WAYNE STATE UNIVERSITY

HARWELL FIELD - BASEBALL INFIELD TURF
5401 JOHN C. LODGE SERVICE DR, DETROIT, MI 48202

ISSUED FOR: OWNER REVIEW
5/2/2022
WSU PROJECT #097-345346

PROJECT SUMMARY

HARWELL FIELD - BASEBALL INFIELD TURF REPLACEMENT PROJECT CONSISTS OF REMOVING THE EXISTING INFIELD SKINNED SURFACE AND REPLACING WITH SYNTHETIC TURF.
NOTES:

1. ALL BASEBALL FIELD MARKINGS SHALL BE PAINTED ACCORDING TO MANUFACTURER'S SPECIFICATIONS.

2. CONTRACTOR TO PROTECT EXISTING OUTFIELD GRASS AND TO REPAIR ANY AREA WITH SOD AFTER WORK IS COMPLETED AND TO RECOVER THE FIELD LIMITS AS AFFECTED BY CONSTRUCTION ACTIVITIES.

3. SEE DETAILS C-801 FOR CIVIL DETAILS.
NOTES:
1. OVERALL SYNTHETIC TURF AREA = 34,423 SF
2. SEE SHEET C-802 FOR FIELD DETAILS.
3. REFER TO C-100 FOR ALL FIELD LINES & MARKINGS.
CONSTRUCTION IMPLEMENTATION SCHEDULE:

1. MOBILIZATION
2. OWNER AND CONTRACTOR TO DOCUMENT EXISTING CONDITIONS WITH PHOTOGRAPHS AND NOTES AS A BASIS FOR RESTORATION
3. INSTALLATION FILTER SOCK, SILT FENCE, AND INLET PROTECTION
4. DEMOLITION OF EXISTING GRASS FIELD
5. INSTALL COLLECTOR AND UNDER DRAIN SYSTEMS
6. INSTALL STONE BASE
7. INSTALL SYNTHETIC TURF AND FIELD MARKINGS
8. INFILL APPLICATION
9. DECOMPOSITION OF ANY SITE SOILS DISTURBED BY CONSTRUCTION ACTIVITIES
10. RESTORE/REPAIR ACCESS ROAD, LAYDOWN AREAS, PAVEMENT, ETC. TO ORIGINAL CONDITION
11. RESERVE NATURAL GRASS AREA
12. DEMOLITION
13. REMOVE FILTER SOCK, SILT FENCE AND INLET PROTECTION
14. PROJECT COMPLETION

NOTES:
1. PROPOSED STAGING LIMITS FOR USE AS REFERENCE ONLY
2. CONTRACTOR IS RESPONSIBLE FOR REMOVAL AND REPLACEMENT OF FENCE THAT IS DAMAGED FOR CONSTRUCTION ACTIVITIES

SWPPP LEGEND:
- SILT FENCE/FILTER SOCK
- INLET PROTECTION
- CONCRETE WASHOUT BARRIERS AND DUMPSTER AREAS
- CONSTRUCTION DRIES
- LIMITS OF CONSTRUCTION (LT. NOT SH)
A CONCRETE WASHOUT AREAS SHALL BE DESIGNATED TO CLEAN CONCRETE TRUCKS AND TOOLS. AT NO TIME SHALL CONCRETE PRODUCTS BE ALLOWED TO ENTER STREAMS OR DRAINS.

2. TEMPORARY CONCRETE WASHOUT FACILITIES (TYPE BELOW GRADE) SHOULD BE CONSTRUCTED AS SHOWN ON THE DETAIL, WITH A RECOMMENDED MINIMUM LENGTH AND MINIMUM WIDTH OF 10 FT. THE QUANTITY AND VOLUME SHOULD BE SUFFICIENT TO CONTAIN ALL LIQUID AND CONCRETE WASTE GENERATED BY WASHOUT OPERATIONS.

3. LATH AND FLAGGING SHOULD BE COMMERCIAL TYPE.

4. PLASTIC LINING MATERIAL SHOULD BE A MINIMUM 10 MIL POLYETHYLENE SHEETING AND SHOULD BE FREE OF HOLES, TEARS, OR OTHER DEFECTS THAT COMPROMISE THE IMPERVIOUSNESS OF THE MATERIAL BELOW GRADE.

ALTERNATE: APPROVED FABRIC WASHOUT BAGS.

1. MATERIALS - COMPOST USED FOR FILTER SOCKS SHALL BE WEED, PATHOGEN AND INSECT FREE AND FREE OF ANY REFUSE, CONTAMINANTS OR OTHER MATERIALS TOXIC TO PLANT GROWTH. THEY SHALL BE DERIVED FROM A WELL-COMPOSED SOURCE OF ORGANIC MATTER AND CONSIST OF A PARTICLE RANGING FROM 3/8" TO 2".

2. FILTER SOCKS SHALL BE 3 OR 5 MIL CONTINUOUS, TUBULAR, HDPE 3/8" KNITTED MESH NETTING MATERIAL, FILLED WITH COMPOST PASSING THE ABOVE SPECIFICATIONS FOR COMPOST PRODUCTS.

3. FILTER SOCKS WILL BE PLACED ON A LEVEL LINE ACROSS SLOPES, GENERALLY PARALLEL TO THE BASE OF THE SLOPE OR OTHER AFFECTED AREA. ON SLOPES APPROACHING 2:1, ADDITIONAL SOCKS SHALL BE PROVIDED AT THE TOP AND AS NEEDED MID-SLOPE.

4. FILTER SOCKS INTENDED TO BE LEFT AS A PERMANENT FILTER OR PART OF THE NATURAL LANDSCAPE, SHALL BE SEEDED AT THE TIME OF INSTALLATION FOR ESTABLISHMENT OF PERMANENT VEGETATION.

5. FILTER SOCKS ARE NOT TO BE USED IN CONCENTRATED FLOW SITUATIONS OR IN RUNOFF CHANNELS.

6. ROUTINELY INSPECT FILTER SOCKS AFTER EACH SIGNIFICANT RAIN, MAINTAINING FILTER SOCKS IN A FUNCTIONAL CONDITION AT ALL TIMES.

7. REMOVE SEDIMENTS COLLECTED AT THE BASE OF THE FILTER SOCKS WHEN THEY REACH 1/3 OF THE EXPOSED HEIGHT OFF THE PRACTICE.

8. WHERE THE FILTER SOCK DETERIORATES OR FAILS, IT WILL BE REPAIRED OR REPLACED WITH A MORE EFFECTIVE ALTERNATIVE.

9. REMOVAL - FILTER SOCKS WILL BE DISPERSED ON SITE WHEN NO LONGER REQUIRED IN SUCH A WAY AS TO FACILITATE AND NOT OBSTRUCT SEEDINGS.

NOTES
1.) LOCATE STONE PAD AT ANY POINT WHERE VEHICULAR TRAFFIC WILL BE LEAVING THE SITE ONTO A PUBLIC ROAD OR PRIVATE ROADWAY, OR PARKING AREA.

2.) PAD Width - 14'-0" MINIMUM BUT NOT LESS THAN FULL WIDTH OF ALL POINTS OF VEHICULAR EGRESS. PAD LENGTH - 70'-0" MINIMUM.

3.) LOCATE THE PAD TO PREVENT TRACKING OR LOSS OF MUD ONTO PUBLIC RIGHTS-OF-WAY. PROVIDE PROJECTS TOP DRAINAGE DETAIL AS SHOWN TO FACILITATE TOPE DRAINAGE. PROVIDE A MINIMUM 12" DRAINAGE DITCH TO CAPTURE ALL INFLOW.

4.) CLEAN HUMUS TO REMOVE OIL PRIOR TO SELTING CONSTRUCTION SITE. WHEN WASHING IS REQUIRED, DO SO ON AREAS STABILIZED WITH COMPOSTED HUMUS DRAPED INTO AN APPROVED SEEDBED TRAP OR SEEDBED BAG.

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THE BACKFILL MATERIAL SHALL BE CRUSHED STONE OR OTHER GRANULAR MATERIAL MEETING THE REQUIREMENTS OF CLASS II MATERIAL AS DEFINED IN ASTM D2321, OR AS DETERMINED BY LOCAL STANDARDS & SITE ENGINEER.

BEDDING & BACKFILL FOR SURFACE DRAINAGE INLETS SHALL BE PLACED & COMPACTED UNIFORMLY IN ACCORDANCE WITH ASTM D2321.

NOTES:
1. PREMIUM FILL MATERIALS SHALL CONSIST OF AGGREGATE MATERIAL PER SPECIFICATION SECTION 312333 AND SHALL BE PLACED IN ALL LOCATIONS UNDER OR WITHIN TWO (2) FEET OF PAVEMENT AND WITHIN TWENTY (20) FEET OF BUILDINGS.
2. COMMON FILL MATERIAL MAY BE USED IN OTHER AREAS.
3. PIPE COVER SHALL CONSIST OF COARSE INTERLOCKING AGGREGATE NO. 6, 67, 68, 7, 78 OR 8.
4. BEDDING SHALL CONSIST OF COARSE INTERLOCKING AGGREGATE NO. 6, 67, 68, 7, 78 OR 8.

2'-0" LENGTH OF HDPE PIPE

NOTES:
1. ALL BENDS AND FITTINGS AND ALL VERTICAL PIPE SHALL BE SOLID WALL HDPE.
2. 8" CLEAN OUT SHALL BE USED FOR 8" SEWER AND LARGER.
3. SMALLER SIZE SEWERS AND LAMP SHALL HAVE SAME SIZE PIPE.

PROVIDE SOLID CAP

8" HDPE PIPE ENCASED IN #57 AGGREGATE

8" X 8" Y BRANCH

VARIETY

8" MAX

6"

4"

MIRAFI 500X GEOTEXTILE LINER OR APPROVED EQUAL

SYNTHETIC TURF SYSTEM DETAIL

SYNTHETIC TURF PLAYING SURFACE

8" HDPE 30° CURVE

ASTM C-24 JOINT

HDPE STOPPER SEALED

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PROJECT MANUAL

WAYNE STATE UNIVERSITY
HARWELL FIELD
BASEBALL INFIELD TURF

PROJECT # 097-345346

ISSUED FOR BID
MAY 2, 2022

Prepared For: WAYNE STATE UNIVERSITY

Prepared By: OSPORTS - Division of Osborn Engineering
1100 Superior Avenue, Suite 300
Cleveland, OH 44114
TABLE OF CONTENTS

DIVISION 1
01 10 00   Summary
01 25 00   Substitution Procedures
01 33 00   Submittal Procedure
01 60 00   Product Requirements

DIVISION 11 – EQUIPMENT
11 68 33   Baseball Field Equipment

DIVISION 31 – EARTHWORK
31 10 00   Site Clearing
31 22 01   Field Grading
31 23 33   Trenching and Backfilling

DIVISION 32 – SITE IMPROVEMENTS
32 92 00   Turf Grasses
32 92 05   Synthetic Turf – Project Requirements and Conditions
32 92 10   Synthetic Turf Subsurface Drainage & Aggregate Base
32 92 13   Synthetic Turf Playing Surface – Alternate #1
                       AstroTurf – Diamond OPS/RBI
32 92 15   Synthetic Turf Playing Surface – Alternate #2
                       Field Turf – DoublePlay Fast Clay/Fast Grass
32 92 17   Synthetic Turf Playing Surface Alternate #3
                       Shaw Sports Turf – B1K Six4Three/TagUp 1.75
32 92 25   Natural Turf – Grass Turf System

DIVISION 33 – SITE UTILITIES
33 40 00   Storm Drainage Utilities
SECTION 01 10 00
SUMMARY

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and other Division 01 Specification Sections, apply to this Section.

1.2 SUMMARY

A. Section Includes:

1. Project information.
2. Work covered by Contract Documents.
3. Access to site.
4. Work restrictions.
5. Specification and drawing conventions.

