

Buyer's Guide for Synthetic Turf Field Construction

Today more synthetic turf fields being installed than ever before, from the local park to the NFL. Why the boom? One reason is that the cost has come down; there are many more options so that a turf field can be built within the budgets of most organizations and institutions.

Also, the product has been improved. Even some who were adamantly opposed to the older short pile nylon turf products have become advocates for the new long pile, infill turf, which looks and feels more like natural grass.

In some areas of the country, drought and/or water restriction is another force driving the installation of synthetic turf. Unlike natural grass, turf requires no regular irrigation, though for some sports at the highest levels, players may prefer a field that has been watered before play.

But the most attractive characteristic of synthetic turf fields is that they can be used day-in and day-out. In short, the installation of synthetic turf maximizes the productive use of a field, providing many more athletic and recreational opportunities for a school or community.

With turf fields becoming less expensive, more user-friendly and offering greater use at a better cost per hour of use ratio, what's the downside? This is a very new industry and, thus far, largely unregulated. To get the most value from a sizeable investment, an owner must take care in defining needs, exploring available options and making appropriate choices.

American Sports Builders Association (ASBA) put together this Buyer's Guide to provide an overview of the process, along with some basic guidance to aid you in making the decisions necessary in developing a synthetic turf project.

Define your needs

Early in the project, an owner must decide on its scope. What sports or activities will take place on the field? The specific sports or other activities (e.g., band practice) to be played on the surface may influence the appropriate length of turf, as well as the depth and type of infill.

At what level will these sports be played? The level of competition will determine which governing body and, therefore, which rules will prevail. Governing body rules will specify the necessary field dimensions and surface types, as well as the size of required runover areas.

Will a track surround the field? If so, which field events are planned and which of them may be placed in the infield? Some of the field events traditionally

conducted in the infield, such as the hammer throw, will need to be relocated as they may damage a synthetic field.

Most multi-purpose fields will require some compromise between what is optimal for one program or sport versus the performance characteristics and requirements of another. Carefully defining needs and establishing priorities will go a long way toward insuring that the facility, once built, performs as well as possible.

Develop a budget

How much can you afford to spend? Developing a budget may be the most difficult step in the construction process. You may have to make some concessions, but in order to make informed choices you need to determine priorities. For example:

- * Do you need a completed facility now or can you wait a while for fencing, lighting, seating or other aspects of the project?
- * Have you decided upon a given surface or specific site, or are you willing to consider alternatives?
- * What site conditions will you be working with? Irrigation and drainage issues? Soil conditions and quality?
- * Do you have an existing grass field to convert or will you be working with previously undeveloped ground?

Remember that as in most projects, it is easy to spend more than you had in mind. Working within a budget involves considering various options and making informed

choices, but choices don't have to mean compromising the end result. Knowledge of what factors are most important to the facility you are planning and a desire to seek creative solutions can bring the project in at a reasonable cost.

In budget planning, consider not just initial cost but long-term cost. Before committing to a turf project, be certain that you can afford the schedule of maintenance recommended by the supplier of your chosen turf system, as well as a reserve for eventual repair and/or replacement. It may be wise to consider a maintenance contract with the installer or with an expert maintenance company to keep your turf in the best possible condition and to extend its useful life.

Consider a design professional

It is often desirable to employ a licensed design professional, consultant, or other expert to assist in planning, building, or retrofitting a synthetic turf field. Depending on the scope of the project, employing the services of an expert can actually help control job costs by better translating the needs of the owner into



Courtesy of the Motz Group, Cincinnati, OH

proper direction for construction, and by helping to avoid costly mistakes. A professional architect, engineer or landscape architect, trained and experienced in synthetic turf construction, or an experienced installer, will help you identify your needs and refine that information to the specific requirements of your site.

An expert can assist you in determining the scope of work to be included in the job, in planning the facility, in determining a realistic budget for the project, in evaluating and comparing bids, in overseeing the work in progress and in solving any problems that occur during construction.

However, be sure to choose an expert with specific related experience. Third generation (long pile, infill) turf is relatively new to the marketplace. There are many design professionals, manufacturers, installers and others claiming expertise in this highly specialized field. In fact, anyone can claim to be an expert. It is important to research the credentials of your proposed consultant before choosing an individual or firm.

Perhaps the best way to find a qualified professional is by contacting colleagues who have recently completed similar projects and asking for a recommendation.

