SECTION 32 18 13

SYNTHETIC TURF

PART 1 GENERAL

1.1 DESCRIPTION OF WORK

A. Furnish all labor, materials, tools and equipment necessary to install all synthetic turf and infill as indicated on the plans and as specified herein and other related specifications. The installation of all new materials shall be performed in strict accordance with the manufacturer's installation instructions and in accordance with all approved shop drawings.

B. Turf Contractor shall be responsible for all synthetic turf work within the proposed perimeter curb including installation of drain cleanouts and tops, communication boxes and tops, shock pad, synthetic turf and infill.

C. Turf Contractor shall provide turf groomer/ sweeper and train County staff

1.2 RELATED SECTIONS

A. Construction Drawings and general provision of contract, including General and Supplementary Conditions and other Division 1 Specification Sections, apply to work of this Section.

1. Section 033000 – Cast-in-Place Concrete
2. Section 321123 – Aggregate Base Course and Underdrainage for Synthetic Turf
3. Section 321823 – Turf Base Shock Pad

1.3 REFERENCES

A. FM P7825 - Approval Guide; Factory Mutual Research Corporation; current edition

B. ASTM – American Society for Testing and Materials

1. D418 - Pile Height, Tuft Spacing, Face Weight, and Total Weight
2. D789 - Yarn Melting Point
3. D1335 - Standard Test for Tuft Bind of Pile Yarn Floor Coverings
4. D1577 - Standard Test Method for Linear Density of Textile Fiber
5. D1682 - Standard Method of Test for Breaking Load and Elongation of Textile Fabrics
6. D2256 - Standard Test Method for Tensile Properties of Yarns
7. D2859 - Standard Test Method for Ignition Characteristics of Finished Textile Floor Covering Materials (Pill Test)
8. D3218 - Standard Specification of Polyolefin Monofilaments (Yarn Thickness)
9. D4491 - Standard Test Methods for Water Permeability of Geotextiles by Permittivity
10. D5034 - Standard Test Method of Breaking Strength and Elongation of Textile Fabrics (Grab Test)
11. D5793 - Standard Test Method for Binding Sites per Unit Length of Width of Pile Yarn Floor Coverings (Stitch Gauge)
12. D5848 - Standard Test Method for Mass Per Unit Area of Pile Yarn Floor Covering
13. F355 - Standard Test Method for Shock-Absorbing Properties of Playing Surfaces.
14. F1015 - Standard Test Method for Relative Abrasiveness of Synthetic Turf Playing Surfaces

15. F1551-03 Suffix: DIN 18-035, Part 6: Water Permeability of Synthetic Turf Systems
16. F1951-99 Standard Specification for Determination of Accessibility of Surface Systems
17. F2765 – Standard Specification of Total Lead Content in Synthetic Turf Fibers
18. WK 22081 – Test methods for vertical permeability and synthetic turf sports field bases and system by bucket flood test method.

C. Most recent National Federation of High School Rules (NFHS) Rules and Interpretations or as applicable.

1.4 SUBMITTALS

A. Submit listed submittals in accordance with conditions of the Contract and Division 1 submittal procedures section.

B. Shop Drawings:

1. Recreation Field layout, field striping plan (soccer and lacrosse), methods of attachment and perimeter conditions.
2. Roll/Seaming Marking Plan, joint/carpet overlay detail at change in slope
3. Show installation methods and construction indicating field verified conditions, clearances, measurements, terminations, drainage including any details of construction that deviate from the plans and specs.

C. Turf Product Data:

1. Submit manufacturer's catalog cuts, material safety data sheets (MSDS), brochures, specifications; preparation and installation instructions and recommendations; storage, handling requirements and recommendations.
2. Submit fiber manufacturer's name, type of fiber and composition of fiber.
3. Submit carpet with specified infill flow rate, to meet specifications in contract drawings.
4. Submit data in sufficient detail to indicate compliance with the contract documents.
5. Submit manufacturer's instructions for installation.
6. Submit manufacturer's instructions for maintenance for the proper care and preventative maintenance of the synthetic turf system.