1.3 PROJECT INFORMATION

A. Project Identification: Harwell Field – Baseball Infield Turf Installation

1. Project Location: 5401 John C. Lodge Service Drive, Detroit MI, 48208

B. Owner: Wayne State University

1. Owner's Representatives:

Alysca Valentine, Construction - Project Manager
Wayne State University, Design and Construction Services

Jason Clark, Executive Associate Athletics Director
Wayne State University
C. Architect/Engineer: OSPORTS

1. Points of Contact

    Dan Kelbach, PE - Project Manager
    OSPORTS

1.4 WORK COVERED BY CONTRACT DOCUMENTS

A. The Work of Project is defined by the Contract Documents and consists of the following:

1. Contractor mobilization.
2. Perform preconstruction video prior to construction of all areas occupied by the contractor and trucking areas.
3. Install erosion and sediment control as per plans.
4. Demolition of existing natural grass field and infield skinned surface as per plans.
5. Installation of field collector and underdrain systems.
7. Installation of synthetic turf systems and inlay of all field markings.
8. Installation of infill systems.
9. Decompaction of any site soils disturbed by construction activities.
10. Restoration and repair of any areas disturbed by construction activities and laydown areas.
11. Reseed and resod of natural grass areas.
12. Contractor demobilization.
14. Project completion.

B. Type of Contract:

1. Project will be constructed under a single prime contract.
1.5 ACCESS TO SITE

A. General: Contractor shall have full use of Project site for construction operations during construction period. Contractor's use of Project site is limited only by Owner's right to perform work or to retain other contractors on portions of Project.

B. Use of Site: Limit use of Project site to areas within the Contract limits indicated. Do not disturb portions of Project site beyond areas in which the Work is indicated.

1. Driveways, Walkways and Entrances: Keep driveways and entrances serving premises clear and available to Owner, Owner's employees, and emergency vehicles at all times. Do not use these areas for parking or storage of materials.
   a. Schedule deliveries to minimize use of driveways and entrances by construction operations.
   b. Schedule deliveries to minimize space and time requirements for storage of materials and equipment on-site.

1.6 WORK RESTRICTIONS

A. Work Restrictions, General: Comply with restrictions on construction operations.

1. Comply with limitations on use of public streets and with other requirements of authorities having jurisdiction.

B. On-Site Work Hours: Limit work in the existing field to normal business working hours of 8:00 a.m. to 6:00 p.m., Monday through Saturday, unless otherwise indicated.

C. Existing Utility Interruptions: Do not interrupt utilities serving facilities occupied by Owner or others unless permitted under the following conditions and then only after providing temporary utility services according to requirements indicated:

1. Notify Owner not less than two days in advance of proposed utility interruptions.

2. Obtain Owner's written permission before proceeding with utility interruptions.

D. Nonsmoking Site: Smoking is not permitted on the site.
E. Controlled Substances: Use of tobacco products and other controlled substances on Project site is not permitted.

1.7 PROJECT SCHEDULE

A. Anticipated Construction Start: June 20th, 2021
B. Punchlist/Substantial Completion: September 15th, 2022
C. Project Closeout: October 1st, 2022

1.8 SPECIFICATION AND DRAWING CONVENTIONS

A. Specification Content: The Specifications use certain conventions for the style of language and the intended meaning of certain terms, words, and phrases when used in particular situations. These conventions are as follows:

1. Imperative mood and streamlined language are generally used in the Specifications. The words "shall," "shall be," or "shall comply with," depending on the context, are implied where a colon (:) is used within a sentence or phrase.
2. Specification requirements are to be performed by Contractor unless specifically stated otherwise.

B. Division 01 General Requirements: Requirements of Sections in Division 01 apply to the Work of all Sections in the Specifications.

C. Drawing Coordination: Requirements for materials and products identified on Drawings are described in detail in the Specifications. One or more of the following are used on Drawings to identify materials and products:

1. Terminology: Materials and products are identified by the typical generic terms used in the individual Specifications Sections.
2. Abbreviations: Materials and products are identified by abbreviations published as part of the U.S. National CAD Standard.
3. Keynoting: Materials and products are identified by reference keynotes referencing Specification Section numbers found in this Project Manual.
PART 2 - PRODUCTS (Not Used)

PART 3 - EXECUTION (Not Used)

END OF SECTION 011000
SECTION 01 25 00

SUBSTITUTION PROCEDURES

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and other Division 01 Specification Sections, apply to this Section.

1.2 SUMMARY

A. Section includes administrative and procedural requirements for substitutions.

1.3 DEFINITIONS

A. Substitutions: Changes in products, materials, equipment, and methods of construction from those required by the Contract Documents and proposed by Contractor.

1. Substitutions for Cause: Changes proposed by Contractor that are required due to changed Project conditions, such as unavailability of product, regulatory changes, or unavailability of required warranty terms.

2. Substitutions for Convenience: Changes proposed by Contractor or Owner that are not required in order to meet other Project requirements but may offer advantage to Contractor or Owner.

1.4 ACTION SUBMITTALS

A. Substitution Requests: Submit three copies of each request for consideration. Identify product or fabrication or installation method to be replaced. Include Specification Section number and title and Drawing numbers and titles.

1. Substitution Request Form: Use CSI Form 13.1A.

2. Documentation: Show compliance with requirements for substitutions and the following, as applicable:
   a. Statement indicating why specified product or fabrication or installation cannot be provided, if applicable.
   b. Coordination information, including a list of changes or revisions needed to other parts of the Work and to construction performed by Owner and separate contractors that will be necessary to accommodate proposed substitution.
c. Detailed comparison of significant qualities of proposed substitution with those of the Work specified. Include annotated copy of applicable Specification Section. Significant qualities may include attributes such as performance, weight, size, durability, visual effect, sustainable design characteristics, warranties, and specific features and requirements indicated. Indicate deviations, if any, from the Work specified.

d. Product Data, including drawings and descriptions of products and fabrication and installation procedures.

e. Samples, where applicable or requested.

f. Certificates and qualification data, where applicable or requested.

g. List of similar installations for completed projects with project names and addresses and names and addresses of architects and owners.

h. Material test reports from a qualified testing agency indicating and interpreting test results for compliance with requirements indicated.

i. Detailed comparison of Contractor's construction schedule using proposed substitution with products specified for the Work, including effect on the overall Contract Time. If specified product or method of construction cannot be provided within the Contract Time, include letter from manufacturer, on manufacturer's letterhead, stating date of receipt of purchase order, lack of availability, or delays in delivery.

j. Cost information, including a proposal of change, if any, in the Contract Sum.

k. Contractor's certification that proposed substitution complies with requirements in the Contract Documents except as indicated in substitution request, is compatible with related materials, and is appropriate for applications indicated.

l. Contractor's waiver of rights to additional payment or time that may subsequently become necessary because of failure of proposed substitution to produce indicated results.

3. Architect's Action: If necessary, Architect will request additional information or documentation for evaluation within seven days of receipt of a request for substitution. Architect will notify Contractor of acceptance or rejection of proposed substitution within 15 days of receipt of request, or seven days of receipt of additional information or documentation, whichever is later.


b. Use product specified if Architect does not issue a decision on use of a proposed substitution within time allocated.
1.5 QUALITY ASSURANCE

A. Compatibility of Substitutions: Investigate and document compatibility of proposed substitution with related products and materials. Engage a qualified testing agency to perform compatibility tests recommended by manufacturers.

1.6 PROCEDURES

A. Coordination: Revise or adjust affected work as necessary to integrate work of the approved substitutions.

PART 2 - PRODUCTS

2.1 SUBSTITUTIONS

A. Substitutions for Cause: Submit requests for substitution immediately on discovery of need for change, but not later than 15 days prior to time required for preparation and review of related submittals.

1. Conditions: Architect will consider Contractor's request for substitution when the following conditions are satisfied. If the following conditions are not satisfied, Architect will return requests without action, except to record noncompliance with these requirements:

   a. Requested substitution is consistent with the Contract Documents and will produce indicated results.

   b. Substitution request is fully documented and properly submitted.

   c. Requested substitution will not adversely affect Contractor's construction schedule.

   d. Requested substitution has received necessary approvals of authorities having jurisdiction.

   e. Requested substitution is compatible with other portions of the Work.

   f. Requested substitution has been coordinated with other portions of the Work.

   g. Requested substitution provides specified warranty.

   h. If requested substitution involves more than one contractor, requested substitution has been coordinated with other portions of the Work, is uniform and consistent, is compatible with other products, and is acceptable to all contractors involved.

B. Substitutions for Convenience: Not allowed.
PART 3 - EXECUTION (Not Used)

END OF SECTION 012500
SECTION 01 33 00

SUBMITTAL PROCEDURES

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and other Division 01 Specification Sections, apply to this Section.

1.2 SUMMARY

A. Section includes requirements for the submittal schedule and administrative and procedural requirements for submitting Shop Drawings, Product Data, Samples, and other submittals.

1.3 DEFINITIONS

A. Action Submittals: Written and graphic information and physical samples that require Architect's responsive action. Action submittals are those submittals indicated in individual Specification Sections as "action submittals."

B. Informational Submittals: Written and graphic information and physical samples that do not require Architect's responsive action. Submittals may be rejected for not complying with requirements. Informational submittals are those submittals indicated in individual Specification Sections as "informational submittals."

C. File Transfer Protocol (FTP): Communications protocol that enables transfer of files to and from another computer over a network and that serves as the basis for standard Internet protocols. An FTP site is a portion of a network located outside of network firewalls within which internal and external users are able to access files.

1.4 ACTION SUBMITTALS

A. Submittal Schedule: Submit a schedule of submittals, arranged in chronological order by dates required by construction schedule. Include time required for review, ordering, manufacturing, fabrication, and delivery when establishing dates. Include additional time required for making corrections or revisions to submittals noted by Architect and additional time for handling and reviewing submittals required by those corrections.

1. Coordinate submittal schedule with list of subcontracts, the schedule of values, and Contractor's construction schedule.

2. Initial Submittal: Submit concurrently with startup construction schedule. Include submittals required during the first 60 days of construction. List those submittals required to maintain orderly progress of the Work and those required early because of long lead time for manufacture or fabrication.

3. Final Submittal: Submit concurrently with the first complete submittal of Contractor's construction schedule.
   a. Submit revised submittal schedule to reflect changes in current status and timing for submittals.

4. Format: Arrange the following information in a tabular format:
   a. Scheduled date for first submittal.
   b. Specification Section number and title.
   c. Submittal category: Action; informational.
   d. Name of subcontractor.
   e. Description of the Work covered.
   f. Scheduled date for Architect's final release or approval.
   g. Scheduled date of fabrication.

1.5 SUBMITTAL ADMINISTRATIVE REQUIREMENTS

A. Architect's Digital Data Files: Electronic digital data files of the Contract Drawings will not be provided by Architect for Contractor's use in preparing submittals.

B. Coordination: Coordinate preparation and processing of submittals with performance of construction activities.
1. Coordinate each submittal with fabrication, purchasing, testing, delivery, other submittals, and related activities that require sequential activity.

2. Submit all submittal items required for each Specification Section concurrently unless partial submittals for portions of the Work are indicated on approved submittal schedule.

3. Submit action submittals and informational submittals required by the same Specification Section as separate packages under separate transmittals.

4. Coordinate transmittal of different types of submittals for related parts of the Work so processing will not be delayed because of need to review submittals concurrently for coordination.
   a. Architect reserves the right to withhold action on a submittal requiring coordination with other submittals until related submittals are received.

C. Processing Time: Allow time for submittal review, including time for resubmittals, as follows. Time for review shall commence on Architect's receipt of submittal. No extension of the Contract Time will be authorized because of failure to transmit submittals enough in advance of the Work to permit processing, including resubmittals.
   1. Initial Review: Allow 15 days for initial review of each submittal. Allow additional time if coordination with subsequent submittals is required. Architect will advise Contractor when a submittal being processed must be delayed for coordination.
   2. Intermediate Review: If intermediate submittal is necessary, process it in same manner as initial submittal.
   3. Resubmittal Review: Allow 15 days for review of each resubmittal.

