SECTION 02965
SYNTHETIC TURF SURFACING

PART 1 - GENERAL

1.1 SCOPE OF WORK

A. Scope of work to include all labor, material, equipment, transportation and services to install complete new vertically draining in-filled synthetic turf surfacing system as shown and described. System to be as herein specified including, but not specifically limited to the following:

1. The field color shall be medium green, with white, black, red, and blue tufted markings and white, black, red and blue inlaid markings.
2. Product submittals including samples, technical data, shop drawings etc.
3. Independent testing of the synthetic turf materials prior to shipment to the project site;
4. Delivery of the synthetic turf materials (not including infill) a minimum of 1 week prior to the scheduled installation of the materials;
5. Review and acceptance or certification of the permeable aggregate base as it applies to installation of turf system, permeability and warranty implementation;
6. Installation of and acceptance of a field underlayment/elastic pad layer as it applies to installation of turf system, permeability and warranty implementation;
7. Installation of complete vertical draining synthetic turf surfacing system. Field system shall consist of a sand and rubber infill composition.
8. Installation of tufted and inlaid field lines and markings as indicated on the drawings.
9. Provide extra turf materials to the Owner for future repair and protective purposes.
10. Provide all appropriate maintenance and repair manuals and warranty package to Owner.
11. Provide field maintenance equipment.
12. Maintenance of the Synthetic Turf at completion of 6 months and 1 year of service.

1.2 SYNTHETIC TURF SURFACING PERFORMANCE & PAYMENT BOND

A. The Synthetic Turf Contractor shall provide a performance and payment bond to the Owner for the full subcontract amount of the synthetic turf surfacing system including materials, assembly, shipping, and installation. A copy of the performance and payment bond must be provided to the Owner within 14 days of the issuance of the notice to proceed.

B. The performance and payment bond must be provided in the name of the same corporate entity that provides the warranty for the synthetic turf surfacing system to the Owner.

1.3 SYNTHETIC TURF SURFACING

A. The following vendors and corresponding product is pre-approved for the Synthetic Turf Field surface:

1. FieldTurf/Tarkett – Revolution 2” FieldTurf (760) 310-2139
1.4 APPROVED FIBER MANUFACTURERS

A. The following fiber manufacturer is pre-approved for the In-filled Synthetic Turf Systems:

   FieldTurf Revolution

B. The synthetic turf vendor shall provide written documentation in the form of a signed affidavit certifying the source of the fiber used for the field including both green and any other colors used for the lines and markings.

C. Fiber shall be certified in writing to have less than 50 ppm or less of lead from both the fiber supplier and the turf vendor.

1.5 MINIMUM QUALIFICATIONS FOR SYNTHETIC TURF SYSTEM

A. Approved Synthetic Turf System shall be manufactured, sold, and warranted by a single vendor. Manufacture of the system shall include, at a minimum, assembly of the constituent components, i.e. tufting, of the specified fiber into an approved backing.

B. The manufacturer of the synthetic turf system must have produced a minimum of fifty (50) successful in-filled fields of full size and outdoors within the past two (2) years.

C. Installer of the synthetic turf system must have installed a either a minimum of ten (10) successful in-filled synthetic turf football or soccer fields of full size within the past two (2) years or a minimum of twenty (20) successful in-filled synthetic turf football or soccer fields of full size within the past five (5) years. The installer shall have installed a minimum of five (5) successful in-filled synthetic turf football or soccer fields of full size with the product vendor.

D. The synthetic turf surfacing system vendor or installer shall have a designated employed representative available for service based in Southern California.

E. The synthetic turf surface and elastic layer pad shall be purchased separately through the California Multiple Award Scheduled (CMAS).

RELATED WORK SPECIFIED IN OTHER SECTIONS

A. Field Subgrade Establishment

B. Field Permeable Aggregate and Porous Asphalt

C. Field Sitework Concrete

1.6 STANDARD SPECIFICATIONS


1.7 POST AWARD SUBMITTALS

A. Shop Drawings: Within 5 calendar days after issuance of Notice to Proceed, submit to the Field Landscape Architect five (5) copies of complete and detailed drawings showing all component parts of the synthetic turf system. The shop drawings shall be drawing to scale (1”=20’) and shall
include:

1. total depth of infill
2. edge details
3. insert details including backing material
4. seam details
5. seam layout
6. gluing patterns
7. dimensional shop drawing for all field lines, markings and boundaries

B. Synthetic Turf Samples: Within 5 calendar days after issuance of Notice to Proceed submit to the Field Landscape Architect:

1. Two 12"x 12" samples each of each green turf showing backing with perforations.
2. Two 12" x 12" samples each of turf showing method of seam makeup with perforations. One sample to have example of inlaid lines.
3. Two 12" x 12" samples each of the other colors proposed for use on the field for lines and markings.
4. Two 1-pound samples of the proposed In-fill material(s).

C. Manufacturer's Specifications and Warranty:

1. Within 5 calendar days after issuance of Notice to Proceed submit to the Field Landscape Architect five (5) copies each of selected manufacturer’s material specifications and installation instructions. Include detailed specifications of manufacturer’s provisions for achieving permeability, stating rate in infiltration and permeability in inches per hour of system materials for the vertical draining system.
2. Within 10 calendar days after Notice to Proceed, submit to the Field Landscape Architect five (5) sample copies of warranty package herein specified for review.

D. Testing and Quality Control: Within 5 calendar days after issuance of Notice to Proceed, submit to the Field Landscape Architect the following test results for the system specified. An independent testing laboratory experience with testing of synthetic turf or carpeting materials shall certify these tests. The qualifications of the testing laboratory to be utilized for the submittal and the pre-shipment testing shall be submitted to the Field Landscape Architect for approval. Applicable minimum material ASTM tests:

1. Dynamic Cushion Test - ASTM F355, Procedure A, (system); ASTM F355 procedure A at the 24" drop.
2. Yarn and fabric characteristics.
3. Pill Burn Test – ASTM D2859

E. Maintenance and Operating Data:

1. Prior to acceptance and/or occupancy by the Owner, furnish to the Field Landscape Architect five (5) copies in hard cover form of maintenance and operating data with imprinted Project, Owner, Field Landscape Architect, Contractor and Turf Subcontractor
names, and date of turf system installation.