In any case, when you contact a prospective consultant, be sure to ask questions about the firm's experience in turf field design. Contact references and visit completed projects. Ask for proposals and compare them carefully. Be sure you understand what is and what is not included in the proposed contract. Finally, once you choose a professional, carefully negotiate fees and services and secure a signed letter of agreement or contract, which clarifies all aspects of your arrangement.

Choose a site

Where will you build? Before you contemplate new construction, be certain that you have an acceptable site. Whether new construction or replacement of a natural grass field, numerous factors make the design phase critical.

For new construction:

* How large a site is available? If the field is to be surrounded by a track, a site no less than five acres, a minimum of 600 feet long by 300 feet wide will be required. Additional area must be allowed for grading, drainage, the anchoring detail, player seating and walkways, and for facilities such as bleachers, lighting, walkways, fencing, etc.

* Does a potential site allow for proper drainage and storm water management? It is best to locate a field on a relatively level site, higher than surrounding areas. Additional filling or drainage work required by a low site may add substantially to construction costs.

* Is the site reasonably level? While the field and any surrounding track will be sloped slightly for drainage, for all practical purposes, the track must be level in the running direction.

* What type of soil exists at the site? The best soil is hard, well drained and non-heaving. Locations with peat, clay, topsoil, shear sand or other unsuitable materials should be avoided, if possible. In practice, however, sites available for fields are often sites that have been avoided in previous construction because poor drainage, unsuitable soils, and other problems. Consult with a soils expert before developing a construction plan. Site problems can be overcome with expert design and engineering, but this will add to the cost of the project.

* Is the site accessible for construction? Field construction requires the use of heavy equipment, which must get to the site. The need to move or to avoid obstructions, such as fences, trees, buildings, grandstands and bleachers, may add to the cost of construction.

* Where are underground utilities (electricity, water, gas, telephone, sewer, etc.)? While the finished facility will require utility service, the presence of underground utilities in the field area will complicate construction. It is advisable to employ a licensed surveyor and contact specific utility companies for line mark out to locate utility easements. It may be necessary to relocate some or all of these utilities, which will add to the cost of the project.

* Where is the prevailing wind? Where does the sun rise and set? Most commonly, the preferred orientation for a field is north-south.

Whenever a facility will be used for multiple sports or events, event-by-event design considerations will add to the complexity of the overall project and will have a significant impact on the size of site required and possibly on construction costs.

For retrofitting a synthetic turf field into an existing facility, the primary concern will be protecting existing structures during construction, which requires

heavy equipment, substantial excavation, and the delivery and placement of tons of material. Most vulnerable will be a running track that surrounds the field. If a track is present, the field contractor will need to bridge and protect the track surface and edge, and even with reasonable care, some damage may occur. Your budget should include the funds that may be required to repair the track once the field has been completed. In fact, if possible, it is advisable and cost effective to repair and resurface the track completely at the conclusion of field construction.

If the existing track has no curb, it will be necessary to prepare the inside edge for anchoring the turf. You should consult with both your design professional and turf contractor on the anchoring detail in a retrofit project. Tying together and coordinating track and field drainage also will be critical to the project's success. Accommodating the track, however, is not the only concern in reconstruction projects. Installing an appropriate base for a synthetic turf field may necessitate a change in elevation for the field itself, which, in turn, will require that football goal posts, player benches, and other structures on or near the field be re-set. A licensed design professional or contractor experienced in these projects will help the owner to identify in advance, and plan for, all the impacts of the field reconstruction project.

Choose a surface and develop specs

Another important choice in planning a field is the specific type/brand of synthetic turf. It is important to research the brands you may be considering. Where is the product made and by whom? What is the relationship between the manufacturer and the installer, if any? Who carries the warranty and how long have they been in business? An experienced design professional may help you sort out and evaluate the advertising claims of various brands.

The important thing to note is that each brand of synthetic turf is a system, made up of similar but variable components, each of which plays a role in producing the physical properties and performance characteristics of that system.

These components include:

Base construction. The first step in constructing a synthetic turf field will be to strip the site, cut, and fill to level, grade and compact the soil. Next, drainage pipes will be installed and connected to a collection system surrounding the field. Generally, a geotextile separation fabric then is installed to separate the subsoil from the base.

