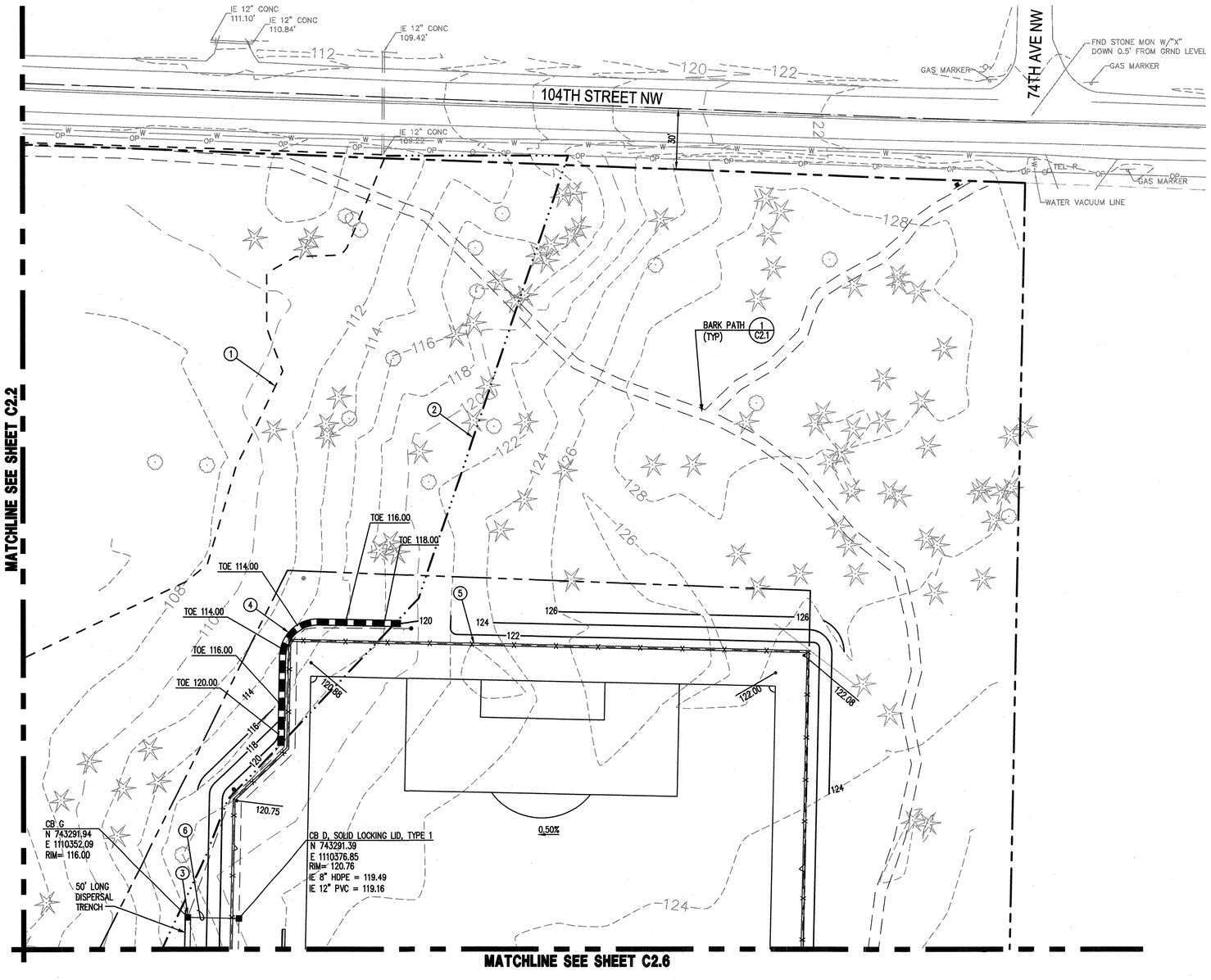
SEHMEL HOMESTEAD PARK

PORTIONS OF THE NW 1/4, SW 1/4 OF THE SE 1/4 AND THE SE 1/4 OF THE SW 1/4 OF SEC 35, T22N, R1E, PIERCE COUNTY, WASHINGTON

0 15 30 60
GRAPHIC SCALE



THESE PLANS MEET THE MINIMUM REQ'MTS OF PIERCE COUNTY ORD. 99-24S AND TITLE 17A

NAME:

6/25/08
DATE

THESE ACTIONS MUST BE COMPLETED PRIOR TO BEGINNING CONSTRUCTION.

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2. APPOINT A TRAINED ESC LEAD WHO SHALL PROVIDE A COPY OF THE ESC PLAN & INSPECTION SCHEDULE.

3. CONTACT JON FRANCE AT (253)798-3277 TO COORDINATE PRECONSTRUCTION MEETING AND COUNTY INSPECTIONS.

FAILURE TO OBTAIN REQUIRED INSPECTIONS MAY ENDANGER OR DELAY PROJECT APPROVAL.

ALL WORK IN THE PUBLIC RIGHT-OF-WAY REQUIRES A PERMIT FROM THE PIERCE COUNTY PUBLIC WORKS DEPARTMENT.

NOTES

1. SEE SHEET C2.1 FOR GENERAL NOTES.

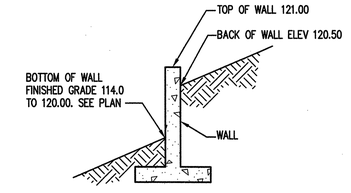
2. SEE WALL DETAILS ON SHEET C6.1.

KEY NOTES

1. WETLAND EDGE.
2. WETLAND BUFFER.
3. FLOW DISPERSION TRENCH, SEE DETAIL 3/C5.2
   CB RIM= 116.00, SOLID LID, IE= 113.00
4. SEGMENTAL BLOCK RETAINING WALL. TOP OF WALL 121.00.
5. FENCE, SEE LANDSCAPE PLANS
6. 24LF 12" PVC @ 23.58% SLOPE

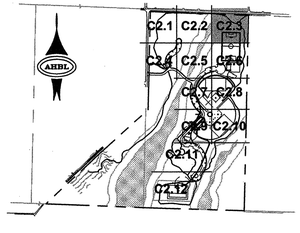
LEGEND

- POROUS ASPHALT
- STANDARD ASPHALT
- CONCRETE



1 DETAIL - SEGMENTAL WALL

NOT TO SCALE



KEY MAP

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AHBL Job No. **205248**

SEHMEL HOMESTEAD PARK

PERMIT SET

6-10-08
DOREEN S. GAVIN
STATE OF WASHINGTON
23487
REGISTERED
PROFESSIONAL ENGINEER
EXPIRES 8/27/09

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3 _____
2 _____
1 _____

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Sheet Title:

GRADING AND UTILITIES

Issue Date:
MAY 29, 2008

Sheet No.