D. Electronic Submittals: Identify and incorporate information in each electronic submittal file as follows:
   1. Assemble complete submittal package into a single indexed file incorporating submittal requirements of a single Specification Section and transmittal form with links enabling navigation to each item.
   2. Name file with submittal number or other unique identifier, including revision identifier.
      a. File name shall use project identifier and Specification Section number followed by a decimal point and then a sequential number (e.g., RECF-061000.01). Resubmittals shall include an alphabetic suffix after another decimal point (e.g., RECF-061000.01.A).
3. Provide means for insertion to permanently record Contractor's review and approval markings and action taken by Architect.

4. Transmittal Form for Electronic Submittals: Use electronic form acceptable to Owner, containing the following information:
   a. Project name.
   b. Date.
   c. Name and address of Architect.
   d. Name of Construction Manager.
   e. Name of Contractor.
   f. Name of firm or entity that prepared submittal.
   g. Names of subcontractor, manufacturer, and supplier.
   h. Category and type of submittal.
   i. Submittal purpose and description.
   j. Specification Section number and title.
   k. Specification paragraph number or drawing designation and generic name for each of multiple items.
   l. Drawing number and detail references, as appropriate.
   m. Location(s) where product is to be installed, as appropriate.
   n. Related physical samples submitted directly.
   o. Indication of full or partial submittal.
   p. Transmittal number, numbered consecutively.
   q. Submittal and transmittal distribution record.
   r. Other necessary identification.
   s. Remarks.

E. Options: Identify options requiring selection by Architect.

F. Deviations and Additional Information: On an attached separate sheet, prepared on Contractor's letterhead, record relevant information, requests for data, revisions other than those requested by Architect on previous submittals, and deviations from requirements in the Contract Documents, including minor variations and limitations. Include same identification information as related submittal.
G. Resubmittals: Make resubmittals in same form and number of copies as initial submittal.
   1. Note date and content of previous submittal.
   2. Note date and content of revision in label or title block and clearly indicate extent of revision.
   3. Resubmit submittals until they are marked with approval notation from Architect's action stamp.

H. Distribution: Furnish copies of final submittals to manufacturers, subcontractors, suppliers, fabricators, installers, authorities having jurisdiction, and others as necessary for performance of construction activities. Show distribution on transmittal forms.

I. Use for Construction: Retain complete copies of submittals on Project site. Use only final action submittals that are marked with approval notation from Architect's action stamp.

PART 2 - PRODUCTS

2.1 SUBMITTAL PROCEDURES

A. General Submittal Procedure Requirements: Prepare and submit submittals required by individual Specification Sections. Types of submittals are indicated in individual Specification Sections.

   1. Submit electronic submittals via email as PDF electronic files.


   2. Certificates and Certifications Submittals: Provide a statement that includes signature of entity responsible for preparing certification. Certificates and certifications shall be signed by an officer or other individual authorized to sign documents on behalf of that entity.

      a. Provide a digital signature with digital certificate on electronically submitted certificates and certifications where indicated.

B. Product Data: Collect information into a single submittal for each element of construction and type of product or equipment.
1. If information must be specially prepared for submittal because standard published data are not suitable for use, submit as Shop Drawings, not as Product Data.

2. Mark each copy of each submittal to show which products and options are applicable.

3. Include the following information, as applicable:
   a. Manufacturer's catalog cuts.
   b. Manufacturer's product specifications.
   c. Standard color charts.
   d. Statement of compliance with specified referenced standards.
   e. Testing by recognized testing agency.
   f. Application of testing agency labels and seals.
   g. Notation of coordination requirements.
   h. Availability and delivery time information.

4. Submit Product Data before or concurrent with Samples.

5. Submit Product Data in the following format:
   a. PDF electronic file.

C. Shop Drawings: Prepare Project-specific information, drawn accurately to scale. Do not base Shop Drawings on reproductions of the Contract Documents or standard printed data.

1. Preparation: Fully illustrate requirements in the Contract Documents. Include the following information, as applicable:
   a. Identification of products.
   b. Schedules.
   c. Compliance with specified standards.
   d. Notation of coordination requirements.
   e. Notation of dimensions established by field measurement.
   f. Relationship and attachment to adjoining construction clearly indicated.
   g. Seal and signature of professional engineer if specified.
2. Sheet Size: Except for templates, patterns, and similar full-size drawings, submit Shop Drawings on sheets at least 8-1/2 by 11 inches (215 by 280 mm), but no larger than 22 by 34 inches.

3. Submit Shop Drawings in the following format:
   a. PDF electronic file.

D. Samples: Submit Samples for review of kind, color, pattern, and texture for a check of these characteristics with other elements and for a comparison of these characteristics between submittal and actual component as delivered and installed.
   1. Transmit Samples that contain multiple, related components such as accessories together in one submittal package.
   2. Identification: Attach label on unexposed side of Samples that includes the following:
      a. Generic description of Sample.
      b. Product name and name of manufacturer.
      c. Sample source.
      d. Number and title of applicable Specification Section.
      e. Specification paragraph number and generic name of each item.

3. For projects where electronic submittals are required, provide corresponding electronic submittal of Sample transmittal, digital image file illustrating Sample characteristics, and identification information for record.

4. Disposition: Maintain sets of approved Samples at Project site, available for quality-control comparisons throughout the course of construction activity. Sample sets may be used to determine final acceptance of construction associated with each set.
   a. Samples not incorporated into the Work, or otherwise designated as Owner's property, are the property of Contractor.

5. Samples for Initial Selection: Submit manufacturer's color charts consisting of units or sections of units showing the full range of colors, textures, and patterns available.
   a. Number of Samples: Submit one full set(s) of available choices where color, pattern, texture, or similar characteristics are required to be selected from manufacturer’s product line. Architect will return submittal with options selected.
6. Samples for Verification: Submit full-size units or Samples of size indicated, prepared from same material to be used for the Work, cured and finished in manner specified, and physically identical with material or product proposed for use, and that show full range of color and texture variations expected. Samples include, but are not limited to, the following: partial sections of manufactured or fabricated components; small cuts or containers of materials; complete units of repetitively used materials; swatches showing color, texture, and pattern; color range sets; and components used for independent testing and inspection.

   a. Number of Samples: Submit three sets of Samples. Architect will retain one Sample set; remainder will be returned. Mark up and retain one returned Sample set as a project record sample.

      1) Submit a single Sample where assembly details, workmanship, fabrication techniques, connections, operation, and other similar characteristics are to be demonstrated.

      2) If variation in color, pattern, texture, or other characteristic is inherent in material or product represented by a Sample, submit at least three sets of paired units that show approximate limits of variations.

E. Contractor's Construction Schedule: Comply with requirements specified in Section 013200 "Construction Progress Documentation."

F. Qualification Data: Prepare written information that demonstrates capabilities and experience of firm or person. Include lists of completed projects with project names and addresses, contact information of architects and owners, and other information specified.

G. Installer Certificates: Submit written statements on manufacturer's letterhead certifying that Installer complies with requirements in the Contract Documents and, where required, is authorized by manufacturer for this specific Project.

H. Product Certificates: Submit written statements on manufacturer's letterhead certifying that product complies with requirements in the Contract Documents.

I. Material Certificates: Submit written statements on manufacturer's letterhead certifying that material complies with requirements in the Contract Documents.

J. Material Test Reports: Submit reports written by a qualified testing agency, on testing agency's standard form, indicating and interpreting test results of material for compliance with requirements in the Contract Documents.
K. Product Test Reports: Submit written reports indicating that current product produced by manufacturer complies with requirements in the Contract Documents. Base reports on evaluation of tests performed by manufacturer and witnessed by a qualified testing agency, or on comprehensive tests performed by a qualified testing agency.

L. Field Test Reports: Submit written reports indicating and interpreting results of field tests performed either during installation of product or after product is installed in its final location, for compliance with requirements in the Contract Documents.

2.2 DELEGATED-DESIGN SERVICES

A. Performance and Design Criteria: Where professional design services or certifications by a design professional are specifically required of Contractor by the Contract Documents, provide products and systems complying with specific performance and design criteria indicated.

1. If criteria indicated are not sufficient to perform services or certification required, submit a written request for additional information to Architect.

B. Delegated-Design Services Certification: In addition to Shop Drawings, Product Data, and other required submittals, submit digitally signed PDF electronic file of certificate, signed and sealed by the responsible design professional, for each product and system specifically assigned to Contractor to be designed or certified by a design professional.

1. Indicate that products and systems comply with performance and design criteria in the Contract Documents. Include list of codes, loads, and other factors used in performing these services.

PART 3 - EXECUTION

3.1 CONTRACTOR'S REVIEW

A. Action and Informational Submittals: Review each submittal and check for coordination with other Work of the Contract and for compliance with the Contract Documents. Note corrections and field dimensions. Mark with approval stamp before submitting to Architect.

B. Project Closeout and Maintenance Material Submittals: See requirements in Section 017700 "Closeout Procedures."
C. Approval Stamp: Stamp each submittal with a uniform, approval stamp. Include Project name and location, submittal number, Specification Section title and number, name of reviewer, date of Contractor's approval, and statement certifying that submittal has been reviewed, checked, and approved for compliance with the Contract Documents.

3.2 ARCHITECT'S ACTION

A. Action Submittals: Architect will review each submittal, make marks to indicate corrections or revisions required, and return it. Architect will stamp each submittal with an action stamp and will mark stamp appropriately to indicate action.

B. Informational Submittals: Architect will review each submittal and will not return it, or will return it if it does not comply with requirements. Architect will forward each submittal to appropriate party.

C. Partial submittals prepared for a portion of the Work will be reviewed when use of partial submittals has received prior approval from Architect.

D. Incomplete submittals are unacceptable, will be considered nonresponsive, and will be returned for resubmittal without review.

E. Submittals not required by the Contract Documents may be returned by the Architect without action.

END OF SECTION 013300
PART 1 - GENERAL

1.1 RELATED DOCUMENTS

A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and other Division 01 Specification Sections, apply to this Section.

1.2 SUMMARY

A. Section includes administrative and procedural requirements for selection of products for use in Project; product delivery, storage, and handling; manufacturers' standard warranties on products; special warranties; and comparable products.

B. Related Requirements:
1. Section 012500 "Substitution Procedures" for requests for substitutions.

1.3 DEFINITIONS

A. Products: Items obtained for incorporating into the Work, whether purchased for Project or taken from previously purchased stock. The term "product" includes the terms "material," "equipment," "system," and terms of similar intent.

1. Named Products: Items identified by manufacturer's product name, including make or model number or other designation shown or listed in manufacturer's published product literature, that is current as of date of the Contract Documents.

2. New Products: Items that have not previously been incorporated into another project or facility. Products salvaged or recycled from other projects are not considered new products.

3. Comparable Product: Product that is demonstrated and approved through submittal process to have the indicated qualities related to type, function, dimension, in-service performance, physical properties, appearance, and other characteristics that equal or exceed those of specified product.
B. Basis-of-Design Product Specification: A specification in which a specific manufacturer's product is named and accompanied by the words "basis-of-design product," including make or model number or other designation, to establish the significant qualities related to type, function, dimension, in-service performance, physical properties, appearance, and other characteristics for purposes of evaluating comparable products of additional manufacturers named in the specification.

1.4 ACTION SUBMITTALS

A. Comparable Product Requests: Submit request for consideration of each comparable product. Identify product or fabrication or installation method to be replaced. Include Specification Section number and title and Drawing numbers and titles.

1. Include data to indicate compliance with the requirements specified in "Comparable Products" Article.

2. Architect's Action: If necessary, Architect will request additional information or documentation for evaluation within one week of receipt of a comparable product request. Architect will notify Contractor of approval or rejection of proposed comparable product request within 15 days of receipt of request, or seven days of receipt of additional information or documentation, whichever is later.

   a. Form of Approval: As specified in Section 013300 "Submittal Procedures."

   b. Use product specified if Architect does not issue a decision on use of a comparable product request within time allocated.


