



INVITATION FOR BID

AEPA IFB #016-G

ATHLETIC SURFACES – SYNTHETIC TURF

PART B – SPECIFICATIONS

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1. Scope of Bid

AEPA is seeking qualified, experienced contractor(s) who possess the necessary resources and capabilities to acquire, deliver and perform the required supplies, materials equipment, testing and labor to all participating member states (up to 26) necessary to:

Respond to request from AEPA member organizations which represent a number of different types of educational, governmental and public institutions seeking equipment, materials, and supplies, necessary to design, install, site preparation, materials testing, maintenance, renovation, repair, grooming and cleaning of synthetic turf fields. Also to provide as an options, equipment and installation services for in-ground equipment and accessories; field grooming equipment and supplies; and replacement or re-seeding of natural grass services.

These parts and supplies will include but are not limited to: different types and weights of synthetic turf, infill materials, in-ground equipment and accessories; irrigation and drainage systems;

Types of services may include, but are not limited to: construction, design and engineering services; installation and site preparation services; soil and materials testing, GMAX testing; warranty; grooming, cleaning, and maintenance; etc.

2. Type of Bid

This bid is considered a:

YES	NO	TYPE OF BID
	√	CATALOG: A catalog bid is utilized when the products and/or services solicited are clearly identified with set and specific characteristics, attributes and configurations that are identifiable as a stand-alone single unit and can be listed and priced as a single unit with options that can be added to enhance and/or improve its operation and functionality. The Bidder offers a fixed discount(s) off retail price or prices in a Commercially Available Catalog. The discounts may be for the entire Commercially Available Catalog, for specific products, product lines, manufacturers or category of products as determined by the Bidder. See Pricing section for detailed information on Catalog Pricing.
√		LINE- ITEM: A line-item bid is utilized when the products and services solicited cannot be identified or listed as a single unit; consists of a number of different variables and configurations, it is necessary to identify the specific project or application; the end product or solution is made of individually priced elements or components and the end product's or solution's cost is derived by the Vendor Partner specially prepared and providing a quote based on the project's terms, conditions and requirements. See Pricing section for detailed information on Line-Item Pricing.

3. Anticipated AEPA Member Agency Participation

State	Parti- cipate? Yes/No/ Undecided	Other States Member Sells In	Est. 1 st Year Purchase Volume	% Grow th for Year 2-4	State	Parti- cipate? Yes/No/ Undecided	Other States Memb er Sells In	Est. 1 st Year Purchase Volume	% Growth for Years 2-4
California	Yes	AZ,NV	\$ 100,000	2%	Nebraska	Yes		\$ 100,000	
Colorado	Yes		\$ 500,000	10%	New Jersey	Yes		\$ 1,000,000	
Connecticut	Yes	MA,ME,NH, NY,RI,VT	\$ 600,000	10%	New Mexico	Undecided			
Florida	Yes	AL,GA		33%	North Dakota	Yes		\$ 500,000	
Indiana	No				Ohio	Yes		\$ 2,000,000	
Iowa	No	IL,SD			Oregon	Yes		\$ 1,569,442	
Kansas	Yes	OK	\$ 2,000,000	2%	Pennsylvania	No	DE,HI, MD,NY,		
Kentucky	Yes	AL,GA,LA,MS, NC,SC,TN,WV	\$ 100,000	2%	Texas	Yes		\$ 1,000,000	
Massachusetts	No				Virginia	Yes		\$ 3,000,000	
Michigan	Yes			5%	Washington	Yes	AK,ID	\$ 10,000,000	
Minnesota	Yes	SD	\$ 1,600,000	2%	West Virginia	Yes		\$ 3,000,000	
Missouri		AR,IL,LA,SD			Wisconsin				
Montana	Yes	ID	\$ 50,000	5%	Wyoming	Yes	SD,UT	\$	
					Total	19		\$ 27,119,442	

Please note that individual AEPA Member Agencies that have indicated that they intend to participate in any contract approved under this solicitation, does not guarantee or mean that the individual AEPA Member

Agency will enter into a contract with any AEPA approved Vendor Partner. Each AEPA Member Agency will make that determination after reviewing Vendor Partner responses and AEPA's recommendation for acceptance and bid award. The AEPA Member Agency's contracting decision shall be final.

The above information relating to the estimated/projected volume for the first year for this solicitation is provided based on submittals from its members. AEPA Member Agencies anticipate that purchase volumes will increase in contract years two (2) through four (4). This information is provided as an aid to Bidders in preparing responses only. It is not to be considered a guarantee of volume under this IFB. The successful Vendor Partner's discount and pricing schedule shall apply regardless of the volume of business under the contract.

4. Glossary of Terms and Abbreviations

Abbreviations and Acronyms for Standards and Regulations: Where abbreviations and acronyms are used in specifications or other contract documents, they shall mean the recognized name of the organizations responsible for the standards and regulations in the following list. Names, telephone numbers, and websites are subject to change and are believed to be accurate and up-to-date as of the date of the contract documents.

- 4.1 Base Materials: Materials that provide porosity and stability such as crushed aggregate or porous pavement.
- 4.2 Denier: The weight in grams of 9,000 meters of fiber
- 4.3 Drainage System: A method of removing surface and subsurface moisture/water.
- 4.4 Fiber: A specific form of fibrous textile material that has a length at least 100 times its diameter or width.
- 4.5 Fiber Thickness: A measurement in microns (metric) or mils. (U.S.) of the thinnest cross section of a fiber.
- 4.6 G-Max: A measurement of impact (shock absorption) in terms of gravity units as a ratio of deceleration.
- 4.7 Infill: Loosely dispersed materials that are added to the synthetic turf system, typically sand, rubber, other suitable material, or a combination thereof.
- 4.8 Knitted: A process in which the yarn fibers of the pile are tied to the backing which was simultaneously constructed by transforming continuous strands of multi-filaments into a series of interlocking loops, each row of such loops hanging from the row immediately preceding it.
- 4.9 Water Permeability: The rate at which water flows through a surface or system cross-section or components of the cross-section.
- 4.10 Planarity: Uniformity of the surface as compared to certain fixed predetermined points or prescribed slopes.
- 4.11 Primary Backing System: A single or multiple layers of woven or non-woven materials, into which the fiber is either tufted or knitted, to provide the initial construction of the synthetic turf.
- 4.12 Secondary Backing System: A coating and/or woven or non-woven fabric layer(s) applied to the primary backing after the fiber pile has been tufted or knitted into place, which serves to enhance tuft bind and provide additional structural integrity.
- 4.13 Shock Absorbing System: Component(s) that add resiliency to the system.
- 4.14 Sub-grade: A stabilized foundation onto which the base materials and field systems are installed.
- 4.15 Synthetic Pile Fiber: Grass-like blades made of synthetic materials.
- 4.16 Synthetic Turf Systems: These systems are comprised of synthetic grass like surface piles, tufted, or knitted into a primary backing system to which a secondary backing system has been applied; with or without infill material (s); a shock absorbing system, and suitable base materials with an appropriate drainage system.
- 4.17 Tufted: A process by which the fiber yarns that form the pile are inserted into a previously prepared blanket-like primary backing.
- 4.18 Abbreviations that may be referenced in the specifications.
- 4.19 Amateur Athletic Union (AAU)
- 4.20 American Society for Testing and Materials (ASTM)

- 4.21 Deutsches Institut für Normung (DIN)
- 4.22 Federation of International Football Association (FIFA)
- 4.23 International Amateur Athletic Federation (IAAF)
- 4.24 National Collegiate Athletic Association (NCAA)
- 4.25 Synthetic Turf Council (STC)

