SECTION 32 18 01

SYNTHETIC TURF SYSTEM

PART 1 GENERAL

1.01 SUMMARY

A. Section Includes:

1. Summary

2. Scope of Work

3. Quality Assurance

4. Qualifications and Submittals

5. Delivery, storage, and handling

6. Warranty

7. Materials

8. Execution

9. Examination

10. Installation of Turf System

11. Maintenance & Warranty

12. Maintenance Equipment

13. Maintenance Service

1.02 SCOPE OF WORK

A. It shall be the responsibility of the successful Contractor to provide all labor, materials, equipment and tools necessary for the complete installation of a synthetic turf field as indicated on the plans and as specified herein. The installation of all materials shall be performed in strict accordance with the manufacturer's installation instructions and in accordance with all approved shop drawings. The system shall consist of, but not necessarily be limited to, the following:

1. A vertical draining, porous stone aggregate base consisting of a large base stone (Field Sub-Base or Granular Drainage Material) and a porous finish aggregate material (Field Top Rock). Submittal must be sent to Project Geotechnical Engineer for approval.

2. A shock attenuation pad per Section 32 18 02.

3. A complete synthetic turf carpet, consisting of nominal 2-inch-long natural grass green, 100 percent polyethylene athletic field quality yarn designed for outdoor use, tufted or knitted to a porous or perforated backing and, if proposed by the Turf Company, a porous or perforated secondary backing.

4. A resilient infill system, consisting of a formulated mixture of sand and rubber or of 100 percent rubber.

5. The field shall include permanent lines and markings as shown on the civil site plan

B. Perimeter edge details required for the system shall be as detailed and as further recommended by the selected Manufacturer, and as approved by the Owner. Supply and installation of these details will be under the scope of work of the base contractor, not that of the Turf Installer.

C. The selection of a synthetic turf provider shall be done via a proposal process to consist of pricing and review of proposed synthetic turf system performance in coordination with the Owner and General Contractor.

1.03. DEFINITIONS

1. Owner – Property Owner (PPS or PP&R) or its designee.
2. Third Party Partner – An entity that contracts with the Owner and provides the funding for a project.
3. Designer – Architect/Engineer/Professional completing the design drawings and specifications. All Plans and Specs shall be stamped by a Professional Engineer, Architect or Landscape Architect registered in the state of Oregon.
4. General Contractor – The Bidder and contractor with the primary contract with the Owner/Third Party Partner
5. Superintendent – The primary daily on-site contact employed by the General Contractor.
6. Synthetic Turf System – All aspects of the installed field system to be used as the play surface including native soil, subgrade materials including aggregate and cement augmentation, drainage systems, Shock Attenuation Pad, tufted turf, and infill materials.
7. Synthetic Turf Provider – The Manufacturer or Supplier of the Synthetic Turf.
8. Synthetic Turf Installer – The contractor installing the Synthetic Turf and all infill material. Turf Installer must be certified in writing by the Synthetic Turf Provider.
9. Grading Contractor – Contractor doing the base work. May or may not be the General Contractor/Bidder.
10. Shock Attenuation Pad – A secondary head impact attenuation layer placed between the base and the carpet. The Shock Attenuation Pad is considered part of the Synthetic Turf System.

1.03 RELATED REQUIREMENTS

A. 32 11 23 – Aggregate Base Courses

B. 32 18 02 – Shock Attenuation Pad System

C. Geotechnical engineering report: [REPORT TITLE, AUTHOR, AND DATE]

1.04 QUALITY ASSURANCE

A. Manufacturer Qualifications: Company specializing in manufacturing products specified in this section. The Turf Contractor and the Turf Manufacturer must:

1. Be experienced in the manufacture and installation, in the United States of this type of tall pile synthetic infill grass systems for at least ten (10) years of continuous operation for sports fields.

2. Turf Company must be an actual manufacturer of synthetic turf, not a reseller. Turf manufacturer must own its manufacturing plant and be able to control its production 100%, including lead-time and quality control.

