters or the sizes of flat drains, location and distance of laterals, collection systems and storm sewer tieins for the drainage system.

(Yes, there's a lot to this drainage stuff, isn't there? And we're just getting started.)

Design and construction of sports facilities is a specific, exacting discipline. It's not something that needs to be left to the low bidder; in fact, it should never be a 'cheapest option available' scenario, whether you're talking about one field or a number of them. There are many options to finding a good design professional or field builder. The Internet is everyone's favorite (quickly replacing the Yellow Pages) but another option is to check the American Sports Builders Association (ASBA). ASBA offers a voluntary builder certification program for field professionals.

#### **DOING THE MATH**

To facilitate discussions with your field builder and/or your design professional, you can estimate the amount of water your field will need to handle with the following formula:

Length of the field in feet x width of the field in feet x .623 gallons = gallons of water produced by 1" of rainfall

Drainage products are rated by gallons of flow per minute (abbreviated as gpm), or sometimes as cubic feet per second (cfs).

#### **TYPES OF DRAINAGE SYSTEMS**

To understand what works best, it's imperative to know what is on the market, since various systems are used.

"It is important to remember that most of the projects being designed today for synthetic turf consist of what is known as a drainage layer of stone (typically 6" to 8" deep) under the entire field," notes Norton. "This increases the efficiency of drainage by providing another way to move water through the drainage layer of stone and away from the field. Obviously, piping will serve to move water even more quickly to the established collection/exit points. The stone is not just for drainage, but also provides stability for the field."

**Flat Drains**: One type consists of flat drains, used with or without a wrapping of filter fabric, placed horizontally on the subgrade in a diagonal, herringbone pattern. Because synthetic turf fields drain quickly and have the potential to capture significant amounts of water, internal drainage lines usually can be placed farther apart than for natural grass. Of course, the closer the lines are placed, the more quickly the field will drain and be available for use after rain, but the more costly the drainage system will be.

The rate of drainage also will depend on the depth of the subgrade and the slope of the drains; this is usually .5% - 1%.

**Trench Systems**: An alternate system uses perforated pipes, 4" in diameter, also laid in a diagonal or herringbone pattern. (Larger pipes, around 10", will be used in the perimeter of the field). Pipes must be sized and spaced correctly by the design professional, de-

pending on the amount of water they should be expected to handle. These perforated pipes are laid in trenches, surrounded by clean stone or coarse sand. In some cases, filter fabric may also be used. The deeper the drains are placed, the slower will be the initial response time.

Whether the field uses flat drains or trenches, water flowing into the drainage system can carry with it silt or clay particles or other contaminants. Therefore, it is important to surround the drainage pipes with clean stone (in this case, clean is defined as being without silt or clay contamination) or coarse sand, both of which help to remove those particles and prevent them from entering the drainage system.

#### **MOVEMENT OF WATER OFF THE FIELD**

Whether a field uses flat or trench drains, both are sloped to the edges of a rectangular field. The drains should extend 10' - 15' beyond the sidelines themselves to an area where the water is deposited in perimeter collector pipes. Depending on the grading plan, the amount of water to be moved and other factors, intermediate collector pipes also may be included in the drainage plan; again, this is an issue where a builder and a field design professional can provide advice.

Placement of collector pipes may depend upon the sport itself. Most baseball or softball fields include intermediate collector pipes starting approximately halfway up the sideline, or foul lines, and running parallel to the centerline. Some football or soccer fields also may include intermediate collector pipes depending upon the grade of the subbase, the amount of water expected, how quickly the field must be available after rain and other factors. These intermediate collector pipes as well as the drainage pipes move the water to perimeter collector pipes, which in turn move it to a disposal site such as a storm drain or catch basin.

It is important to remember that most of the projects being designed today for synthetic turf consist of what is known as a drainage layer of stone (typically 6" to 8" deep) under the entire field. This increases the efficiency of drainage by providing another way to move water through the drainage layer of stone and away from the field. Obviously, piping will serve to move water even more quickly to the established collection/exit points.

As was mentioned previously, there are multiple systems that should be employed to move water beyond the site itself, and to deposit it into a legitimate collection area. These issues will be discussed in a future article.

Mary Helen Sprecher wrote this article on behalf of the American Sports Builders Association. Available at no charge is a listing of all publications offered by the ASBA, as well as their Membership Directory. For info, 866-501-2722 or www.sportsbuilders.org. ASBA also offers its book, Sports Fields: A Construction and Maintenance Manual, which contains information on sports facilities, from concept to completion.

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#### **POST-EMERGENT PRODUCTS**

With the industry as a whole being more environmentally aware, especially in sports turf with participation levels so high in competitive and recreational youth athletics, it is expected that companies will move toward active ingredients that offer effective control and are not harmful. That being stated, it is important to note that every pesticide sold or used has been thoroughly tested for a possible impact on human health and only control products determined to have a reasonable certainty of not being harmful to the environment or to humans will be registered by the EPA.-Jim Goodrich, product sales specialist, professional products, PBI-Gordon Corp.