5. Special Terms and Conditions

- 5.1 Acceptable bid security will be in an amount of \$25,000 with the principal being the Bidder and the Association of Educational Purchasing Agencies being the Agency of Record. Bid Security may be a one-time bid bond underwritten by a surety company licensed to issue bid bonds in the state of Nevada and said surety to be approved in federal circular 570 as published by the United States treasury department or the equivalent in cash or an irrevocable letter of credit from a FDIC financial institution. The bid security shall remain in force for one hundred twenty (120) days of bid opening.
- 5.2 The Vendor Partner will warranty all parts and materials for at least 90 days from date of purchase or manufactures' warranty, whichever is longer.
- 5.3 Vendor Partner will endeavor to supply products that are made in the United States of America.
- 5.4 Contractor's License: Each of the 26 states covered by this solicitation has its own state licensing qualifications, requirements and processes. The Vendor Partner is responsible for knowing each state's requirements and codes. At the time of the response, Vendor Partner must be able to comply with all licensing requirements. For those states where licenses are required, a copy of the appropriate licenses authorizing the Vendor Partner to undertake or purports to undertake, supervise, subcontract others, to construct or to provide services and materials described herein, shall be provided within 5 business days of request, and must have been in effect as of the date this bid was issued. If the Vendor Partner intends to subcontract with other qualified distributors, dealers or firms, the subcontractors must be listed and copies of their licenses shall be submitted by the Vendor Partner within 10 business days following request. All required licenses will be kept current and in compliance with the rules and regulations of each state's regulatory agency.
- 5.5 Any contract awarded under this Category is an indefinite-quantity contract for synthetic turf with or without installation.. All costs associated with preparing quotes/job orders/cost proposals shall be the responsibility of the contractor and must be based on a detailed scope of work and in compliance with one of the approved pricing methodologies.
- 5.6 The Vendor Partner must be willing and able to demonstrate its past experience on at least five (5) acceptable installation of full-size football, soccer, baseball field, or other athletic/recreational fields (minimum of 70,000 square feet) in the United States within the past three (3) years.
- 5.7 The Vendor Partner must have the capacity to provide design, site inspection, site preparation and construction services for synthetic turf fields. These services may be provided by the Vendor Partner's own staff or by subcontractors contracted and supervised by the Vendor Partner.
- 5.8 The Vendor Partner is responsible for ensuring that the design and construction drawings and manual clearly indicate, identify and communicate the products, services and testing that must be provided to deal with site preparation and public utilities; sub-base-works, drainage systems; and synthetic turf surfaces that comply with AAU, NCAA, FIFA, and state requirements.
- 5.9 For any project the proposer must comply with the Americans with Disabilities Act (ADA) (42 USC Section 12101 et seq.) and the Americans with Disabilities Act Architectural Guidelines (ADAAG), as well as the implementing requirements, 28 CFR Part 36, Federal Register, Vol. 56, No. 144, July 26, 1991, as amended.
- 5.10 The Vendor Partner must possess a knowledge and understanding of all federal, state, and local government codes, regulations and building codes dealing with the construction and installation of synthetic turf surfaces.

6. Standard Specifications [Fixed Specifications]

Item	Description
6.1	All charges and components necessary for performance of the contract shall be clearly identified even if such are not specifically addressed in any paragraph or sub-paragraph or form that is a part of this request.
6.2	If the Vendor Partner intends to utilize independent agents/distributors, subcontractors and/or third-party agents to perform and/or provide any part of the products and services offered herein, the Vendor Partner must identify all providers and any and all associated costs with these providers.
6.3	Optional services must be identified separately, and must include clear descriptions of proposed services.
6.18	Vendor Partner shall provide a Material Safety Data Sheet (MSDS) for all items sold, if required. A separate sheet shall be provided for each individual item when purchase is made.

7. Product | Category Specific Specifications

Item	Description
7.1.	The standards and specifications provided below are intended to establish minimum requirements and provide a general overview of the quality and type of products and services being requested.
7.2.	Any products and services offered are to meet or exceed all local and state building codes.
7.3.	The products and services may include, but are not limited to, the following.
7.4.	Provide technical and consulting services relating to athletic and recreational field surface design, characteristics, construction, and integration into the development of a new athletic or recreational facility.
7.5.	Provide existing site inspection and investigation to identify soil conditions existing at the site in order to take into account the conditions found in the designing of athletic and recreational fields. The investigation shall include, but not be limited to:
7.5.1.	Stripping, placement of backfill and base construction in order to ensure the minimization of the risk of problems due to subsoil and subgrade conditions.
7.5.2.	Soil inspection for the existence of peat or other organic soils at the site.
7.5.3.	Inspection for uncontrolled fill materials or waste materials at the site.
7.5.4.	Inspection for expansive soils at the site.
7.5.5.	High ground water conditions or surface water retention areas (low area flooding).
7.6.	Provide all labor, materials, equipment and drawings required to provide design services for a project cost proposal with a complete scope of work, including all products, services and athletic and recreational field specifications with their associated costs. A preliminary construction time schedule shall be a part of the project proposal.
7.7.	Provide all labor, materials, equipment, project drawings and construction documents necessary to establish, construct, install lines and markings required to complete the athletic or recreational field as identified and specified within the project documents for the individual Member's project scope of work and documents.
7.8.	Provide all labor, materials and equipment required to assess and evaluate existing facilities, and develop and establish a plan of action for maintenance, repair and/or renovation of the existing athletic and recreational field to

Item	Description
	condition as required by the Member.
7.9.	Provide ongoing technical support and training services for AEPA Member's staff relating to the maintenance and operation of these types of facilities to ensure their good operational condition.
7.10.	The synthetic turf surface should provide the performance characteristics, components, and construction that meet the needs of the declared use and/or functions.
7.11.	The synthetic turf system and all of its components should be resistant to moisture, rot, mildew, bacteria, fungus growth, ultraviolet ray degradation, non-toxic, not cause commonly known allergic reactions at all field locations, and meet AEPA Member local state and environmental requirements.
7.12.	Each synthetic turf system should be constructed to provide dimensional stability and resist damage from wear and tear during athletic and recreational usage.
7.13.	Any Project to Include:
7.13.1.	Assess and determine existing site conditions and Member's expectations for the project.
7.13.2.	Develop a proposed solution to conform to and meet the Member's expectations while considering and ensuring the following:
7.13.2.1.	The solution proposed is adequate and functional within the existing site conditions and will comply with all building codes.
7.13.2.2.	Provide labor, materials, equipment and supervision necessary to complete installation of synthetic turf, including the following:
7.13.2.2.1.	Site inspection and investigation.
7.13.2.2.2.	Site preparation and sub-base.
7.13.2.2.3.	Inspection and approval of sub-base.
7.13.2.2.4.	Installation of proposed synthetic turf system with accessories, striping and equipment.
7.13.2.3.	Provide cost estimates and information relating to after-the-sale ongoing inspection and maintenance services to ensure proper operation and upkeep of the synthetic field.
7.13.3.	Construction and installation services to prepare and install proposed synthetic turf system on the designated site in accordance with the shop drawings, striping plan and manufacturer's instructions and specifications.
7.13.4.	Guarantee the usability and playability of the synthetic turf system for its intended uses for an eight (8) year period commencing with the date of substantial completion and acceptance by the Member. The warranty coverage shall not be limited to the amount of usage.
7.13.5.	Prior to order of materials, the contractor shall submit the following:
7.13.5.1.	Sample warranty.
7.13.5.2.	Seam layout of the field and striping plans.
7.13.5.3.	Details on construction, especially any details that may deviate from plans and specifications.
7.13.6.	Prior to the beginning of installation, the manufacturer/installer of the synthetic turf shall inspect the sub-base and supply a Certificate of Sub-Base Acceptance for the purpose of obtaining manufacturer's warranty for the finished synthetic playing surface.
7.14.	Components for Synthetic Turf Systems to include but not limited to:
7.14.1.	Synthetic Turf Types: There are several different types of synthetic turf available. They are distinguishable through the use of different fibers and different construction. Differentiated by construction are the tufted or the knitted synthetic turf systems. Both systems are comprised of synthetic fibers with primary and secondary backing systems and a resilient shock absorbing

