

RAIN, RAIN, GO AWAY.

After all, nobody really wants to put up with inclement weather when there's a game to be played (or watched or coached or refereed) outdoors.

But if that cloudburst does happen, it's absolutely essential that the water be able to move off the field so that play can be maintained (if the weather isn't severe) or resume later (should conditions force the game to be halted or suspended). And for that, good drainage is required.

"Drainage is one of the most important aspects of a successful athletic field installation, both turf and track," says Sam Fisher of Fisher Tracks, Inc. in Boone, IA. "It also seems to be one of the most misunderstood. We do not need a drainage system to drain the worst gulley washer in 30 seconds, but we do need an adequate drainage system so that water is not standing, pooling or going across the performance areas."

Whether a field is natural turf or synthetic, drainage is essential to continued quality of play. Trouble is, it's hard to convince an owner of that. Drainage just isn't fascinating, sexy or even (in most cases) visible. It's something that won't be noticed until it isn't working. The best way to keep it in shape, say builders, designers and installers, is to do regular maintenance. And particularly in an economy where every dollar counts, it's imperative to do the day-to-day (and season-to-season) work that helps preserve an investment as significant as an athletic field.

Natural turf fields

According to Bill Fee of Carducci Landscape Architects in San Francisco, keeping a natural turf field draining well means constant vigilance.

"The owner needs to keep drainage structures free of grass clippings, soil, leaves and debris," says Fee. It's also imperative, he adds, to "repair eroding soils in and around the field, which can contribute sediment to the storm system. No soil or sediment should enter the storm system."

According to James D. Catella of the Clark Companies in Delhi, NY, the planarity of the field will play an enormous role in drainage. "On natural native soil fields, proper grading is the most important factor to sheet drain water to a conveyance mechanism such as a storm inlet, open swale or trench drain," says Catella. "High-end natural grass sand-based fields also drain vertically through a USGA sand rootzone medium. These must be maintained by a professional who constantly monitors the health of the grass plant, amends with nutrients as necessary and provides surface aeration periodically to keep the surface from becoming too compacted to drain as designed. Any field that is surrounded by a track should have positive drainage at the track/field interface at the inside edge of lane one. By providing a trench drain at this area, the most important lane of the track is protected from the effects of standing water."

Fee stresses upon owners to close natural turf fields when the soil is wet because play that tears up existing turf

Field drainage

from builders' perspective

» A successful field starts with a quality drainage system, installed early on in the construction process. Photo courtesy of William E. Fee, Carducci Landscape Architects, San Francisco, CA.



» Left: It's not hard to identify a field that has drainage problems. Water will collect on the surface and not disperse. Photo courtesy of William E. Fee, Carducci Landscape Architects, San Francisco, CA.

» Right: Poor drainage of synthetic turf must be traced back to its source. It may be an easy fix (such as clean-outs that have become clogged with debris) or it may be something requiring extensive work. Photo courtesy of William E. Fee, Carducci Landscape Architects, San Francisco, CA.



doesn't help anything. Other important points? "Keep the soil healthy and maintain infiltration rates by aeration, top seeding and sand topdressing. Low spots in fields should be repaired with sand topdressing." In addition, he notes, "consider using organic fertilizers and compost tea to build microbiology of healthy soils that are less prone to soil compaction, fertilizer burn and nitrogen runoff."

Builders and installers alike say that more attention needs to be paid to the soil itself. Fee, like Catella, prefers sand-based fields based on the U.S. Golf Association guidelines for sand putting greens. "Sand can be an ideal soil for athletic fields," Fee notes. "USGA sand is excellent for playability and drainage. Unfortunately, it can be resource consumptive to construct and maintain sand fields, so for many situations it is impractical. Sand is the 'gold standard' of soils for sports fields. If the field is sand, it should drain. However, not all sands are alike." (USGA sets forth guidelines for sand content, Fee notes, and these should be followed by those looking to improve the drainage of an athletic field).

Of course, says Fee, then there are other options. "If a sand-based field is the gold standard, then sand trenches in native soil sports fields are the gold-plated approach. Sand filled trenches will drain surface water. In native soil fields, sand-filled trenches are less resource consumptive than sand-based fields and may be practical when fields need to be well drained without interrupting play."

In terms of annual maintenance, Fee recommends sand topdressing to improve the infiltration rate. "Applying 50 tons of sand to a field per year appears to be an effective rate," he notes. "It is possible to apply higher rates of 60-100 tons, especially if the sand is applied in two increments, spring and fall. The sand is either applied alone or in combination with soil or compost. The soil and/or compost typically make up 10-30% of the mix."

Natural turf fields need regular care to help maintain slope, break up overcompaction and keep drainage systems free of obstructions. Convincing an owner of this, and getting him or her to understand that natural turf fields aren't self-maintaining (outside of mowing, watering and weeding)? Not an easy task.

Synthetic fields

Unlike their natural turf counterparts, synthetic turf fields don't require watering. Therefore, the only water that should fall onto a synthetic turf facility is rain. Irrigation systems for nearby landscaping should not cause water to move onto the field. Nor should water run down nearby slopes or off bleachers and onto the playing surface. Proper sloping of such facilities to direct water, correct placement of perimeter drains (and regular care of these drains, such as keeping them free of sediment and debris) should keep problems to a minimum.