2. In addition, provide descriptions of any equipment recommended for maintenance and repair, citing specific vendors for each unit.

3. Use and Limitations - Provide a separate page stating approved activity usage for the turf and activities not recommended relative to warranty.

4. Index - Index with tab dividers for data as follows: Materials installed with their characteristics:
   a. General maintenance
   b. Small repair procedures
   c. Minor seam repair
   d. Discussion of precautions to be practiced, general maintenance, and uses to avoid to protect turf surface and to maintain installation's warranty
   e. Recommendations for paint application and removal of lines and markings.

1.8 PRE-SHIPMENT SUBMITTALS

A. Prior to shipment of the synthetic turf materials to the job site, synthetic turf material from every sixth roll shall be randomly sampled and the tested by an independent testing laboratory with experience with testing synthetic turf materials. The testing laboratory shall be completely independent with no ties to the turf manufacturer. The testing shall include the following:

<table>
<thead>
<tr>
<th>Item</th>
<th>ASTM</th>
<th>Property</th>
</tr>
</thead>
<tbody>
<tr>
<td>1.</td>
<td>FTIR</td>
<td>Pile Composition</td>
</tr>
<tr>
<td>2.</td>
<td>D418</td>
<td>Pile Weight</td>
</tr>
<tr>
<td>3.</td>
<td>D418</td>
<td>Total Weight</td>
</tr>
<tr>
<td>4.</td>
<td>D418</td>
<td>Pile Height</td>
</tr>
<tr>
<td>5.</td>
<td>D418</td>
<td>Backing Perforation Diameter and Spacing</td>
</tr>
<tr>
<td>6.</td>
<td>D1335</td>
<td>Tuft Bind (without infill)</td>
</tr>
<tr>
<td>7.</td>
<td>D1682</td>
<td>Grab/Tear Strength.</td>
</tr>
</tbody>
</table>

B. Copies of the test results shall be transmitted to the Owner and Field Landscape Architect directly from the testing laboratory. The synthetic turf materials shall not be shipped to the site without written authorization from the Field Landscape Architect after the Owner and Field Landscape Architect have approved the test results.

C. Samples of the synthetic turf material tested from every sixth (6th) roll shall also be transmitted to the Field Landscape Architect for approval by the independent testing laboratory prior to shipment of the synthetic turf materials to the job site. Sample size shall be minimum 12” x 12”.

D. All fees and costs associated with the pre-shipment sampling and testing shall be paid by the Contractor.

1.9 CERTIFICATION OF THE BASE

A. The Synthetic Turf Surfacing Contractor shall furnish to the Owner, prior to the synthetic turf system installation as applicable, a written certification of the acceptability by the turf vendor of the permeable aggregate and elastic layer pad system for installation and warranty validation.
1.10 TURF SYSTEM HOLD HARMLESS

A. The synthetic turf manufacturer and installer shall not infringe upon any current or pending patents held by other synthetic turf manufacturers or installers.

B. The synthetic turf subcontractor and the synthetic turf manufacturer shall hold the Owner, Owner’s Representative, and the Field Landscape Architect harmless from infringement of any current or future patent issued for the synthetic turf surfacing system, installation methods and vertical draining characteristics. A notarized statement shall be provided as part of the submittal package.

1.11 WARRANTY OF SYNTHETIC TURF

A. Warranty shall cover, in general, the usability of the turf surface, accessories, use characteristics, and suitability of the installation. All items covered by warranty are to be replaced or repaired with new materials, including installation at the sole expense of the warranting contractor for the period of eight (8) years to the Owner, for the designated uses enumerated as follows:

1. Football
2. Soccer
3. Lacrosse
4. Field Hockey
5. Discus
6. Softball
7. Baseball
8. Track and Field activities
9. Ultimate Frisbee
10. Physical exercises
11. Physical education activities
12. Pneumatic rubber-tired maintenance and service vehicles
13. Pedestrian traffic and other similar uses
14. Ceremonial and Entertainment Events

B. A principal of the applicable firm, duly-authorized to make contracts, shall sign the turf vendor warranty. If the turf vendor is not the manufacturer, the manufacturing firm shall also sign the warranty. The term “Contractor” contained herein means the firm furnishing warranty. “Owner” is the San Dieguito Union High School District. Warranty period shall be a minimum of eight years from date of acceptance of the installed system by the Owner.

C. Furnish a pre-paid insurance policy in support of the warranty required for the field, for the entire warranty period from an A-rated domestic insurance carrier. The warranty shall be secured to the Owner with an insurance policy of not less than $300,000 per claim and an aggregate of $5,000,000.

1.12 FORM OF WARRANTY OF SYNTHETIC TURF SYSTEM

A. Contractor hereby warrants to Owner, subject to the limitations and conditions set forth below, that its synthetic turf system consisting of synthetic turf described as ___________________________, and the adhesives used in the installation, is free from
defects in material and workmanship and shall, for a period of eight years as applicable from the date of acceptance by the Owner, remain serviceable for multiple sports activities.

B. Contractor warrants to the Owner that its synthetic turf materials shall not fade, fail, shrink, wrinkle, or reflect excessive wear. Contractor shall, at their sole expense and cost, replace such areas of the synthetic turf system not performing to these standards for the life of the warranty.

C. Definitions

1. The term "not fade" in the context of this warranty shall mean that the synthetic turf material shall remain a uniform shade of green, or other colors installed, with no significant loss of color.

2. The term "not fail" or "excessive wear" as used in the context of this warranty shall mean that the length and weight of the face yarn or pile material in the synthetic turf surface above the infill materials shall not have been decreased by more than 10% per year according to ASTM D418, nor exceed 50% during the warranty period. In the event that the synthetic turf system does not retain its fiber height or shock absorbency and is consequently no longer serviceable during the warranty period, the Contractor shall, at their sole expense, replace such portion of the system that is no longer serviceable.