Item	Description
	system. The shock absorbing system can consist of infill, a padding system, or a combination of both.
7.14.2.	Fiber: Typically, the fiber used in synthetic turf is textured and/or non-textured polypropylene, polyester, polyethylene, nylon or other suitable performing hybrid or copolymer in tape form or monofilament. Minimum fiber sizes are 50 microns for polypropylene or polyester, 100 microns for tape form (slit-film) polyethylene, 140-300 for monofilament polyethylene (shape dependent) and 500 denier for nylon. Fiber sizes for hybrids or copolymer will comply with the most closely related fiber type. Ideally, all fibers should be of the same chemical composition, shape, and texture. Fibers should be compliant to ASTM guideline for total lead content.
7.14.3.	Primary Backing Systems Material: The primary backing materials are of a woven or non-woven fabric in one or more layers which are utilized in the tufting process, or of high strength polyester multi-filament fiber utilized in the knitting process. This backing material provides the initial dimensional stability for the system.
7.14.4.	Secondary Backing Systems Material: The secondary backing materials are applied through a coating process with a single or multiple applications of one or various materials.
7.14.5.	Perforations: Depending on the final construction of the turf system, the system may or may not be permeable to water. Perforations are typically required of fully coated system backings to provide adequate vertical drainage throughout the system. Some turf systems may allow for drainage without perforations by employing a process of partial coating or other system designs. Developments in coating systems have provided for lighter weight and aqueous permeable chemicals; however, the drainage criteria must be met.
7.14.6.	Infill Materials: The most recent generation of synthetic turf systems utilizes a long pile height and needs to be supported with infill materials for directional stability and structural integrity, as well as resiliency. The infill materials commonly used are EDPM, TPE, natural cork, ground fibers from coconut shells, coated and non-coated silica sand, crumb and coated rubber, other suitable materials, or combinations of sand, rubber, or other suitable materials
7.15.	Performance of Synthetic Turf
7.15.1.	Traction: The surface should provide good traction in all types of weather with the use of conventional athletic type shoes applicable to the sports and/or activity specified.
7.15.2.	Rotational Resistance: The surface should allow for twisting movements as is common in athletic activities. Rotational resistance measures the ability of the user to perform twisting motions when in contact with the surface.
7.15.3.	Slip Resistance Component: The system should enable a predictable range of movement between the user and the surface uniformly throughout. The surface should balance traction and slippage by way of the sliding coefficient.
7.15.4.	Surface Abrasiveness: The field surface should have fibers and infill materials that minimize skin abrasions.
7.15.5.	Impact Attenuation (g-max): The field surface should have the ability to adequately absorb player impact with the surface. The g-max and force reduction tests are two tests typically used. G-Max values may vary from location to location on a playing surface. Such variances shall be taken into account when setting maximum test values. A maximum, not-to-exceed limit should be specified for the life of the warranty. The STC's guideline is that g-max should be below 165 for the life of the field.
7.15.6.	Surface Stability (vertical deformation): The surface should provide adequate stability so that the athlete can maintain body control to help prevent or properly control contact between athletes. This is an important consideration

Item	Description
	that should be balanced with the surfaces' ability to absorb impact. If the surface is too soft, the stability provided by the field may not be optimal for player movement and body control.
7.15.7.	Ball-Surface Interaction: The synthetic turf playing field should provide consistent and predictable ball performance reaction characteristics.
7.15.8.	Surface Uniformity: The synthetic turf playing field should be as level as practical. The synthetic surface shall provide a true and uniform playing surface throughout.
7.15.9.	Ball Bounce: The synthetic turf field should provide a ball bounce as close to the optimal playing characteristics of the sport or sports. The published standards for the regulatory organizations as applicable for each sport should be referenced.
7.15.10.	Ball Roll: The synthetic turf field should provide a ball roll as close to optimal playing characteristics of the intended sport or sports. The published standards for the regulatory organizations as may be applicable for each sport should be referenced.
7.15.11.	Appearance: Unless otherwise dictated by design, the synthetic turf should have a consistent color, texture, and shade without significantly noticeable streaks or other irregularities when observed in any direction.
7.16.	Warranties for the synthetic turf field systems should include the following:
7.16.1.	Acceptable uses for the field
7.16.2.	Expected number of yearly hours of use of the field
7.16.3.	Type of shoes used
7.16.4.	Fading
7.16.5.	Color match within specifications
7.16.6.	Excessive fiber wear
7.16.7.	Acceptable loss of pile height over time
7.16.8.	Wrinkling and panel movement
7.16.9.	Shock absorbency (g-max)
7.16.10.	Seam integrity
7.16.11.	Drainage
7.16.12.	Response time for required repairs/replacement
7.16.13.	Approved maintenance equipment
7.16.14.	Other items deemed relevant
7.17.	Maintenance:
7.17.1.	A regular schedule of maintenance should include but not limited to surface cleaning, debris removal, grooming, and infill replenishment, redistribution, and de-compaction.
7.17.2.	The maintenance procedures and equipment, as specified by the synthetic turf manufacturer or Synthetic Turf Council's Guidelines for the Maintenance of Infilled Synthetic Turf Surfaces, January 2013, for additional information.
7.18.	Other Considerations:
7.18.1.	The synthetic turf supplier, unless the base is part of their scope of work, should perform an inspection of the field planarity base on to which the synthetic turf system is to be installed and to examine the finished surface for required compaction, water permeability, and grade tolerances. After any discrepancies between the required materials, application, and tolerance requirements noted have been corrected, the owner's representative (architect/engineer) should review and approve for compliance with documents. The acceptance of the base construction should be included in the certification for warranty validation.
7.18.2.	Extra Materials: the synthetic turf manufacturer and installation contractor can provide extra sections of synthetic turf material for future repairs. If necessary, this should include materials for all colors used with any lines, markings, and

Item	Description
	logos. Quantities to be predetermined. This allows for materials from the same manufacturing run to be utilized for minor repairs.
7.19.	Drainage System Components
7.19.1.	The system chosen will depend on the use of the field, climate, amount of rainfall, and other factors.
7.19.2.	The drainage system may include but not limited to the synthetic turf, pad, base materials, and collector pipes that collect and remove storm water from the playing field.
7.19.3.	The design of the drainage system is dependent upon local conditions, climates, and site constraints.
7.19.4.	Collector pipes are typically perforated polyvinyl chloride (PVC) or polyethylene (PE) pipes. Size and type of perforations are dependent upon the size of the pipe. If perforations are larger than the smallest aggregate in the base material then a geo-textile sock filter may be used to encapsulate the pipe-care should be taken to ensure that the openings in the geo-textile fabric are compatible with the granular smaller components so that they do not block the pores and reduce water flow. A qualified civil or geotechnical engineer should be consulted to determine the suitability of using a product with a geo-textile sock in conjunction with the selected base materials. Additionally the compressive strength of various systems can differ greatly and care should be taken to keep construction traffic off of the systems until enough stone has been placed and compacted.
7.19.5.	The expected performance evaluation and the systems used should undergo an independent engineering analysis.
7.20.	Base Materials
7.20.1.	The aggregate base on which the synthetic turf is installed provides a structurally sound foundation for field construction, and a media for drainage of the field. The base materials should contain the necessary components and characteristics to satisfy local conditions. A good geotechnical report will provide essential information for a firm and stable base for the synthetic turf.
7.20.2.	Depending on the local site conditions, a geo-textile fabric may be placed over the entire sub-grade and within the pipe trenches prior to the installation of the base materials to minimize contamination of the aggregate and possible clogging of the perforated drainage pipes. Where soil conditions warrant, a polyethylene, PVC, or other impermeable sheet liner may be used in lieu of the geo-textile to inhibit storm water infiltration into the subsoil.
7.20.3.	The aggregate materials utilized to construct the field base must be a properly graded washed crushed stone to provide a balance between stability and permeability. A highly fractured material is desirable to provide the surface stability required for the synthetic turf surfacing, supplemental padding or porous paving as applicable. The graded aggregate particle sizes must be tightly controlled to fall within the bandwidth for all specified sieve sizes with just enough fines to provide stability while still allowing for sufficient drainage. Minimum stability and permeability requirements should be determined and confirmed by an independent certified laboratory prior to construction of the base course.
7.20.4.	The base materials should be thoroughly compacted to prevent differential settlement across the field area. Minimum compaction levels typically should not be less than 95% density as measured by a standard proctor test. Special attention should be given to backfill compaction of any utility trenches that cross the field area. Care should also be taken not to over compact, which could affect drainage.
7.20.5.	If pavement is required by design, the base materials may be porous, conventional asphalt or concrete.