1.5 QUALITY ASSURANCE

A. Compatibility of Options: If Contractor is given option of selecting between two or more products for use on Project, select product compatible with products previously selected, even if previously selected products were also options.

1. Each contractor is responsible for providing products and construction methods compatible with products and construction methods of other contractors.
2. If a dispute arises between contractors over concurrently selectable but incompatible products, Architect will determine which products shall be used.

1.6 PRODUCT DELIVERY, STORAGE, AND HANDLING

A. Deliver, store, and handle products using means and methods that will prevent damage, deterioration, and loss, including theft and vandalism. Comply with manufacturer's written instructions.

B. Delivery and Handling:
   1. Schedule delivery to minimize long-term storage at Project site and to prevent overcrowding of construction spaces.
   2. Coordinate delivery with installation time to ensure minimum holding time for items that are flammable, hazardous, easily damaged, or sensitive to deterioration, theft, and other losses.
   3. Deliver products to Project site in an undamaged condition in manufacturer's original sealed container or other packaging system, complete with labels and instructions for handling, storing, unpacking, protecting, and installing.
   4. Inspect products on delivery to determine compliance with the Contract Documents and to determine that products are undamaged and properly protected.

C. Storage:
   1. Store products to allow for inspection and measurement of quantity or counting of units.
   2. Store products that are subject to damage by the elements, under cover in a weathertight enclosure above ground, with ventilation adequate to prevent condensation.
   3. Comply with product manufacturer's written instructions for temperature, humidity, ventilation, and weather-protection requirements for storage.
   4. Protect stored products from damage and liquids from freezing.

1.7 PRODUCT WARRANTIES

A. Warranties specified in other Sections shall be in addition to, and run concurrent with, other warranties required by the Contract Documents.
Manufacturer's disclaimers and limitations on product warranties do not relieve Contractor of obligations under requirements of the Contract Documents.

1. Manufacturer's Warranty: Written warranty furnished by individual manufacturer for a particular product and specifically endorsed by manufacturer to Owner.

2. Special Warranty: Written warranty required by the Contract Documents to provide specific rights for Owner.

B. Special Warranties: Prepare a written document that contains appropriate terms and identification, ready for execution.

1. Manufacturer's Standard Form: Modified to include Project-specific information and properly executed.

C. Submittal Time: Comply with requirements in Section 017700 "Closeout Procedures."

PART 2 - PRODUCTS

2.1 PRODUCT SELECTION PROCEDURES

A. General Product Requirements: Provide products that comply with the Contract Documents, are undamaged and, unless otherwise indicated, are new at time of installation.

1. Provide products complete with accessories, trim, finish, fasteners, and other items needed for a complete installation and indicated use and effect.

2. Standard Products: If available, and unless custom products or nonstandard options are specified, provide standard products of types that have been produced and used successfully in similar situations on other projects.

3. Owner reserves the right to limit selection to products with warranties not in conflict with requirements of the Contract Documents.

4. Where products are accompanied by the term "as selected," Architect will make selection.

6. Or Equal: For products specified by name and accompanied by the term "or equal," or "or approved equal," or "or approved," comply with requirements in "Comparable Products" Article to obtain approval for use of an unnamed product.

B. Product Selection Procedures:

1. Product: Where Specifications name a single manufacturer and product, provide the named product that complies with requirements. Comparable products or substitutions for Contractor's convenience will not be considered.

2. Manufacturer/Source: Where Specifications name a single manufacturer or source, provide a product by the named manufacturer or source that complies with requirements. Comparable products or substitutions for Contractor's convenience will not be considered.

3. Products:
   a. Restricted List: Where Specifications include a list of names of both manufacturers and products, provide one of the products listed that complies with requirements. Comparable products or substitutions for Contractor's convenience will not be considered.
   b. Nonrestricted List: Where Specifications include a list of names of both available manufacturers and products, provide one of the products listed, or an unnamed product, that complies with requirements. Comply with requirements in "Comparable Products" Article for consideration of an unnamed product.

4. Manufacturers:
   a. Restricted List: Where Specifications include a list of manufacturers' names, provide a product by one of the manufacturers listed that complies with requirements. Comparable products or substitutions for Contractor's convenience will not be considered.
   b. Nonrestricted List: Where Specifications include a list of available manufacturers, provide a product by one of the manufacturers listed, or a product by an unnamed manufacturer, that complies with requirements. Comply with requirements in "Comparable Products" Article for consideration of an unnamed manufacturer's product.

5. Basis-of-Design Product: Where Specifications name a product, or refer to a product indicated on Drawings, and include a list of manufacturers, provide the specified or indicated product or a comparable product by one of the other named manufacturers. Drawings and Specifications indicate sizes, profiles, dimensions, and other characteristics that are
based on the product named. Comply with requirements in "Comparable Products" Article for consideration of an unnamed product by one of the other named manufacturers.

C. Visual Selection Specification: Where Specifications include the phrase "as selected by Architect from manufacturer's full range" or similar phrase, select a product that complies with requirements. Architect will select color, gloss, pattern, density, or texture from manufacturer's product line that includes both standard and premium items.

2.2 COMPARABLE PRODUCTS

A. Conditions for Consideration: Architect will consider Contractor's request for comparable product when the following conditions are satisfied. If the following conditions are not satisfied, Architect may return requests without action, except to record noncompliance with these requirements:

1. Evidence that the proposed product does not require revisions to the Contract Documents, that it is consistent with the Contract Documents and will produce the indicated results, and that it is compatible with other portions of the Work.

2. Detailed comparison of significant qualities of proposed product with those named in the Specifications. Significant qualities include attributes such as performance, weight, size, durability, visual effect, and specific features and requirements indicated.

3. Evidence that proposed product provides specified warranty.

4. List of similar installations for completed projects with project names and addresses and names and addresses of architects and owners, if requested.

5. Samples, if requested.

PART 3 - EXECUTION (Not Used)

END OF SECTION 016000
PART 1 - GENERAL

1.01 RELATED DOCUMENTS

A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 01 Specification Sections, apply to this Section.

1.02 SUMMARY

A. Section includes baseball field equipment as follows:
   1. Ground Anchored Bases.
   2. Ground Anchored Home Plate
   3. Ground Anchored Pitching Rubber

1.03 REFERENCES

A. Comply with applicable requirements of the following standards:
   1. National Federation of State High School Associations (NFHS).
   4. Manufacturers Data and Recommended Installation Requirements.

1.04 ACTION SUBMITTALS

A. Product Data: For each type of product.

B. Shop Drawings: For each type of baseball field equipment.
   1. Include plans, elevations, sections, and attachment details.
   2. Provide drawings of the manufacturer’s recommended installation requirements.

C. Samples for Verification: For each type of exposed finish on the following products:
   1. Include Samples of accessories to verify color and finish selection.
   2. Molded Plastic/Rubber/Turf Options: Minimum 3 inches (76 mm) square.
1.05 INFORMATIONAL SUBMITTALS

A. Product Certificates: For each type of baseball field equipment.
B. Field quality-control reports.
C. Sample Warranty: For manufacturer's special warranties.

1.06 CLOSEOUT SUBMITTALS

A. Maintenance Data: For playground equipment and finishes to include in maintenance manuals.

1.07 QUALITY ASSURANCE

A. Manufacturer Qualifications: A firm whose baseball field equipment components have been certified by third-party product certification service.

1.08 WARRANTY

A. Special Warranty: Manufacturer agrees to repair or replace components of baseball field equipment that fail in materials or workmanship within specified warranty period.
   1. Failures include, but are not limited to, the following:
      a. Structural failures.
      b. Deterioration of metals, metal finishes, and other materials beyond normal weathering and use.
   2. Warranty Period: Five years from date of Substantial Completion.
   3. Bleachers: One year from defect in materials and workmanship on total structure. Five years on planks due to exposure to weather conditions or UV rays.

PART 2 - PRODUCTS

2.01 BASEBALL FIELD EQUIPMENT

A. Ground Anchored Bases:
   1. Basis-of-Design Product: Subject to compliance with requirements, provide “Hollywood Slider Base-set of three, BB Bases, SB Bases” as manufactured by Schutt or comparable product/system as approved by Architect.
   2. Construction: Solid, one-piece style with beveled corners and tapered base, allowing runners to slide over the base with reduced risk of injury.
B. Ground Anchored Homeplate:
   1. Basis-of-Design Product: Subject to compliance with requirements, provide “Hollywood Bury-All Home Plate” as manufactured by Schutt or comparable product/system as approved by Architect.
   2. Material: All rubber construction, non-skid surface.

C. Ground Anchored Pitching Rubber:
   1. Basis-of-Design Product: Subject to compliance with requirements, provide “Hollywood MLB Official Size Four Sided Pitching Rubber” as manufactured by Schutt or comparable product/system as approved by Architect.
   2. Material: All rubber construction, non-skid surface.

PART 3 - EXECUTION

3.01 EXAMINATION

A. Examine substrates, areas, and conditions, with Installer present, for compliance with requirements for earthwork, subgrade elevations, surface and subgrade drainage, and other conditions affecting performance of the Work.

B. Proceed with installation only after unsatisfactory conditions have been corrected.

3.02 INSTALLATION

A. Comply with manufacturer's written installation instructions for each equipment type unless more stringent requirements are indicated. Anchor baseball field equipment securely, positioned at locations and elevations indicated.
SECTION 31 10 00
SITE CLEARING

PART 1 - GENERAL

1.01 RELATED DOCUMENTS

A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 01 Specification Sections, apply to this Section, including but not limited to - the following.

1. Document 31 22 01 FIELD GRADING: Requirements for earth moving and filling operations


1.02 SUMMARY

A. Section Includes:

1. Protecting existing vegetation to remain.
2. Removing existing vegetation.
3. Clearing and grubbing.
4. Stripping and stockpiling topsoil.
5. Removing above- and below-grade site improvements.
6. Disconnecting, capping or sealing, and removing site utilities and/or abandoning site utilities in place.

1.03 DEFINITIONS

A. Subsoil: All soil beneath the topsoil layer of the soil profile, and typified by the lack of organic matter and soil organisms.

B. Surface Soil: Soil that is present at the top layer of the existing soil profile at the Project site. In undisturbed areas, the surface soil is typically topsoil; but in disturbed areas such as urban environments, the surface soil can be subsoil.

C. Topsoil: Top layer of the soil profile consisting of existing native surface topsoil or existing in-place surface soil and is the zone where plant roots grow.
D. Vegetation: Trees, shrubs, groundcovers, grass, and other plants.

1.04 MATERIAL OWNERSHIP

A. Except for stripped topsoil and other materials indicated to be stockpiled or otherwise remain Owner's property, cleared materials shall become Contractor's property and shall be removed from Project site.

1.05 SUBMITTALS

A. Existing Conditions: Documentation of existing trees and plantings, adjoining construction, and site improvements that establishes preconstruction conditions that might be misconstrued as damage caused by site clearing.

1. Use sufficiently detailed photographs or videotape.

2. Include plans and notations to indicate specific wounds and damage conditions of each tree or other plants designated to remain.

B. Record Drawings: Identifying and accurately showing locations of capped utilities and other subsurface structural, electrical, and mechanical conditions.

1.06 PROJECT CONDITIONS

A. Traffic: Minimize interference with adjoining roads, streets, walks, and other adjacent occupied or used facilities during site-clearing operations.

1. Do not close or obstruct streets, walks, or other adjacent occupied or used facilities without permission from Owner and authorities having jurisdiction.

2. Provide alternate routes around closed or obstructed traffic ways if required by Owner or authorities having jurisdiction.

B. Improvements on Adjoining Property: Authority for performing site clearing indicated on property adjoining Owner's property will be obtained by Owner before award of Contract.

1. Do not proceed with work on adjoining property until directed by Architect.

C. Utility Locator Service: Notify MissDIG at 1-800-482-7171 or 8-1-1 for area where Project is located before site clearing.
D. Do not commence site clearing operations until temporary erosion and sedimentation-control measures are in place.