3. Must have a professional, full time maintenance and service company, or provide the ability to contract with same, with a minimum of 10 current maintenance contracts in place.

B. Turf Company/Installer Qualifications: Company specializing in performing the work of this section. By reference, “company”, “installer’, and “contractor” each refer to the turf vendor.

1. The Turf Company must provide competent workmen, skilled in this specific type of infilled synthetic grass installation; the installers must have installed a minimum of 10 fields of 65,000 square feet or more. 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. The manufacturer shall have a representative on site to certify the installation and warranty compliance.

2. Turf Company must have certified crews and may not use outside, independent contractors for the installation.

3. Turf Company must not have had a Surety or Bonding Company finish work on any contract within the last five (5) years.

4. Turf Company must not have been disqualified or barred from performing work for any public owner or other contracting entity in the U.S.

5. Prior to the owner approval of a specified artificial turf system, the Turf Company shall provide a copy of the 8-year minimum prepaid, non-prorated, third-party insured warranty and insurance policy information. Warranty shall be the sole expense of the Turf Company. If the turf manufacturer is not the same entity as the turf installer, the warranty shall be co-signed by each.

6. The contractor shall provide evidence direct from the Turf Company stating the installer has complied with the requirements in sections above and is certified to install this type of synthetic grass.

C. The Turf Installer and the Turf Company must have at least 5 years’ experience in the manufacture and installation of this specific type of synthetic infilled turf system. Prior to acceptance of contract, the installer must provide references from 5 installations within the last 3 years.

1.05 QUALIFICATIONS AND SUBMITTALS

**Each prospective bidders and/or installers of the turf shall be required to comply with and supply proof to the engineer, contractor or owner, prior to the bid, the following information:**

1. All Contractors shall have valid Oregon CCB commercial license in good standing.
2. All Contractors shall have a COP business license.
3. All Contractors shall have Worker’s Compensation Insurance as required by Oregon CCB or have hired a sub-contractor who has obtained Worker’s Compensation Insurance.
4. Verify wage requirements prior to bid (BOLI, Davis Bacon, etc.).
5. A single General Contractor shall be hired to perform and/or manage all phases of construction. The contractor shall have a single point of contact for all onsite work.
6. The contractor shall appoint a designated Superintendent skilled in the performance of assigned duties with a minimum of 5 years of experience in supervising similar size and type of projects. Appointed individuals shall not be replaced unless the substitute individuals have equivalent qualifications and is approved by the owner.
7. See Section 01 30 00 – Administrative Requirements for submittal procedures.
8. Submit with the bid:

1. A letter and specification sheet certifying that the products of this section meet or exceed all specified requirements, or note in each and any case, deviation from the specification and reasons for the deviation.

Turf companies shall provide at least one bid for:

a. a not less than 2” long monofilament fiber turf

and may provide two, separate bids at their discretion for:

b. a not less than 2” long fibrillated slit film fiber turf, and/or

c. any not less than 2” long synthetic turf that meets or exceeds these specifications.

2. Provide a copy of the 8-year, prepaid, non-prorated, third party insured warranty and insurance policy information as listed below.

3. The contractor shall provide evidence direct from the turf manufacturer stating the installer is certified by the manufacturer to install this type of synthetic grass.

4. The installer/manufacturer shall submit an 12-inch by 12-inch sample of the exact synthetic turf and infill system specified for this project.

5. The Synthetic Turf Installer shall provide a list of 10 completed field installations in the last five years. At least 3 fields installed in the last 5 years must include Shock Attenuation Pad systems.