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7.20.6.	Water permeability rates for both the field's surfacing and the field base materials should be designed to accommodate the local weather patterns and storm water management regulations. The permeability of both the field surface and the base materials will typically decrease over the life of the field. An adequate factor of safety should be utilized to provide initial infiltration rates for the completed field above those required by the local weather conditions.
7.21.	Shock Absorbing Resilient Underlayment Systems
7.21.1.	Performance Characteristics: The selection of the cushion layers should be closely coordinated with the performance characteristics of the synthetic turf utilized. The cushion layers should provide shock absorption without compromising footing and surface stability.
7.21.2.	Prefabricated Cushion Layers (Pad): If included in the design, these cushion layers are rolls or tiles of resilient material installed under and occasionally adhered to the synthetic turf backing.
7.21.2.1.	Physical Characteristics: Prefabricated cushion layers are typically comprised of rubber, polyurethane foam, or other suitable materials. The rubber pads are SBR rubber fibers or granules bound together with a polyurethane binder and usually come as roll or piece goods and should be permeable. The foam cushion layers are typically polyurethane or polyvinyl chloride and should be water permeable for drainage.
7.21.2.2.	Performance Characteristics: The selection of the cushion layers should be closely coordinated with the performance characteristics and requirements of the synthetic turf system utilized. The cushion layers should provide shock absorption without compromising footing and/or surface stability.
7.21.2.3.	Water Permeability Rate: The system is to be permeable by design with adequate drainage, perforations through all of the cushioning layers to provide for adequate drainage through the system as specified.
7.22.	Irrigation System:
7.22.1.	The installation of a manual or automatic irrigation system can be considered for synthetic turf installations. Guidelines on whether synthetic fields are watered are determined by factors such as region, climate, turf material, player traffic type, and level of games played.
7.22.2.	It is recommended that the design be reviewed and approved by a recognized irrigation consultant or landscape designer.
7.23.	Seams:
7.23.1.	Each panel or roll should be attached to the next with a seam to form the playing substrate of the field. Seams should be glued with a supplemental backing material or sewn with high strength sewing thread. The bonding or fastening of all system material components should provide a permanent, tight, secure, and hazard-free athletic playing surface.
7.23.2.	Adhesive: Synthetic turf adhesives should be applied by experienced, professional installers. The adhesives should provide a strong, hazard-free, and durable bond between the adjacent turf panels or sections and to be usable for installation under variable weather conditions. The adhesive should also be resistant to water, fungus, and mildew. Synthetic turf adhesives include: one-part adhesives (urethanes), two-part (epoxy or urethane), hot melt, and water-based (latex).
7.23.3.	Seaming Tape: The tape is comprised of a fabric that should be installed below the backing material on both sides of a seam or inlay. The fabric used for seaming tape should provide dimensional strength and enough surface texture and width to bond well with the adhesive and the turf backing material on each side of the seam.
7.24.	Lines and Markings:
7.24.1.	Installation: Lines and markings should be installed on the synthetic turf surface

Item	Description
	in one of three methods: with paint, with colored fiber that is either tufted or knitted into the synthetic turf panels, or installed as inlays. Tufted in or inlaid lines and markings are a permanent part of the surface.
7.24.2.	Painted lines and markings installed with either permanent or temporary paint require maintenance. Even permanently painted lines require additional paint on a periodic basis.
7.24.3.	Synthetic turf and fibers utilized for the tufted or inlaid lines and markings should be similar to that used in all other areas of the field and installed to the same tolerances.
7.25.	Inserts:
7.25.1.	They can include covers for goal sleeves and anchors and conversion of baseball infield clay areas to synthetic turf.
7.25.2.	The synthetic turf used for the inserts should be similar to that used in the area adjacent to the insert.
7.25.3.	The inserts should be anchored securely to the surrounding areas so that they cannot be displaced by the activities occurring on the field and installed to the same tolerances.
7.26.	Synthetic Turf Material Production Quality Assurance .
7.26.1.	Testing of materials should be performed prior to shipment of product to the job site.
7.26.2.	The synthetic turf rolls should be randomly sampled and tested by the manufacturer who will certify that they meet the specification.
7.26.3.	Testing may include pile composition, pile weight, total weight, pile height, tuft bind (without infill), and grab/tear strength.
7.26.4.	The manufacturer, to certify in writing at the owner request that the test results meet or exceed the synthetic turf specification.
7.27.	Construction and Installation
7.27.1.	Inspection:
7.27.1.1.	Synthetic materials should be inspected prior to installation for:
7.27.1.1.1.	Damaged or defective goods
7.27.1.1.2.	Missing goods or quantities
7.27.1.1.3.	Correct fiber type
7.27.1.1.4.	Correct turf pile height and weight
7.27.1.1.5.	Proper tuft bind
7.27.1.1.6.	Correct backing perforation diameter and spacing, if applicable
7.27.1.1.7.	Materials out of tolerance with the specification
7.27.2.	Sub-Grade Preparation
7.27.2.1.	The sub-grade should provide a stabilized foundation upon which base materials and subsequent components of playing field systems will be installed.
7.27.2.2.	It should also provide the pitched surface on which storm water is directed toward the active drainage system for evacuation.
7.27.3.	Shape and Compaction: Prior to placement of base materials, the sub-grade should be shaped to an appropriate profile and compacted by proof rolling to obtain a firm even surface. Depressed areas should be filled and unsuitable materials removed and replaced with clean fill or aggregate. Compaction should be performed to achieve a minimum of 95% in accordance with ASTM D698 Standard Proctor Method. The appropriate moisture content must be maintained in the field sub-grade to allow for optimal levels of compaction.
7.27.4.	Sub-Grade (Rough) Planarity: The tolerances for the finished sub-grade should not exceed one-half (1/2") inch as measured by a 10-foot straight edge. Grading of the sub-grade shall minimize pending to the extent practical. The use of laser guided and controlled equipment is highly recommended for sub-grade preparation.

Item	Description
7.27.5.	Aggregate:
7.27.5.1.	Installation of the aggregate base should provide a close, evenly textured surface meeting the required tolerances.
7.27.5.2.	Extreme care should be taken to ensure that there is no disturbance to the sub-grade and that there is no displacement of the soil separator. All disturbed, displaced, or damaged material is to be repaired or replaced.
7.27.5.3.	The aggregate base should be placed in a manner that will produce a uniform and evenly graded mass to the specified depth. The material should be placed and spread by the appropriate equipment and methods in successive horizontal layers not exceeding the depth per synthetic turf manufacturer's specifications. Pockets that occur as a result of stone segregation during installation should be removed and replaced. After correct placement, each lift shall be uniformly compacted with a self-propelled roller to achieve the specified density.
7.27.5.4.	The field base materials should be thoroughly compacted to prevent any significant differential settlement across the area of synthetic turf surfacing. The appropriate moisture content must be maintained in the base materials to allow for optimal levels of compaction.
7.27.5.5.	Finish-Grade Planarity (surface tolerances): Irregularities in the surface of the base materials are typically reflected in the finished field surface. To controlled tolerances the contractor is to use a laser guided and controlled equipment for subgrade preparation. The local deviation of the finished surface of the base stone should not exceed ¼ in. in any direction when measured beneath a 10-foot long straight edge. Hollows and depressions, which may have developed during the process of compacting the base, should be filled with acceptable material and re-compacted.
7.28.	Shock Absorbing Resilient Underlayment System:
7.28.1.	Cushion-Layer (Elastic Layer Pad) Installation: If required by design, the in situ cushion layers should be installed with specialized paving equipment used only for in situ pad. All paving seams should be hand rolled and troweled. All cold joints in the pad should be pretreated with a polyurethane primer. The specified thickness of the in situ pad should be continuously monitored for consistency. The components of the in situ cushion layers should be thoroughly mixed. The mixing ratios should also be monitored for consistency. The cushion-layer system should be securely placed on the field base materials. The in situ cushion surface should not vary more than ¼ in. in 10 ft. as measured in any direction with a string line or straight edge.
7.28.2.	Seam Installation: If required by design, prefabricated cushion-layer systems are typically installed as roll or piece goods. The head seams at the end of each roll should be staggered across the field. When required by the padding manufacturer, all glued cushion-layer seams should be butted together and a permeable or mesh type fabric should be adhered to the surface of the cushion layer at all seam locations to bridge the cushion-layer joints. (This does not apply to sewn seams).
7.28.3.	Resilient Infill: If required by design, the infill material should be applied when in a dry condition and should not be applied unless the synthetic turf is also dry. The infill material should be applied in consistent layers with multiple applications. It is critical to insure that synthetic fibers are not trapped underneath the infill. After application of each layer, the synthetic turf should be dragged and/or brushed according to the manufacturer's recommendations in order to lift the fibers and distribute the infill material into the turf system in a consistent manner.
7.29.	Irrigation System
7.29.1.	Sprinklers located inside the field of play are not acceptable. The installation of multiple infield sprinklers is and can affect the turf's adhesion to the field base.