PART 2 - PRODUCTS

2.01 MATERIALS

A. Satisfactory Soil Material: Requirements for satisfactory soil material are specified in Division 31 Section 31 22 01 "FIELD GRADING."

1. Obtain approved borrow soil material off-site when satisfactory soil material is not available on-site.

PART 3 - EXECUTION

3.01 PREPARATION

A. Protect and maintain benchmarks and survey control points from disturbance during construction.

B. Protect existing site improvements to remain from damage during construction.

1. Restore damaged improvements to their original condition, as acceptable to Owner.

3.02 EXISTING UTILITIES

A. Locate, identify, disconnect, and seal or cap utilities indicated to be removed.

1. Arrange with utility companies to shut off indicated utilities.

B. Locate, identify, and disconnect utilities indicated to be abandoned in place.

C. Interrupting Existing Utilities: Do not interrupt utilities serving facilities occupied by Owner or others unless permitted under the following conditions and then only after arranging to provide temporary utility services according to requirements indicated:

1. Revise subparagraphs below to suit Project. Change "Architect" to "Owner" or other responsible party if required.

2. Notify Owner not less than three days in advance of proposed utility interruptions.

3. Do not proceed with utility interruptions without Owner’s written permission.
D. Excavate for and remove underground utilities indicated to be removed.

3.03 CLEARING AND GRUBBING

A. Remove obstructions, trees, shrubs, and other vegetation to permit installation of new construction.

1. Do not remove trees, shrubs, and other vegetation indicated to remain or to be relocated.

2. Grind down stumps and remove roots, obstructions, and debris to a depth of 18 inches below exposed subgrade.

3. Use only hand methods for grubbing within protection zones.

4. Chip removed tree branches and dispose of off-site.

B. Fill depressions caused by clearing and grubbing operations with satisfactory soil material unless further excavation or earthwork is indicated.

3.04 TOPSOIL STRIPPING

A. Remove sod and grass before stripping topsoil.

B. Strip topsoil in a manner to prevent intermingling with underlying subsoil or other waste materials.

1. Remove subsoil and nonsoil materials from topsoil, including clay lumps, gravel, and other objects more than 2 inches in diameter; trash, debris, weeds, roots, and other waste materials.

2. Refer to section 32.92.00 TURF GRASSES for topsoil processing requirements, if applicable.

3.05 SITE IMPROVEMENTS

A. Remove existing above- and below-grade improvements as indicated on drawings and necessary to facilitate new construction.

B. Remove slabs, paving, curbs, gutters, and aggregate base as indicated.

1. Unless existing full-depth joints coincide with line of demolition, neatly saw-cut along line of existing pavement to remain before removing adjacent existing pavement. Saw-cut faces vertically.
2. Paint cut ends of steel reinforcement in concrete to remain with two coats of antirust coating, following coating manufacturer's written instructions. Keep paint off surfaces that will remain exposed.

3.06 DISPOSAL OF SURPLUS AND WASTE MATERIALS

A. Remove surplus soil material, unsuitable topsoil, obstructions, demolished materials, and waste materials including trash and debris, and legally dispose of them off Owner’s property.

END OF SECTION 311000
PART 1 – GENERAL

1.01 RELATED DOCUMENTS

A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 1 Specification Sections, apply to this Section.

1.02 SUMMARY

A. Section Includes:
   1. Removal of topsoil and stockpiling for later reuse and removal of excess from the Site.
   2. Removal of subsoil and stockpiling for later reuse and removal of excess from the Site.
   3. Grading and fill operations for the Site.
   4. Finish grading with topsoil to proposed contours.

B. Related Sections:
   1. SECTION 312333 – TRENCHING AND BACKFILLING: Excavation and backfilling for utilities.
   2. SECTION 329210 – SYNTHETIC TURF PLAYING DRAINAGE AND BASE: Finish grading, compaction, and testing of subgrade for aggregate base course.

1.03 REFERENCES

A. ASTM International:
   2. Standard Test Methods for Laboratory Compaction Characteristics of Soil Using Standard Effort (12,400 ft-lb/ft³ (600 kN-m/m³)) (ASTM D-698-00a).
   4. Standard Test Methods for Laboratory Compaction Characteristics of Soil Using Modified Effort (56,000 lb-lbf/ft³ (2,700 kN-m/m³)) (ASTM D-1557-00).
   5. Standard Practice for Classification of Soils for Engineering Purposes (Unified Soil Classification System) (ASTM D-2487-00).
7. Standard Test Method for Water Content of Soil and Rock in Place by Nuclear Methods (Shallow Depth) (ASTM D-3017-96(e1)).

1.04 SUBMITTALS

A. Quality Control Submittals (Test Reports): Submit the following in accordance with the GENERAL REQUIREMENTS:
   1. Field density test reports.
   2. Report of actual unconfined compressive strength and/or results of bearing tests of each stratum tested.

B. Contract Closeout Submittals (Project Record Documents): Accurately record horizontal dimensions, elevations or inverts, and slope gradients of the following:
   1. Utilities to remain in place.
   2. Rerouted utilities.
   3. New utilities.

1.05 PROJECT CONDITIONS

A. Existing Conditions: For reference only, a topographic survey of the Site has been included on the Drawings.

PART 2 - PRODUCTS

2.01 MATERIALS

A. Existing Topsoil: Natural, fertile agricultural soil capable of sustaining vigorous plant growth, not in frozen or muddy condition, containing not less than six percent organic matter, and corrected to pH value of 5.5 to 7.5. Free from subsoil, slag, clay, stones, lumps, live plants, roots, sticks, crabgrass, couchgrass, noxious weeds, and foreign matter.

B. Subsoil: Excavated material, graded free of lumps larger than 4 inches, rocks larger than 2 inches.

C. Structural Fill: Fill materials required to achieve design grades underneath field areas shall be composed of the following characteristics.
   1. USCS Classification: SP, SP-SM, or SP-SC
   2. Fines Content: < 12 %
   3. Maximum Particle Size: 2 inches diameter
   4. Organic Content: < 5%
2.02 SOURCE QUALITY CONTROL

A. Perform test and analysis of fill materials per ASTM D-698 for cohesive materials and ASTM D-4254 for cohesionless soils and in accordance with DIVISION 1 – GENERAL REQUIREMENTS.

PART 3 - EXECUTION

3.01 EXAMINATION

A. Inspect the Site and verify as to actual grades and levels, and the true conditions under which the work is to be performed.

3.02 PREPARATION

A. Locate and verify all underground utilities.

B. Contact MissDig (811 or 1-800-482-7171) at least 72 hours before digging.
   1. Notify owners of underground utilities who are not current members of Sunshine811 three (3) working days in advance.

C. Protection:
   1. Protect trees, shrubs, lawns and other features remaining as portion of final landscaping.
   2. Protect benchmarks, existing structures, fences, roads, sidewalks, paving and curbs from equipment and vehicular traffic.
   3. Maintain and protect utilities that pass through work area and are indicated to remain:
      a. Identify and flag aerial and surface utilities.
      b. Identify known underground utilities. Stake and flag locations.
      c. Where unmarked utilities are uncovered within the work area, notify the Engineer and the authorities having jurisdiction (AHJ), and take precautions to prevent interruption of service. Should such lines or services be damaged, broken, or interrupted through negligence, repair and restore immediately without additional cost to utility owner.
   4. Repair damage caused by the Work of this Section.
   5. Identify required lines, levels, contours, and datum.
   6. Notify utility company when removing and/or relocating existing utilities.
   7. If conditions are encountered that are different than those indicated on the Drawings, notify the Engineer and discontinue affected work in area until notified to resume work.
3.03 CONSTRUCTION

A. Topsoil Stripping:
1. Prior to mass earthwork excavation, strip all topsoil from areas which will receive paving, walks, synthetic turf systems or other impervious surfacing. Remove topsoil, vegetation, roots, soft, organic, frozen, or unsuitable soils in the construction area.
2. Stockpile topsoil in storage piles where directed by the Owner/Site Civil Engineer. Construct storage piles to freely drain surface water. Cover storage piles if required to prevent wind-blown dust.
3. Dispose of topsoil in excess of that needed for finish grading off the Site.

B. Subgrade Compaction and Proof Rolling
1. Prior to fill and grading operations, the contractor shall scarify and compact the subgrade in field areas to at least 98% of the materials’ standard proctor maximum dry density, in general accordance with ASTM procedures, to a depth of at least twelve inches below the surface and then proof-rolled with a loaded tandem axle dump truck or similar heavy rubber tired vehicle.
2. Subgrade compaction should be compacted and/or stabilized before proof rolling operations.
3. Proof-rolling operations shall be performed under a period of dry-weather and be witnessed by a representative of the geotechnical engineer of record.
   a. Soils that are observed to rut or deflect excessively (>1”) under the moving load should be undercut and replaced with properly compacted low plasticity fill material.

C. Rough Grading:
1. Set all required grading stakes. Check and verify correctness.
2. Perform all exterior cut, fill, backfill and grading as required to conform to existing contours and elevations on the Drawings. Hold rough grades below finish grades as follows:
   a. Areas to receive Natural and Synthetic Turf Playing Systems:
      To bottom of proposed base layer.
3. Dispose excavated material in excess of that needed for fill off the Site or as directed by the Owner/Site Civil Engineer. Provide additional fill equivalent to that obtained on the Site and which meets specified material. Install in layers not exceeding 6 inches or of a thickness determined by the testing service as required to achieve proper compaction and moisten only to obtain the specified degree of compaction.
D. Pavement Subbase Course:
   1. General: Subbase course consists of placing subbase material, in layers of specified thickness, over subgrade to support a pavement base course.
   2. Grade Control: During construction, maintain lines and grades including crown and cross-slope of subbase course.
   3. Shoulders: Place shoulders along edges of subbase course to prevent lateral movement. Construct shoulders of acceptable soil materials, placed in such quantity to compact to thickness of each subbase course layer. Compact and roll at least a 12-inch width of shoulder simultaneously with compacting and rolling of each layer of subbase course.
   4. Placing: Place subbase course material on prepared subgrade in layers of uniform thickness, conforming to indicated cross-section and thickness. Maintain optimum moisture content for compacting subbase material during placement operations.
   5. When a compacted subbase course is indicated to be 6 inches thick or less, place material in a single layer. When shown to be more than 6 inches thick, place material in equal layers, except no single layer more than 6 inches or less than 3 inches in thickness when compacted.

E. Fill Operations and Compaction:
   1. Structural fill materials to be placed in maximum loose lifts of 4 to 6 inches when hand-guided compacted equipment, and maximum loose lifts and compacted to the requirements listed below.
   2. Compact soil to not less than the following percentages of maximum density for soils that exhibit a well-defined moisture density relationship (cohesive soils) determined per ASTM D-698; and not less than the following percentages of relative density, determined per ASTM D-4254 for soils that will not exhibit a well-defined moisture-density relationship (cohesionless soils):
      a. Dugout Structures and Synthetic Turf Playing Field Systems: Compact top 6 inches and layer of backfill or fill materials to at least 98 percent of the materials’ standard Proctor maximum dry density.
      b. Outfield and Warning Track Areas: Compact top 6 inches and layer of backfill or fill materials to at least 90 percent of the materials’ standard Proctor maximum dry density.

F. Shaping:
   1. After grading is completed, drag and float surface to remove ridges, depressions, and other irregularities.
   2. Rake out and remove all roots, debris and stones larger than 1 1/2 inches.
G. Site Tolerances:
1. Perform earthwork operations to establish required elevations and dimensions within the following tolerances at points taken on a grid of the specified dimensions. Results that rely on average values will be grounds for rejection of the installation.
   a. Exception: No tolerance will be permitted that would allow:
      1) A lesser size than indicated for footings and foundations.
      2) A lesser thickness than indicated for:
         a. Paving
         b. Paving base course.
         c. Concrete floor slabs-on-grade.