C2.3

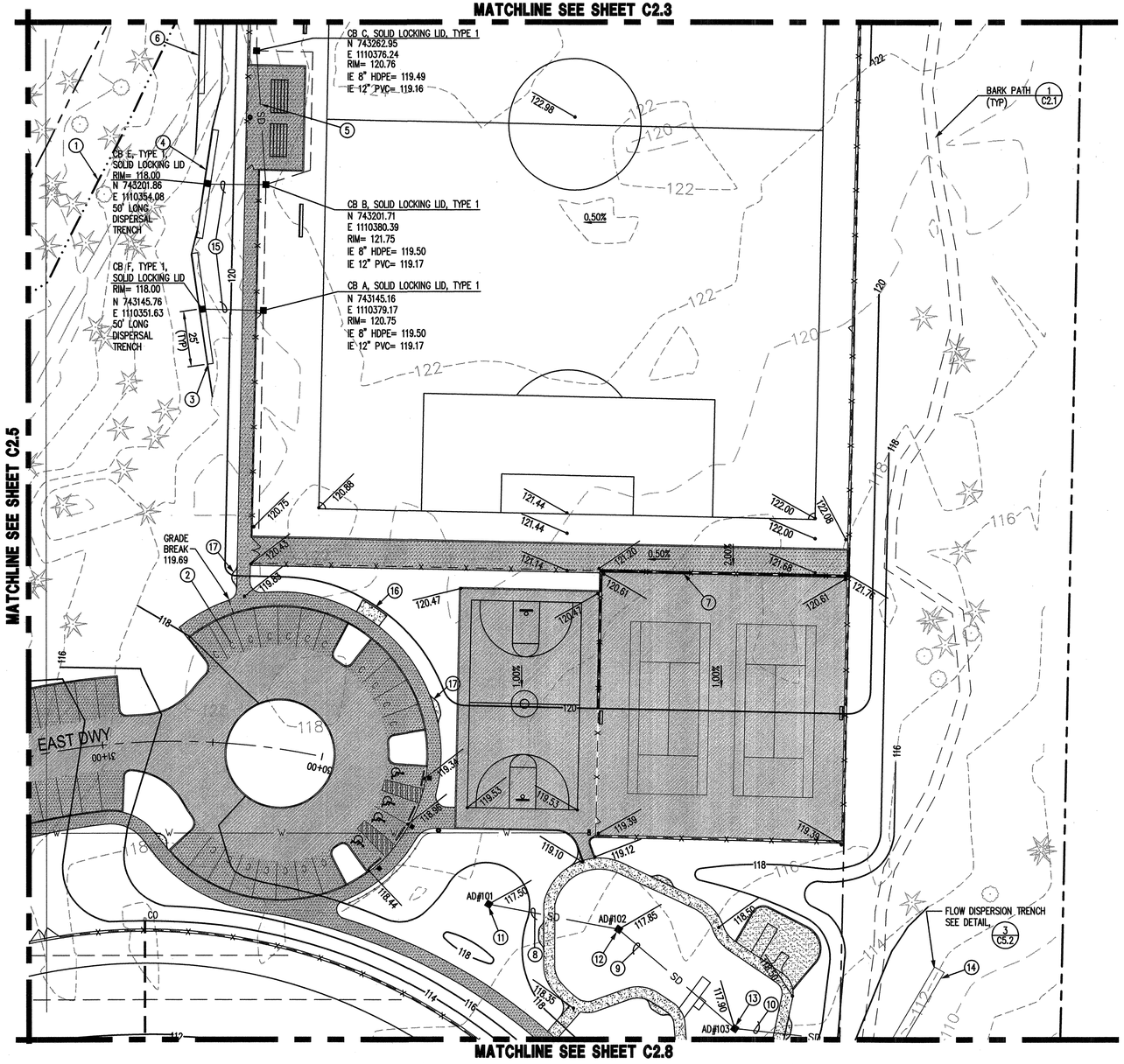
PLANNING & LAND SERVICES
JUN 12 2008
PIERCE COUNTY

R:\205\05\205248\CAD\dwg\C2\01.dwn, C2.3, 6/10/2008 5:07:39 PM, adkulka, Oce TDS700.ctb, Oce TDS700.ps3, Oce ID 2D-34 in (Landscape), 1:1

SEHMEL HOMESTEAD PARK

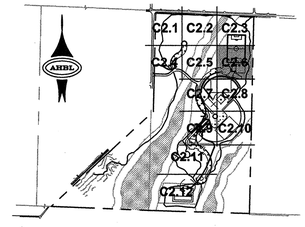
PORTIONS OF THE NW 1/4, SW 1/4 OF THE SE 1/4 AND THE SE 1/4 OF THE SW 1/4 OF SEC 35, T22N, R1E, PIERCE COUNTY, WASHINGTON

0 15 30 60
GRAPHIC SCALE



LEGEND

- POROUS ASPHALT
- STANDARD ASPHALT
- CONCRETE



KEY MAP

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THESE PLANS MEET THE MINIMUM REQ'MTS OF PIERCE COUNTY ORD. 99-24S AND TITLE 17A

NAME:

DATE: 6/25/08

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NOTES

1. SEE SHEET C2.1 FOR GENERAL NOTES.

KEY NOTES

1. WETLAND BUFFER.
2. C= COMPACT PARKING STALLS.
3. FLOW DISPERSION TRENCH, SEE DETAIL 3/C5.2
   RIM OF CB= 118.00
   IE 12" PVC (IN)= 115.00
4. FLOW DISPERSAL TRENCH, SEE DETAIL 3/C5.2
   RIM OF CB= 118.00
   IE 12" PVC (IN)= 115.00
5. 12" PVC, 61 LF @ 0.00% SLOPE
6. FLOW DISPERSION TRENCH, SEE SHEET C2.3 PLAN
7. CONCRETE WALL WITH FENCE ON TOP. TOP OF WALL @ 122.00
8. 60LF 8" CPEP @ 1.00% SLOPE
9. 69LF 8" CPEP @ 1.00% SLOPE
10. 73LF 8" CPEP @ 1.00% SLOPE
11. AREA DRAIN IE= 111.02, SEE DETAIL 6/C5.2
12. AREA DRAIN IE= 110.42, SEE DETAIL 6/C5.2
13. AREA DRAIN IE= 109.73, SEE DETAIL 6/C5.2
14. 50 FOOT LONG FLOW DISPERSAL TRENCH
15. 26LF PVC @ 14.11% SLOPE
16. 12' X 6' CONCRETE PAD FOR SANICANS
17. CONCRETE PAD FOR BENCH, SEE LANDSCAPE DRAWINGS

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Gig Harbor, Washington

Peninsula Metro Park District

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STATE OF WASHINGTON
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REGISTERED
PROFESSIONAL ENGINEER
EXPIRES 8/21/09

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Sheet Title:

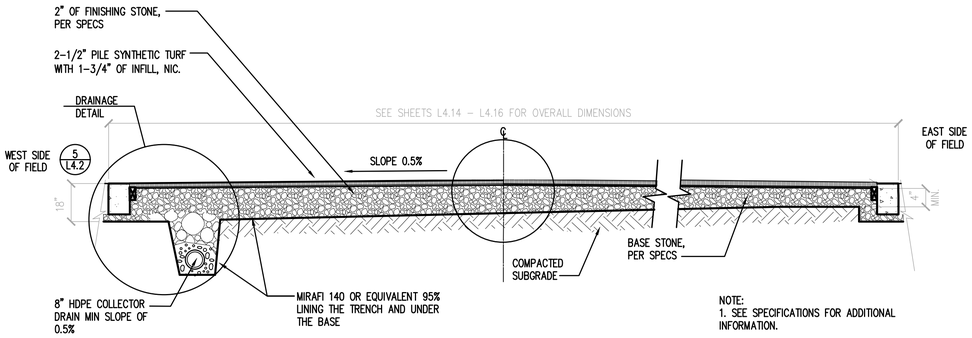
GRADING AND UTILITIES

Issue Date:
MAY 29, 2008

Sheet No.
C2.6

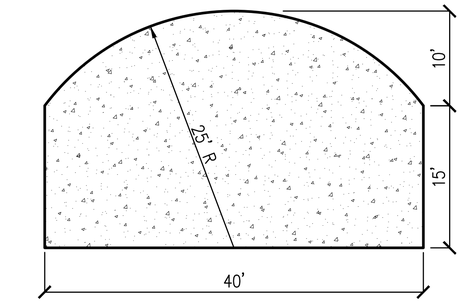
PLANNING & LAND SERVICES
JUN 12 2008
PIERCE COUNTY

R:\Projects\2005\205248\CAD\dwg\C2.6, 6/10/2008 5:08:29 PM, ssmith, Oce TDS700.ctb, Oce TDS700.ps3, Oce D 22x34 H (Landscape), 1:1

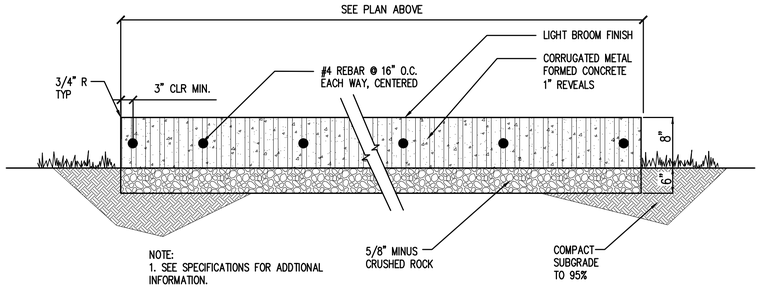


6 SYNTHETIC TURF FIELD CROSS SECTION

3/8"=1'-0"

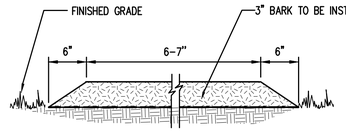


STAGE PLAN



3 STAGE SECTION

NOT TO SCALE



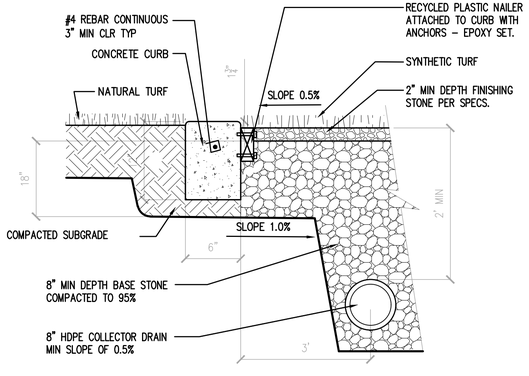
NOTE:
1. ALL BARK PATHS AND TRAIL BENCH LOCATIONS SHALL BE FIELD LOCATED.