Item	Description
	This can have a negative effect on the completed turf planarity and consistency. Use of agricultural, long range sprinkler guns mounted on riser posts or long range perimeter pop-up sprinklers buried at grade level, the popup sprinklers provide discrete, low level, unobtrusive, long range performance with the ability to throw beyond the half way line.
7.29.2.	Sprinkler installation design would allow for minimum spray disruption for slight wind conditions.
7.29.3.	Manual or remote controllers can be offered
7.29.4.	Warning notification sound and visual safety measures to ensure players, spectators and service personnel are not at risk from the water jet as the sprinklers are activated can be offered.
7.30.	Synthetic Turf Installation:
7.30.1.	All synthetic turf systems should be installed to provide stability that will prevent panels from shifting or bunching.
7.30.2.	The synthetic turf panels should be securely fastened together for the warranted life of the system. These seams can be glued or sewn depending upon the synthetic turf system . Seam gaps should be minimal and uniform. For tufted infill systems the gap between the fibers should not exceed the gauge of the tufting. For other synthetic turf systems, the seam gaps should not exceed 1/16 in.
7.30.3.	Edge anchoring may consist of a concrete curb, a treated wood header, a composite material, or a trench drain. These may vary by design and region, but should always provide a secure anchor.
7.30.4.	Inlaid lines and markings should consist of synthetic turf with contrasting colored fiber installed in lieu of painted fiber. Inlay gaps should be uniform. For tufted systems, the gap between the fibers should not exceed the gauge of the tufting. Lines and markings must conform to the appropriate association or organization suggested guidelines for the intended level of use.
7.30.5.	Care should be taken during installation to account for rapid fluctuations in temperature to avoid expansion and/or contraction which can affect the final installation. Temperature extremes should also be carefully monitored. The carpet should never be rolled or unrolled when frozen, which can cause cracking and irreparable damage to the secondary backing.
7.30.6.	Infill material installation to follow the manufacturer's installation recommendations.
7.30.7.	G-Max testing to be performed by an independent testing company or lab.
7.31.	Clean-Up
7.31.1.	Turf contractor shall provide the labor, supplies and equipment as necessary for final cleaning of surfaces and installed items.
7.31.2.	All usable remnants of new material shall become the property of the Member.
7.31.3.	The turf contractor shall keep the area clean throughout the project and clear of debris.
7.31.4.	Surfaces, recesses, enclosures, etc., shall be cleaned, as necessary, to leave the work area in a clean, immaculate condition ready for immediate occupancy and use by the Member.
7.32.	Field Quality Control
7.32.1.	At the time of substantial completion and bi-annually during the life of the warranty, the Contractor shall perform a series of tests using an independent testing agency to evaluate the shock absorption characteristics of the field. The tests shall be performed on a 50 foot grid in both directions using an accelerometer in accordance with ASTM F1936 and ASTM F355. Test the field at a minimum of 12 points and submit the results to the Owner within 30 days of testing. At no point shall any reading exceed 160 Gmax during the life of the warranty. If any point exceeds the maximum deceleration, the Contractor shall

Item	Description
	make corrections to provide the allowable Gmax deceleration at the Contractor's expense. Owner has the option to engage a qualified independent testing and inspecting agency to perform field tests and inspections and prepare test reports.
7.32.2.	Testing and inspecting of completed applications of synthetic turf system shall take place in suggestive states, in areas of extent and using methods that are industry standard.
7.32.3.	The Contractor is to remove and replace items where test results indicate that it does not comply with specified Gmax requirements.
7.33.	Field Markings and Decorations
7.33.1.	A complete field "Lining, Marking, and Field Boundary" system will be provided with the installation of the surfacing system.
7.33.2.	Field markings are to be installed in accordance with approved project shop drawings and marking plan.
7.33.3.	Tufted lines, hash marks, ticks, and number markings, shall conform to the manufacturers' specifications and recommendations.
7.33.4.	Striping layouts shall be accurately surveyed by the Contractor before installation of tufted field markings.
7.33.5.	Install tufted lines and markings only when the surface is completely dry.
7.33.6.	AEPA Member will provide logos as required in a format that the contractor requires. The Contractor shall submit shop drawing of logo to include colors, dimensions and locations for approval prior to ordering and installation.
7.34.	Synthetic Turf Maintenance
7.34.1.	The turf manufacturer to provide detailed written maintenance instructions and training of maintenance personnel. Maintenance to include but not limited to cleaning, stain removal, minor seam repair, dragging, or redistribution of any infill material, and management of infill compaction. The Vendor Partner can offer equipment and supplies that are required for the maintenance of the synthetic turf surface. Utilizing this equipment as recommended by the turf manufacturer will generate the proper maintenance in relation to any future warranty claims.
7.34.2.	Seam Repair: Seams that open or become loose may require some immediate and temporary gluing until they can be inspected and corrected by the installation builder. The gluing should conform to the written maintenance suggested guide- lines provided by the synthetic turf vendor.
7.35.	Quality Assurance
7.35.1.	Manufacturer - Proposed solutions must be equal to or better than those available from nationally-recognized manufacturers specializing in outdoor synthetic turf products for athletic and recreational facilities.
7.35.2.	Manufacturer Qualifications - Manufacturer must have ten (10) years of experience in the manufacture of synthetic turf systems which meet and/or exceed the standards and guidelines presented herein.
7.35.3.	Engineering Qualifications - The Vendor Partner must have a professional engineer, licensed in the state where the field is to be installed to review and certify that the proposed site, site conditions and synthetic turf system being supplied and installed meets or exceeds the design criteria of the specifications, and the site conditions exceed the minimum requirements of the system's design performance standards set by the manufacturer.
7.35.4.	Installer Qualifications - Factory-trained and certified with a minimum of three (3) years' experience of successfully installing synthetic turf systems. Must have the appropriate contractor's license as required by the state or local jurisdiction where the field will be installed.
7.36.	Project Documents and Submittals
7.36.1.	Design Documents