3. The term "serviceable" in the context of this warranty shall mean that the synthetic turf system for the soccer field shall have a maximum "G" value according to ASTM F1936-10 and Procedure A, ASTM F355, not to exceed 130G's at any location upon installation and shall not exceed 175G's throughout life of the warranty period. This shall be determined by conducting dynamic cushioning tests at the locations designated in ASTM F1936-10 and at corners of the soccer penalty boxes at opposite sides of the field. Any increase from 130G's to allowable 175G's maximum shall be at a relative uniform rate not to exceed 15 G's in any single yearly period.

D. Where applicable, the fabric seams shall remain attached to the underlying surface over the warranty period and shall not separate or become unglued or unattached, as applicable.

E. Contractor warrants to the Owner that the permeable synthetic system shall drain vertically a minimum of 20 inches precipitation per hour without visible surface ponding.

F. Contractor shall replace with new materials, at their sole expense, any damage to the synthetic turf system that extends more than 3 feet beyond the location of foreign combustibles, which may ignite and fire-damage the synthetic turf system. The Contractor shall not be held liable for any incidental or consequential damages. These warranties and the Contractor's obligations hereunder are expressly conditioned upon;

1. The Owner making all minor repairs to the synthetic turf system upon the discovery of the need for such repairs;

2. The Owner maintaining and properly caring for the synthetic turf system in accordance with the Contractor's maintenance manual and instructions;

3. The Owner complying with the dynamic and static load specifications established by the Contractor.

G. The warranty is not to cover any defect, failure, damage or undue wear in or to the synthetic turf system caused by or connected with abuse, neglect, deliberate acts, act of God, casually, static or dynamic loads exceeding Contractor's recommendations, footwear having cleats, spikes, or similar projections other than conventional baseball, football, soccer, or rugby shoes having cleats of not more than 1/2" in length, and other conventional running track shoes having spikes of not more than 1/4" in length, or use of improper cleaning methods.
H. Contractor shall be allowed to examine the synthetic turf system regarding any claim that the Owner makes to be present at any time, to analyze the results of all tests conducted by the Owner or others, and to conduct such tests of their own. Contractor shall not be responsible for any costs or expenses incurred by the Owner or others with respect to such tests, except the Contractor shall pay for costs of all tests and analysis conducted or directed by their representative.

I. In the event the Contractor does not respond to the Owner’s written notice within 10 days of receipt of notice or does not submit, schedule and execute corrective work within 30 days for any material replacement and within 5 days for work limited to repairs of existing materials or repair that can be made with attic stock materials, the Owner has the option of having the work performed at the expense of the Contractor.

J. Sample form of warranty herein set forth is a suggested form for use for the work under this section. Manufacturer’s standard form of warranty may be used provided all conditions specified are incorporated. All claims by the Owner under this warranty must be made in writing to Contractor’s address at____________________ within 30 days after the Owner learns of the defect giving rise to the claim. This warranty shall constitute a contract made in the State of California and shall be governed by the laws thereof.

1.13 WARRANTY TESTING

A. The turf for the soccer field is to be tested for dynamic cushioning (“G” Test) by an experienced independent testing laboratory acceptable to the Field Landscape Architect or Owner at the completion of the installation shortly prior to acceptance inspection by the Owner/Field Landscape Architect, at the anniversary date of the first year, second year, fourth year, sixth year, and 60 days prior to the anniversary date of the warranty expiration. If conditions of the Specifications and/or Warranty are not met, the Contractor has the option of corrective work or replacement. In the event corrective work does not meet the requirements of the Specifications after a second attempt to bring the system within these limits, then the Contractor is to replace non-conforming areas or sections solely at the Owner’s discretion and direction.

B. Tests shall be performed in accordance with ASTM F-1936-10 and F355.

C. Test locations as designated in F-1936-10, Paragraph 8.1. Included in the report shall be the measured depth of the infill material at all test locations.

D. All costs for the stated testing shall be paid by the Synthetic Turf Surfacing Contractor.

E. If the Contractor does not have the tests performed within 10 days of specified times listed, the Owner has the option of ordering the testing work at the expense of the Synthetic Turf Surfacing Contractor.

1.14 FORM OF WARRANTY FOR SUPPLEMENTAL PAD SYSTEM

A. Contractor hereby warrants to Owner, subject to the limitations and conditions set forth below, that field underlayment system consisting of______________________, is free from defects in material and workmanship and shall, for a period of eight years from the date of acceptance by the Owner, remain serviceable for multiple sports and snow removal activities.

B. Contractor warrants to the Owner that its field underlayment materials shall remain permeable and shall not fail, shrink or buckle. Contractor shall, at their sole expense and cost, replace such areas of the field underlayment system not performing to these standards for the life of the warranty.
C. Definitions

1. The term "permeable" in the context of this warranty shall mean that the field underlayment material shall provide a minimum vertical drainage rate of 20 inches per hour.

2. The term "not shrink" in the context of this warranty shall mean that the field underlayment panels shall remain butted together without gaps exceeding ¼ inch in any location across the field.

3. The term "buckle" in the context of this warranty shall mean that the field underlayment shall lay flat on the base without warping or creating surface irregularities in excess of ¼ inch.

D. Contractor shall replace with new materials, at their sole expense, any field underlayment materials that do not comply with these warranty requirements.

E. These warranties and the Contractor's obligations here-under are expressly conditioned upon;

1. The Owner maintaining and properly caring for the synthetic turf and field underlayment system in accordance with the Contractor's maintenance manual and instructions;

2. The Owner complying with the dynamic and static load specifications established by the Contractor.

F. The warranty is not to cover any defect, failure, damage caused by or connected with abuse, neglect, deliberate acts, act of God, casualty, static or dynamic loads exceeding Contractor's recommendations.