D. Infill Product Data:

1. Submit manufacturer's catalog cuts, material safety data sheets (MSDS), brochures, specifications, preparation and installation instructions and recommendations, storage, handling requirements, and recommendations.
2. Submit infill weight ratio based on selected turf manufacturer’s specific carpet type and blade stitch gauge based on the specification herein.
3. Submit carpet with specified infill flow rate, to meet specifications in contract drawings.

E. Samples:

1. Submit two (2) samples, one (1) 12”x12” (minimum) boxed including infill representing finished turf system, including pad if applicable – see construction drawings and one 12”x12” (minimum) loose and without infill. Loose sample should demonstrate seaming and include an inlaid line.
2. Submit a sample infill. Particle size gradation charts must also be included.

F. Product Certification:

1. Submit manufacturer’s certification that products and materials comply with requirements of the specifications.
2. Submit test results indicating compliance with Reference Standards.

G. Sweeper and Grooming Machine Product Data:

1. Submit manufacturer's catalog cuts, brochures, specifications, storage, handling requirements, and recommendations.

H. Project Record Documents: Record actual locations of seams, drains and other pertinent information in accordance with Division 1 Specifications Series, General Requirements.

I. List of existing installations: Submit list including respective Owner’s representative and telephone number.

J. Warranties: Per section 1.7, Submit Manufacturer’s warranty and ensure that forms have been completed in Owner's name and registered with approved manufacturer.

K. Testing Certification: Submit certified copies of independent (third-party) laboratory reports on ASTM testing:

1. Pile Height, Face Weight & Total Fabric Weight, ASTM D5848.
2. Primary & Secondary Backing Weights, ASTM D5848.
3. Tuft Bind, ASTM D1335.
4. Grab Tear Strength, ASTM D1682 or D5034.
5. Shock Attenuation, ASTM F1936
6. Water Permeability, ASTM D4491
7. Lead Content, ASTM F2765 (after carpet arrives on site)
8. Accessibility of Surface, ASTM 1951-99

L. Prior to Final Acceptance, the Contractor shall submit to the GORDON:

1. Delivery Tickets of all infill delivered to site. This will be used to determine if amount specified was installed. The Contractor will be responsible if any discrepancy exists.

M. Prior to Final Acceptance, the Contractor shall submit to the Owner:

1. Three (3) copies of Maintenance Manuals, which will include all necessary instructions for the proper care and preventive maintenance of the turf system, including painting and markings.
2. Project Record Documents: Record actual locations of seams, drains or other pertinent information.
3. Warranty: Submit Manufacturer Warranty and ensure that forms have been completed in Owner's name and registered with Manufacturer and Insurance Carrier. Submit information confirming that 3rd Party Insurance Policy, non-cancelable and pre-paid, is in effect covering this installation, and underwritten by an AM Best A Rated Insurance Carrier. Insurance carrier must confirm that the policy is in force and premiums paid.

N. Contractor shall provide certification that synthetic turf system is approved as ADA/ wheelchair accessible as determined by Test Method - ASTM 1951-99 (Standard Specification for determination of accessibility of surface under and around playground equipment). Proof of passing test report must be submitted.

1.5 QUALITY ASSURANCE

A. Synthetic turf field Manufacturer Qualifications: Company specializing in manufacturing products specified in this section. If proposing an equivalent product, the Turf Contractor and/or the Turf Manufacturer:

1. Must be experienced in the manufacture of each type of synthetic turf systems as outlined below:
   a. A minimum of 20 fields installed by the same manufacturer of 75,000 square feet or more in the United States.
   b. A minimum of 10 fields installed by the same manufacturer of 75,000 square feet or more in the United States that have been in place for a minimum of five (5) years.
   c. A minimum of five (5) multi-purpose recreation fields installed by the same manufacturer of 75,000 square feet or more in the United States, using the specified fiber and fill, in play. (For newer product types) These installations must have used the same manufacturer and product proposed for this field, including the same fiber and infill type etc.