2. Under Synthetic Turf Playing Field System Areas: Plus 0 inch or minus 1/2 inch at points taken on a 25-foot grid.

H. Dewatering:
1. Prevent surface water and subsurface or groundwater from flowing into excavations and from flooding the Site and the surrounding areas.
2. Do not allow water to accumulate in excavations. Remove water to prevent soil changes detrimental to stability of subgrades. Provide and maintain pumps, well points, sumps, suction and discharge lines, and other dewatering system components necessary to convey water away from excavations.
3. Establish and maintain temporary drainage ditches and other diversions outside excavation limits to convey rainwater and water removed from excavations to collecting or run-off areas. Do not use trench excavations as temporary drainage ditches.

3.04 FIELD QUALITY CONTROL

A. The Contractor shall employ and pay for soil testing and inspection service for quality control testing during earthwork operations in accordance with DIVISION 1 – GENERAL REQUIREMENTS. Allow testing service to inspect and approve subgrades and fill layers before further construction work is performed.
   1. Testing frequency of Standard Proctor, Minimum % Dry Density, and Placement Moisture Content Range shall be performed in the following intervals.
      a. Structural Fill (Granular): 1 per 5,000 sqft of fill placed/lift
      b. Utility Trench Backfilling: 1 per 150 linear foot/lift

B. If tests indicate work does not meet specified requirements, remove work, replace and re-test at no additional cost to the Owner.
3.05 ADJUSTING

A. Repair and re-establish grades in settled, eroded, or rutted areas:
   1. Where completed compacted areas are disturbed by subsequent construction operations or adverse weather, remove and replace or scarify soil materials, reshape, and re-compact to specified density prior to further construction.
   2. Where settling is measurable or observable at excavated areas during general warranty period for the Project, remove surface (lawn, or other finish), add backfill material, compact, and replace surface treatment. Restore appearance, quality, and condition of surface or finish to match adjacent work, and eliminate evidence of restoration to greatest extent possible.

3.06 PROTECTION

A. Protect graded areas from traffic and erosion.

END OF SECTION 312201
SECTION 31 23 33

TRENCHING AND BACKFILL

PART 1 - GENERAL

1.01 RELATED DOCUMENTS

A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 01 Specification Sections, apply to this Section, including but not limited to - the following.

1. Document 31 22 01 - FIELD GRADING
2. Document 33 40 00 - STORM UTILITY DRAINAGE PIPING
3. Trench excavation width and safety.
4. Backfill materials and placement for underground utilities.
5. Utility identification using marking tape and trace wire.

1.02 SUMMARY

A. Section Includes:

1. Trench excavation width and safety.
2. Backfill materials and placement for underground utilities.
3. Utility identification using marking tape and trace wire.

1.03 REFERENCES

A. American Public Works Association (APWA):


B. ASTM International (ASTM):

5. D421: Practice for Dry Preparation of Soil Samples for Particle Size Analysis and Determination of Soil Constants.


7. D698: Standard Test Methods for Laboratory Compaction Characteristics of Soil Using Standard Effort (12 400 ft-lbf/ft³ (600 kN·m/m³)).

8. D1556: Test Method for Density and Unit Weight of Soil in Place by the Sand-Cone Method.

9. D1557: Test Method for Laboratory Compaction Characteristics of Soil Using Modified Effort (56,000 ft-lb/ft³ (600 kN·m/m³)).

10. D2167: Test Method for Density and Unit Weight of Soil in Place by the Rubber Balloon Method.


C. Occupational Safety and Health Administration (OSHA) Standards and Regulations:

1.04 CLASSIFICATION OF EXCAVATION

A. As specified in Section 31 20 01 – FIELD GRADING

1.05 DEFINITIONS

A. Percent Compaction or Compaction Density: The field dry density of compacted material, expressed as a percentage of the maximum dry density.

B. Field Dry Density or Field Density: In-place density as determined by ASTM D1556 (Sand Cone Method), ASTM D2167 (Rubber Balloon Method), or ASTM D6938 (Nuclear Method).

C. Maximum Dry Density: Laboratory density as determined by ASTM D698 (Standard Proctor) and occurring at the optimum moisture content of the soil being tested.

D. Pipe Embedment: Comprised of the following or combination thereof:

1. Foundation: Required only when the native trench bottom does not provide a firm working platform or the necessary uniform and stable support for the installed pipe.

2. Bedding: Placed directly underneath the pipe and brings the trench bottom to grade. Provides a firm, stable, and uniform support of the pipe.

3. Haunching: From bottom of pipe to springline.

4. Initial Backfill: From top of bedding or foundation to six inches above top of pipe, unless noted otherwise.

5. Final Backfill: Above the initial backfill to the original or finish grade.


1.06 SUBMITTALS

A. Submit in accordance with Section 01 33 00, Submittals.

B. Materials Sources: Name of source, location, date of sample, sieve analysis, and laboratory compaction characteristics.
1.07 QUALITY ASSURANCE

A. Comply with the requirements specified in Section 01 43 00, Quality Requirements, an

B. Responsibilities by CONTRACTOR:

1. The CONTRACTOR shall compact backfill material in accordance with the specifications.

C. Responsibilities of Owner:

1. The Owner shall provide quality control acceptance field testing services of compacted backfill material, unless noted otherwise.

2. The Owner’s representative will take tests along backfilled area if compaction tests indicate a failure to meet the specified compaction requirements.

1.08 DELIVERY STORAGE AND HANDLING

A. Comply with the requirements specified in Section 01 66 13, Product Storage, Maintenance, and Protection.

B. Provide geotextile fabric meeting the following requirements, 3.5oz/y nonwoven, needlepunched PP fabric; 90lbs tensile strength, 185psi Mullen burst, 60lb puncture, 40lb trapezoidal tear.

C. Protect geotextile fabric from sunlight during transportation and storage. Do not leave geotextile fabric exposed to sunlight for more than five days during installation operations.

1.09 SITE CONDITIONS

A. A Geotechnical Data Report was prepared for this Project and is provided with the Contract Documents.

PART 2 - PRODUCTS

2.01 BACKFILL MATERIALS

A. Sanitary Sewer Pipe Bedding Classification as noted below, unless otherwise indicated on the Contract Drawings:

1. Rigid pipe and non-rigid pipe as defined in Section 33 30 00, Sanitary Sewerage Utilities.
2. Rigid Pipe – ASTM C12, Class B.

B. Materials as specified in Section 31 20 00 - GRADING, and indicated on Contract Drawings.

2.02 EQUIPMENT

A. Compaction equipment shall be capable of consistently achieving the specified compaction requirements without damaging pipes.

2.03 UTILITY IDENTIFICATION

A. Trace Wire: Continuous, single-strand copper wire, insulated, maximum 10 AWG. Clear plastic covering, imprinted with inscription describing specific utility in large letters.

B. Marking Tape: Use type specifically manufactured for marking and locating underground utilities. Acid- and alkali-resistant polyethylene film, six inches wide with minimum thickness of 0.004 inch, minimum strength of 1,750 psi lengthwise and 1,500 psi crosswise. Provide tape manufactured with foil core at least 0.35-mil thick to enable detection by metal detection when tape is buried up to three feet deep. Tape shall bear continuous printed inscription describing specific utility. Tape shall be installed 12 inches below finished grade. Tape color shall be as follows:

1. Electric conduits, duct banks, and cable: Red.
2. Potable water systems: Blue.
5. Telephone, Fiber Optic, CCTW, fire communications: Orange.

PART 3 - EXECUTION

3.01 EXAMINATION

A. As specified in Section 31 20 01 - FIELD GRADING.
3.02 PREPARATION

A. As specified in Section 31 20 01 – FIELD GRADING

3.03 PROTECTION OF IN-PLACE CONDITIONS

A. As specified in Section 31 20 01 – FIELD GRADING.

3.04 RESTORATION

A. As specified in Section 31 20 01 – FIELD GRADING.

3.05 TRENCH EXCAVATION

A. Preserve material below and beyond the lines of excavations.

B. Locate stockpiled excavated material at least three feet from edge of excavations and prevent cave-ins or bank slides.

C. Remove rock to the greater of six inches seal if required, and backfill with bedding material.

D. Refer to Section 31 20 00 - GRADING, for additional requirements.

3.06 UNAUTHORIZED EXCAVATION

A. CONTRACTOR is responsible for backfilling unauthorized excavations.

B. Unauthorized excavations which extend to and expose rock will be sealed with at least six inches of CLSM, concrete, or sprayed with bitumen within eight hours of exposure. If sealing is delayed more than eight hours, over excavate at least six inches below the excavation bottom to expose fresh rock and seal within eight hours.

C. Remaining extent of unauthorized excavation will be filled with bedding material.

3.07 BACKFILL

A. Contractor responsible for obtaining all inspections and approvals.

B. All trenches and excavations shall be backfilled as soon as practicable after the pipe has been installed unless other protection of the pipe is directed or shown on the plans.
C. The backfill around the pipe up to the top of the pipe shall be placed in loose layers not exceeding six inches per layer and thoroughly compacted by hand or power tampers approved by the OWNER. Great care shall be used to obtain thorough compaction under the haunches and along the sides of the pipe. Over the top of the pipe, backfill layers of approximately eight inch depth shall be added with each layer compacted separately and thoroughly until the trench is completely and uniformly filled to a depth of two feet above the top of the pipe. Backfilling operations shall be done in such a manner as to avoid movement or damage to the pipe.

D. Backfill material shall be brought up evenly by depositing the material in layers approximately nine inches in loose depth and without injuring the pipe by shock, jar or excessive free fall. Each layer shall be thoroughly compacted by power tampers operated with care so as not to injure the underlying pipe or appurtenances. Hand tampers may be used in corners or narrow places inaccessible to power tampers. If compaction is done using hydraulically-operated backhoe-mounted compactors with minimum rated impulse force of 6,400 pounds with a minimum of 2,000 cycles per minute, the backfill material may be deposited in layers not more than two feet in loose depth. Layers in excess of two feet may be deposited only if tests, conducted at the CONTRACTOR's expense, show, to the satisfaction of the OWNER, that the specified degree of compaction is being achieved. There shall be at least three feet of compacted backfill over the pipe before this method of compaction may be employed.

E. Backfilling shall be kept completed up to a point within 100 feet of the end of the newly laid pipe unless otherwise directed by the OWNER. During backfilling operations, no sheeting or bracing shall be removed without permission of the OWNER.

F. Fill to lines and grades necessary to provide finish grades.

G. Use a placement method that does not disturb or damage other work or existing features.

H. Maintain fill materials within two percent of optimum moisture, to attain required compaction density.

I. Place and compact material in equal continuous layers.

J. Maximum compacted depth is six inches for aggregate materials and eight inches for soil materials, unless noted otherwise.
3.08 COMPACTON
A. As specified in Section 31 20 01 – FIELD GRADING.

3.09 UTILITY IDENTIFICATION
A. Install marking tape over all site utilities, 12 inches below finish grade or as indicated on Contract Drawings.

B. Install trace wire at top center of marking tape; pull wire taut to remove slack.

C. Extend trace wire to utility boxes, manholes and junctions to allow for connection to subsurface location equipment.

3.10 FIELD QUALITY CONTROL AND QUALITY ASSURANCE
A. General

1. The OWNER shall perform field quality control tests separate from acceptance testing. CONTRACTOR test results will not be used by the OWNER for acceptance.

2. The Owner will perform field density testing for quality assurance testing in accordance with ASTM D1556, ASTM D2167, or ASTM D6938. Acceptance of compaction will be in accordance with City’s test only.

3. Compaction shall be deemed to comply with the specifications when no more than one test of any three consecutive tests performed by the City falls below the specified relative compaction. The one test shall be no more than three percentage points below the specified compaction. The CONTRACTOR shall pay the costs for any retesting or additional testing of work not conforming to these Specifications.

4. Where compaction tests indicate a failure to meet the specified compaction, the City will take additional tests in each direction until the extent of the failing area is identified. Rework the entire failed area until the specified compaction has been achieved.