G. Contractor shall be allowed to examine the field underlayment system regarding any claim that the Owner makes to be present at any time, to analyze the results of all tests conducted by the Owner or others, and to conduct such tests of their own. Contractor shall not be responsible for any costs or expenses incurred by the Owner or others with respect to such tests, except the Contractor shall pay for costs of all tests and analysis conducted or approved by the Owner's Representative.

H. In the event the Contractor does not respond to the Owner's written notice within 10 days of receipt of notice or does not submit, schedule and execute corrective work within 30 days, the Owner has the option of having the work performed at the expense of the Contractor.

I. Sample form of warranty herein set forth is a suggested form for use for the work under this section. Manufacturer's standard form of warranty may be used provided all conditions specified are incorporated. All claims by the Owner under this warranty must be made in writing to Contractor's address at ____________ within 30 days after the Owner learns of the defect giving rise to the claim. This warranty shall constitute a contract made in the State of California and shall be governed by the laws thereof.

PART 2 - MATERIALS

2.1 GENERAL

A. Infilled Synthetic Turf: The turf system shall be a vertical-draining permeable synthetic turf system. The turf system shall consist of a synthetic grass-like surface pile, which shall be tufted into a synthetic backing.

B. All backing layers and coatings shall be firmly bonded together. Coating materials must be
completely cured and bonded to the other backing layers. Synthetic turf panels or rolls that do not meet this requirement will be rejected.

C. The entire system shall be resistant to weather, insects, rot, mildew, and fungus growth, and be non-allergenic and non-toxic. The entire system shall be constructed to maximize dimensional stability, to resist damage and normal wear and tear from its designated use, and to minimize ultraviolet degradation.

D. All adhesives used in bonding the system together shall be resistant to moisture, bacterial and fungus attacks, and resistant to ultraviolet rays at any location upon installation.

2.2 DYNAMIC CUSHIONING REQUIREMENTS

A. The dynamic cushioning of the system shall not exceed a maximum value of 130 G's per ASTM, F1936-10 snf ASTM, F355, procedure A at any location upon installation.

2.3 IN-SITU SHOCK ABSORBING PAD

A. The shock-absorbing pad shall be a paved-in-place (in-situ) porous elastic layer and shall become part of the base for the system.

B. The elastic layer shall be porous and shall resist the effects of adhesives, water, freeze-thaw, heavy loads associated with athletic fields, compression/deflection, rot, mold, mildew, bacteria, and air-borne pollution.

C. The paved-in-place (in-situ) elastic layer shall be a minimum thickness of 15mm.

D. Single Layer Installation: The paved-in-place (in-situ) elastic layer shall be installed in one lift to a minimum thickness of 19mm. The elastic layer shall contain only the following:

<table>
<thead>
<tr>
<th>Components</th>
<th>% by Weight</th>
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<tbody>
<tr>
<td>Granulated SBR rubber (1-5mm)</td>
<td>43-47%</td>
</tr>
<tr>
<td>Clean-washed &quot;bird's-eye&quot; aggregate (3-6mm)</td>
<td>44-48%</td>
</tr>
<tr>
<td>Single component high quality polyurethane binder</td>
<td>6-8%</td>
</tr>
</tbody>
</table>

E. The exact material mix ratio may be altered to provide strength, shock attenuation (in conformance with the 110G limit specified herein) and to provide permeability as approved by the Engineer. Successful bidder may submit an elastic layer formulation with minor modification for Engineer's consideration and approval.

2.4 PERMEABILITY REQUIREMENTS OF THE SYNTHETIC TURF SYSTEM

A. The system including the synthetic turf and infill materials shall drain vertically a minimum of 20 inches precipitation per hour without visible surface ponding.

2.5 SYNTHETIC TURF PILE SURFACE

A. The pile surface shall provide good traction in all types of weather with the use of conventional "sneaker-type shoes" and composition, molded-sole athletic shoes.

B. The pile surface shall be suitable for both temporary and permanent line markings using rubber-base paint where applicable.
C. Pile surface shall be nominally uniform in length for all portions of the field. Synthetic turf panels or rolls with irregular pile heights or with "J hooked" fibers that extend more than 1/4 inch above the surrounding fibers will be rejected.

2.6 SYNTHETIC TURF FABRIC SURFACE

A. The fabric surface shall be constructed and installed in minimum 15-foot widths with no longitudinal or transverse seams, except for head or tee seams at field boundaries and inlaid lines within a finished roll assembly. The seams shall be 15'-0" spacing.

B. Rolls that do not lay evenly and with full dimension width will be rejected. No fitted pieces or relief cuts will be allowed to true alignment.

C. The color shall be uniform with no visible deviations in shade permitted. Rolls that do not meet this requirement will be rejected.

2.7 SYNTHETIC TURF SYSTEM MATERIAL COMPONENTS

A. Pile fibers shall resemble freshly-grown natural grass in appearance, texture and colors.

B. Fabric backing for the in-filled synthetic turf systems can be loose laid and anchored at the perimeter of the fields as shown in the details or adhered to the base.

C. All turf seams shall be sewn per paragraph 3.5 of this specification. All seams shall include at least one fabric roll selvage edge – no transverse or "head" seams will be permitted.

2.8 SYNTHETIC TURF PERFORATIONS

A. Synthetic turf with tufted fibers and a coated backing must include either perforations in the backing for vertical drainage, or the turf shall include a partially coated backing providing permeability without the use of perforations. Certified independent test results indicating a minimum drainage rate of 40 inches per hour for the permeable backing must be provided.

B. Perforations in turf backing to be a minimum of 3/16" diameter clear opening and shall be spaced a maximum of 4" uniformly on-center.

C. The turf shall be perforated with a minimum of 95% integrity over entire surface. Holes must be full diameter, completely through the underside of the turf backing with no material residue or fragmented fibers remaining.

D. Field Landscape Architect shall approve the turf perforations prior to shipment, upon shipment onsite, or during on-site perforating operations as applicable.