2. CONTRACTOR IS RESPONSIBLE FOR CLEARING AND GRUBBING OF TRAIL AND BENCH PADS.

3. SEE SPECIFICATIONS FOR ADDITIONAL INFORMATION.

2 BARK PATH (by others)

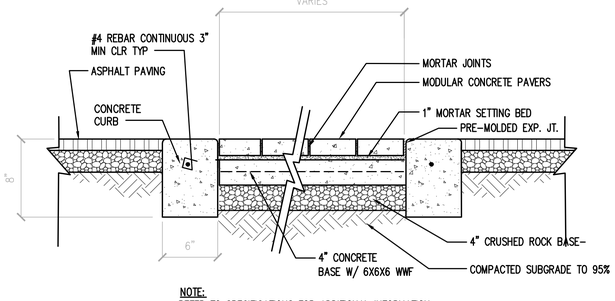
NOT TO SCALE



NOTE:
1. SEE SPECIFICATIONS FOR ADDITIONAL INFORMATION.

5 SYNTHETIC TURF DRAINAGE DETAIL

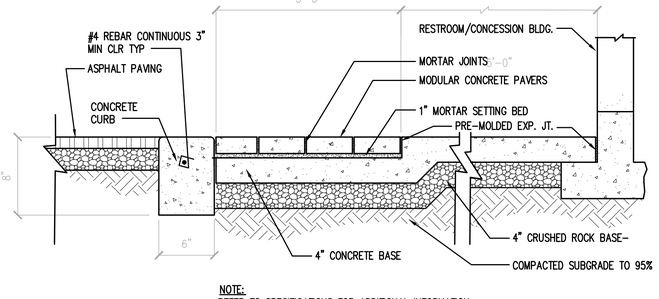
NOT TO SCALE



NOTE:
REFER TO SPECIFICATIONS FOR ADDITIONAL INFORMATION.

4 CROSSWALK

NOT TO SCALE



NOTE:
REFER TO SPECIFICATIONS FOR ADDITIONAL INFORMATION.

1 MODULAR PAVERS - FLAG PLAZA

NOT TO SCALE

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Sheet Title:

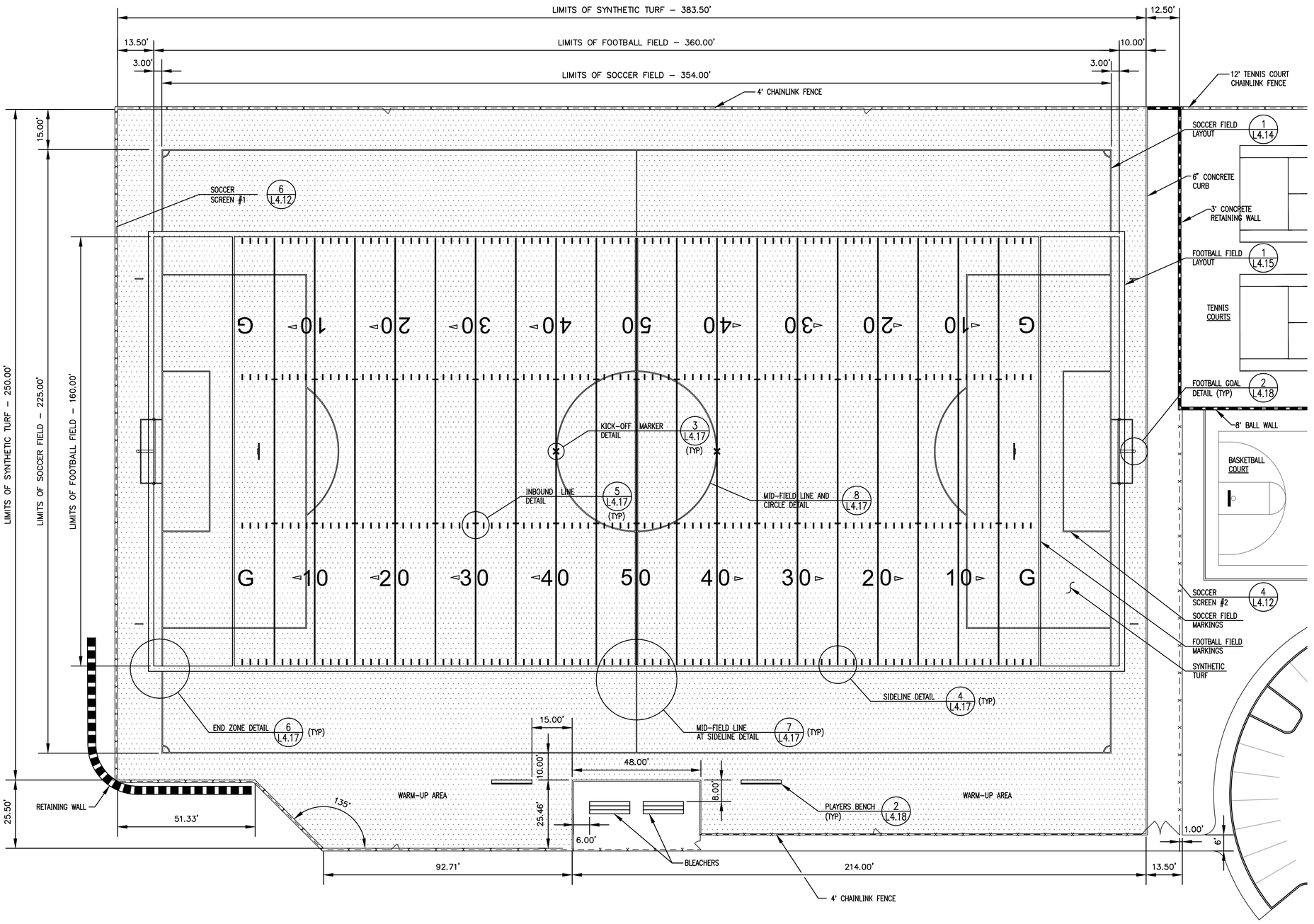
SITE DETAILS

Issue Date:
MAY 27, 2008

Sheet No.

L4.2

Xref R:\C\2005\205248\



Note: Two cross-field soccer sets of lines added during installation

1 **COMPOSITE FIELD LAYOUT PLAN**
SCALE: 1"=20'

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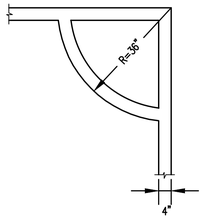
COMPOSITE FIELD LAYOUT PLAN

Issue Date:
MAY 27, 2008

Sheet No.

L4.16



9 CORNER KICK DETAIL
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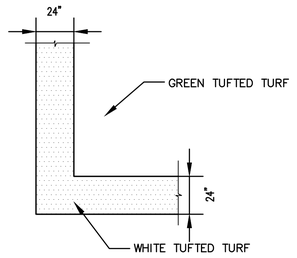

6 END ZONE DETAIL
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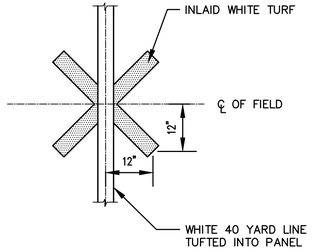

3 KICK-OFF MARKER
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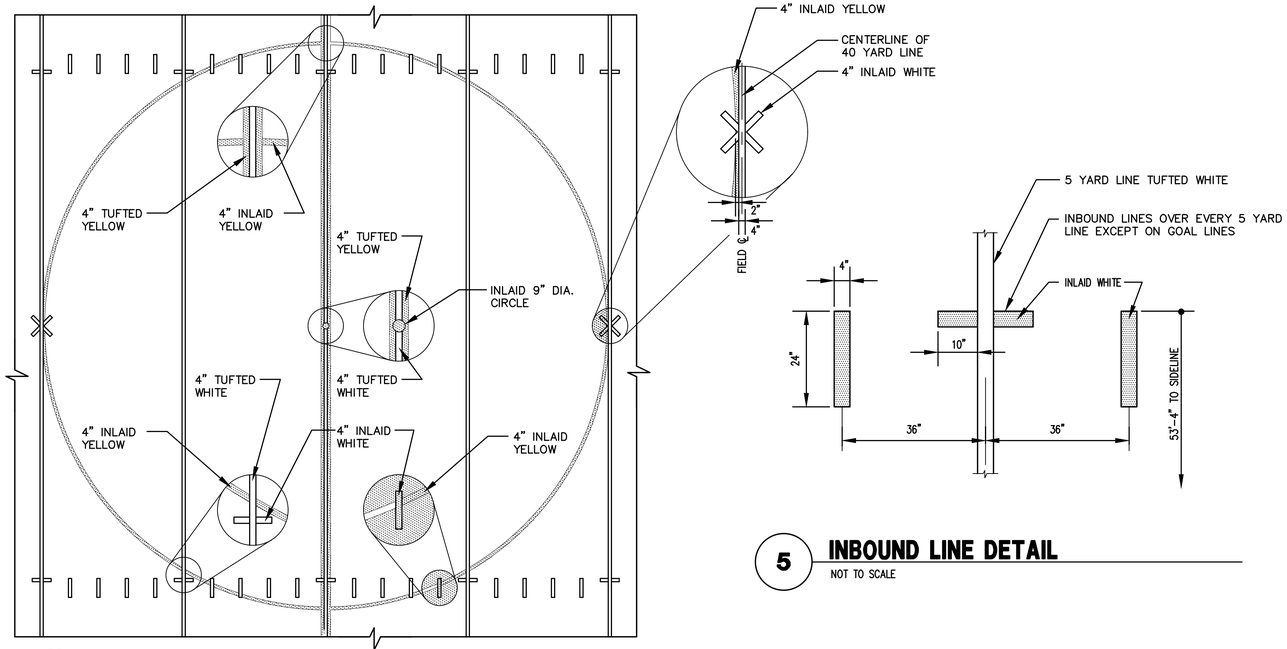
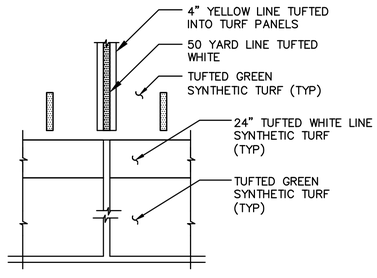