B. Synthetic Turf Contractor/Installer Qualifications: Company specializing in performing the work of this section.

1. The Turf Contractor must provide competent workmen skilled in this specific type of synthetic turf installation. Technicians must have installed this type of system, with sewn seams and monofilament fiber, on at least 10 installations in the past three (3) years.
2. The designated Supervisory Personnel on the project must be certified, in writing by the turf Manufacturer, as competent in the installation of this material, including sewing seams and proper installation of the infill mixture with a minimum of five (5) years of experience in turf installations.
3. Installer shall be certified by the manufacturer and licensed.
4. The Manufacturer shall have a representative visit the site to certify, in writing, the installation and Warranty compliance.

C. Prior to the beginning of installation of the turf system, the turf installer (if different from base installer) of the synthetic turf shall inspect the stone sub-base. The installer will accept the stone sub-base in writing when the base contractor provides test results for compaction, planarity and permeability that are in compliance with the synthetic turf manufacturer’s recommendations.

D. The Turf Contractor shall provide the necessary testing data to the owner that the finished field meets the required initial shock attenuation, as per ASTM F1936.

E. Specified turf field system shall meet the G-max requirements under section 1.8.

F. The Owner reserves the right to reject and/or refuse acceptance of any or all aspects of the synthetic turf installation if it fails to meet the requirements of this specification section.

1.6 DELIVERY, STORAGE, AND PROTECTION

A. Deliver products to project site in wrapped condition.

B. Store materials/products in a safe and secure place, under cover and elevated above grade.

C. Prevent contact with materials that may cause dysfunction.

D. Deliver and store components with labels intact and legible.

E. Protect from damage during delivery, storage, handling and installation. Protect from damage by other trades.

F. Inspect all delivered materials and products to ensure they are undamaged and in good condition.

G. Comply with manufacturer’s recommendations.

1.7 WARRANTIES

A. The Contractor shall provide a warranty to the Owner that covers defects in materials and workmanship of the turf for a minimum period of eight (8) years from the date of substantial completion. The Turf Manufacturer must verify that their representative has inspected the installation and that the work conforms to the manufacturer's requirements. The manufacturer's warranty shall include general wear and damage caused from UV degradation. The warranty shall specifically exclude vandalism, and acts of nature beyond the control of the Owner or the manufacturer. The warranty shall be fully third party insured; pre-paid for the entire minimum eight (8) year term and be non-prorated. The Contractor shall provide a warranty to the Owner that covers defects in the installation 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 representative. Prior to final payment for the synthetic turf, the Contractor shall submit to owner notification in writing that the field is officially added to the annual policy coverage, guaranteeing the warranty to the Owner. The insurance policy must be underwritten by an “AM Best” A rated carrier and must reflect the following values:

1. Pre-Paid minimum eight (8) year insured warranty.
2. Insured Warranty Coverage must be provided in the form of one (1) single policy.
3. No maximum per claim coverage amount.
4. Minimum of ten-million dollars ($10,0000,000) annual aggregate
5. Must cover full 100% replacement value of total square footage installed, minimum of $7.50 per sq. ft. (in case of complete product failure, which will include removal and disposal of the existing surface) The warranty shall include all necessary materials, labor, transportation costs, dumping fees, etc. to complete any repairs under such warranty.
6. Policies that include self-insurance or self-retention clauses shall not be considered.
7. Policy cannot include any form of deductible amount.
8. Sample policy must be provided at time of bid to prove that policy is in force. A letter from an agent or a sample Certificate of Insurance will not be acceptable.

B. The warranty coverage shall not place limits on the amount of the field’s usage.

C. The synthetic turf system must maintain a G-max of less than 165 for the life of the Warranty as per ASTM F1936.

D. Repairs must be performed by the turf manufacturer's authorized maintainer and must be completed within two (2) weeks of notification.

1.8 TESTING

A. Contractor/Turf Manufacturer shall be responsible to provide independent laboratory G-max testing, per ASTM 355, 1936 method at substantial completion, to verify that the shock attenuation properties of the field meet the requirements set forth in this specification.

1. At the time of substantial completion, the system's shock attenuation shall have an average G-max value of 90-110 for the specified system, based on ASTM-F355A.
2. At no time shall the G-max value exceed 135 for the specified system throughout the life of the warranty.

B. Turf Manufacturer shall be responsible to provide independent laboratory Lead Content testing prior to substantial completion and final acceptance by Owner.

