Sizing Up Sports Field Renovation

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Nothing lasts forever. Even an athletic field that is creatively designed and meticulously constructed has a finite lifespan. By the age of 25 or 30, a typical field has usually seen its better days and becomes a candidate for renovation. The most common symptoms of a field that is ready for renovation include severe compaction, poor grass cover despite well-intentioned maintenance, the loss of organic matter, settlement and the most problematic of all issues, poor soil structure and inadequate drainage.

Unfortunately, one size does not fit for all field renovation projects. There are several options for consideration depending on the underlying field conditions, budget and the field's anticipated use. These options range from simple to complex, but all have common goals: improve drainage and create soil conditions that allow your grass the best chance to thrive.

SOLUTIONS LARGE AND SMALL

Ideally, a field will go through several modest renovations before complete replacement is necessary. The most simple of these “renovations” is to improve cultural practices and provide more consistent maintenance. This includes a program that utilizes frequent core aeration to promote healthy surface conditions and regular deep tine aeration to break up subsurface compaction and increase infiltration through the soil profile. It also includes overseeding with improved varieties that are more tolerant to the constant abuse meted out by cleated athletes, better irrigation management and more diligent topdressing and fertilization programs to improve soil structure and fertility.

When better cultural management does not yield the desired results, you have to consider more aggressive steps. A consultant specializing in athletic field design is highly recommended to help guide this process. The cost of these services can often offset the mistake of being overly conservative in design or, worse, under-assessing the requirements for a successful field renovation.

Before deciding which solution is best, begin by finding old construction plans and digging test pits to determine the depth and nature of the existing soil profile. Because conditions can vary greatly across a single field, consider digging several pits to gain a full understanding of the field's subsurface makeup. Take samples of the various soil strata and have them analyzed by a geotechnical engineer or testing laboratory that specializes in sports field soils.

This investigation will reveal two critical factors: the need for surface drainage based upon the texture of the topsoil, and the need for subsurface drainage based upon the permeability of the subsoils. Soils with higher silt and clay contents typically rely exclusively on surface drainage in the form of a crown (1.5 to 2 percent minimum) to shed excess water before it enters the soil profile. Sandier soils with better infiltration can perform admirably with less of a crown, though anything less than 1 percent is not recommended. Beware of the field built on a poorly drained or over compacted subgrade. These fields, regardless of the quality and nature of the topsoil, will require a significant crown to shed excess water and perhaps an extensive system for removing subsurface water.

Armed with this information, it will be easier to determine what is and — equally as important — what isn't required to make the renovation a success. If you're lucky enough to have adequately draining subsoils and topsoil conducive to satisfactory grass growth, renovation can be straightforward and relatively inexpensive. Begin by stripping the existing sod and mitigating subsurface compaction by tilling or aggressively deep tining the soil profile. If the soil-testing lab recommends application of amendments, this is an opportune time for incorporation. Following up on these activities by raising or reestablishing the crown to shed surface water will usually do the trick. Seed or sod, depending on your budget and the timeframe in which the field needs to be put back into play. If your field is not irrigated, consider the installation of an automatic in-ground system that can deliver water efficiently and judiciously across the entire playing surface. Improperly designed and managed irrigation systems will only exacerbate surface drainage and compaction problems.

WHEN SIMPLE IS NOT ENOUGH

When the subsurface is not conducive to free drainage or your topsoil is unsuited to supporting an acceptable stand of grass, it's time to consider more aggressive and expensive renovation methods.

Begin your renovation by stripping the existing topsoil to subgrade and stockpiling it off of the field limits. If it is very poor, export the material and begin fresh, if budget permits. You can improve marginal soils with amendments, but use caution, as the addition of improperly conceived amendments can make a good soil bad and a bad soil worse. Consult with a specialized soil-testing laboratory to insure that your amendments are proper in makeup and ratio to meet your desired field characteristics.