E. If the non-permeable backing material exceeds 12 inches in width it shall be perforated in accordance with paragraph 2.7 of this section. Perforations shall be drilled from the surface after the adhesive has set.

2.9 LINES AND MARKINGS

A. A complete field lining, marking and field boundary system with team area limits, etc., shall be provided with the initial installation of the surfacing system. Layouts shall be accurately surveyed and marked prior to installation.

B. All lines and field markings shall be tufted in or installed as synthetic turf inlays. Wherever
possible, lines shall be tufted into the turf panels in lieu of inlays. All markings shall be uniform in color, providing a sharp contrast with the turf color, and shall have sharp and distinct edges. Markings shall be true and shall not vary more than 7/32" from specified width and location.

C. Manufacturer shall guarantee the synthetic turf is adaptable to painted lines in the event painting is utilized in the future.

D. For cemented seams, use supplemental backing material. The supplemental backing material shall bridge all inlaid lines and markings a minimum of 4 inches on each side of the seam. Supplemental backing material that is greater than 12 inches in width shall be perforated in accordance with paragraph 2.7 of this section. Perforations shall be drilled from the surface after the adhesive has set.

Combined Soccer/Lacrosse/Field Hockey Field

**Soccer:**
1. Playing field boundaries: 4" wide white lines
2. Mid-field line: 4" wide white line
3. Goal and penalty boxes: 4" wide white lines
4. Center circle & penalty arc 4" wide white lines
5. Corner kick arc 4" wide white lines
6. Corner kick hash marks 4" wide x white lines
7. Center spot: 9" diameter white dot

**Men’s Lacrosse:**
1. The lacrosse lines are 3" blue. The lacrosse field shall be 240 feet long (goal to goal) and 180 feet wide. The goal line in the crease shall be 2" wide, blue.

**Women’s Lacrosse:**
1. The lacrosse lines are 3" red. The lacrosse field shall be 270 feet long (goal to goal) and 195 feet wide. The goal line in the crease shall be 2" wide, red.

**Field Hockey:**
1. The field hockey lines are 3" black. The lacrosse field shall be 300 feet long (goal to goal) and 180 feet wide.

**Mid Field Logo:**

Blue and White

**Mid Field Letters:**

Blue and White = “SAN DIEGUITO ACADEMY” and “MUSTANGS”

2.10 **MINIMUM SPECIFICATIONS FOR SYNTHETIC TURF SYSTEM MATERIALS**

A. The minimum material will be verified and enforced and will be the basis for Owner's testing. Material that fails to meet these minimum specifications will be rejected. The material specifications in this section are minimums. The manufacturer of the synthetic turf fiber and fabric may elect to exceed these specifications to insure compliance with all requirements and the warranty as specified in this section.

B. Color of synthetic turf to be medium green as approved by Owner. Additional turf colors shall be as called for in Section 2.9 for lines and markings. The fiber used for the lines and markings shall
be of the same composition as that used for the green areas.

FieldTurf Revolution 2"

<table>
<thead>
<tr>
<th>Item</th>
<th>ASTM</th>
<th>Property</th>
<th>Minimum Specifications</th>
</tr>
</thead>
<tbody>
<tr>
<td>A.</td>
<td>D418</td>
<td>Pile Weight</td>
<td>34 oz/sq yard</td>
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<tr>
<td>B.</td>
<td>D418</td>
<td>Primary Backing</td>
<td>7 oz/sq yard total</td>
</tr>
<tr>
<td>C.</td>
<td>D418</td>
<td>Back Coating</td>
<td>18 oz/sq yard</td>
</tr>
<tr>
<td>D.</td>
<td>D418</td>
<td>Total Weight</td>
<td>59 oz/sq yard</td>
</tr>
<tr>
<td>E.</td>
<td>D418</td>
<td>Pile Height</td>
<td>2.00”-2.10” (2” minimum)</td>
</tr>
<tr>
<td>F.</td>
<td>D1335</td>
<td>Tuft Bind (without infill)</td>
<td>8 lbs.</td>
</tr>
<tr>
<td>G.</td>
<td>D1682</td>
<td>Grab/Tear Strength</td>
<td>200 lbs.</td>
</tr>
<tr>
<td>H.</td>
<td>D2859</td>
<td>Pill Burn Test</td>
<td>Pass</td>
</tr>
</tbody>
</table>

2.11 MINIMUM TURF MATERIAL SPECIFICATIONS

A. Pile fiber shall be 100% monofilament, polyethylene athletic quality yarn designed specifically for outdoor use and stabilized to resist the effects of ultra-violet degradation, heat, wear, water and airborne pollution.

B. Fiber shall be certified to have less than 50 ppm or less of lead from both the fiber supplier and the turf vendor.

C. The fiber shall meet the following requirements:

<table>
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<th>Property</th>
<th>Minimum Specifications</th>
</tr>
</thead>
<tbody>
<tr>
<td>1.</td>
<td>D1577</td>
<td>Yarn Denier / Ply</td>
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<tr>
<td>2.</td>
<td>D1577</td>
<td>Base Filament Thickness</td>
<td>250 U Micron</td>
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<tr>
<td>3.</td>
<td>D1577</td>
<td>Monofilament Width</td>
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<td>4.</td>
<td>D2256</td>
<td>Yarn Breaking Strength</td>
<td>20 lbs</td>
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<td>5.</td>
<td>D2256</td>
<td>Yarn Elongation to Break</td>
<td>50%</td>
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<td>6.</td>
<td>D789</td>
<td>Yarn Melting Point</td>
<td>240°F</td>
</tr>
</tbody>
</table>

D. Fiber Wear Simulation: Fiber shall exhibit no splitting or appreciable degradation after a minimum of 40,000 cycles of simulated Lisport wear testing and shall remain serviceable without appreciable face weight loss after a minimum of 40,000 cycles of simulated Lisport wear testing.

E. Fabric Composition: Shall consist of 100% polyethylene monofilament yarn tufted into polypropylene backings coated with high-grade polyurethane. Coating and backing materials shall assure suitable tuft bind strength, dimensional stability, and long-term wearing properties.