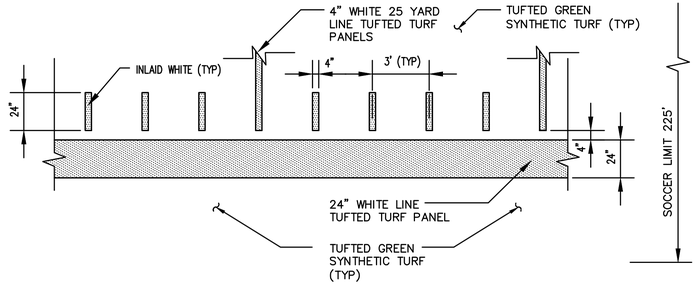
8 MID-FIELD LINE AND CIRCLE DETAIL
NOT TO SCALE

5 INBOUND LINE DETAIL
NOT TO SCALE

2 NOT USED
NOT TO SCALE



7 MID-FIELD LINE AT SIDELINE DETAIL
NOT TO SCALE



4 TYPICAL SIDELINE DETAIL
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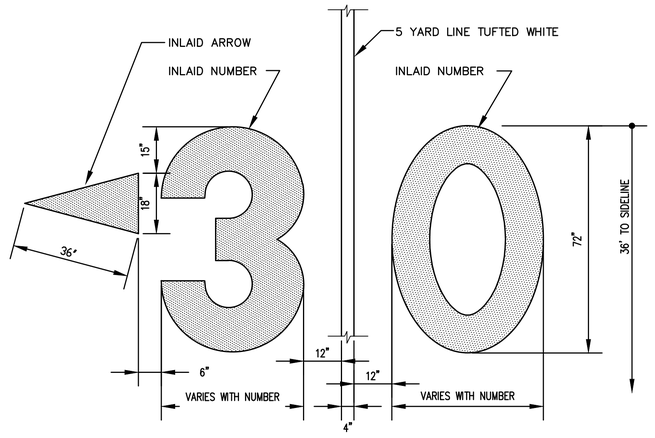

1 YARDLINE NUMBERS
1/2"=1'-0"

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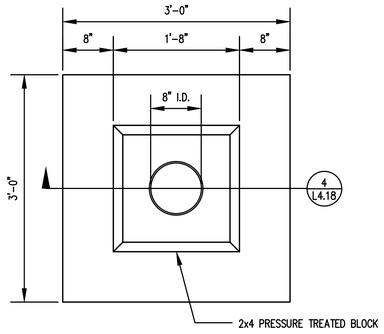
DEW	EES	DEW

Sheet Title:

SYNTHETIC TURF DETAILS

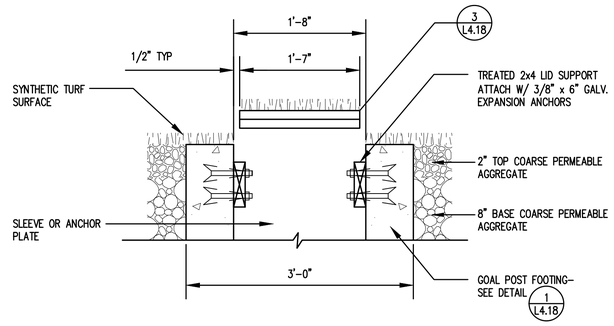
Issue Date:
MAY 27, 2008

Sheet No.
L4.17



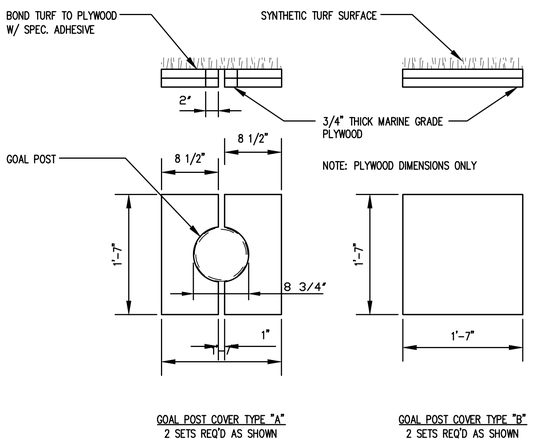
5 PLAN AT GOAL POST

NOT TO SCALE



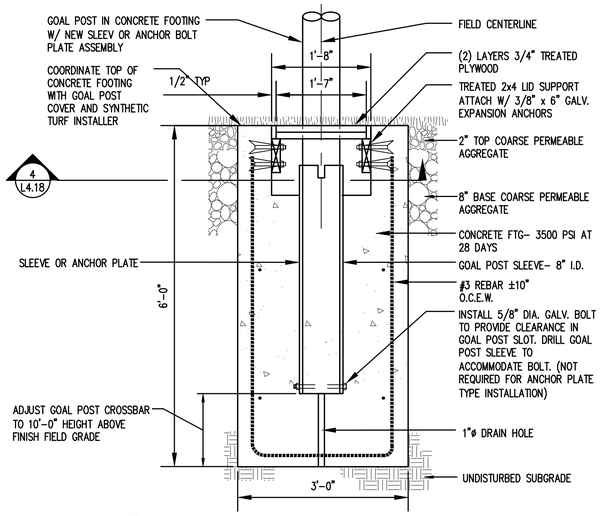
4 SECTION AT GOAL POST

NOT TO SCALE



3 GOAL POST TURF COVERS

NOT TO SCALE



1 FOOTBALL GOALPOST FOOTING

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Revisions:

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Designed by:	Drawn by:	Checked by:
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Sheet Title:

GOAL POST DETAILS

Issue Date:
MAY 27, 2008

Sheet No.

L4.18

PART 1 GENERAL

1.1 SCOPE OF WORK

A. It shall be the responsibility of the Synthetic Turf Contractor to provide all labor, materials, equipment and tools necessary for the complete installation of a vertically draining infilled synthetic turf system. The installation of all new materials shall be performed in strict accordance with the manufacturer's written instructions and in accordance with all approved shop drawings.

B. The synthetic turf system shall consist of a synthetic membrane and artificial "grass blades" that are supported in the vertical position by an infill material.

C. The synthetic turf system shall be suitable for many outdoor types of athletic sports, miscellaneous physical and marching activites, and related uses as noted in paragraph 1.9, E.

D. The synthetic turf system installer shall provide all field layout services, inlaid field lines and text markings as shown on the drawings.

E. The synthetic turf system installer shall provide tufted, or inlaid (sewn in or glued in) lines and marks as shown on the drawings.
   1. Football out-of-bounds and 5-yard lines, inside and outside hash marks, numbers and arrows, perimeter limits and players area.
   2. Soccer lines, arcs and boxes.

F. Provide extra turf materials to Owner for future repair.

G. Provide two field sweepers and one synthetic turf groomer with detailed maintenance and operation instructions and repair manuals.

H. Provide one 52-inch wide sweeper unit with 25-cubic foot capacity debris hopper with maintenance and repair manuals.

I. Provide training for use of field sweeper and turf groomer equipment.

1.2 APPROVED SYNTHETIC TURF MANUFACTURERS

A. Following are the approved synthetic turf manufacturers for the synthetic turf soccer/football field:
   1. Field Turf, 1 (800) 724-2969
   2. Sportexe, 1 (866) 935-7100

3. Sprint Turf, 1 (877) 686-8873

1.3 Related Work

A. Section 02230, "Site Clearing and Erosion Control."

B. Section 02300, "Earthwork."

C. Section 02760, "Site Furnishings and Sport Equipment."

D. Section 02810, "Irrigation."

E. Section 02820, "Field Drainage."

F. Section 02880, "Permeable Crushed Rock Base."

1.4 Owners Option

A. The Owner reserves the option to select either a 100 percent monofilament fiber, or a dual fiber (50 percent monofilament, 50 percent slit film polyethylene) synthetic turf system described herein, installed with either an all rubber or rubber/sand infill. Regardless of what system is selected, there shall be no additional cost to the Owner.

1.5 Quality Assurance

A. Manufacturer's Qualifications: Manufacturer shall have at least 5 years of experience in the design and manufacture of infilled synthetic turf systems and shall have created work that has resulted in construction with a record of successful in-service performance. The manufacturer shall have produced a minimum of twenty-five (25) successful full size (no less than 75,000 square feet) outdoor soccer or football infilled synthetic turf fields within the past 3 years.

