



PLANNING FOR DRAINAGE

means deciding between native soil and sand-based systems



One thing you can count on in construction of all types of fields: there will be no shortage of decisions to make. And for those who thought it would get easier after they made the big decision of natural grass vs. synthetic field—well, they’ve only scratched the surface, so to speak.

If you’ve decided upon a natural grass field, the next big decision awaiting you will be the following: should you go with a native soil field or a sand-based system?

If this is all new, here’s a quick recap: If you are building a natural grass field, there are two basic types: native soil and sand-based:

A native soil field may be a *true native field*, which uses only the soil found at the site, a *modified native soil field*, which includes the introduction of amendments such as sand, peat, compost or porous

ceramics to provide a better growing medium and/or a more stable base or a *sand cap field*, in which the top 2-6 inches (typically 2-4 inches) of soil is replaced with sand, either during construction or over time.

A sand-based system, in which the native soil is completely removed and replaced with an under drain system, a drainage media layer, principally stone and rootzone material, principally sand.

Why is this so important? In one word: drainage. Of all the decisions you will make with regard to your field, the drainage will be the most essential. The field’s ability to absorb water and move it off the playing surface is what will allow it to remain healthy and usable. Nice seating, a cool scoreboard, great concessions and locker rooms, even a fully-equipped press box and facility-wide Wi-Fi are not going to mean anything if the field is wet and muddy when game time rolls around.

“Sand-based fields, whether native or non-native, are usually always advantageous,” notes Mark Wrona of URS in Grand Rapids, MI.

The type of field chosen, native or sand-based, will depend on several factors; these include:

- The soil conditions that exist at the site
- The weather during the playing season
- How often the field will see use

While it is less expensive to go with the soil on-site, the professionals warn against making that the primary factor in determining what type of field to have.

"The first big difference between natural soil fields and sand-based fields is cost," says Dan Wright of Sports Turf Co., Inc., in Whitesburg, GA. "Drainage is the biggest issue with natural soil fields. Since there are no under-drains on a natural field, all drainage is surface drained."

This, he notes, calls for specific grading of the field.

"The goal is to get the water off the field the shortest and quickest way possible. Once the water is off the field, it must be captured and moved into some drainage swale and ultimately into a storm drain. The crown on a soccer and football field usually is at least 1.5 – 2 percent. For a baseball field, the infield should be sloped at least one percent and sloped toward the foul lines in order to get water off the infield, and the outfield should be sloped from the infield arc to the outfield fence at least 1.5% but no less than 1.25%."

The need to move water off the field, he notes, can create a maintenance nightmare, since many fields wind up being graded from the

outfield fence to the home plate drain. The long path for water to travel usually results in an unplayable field following a rain.

"Sand-based fields, whether native or non-native, are usually always advantageous," notes Mark Wrona of URS in Grand Rapids, MI. "Natural grass multi-purpose athletic fields, even those with a well-drained sand base systems and regular maintenance, should not be expected to remain in excellent condition if the number of game/events exceeds 30 per year."

Professionals will perform soil tests at the site where the field is to be constructed, and will make recommendations based on the soil content and on its ability to allow water to percolate down from the surface in a given amount of time.

Just remember, says Wrona, the professionals know what they're talking about. Two starkly contrasting scenarios come to mind as cautionary tales.

"At one school facility, a multi-field complex was built over a gravel pit, so in their wisdom, school officials allowed clay soil from the adjacent region to be dumped over their native gravel site with the thought of saving on watering costs. With a new thick clay layer spread over the native gravel, less water was required to water the field complex, but after only several events during our normally wet spring season here in Michigan, the fields would turn to mud. The situation was remedied decades later by stripping off much of the clay and mixing the remaining clay with underlying native sand and then reseeded.

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"We also worked on another project, a proposed new high school on an 80-acre open farm site with heavy clay almost everywhere. Soil borings in a depressed area of the site identified sand of various grain size diameters, perfect as a field drainage material as well as support below concrete slabs. The design team took advantage of this depressed area by removing its clay layer and excavating the sand for use creating a building pad and for use below all proposed concrete walks on this sticky clay site. This sand was also blended into the existing topsoil for all the PE/athletic fields. A separate machine was brought to the site to accomplish the blending process. The depressed area that remained was perfect as a sunken stadium with spectator seating built into the side slopes."

And if at the crux of the problem is the cost, says Wrona, there are usually various ways to address it. Narrow pipe trenching can help move water off clay fields. Generally, professionals in a specific geographical area have experience with workarounds and can let field owners know if other possibilities exist.

Balancing the needs of the owner, the needs of the athletes and the need to bring the project in on budget can be a challenge. At the same time, however, be sure to factor in maintenance costs.

"Naturally, a sand-based field, if maintained properly, will drain a lot quicker than a natural soil field and will allow play quickly after a rain event," says Dan Wright. "With a sand-based field it is imperative to maintain the field properly to ensure playability and drainage is main-

tained. A maintenance budget for a sand-based field will be more than for a natural soil field."

In addition to being less expensive to build, many native soil fields offer good water retention and can hold soil nutrients, minimizing the need for fertilization and irrigation, as compared to a sand-based field. However, as previously mentioned, they do absorb water more slowly, and can become muddy, worn and unplayable. And one day of rain can lead to more than one day's worth of delay when it comes to scheduling games, something that ultimately may wind up in costs to rent alternate field space.

So what's the answer? Listen to the professionals, get all the information you can and take every aspect into consideration when planning. There is no "perfect" field, but there is a field that is right for any given situation. ■

Mary Helen Sprecher is a free lance writer who wrote this article on behalf of the American Sports Builders Association. ASBA is a non-profit association helping designers, builders, owners, operators and users understand quality athletic field construction. ASBA offers the publication, "Sports Fields: A Construction and Maintenance Manual," which discusses, among other topics, sustainability in the construction and maintenance of synthetic fields, as well as synthetic turf recycling. For information, visit www.sportsbuilders.org.

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