1. Two (2) representative samples of fiber(s) and locations on the field shall be tested by the test methods below. The total lead content measured shall be less than 300 mg/kg (ppm). Sample locations shall be chosen by the Owner.
2. The testing shall be conducted by an independent environmental laboratory accredited for heavy metal testing in solid and hazardous waste.
3. Prepare samples as outlined in EPA Method 3052 with the temperature modified from 180 +/- 5 deg C to 210 +/- 10 deg C.
4. Analyze prepared samples for lead using inductively coupled plasma-atomic emission spectrometry (AAS) as outlined in Test Method E 1613.
5. Report total lead content as mg/kg (ppm).

C. Turf Manufacturer shall be responsible to provide independent drainage testing of installed turf carpet with infill prior to substantial completion and final acceptance by Owner. The combined tests shall prove installed synthetic turf system's drainage capability shall allow water flow through the system at a rate of not less than 20 inches per hour.

1. ASTM test WK22081 – Test Methods for Vertical Permeability of Synthetic Turf Sports Field Base Stone and System by Bucket Flood Test Method. This test does not require special equipment and can be done in the field to test the vertical permeability before the synthetic turf is installed and after installation of the base is complete. This method does not require the application of a head and more accurately mimics rainwater conditions. It provides an opportunity to actually see the surface drain.
2. ASTM F1551 - Water Permeability of Synthetic Turf Systems and Permeable Bases. Test will provide permeability of synthetic turf carpet with infill.
3. Provide written report of permeability of base, and carpet with infill over base. Report shall include inches per hour rate.

PART 2 PRODUCTS

2.1 TURF MANUFACTURERS

A. Manufacturers for synthetic turf products shall meet or exceed the requirements listed in part 1.5. Synthetic turf products from manufacturers meeting the requirement of 1.05 shall meet or exceed the requirements listed in part 2.2.

B. Approved Turf Product/ Turf Manufacturers:

1. Legion Pro 1.75" as manufactured by Shaw Sports Turf; Local Product Rep Andrew Barksdale 864-363-4718.
2. Titan 1.75" as manufactured by A-Turf; Local Product Rep Dean Ferrell 716-204-0748
3. Rhino Blend 1.75" as manufactured by Astroturf, Local Product Rep Tim Jordan, 804-248-6588.
4. Fusion H 1.75" as manufactured by Hellas Construction, Local Product Rep Don Massey, 512-621-8014.
5. Vertex Core 1.75" as manufactured by Fieldturf, Local Product Rep John McShane 301-907-4727

C. Manufacturers of equivalent synthetic turf products may be permitted if meeting the requirements of 2.2 TURF MATERIALS below. Equivalent products will only be considered after contract award and their approval should not be assumed during the bidding process.

2.2 TURF MATERIALS

A. General: The synthetic turf shall be specifically designed, manufactured and installed for the intended sports. Sports to include but are not limited to soccer and lacrosse.

B. G-max: At the time of substantial completion, the system's shock attenuation shall have an average G-max value of **90-110 for the padded system specified** based on ASTM-F355A. At no time shall the G-max value exceed **135** throughout the life of the warranty.

C. The component materials of the synthetic turf field system consist of:

1. A carpet made of 100% polyethylene parallel-long slit and monofilament fibers blended in dual yarn types and dual yarn thickness and tufted into a backing. All backing must meet the drainage requirements below.
2. The fiber shall be low friction, UV-resistant measuring **1.75** inches high when tufted into the fabric.
3. All components and their installation method shall be designed and manufactured for use on outdoor athletic fields. The materials as hereinafter specified should be able to withstand full climatic exposure in all climates, be resistant to insect infestation, rot, fungus, mildew, ultraviolet light and heat degradation, and shall have the basic characteristics of flow-through drainage, allowing free movement of surface runoff through the synthetic turf fabric where such water may flow to the existing base and into the field drainage system.
4. The finished playing surface shall have no irregularities and shall afford excellent traction for conventional athletic shoes of all types. The finished surface shall resist abrasion and cutting from normal use.
5. Glue, thread, paint, seaming fabric and other materials used to install and mark the synthetic turf. Turf panels, including sideline panels, must be sewn. Glued panel seams are not acceptable.