B. Installer Qualifications: Installer's project supervisor and job foreman shall have installed a minimum of 8 infill turf system fields of similar size and type within the past 3 years and whose work has resulted in construction with a record of successful in-service performance.

C. The Bidder shall provide evidence of a bonding capacity of no less than $10 million dollars, in the form of a bond capability letter from the corporate surety.

D. The synthetic turf system shall be further warranted for a minimum period of 8 years to provide a "G-Max" rating of no higher than 175.

1.6 Standards

A. American Society of Testing Materials (ASTM), (latest edition). Standard Test Methods:
   1. D1577 - Standard Test Method for Linear Density of Textile Fiber
   2. D5848 - Standard Test Method for Mass per Unit Area of Pile Yarn Floor Covering
   3. D418 - Standard Test Method for Testing Pile Yarn Floor Covering Construction
   4. D1335 - Standard Test Method for Tuft Bind of Pile Yarn Floor Coverings
   5. D1682 - Standard Method of Test for Breaking Load and Elongation of Textile Fabrics
   6. D5034 - Standard Test Method of Breaking Strength and Elongation of Textile Fabrics (Grab Test)
   7. F1015 - Standard Test Method for Relative Abrasiveness of Synthetic Turf Playing Surfaces
   8. D4491 - Standard Test Methods for Water Permeability of Geotextiles by Permittivity
   9. D2859 - Standard Test Method for Ignition Characteristics of Finished Textile Floor Covering Materials
   10. F355 - Standard Test Method for Shock-Absorbing Properties of Playing Surfaces
   11. F1936 - Standard Test Method for Shock-Absorbing Properties of North American Football Field Playing Systems as Measured in the Field
   12. D1557 - Test Method for Laboratory Compaction Characteristics of Soil Using Modified Effort

B. Football rulebook (latest edition) of the National Federation of State High School Association (NFHS) and National Collegiate Athletic Association (NCAA).

C. Soccer Rule book (latest edition) of the National Federation of State High School Association (NFHS) and National Collegiate Athletic Association (NCAA).

1.7 Submittals

A. The Synthetic Turf Manufacturer and Synthetic Turf Contractor (if different from the company) shall provide the Owner with the latest documents for Turf Warranty and 3rd party Insurance Warranty.

B. The Synthetic Turf Contractor shall submit the fiber manufacturer's name, type of fiber and composition of fiber.

C. Shop Drawings: Within 21 calendar days after issuance of "Notice to Proceed", submit to the Owner and Landscape Architect complete and detailed drawings showing all component parts of the synthetic turf infill system:
   1. Field Layout Plan at 1”=20’.
   2. Field Line and Marking Plan and details for the specified sports; i.e., football and soccer.
   3. Roll/Seaming Layout and Seam Details.
   4. Sewn or glue patterns (as applicable).
   5. Methods of attachment (edging details) and perimeter conditions.
   6. Details for removable covers.

D. Synthetic Turf Samples: Within 21 calendar days after "Notice to Proceed", submit to the Landscape Architect:
   1. Submit one (1) 18x18 inch sample of each synthetic turf color (white, yellow, and green and light green which will occur at 10-yard intervals), showing backing with perforations for non-porous systems. The green samples shall show seam makeup (sewn or glued) with dimensional inlaid lines and markings.
   2. Proposed Infill material(s) – two 2-pound samples clearly labeled in plastic ziplock bag for each type.
   3. A letter and the manufacturer’s material specification sheet certifying that the products of this section meet or exceed specified requirements and written installation instructions.

E. The manufacturer of the synthetic turf system shall submit, with the bid, a list of twenty-five (25) completed installations over the past 3 years. The list shall include installations that are similar in scope and no less than 75,000 square feet in size and include ten (10) projects that include the identical proposed synthetic turf system products for this project. The list shall include names and phone numbers of the contacts.

F. The Synthetic Turf Contractor shall submit, with the bid, a resume for the Project Supervisor(s) and Job Foreman that will be utilized on the project. Subcontractors are not acceptable for the installation of the synthetic turf, inlays or infill.

G. Prior to Ordering of Materials:
   1. Provide to the Owner and Landscape Architect directly from an approved independent (third-party) testing laboratory with no ties to the turf manufacturer and within 14 calendar days after issuance of Notice to Proceed, certified copies of ASTM laboratory testing reports on randomly selected samples from every sixth synthetic turf roll as follows:

ASTM Property	Minimum Specifications
FTIR Spectrograph	Pile Composition
ASTM D418	Pile Height Pile Weight and Total Fabric Weight
ASTM D418	Primary and Secondary Backing Weights
ASTM D418	Backing Perforation and Diameter Spacing
ASTM D1335	Tuft Bind (without infill)
ASTM D1682	Grab Tear Strength
ASTM D2859	Pill Burn Test

   2. Provide applicable minimum material ASTM tests to include Dynamic Cushion Test – ASTM F355, Procedure A, (system) and yarn and fabric characteristics.
   3. Provide the necessary testing data to the owner that the finished field meets the required shock attenuation, as per ASTM F1936.
   4. The Landscape Architect and Owner shall provide written authorization of the approved test results prior to the contractor ordering shipment of the synthetic turf materials to the site.

H. Prior to Final Acceptance, the Synthetic Turf Contractor shall submit to the Owner:
   1. Three (3) spiral bound copies with dividers of the Operation and Maintenance Manuals, which shall include a printed list of the project/team on the cover, all necessary instructions for the proper care and preventative maintenance of the synthetic turf system, minor repairs, equipment, uses to avoid to protect the synthetic turf surface to preserve the installation's warranty, and include the name, address, and contacts of all associated vendors.
   2. Project Record Drawing: Record actual locations of seams, drains, quick couplers or other pertinent information.
   3. Insured Warranty: Submit five (5) copies of the Manufacturer Turf Warranty and 3rd party Insurance Warranty and ensure that the forms have been completed in the Owner's name and certified/registered with the Manufacturer.

I. Certification of the Base: Prior to synthetic turf installation, The synthetic turf installer and manufacturer shall provide written certification to the Owner accepting the sub-base surface planarity, compaction, and drainage for installation and warranty validation of the synthetic turf/infill system.

1.8 Manufacturer's Specifications and Warranty:

A. Within 21 calendar days after issuance of Notice to Proceed submit to the 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.

B. Within 21 calendar days after Notice to Proceed, submit to the Landscape Architect five (5) sample copies of warranty package herein specified for review.

1.9 Delivery, Storage, and Protection

A. Deliver synthetic turf and turf products to project site in a sealed/wrapped condition and all other materials in sealed containers or bins. Store per manufacturer’s instructions.

B. Notify Landscape Architect 1 month prior to product delivery.

1.10 Insured Warranty:

A. The Manufacturer’s Turf Warranty shall be insured by an 8-year, pre-paid 3rd Party Insured Warranty.

B. The synthetic turf system shall be warranted by the Manufacturer for a minimum period of 8 years to the Owner from the date of acceptance of the installed system and shall be signed by a principal of the applicable firm, duly authorized to make contracts. In addition, the Manufacturer’s Turf Warranty and the 8-year, pre-paid 3rd Party Insured Warranty.shall be provided by an insurer with an A.M. Best financial strength rating of “Excellent” or higher.

C. The synthetic turf provider shall provide an 8-year warranty that is insured by a policy of insurance issued by a reputable insurance company and must have the following policy features:
   1. Insurance coverage shall specifically provide for reimbursement to the warranty holder in the event of a bankruptcy of the synthetic turf provider.

2. Insurance coverage shall apply to playing surface inclusive of infill.
3. Insurance coverage shall apply to the full 8-year period from acceptance date of project, with no uninsured periods or periods of self-insurance.
4. Insurance coverage shall not limit the hours of use.
5. Insurance coverage shall not exclude heavily trafficked areas.
6. Insurance coverage shall not exclude any colored turf fibers.
7. Insurance coverage shall offer a claim limit of at least (US) $5 million in the aggregate per annum.
8. Insurance coverage shall offer a claim limit of at least (US) $300,000 per field.
9. Insurance coverage shall specifically state exclusions of warranty coverage (if any) and clearly describe maintenance requirements, record keeping, and notifications, etc., for validating warranty.

D. At the sole expense of the synthetic turf warranting contractor, all items of the synthetic turf system covered by the 8-year warranties exhibiting or not performing to the standards noted below shall be repaired or replaced with new materials at no additional cost to the Owner:
   1. Defects in workmanship and premature wear and tear.
   2. Ultraviolet degradation due to normal exposure to the sun.
   3. Synthetic turf materials shall not fade, not fail, shrink, or reflect excessive wear.
   4. Fabric seams shall not separate or become unglued or unattached.

E. Acceptable ‘Designated Uses’ for the synthetic turf field covered by the Warranties shall include:
   1. Games and practices for football, soccer, rugby, lacrosse, field hockey, and ultimate Frisbee, whether or not the field is or not marked for these events.
   2. General recreational sports activities for youth, peewee, and adult soccer.