The base then will be constructed. The base provides a stable platform for the synthetic turf and aids in drainage. Two types of bases commonly are used for synthetic turf fields:

* An unbound base consists of loose laid aggregates. The aggregates chosen may be graded (based on highway specifications) or may be a carefully chosen mixture of coarse and fine aggregate, capable of compaction yet allowing free draining. The latter form is known as a "dynamic base." It is important to obtain expert advice on the design of a dynamic base so that the finished base can be compacted and fine graded as necessary, while the drainage is retained. In general, an unbound base promotes drainage.

* An engineered base consists of an aggregate foundation topped by an asphalt pavement, installed in one or two courses. An engineered base may add stability and enhance planarity.

Either type of base will be designed for specific site conditions and to accommodate the local climate, especially freeze/thaw activity. An owner should not overlook the importance of base design. A well-engineered and well-constructed base contributes importantly to both the performance and durability of a synthetic turf system.

Shockpad. Some, but not all, synthetic turf systems incorporate an elastic layer, or shockpad, between the base and the turf. Various materials are used, including rubber mats and felt pads, as well as rubber granules mixed with polyurethane binder on site and laid with a paving machine.

Carpet (sometimes called fabric). The carpet consists of a yarn or fiber (most commonly polyethylene, polypropylene or a blend of the two) of varying thickness (expressed in microns), which may be straight, twisted, curly or textured. Most commonly, the yarn is produced in sheets, which are split into thin strips or ribbons and then slit with razors to create multiple strands. The ribbons are then twisted together and tufted through a backing cloth to form the carpet. This type of carpet helps to stabilize and prevent excess movement of the infill. Alternatively, some carpets are manufactured from single strands of yarn, known as monofilament.

The quantity of yarn used and the distance between the tufts (or stitch gauge) will vary from system to system. Some systems use more yarn or closer tufts; others use more infill. Yarn quantity is expressed in units of tex, a ratio of mass to length, or in weight (ounces per square foot).

Backing cloths also vary. A good backing cloth is easily tufted, resists fraying, absorbs coatings, is UV and rot-resistant, and has high dimensional stability. This means that the finished product will not creep or stretch, minimizing line movement.

Once the yarn has been tufted into the backing cloth, coatings, including polyurethane and latex coatings, may be applied to the backing to help to hold the tufts in place (called increasing the "tuft bind") and to increase the dimensional stability of the finished carpet. In some brands, the coatings are applied only to the individual tufts, leaving the areas between the tufts uncoated for drainage. In others, the entire backing is coated and the carpet then is perforated for drainage if designed for outdoor use. If perforated, the size, number, and placement of perforations will vary from brand to brand. If carpet is to be used indoors and drainage is unnecessary, it may be ordered without perforations to increase its strength.

Once the carpet has been installed, the fibers may be further fibrillated to give them the look and feel of natural grass.

Seaming. Carpets are produced in rolls generally 3.5m to 4.5m wide (15 feet). These normally are laid across the field for its full width and seamed together. Seams may be secured by sewing, by use of adhesives, or both, with or without seam tapes, depending on the system. What is important is that the joints be neat, virtually invisible and durable.

Infill. The carpet then is filled with particulate material, the type and depth of which will vary from system to system. This "infill" holds up the long fibers in the carpet and contributes significantly to the performance characteristics of the system.