D. The installed synthetic turf fabric system shall have at minimum the following specified properties:

Standard Method	Property	Specification – Mono/ Slit
ASTM D1577	PE Fiber Denier	10,800/ 5,000
UV Stabilizer		10,000ppm
ASTM D3218	Yarn Thickness	>300/ 100 microns ASTM
D2256	Yarn Breaking Strength	>25lbs
ASTM D5793	Stitch Gauge	min 3/8" – max 3/4"
ASTM D418/D5848	Pile Height	2.5"
ASTM D5848	Pile Weight	min. 44oz/square yard
ASTM D5848	Primary Backing	min. 8 oz/ square yard*
ASTM D5848	Secondary Backing	min 20 oz/ square yard*
ASTM D5848	Total Weight	min. 65 oz/ square yard
ASTM D1335	Tuft Bind (without infill)	min. 8 lbs
ASTM D1682/D5034	Grab Tear (width)	200 lbs/force
ASTM D1682/D5034	Grab Tear (length)	200 lbs/force
ASTM F1015	Relative Abrasiveness Index	<25
ASTM D4491	Carpet Permeability	>20 inches/hour
ASTM D789	Melt Point	>240 degrees F
ASTM D2859	Surface Flammability	8 of 8 Pass
ASTM F2765	Lead Content	<50 ppm

*Lower backing weight is acceptable if porous backing.

E. The carpet shall consist of tall pile polyethylene fibers tufted into a primary backing with a secondary coating.

1. The carpet shall be furnished in 15' wide rolls. Rolls shall be long enough to run from end to end without splicing. The perimeter lines or borders shall be tufted into the individual rolls. Head seams, other than at endline/sideline intersection, will not be acceptable.
2. Porous Backing:
   a. Primary backing shall be double-layered polypropylene fabric treated with UV inhibitors.
   b. The secondary backing shall consist of an application of porous, heat-activated urethane to permanently lock the fiber tufts in place.
3. Perforated Backing:
   a. The primary backing shall consist of two (2) layers of woven fabric and one (1) layer of non-woven fabric.
   b. The secondary backing of high-grade polyurethane shall be applied to the primary backing at a min of 25 oz/yd. Secondary backing adds resistance to water degradation and strengthens grip on fibers.
   c. The entire backing shall be perforated at a four (4) inch square interval with 3/16" holes to allow for drainage.
   d. Four (4) inch hole spacing must allow for water drainage of a minimum of 20" an hour. The 20" per hour must account for infill blockage. If the spacing cannot achieve 20" per hour, the hole spacing shall be increased to allow for such a rate. Turf manufacturer must submit product data for hole spacing and hole size for rate of permeability

F. Color: Synthetic turf shall consist of **two (2) tone blended fibers.** Manufacturer to provide color options for Owner selection.

G. Seams between turf panels must be sewn. The use of seaming tape and glue is not permitted. Thread for sewing seams of turf shall be as recommended by the synthetic turf Manufacturer based on the submitted turf product. Seams must be sewn with a high quality cord/thread.

H. Glue and seaming fabric for inlaying lines (if needed) and markings shall be as recommended by the synthetic turf manufacturer.

2.3 FIELD MARKINGS

A. The field will have the following lines tufted, inlaid, or painted according to National Federation of High School standards, whichever are applicable and shown on the plans.

Soccer

1. Soccer as shown on the contract drawings. Except where noted (construction details and below), color shall be four (4) inch white tufted lines:
   a. Touch (Side) lines
   b. Goal (End) lines
   c. Halfway Line
2. Soccer as shown on the contract drawings. Except where noted (construction details and below), color shall be four (4) inch white inlaid lines unless able to be manufacturer tufted:
   a. Center Circle
   b. Goal Area Lines excluding kick mark
   c. Hash Marks
   d. Goal Kick Line