Item	Description
7.36.1.1.	Planning
7.36.1.2.	Grading Plan
7.36.1.3.	Drainage Plan
7.36.1.4.	Edge Details
7.36.1.5.	Installation Instructions and standards
7.36.2.	Project Schedule
7.36.3.	Shop Drawings - Show all site preparation, materials, supplies and fixtures to be furnished even if provided by others.
7.36.4.	Synthetic Turf Product Data Sheet and Specifications.
7.36.5.	Material Safety Data Sheets (MSDS)
7.36.6.	Testing Requirements
7.36.6.1.	G-Max Testing
7.36.6.2.	Lead and Heavy Metal Testing
7.36.6.3.	All turf fiber, infill, base and subbase, etc
7.36.7.	Maintenance Manual and Instructions
7.36.8.	Samples - Samples of materials and colors as requested by the owner or owner's representative.
7.36.9.	Detail information on all items and work to be provided and/or performed by the Member and stipulate minimum requirements.
7.36.10.	Warranty
7.36.10.1.	Written warranty documents
7.36.10.2.	Warranty insurance policy.
7.36.11.	Cost Proposal - Detail breakdown of all costs associated with the design, manufacture, delivery, installation, and warranty of the proposed solution per contract documents.
7.37.	Project Close-out
7.37.1.	The Contractor and the Member's representative shall conduct a complete and extensive site inspection of all work performed and products provided and installed.
7.37.2.	The Contractor shall provide the necessary testing data to the owner that the finished field installed meets the required shock attenuation, as per ASTM F1936.
7.37.3.	The turf material shall be non-combustible and pass the DIN standard Pill Burn test or ASTM D 2859.
7.37.4.	The Contractor to provide a written acceptance by the turf manufacturer that the turf and base system is installed in accordance with their recommendations prior to final completion.
7.37.5.	Upon completion of the work, the Vendor Partner will present the Member with all documents necessary. to close out the project. Including, but not limited to:
7.37.6.	Certificate of occupancy.
7.37.7.	Maintenance manuals.
7.37.8.	Up to four (4) complete sets of "as built" project drawings, showing the actual locations of seams, drains, in-ground equipment and other accessories installed/provided as required by AEPA Member.
7.37.9.	Minimum of two (2) copies each of any installed equipment as required by AEPA Member.
7.37.10.	Manufacturer's Instructions and Maintenance Manuals, which will include all necessary instructions for the proper care and preventative maintenance of the synthetic turf system, including painting and markings, procedures of use and executed warranties on installed products and equipment.
7.37.11.	Any state, local and/or manufacturer's inspection report or certificate certifying that all state, local and manufacturer's standards, codes and requirements have been met.

Item	Description		
7.37.12.	All warranty information.		
7.38.	Material Specification, Performance Guidelines, Properties and Lab and Field Tests Requirements		
7.38.1.	All minimum and maximum values take into account acceptable industry manufacturing tolerances plus or minus 2% of the variance.		
7.38.2.	Testing to meet the minimum standards of the Synthetic Turf Council recommendations are for specific purposes such as the following.		
7.38.3.	All minimum values should be evaluated as they relate to the system performance.		
7.38.4.	Site testing shall be at ambient shaded air temperature of 40 - 100°F. Laboratory testing shall be at ambient indoor temperature unless otherwise specified by the test method.		
7.38.5.	Base Materials Test Requirements		
Test Property	Method of Determination	STC Guidelines	Lab/Field Test
Size of particle mix	ASTM D422 Particle size analysis	As per specification	Lab (on site material)
Drainage	ASTM F1551/DIN 18035:6 Permeability to water* ASTM D2434 Permeability of Granular Soils (Constant Head)	Min. of 0.01 cm/s (14 in. per hour)	Lab or Field **
Compaction (Density)	ASTM D698 Compaction Using Standard Effort ASTM D2922 Compaction of Soil In Place by Nuclear Methods	To set criteria for ASTM D2922 Min. 90% Standard Proctor	Lab/Field
Final Grade	ASTM F2157 Test method for Base Material Evenness	Less than 1/4 in. over 10 ft 6mm over 1m	Field
7.38.6.	Determination in the lab: It is necessary to seal the test ring to the base of the sample. The edges of the sample must also be sealed to prevent any water from flowing around rather than through the sample.		
7.38.7.	** Determination in the field: An exact seal is typically not attainable and the test is not as accurate/reproducible due to the lateral flow of water and the problems of determining the areas through which the water is flowing.		
7.39.	Turf Characteristics For Tufted Infill Systems (Typical for High School, Collegiate, and Professional Playing Fields)		
Test Property	Method of Determination	STC Guidelines	Lab/Field Test
Manufacturer of System (name)	Manufacturer Declaration	Not Specified	N/A
Pile Fiber ID	Manufacturer Declaration	Not Specified	N/A

Item	Description		
Primary Backing System ID	Manufacturer Declaration	Not Specified	N/A
Secondary Backing System ID	Manufacturer Declaration	Polyurethane/Latex/Fabrics	N/A
Pile (face weight)	ASTM D5848	Min. 30 oz./sq. yd.	Lab
Primary Backing System Weight	ASTM D5848	Min. 5.5 oz./sq. yd.	Lab
Secondary Backing System Weight	ASTM D5848	Min. 16 oz./sq. yd.	Lab
Pile Height	ASTM D5823	Sport specific or as specified	Lab/Field
Pile Height above infill	Measurement	Must meet system specs	Lab/Field
Yarn Thickness	ASTM D3218	Min. 75 microns	Lab tested
Yarn Denier	ASTM D1577	Min. 500 (nylon)	Lab tested
Grab Tear Strength	ASTM D5034	Min. 150 lbs.	Lab
Tuft Bind	ASTM D1335	Min. Avg. 6 pounds	Lab only
Flammability	ASTM D2859 "Burning Pill"	Passing result tested as installed	Lab
Color Uniformity	Visual	No significant change	Lab & Field
7.40.	Turf Characteristics For Knitted Turf Systems		
Test Property	Method of Determination	STC Guidelines	Lab/Field Test
Manufacturer of System (name)	Manufacturer Declaration	Not Specified	N/A
Pile Fiber ID	Manufacturer Declaration	Not Specified	N/A
Primary Backing System ID	Manufacturer Declaration	Not Specified	N/A
Secondary Backing System ID	Manufacturer Declaration	Glued: Acrylic Loose laid: Polyurethane, or Acrylic	N/A
Pile (face weight)	ASTM D5848	Min. 55 oz./sq. yd.	Lab
Primary Backing	ASTM D5848	Min. 8 oz./sq. yd.	Lab

Item	Description		
System Weight			
Secondary Backing System Weight	ASTM D5848	Glued: Min. 3 oz./sq. yd. Loose laid: 1/4 in. (6 mm) pre-coat & attached cushion weight combined is min. 50 oz./sq. yd.	Lab
Pile Height	ASTM D5823	Min. 0.5 in.	Lab/Field
Pile Height above infill	Measurement	N/A	Lab/Field
Yarn Denier	ASTM D1907	Min. 500 (nylon)	Lab
Yarn Thickness	ASTM D3218	Min. 75 microns PE Min. 50 microns PP	Lab
Grab Tear Strength	ASTM D5034	Min. 350 pounds	Lab
Tuft Bind	ASTM D1335	Min. Avg. 6 lbs.	Lab
Flammability	ASTM D2859 "Burning Pill"	Passing result tested as installed	Lab
Relative Abrasiveness	ASTM F1015	Measurement	Lab
Color Uniformity	Visual	No significant changes	Lab & Field
7.41.	Turf Characteristics For Tufted Polypropylene (Pp), Polyethylene (Pe), Or Nylon Systems (Non-Infill Systems)		
Test Property	Method of Determination	STC Guidelines	Lab/Field Test
Manufacturer of System (name)	Manufacturer Declaration	Not Specified	N/A
Pile Fiber ID	Manufacturer Declaration	Nylon 6 or 6,6; PP, PE	N/A
Primary Backing System ID	Manufacturer Declaration	Not Specified	N/A
Secondary Backing: System ID	Manufacturer Declaration	Polyurethane	N/A
Pile (face weight)	ASTM D5848	Min. 48 oz./sq. yd.	Lab
Primary Backing Weight	ASTM D5848	Min. 6 oz./sq. yd.	Lab
Secondary Backing System Weight	ASTM D5848	Min. 16 oz./sq. yd.	Lab
Pile Height	ASTM D5823 or D6859	Min. 0.45 in.	Lab/Field
Pile Height above infill	Measurement	N/A	Lab/Field
Fiber			