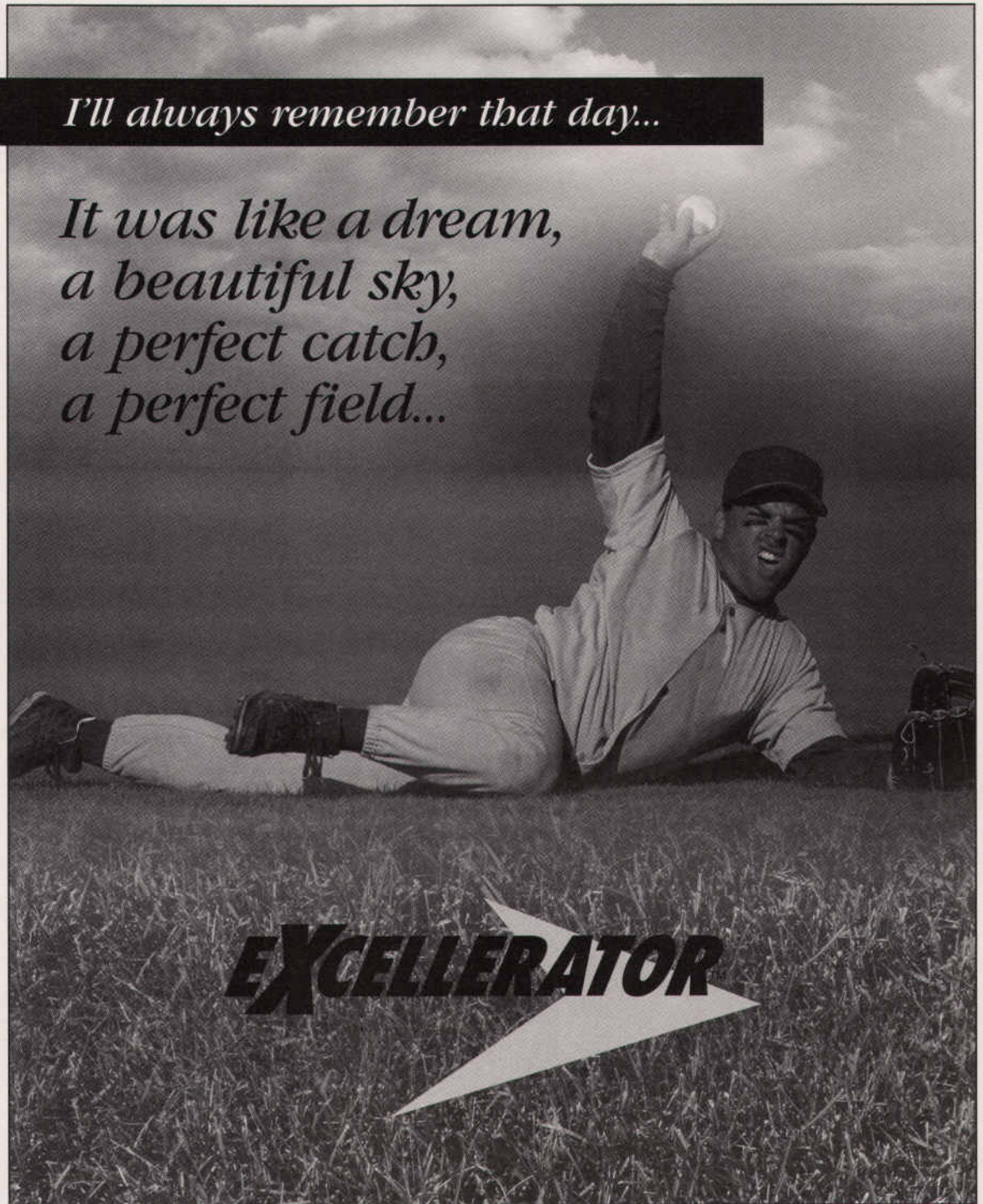
Infill materials most often are granulated rubber or rubber and sand, either layered or mixed. The rubber may be styrene-butadiene rubber (SBR) granules, black in color and produced from re-cycled tires, or ethylene propylene terpolymer (EPDM) granules, specifically produced to be granulated and available in black or in colors. SBR is considerably less expensive, but some have expressed concern because of the possible inclusion of contaminants, such as heavy metals, in recycled tire rubber. It is impor-

tant to inspect the rubber being used on the project for these contaminants and for overall quality and conformity to the published specifications.

Clearly, the components and the construction of synthetic turf systems vary. Depending upon the system, different components may play more or less of a role in the ultimate performance of the system. Some of the components described are incompatible with others. What is important is that you determine priorities and

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carefully query the manufacturer and/or installer regarding the particular components and some or all of the following characteristics of the proposed system:

- Construction
- Slope
- Depth
- Permeability
- Stability
- Suitability for local weather conditions

- Physical Properties
 - Tuft bind
 - Seam strength
 - Dimensional stability
 - UV stability
 - Permeability
 - Wear testing

- Performance/Safety Properties (Preferred performance properties may be sport specific)
 - Shock absorbency
 - Ball roll
 - Ball bounce
 - Traction - Rotational friction and sliding
 - Vertical deformation

Any budget for a synthetic turf field should provide for some testing. For example, a survey of planarity and percolation of the base before installation of the carpet is recommended. Materials delivered to the job should be sampled before they are

installed to insure that they are in compliance with the specifications. And, the completed system should be tested on site to confirm that the performance properties are as promised by the manufacturer or installer. The system should be tested again after the first year, when rain, freeze/thaw and use have settled the materials. It may be necessary to add fill at that time.