Youth Soccer

1. Soccer as shown on the contract drawings. Except where noted (construction details and below), color shall be four (4) inch orange tufted lines:
   a. Touch (Side) lines
2. Soccer as shown on the contract drawings. Except where noted (construction details and below), color shall be four (4) inch orange inlaid lines unless able to be manufacturer tufted:
   a. Center Circle
   b. Goal End Lines
   c. Goal Area Lines excluding kick mark
   d. Hash Marks
   e. Goal Kick Line
   f. Halfway Line

2.4 INFILL MATERIALS

A. COATED SAND: The coated sand infill materials shall meet the following specifications:

1. The synthetic turf infill material shall be specifically designed and manufactured for athletic use. It shall be a rounded and highly uniform quartz sand pigmented and sealed with an acrylic polymer and have the following properties:
2. The silica sand shall have a Coefficient of Uniformity of ≤ 1.3.
3. 98% of the particles retained on US standard sieves 12 through 20.
4. The coated particles shall be smooth to resist mounding and compaction and have an angle of repose of 30º or less.
5. The finished product shall be 100% coated, shall repel water, be non-flammable and have <.001% dust content.

6. When placed in the synthetic turf, the system shall have an Abrasion Index of 26±2.
7. Installed homogenously, without any additional infill materials.
8. Shall carry a 16-year product warranty.
9. Color: **Green**
10. Depths: Installed to a leveled depth of 1-1/8 at time of install and no less than a settled depth of **1-1/16"** ***after 1 year of use and weather conditions.***
11. Approved coated sand Manufacturer/ Products:
    a. USGreentech/Envirofill (no substitutions permitted).

2.5 ADDITIONAL MATERIAL

A. The Contractor shall provide the Owner the following materials:

1. Turf fabric: two hundred fifty square feet (250) to be used for emergency repairs of turf. Owner to set forth min. size requirements during submittal phase.
2. All usable remnants of new material (green and colored) shall become the property of the Owner and may satisfy the 250 square feet requirement.
3. In-fill material-as required to fill two hundred square feet (250). This material may not be used by the Contractor as top-dressing as required to maintain depth and Gmax values during the warranty period.
4. All other leftover new turf material shall be recycled.

2.6 FIELD SWEEPER AND FIELD GROOMER

A. A field sweeper and groomer shall be supplied as part of this bid. Field sweeper and groomer shall be recommended and approved by the manufacturer of the turf installed. Field sweeper and groomer shall include a towing attachment compatible with a field utility vehicle.

PART 3 EXECUTION

3.1 GENERAL

A. The installation shall be performed in full compliance with approved shop drawings.

B. Only trained technicians, skilled in the installation of athletic caliber synthetic turf systems working under the direct supervision of the approved installer/manufacturer supervisors, shall undertake any cutting, sewing, gluing, shearing, topdressing, or brushing operations.

C. The designated Supervisory personnel on the project must be certified, in writing, by the turf Manufacturer, as competent in the installation of this material, including sewing seams and proper installation of the Infill mixture.

D. When applicable, Field Builder and Base Construction Contractor to coordinate to make sure communication boxes and perimeter drain cleanouts are adjusted to achieve proper height above finished playing surface.

3.2 EXAMINATION

A. Verify that all sub-base, drainage and leveling is complete prior to installation.

B. The surface to receive the synthetic turf must be inspected by the Installer and SWM certifying

engineer, and prior to the beginning of installation, the Installer and SWM certifying engineer must accept the sub-base in writing. The acceptance will depend on the base contractor providing the installer with test results indicating that compaction, planarity and permeability ware in compliance with the synthetic turf manufacturer's specifications and that the dimensions/materials of the extended storage area meet the approved plans. The surface must be perfectly clean as installation commences and shall be maintained in that condition throughout the process. Acceptance shall be for tolerance to grade not to exceed 1/4 inch in 10 feet in all directions and 1/4 inch from design grade.

3.3 INSTALLATION OF TURF SYSTEM

A. Install in accordance with Manufacturer's instructions. The Turf Contractor shall strictly adhere to the installation procedures outlined under this section. Any variance from these requirements must be accepted, in writing, by the onsite representative of the Manufacturer/Installer, and submitted to the Owner, verifying that the changes do not in any way affect the warranty or performance of the system. Infill materials shall be approved by the Manufacturer and installed in accordance with the Manufacturer's standard procedures.