Item	Description		
Conditioning	Manufacturer Declaration	Texturized	N/A
Yarn Denier	ASTM D1907	Min. 500 Nylon	Lab
Yarn Thickness	ASTM D3218	Min. 75 microns PE Min. 50 microns PP	Lab
Yarn Elongation	ASTM D2256	N/A	Lab
Grab Tear Strength	ASTM D5034	Min. 150 pounds	Lab
Yarn Breaking Load (Tensile strength)	ASTM D2256	Mfr. recommended spec	Lab
Tuft Bind	ASTM D1335	Min. Avg. 6 lbs.	Lab
Flammability	ASTM D2859 "Burning Pill"	Passing result tested as installed	Lab
Color Uniformity	Visual	No significant changes	Lab & Field
7.42.	INFILL Materials		
7.42.1.	Infill Materials: The most recent generation of synthetic turf systems utilizes a long pile height and needs to be supported with infill materials for directional stability and structural integrity, as well as resiliency. The infill materials commonly used are sand, rubber, other suitable materials, or combinations of the following:		
7.42.1.1.	EPDM (Ethylene Propylene Diene Monomer) is a polymer elastomer with high resistance to abrasion and wear and will not change its solid form under high temperatures. Typical EPDM colors are green and tan. EPDM has proven its durability as an infill product in all types of climates. Its excellent elasticity properties and resistance to atmospheric and chemical agents provide a stable, high performance infill product.		
7.42.1.2.	TPE (Thermo plastic elastomer) infill is non-toxic, heavy metal free, available in a variety of colors that resist fading, very long lasting, and 100% recyclable and reusable as infill when the field is replaced. TPE infill, when utilizing virgin-based resins, will offer consistent performance and excellent g- max over a wide temperature range.		
7.42.1.3.	Organics: There are several organic infill utilizing different organic components, such as natural cork and or ground fibers from the outside shell of the coconut. These products can be utilized in sports applications as well as for landscaping.		
7.42.1.4.	Silica Sand: This product is a natural infill that is non-toxic, chemically stable, and fracture resistant. Silica sand infills are typically tan, off-tan or white in color and depending upon plant location, may be round or sub-round in particle shape. As a natural product there is no possibility of heavy metals, and the dust/turbidity rating is less than 100. It can be used in conjunction with many other to provide a safe and more realistic playing surface. The round shape plays an integral part in the synthetic turf system. Silica sand have a high purity (greater than 90%) to resist crushing and absorption of bacteria and other field contaminants. Silica sand can either be coated with different materials as a standalone product or can be used to firm up in combination with traditional crumb rubber infill systems.		

Item	Description		
7.42.1.5.	Coated Silica Sand: This class of infill consists of coated, high purity silica sand with either a soft or rigid coating specifically engineered for synthetic turf. These coatings are either elastomeric or acrylic in nature (non-toxic) and form a bond with the sand grain sealing it from bacteria to provide superior performance and durability over the life of a field. Coated sand is available in various sizes to meet the application's needs.		
7.42.1.6.	Crumb Rubber: Two types of crumb rubber infill exist: Ambient and Cryogenic. Crumb rubber infill is substantially metal free, and, according to the STC's Guidelines for Crumb Rubber Infill Used in Synthetic Turf Fields, should not contain liberated fiber in an amount that exceeds .01% of the total weight of crumb rubber, or .6 lbs. per ton.		
7.42.1.7.	Coated Rubber: Both ambient and cryogenic rubber can be coated with colorants, sealers, or anti-microbial substances if desired. Coated rubber provides additional aesthetic appeal, reduction of dust by products during the manufacturing process and complete encapsulation of the rubber particle.		
7.42.1.8.	Hybrid: Constitutes the use of sand, rubber, or other suitable materials in various combinations. (This should not be confused with hybrid carpet systems that consist of a combination of fiber types.)		
Test Property	Method of Determination	STC Guidelines	Lab/Field Test
Material Identification	Manufacturer Declaration	Must meet system specifications	N/A
Grain Size (Particle Size)	ASTM D442 (soil) ASTM D5644 (rubber)	Must meet system specifications	Lab
Depth	Measurement from top of infill to surface of fabric	Must meet system specification at all locations 3/8 in. (± 9 mm)	Lab/Field
Flammability	ASTM D2859 "Burning Pill"	Passing result tested as installed	Lab
Color Uniformity	Visual	No significant changes	Lab/Field
7.43.	Shock Pad Layer Properties		
Test Property	Method of Determination	STC Guidelines	Lab/Field Test
Material Identification	Manufacturer Declaration	Must meet system specifications	N/A
Mix Design	Manufacturer Declaration	Must meet system specifications	N/A
Drainage	ASTM F1551/DIN 18035-6 Water Permeability	Min. of 14 in. per hour	Lab/Field
Components Size Rubber / Stone (gravel)	ASTM F1508 Sieve Analysis	Must meet system specifications	Lab
Evenness	ASTM 2157: Test method for Base Material Evenness	Less than 1/4 in. over 10 ft. (6 mm over 3 m)	Field
Thickness	Measurement	Meet system spec at every point measured	Lab/Field

Item	Description		
		(+1/4 in./-0) (+6 mm/-0 mm) cushion layer	
7.44.	Performance Guidelines		
7.44.1.	The values indicated on these Tables are based on the performance of infill systems currently available and found to be satisfactory nationally and internationally.		
7.44.2.	Performance Guidelines for (North American) Football Fields		
Property	Description	Test Method	STC Guidelines
Shock Absorption	A measure of the surface's ability to absorb impact energy	ASTM F1936 (<i>g-max</i>)	Shall not exceed 200 at each test point*
Deformation	A measure of the degree a surface deforms when a player runs across it	ASTM F2157-02**	≤ 10 mm
Drainage	Measure of water passage	ASTM F1551	14 in./hr. Base 10 in./hr. Turf System
7.44.3.	Performance Guidelines for Soccer Fields		
Property	Description	Test Method	STC Guidelines
Ball Rebound	A measure of how high a ball bounces vertically	ASTM F2117	30% - ≤ 50%
Ball Roll	A measure of how far a ball rolls	EN 12234	4m - 10m
Force Reduction	A measure of the impact energy absorption of a surface when a player runs across it	ASTM F2157-02	55% - 70%
Deformation	A measure of the degree a surface deforms when a player runs across it	ASTM F2157-02*	≤ 10mm
Rotational Resistance	A measure of the foot grip provided by the surface	EN 15301 Method 1	25Nm - 50Nm
Drainage	Measure of water passage	ASTM F1551	14 in./hr. Base 10 in/hr. Turf System
7.44.3.1.	*To prevent compaction the mass must be caught after each impact		
7.44.3.2.	Legend		
7.44.3.3.	ASTM - Test method published by the American Society for Testing and Materials		
7.44.3.4.	EN -Test method published by the European Standards Organization		
7.44.3.5.	FIFA -Test method described in FIFA Handbook of Test Methods and Requirements for Artificial Turf Football Surfaces		
7.45.	Materials Specifications		
7.45.1.	The reference specifications, as established by the Synthetic Turf Council, are "typical" examples of minimums that are most commonly encountered and have fulfilled reasonable expectations for successful performance. Deviations from these minimums can be expected due to product innovations or quality upgrades and can be considered when properly justified in terms of their expected performance.		
7.45.2.	All tests prior to, during, or after installation are to be specifically listed and understood by all parties as to their execution and financial responsibility.		
7.45.3.	Environmental Conditions: Suitable weather conditions are important for the		

Item	Description
	successful installation of the systems.
7.45.4.	In the event of questionable conditions, the manufacturer's recommendation should be obtained to prevent the possible voiding of any warranties (particularly as it applies to adhesives).
7.45.5.	Synthetic Turf Specification
FIBER:	
Material	PE, PP, Nylon 6, or Nylon 6.6
Denier	Must meet system specs
BACKING (primary/secondary):	
Weight primary	Not less than 5.5 oz. Per sq. Yd.
Weight secondary	Not less than 16 oz. Per sq. Yd.
Additional backings	Optional
FABRIC:	
Width	12 ft. to 15 ft.
Tuft bind	> 6.8 lbs. or 30 N
Pile height	Sport specific or as specified
Pile weight	Not less than 30 oz./per sq. yd. Must meet system specifications.
Grab tear strength	Not less than 150 lbs.
Pill burn test	Passing results tested as installed.
INFILL SYSTEM:	Depending on Manufacturer's recommendation.
Depth of infill	Nominal, per Manufacturer's recommendation.
Impact attenuation	The standard for G-max is a maximum value of 165 at each test point. G-max values may vary from location to location on a playing surface. Such variances should be taken into account when setting maximum values.
Water Permeability	Turf cushion layer - min. 10 in./hour
7.45.6.	Knitted Synthetic Turf Specification - Short pile
FIBER:	
Material	PE, PP, Nylon 6, or Nylon 6.6
Denier	Min. 500 Nylon
Thickness	Min. 75 microns PE or PP
BACKING (primary/secondary):	
Ground Yarn	Polyester multi-filaments
Weight primary	Min. 8 oz./sq. yd.
Acrylic	Min. 3 oz./sq. yd.
Polyurethane attached cushion	optional
FABRIC:	
Width	Typically 15 ft.
Tuft bind	N/A
Pile height	Sport specific or as specified
Pile weight	Min. 55 oz./sq. yd.
Grab tear strength	Min. 350 lbs.