You can till over-compacted but otherwise free-draining subgrades to loosen the structure and restore infiltration. Infiltration in finer subgrades can be improved, though not indefinitely, through the liberal application of gypsum. Where subgrades are essentially impermeable, you should seriously consider the installation of subsurface drains. Because water does not move well laterally in finer textured soils, you may need to space drains as tight as three feet on center to effectively remove water from the soil profile. While placing drains at three feet on center may be cost prohibitive, opting to place them at 20 feet on center would be wasteful and ineffective. Consult with a firm specializing in field design to determine the proper drain spacing. Where subsurface drainage is not a reality due to budget constraints, adequate surface drainage is an absolute must. Prevent surrounding areas from draining across the field and direct water away from the surface to the nearest storm drainage system.

WHEN BUDGET IS NOT THE ISSUE

Let's face it, budget is always an issue, but for high-profile athletic fields, consider a top-of-the-line renovation including a subsurface drainage system, sand based rootzone and a state of the art irrigation system. The benefits of a sand-based field include resistance to compaction and excellent internal drainage, which allows the surface to dry more rapidly for a quickreturn to play. Sand-based fields also allow for a shallower crown (less than 1 percent), which is desirable for many sports — soccer in particular. The drawback of this type of field is its significant expense, which can range from $5 to $10 per square foot, depending upon geographic location and unique site conditions.

Even this ultimate natural grass renovation is oftentimes unable to meet the demands placed upon the field. Increased usage and growth in non-traditional sports such as field hockey and lacrosse can make the survival of grass impossible, particularly with limited field space. A viable option is the use of synthetic grass, particularly the latest generation of infilled products, which are growing in use and popularity across the country.

Infilled synthetic turf, comprised of a carpet of smooth polyethylene fibers “infilled” with sand or recycled rubber, is becoming increasingly popular with users, coaches and athletic directors as it eliminates many of the problems associated with conventional nylon turf and mimics the desirable attributes of well-maintained natural grass. Improvements in synthetic turf have yielded dark-green blades that stand tall and feel natural to the touch.

Though synthetic fields are initially more expensive to install ($8 to $12 per square foot, some two to three times the cost of conventional grass fields), they can pay for themselves over time in decreased maintenance and increased usage.

SIZING THINGS UP

Voses Field at Milton Academy in Milton, Mass., dates back several generations and was built on the remains of an old pine forest harvested for timber and mined for the rich deposit of native free-draining gravel used to construct several of the campus's historic buildings and roadways. Though the imported topsoil is of good quality and is suitable without amendment to maintain a desirable stand of grass, much of the imported fill — some 2- to 4-feet thick in places — is comprised of clay, silt and decomposed organic matter. Despite good topsoil and a subsoil that infiltrates at a rate greater than an inch per minute, Voses Field does not drain. The field is over compacted and stays soggy for days after an irrigation cycle or a modest rain event. Use of a significant portion of the field this summer as staging for the construction of a new dormitory has precipitated the long-needed renovation.

Since drainage had already proved inadequate despite a crown in excess of 1 percent, it was determined that simply regrading the field and increasing the crown to 2 percent or more would not address the core issue and was deemed unsuitable for a varsity level field. Though a sand-based rootzone with under-drainage would certainly provide an excellent playing surface, it too was quickly dismissed because it far exceeded the academy's limited project budget.

After discarding these two extreme alternatives, Milton Academy began to focus in on the most cost effective method of achieving an excellent varsity level playing field without the expense of exporting the impermeable fills. Because the existing topsoil was deemed suitable, it will be stripped and stockpiled for reuse. In order to achieve proper surface drainage, the field will be crowned toward the sidelines at 1.5 percent, the maximum crown determined to be acceptable for the intended varsity use. Shallow sideline swales with surface grates placed every 50 feet will remove water rapidly from the surface.

Recognizing that the underlying parent gravel would be a desireable avenue for infiltrating subsurface water were it not for the imported fill layer, a cost-effective method was devised to bridge the existing topsoil with the parent gravel. Cutting closely spaced trenches through the impermeable fill and filling them with inexpensive construction sand will achieve this.

Like Milton Academy, keep options open and think simply and creatively. Doing everything possible within budget to improve drainage and soil structure and increasing maintenance as usage increases will go a long way toward creating a winning foundation for your field, keeping your future renovations small in scale.