Another important area to explore before choosing a system is the recommended maintenance regimen for the systems being proposed. There is no question that some synthetic turf fields have been in place for years with little or no maintenance. It is equally clear that optimum maintenance schedules that enhance performance and extend the useful life of these relatively new systems, still are being developed. However, it is likely that any warranty will depend on adherence to recommended maintenance practices, which may include some or all of:

- * Dragging or brushing to redistribute infill
- * Brushing to lift pile
- * Brushing and/or vacuuming to remove debris
- * Localized topdressing at heavy wear areas
- * Grooming to relieve compaction of the infill
- * Removal of moss, algae and/or weeds.

Once a surface is chosen, you should draft specifications. The more specific and detailed your specifications, the more likely that prospective builders will submit comparable bids. Specifications should outline the scope of work, including subbase and base preparation, materials and accessories to be provided. Be sure to make clear in your specifications whether particular materials are required, or whether substitutions or equivalents are acceptable. Specifications also should outline performance criteria and testing to be conducted at the conclusion of construction. It may be advisable that you utilize a design professional to assist in developing specifications.

With so many systems available, it is important that an owner give a great deal of attention to choosing the best surface for a particular installation. Factors impacting that choice include initial cost, maintenance cost over the expected life of the surface, life expectancy, surface wear, reparability and performance characteristics, along with factors related to the reputation, experience, stability and responsiveness of the manufacturer and installer.

It is important to acknowledge that this product is breaking new ground.

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Because of the many advantages of synthetic turf products, the marketplace is virtually exploding. This growth will enhance research and development. It has and will encourage the entry of new competitors. There are variations in the size, experience and financial stability of companies offering turf products. Competition is fierce and, as in any new field, some problems are inevitable.

For example, what is an appropriate warranty? There simply isn't enough experience with this product to say. Obviously, the useful life of a synthetic turf field will depend on the quality of the products used and the skill of the installer. However, with many new companies entering the field, it also is obvious that the owner should research and question the manufacturer/installer's stability. Any warranty is only as good as the corporate and financial strength of the company that offers it.

Make specific choices

Make specific choices regarding additional facilities, amenities, and accessories to be included in your field project.

A fine field begins with a well-built base and a quality surface, but it doesn't end there. Will the construction project include benches, bleachers, fencing, lighting, scoreboards, a new track or track repair and reconstruction, construction or relocation of field events? Most owners want a complete project and, often, it is more economical to construct it all at the same time than piecemeal.

You also should budget funds for equipment such as goals and field markers, as well as for utility vehicles and apparatus for routine maintenance of the field.

Hire a qualified contractor

Choosing the right contractor can determine the ultimate success of your facility. A knowledgeable and experienced contractor can help you to make the right

A SUCCESSFUL PROJECT WILL DEPEND ON:

1. Thorough planning
2. Proper site analysis
3. Professional design and engineering
4. A quality turf product
5. Expert construction including proper drainage, a stable base and a quality surface
6. Proper integration with the surrounding track and/or other site structures
7. Accurate marking

decisions resulting in a quality project. Turf field construction is a highly specialized field within the construction industry. It is vital that the contractor you choose be familiar with the current marketplace, as well as with the type of surface you intend to install.

How do you find a qualified contractor? One way is to contact the ASBA. As the trade association for sports builders, the ASBA can provide a Directory of its members. In addition, the ASBA conducts a certified builder program for track builders, many of whom also build turf fields. The Association also conducts an inquiry program, requesting information on your behalf from contractors and suppliers who have the answers to your questions. (See our online list of Certified Track Builders and our online inquiry form on our website at www.ustctba.org.)

Another way to locate such specialists is by contacting municipal facilities and schools that have recently completed projects. Ask whether or not they would recommend their contractor and, further, ask some specific questions. Was the job completed on time? Did it meet the owner's expectations? Were there any hidden costs? Was the contractor able to solve any problems that arose during construction? If there have been any post-construction problems, was the builder responsive in

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taking care of them? How does the field look? How does it perform? Remember, the experience, skill and reliability of the prospective builder all are important.

Once you have the names of a few builder prospects, consider the following:

* How many years has the company been in business? If it is a relatively new

company, what is the work experience of its principals? How many fields have they built? Were they responsible for the complete project, just for surfacing, just for site work? Look for individuals or for a company with specific knowledge and experience in turf field construction.