6. Lists providing specific contacts and telephone numbers of the following:

a. A list of fields utilizing the exact specified material. Two of these fields must have been in play in the United States for at least 18 months.

b. A list of two (2) sand/rubber synthetic grass fields in play for at least five (5) years in the Pacific Northwest.

c. The Turf Contractor/Manufacturer shall provide indisputable evidence (in the form of the executed warranty policy itself or a certified letter from a Best A Rated Insurance Carrier confirming all aspects of the policy specified herein) that it offers an insured, non-prorated warranty and NON-CANCELABLE warranty insurance policy with a policy minimum claim limit of at least $600,000 and ANNUAL aggregate limit of at least $5,000,000 in order to fully cover the full replacement cost of the turf system in the event of total failure. Insurance carrier must confirm that the policy is in force and premiums paid.

1. Prior to ordering of materials:

1. The Contractor shall submit Shop Drawings indicating:

a. Field Layout

b. Colored Field Marking Plan and details for the specified sports, including equipment installation details.

c. Roll/Seaming Layout

d. Methods of attachment, field openings and perimeter conditions.

e. Field drainage system layout

2. The Turf Manufacturer must submit the fiber manufacturer's name, type of fiber and composition of fiber.

3. The Turf Contractor shall submit color samples for approval for all logo work

4. Contractor shall submit certified copies of independent (third-party) laboratory reports on ASTM tests as follows:

a. Pile Height, Face or pile weight & Total Fabric Weight, ASTM D418

b. Primary & Secondary Backing Weights, ASTM D418 or D5848

c. Tuft Bind (without infill), ASTM D1335

d. Grab Tear Strength, ASTM D1682

e. Lead and Heavy Metal compliance

5. Infiltration testing results for each base material, infill material, and for at least two examples of installed systems of the same type.

1. Prior to turf delivery, provide five sets of the following to the Engineer for approval:

1. Manufacturer’s detailed installation instructions for Synthetic Turf System used.

2. Detailed maintenance procedures and equipment requirements for the Synthetic Turf System supplied.

3. Manufacturer’s written warranty for materials as specified under Section 1.07, Warranty.

4. Installer’s written warranty for workmanship as specified under Section 1.07, Warranty.

5. Contractor’s insurance documentation as specified under Section 01 30 00.

6. Contractor’s bond as specified under Section 01 30 00.

1. Synthetic turf and infill materials shall not be shipped to the site without written approval from the Owner or Engineer, which will follow testing and submittals approval.
2. Field Subbase Rock and Field Top Rock: the General Contractor shall submit five copies of laboratory test results prior to placement of aggregate for review by the Engineer and turf manufacturer. Refer to Section 01 40 00.

1.06 DELIVERY, STORAGE, AND HANDLING

A. Provide for delivery of all materials required to complete the work of this section. Store all materials in such a manner as to prevent ground contact or exposure to sun, wind, or rain. Handle all materials in accordance with the manufacturer’s recommendations.

1.07 WARRANTY

1. All Warranty language shall be submitted to the Owner for review and written approval prior to Notice To Proceed.
2. All Warranties will be guaranteed by a Warranty Bond and/or Insurance Policy. All proposed Bonds and Insurance Policies are subject to the Owner’s review and written approval prior to Synthetic Turf purchase and installation.
3. Synthetic Turf Provider Warranty: A minimum of an 8 year, non-pro-rated, warranty shall be provided by the Synthetic Turf System Provider to cover any and all defects related to material failure, manufacturing, or workmanship during production and transport of the Synthetic Turf to the site or location designated by the General Contractor. Warranty shall be secured by a bond or an insurance policy covering the same 8 year term. Warranty begins at date of Final Completion as determined by the Owner. Warranty shall also comply with the terms as outlined in Items 11e through 11m below.
4. General Contractor Synthetic Turf System Warranty: A minimum of an 8 year, non-pro-rated, warranty shall be provided by the General Contractor to cover any and all defects, breaks or failures related to improper material storage, use of materials or equipment non-compatible with the proposed turf system, untrained labor, or poor or non- compliant installation techniques. Additionally, an average Gmax reading of over 150 shall constitute Synthetic Turf System failure. Such warranty shall be secured by an insurance policy or bond covering the same 8 year term. Warranty begins at date of Final Completion as determined by the Owner. Warranty shall also comply with the terms as outlined in Items 11e through 11m below
5. General Contractor Maintenance Warranty for Items of Work Not Including the Synthetic Turf System: Contractor shall provide a 2 year bonded warranty for all items of work completed and not directly defined as the Synthetic Turf System. Contractor’s warranty and bonding obligations shall conform to the requirements as outlined in the Owner’s standard warranty language. In the instance that the Owner is the City of Portland warranty language is outline in City of Portland Standard Construction Specifications 2010, Section 150.96 Maintenance Warranties and Guarantees. In the instance in which the Owner is the Portland Public School District warranty language is outlined in Portland Public Schools, General Conditions of the Contract for Construction, Section 107.14
6. Warranties shall not exclude, at a minimum the following intended uses for the field:

1. Football

2. Soccer

3. Lacrosse

4. Marching Band

5. Physical Education Classes

6. Track and Field use including discus and javelins with protected tips.

7. Alternate Sport uses like Ultimate Frisbee, Cheerleading, etc.

8. Student gatherings and celebrations.

9. Community Events

10. Any other typical uses for synthetic turf.

11. Approved maintenance and service equipment and vehicles.

1. Warranty shall cover the use of the footwear and equipment typical for the intended uses of the field.
2. Provide indisputable evidence in the form of an executed insurance policy from an A.M. Best “A” Rated (at a minimum) Insurance Carrier confirming all aspects of the policy specified below. Policy shall offer a premium pre-paid, NON- CANCELABLE insurance policy for an 8 year term with a minimum $5 million per claim limit and an ANNUAL aggregate limit of at least $15 million in order to cover the partial or full replacement cost of the turf system in the event of failure under the provided warranty. Owner shall be made an additional insured on the policy.
3. All Warranties shall cover full replacement and disposal of the replaced field. It shall include all elements including, but not limited to seams, lines, infill, etc. No exclusions shall apply that limit play time/use.
4. General Contractor’s Warranty shall include provisions to correct field conditions if the average G-max levels exceed 150. Corrections shall be made at the General Contractor’s expense.
5. Synthetic Turf Provider shall verify in writing that their representative has inspected the installation and that the work conforms to the manufacturer’s requirements and any written directives of the manufacturer’s representative.
6. Warranties shall warrant that the weight of the face yarn or pile material in any or all areas of the artificial turf surface shall not decrease by more than eight (8) percent per year (according to ASTM D5848-10e1) up to a maximum of forty percent over the life of the warranty. If the Owner determines the turf fibers are showings signs of excessive wear, it shall check and verify the weight of the face. Corrections shall be made and paid for as a provision of the Warranty.
7. If installed, Resilient Underlayment shall be warranted by the Synthetic Turf Provider for 16 years from the date of Final Completion.

1.08 BONDING AND INSURANCE

A. Contractor shall provide Bonding in the following forms:

1. Payment and Performance Bonds for all work to be completed in the amount of the original contract. Follow PPS general requirements for Performance and payment bonds.

2. Bonds shall be in place prior to beginning of construction.

B. Contactor shall obtain a minimum of $1,000,000 of liability insurance per occurrence, $2,000,000 aggregate, and $1,000,000 auto insurance. Policy shall name PPS as beneficiary.

1.09 AS-BUILT DOCUMENTATION

A. The General Contractor shall provide as-builts including a complete topographically surveyed map of all above and below grade utilities and systems. They shall provide actual locations of seams, drains, playing field lines and other pertinent information as well. As-builts shall be provided in AutoCAD and PDF electronic format as well as hard copies per Owner Standard Requirements. Owner reserves the right to withhold release of retainage until all as-builts and final closeout requirements are received and approved by the Owner.

1.10 CLOSE-OUT AND PAYMENT PROCEDURES

A. Final Completion shall not be granted without Owner approval in writing.

B. 5% retainage shall be withheld from the General Contractor until after final completion.

C. Any damage during construction to turf system due to heat exposure from machinery or other construction methods will be the responsibility of the contractor to replace/repair.