# Blinds









Blindside herbicide is a new, fast-acting postemergence herbicide offering a unique solution for challenging weeds like doveweed, dollarweed, buttonweed and sedges in warm-season turf. Blindside can be applied to most types of warm-season turfgrass even St. Augustinegrass as well as Kentucky bluegrass and tall fescue, offering transition zone flexibility. Dual-action Blindside works through both foliar and root uptake to deliver faster control of more than 70 broadleaf weeds and sedges. An optimized combination of active ingredients, Blindside delivers visible signs of control within a week, making it significantly faster than other products. The label allows for a follow-up application under extreme weed pressure or for specific weeds. Blindside can also be applied in warmer temperatures without causing additional stress to turf. **FMC** 

#### Tribute Total

Tribute Total provides broad-spectrum, post-emergent weed control in bermudagrass. Tribute Total is a novel herbicide that provides sports turf managers a complete solution for post-emergent control of the most troublesome weeds including *Poa annua*, goosegrass, dallisgrass, Virginia buttonweed, doveweed, and sedges as well as many other broadleaf weeds. Tribute Total is readily absorbed by the foliage and carried to the site of action in the growing points of the susceptible plant. The unique combination of active ingredients in Tribute Total replaces the need for tank mixing multiple products to achieve desired weed control. **Bayer Environmental Science** 

#### **Q4 Plus**

One of PBI Gordon's best herbicides formulations for sports turf is Q4 Plus. It is a combination of 4 active ingredients (2, 4-D; dicamba, quinclorac and sulfentrazone) and offers broad spectrum weed control. It is very affordable and safe to use on cool-season and warm-season turf. It controls broadleaf weeds and grassy weeds so it makes it kind of an "all-in-one" option for sports field managers. Sports fields are made playable because of weed control.

**PBI Gordon** 

#### Monument 75WG herbicide

The post-emergence, broad-spectrum herbicide Monument 75WG from Syngenta controls all major sedges and key weeds that frustrate professionals in a water-soluble, pre-measured package, with two application options, broadcast or spot treatment. Monument 75WG controls all major sedges and more than 40 other weeds, including key lawn weeds on warm-season grasses. Monument 75WG is conveniently packaged in new individual 0.5 gram pre-measured packets. Simply add the water-soluble packet to two gallons of water in a backpack or handheld sprayer.

Syngenta

#### **Combo product from Lebanon Turf**

ProScape 19-0-6 40% MESA with LockUp and .17 Dimension is the ultimate combination product that delivers extended feeding to the plant with MESA, while providing post-emergent control of perennial broadleaf weeds and annual grasses with LockUp, and pre-emergent control of annual grassy weeds with Dimension. Labeled for use on established residential lawns, golf courses, parks, sports fields, commercial buildings and any other turf situation where eliminating existing weeds and preventing new weeds is highly desirable. This time saving product successfully performs three specific jobs with one simple application. Lebanon Turf

#### **XONERATE** herbicide

XONERATE Herbicide doesn't just manage or suppress *Poa annua*, it eliminates it. Studies have shown XONERATE to be 90% effective in controlling *Poa annua*, more than any current product on the market, a major breakthrough in *Poa annua* control. XONERATE also provides greater application flexibility than current products. And by eliminating *Poa annua*, you're also eliminating the time and expense of trying to manage it: Less nutrient and water requirements. Less time spent watering and mowing. And less pesticide use due to a possible reduction in disease and insects. XONERATE allows for selective removal of *Poa annua*. **Arysta LifeScience** 

#### NEGATE, a synergistic post-emergent herbicide

Quali-Pro, a division of Control Solutions Inc., has launched NEGATE 37WG herbicide. NEGATE's synergistic formulation allows turf managers to control more than 35 grasses and broadleaf weeds in Bermudagrass and Zoysiagrass. NEGATE inhibits the growth enzyme acetolactate synthase (ALS), providing fast and complete post-emergent control. NEGATE also allows you the ability to control problematic grasses such as POA, and ryegrass as well as broadleaf weeds. NEGATE attacks grasses and weeds systemically, moving through the plant by absorption through the foliage and roots. The distinct formulation of NEGATE will also control stubborn weed species such as clover, dandelion, henbit, chickweed, and prostrate spurge. Quali-Pro

#### Katana turf herbicide

The trend we are seeing in the industry is the move toward low-impact, reduced use-rate active ingredients. Our Katana Turf Herbicide falls into this category. Katana is an herbicide that controls cool-season grassy weeds, broadleaf weeds and sedges in warm-season turf (i.e. bermudagrass, zoysiagrass, buffalograss, etc.). Katana controls these weeds at very low use rates, 1.0 – 3.0 ounces per acre. Katana has been available for 2 years for professional sports turf, but was recently granted use on all sports turf.