2.12 INFILL MATERIALS

A. The synthetic turf shall utilize a combination of sand and rubber infill materials. The maximum sand content shall not exceed 50% by volume and shall not be less than 30% by volume. Proprietary infill volumes with greater than 30% sand will be considered on a product by product basis. The exact in-fill material ratio may be altered to provide strength, shock attenuation, and to provide permeability by the vendor/installer as approved by the Field Landscape Architect.
B. Infill material shall be applied in a dried condition when the turf is dry. It shall be applied in uniform layers effectively dragged and/or brushed to distribute the material uniformly onto the backing of the turf.

C. The sand infill material shall be graded silica sand, sub-round to round, compaction resistant, washed and dried. The sand shall meet the following criteria:

<table>
<thead>
<tr>
<th>Property</th>
<th>Criteria</th>
</tr>
</thead>
<tbody>
<tr>
<td>Percent Silica</td>
<td>80-95%</td>
</tr>
<tr>
<td>Shape</td>
<td>Round to Sub-round</td>
</tr>
<tr>
<td>Sphericity</td>
<td>0.65 – 0.85</td>
</tr>
<tr>
<td>Roundness</td>
<td>0.60 – 0.70</td>
</tr>
<tr>
<td>Hardness (Moh)</td>
<td>7</td>
</tr>
</tbody>
</table>

The sand gradation shall meet the following wet sieve analysis:

<table>
<thead>
<tr>
<th>Sieve Size</th>
<th>Percent Retained</th>
</tr>
</thead>
<tbody>
<tr>
<td>#16</td>
<td>0% – 5%</td>
</tr>
<tr>
<td>#20</td>
<td>10% – 20%</td>
</tr>
<tr>
<td>#30</td>
<td>50% – 70%</td>
</tr>
<tr>
<td>#40</td>
<td>15% – 25%</td>
</tr>
<tr>
<td>#50</td>
<td>0% – 10%</td>
</tr>
<tr>
<td>#100</td>
<td>0% – 5%</td>
</tr>
<tr>
<td>Pan</td>
<td>0% – 2%</td>
</tr>
</tbody>
</table>

D. Rubber Infill:

1. The rubber shall be 100% SBR cryogenically processed free of any tire cord and steel materials or kevlar. SBR rubber shall be manufactured from North American automotive or truck tires and shall be generated from California based tires. Tires more than 10 years old from date of production are not allowed. The rubber infill material gradation shall meet the following size requirements:

<table>
<thead>
<tr>
<th>Size</th>
<th>Percent Retained</th>
</tr>
</thead>
<tbody>
<tr>
<td>2.0 – 1.5 mm</td>
<td>0% - 10%</td>
</tr>
<tr>
<td>1.5 – 1.0 mm</td>
<td>10% - 30%</td>
</tr>
<tr>
<td>1.0 – 0.5 mm</td>
<td>40% - 80%</td>
</tr>
<tr>
<td>0.5 – 0.0 mm</td>
<td>0% - 10%</td>
</tr>
</tbody>
</table>

E. SBR rubber shall be certified in writing to have less than 50 ppm or less of lead from both the rubber supplier and the turf vendor.

F. It shall be applied in uniform layers effectively dragged to distribute the material uniformly to the backing of the turf. The layers shall be installed to provide a profile with 100% sand at the bottom, a blend of sand and rubber in the center, and 100% rubber on the surface. The application rate shall provide a total minimum weight of 2.4 lbs. of rubber infill material per square foot of the turf area and approximately 3.65 lbs. of sand infill material per square foot.

G. Maximum exposed fiber height shall be ¾” after infill placement, settling, and compaction.
2.13 **PAINT**

A. Paint for lines and markings shall be specifically formulated for use with synthetic turf. Paint formulation shall be considered as a semi-permanent installation. Acceptable manufacturer and product include:

1. Pioneer Athletics – ExtremeLine Paint
2. Eco Paint
3. Or approved equal.

2.14 **MAINTENANCE EQUIPMENT – SWEEPER UNITS**

A. The Contractor shall provide one tow behind sweeper/ provide ground driven rotary brush for the cleaning and maintenance of the infilled synthetic turf. Unit shall:

1. Provide for metered re-application of infill material with simultaneous dirt removal through 2 sieve trays
2. Provide sieve trays with variable settings from 4-10MM;
3. Adjustable depth row of tines for decompact infill material
4. Working width to be nominally 6 ft.
5. Rear mounted drag brush.
6. Provide connections for tow behind standard tractor or utility vehicle.

B. Manufacturer’s Reference: The sweeper unit shall be SMG TurfCare TCA 1400 or approved equal. Contact SMG Equipment LLC, (253) 350-8803 / www.smgequipment.com.

2.15 **MAINTENANCE EQUIPMENT – DRAG BRUSH UNITS**

A. One tow-behind drag unit shall be furnished to the Owner with the playfield surfacing system.

B. The drag brush unit shall include 3-point hitch, rear-mount with tow coupling.

C. Include four specially-arranged brush rows to level surface of turf with infilling granulate

D. Working width to be nominally 6 ft.

E. Manufacturer’s Reference: The unit shall be SMG Drag Brush SB1.1 or approved equal. Contact SMG Equipment LLC, (253) 350-8803 / www.smgequipment.com.

2.16 **ALTERNATE FIELD EQUIPMENT**

A. The synthetic turf vendor may request to substitute equipment for those specific units specified, provided an equivalent function is provided to the specified equipment.

**PART 3 - INSTALLATION**

3.1 **CERTIFICATION OF FIELD BASE INSTALLATION**

A. The Contractor, the Contractor's subcontractor and the Turf Vendor shall perform an inspection of the permeable aggregate and submit written certification of acceptance of the base for the installation of the synthetic turf system.
B. Summary of certification shall include, but not be limited to:

1. Acceptance of the base construction "finish surfaces" as totally suitable for the application of work specified under this section.