D. All third party testing to be managed by owner, and initial testing paid for by owner. Any repeat testing due to non-compliant work shall be charged to the contractor.

PART 2 PRODUCTS

2.01 MATERIALS

1. Shock Attenuation Pad: See Section 32 18 02
2. Synthetic Turf:

1. A complete synthetic grass system, consisting of not less than 2 inch long, polyethylene pile fiber.

2. Non-tufted or inlaid lines and markings shall be permanently inlaid as approved by the Synthetic Turf Manufacturer. If additional lines are required for special events or changes in the sports being played, these can be painted onto the surface using paint as approved by the Synthetic Turf Manufacturer.

3. Any thread for sewing seams of turf shall be high strength nylon or polyester fiber, as recommended by the Synthetic Turf Manufacturer.

4. Any adhesives shall be as recommended by the Synthetic Turf Manufacturer. All adhesives shall be resistant to moisture, bacteria, and ultraviolet rays. Adhered seams shall bridge a minimum of 3 inches on each side of any seam.

5. All seams, sewn or adhered, must maintain their integrity for the length of the warranty period.

6. At the end of its useful life, the synthetic turf shall be returnable to the original manufacturer for recycling/reuse into future products.

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| **Property** | **Value** | **Units** | **ASTM** |
| Pile Yarn Type | UV-resistant C6 polyethylene  Monofilament or slit film | | n/a |
| Yarn Denier | Min. 8500 | Denier | D1577 |
| Yarn Breaking  Strength | Min. 18-24 | Lbs. | D2256 |
| Pile Height | 2.25 – 2.50 | Inches | D5823 |
| Pile Weight | ≥35 | oz/yd2 | D5848 |
| Secondary Backing  Weight | Min. 20 for slit film, 26 for  monofilament | oz/yd2 | D5848 |
| Dimensional Stability  Layer | 80 | Gram |  |
| Stitch Gauge | .375 to .75  centers | inches | D5793 |
| Tuft Bind | Min. avg 8 | lbs/force | D1335 |
| Grab Tear Length | >200 | lbs/force | D5034 |
| Grab Tear Width | >200 | lbs/force | D5034 |
| Drainage | >10 | In/hour | F1551 |

1. Infill:

1. A resilient infill system, consisting of a formulated mixture of sand and rubber. Infill ratio or mixture of materials to be proposed by the turf vendor shall match the turf requirements and provide strength, permeability, and shock attenuation. The infill shall be filled so that there is a void of no greater than 3/4" to the top of the fiber.

2. The infill weights are of critical importance and shall be a minimum of 6-1/2 pounds per square foot of layered cryogenically ground rubber and silica sand. Systems with an all rubber, all sand or coated sand filling; and/or systems with an infill of less than 60%-40% sand & rubber infill ratio (the rubber component being at least 3 lbs. per square foot) may propose a reduced weight of infill.

3. Rubber must be smooth, rounded, cryogenically ground SBR rubber, free of any cord, wire, or steel materials. Only tires manufactured in North America within the last ten years shall be used for the infill materials. The rubber must meet the requirements of ASTM D5644.

4. Rubber shall be certified to have less than 50ppm or less of lead.

5. Sand must be dust free, rounded, silica sand, compaction-resistant, washed and dried, with a hardness criteria (Moh) of 7; any other sand will not be accepted.

6. The proportions of the materials are selected to adjust the shock attenuation characteristics of the system. These shall generally result in G Max readings of between 110 and 140 at time of installation and never higher than 150 over the warranty of the installation.

1. Field Markings:

1. The field will have the lines tufted or inlaid as specified according to NAIA standards, as shown on the project plans.

4. Logos: expected to be X logos, totaling XXX sq.ft. Colors shall be varied, except where noted. These are expected to be located as follows: [LOGO DESCRIPTIONS AND LOCATIONS]. Owner to provide representative artwork.