* Does the company have experience in the type of project you contemplate? Look for a company with experience in projects similar in size and scope to yours.

* Ask for references and for a complete list of recent projects. If a significant project is omitted from the list of references, there may be a reason for that omission. Call references and ask questions. Determine as much information as you can about a prospective contractor's knowledge, experience, workmanship, ability to meet schedules, financial responsibility, and accountability. If possible, visit completed projects and talk to owners.

* Get references from design professionals, subcontractors, bankers and bonding companies.

* Ask about a contractor's insurance; have there been any major accidents or claims against the builder? Consider using ASBA's Contractor Qualification Form to secure necessary information.

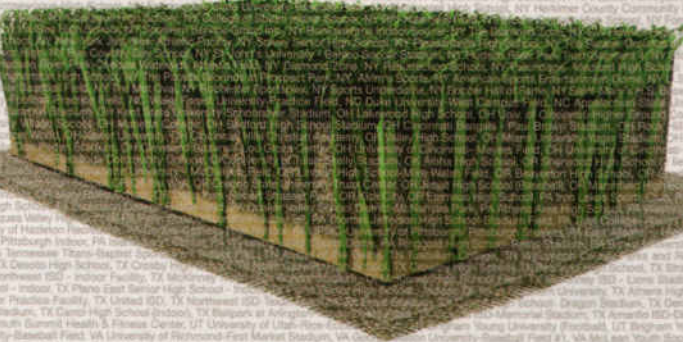
* Ask about awards and recognition. Has the contractor won any awards for its work? Have the contractor or any of its employees been certified or accredited by any trade organization?

* Check on lawsuits. If the contractor has been or is currently involved in litigation, find out the details. Check with your local Better Business Bureau, or with any local licensing agency, for consumer complaints.

* Ask to meet the individuals who will be involved with your project, particularly the job superintendent. Does the contractor/superintendent seem knowledgeable about measurements, orientation, materials, construction, and marking of turf fields? Does he understand grading, drainage, site preparation and base materials? Is he familiar with different turf surfaces? Can he make recommendations regarding specific surfaces for your needs? Is he a Certified Track Builder (CTB) or a member of the ASBA? What is his current workload; can he realistically handle your project within a reasonable time frame?

* Consider communication. You want a contractor who listens to you and responds to your needs. You want someone with whom you feel comfortable, someone with whom you can establish rapport. You want a contractor who will build the facility you want, not one who will build his standard field and move on. You

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want a contractor in whom you have confidence. Don't underestimate the value of a good working relationship.

* Ask for proposals in writing and compare them carefully. Ensure that the bids, including products to be used and methods of construction, are equivalent to your specifications. What is included and what is not included in the contract price? Who is responsible for such items as permits, site preparation, identification and relocation of utilities, taxes, insurance, removal and replacement of trees and shrubbery? Such items, while essential to the project, may or may not be included in the bid; whether or not they are included can significantly affect the contract price and the overall project cost. Even if construction materials and methods are identical and items included in the contract are consistent, look beyond price when comparing proposals. Compare proposed construction schedules, progress payments, and guarantees and warranties.

* Be sure that you understand what is included in any guarantee or warranty, e.g., materials, workmanship or both, and for how long. Is the warranty or guarantee backed by a bonding company, or if not, does the contractor have the financial ability and the reputation for backing up his work? Remember that a warranty is not a substitute for a quality installation by a reputable builder.

* Rank the proposals and then attempt to negotiate a contract with your first choice builder. If the bid of your preferred contractor seems high, question the bidder to determine why. Remember that price is not the only consideration. A project which is initially more expensive but which provides long-term satisfaction and wears well is a good value.

* Once you have chosen a contractor, confirm your agreement in writing. The contract documents should be as specific as possible and should include, where appropriate, a construction contract, conditions of the contract, drawings and specifications defining the scope of work including labor, materials, equipment and transportation to construct the project.

* Consider appropriate bonding. You may require a bid bond, a performance bond and/or a payment bond. Also, you should require a certificate of insurance as proof that your chosen contractor has adequate insurance coverage.

If you, the buyer, are to make the right decisions regarding a field project, becoming a knowledgeable consumer is the first step. Asking questions is not only smart, it is essential. The investment of time and energy now can yield a huge return in the

future, in terms of a quality facility, and in the hours of enjoyment that will be derived from it. **ST**

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