2. Verification and certification of the infiltration and permeability rates of the permeable aggregate as applying to the warranty.

C. All discrepancies between the required materials, application and tolerance requirements noted by the turf installer shall be brought immediately to the attention of the Contractor and the Field Landscape Architect. Failure of the turf installer to immediately inform the Contractor and Field Landscape Architect of any prior work that does not meet the required specifications will result in the turf installer being required to perform any work needed to bring the base to acceptable condition.

3.2 SUPPLEMENTAL PAD SYSTEM INSTALLATION

A. Elastic Layer Pad Installation

1. The Superintendent shall thoroughly inspect all materials delivered to site both for quality and quantity to assure that the entire installation shall have sufficient material to maintain proper mixing ratios.

2. Installation of the elastic layer shall not take place if the ambient temperature is below 50 degrees F, if the material is wet, or if rain is falling or pending.

3. The material to be placed shall be mechanically mixed to obtain a homogeneous mixture. Extreme care shall be taken under the immediate supervision of the Superintendent in the weighing and mixing of the components to maintain a uniform mixture with predictable and consistent performance characteristics across the entire field area. The polyurethane shall be of sufficient volume to obtain satisfactory long-term bonding of the components but shall not be of such volume as to render the elastic layer hard and uncomfortable for athletic use.

4. The elastic layer shall be installed with a paving machine that utilizes an electrically heated finish surface screed bar. The paving machine must be operated by a minimum of two skilled technicians at all times.

5. All seams shall be hand rolled and cold pad joints shall be primed with a polyurethane primer supplied by the binder manufacturer.

6. The Superintendent must consistently monitor thickness of the elastic layer and supervise all mixing ratios by means of component weight checks.

7. The elastic layer pad must cure free of foot and equipment traffic for 48 hours after placement.

8. The finished elastic layer must adhere 100% to the porous asphalt with no separations.

9. The finished elastic layer must be properly compacted, uniform in texture, density, thickness, and tolerance to grade and suitable as a shock attenuation pad providing dynamic cushioning for the turf system.

10. The elastic layer shall have minimum thickness of 19 mm. The finished surface shall not vary more than 1/4" in 10' (6.25mm in 3.0 meters) measured in any direction as gauged from a string line or straight edge.

11. The Contractor shall test the permeability of the in-situ pad prior to synthetic turf installation. The pad shall be tested in a minimum of six (6) representative locations. The test results shall be submitted to the Engineer prior to synthetic turf installation.
3.3 SYNTHETIC TURF INSTALLATION

A. Perform all work in strict accordance to the drawings, specifications, shop drawings and manufacturer's specifications and instructions.

B. Verification: The Contractor is responsible for inspecting, verifying, and accepting all installed work of this section.

C. Environmental Conditions: Do not apply adhesive materials or infill material when:

1. Ambient air temperature is below 50 degrees F.
2. Material temperatures are below 50 degrees F.
3. Rain is falling or pending
4. Conditions exist, or are pending, that will be unsuitable to the installation of the system.

D. Preparation:

1. Accept base onto which the synthetic turf surfacing system and the anchoring system are to be applied, as specified above.
2. Immediately prior to application of the synthetic turf, the base shall be thoroughly cleaned of all foreign material, soil, or any other substances that may be detrimental to permeability and the installation of the turf system.

3.4 INSPECTION OF MATERIALS

A. Prior to installation, and immediately upon delivery of synthetic turf system materials to the project site, the Synthetic Turf Surfacing Contractor shall inspect material as follows:

1. For damaged or defective items;
2. Measure turf pile height and thickness of each roll;
3. Measure backing perforation diameter and spacing;
4. Reject damaged materials and all materials out of tolerance with this specification.

B. After installation, inspect project area for acceptable seaming, adhesive bonding, uniformity of color of turf, bubble- and wrinkle-free surface smoothness as laid, field lines and markings, insert installations, edge details. Remove and/or repair deficient workmanship in a manner consistent with these specifications prior to requesting the Field Landscape Architect's inspection pursuant to completion and acceptance of the work.

3.5 OWNER'S TEST

A. Owner may have samples of the turf submitted and tested for verification of conformance to specifications. Turf system acceptance is subject to the results of these tests.

B. Any material so tested and found not conforming to specification will be rejected and replaced with material conforming to the specification at Synthetic Turf Surfacing Contractor's expense. Resubmittal shall be required.

3.6 SYNTHETIC TURF INSTALLATION

A. Perform all work in strict accordance to the drawings, shop drawings and manufacturer's
specifications and instructions.

B. Verification: The Contractor is responsible for inspecting, verifying, and accepting all installed work of this section.

C. Environmental Conditions: Do not apply adhesive materials or infill material when:
   1. Ambient air temperature is below 40 degrees F.
   2. Material temperatures are below 40 degrees F.
   3. Rain is falling or pending
   4. Conditions exist, or are pending, that will be unsuitable to the installation of the system.

D. Preparation:
   1. Accept base onto which the synthetic turf surfacing system and the anchoring system are to be applied, as specified above.
   2. Immediately prior to application of the synthetic turf, the base shall be thoroughly cleaned of all foreign material, soil, or any other substances that may be detrimental to permeability and the installation of the turf system.

E. Equipment and Access:
   1. Passenger vehicles shall not be allowed to park or staged upon the completed aggregate surface either prior to or during installation of the synthetic turf.
   2. Equipment utilized during construction including compressors, generators, etc. shall be in complete working order, with exhaust systems oriented vertically and away from the synthetic turf surface. At any location where equipment is parked and/or staged on the turf surface during installation, adequate protection of the finish turf surface will be required including, but not limited to heat resistant panels to ensure 100% viability of the finish turf surface and fibers. Should a portion of the turf be damaged as a result of installation techniques, the entire turf panel may be subject to rejection and replacement at the direction of the Field Landscape Architect.

F. The fabric surface shall be constructed and installed in 15-foot minimum widths with no longitudinal or transverse seams, except for head or tee seams at field boundaries and inlaid lines within a finished roll assembly.