PBI Gordon

#### DIG's new solar-powered irrigation controller

DIG has debuted the LEIT-1, the latest addition to its eco-conscious product-line of ambient light powered, LEIT irrigation controllers. The single station LEIT-1 is unique in that, unlike most other solar controllers, it does not require direct sunlight to operate and commits to using only clean and sustainable energy. It uses SimpleSmart programming technology, which provides smart irrigation control made simple and easy. In addition to the LEIT-1, DIG offers a robust inventory of eco-friendly products like the LEIT and LEIT-2ET controllers, 700 series battery controllers, and key drip irrigation products like their EXCEL LFPB dripline, which is an economical drip emitter line that uses fewer materials without compromising strength or quality.

**DIG Corporation** 

#### **Redesigned Drag King from Newstripe**

Newstripe, Inc. has completely redesigned the Drag King infield drag and groomer. Of particular note, the new Drag King uses long lasting, reversible, hardened teeth that are replaceable. This design increases cutting action on hard-packed surfaces plus the teeth will last much longer. It also features a 48" wide cutting path and may be pulled with garden tractors, ATVs or light utility vehicles. Three sections allow scarifying, levelling and final grooming in a single pass. A debris basket catches large stone and trash. The scarifier simply flips over for transport or to level and finish without scarifying. The cutting blade position has been moved to the center section improving levelling of base lines.

Newstripe

#### **Broyhill's Stadium Vac**

Broyhill's Stadium Vac is a totally self-contained vacuum for turf vehicles and RTV's. Unit features a new 20.8 HP Honda engine and wireless remote controls for suction hose height

(up-down) and distance (in and out from vehicle). Trash is collected in the 1 cubic yard container and no trash goes thru the impeller. Perfect for parks & rec departments and along bike paths.

Broyhill

#### **Gravely introduces line of three Hurricane Plus blowers**

Gravely introduces a new line of Hurricane Plus walk-behind blowers for easy debris clean-up without the hassle of back or arm strain. The Hurricane Plus Blowers are available in the 169cc, 265cc and 404cc Subaru engines. All three blowers feature remote throttle control with an optional remote locking caster. The remote throttle control is located conveniently on the handle near the operator for easy access. Direction and dispersion of the debris can be controlled by the front and side discharge on the blower as well. The blowers are covered by Gravely's one-year limited warranty. Two accessory kits are available for increasing the functionality of the blowers: a hose kit with parking brake and a front swivel caster kit.

#### NutriSmart fertilizer and soil amendment

LidoChem, Inc.'s Performance Nutrition Division is the US distributor of NutriSmart, an environmentally friendly, patented granular biological fertilizer and humate soil amendment developed by CK Life Sciences. OMRI listed NutriSmart interacts with soil and plant roots to significantly improve nutrient balance and enhance the efficiency of root systems. NutriSmart improves turf performance by supplying nitrogen according to plant demand, by releasing "locked-up" P&K in the soil and by improving uptake of both macro and micronutrients. Maintaining adequate levels of soil nutrients results in improved turf color, shoot density and a higher root-shoot ratio. NutriSmart changes the property of the soil through the improvement of soil water holding capacity, soil friability and porosity. It also enhances the soil's chemical and biological properties such as organic matter content and beneficial microbial populations in the rootzone.

LidoChem, Inc.

#### **10-foot seeder from Kasco**

Kasco Manufacturing recently introduced a new 10' wide Vari-Slice seeder. The disc angle can be adjusted quickly to move more aggressively over the ground with rugged cutting coulters to cut through roots, limbs and debris. Other widths of 3', 4', 5', 6' and 8' are also available. These seeders feature a unique metering system for planting a variety of a seeds such as Bermuda, alfalfa, timothy, rye and oats. A patented, optional positive feed agitator system is also in a second box to plant native or warm season grasses. Vari-Slice units with a standard seedbox and warm season grass box are able to plant virtually any seed variety.

**Kasco Manufacturing** 













www.stma.org



# **DICK'S SPORTING GOODS PARK,** Commerce City, Colorado





- Level of Submission: Professional
- Category of Submission: Soccer
- Head Sports Turf Manager: Bret Baird
- Title: Turf Manager
- Education: Bachelor's degree from Michigan State in Crop and Soil Sciences

• Experience: May 2001-May 2006, Assistant Turf Manager, Denver Broncos; May 2006 to present, Turf Manager, Dick's Sporting Good Park

Other crew to recognize: Phil McQuade (current STMA Board member); Cody Witham; Manuel Garcia; and Brad Youn
Original construction: 2006; won STMA Field of the Year Award in 2008

• **Turfgrass variety:** The field is 100% Kentucky bluegrass. The original sod was grown with the following varieties: Brilliant, North Star, Moonlight, and Blackstone.