1. Aggregate Base (by General Contractor)

1. Provide a vertical draining base of crushed aggregate consisting of a permeable layer of crushed aggregate (Field Subbase or Granular Drainage Material) topped by a permeable leveling course of finer crushed aggregate (Field Top Rock). The geotechnical engineer must approve both aggregates prior to start of construction.

2. Field Subbase course: Refer to geotechnical report for material requirements.

3. Field Top Rock course: Refer to geotechnical report for material requirements.

4. Minimum infiltration rate for placed and compacted Field Subbase and Field Top Rock courses shall be 30 inches per hour.

5. Overall synthetic turf system shall have an infiltration rate of 8 inches per hour at installation without visible surface ponding.

PART 3 EXECUTION

3.01 PREPARATION

A. After demolition of existing improvements and completion of excavation, subgrade shall be compacted in both directions to at least 92 percent of ASTM D1557 modified proctor maximum dry density. Conform to geotechnical engineer requirements for all grading and compaction requirements.

B. Subgrade shall be prepared to tolerances not to exceed 1/4-inch in 10 feet to allow for even drainage. Laser grading is recommended.

1. Contractor shall schedule a walk-through with Turf Contractor, Turf Supplier, Earthwork Contractor, and other subcontractors to review the prepared subgrade. Contractor shall obtain from subcontractors written approval of the work completed to date prior to proceeding.

C. Install geotextile fabric and place Field Subbase rock in accordance with geotechnical report and Section 32 11 23.

1. Field Subbase rock must be laid without damaging the geotextile fabric. Do not create depressions in subgrade or Field Subbsae rock.

2. Place field aggregate in maximum 6-inch lifts. Each lift shall be compacted in both directions to a minimum of 95 percent per ASTM D1557.

3. Contractor shall schedule a walk-through with Turf Contractor, Turf Supplier, Earthwork Contractor, and other subcontractors to review the prepared Field Subbase rock. Contractor shall obtain from subcontractors written approval of the work completed to date prior to proceeding.

D. Place Field Top Rock leveling course aggregate in one lift by a full-size paving machine and compacted in both directions to a minimum of 95 percent per ASTM D1557.

1. Contractor shall schedule a walk-through with Turf Contractor, Turf Supplier, Earthwork Contractor, and other subcontractors to review the prepared Field Top rock. Contractor shall obtain from subcontractors written approval of the work completed to date prior to proceeding.

3.02 EXAMINATION

A. Verify that all sub-base, drainage and leveling is complete prior to installation. Prior to turf installation, the turf manufacturer and installer must accept the aggregate base prior to the installation of the synthetic grass system. Manufacturer and installer shall submit written certification to the Engineer/Owner. Any costs associated with rework of base materials will not be borne by the Owner. Subcontractor, turf manufacturer, and turf installer acceptance of the work shall occur at the following checkpoints prior to turf installation:

1. Preparation of field subgrade

2. Installation of Field Subbase rock

3. Installation of Field Top rock

4. Infiltration testing of the field base system

B. The synthetic turf must be inspected by the Installer, and prior to the beginning of installation, the Installer must accept the sub-base in writing.

C. The General Contractor will provide the Owner and the Installer with test results indicating that compaction, planarity and permeability are in compliance with the synthetic turf manufacturer's specifications. The surface must be clean as installation commences and shall be maintained in that condition throughout the process. Acceptance shall be for tolerance to grade (1/4 inch in 10 feet in all directions).

D. The compaction of the aggregate base shall be 95%, according to the Modified Proctor procedure (ASTM D1557), and the surface tolerance shall not exceed 1/4 inch over 10 feet and 0-1/2 inch from design grade. All must be verified by means of ASTM testing and surveys to the satisfaction of the turf contractor.

E. Conduct an in-situ infiltration test of the constructed field base rock system. Minimum acceptable infiltration rate is 30 inches per hour.

F. All testing costs – for base and turf systems - shall be borne by the General Contractor or Turf Company, per their agreement separate from and at no additional costs to the Owner.