B. Compaction:

1. Material shall be placed and compacted in layers until the density is not less than the percentage of maximum dry density indicated in Table 31 23 33-1 determined by ASTM D698 or other approved method.
2. The Engineer will evaluate field density test results in relation to maximum dry density as determined by testing material in accordance with ASTM D698 (Standard Proctor).

3. Location of field density tests shall be determined by the OWNER.

4. Minimum frequency of City field density tests as specified in Table 31 23 33-2.

<table>
<thead>
<tr>
<th>Area</th>
<th>Frequency</th>
</tr>
</thead>
<tbody>
<tr>
<td>Trench (Structural Areas)</td>
<td>1 per lift for every 1,000 linear feet (300 m) of trench</td>
</tr>
<tr>
<td>Trench (Non-Structural Areas)</td>
<td>1 per alternate lift for every 1,000 linear feet (300 m) of trench</td>
</tr>
</tbody>
</table>

5. Regardless of the minimum testing frequency specified, field density tests shall be performed by the CONTRACTOR in sufficient number for the CONTRACTOR's quality control purposes to ensure that specified density is obtained.

3.11 ADJUSTING

A. Shrinkage:

1. Backfill to a height above finished grade which will allow for the shrinkage or consolidation of material. Initially, provide at all points, an excess of at least one percent of total height of backfill measured from stripped surface to top of finished surface.

2. Supply specified materials and build up low places, without additional cost if embankment or backfilling settles to be below the indicated level for proposed finished surface at any time before final acceptance of the work.
3.12 PROTECTION

A. Formulate excavation, backfilling, and filling schedule and procedures to eliminate possibility of undermining or disturbing foundations of partially and completed structures, pipelines and embankments or existing structures and pipelines.

END OF SECTION 312333
PART 1 - GENERAL

1.1 RELATED DOCUMENTS

A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 1 Specification Sections, apply to this Section.

1.2 SUMMARY

A. This Section includes the following:

1. Seeding.
2. Lawn renovation.

1.3 DEFINITIONS

A. Finish Grade: Elevation of finished surface of planting soil.

B. Manufactured Soil: Soil produced off-site by homogeneously blending mineral soils or sand with stabilized organic soil amendments to produce topsoil or planting soil.

C. Planting Soil: Native or imported topsoil, manufactured topsoil, or surface soil modified to become topsoil; mixed with soil amendments.

D. Subgrade: Surface or elevation of subsoil remaining after completing excavation, or top surface of a fill or backfill immediately beneath planting soil.

1.4 SUBMITTALS

A. Product Data: For each type of product indicated.

B. Certification of Grass Seed: From seed vendor for each grass-seed monostand or mixture stating the botanical and common name and percentage by weight of each species and variety, and percentage of purity,
germination, and weed seed. Include the year of production and date of packaging.

1. Certification of each seed mixture for turfgrass seed, identifying source, including name and telephone number of supplier.

C. Product Certificates: For soil amendments and fertilizers, signed by product manufacturer.

D. Qualification Data: For landscape Installer.

E. Material Test Reports: For existing surface soil and imported topsoil.

F. Planting Schedule: Indicating anticipated planting dates for each type of planting.

G. Maintenance Instructions: Recommended procedures to be established by Owner for maintenance of lawns during a calendar year. Submit before expiration of required maintenance periods.

1.5 QUALITY ASSURANCE

A. Installer Qualifications: A qualified landscape installer whose work has resulted in successful lawn and meadow establishment.

1. Installer's Field Supervision: Require Installer to maintain an experienced full-time supervisor on Project site when planting is in progress.

B. Soil-Testing Laboratory Qualifications: An independent laboratory, recognized by the State Department of Agriculture, with the experience and capability to conduct the testing indicated and that specializes in types of tests to be performed.

C. Topsoil Analysis: Furnish soil analysis by a qualified soil-testing laboratory stating percentages of organic matter; gradation of sand, silt, and clay content; cation exchange capacity; sodium absorption ratio; deleterious material; pH; and mineral and plant-nutrient content of topsoil.

1. Report suitability of topsoil for lawn growth. State recommended quantities of nitrogen, phosphorus, and potash nutrients and soil
amendments to be added to produce a satisfactory topsoil.

D. Preinstallation Conference: Conduct conference at Project site upon request by the CM.

1.6 DELIVERY, STORAGE, AND HANDLING

A. Seed: Deliver seed in original sealed, labeled, and undamaged containers.

1.7 SCHEDULING

A. Planting Restrictions: Plant during one of the following periods. Coordinate planting periods with maintenance periods to provide required maintenance from date of Contract Completion.

2. Fall Planting: August 15 until October 15.

B. Weather Limitations: Proceed with planting only when existing and forecasted weather conditions permit.

1.8 LAWN MAINTENANCE

A. Begin maintenance immediately after each area is planted and continue until acceptable lawn is established, but for not less than the following periods (confirm schedule and coordinate with CM):

1. Seeded Lawns: 60 days from date of Contract Completion.
   a. When full maintenance period has not elapsed before end of planting season, or if lawn is not fully established, continue maintenance during next planting season.

B. Maintain and establish lawn by watering, fertilizing, weeding, mowing, trimming, replanting, and other operations. Roll, regrade, and replant bare or eroded areas and remulch to produce a uniformly smooth lawn.

1. In areas where mulch has been disturbed by wind or maintenance operations, add new mulch. Anchor as required to prevent displacement.

C. Watering: Provide and maintain temporary piping, hoses, and lawn-watering
equipment to convey water from sources and to keep lawn uniformly moist to a depth of 4 inches.

1. Schedule watering to prevent wilting, puddling, erosion, and displacement of seed or mulch. Lay out temporary watering system to avoid walking over muddy or newly planted areas.
2. Water lawn at a minimum rate of 1 inch per week.

D. Mow lawn as soon as top growth is tall enough to cut. Repeat mowing to maintain specified height without cutting more than 40 percent of grass height. Remove no more than 40 percent of grass-leaf growth in initial or subsequent mowings. Do not delay mowing until grass blades bend over and become matted. Do not mow when grass is wet. Schedule initial and subsequent mowings to maintain the following grass height:

1. Mow grass 3 to 4 inches high.

E. Lawn Postfertilization: Apply fertilizer after initial mowing and when grass is dry.

1. Use fertilizer that will provide actual nitrogen of at least 1 lb/1000 sq.ft. to lawn area.

PART 2 - PRODUCTS

2.1 SEED

A. Grass Seed: Fresh, clean, dry, new-crop seed complying with AOSA's "Journal of Seed Technology; Rules for Testing Seeds" for purity and germination tolerances.

B. General Seed Mix: State-certified seed of grass species as follows, with not less than 95 percent germination, not less than 85 percent pure seed, and not more than 0.5 percent weed seed, proportioned by weight, as follows:
   a. 70 percent turf-type tall fescue.
   b. 20 percent perennial ryegrass (Lolium perenne).
   c. 10 percent Kentucky bluegrass (Poa pratensis).
2.2 TOPSOIL

A. Topsoil: ASTM D 5268, pH range of 5.5 to 7, a minimum of 6 percent organic material content; free of stones 1 inch or larger in any dimension and other extraneous materials harmful to plant growth.

1. Topsoil Source: Amend existing in-place surface soil to produce topsoil. Verify suitability of surface soil to produce topsoil. Clean surface soil of roots, plants, sod, stones, clay lumps, and other extraneous materials harmful to plant growth.

   a. Surface soil may be supplemented with imported or manufactured topsoil from off-site sources. Obtain topsoil displaced from naturally well-drained construction or mining sites where topsoil occurs at least 4 inches deep; do not obtain from agricultural land, bogs or marshes.

2.3 INORGANIC SOIL AMENDMENTS

A. Lime: ASTM C 602, agricultural limestone containing a minimum 80 percent calcium carbonate equivalent and as follows:

   1. Class: Class T, with a minimum 99 percent passing through No. 8 sieve and a minimum 75 percent passing through No. 60 sieve.
   2. Provide lime in form of dolomitic limestone.

B. Sulfur: Granular, biodegradable, containing a minimum of 90 percent sulfur, with a minimum 99 percent passing through No. 6 sieve and a maximum 10 percent passing through No. 40 sieve.

C. Iron Sulfate: Granulated ferrous sulfate containing a minimum of 20 percent iron and 10 percent sulfur.

D. Aluminum Sulfate: Commercial grade, unadulterated.

E. Perlite: Horticultural perlite, soil amendment grade.

F. Agricultural Gypsum: Finely ground, containing a minimum of 90 percent calcium sulfate.

G. Sand: Clean, washed, natural or manufactured, free of toxic materials.
H. Diatomaceous Earth: Calcined, diatomaceous earth, 90 percent silica, with approximately 140 percent water absorption capacity by weight.

I. Zeolites: Mineral clinoptilolite with at least 60 percent water absorption by weight.

2.4 ORGANIC SOIL AMENDMENTS

A. Peat: Finely divided or granular texture, with a pH range of 6 to 7.5, containing partially decomposed moss peat, native peat, or reed-sedge peat and having a water-absorbing capacity of 1100 to 2000 percent.

B. Manure: Well-rotted, unleached, stable or cattle manure containing not more than 25 percent by volume of straw, sawdust, or other bedding materials; free of toxic substances, stones, sticks, soil, weed seed, and material harmful to plant growth.

2.5 FERTILIZER

A. Bonemeal: Commercial, raw or steamed, finely ground; a minimum of 4 percent nitrogen and 20 percent phosphoric acid.

B. Superphosphate: Commercial, phosphate mixture, soluble; a minimum of 20 percent available phosphoric acid.

C. Commercial Fertilizer: Commercial-grade complete fertilizer of neutral character, consisting of fast- and slow-release nitrogen, 50 percent derived from natural organic sources of urea formaldehyde, phosphorous, and potassium in the following composition:

1. Composition: Nitrogen, phosphorous, and potassium in amounts recommended in soil reports from a qualified soil-testing agency.

D. Slow-Release Fertilizer: Granular or pelleted fertilizer consisting of 50 percent water-insoluble nitrogen, phosphorus, and potassium in the following composition:

1. Composition: Nitrogen, phosphorous, and potassium in amounts recommended in soil reports from a qualified soil-testing agency.
2.6 MULCHES

A. Straw Mulch: Provide air-dry, clean, mildew- and seed-free, salt hay or threshed straw of wheat, rye, oats, or barley.

B. Fiber Mulch: Biodegradable, dyed-wood, cellulose-fiber mulch; nontoxic; free of plant-growth or germination inhibitors; with maximum moisture content of 15 percent and a pH range of 4.5 to 6.5.

C. Nonasphaltic Tackifier: Colloidal tackifier recommended by fiber-mulch manufacturer for slurry application; nontoxic and free of plant-growth or germination inhibitors.

2.7 PESTICIDES

A. General: Pesticide, registered and approved by EPA, acceptable to authorities having jurisdiction, and of type recommended by manufacturer for each specific problem and as required for Project conditions and application. Do not use restricted pesticides unless authorized in writing by authorities having jurisdiction.

B. Pre-Emergent Herbicide (Selective and Non-Selective): Effective for controlling the germination or growth of weeds within planted areas at the soil level directly below the mulch layer.

C. Post-Emergent Herbicide (Selective and Non-Selective): Effective for controlling weed growth that has already germinated.

2.8 PLANTING SOIL MIX

A. Planting Soil Mix: Mix topsoil with soil amendments and fertilizers as recommended in the soils report.

PART 3 - EXECUTION

3.1 EXAMINATION

A. Examine areas to receive lawns and grass for compliance with requirements and other conditions affecting performance. Proceed with installation only after unsatisfactory conditions have been corrected.
3.2 PREPARATION

A. Protect structures, utilities, sidewalks, pavements, and other facilities, trees, shrubs, and plantings from damage caused by planting operations.