1.11 Definitions

A. The term "not fade" in 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.

B. The term "not fail" or "excessive wear" used in this warranty shall mean that the length and weight of the face yarn or pile material in the synthetic turf surface shall not have been decreased by more than 10 percent per year according to ASTM D418, nor exceed 50 percent 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, at no additional cost to Owner.

C. The term "serviceable" in this warranty shall include that the synthetic turf system shall have a maximum "G" value according to Procedure A ASTM F355, not to exceed 130 G's in any location based on an average of the second and third drops upon installation and shall not exceed 175 G's maximum at any one location thereafter throughout the warranty period. This shall be determined by conducting dynamic cushioning tests per ASTM F355 Procedure "A" at the points indicated in ASTM 1936-98. Any increase from 130 G's to allowable 175 G's maximum shall not exceed 15 G's in any single year period.

D. Defects, product failure and impact attenuation failure shall result in the synthetic turf being replaced by the manufacturer at no additional cost to the Owner.

1.12 Warranty Testing

A. The turf shall be tested for dynamic cushioning ("G" Test) by a licensed testing laboratory acceptable to the Owner at the completion of the installation shortly prior to acceptance inspection by the Owner, at the anniversary date of each 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, the Contractor shall replace non-conforming areas or sections solely at the Owner's discretion and direction.

B. Tests are to be performed in accordance with F355 Procedure A and ASTM F-1936-98.

C. All costs for the stated testing shall be paid for by the Contractor.

D. 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 Contractor.

1.13 Maintenance Service

A. The Synthetic Turf Contractor shall train the Owner's facility maintenance staff in the proper operation of the turf groomer and field sweeper. In addition, the contractor shall demonstrate common clean-up procedures for spills or stains.

PART 2 PRODUCTS

2.1 Synthetic Turf System

A. Permeable and infilled synthetic turf which provides the look, the feel, and the playability of natural grass with respect to ball speed and bounce, and maximum safety to the athletes.

B. The average abrasiveness index according to ASTM F1015 shall not exceed 23. This shall be determined by conducting tests at locations in accordance with ASTM F1936, Article 8.

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 of the Synthetic Turf System

A. The dynamic cushioning of the turf and infill system shall not exceed a maximum value of 130 G's based on an average of the second and third drops per ASTM F1936 (G-Max), ASTM F355 procedure A, at any location upon installation. The surface shall not exceed 175 Gs during the lifetime of the warranty period.

2.3 Permeability Requirements of the Synthetic Turf System

A. The synthetic turf system shall be vertically draining and utilize the prepared permeable base as the primary means of collecting and diverting rainwater falling within the limits of the field. The permeability of the synthetic turf system shall be at least 20 inches/hour. This shall be determined by having tests conducted on representative infilled samples by a recognized testing laboratory.

B. Clear opening perforations in the synthitic turf backing shall be a minimum of 1/4-inch diameter and a maximum of 1/2-inch diameter, and be uniformly spaced at 4 inches on center for non-porous backing systems. Perforations shall be created during the backing process utilizing heat punched/formed performations sealing the hole edges with no fibers or material residue remaining. The Landscape Architect shall approve the turf perforations prior to shipment, upon delivery on-site, or during on-site perforating operations for seaming and inlaid operations as applicable.

2.4 Synthetic Turf Pile Surface

A. The surface shall provide superior traction in all types of weather with the use of conventional athletic shoes and composition molded-soles. Long cleats more than 1/2 inch in length and spikes in excess of 1/4 inch shall not be used for athletic activities or general recreation on the synthetic turf surface.

2.5 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-foot-0-inch spacing at 5-yard marking lines. Rolls that do not lay evenly and with full dimension width will be rejected. No fitted pieces will be allowed to straighten alignment. Turf panels that do not meet these requirements will be rejected and shall be removed from the site.

2.6 Suitability

A. The synthetic turf system shall be suitable for practice and play of soccer, football, similar field sports, marching band and military marching drills, physical education, pedestrian traffic, and pneumatic, rubber-tired maintenance and service vehicles in all local climatic conditions.

2.7 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. Infill material shall be approved by the Landscape Architect prior to installation.

B. Yarn Pile: Shall be textured polyethylene athletic quality yarn designed specifically for outdoor use and stabilized to resist the effects of ultra-violet breakdown, heat, wear, water and airborne pollution.

ASTM	Property	Minimum Specifications
D1577	Yarn Denier	8,000 - 11,000 denier
D2256	Yarn Breaking Strength	1.2 gmd/denier
D2256	Yarn Elongation	9% to break
D789	Yarn Melting Point	245° F

C. Fabric Composition: Shall consist of 100 percent monofilament or dual fiber system containing 50 percent slit film and 50 percent monofilament composed of 100 percent polyethylene yarn tufted into polypropylene backings coated with high-grade latex or polyurethane to assure suitable tuft bind strength, dimensional stability, and long-term wearing properties.

1. Sand/Rubber Infill Systems or All Rubber Infill Systems:

ASTM	Property	Minimum Specifications
D418	Pile Weight (Polyethylene Yarn Only)	38-44 oz/sq. yard
D418	Primary Backing	7 oz/sq. yard total
D418	Back Coating	20 oz/sq. yard
D418	Total Weight	65-71 oz/sq. yard
D418	Pile Height	2-1/2" nominal
D1335	Tuft Bind (without infill)	8.5 lbs.
D1682	Grab/Tear Strength	175 lbs.
D2859	Pill Burn Test	Pass

D. Color of the synthetic turf shall be green as approved by the Owner. Additional turf colors shall be as shown on the drawings for lines and markings.

2.8 Infill Material

A. The infill material shall be either a combination of sand and rubber or 100 percent rubber as recommended by the manufacturer. The maximum sand content shall not exceed 30 percent by volume.

B. The all rubber system shall be 100 percent SBR cryogenically processed free of any steel or tire cord materials.

C. Silica sand shall be a minimum of 80 percent rounded, compaction resistant, dust free, washed and dried. The sand gradation shall meet the following wet sieve analysis:

Sieve Size	% Passing
#8	100
#16	100
#20	95 - 100
#30	45 - 70
#40	5 - 20
#50	0 - 5.0
#100	0 - 1.0
#200	0 - 0.5

D. SBR Rubber shall meet the following size requirements:

2.0 – 1.5 mm	0% - 10%
1.5 – 1.0 mm	30% - 80%
1.0 – 0.5 mm	30% - 80%
0.5 – 0.0 mm	0% - 5%

E. Substitute gradation may be submitted to the Owner and Landscape Architect for review and potential approval.

2.9 Removable Covers

A. Contractor shall provide removable sections of turf to access goal post footing connections, soccer sleeves and other underground utilities as shown on the drawings.

B. Field Sweeper Units:
1. Provide two 52-inch wide sweeper units with 25-cubic foot capacity debris hopper for field maintenance operations. Sweeper units shall be connected in tandem to a common hitch for towing behind an approved field utility vehicle with pneumatic tires for driving/maneuvering on the synthetic turf. The synthetic turf manufacturer shall approve brushes for use on the synthetic turf surface.
2. The sweeper units shall be Toro Pro Sweep Model 5200 or approved equal as recommended by the synthetic turf manufacturer.

2.10 Synthetic Turf Groomer

A. The synthetic turf vendor shall furnish one synthetic sports turf groomer 'dragging platform' to the owner for field maintenance activities. The drag brushes shall be synthetic super duty blue brushes that retain their original shape, resist wear, and will not rot.

B. The turf groomer shall be a minimum 72 inches wide by 36 inches with heavy-duty brushes suitable for use on infilled synthetic turf. Provide one 4-foot by 8-foot dragging platform with brushes. It shall also be equipped with greensslicer spring tine rake that consist of three (3) rows of twenty-eight (28) tines spaced 7/8 inch apart for thorough coverage. Each row of tines shall have the ability to be adjusted to the desired level of aggressiveness.

C. The dragging brush shall include a towing mechanism compatible with a field utility vehicle. The brushing platform shall include an electrical lift.

D. The dragging brush shall be the Synthetic Turf Groomer with Greenslicer Spring Tine Rake or approved equal. Manufacturer GreensGroomer WorldWide, Inc., phone (888) 298-8852), or as recommended by the synthetic turf supplier.

E. The Synthetic Turf Contractor shall provide detailed instructions for the operation of the syinthetic turf grooming equipment and state the importance of not overworking the field.

2.11 Accessories

A. Provide all necessary materials, equipment, and accessories for a complete installation as recommended by the manufacturer.

PART 3 EXECUTION

3.1 Certification of Aggregate

A. The Contractor or the Contractor's synthetic turf installation subcontractor (as applicable) shall perform an inspection of the base aggregate and submit written certification of acceptance of the base for the installation of the turf system to the Owner.

B. Summary of certification shall include, but not be limited to:
1. Acceptance of the base construction as totally suitable for the application of work specified under this section with the assurance that the final installation of work will result in an athletic surface fully warranted for the period and conditions specified.