G. Turf supplier to schedule Gmax testing of the field at completion of construction at no additional costs to the Owner. Turf supplier to schedule additional testing at the end of year one and at the end of year three to confirm that the field still meets specifications. These additional tests will also be at no additional costs to the Owner.

3.03 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 and Engineer, verifying that the changes do not in any way affect the warranty or performance of the system.

B. The installation shall be performed in full compliance with approved Shop Drawings.

C. 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.

D. The designated Supervisory personnel on the project must be certified, in writing by the Turf Manufacturer, as competent in the installation of this material. This includes proper layment, seam work and proper installation of the infill mixture.

E. The carpet rolls are to be installed directly over the properly prepared aggregate base. Extreme care should be taken to avoid disturbing the aggregate base in regard to compaction and planarity. Base shall be cleaned and accepted by Turf Company prior to installation.

F. The carpet shall be delivered in 15-foot wide rolls. The full width rolls shall be laid out across the field. Turf shall be of sufficient length to permit full cross-field installation (from sideline to sideline). No head or cross seams will be allowed in the main playing area between the sidelines, as per standard turf installation procedures.

G. Rolls must lay evenly and with full-width dimension.

H. Synthetic turf shall be attached to the perimeter edge per the contract drawings and in accordance with the Manufacturer's standard procedures.

I. Inlaid markings that are not tufted into the system shall be sheared out to the backing and a new piece of turf installed us­ing special hot melt machinery and adhesives. Cutting through the turf backing to glue in markings to a separate seaming tape is not an acceptable method of constructing permanent markings.

J. Infill materials shall be applied in no less than eight thin lifts, in a dry condition. The mix shall be uniform and even in thickness to assure proper playing characteristics. Infill materials shall not vary by more than 1/4” across the entire field area.

3.04 MAINTENANCE & WARRANTY:

A. The turf installer and/or the turf manufacturer must provide the following:

B. 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:

a. 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 a Best A Rated Insurance Carrier. Insurance carrier must confirm that the policy is in force and premiums paid. The manufacturer's warranty shall include general wear and damage caused from UV degradation.

b. The warranty shall specifically exclude vandalism and Acts of God beyond the control of the owner or the manufacturer.

c. The Turf Company 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 onsite representative.

d. All turf warranties shall be NON PRORATED and limited to repair or replacement of the affected areas, at the option of the manufacturer, and shall include all necessary materials, labor, transportation costs, etc. to complete said repairs. All warranties are contingent on the full payment by the owner of all pertinent invoices.

4. Turf must maintain an ASTM 355 G-max of less than 150 for the life of the warranty.

5. Degradation or shrinking of fiber is prohibited under the warranty period.

3.05 MAINTENANCE EQUIPMENT

A. Contractor shall furnish as a portion of the project cost one Verti-Top Tow-Behind field maintenance implement to clean debris from turf area, or approved equal. www.redeximturfproducts.com

B. Contractor shall furnish as a portion of the project cost one Verti-Broom field maintenance implement to groom turf area, or approved equal. www.redeximturfproducts.com

C. Contractor shall furnish as a portion of the project cost one Verti-Groom field maintenance implement to groom turf area, or approved equal. www.redeximturfproducts.com

3.06 MAINTENANCE SERVICE

A. The Turf Company will train the Owner's facility maintenance staff in the use of the Turf Manufacturer's recommended Groomer within one (1) month after completion of the installation process.

B. The Turf Company shall provide four 33-gallon rubber trash containers with lids of each infill material used in the system and shall provide 1,000 square feet of additional turf material, palletized and shrink-wrapped in individual pieces no less than 5 feet by 10 feet.

C. The Turf Company shall furnish one year’s supply of approved paint for ancillary markings and other designations.

D. The Turf Company shall provide an ALTERNATE price to provide 100% of the maintenance required to maintain the field over an eight year duration. Provide an itemized list of what this maintenance would include. This alternate should take into account subtracting out any cost for maintenance equipment listed in section 3.05.

END OF SECTION