B. The carpet rolls are to be installed directly over the properly prepared shock pad/aggregate base. Extreme care should be taken to avoid damaging the shock pad. All turf installation operations shall follow installation instructions set forth by the shock pad manufacturer.

C. The rolls of turf shall be rolled out a minimum of six (6) hours (four (4) hours if mostly sunny and warm) prior to starting seaming procedures to allow for carpet to expand and relax.

1. All visible wrinkles shall be stretched out before seaming. If wrinkles cannot be stretched properly, material shall either be removed or allowed to sit long enough to be stretched.
2. Seams shall be flat, tight and permanent with no separation or fraying.

D. The full width rolls shall be laid out across the field. Turf shall be of sufficient length to permit full cross-field installation (from end to end or side to side). No "head" or cross seams will be allowed. Utilizing standard state of the art sewing procedures, each roll shall be attached to the next.

E. Installation of the turf fabric rolls shall be sewn together. Gluing of fabric rolls shall not be acceptable. Minimal gluing will be permitted and only to repair problem areas, corner completions, and install logos as required by the specifications. All seams shall be sewn using double bagger stitches and polyester thread. Seams shall be flat, tight, and permanent with no separation or fraying.

F. After final trimming of the turf, the turf shall be adhered and nailed to perimeter curb as per the construction details. Adhesive ensures infill does not creep underneath carpet between nail locations.

G. Infill materials shall be applied in thin lifts to ensure even distribution. The turf shall be brushed as the mixture is applied. The mix shall be uniform and even in thickness to assure proper playability characteristics. The Infill materials shall be installed to fill the voids between the fibers and allow the fibers to remain relatively vertical and non-directional.

H. The Infill shall be installed to a leveled depth of **1-1/8"** in recreation field area. The infill shall be placed so that there is a max void of 5/8" to the top of the turf fibers at time of installation.

I. Synthetic turf shall be attached to the perimeter edge concrete curb, both glued and tacked, in accordance with the Manufacturer's standard procedures and construction details provided in the Bid Documents.

J. Install turf when ambient air temperature is at least 50 degrees F and no greater than 80 degrees F. Carpet stretched out in extreme heat will contract too much over a 2-3 year period causing potential seem failure using the specified system.

3.4 FIELD MARKINGS

A. Field markings shall be installed in accordance with construction drawings/approved shop drawings.

B. The field will have the following lines tufted, or inlaid according to National Federation of High School standards, whichever are applicable and shown on the plans.

1. Soccer
2. Youth Soccer

3.5 CLOSEOUT

A. The turf installer must verify that a qualified representative has inspected the installation and that the finished field surface conforms to the project specifications and manufacturer's requirements.

1. At the time of completion, the turf installer is responsible to perform G-max testing (ASTM 355, 1936 method) to verify that shock attenuation properties of the field meet the requirements set forth in this specification.

B. The Turf Contractor shall provide a warranty to the Owner that covers defects in materials and workmanship of the turf for a period of eight (8) years from the date of Substantial Completion as described in 1.07.

C. The company's eight (8) year warranty must also be supported by a 3rd party insured eight (8) year warranty from an A-rated domestic insurance carrier. Only true 3rd party policies will be accepted. Companies submitting policies that are actually letters of credit or not truly a 3rd party insurance policy will not be accepted.

D. The Turf Contractor must submit its standard maintenance manual to the owner.

E. Turf Installer must train Owner's designated field personnel in proper grooming and care procedures. This includes training field personnel how to properly use grooming equipment as well as make minor repairs.

F. Extra materials: Field Builder must leave enough turf and infill with the Owner to meet the requirements of 2.5 of this specification before leaving job site.

3.6 CLEAN UP AND PROTECTION OF THE SITE

A. Protect installed turf from subsequent construction operations.

B. Contractor shall provide the labor, supplies, and equipment as necessary for final cleaning of surfaces and installed items.

C. All usable remnants of new material shall become the property of the Owner.

D. The Contractor shall keep the area clean throughout the project and clear of debris.

E. 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 Owner.

END OF SECTION