2. Verification and certification of the infiltration and permeability rates as applying to the warranty.
3. In order to provide these assurances and the certification of acceptance, the Manufacturer shall cooperate and communicate fully at all times with the Contractor. This Manufacturer shall be responsible for reviewing all related work, materials and procedures previous to the application of the permeable synthetic turf system specified herein.
4. All discrepancies between the required materials, application and tolerance requirements noted by the Manufacturer shall be brought immediately to the attention of the Contractor and the Owner. Failure to immediately inform the Contractor and Owner of any prior work, which does not meet the required specifications for installation of the permeable synthetic turf, will render the turf Manufacturer/installer responsible. Any additional work later required to bring the base to acceptable conditions shall be performed by the Manufacturer/installer of the permeable synthetic turf system at no additional cost to the Owner. Any discrepancy in the prior work that does not meet the specifications must be brought to the attention of the Owner in writing for appropriate action or the Contractor will be responsible for corrective action at no cost to the Owner.

3.2 Inspection of Materials

A. Prior to installation, and immediately upon delivery of the synthetic turf system materials to the project site, the Synthetic Turf Contractor and Landscape Architect shall inspect material as follows:
   1. Damaged or defective items including but not limited to; turf fibers and/or backing and contaminated or harmful elements within the Infill material (the use of a powerful hand-held magnet shall be used to detect traces of metal in the rubber infill).
   2. Measure turf pile height and thickness of each roll.
   3. Inspect alignment of turf panel sides.
   4. Reject damaged materials and all materials out of tolerance with this specification.

3.3 Owner's Test

A. Owner may have samples of the turf submitted and tested for verification of conformance to specifications. Acceptance of the synthetic turf system is subject to the results of these tests.
   1. Any material tested and found not conforming to specification will be rejected and replaced with material conforming to the specification at the Synthetic Turf Contractor's expense. Re-submittal will be required.

3.4 Examination

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

B. The surface to receive the synthetic turf shall be inspected by the synthetic turf Installer, and prior to the beginning of installation, the Installer shall accept in writing the sub-base surface planarity and compaction.

C. The compaction of the aggregate base shall be 95 percent, according to the Modified Proctor procedure (ASTM D1557), and the surface tolerance shall not exceed 0-1/4 inch over 10 feet and 0-1/2 inch from design grade.

3.5 Synthetic Turf Installation

A. Only trained technicians, skilled in the installation of athletic caliber synthetic turf systems working under the direct supervision of the approved installer supervisor or job foreman, shall undertake any cutting, sewing, glueing, shearing, topdressing or brushing operations.

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

C. Perform all work in strict accordance to the drawings, shop drawings and manufacturer's specifications and instructions.
   1. Verification: The Contractor is responsible for inspecting, verifying, and accepting all installed work of this section.
   2. Environmental Conditions: Do not apply adhesive materials or infill material when ambient air temperature is below 32 degrees F., material temperatures are below 32 degrees F., rain is falling or pending and/or conditions exist, or are pending, that will be unsuitable to the installation of the system.
   3. Preparation: Accept base onto which the synthetic turf surfacing system and the anchoring system is to be applied as specified above.
   4. 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. The surface shall be perfectly clean as installation commences and shall be maintained in that condition throughout the process.

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

E. The Installer shall have the dimensions of the field and locations for all lines and markings accurately surveyed by a registered surveyor to verify conformity to the specifications and applicable standards. A record drawing of the finished field as-built measurements shall be made for submittal to the Landscape Architect.

F. The synthetic turf rolls shall be installed directly over the properly prepared aggregate base. Extreme care should be taken to avoid disturbing the aggregate base, both in regard to compaction and planarity. A 2-5 ton static roller shall be on site and available to repair and properly compact any disturbed areas of the aggregate base.

G. 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. Utilizing standard state of the art sewing procedures or approved glueing procedures, each roll shall be attached to the next. When all of the rolls of the playing surface have been installed, the sideline areas shall be installed at right angles to the playing field turf.

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 or warranty period.

I. Seams (Joint):
   1. All seams for panels and inlaid markings shall have open mesh or be perforated from the top after installation backing with adhesive bonding.
   2. Seams shall be at 5-yard, 15-foot intervals only.
   3. Seams for all main turf panels shall be sewn or glued with approved adhesive.
   4. All seams shall be brushed to provide full coverage of fiber over the seam.

J. Overlapping backing materials shall be perforated in conformance with section 2.3, B are utilized for the inlaid lines and markings resulting in a non-permeable surface in excess of 12 inches wide, the backing materials. from the surfacing after glueing and prior to installation of the infill material.

3.6 Synthetic Turf Edge Anchor Installation

A. Anchor synthetic turf along the sides and ends of the field into the plastic nailer fastened to the perimeter concrete curb as shown on the drawings.

3.7 Field Markings

A. Standards
   1. All lines and markings shall conform to all currently applicable NCAA rules and other standards that may apply to this type of synthetic turf installation and shall be as shown on the drawings and approved shop drawings. Markings shall be true and shall not vary more than 7/32 inch from specified width and location.

B. White football field of play lines/markings, and 5-yard lines, center and side hash marks, numbers and arrows shall be tufted, sewn or glued into the finished field surface.

C. Yellow soccer field lines, arcs, circles, and boxes shall be glued or sewn into finished field surface.

D. All turfed areas not lined shall be dark green (standard) colored fiber.

E. Center field logo and end-zone letters are not required for this project.

3.8 Infill Installation

A. The infill material shall be applied in an oven dry condition and when the synthetic turf is dry. The infill material shall be applied in uniform thin lifts to fill the voids between the fibers and allow the fibers to remain vertical and non-directional with a minimum of eight to ten applications. After application of each layer the synthetic turf shall be dragged or brushed to distribute the infill material uniformly to the backing.

B. Infill material shall be water settled utilizing portable sprinklers to evenly distribute a minimum of 1 inch of water over the entire synthetic surface. The field shall be dragged as required to uniformly distribute the infill material. Additional water settling and dragging shall be completed to meet acceptance requirements as necessary.

C. The Infill shall be installed to the depth of 1-3/4 inches settled stabilized depth and so that there is a void of 3/4 inch to the top of the fibers.

D. After installation, inspect project area for acceptable seaming, adhesive bonding, uniformity of color of turf, bubble-free surface smoothness as laid, surface depressions, filed lines and markings, insert installation, edge details. Remove and/or repair deficient workmanship prior to requesting the Owner's inspection pursuant to completion and acceptance of the work.

3.9 Cleaning

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

B. All usable remnants (8' x 8' min. size) of new material shall become the property of the Owner if so elected.

C. 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.

D. 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.

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

F. 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.

3.10 Protection

A. Do not permit traffic over unprotected surface.

B. Avoid the use of all oils and solvent products within the synthetic turf field limits during and after construction.

C. Adequate protection of materials and work from damage shall be the responsibility of the installer during installation and until acceptance of their work.

D. Synthetic Turf Contractor shall be responsible for protection after the acceptance of the work until final acceptance of all contract work by the Owner.

E. Protect installed synthetic turf from subsequent construction operations.

F. All material damaged prior to acceptance by the Owner shall be replaced at no cost to the Owner.

3.11 Extra Materials

A. Deliver to Owner all extra materials and equipment herein specified. Receive Owner's written receipt for all materials. Deliver receipt to Owner.

B. Turf for Future Repairs: Material may be roll ends or cutoffs. However, each piece of fabric shall be at least 5-foot by 10-foot. There shall be at least one 10-foot by 30-foot turf piece for the green fiber color. The following minimum quantities shall be provided to the Owner:

Minimum Quantities:

Standard Green Turf	600 sf
White Turf:	50 lf of 4" wide line
White Turf	50 lf of 24" wide line
Yellow Turf:	10 lf of 4" wide line

C. Infill Materials: Furnish four 33-gallon rubber trash containers with lids of each infill material used.

End of Section 02790

PART 1 GENERAL

1.1 Scope of Work

A. The Contractor's scope of work includes site preparation, excavation, disposal of excess or unsuitable material, subgrade grading, installation of subsurface drain pipe, and the placement, grading and compaction of drain rock in accordance with the lines, grades, and cross-sections shown on the drawings.

1.2 Related Work

A. Section 02760, Site Furnishings and Sports Equipment

B. Section 02795, Synthetic Turf System.

C. Section 02820, Field Drainage.

1.3 Quality Assurance

A. Notification: No site work shall be performed without notifying synthetic turf system installer and the Landscape Architect at least 48 hours prior to commencement of work.

1.4 Site Conditions

A. The Contractor shall satisfy himself as to the nature and quantity of materials to be moved and other work to be performed, and shall notify the synthetic turf system manufacturer and the Landscape Architect of any differences between site conditions shown on the drawings and actual conditions, prior to commencement of work.