• **Overseed:** Our current overseeding mix consists of 100% Kentucky Bluegrasswith the following varieties: Rugby II, Brooklawn, Prosperity, Moonlight SLT, and Orfeo.



• **Rootzone compostion:** 90% sand, 10% peat; field features SubAir forced air soil heating system.

• **Drainage:** 6-inch drainage pipes on 10-foot centers across field.

Although we made it through the weekend, the field was much more worn than it would have been if we had not weakened 40% of the field by being covered and exposed to extreme temperatures just days before.

#### F.O.Y. | Dick's Sporting Goods Park

#### **CHALLENGES**

One of our largest challenges this year is the extreme amount of practices on our field. Our new coach has stated he would like to train in the stadium the day before every game. In my opinion one practice is more destructive than a game. For example a goal keeper performing practice drills may make 15 cuts in the exact same spot during practice but during a game his 15 cuts are spread throughout the entire goal mouth. Our coaching staff always uses cones for warm-up drills. We work with them on proper placement but all 28 players still cut in the exact same spots opposed to a game where the wear is spread throughout the field.

The timing of practices could not be worse—the day before a game when we have to paint. To combat that, this year we have had to paint the field on Thursday instead of on Friday for a weekend game. The paint for the game is not as bright and the game is played on a chewed up field.

Another challenge this year was a 3 day PHISH concert over Labor Day weekend. The stage was placed on the field directly over a goal mouth. We had a less-than-desirable field covering. Although we specified 100% translucent flooring the suppliers sent us field covering that was two different colors. Sixty percent of the flooring was translucent and 40% was a grey non-translucent. We were not made aware of this until the day before the show when the flooring arrived and by then it was too late to change suppliers. Where the gray covering was we received severe leaf burn from the high temps during the weekend. The field was uncovered on Monday and we hosted an MLS game on Wednesday and two college soccer games on Friday. On Saturday we had US/Canada lacrosse game with practices for each team in the morning. On Sunday we had a season-ticket holder party on the field with various soccer type games and drills on the field for 300 people. Our main concern was extreme wear on the weakened, burnt turf. Although we made it through the weekend, the field was much more worn than it would have been if we had not weakened 40% of the field by being covered and exposed to extreme temperatures just days before.

Year in and year out one of our largest challenges is keeping this field in the best possible condition while also taking care of the rest of the complex. The same crew that takes care of our stadium field is also responsible for the rest of the complex which, beside the stadium field, includes a sand-based practice field, two synthetic fields and 21 native soil fields. Year in and year out one of our largest challenges is keeping this field in the best possible condition while also taking care of the rest of the complex. The same crew that takes care of our stadium field is also responsible for the rest of the complex which, beside the stadium field, includes a sand-based practice field, two synthetic fields and 21 native soil fields.

Unique to MLS is the length of the season. Our first event was on March 10 and our last event is November 10. Our season begins and ends with the field in dormancy. Our concern during these times is keeping high wear areas in good enough condition that they can re-grow once the soil is warm enough. If we do not constantly monitor these high wear areas and talk to user groups about proper usage the field will never make it out of cold months with enough crowns to re-grow once warm.

**SportsTurf**: What type of turf do you have on your field? What is the soil profile? What would be your perfect turf/soil combination for your "dream field".

**Baird**: We have 100% Kentucky bluegrass, on a 90% sand 10% peat profile. I have my ideal; the 90% sand 10% peat has been excellent.

**ST**: How do you balance your family life with work demands? **Baird**: We have an outstanding crew.

**ST**: Did you or are you planning on making any adjustments, large or small, to your maintenance plan in 2013? **Baird**: No.

**ST**: Did you purchase any new equipment or try a new product this year?

Baird: No.

**SportsTurf**: What's the greatest pleasure you derive from your job?

**Baird**: The joy the athletes get while competing on the field when it's in top notch condition.

**SportsTurf**: What's the biggest headache? **Baird**: Trying to rationalize irrational people.

**ST**: How do you see your job changing in the next 10 years? **Baird**: Trying to manage turf in a more environmentally friendly way especially in regards to water use. ■

The STMA Field of the Year Awards began in 1988 and are given annually in baseball, football, softball, soccer and sporting grounds in three levels: professional, collegiate and schools/parks. A panel of 11 judges independently scores the applications and the winners are announced at the STMA Annual Conference and Exhibition. Winners receive signature clothing, complimentary conference registration, three night's accommodations and a trophy for display. The Field of the Year Program is made possible through the generous donations of Carolina Green Corporation, Ewing Irrigation Products, Hunter Industries, and World Class Athletic Surfaces, Inc.