Assuming these types of issues (with the exception of maintenance) have been addressed in the design phase of the project, the drainage system beneath the surface of the field should be adequate to move a normal amount of rain off the surface and keep it playable. The owner or manager, however, should be proactive in making sure the system is functioning correctly.

"It is very important that the drainage system of a synthetic field is constructed correctly initially as the drainage facilities are below a new synthetic surface and can be very costly to repair if they fail," notes Catella.

While it might sound self-evident, says Fee, the system should be examined for proper operation prior to the new field being opened for play.

"A new system should be flushed and tested before turning over to owner," Fee notes. "The owner's maintenance personnel should have a fundamental understanding of how the stormwater flows through the field and where it exits the field and where clean-outs are. The owner should also know where pressurized water shut-off valves are in case a pressurized water system breaks because of a storm drainage problem."

Fee recommends grabbing an umbrella and watching the field periodically during a rainstorm. "The field should self-perform because it is a closed system," he remarks. "If it is puddling or showing subsurface bubbles, consult with the manufacturer, field designer and contractor. If the field shows bubbles under the carpet during a rainstorm or puddles on the surface, this will likely subside after the storm; however, during a game, this could be a safety hazard and an investigation into the causes should be made."

This game-in-progress circumstance, Fee adds, unfortunately occurred (on national television, no less) at UC Berkeley in November 2008 during a football game against the University of Oregon. There was significant puddling on the field and the grounds crew had to improvise by pushing the water off the field and inserting drainage holes with pitchforks. (There's a YouTube video of the incident for those who care to Google it).

There are different choices of drainage systems, and several options on the market. All have their advantages and disadvantages, as well as cost differentials to be considered. The choice of which system to use is ultimately that of the owner, who should make the decision in consultation with industry professionals.

"There are many factors that come into play with the choice of a drainage system for synthetic turf facilities that involve the field designer, civil engineer, the geotechnical engineer and the owner," says Bill Fee. "All sites and soils are not equal, so at each site the site conditions require review and assessment by engineers to make the recommendations based on factual site specific information. This should include a geotechnical investigation and recommendations as well as a drainage analysis."

In other words, there is no "right" answer across the board, but there is always a right answer for a particular situation. An owner should talk with industry professionals, as well as with colleagues in the area who have comparable facilities. There is no such thing as too much information, in this case.

In addition, the experts say, it's absolutely essential to make sure that the guidance of a turf industry professional is used. This is not the time to rely on a generalist.

"It is important that an experienced professional is engaged to design the drainage of your field, be it natural or synthetic," says John Schedler of FieldTurf Tarkett in Highlands Ranch, CO. "The

layout of the system and the overall capacity is directly linked to the design of the entire cross section of the field. The designer needs to take into consideration many variables in the design of each system for each project, including the existing soil conditions, annual and event rainfall for the area, and materials used in the construction of the field. The size, slope and distance between drain lines can be costly depending on the materials used and whether the design utilized trenched in laterals or flat pipe. The designer should know the natural absorption of the existing subgrade and whether a liner should be used or not. The stormwater retention requirements for the region have to be taken into consideration as well. Some regions have much more strict regulations on drainage outflow than others. Permits can be a costly and time consuming process. The materials used in the cross section can be the most important for drainage purposes. In a synthetic field with drainage stone, if the stone that is used isn't good quality then it doesn't matter how much drainage pipe you have below it. In both synthetic and natural projects, in every layer of the system, the water has to be able to move as designed. This is why it's important to make sure a professional is involved."

Yes, the entire aspect of drainage can be a substantial investment. But, say the builders and installers, efficient drainage is one of the most important aspects, if not the most important aspect, period, of any athletic field. Therefore, it's not the place to cut cor-

ners or try to skimp on spending. Just because you don't see it doesn't mean it doesn't work. In fact, you should never have to think about it. That's why it's a good investment.

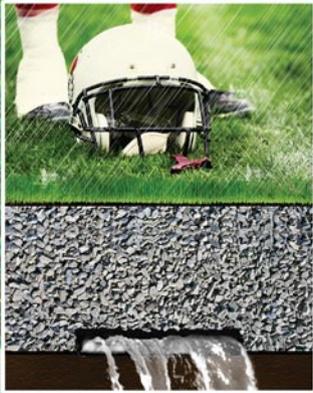
"Proper drainage of an outdoor playing field is the single most important factor in maintaining a quality playing surface," says Catella. "Improper drainage results in ponding and standing water on the field which affects the quality of the contest and increases the risk of injury to the athlete."

Bill Fee is even blunter about it. "You can't have too much drainage or budget too much money on drainage." In fact, he notes, "you may need to add more drainage." ■

Mary Helen Sprecher is a free lance writer who wrote this article for the American Sports Builders Association, a non-profit association helping designers, builders, owners, operators and users understand quality sports facility construction. The ASBA sponsors informative meetings and publishes newsletters, books and technical construction guidelines for athletic facilities including sports fields. It also offers voluntary certification programs in sports facility construction and maintenance, including sports fields. Available at no charge is a listing of all publications offered by the Association, as well as the ASBA's Membership Directory. Info: 866-501-ASBA (2722) or www.sportsbuilders.org.

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