B. Soil Test: Furnished by Owner. See geotechnical information included in the specifications.

C. Underground Utility Lines: Known underground utility lines are shown on the drawings. The Contractor shall locate and clearly mark all underground utilities and obstructions and protect or relocate all that conflict with the work described herein. Assume that other utilities may be present and use caution when working.

1.5 Inspection and Testing

A. A representative, designated by the synthetic turf system manufacturer, shall be present intermittently to observe the Contractor's operation, to perform tests and measurements, and to adjust the work as necessary to meet field conditions. Such observations, tests, measurements and work adjustments shall not alter the requirements of the drawings or specifications nor imply any superintendence or control of the Contractor's operation, nor warranty the Contractor's work. Relative compaction of compacted soils will be determined in general accordance with the American Society for Testing and Materials (ASTM) Test Methods D1557 (modified proctor) and D2167, D2922, or D3017.

1.6 Submittals

A. Contractor shall submit a two-pound sample of both base and top stone and a sieve and permeability analysis test of both to the Landscape Architect for approval prior to delivery to the site. The sieve and permeability analysis shall be by an independent testing lab and to the sieve sizes specified below. The sieve tests shall be made of the EXACT material to be used and performed no more than 21 days prior to submittal for review.

PART 2 PRODUCTS

2.1 Drain Pipe

A. Pipe used to collect subsurface water shall be 8-inch, perforated, ADS, HDPE-N12 or approved equal. Fittings and connectors shall conform to the pipe type used. The size and approximate lengths of the drain and discharge pipe are shown on the drawings.

B. Where pipe direction changes occur, long-bend sweep connectors shall be used unless indicated otherwise on plans.

2.2 Crushed Stone

A. Permeable material used for subdrain trench backfill and permeable base construction shall conform to the following specifications.

	PERCENT PASSING	
Sieves	Base Stone	Top Stone
3" or 75mm		
2" or 50mm	100	
1½" or 38mm	90 – 100	
1" or 25mm	75 – 100	
¾" or 19mm	65 – 95	
½" or 12.5mm	55 – 85	100
3/8" or 9.5mm	40 – 75	85 – 100
¼" or 6.3mm	25 – 65	75 – 100
US #4 or 4.75mm	15 – 60	60 – 90
US #8 or 2.36mm	0 – 40	35 – 75
US #16 or 1.18mm	0 – 20	10 – 55
US #30 or 600mm	0 – 7	0 – 40
US #60 or 250mm	0 – 5	0 – 15
US #100 or 150mm	0 – 3	0 – 8
US #200 or 75mm	0 – 2	0 – 2

B. Restrictions:
1. $d_{85} > 2D_{15}$
   $3d_{50} < D_{50} < 6d_{50}$
   $d_{2x}-d_x < 40\%$ and $D_{2x}-D_x < 40\%$
2. Fragmentation must be at 100 percent.
3. Depending on the type of rock present in the crushed stone mix, other mechanical characteristics might be necessary for approval.

C. "d_{85}" and "d_{50}" are respectively the size of the sieves that passes 85 percent and 50 percent of the top stone. These sizes, for calculation purposes, may be obtained by interpolation on a semi-log graph of the sieve analysis.

D. "D_{15}" and "D_{50}" are respectively the size of the sieves that pass 15 percent and 50 percent of the base stone. These sizes, for calculation purposes, may be obtained by interpolation on a semi-log graph of the sieve analysis.

E. "$d_{2x} – d_x$" and "$D_{2x} – D_x$" are respectively the differences between any sieve and the sieve representing half of its nominal size for the top stone and the bottom stone. The difference between these percent passing shall not exceed 40 percent for compaction and stability purposes.

PART 3 EXECUTION

3.1 General

A. Excavating and grading shall be performed in conformance with the alignment, grade, and cross-sections indicated on the drawings.

3.2 Site Preparation

A. The Contractor shall strip all debris and organic matter from the areas to be graded and shall haul this material off-site for legal disposal, or dispose on-site in approved locations with approval means.

3.3 Spillage, Dust, and Erosion Control

A. The Contractor shall prevent spillage when hauling on or adjacent to any public street, highway, track, and school district property. In the event that spillage occurs, the Contractor shall remove all spillage and sweep, wash, or otherwise clean such streets in accordance with county and/or state requirements.

B. The Contractor shall take all precautions needed to prevent a dust nuisance to adjacent public and private properties and to prevent erosion and transportation of soil to downstream properties due to work under this contract. Any damage so caused by the Contractor's work shall be corrected or repaired by the Contractor.

3.4 Subgrade Excavation and Grading

A. The subgrade shall be excavated to create a positive slope towards the subsurface drain pipes. Unless otherwise specified on the drawings, the minimum slope of the subgrade shall be 1.0 percent.

B. Following rough grading of the subgrade, the exposed soil shall be moisture conditioned to near the optimum moisture content and compacted to at least 90 percent relative compaction (modified proctor) to produce a firm non-yielding surface.

C. No work shall be completed in this section until subgrade is 100 percent completed and accepted by the Owner or his representative.

3.5 Compacted Fill

A. Any fill material placed to create the planned subgrade shall be per WSDOT Common Burrow Specification and placed in layers 8 inches or less in loose thickness, moisture conditioned to near the optimum moisture content and compacted to achieve at least 90 percent relative compaction, unless otherwise specified.

B. Field density tests will be performed by the Owner or his representative to determine the degree of compaction obtained. Where compaction is less than that required, the Contractor shall make additional compactive effort and/or adjustment of the moisture content as necessary, until the required compaction is obtained.

C. The Contractor shall be responsible for placing and compacting approved fill material in accordance with the specifications. Should the Contractor fail to meet the density requirements, he shall reduce his rate of haul, furnish additional spreading and/or compaction equipment, remove and replace the fill material, or make any other adjustments necessary to achieve a satisfactorily compacted fill.

D. No fill shall be compacted during periods of rain nor on ground that is saturated or has standing water. Soil that has been over-saturated by rain or any other means shall not be used until the moisture content is within limits required by the Landscape Architect.

3.6 Subgrade Slopes and Final Grades

A. Final subgrade grades shall conform to the lines and grades shown on the drawings. The measured grades shall not deviate more than 0.06 foot from the planned grades, and not vary more than 0.04 foot in 10 feet in any direction. Laser grading is required.

B. All subgrade grades shown on the drawings shall be completed by Contractor and inspected by the Owner prior to commencing with the subsequent work items.

3.7 Drain Pipe

A. Perforated flat CPEP drain pipe shall be placed in a drainage trench in the graded subgrade for the synthetic turf field in accordance with the drawings. The pipe shall be laid at a minimum slope of 0.5 percent unless otherwise specified on the drawings. Lengths of pipe shall be joined by fittings fabricated by the pipe manufacturer. The subdrain pipe shall be covered with base stone as per drawings.

B. Trench base stone shall be placed in layers 8 inches or less in loose thickness, moisture conditioned to near the optimum moisture content, and compacted to achieve at least 90 percent relative compaction (modified proctor), unless otherwise specified.

3.8 Base Stone

A. The specified base stone shall be carefully placed and compacted over the subgrade and/or drain pipe to the grades and elevations shown on the drawings. If the thickness of the planned base stone exceeds 6 inches, the stone shall be placed in horizontal layers not to exceed 6 inches and each layer proof rolled to 90 percent relative compaction (modified proctor) with a vibratory smooth drum roller.

B. Finished surface shall be proof rolled with a vibratory smooth double drum roller to provide a non-yielding, smooth, flat surface.

C. Final base stone grades shall conform to the lines and grades shown on the drawings. The measured grades shall not deviate more than 0.04 foot from the planned grades and not vary more than 0.04 foot in 10 feet in any direction. Laser grading is required.

D. The top surface of the base stone shall be sloped at 0.5 percent from the centerline toward the sideline or as shown on the drawings.

E. All base stone grades shown on the drawings shall be completed by the Contractor and inspected by the Landscape Architect and synthetic turf representative prior to commencing with the subsequent work items.

3.9 Top Stone

A. The specified top stone shall be carefully placed and compacted over the base stone to the grades and elevations shown on the drawings.

B. The finished surface shall be proof rolled with a vibratory smooth double drum roller to provide a non-yielding, smooth, flat surface.

C. Final top stone grades shall conform to the lines and grades shown on the drawings. The measured grades shall not deviate more than 0.04 foot from the planned grades and not vary more than 0.02 foot in 10 feet in any direction.

D. The top surface of the top stone shall be sloped at 0.5 percent from the centerline toward the sideline or as shown on the drawings.

E. All top stone grades shown on the drawings shall be completed by the Contractor and inspected by the Landscape Architect and synthetic turf representative prior to commencing with the subsequent work items.

F. Finished base stone and top stone must meet the minimum permeability rate acceptable to the synthetic turf manufacturer. The Contractor will do a bucket test at six locations as directed by the Landscape Architect and synthetic turf manufacturer. The Contractor will record the permeability rate for approval by the Owner and the synthetic turf manufacturer. Coordinate this test with synthetic turf manufacturer, Project Manager, and Landscape Architect 48 hours prior to conducting test.

End of Section 02880