G. Rolls that do not lay evenly and with full dimension width will be rejected. No fitted pieces will be allowed to true alignment.

H. Bonding of Material Surfaces: The bonding or fastening of all system material components shall provide a permanent, tight, secure and hazard-free, athletic playing surface. System material components include:
   1. Bonding all seams and inlaid line and markings
   2. Bonding and seaming must maintain their integrity for total length of warranty period.
   I. Seams (Joint)
      1. All turf seams shall be sewn with high strength polyester fiber cord or nylon.
      2. Backing layers must lie flat on the field base to provide a uniform pile surface.
3. The width between fiber rows at the seam locations shall not exceed that of the tufting gauge of the turf materials.

4. All sewn seams shall be brushed to provide full coverage of fiber over the thread.

I. Turf Edges: Turf edges to be as shown on the edge fastening detail and nailed at the perimeter.

3.7 LINING / MARKING INSTALLATION

A. Complete field markings shall be provided with the initial installation of the surfacing system. Provide lines and markings in conformance with these specifications. Layouts shall be accurately surveyed and marked prior to installation.

B. If overlapping backing materials are utilized for the inlaid lines and markings resulting in a non-permeable surface in excess of 12 inches wide, the backing materials shall be perforated in conformance with section 2.8 after gluing and prior to installation of the infill material.

C. To the greatest extent practical, lines and markings shall be installed without compromising the primary backing.

D. Painted lines and markings shall be crisp and distinct, with no weeping or overspray. Application of paint shall be exactly aligned with required dimensions and a guide wire/string line shall be used to produce straight lines.

E. Contractor shall reapply paint if markings exhibit any appreciable fading or degradation within three months of initial application.

3.8 SYNTHETIC TURF EDGE ANCHOR INSTALLATION

A. Anchor synthetic turf along the sides and ends with the existing edge nailer board as shown in the details. Complete any adjustments/additions to the turf nailer board to ensure the top of the infill meets and matches the top of the concrete or rubberized surface edge directly adjacent to the synthetic turf.

3.9 IN-FILL INSTALLATION

A. The in-fill material shall be applied in a dry condition and when the synthetic turf is dry.

B. The synthetic turf installer shall not infringe upon any current or pending patents held by other synthetic turf manufacturers or installers with the installation of the in-fill materials.

C. The infill materials will be installed with a minimum of 12 applications.

D. The infill installation shall not result in fiber material trapped below the surface of the infill material. If fiber is trapped below the surface, a portion or all of the infill material must be removed and reinstalled.

E. The infill material shall be installed at a uniform depth across the entire field area. Infill depths shall not vary by more than +/- 5 mm from the design infill level indicated in the approved submittals across the entire synthetic turf surfacing area.

F. The brushing of the in-fill material shall provide fiber fibrillation resulting in a natural surface appearance. If in Owner’s opinion more fibrillation is desired, the Synthetic Turf Contractor shall provide additional brushing of the surface to provide the desired level of fibrillation.
G. The in-fill materials shall water settled to provide accelerated consolidation of the in-fill material prior to use by the Owner. Water is available from quick coupling valves located around the field. The Synthetic Turf Contractor shall utilize portable sprinkler heads to evenly apply a minimum of 1 inch of water over the entire field area for water settlement. Upon completion of the initial water settlement, the surface will be inspected the Owner and Field Landscape Architect for footing stability and in-fill consolidation. The Synthetic Turf Contractor shall provide any additional water settling as required by the Owner and Field Landscape Architect to achieve the desired level of in-fill stability and consolidation.

3.10 CLEANING

A. Remove all excess materials of all types, equipment, debris, etc., from the site immediately after completion of the work. Remove all stains and other blemishes from all finished surfaces. Leave work in clean, new appearing condition, ready for use by Owner.

B. The Contractor shall inspect the entire field area with a hand held metal detector to identify any construction materials or tools left on the field. All such materials shall be removed prior to Owner occupancy of the field.

3.11 PROTECTION

A. Adequate protection of materials and work from damage will be the responsibility of the installer during installation and until acceptance of their work. Synthetic Turf Surfacing Contractor will be responsible for protection after the acceptance of the work until final acceptance of all contract work by the Owner. All material damaged prior to acceptance by the Owner shall be replaced at no cost to the Owner.

3.12 EXTRA MATERIALS

A. Deliver to Owner all extra materials herein specified. Receive Owner's written receipt for all materials. Deliver receipt to Field Landscape Architect.

B. Infill Materials: Provide four (4) 33 gallon rubber trash containers with lids of each infill material used for each site.

C. Turf for Future Repairs: Material may be roll ends or cutoffs; however, each piece of fabric shall be at least 5’ x 10’. At least one green and one brick red turf piece shall be at least 10’ x 15’. The following are minimum areas for the extra synthetic turf materials to be provided by the Synthetic Turf Surfacing Contractor to the Owner:

Minimum Quantities:

1. Green Turf: 1000 sf
2. White Turf: 100 LF 4” lines
3. Black Turf: 100 LF 4” lines
4. Red Turf: 100 LF 4” lines
5. Blue Turf: 100 LF 4” lines
6. Blue Turf: 200 SF
7. White Turf: 200 SF
3.13 MAINTENANCE

A. Vendor shall complete maintenance of the synthetic turf field at both 6 months and 1 year after the date of Substantial Completion. Minimum maintenance activities shall include:

1. Inspect and repair as required each inlay and seam.
2. Brush and remove surface debris, loose fibers and any other deleterious material. Use of a rotating, mechanical brush is recommended.
3. Decompact and re-level infill materials. Import and place /top dress new infill material matching original infill materials as needed to establish original infill depth, with not more than ¾” of exposed fiber.

B. All maintenance activities shall be as approved and directed by the original manufacturer.

C. All maintenance activities shall be coordinated with scheduled use of the facility and completed at the convenience of the owner and applicable user groups.

END OF SECTION