Item	Description
Pill burn test	Passing results tested as installed
Total Weight	Min. 66 oz./sq. yd. (without attached cushion)
INFILL SYSTEM:	Depending on Manufacturer's recommendation
Impact attenuation	The standard for G-max is a maximum value of 165 at each test point. G-max values may vary from location to location on a playing surface. Such variances should be taken into account when setting maximum values.
Water Permeability	Turf cushion layer - min. 10 in. per hour base materials - min. 14 in. per hour
7.45.7.	Tufted Synthetic Turf Specification - Short pile
FIBER:	
Material	Nylon 6, Nylon 6.6, PE or PP
Denier	Min. 500 nylon
Thickness	Min. 75 microns PE Min. 50 microns PP
BACKING (primary/secondary):	
Woven PP/non-woven	Single or multiple
Weight	Min. 6 oz./sq. yd.
Scrap Coat	Min. 16 oz./sq. yd.
Attached cushion Secondary and/or cushion	Min. 32 oz./sq. yd. (as required)
FABRIC:	
Width	12-15 ft.
Tuft Bind	>6.8 lbs. or 30 N
Pile Height	Sport specific or as specified
Pile Weight	Min. 48 oz./sq. yd.
Grab Tear Strength	Min. 150 lbs.
Pill Burn Test	Passing results tested as installed
Total Weight	Depending on individual construction
SYSTEM:	
Impact attenuation	The standard for <i>G-max</i> is a maximum value of 165 at each test point. <i>G-max</i> values may vary from location to location on a playing surface. Such variances should be taken into account when setting maximum values.
Water Permeability	Turf/cushion layer: min. 10 in./hour Base materials: min. 14 in./hour
7.45.8.	Shock Pad-Pre-Fabricated Pad Systems Specification
Typical Requirement	
Thickness	0.375 in. ± 10%
Density	4.0 lbs./cu. ft. ±10%
Weight	38 oz./sq. yd.
Width	4 ft.
25% Compression Resistance (ASTM D1667)	10-12 psi
Tensile Strength	Typically 75 psi

Item	Description		
(ASTM D412)			
7.45.9.	Shock Pad-In Situ Systems Specification (typical ranges)		
Thickness:	35 mm	25 mm	20 mm
Density:	2 lbs./cu. ft.	1.5 lbs./cu. ft.	1.2 lbs./cu. ft.
Weight:	56 lbs./sq. yd.	40 lbs./sq. yd.	32 lbs./sq. yd.
Component:	SBR	Aggregate	PU Binder
	1-5 mm	1-3 mm	
Percentages (by weight):	60-63%	30-32%	5-10%
7.45.9.1.	Mix Design (all percentages by weight)		
7.45.9.1.1.	Note: Typically the mix design is determined first, to satisfy the needs of the field in relation to its declared use. The mix design then will determine the weight, density, and thickness which should fall within the parameters indicated.		
7.45.9.1.2.	SBR granules to be dust free, no elongated particles are allowed.		
7.45.9.1.3.	Aggregate to be washed/clean, preferably round (pea gravel).		
7.45.9.1.4.	Application to be performed by the use of continuous mixing device and suitable paving equipment.		
7.46.	Warranty		
7.46.1.	The Prime Contractor shall provide a warranty to the owner that covers defects in the prep-work, installation and workmanship, and further warrant that the installation was done in accordance with both the manufacturer's recommendations and any written directives of the manufacturer's onsite representative.		
7.46.2.	Manufacturer's warranty shall include for a period of eight (8) years:		
7.46.3.	General wear and damage caused from UV degradation.		
7.46.4.	The artificial grass field turf must maintain an ASTM 355 G-max in accordance with product specifications for the life of the warranty.		
7.46.5.	The warranty shall specifically exclude vandalism and acts of God beyond the control of the owner or the manufacturer.		
7.46.6.	Surface and the adhesives used in the installation are and will be free from defects in material and workmanship.		
7.46.7.	All defects for failures relating to field construction, drainage, synthetic grass seam rupture, and synthetic yarn UV stability, excessive wear and tensile strength.		
7.46.8.	The warranty must be supported by a paid-up insurance policy from an A.M. Best A-Rated insurance company to ensure that, if warranty work is required during the full eight (8) year required warranty period, the work can be obtained even if the manufacturer/Vendor Partner shall go out of business or no longer exist.		
7.46.9.	100% of field is covered for the entire warranty period in case of catastrophic failure.		
7.46.10.	There are no periods of non-coverage during the warranty period.		
7.46.11.	No annual deductible per field for warranty repairs.		
7.46.12.	The Prime Contractor shall provide a warranty to the owner that covers defects in the prep-work, installation, and workmanship, and further warrant that the installation was done in accordance with both the manufacturer's recommendations and any written directives of the manufacturer's on-site representative.		
7.46.13.	The Vendor Partner may offer extended warranties or maintenance agreements if available at an additional cost to Members. The maintenance contract must be offered as a separate line item.		

Item	Description
7.47.	The Contractor shall provide the necessary training for the proper care and maintenance for all material and equipment in order for them to develop a complete knowledge and understanding of the supplies, materials and equipment required to maintain and keep the synthetic turf system in good working condition through its product lifecycle.
7.48.	Optional Equipment and Accessories
7.48.1.	The Vendor Partner can offer and install in-ground equipment and accessories to include but is not limited to:
7.48.1.1.	Pole Vault Pit -The Vendor Partner shall provide synthetic surfacing material plugs, which are to be installed level to the surfacing of the respective runway and be of similar texture as the surrounding synthetic surfacing.
7.48.1.2.	Take-Off Boards
7.48.1.3.	Shot Put Toe Boards
7.48.1.4.	Shot Put Rings
7.48.1.5.	Discus Rings
7.48.1.6.	Combination Hammer/Discus Cage and cage must meet IAAF rules
7.48.1.7.	Hammer/Discus Conversion Ring
7.48.1.8.	Water Jump Hurdle with sleeves
7.48.1.9.	Water Jump Cover - The Vendor Partner is to install track surfacing onto the cover. The cover, when installed with synthetic surfacing on it, shall be flush with the surrounding area.
7.48.1.10.	Removable Track Curbing. The curb shall meet the requirements of the IAAF.
7.48.1.11.	Long Jump Sandpits and Traps.
7.48.1.12.	Sand - All sand for the long/triple jump sand pits shall be clean, washed, white sand, containing not more than five percent (5%) clay and shall be free of trash, organic matter, and rock. Installed sand shall meet all specifications of the IAAF - washed river sand, 0 to 2mm graining, no organic components, max 5% of weight up to 0.2mm. Prior to installation, the Vendor Partner shall provide the Member with a one (1) gallon sample for approval.
7.48.1.13.	Football goal posts and soccer goals
7.48.1.14.	Batting Cages
7.48.2.	Field groomer and sweeper
7.48.3.	Replacement of grass or re-seeding of natural grass as part of the synthetic turf project.

8. Pricing – See Pricing section in Part A – General Terms & Conditions for details

8.1 Pricing shall be completed on the provided pricing sheets (Microsoft Excel Workbook) with the individual tabs to be completed as follows:

- G.1 Base Bid Pricing (Required), All turf product offering will need to be added.
- G.2 State Multiplier (Required)
- G.3 Volume Discounts (Optional)

8.2 Bid pricing will be evaluated on a combination of items from both the Base Bid Pricing and State Multiplier pricing submittal. AEPA may also include as part of the evaluation process football, soccer, and baseball field with state multiplier on a site ready for installation for various AEPA Members. See Evaluation, Approval and Award in Part A, V. General Terms & Conditions for All Agencies for additional information.