1. Protect adjacent and adjoining areas from hydroseeding overspray.

B. Provide erosion-control measures to prevent erosion or displacement of soils and discharge of soil-bearing water runoff or airborne dust to adjacent properties and walkways.

3.3 LAWN PREPARATION

A. Limit lawn subgrade preparation to areas to be planted.

B. Newly Graded Subgrades: Loosen subgrade to a minimum depth of 6 inches. Remove stones larger than 1 inch in any dimension and sticks, roots, rubbish, and other extraneous matter and legally dispose of them off Owner's property.

1. Apply superphosphate fertilizer directly to subgrade before loosening.
2. Thoroughly blend planting soil mix off-site before spreading or spread topsoil, apply soil amendments and fertilizer on surface, and thoroughly blend planting soil mix.
   a. Delay mixing fertilizer with planting soil if planting will not proceed within a few days.
   b. Mix lime with dry soil before mixing fertilizer.
3. Spread planting soil mix to a depth of 6 inches but not less than required to meet finish grades after light rolling and natural settlement. Do not spread if planting soil or subgrade is frozen, muddy, or excessively wet.
   a. Spread approximately one-half the thickness of planting soil mix over loosened subgrade. Mix thoroughly into top 4 inches of subgrade. Spread remainder of planting soil mix.
   b. Reduce elevation of planting soil to allow for soil thickness of sod.

C. Unchanged Subgrades: If lawns are to be planted in areas unaltered or undisturbed by excavating, grading, or surface soil stripping operations, prepare surface soil as follows:
1. Remove existing grass, vegetation, and turf. Do not mix into surface soil.
2. Loosen surface soil to a depth of at least of 6 inches. Apply soil amendments and fertilizers according to planting soil mix proportions and mix thoroughly into top 6 inches of soil. Till soil to a homogeneous mixture of fine texture.
   a. Apply superphosphate fertilizer directly to surface soil before loosening.
3. Remove stones larger than 1 inch in any dimension and sticks, roots, trash, and other extraneous matter.
4. Legally dispose of waste material, including grass, vegetation, and turf, off Owner's property.

D. Finish Grading: Grade planting areas to a smooth, uniform surface plane with loose, uniformly fine texture. Grade to within plus or minus 1/2 inch of finish elevation. Roll and rake, remove ridges, and fill depressions to meet finish grades. Limit fine grading to areas that can be planted in the immediate future.

E. Moisten prepared lawn areas before planting if soil is dry. Water thoroughly and allow surface to dry before planting. Do not create muddy soil.

F. Restore areas if eroded or otherwise disturbed after finish grading and before planting.

3.4 SEEDING

A. Sow seed with spreader or seeding machine. Do not broadcast or drop seed when wind velocity exceeds 5 mph. Evenly distribute seed by sowing equal quantities in two directions at right angles to each other.
   1. Do not use wet seed or seed that is moldy or otherwise damaged.
B. Sow lawn seed at the rate of 6 to 8 lb/1000 sq. ft..
C. Rake seed lightly into top 1/8 inch of topsoil, roll lightly, and water with fine spray.
D. Protect seeded areas with slopes exceeding 1:6 with erosion-control fiber mesh installed and stapled according to manufacturer's written instructions.
E. Protect seeded areas with slopes not exceeding 1:6 by spreading straw mulch. Spread uniformly at a minimum rate of 2 tons/acre to form a continuous blanket 1-1/2 inches in loose depth over seeded areas. Spread by hand, blower, or other suitable equipment.

1. Anchor straw mulch by crimping into topsoil with suitable mechanical equipment.
2. Bond straw mulch by spraying with asphalt emulsion at the rate of 10 to 13 gal./1000 sq. ft. Take precautions to prevent damage or staining of structures or other plantings adjacent to mulched areas. Immediately clean damaged or stained areas.

F. Protect seeded areas from hot, dry weather or drying winds by applying straw mulch within 24 hours after completing seeding operations. Soak and scatter uniformly to a depth of 3/16 inch and roll to a smooth surface.

3.5 HYDROSEEDING

A. Hydroseeding: Mix specified seed, fertilizer, and fiber mulch in water, using equipment specifically designed for hydroseed application. Continue mixing until uniformly blended into homogeneous slurry suitable for hydraulic application.

1. Mix slurry with nonasphaltic tackifier.
2. Apply slurry uniformly to all areas to be seeded in a one-step process. Apply mulch at a minimum rate of 1500-lb/acre dry weight but not less than the rate required to obtain specified seed-sowing rate.
3. Apply slurry uniformly to all areas to be seeded in a two-step process. Apply first slurry application at a minimum rate of 500-lb/acre dry weight but not less than the rate required to obtain specified seed-sowing rate. Apply slurry cover coat of fiber mulch at a rate of 1000 lb/acre.

3.6 TURF RENOVATION

A. Renovate existing lawn.

B. Renovate existing lawn damaged by Contractor's operations, such as storage of materials or equipment and movement of vehicles.

1. Reestablish lawn where settlement or washouts occur or where minor
regrading is required.

C. Remove sod and vegetation from diseased or unsatisfactory lawn areas; do not bury in soil.

D. Remove topsoil containing foreign materials resulting from Contractor's operations, including oil drippings, fuel spills, stone, gravel, and other construction materials, and replace with new topsoil.

E. Mow, dethatch, core aerate, and rake existing lawn.

F. Remove weeds before seeding. Where weeds are extensive, apply selective herbicides as required. Do not use pre-emergence herbicides.

G. Remove waste and foreign materials, including weeds, soil cores, grass, vegetation, and turf, and legally dispose of them off Owner's property.

H. Till stripped, bare, and compacted areas thoroughly to a soil depth of 6 inches.

I. Apply soil amendments and initial fertilizers required for establishing new lawns and mix thoroughly into top 4 inches of existing soil. Provide new planting soil to fill low spots and meet finish grades.

J. Apply seed and protect with straw mulch as required for new lawns.

K. Water newly planted areas and keep moist until new lawn is established.

3.7 PESTICIDE APPLICATION

A. Apply pesticides and other chemical products and biological control agents in accordance with requirements of authorities having jurisdiction and manufacturer's written recommendations. Coordinate applications with Owner's operations and others in proximity to the Work. Notify CM before each application is performed.

B. Post-Emergent Herbicides (Selective and Non-Selective): Apply only as necessary to treat already-germinated weeds and in accordance with manufacturer's written recommendations.

3.8 SATISFACTORY LAWNS
A. Satisfactory Seeded Lawn: At end of maintenance period, a healthy, uniform, close stand of grass has been established, free of weeds and surface irregularities, with coverage exceeding 90 percent over any 10 sq. ft. (0.92 sq. m) and bare spots not exceeding 5 by 5 inches.

B. Reestablish lawns that do not comply with requirements and continue maintenance until lawns are satisfactory.

3.9 CLEANUP AND PROTECTION

A. Promptly remove soil and debris created by lawn work from paved areas. Clean wheels of vehicles before leaving site to avoid tracking soil onto roads, walks, or other paved areas.

B. Erect barricades and warning signs as required to protect newly planted areas from traffic. Maintain barricades throughout maintenance period and remove after lawn is established. Confirm schedule and coordinate with CM.

C. Remove erosion-control measures after grass establishment period.

END OF SECTION 329200
PART 1 - GENERAL

1.01 RELATED DOCUMENTS

A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 1 Specification Sections, apply to this Section.

1.02 SUMMARY

A. This Section includes the following:
   1. Pre-approved synthetic turf manufacturers/suppliers and selected turf systems for alternate(s).
   2. Synthetic turf playing field system requirements and sports field accessories.
   3. Synthetic turf fabric and infill Manufacturer/Contractor’s required qualifications for performing the work.

B. Related Sections
   1. See Section 32 92 11 SYNTHETIC TURF PLAYING SURFACE – Alternate #1 – AstroTurf – Diamond OPS/ RBI
   2. See Section 32 92 12 SYNTHETIC TURF PLAYING SURFACE – Alternate #2 – Fieldturf – Double Play Fast Clay/Fast Grass
   3. See Section 32 92 13 SYNTHETIC TURF PLAYING SURFACE – Alternate #3 – Shaw Sports Turf – B1K Six4Three / TagUp 2.0

1.03 REFERENCES

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

   1. D1577 - Standard Test Method for Linear Density of Textile Fiber
   2. D1907 – Yarn Denier Skein Method
   3. D2256 – Yarn Tensile & Elongation
   4. D3218 – Yarn Thickness, Microns
5. D5823 – Pile Height
6. D5848 - Standard Test Method for Mass Per Unit Area of Pile Yarn Floor Covering
7. D5793 – Stitch Gauge
9. D5034 - Standard Test Method of Breaking Strength and Elongation of Textile Fabrics (Grab Test)
11. DIN 18-035 – Water Permeability
13. D7138 – Melting Point
16. F1951 – ADA Compliance
17. F2117-01 – Ball Rebound
18. D792 – Specific Gravity
19. EN 14808 – Force Reduction
20. EN 14809 – Vertical Deformation
21. EN 15301-1 – Rotational Resistance

1.04 SUBMITTALS

A. General: Make Submittals in accordance with the General Requirements.

B. Shop Drawings:
1. Indicate field layout; field marking plan and details for the specified sports; i.e., baseball, softball, etc.; roll/seaming layout; methods of attachment, field openings and perimeter conditions.
2. Show installation methods and construction indicating field verified conditions, clearances, measurements, terminations, drainage and goals/goal posts.
3. Provide joint submission with related trades when requested by Architect/Engineer.

C. Product Data:
1. Submit manufacturer's catalog cuts, material safety data sheets (MSDS), brochures, specifications; preparation and installation instructions and recommendations; storage, handling requirements and
1. Submit fiber manufacturer's name, type of fiber and composition of fiber.
2. Submit data in sufficient detail to indicate compliance with the contract documents.
3. Submit manufacturer's instructions for installation.
4. Submit manufacturer's instructions for maintenance for the proper care and preventative maintenance of the synthetic turf system, including painting and markings.

D. Samples for Verification: For the following products, in manufacturer's standard sizes.
   1. A 12-inch x 12-inch, minimum sample of the exact synthetic turf and infill system that is specified for this project.
   2. Sand / Rubber infill mix with proper mix ratio.

E. Product Certification:
   1. Submit manufacturer's certification that products and materials comply with requirements of the specifications.
   2. Submit test results indicating compliance with Reference Standards.

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

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

H. Warranties: Submit warranty and ensure that forms have been completed in Owner's name and registered with approved manufacturer.

I. Testing Certification: Submit certified copies of independent (third-party) laboratory reports on ASTM testing:
   1. D1577 - Linear Density of Textile Fiber
   2. D1907 – Yarn Denier Skein Method
   3. D2256 – Yarn Tensile & Elongation
   4. D3218 – Yarn Thickness, Microns
   5. D5823 – Pile Height
   6. D5848 - Mass Per Unit Area of Pile Yarn Floor Covering
   7. D5793 – Stitch Gauge
   8. D1335 - Tuft Bind of Pile Yarn Floor Covering
   9. D5034 – Breaking Strength and Elongation of Textile Fabrics (Grab Test)
   10. F1015 - Relative Abrasiveness of Synthetic Turf Playing Surfaces
11. DIN 18-035 – Water Permeability
12. D2859 - Ignition Characteristics of Finished Textile Floor Covering Materials
13. D7138 – Melting Point
16. F1951 – ADA Compliance
17. F2117-01 – Ball Rebound
18. D792 – Specific Gravity
19. EN 14808 – Force Reduction
20. EN 14809 – Vertical Deformation
21. EN 15301-1 – Rotational Resistance

1.05 QUALITY ASSURANCE

A. Comply with the General Requirements.

B. Manufacturer Qualifications: Company specializing in manufacturing products specified in this section. The turf manufacturer/supplier:
   1. Shall be experienced in the manufacture and installation of specified type of synthetic infill monofilament and/or slit-film grass system for a minimum of three years with the same manufacturer, product and company they are proposing for this field. This includes use of a monofilament fiber and/or a slit-film fiber in addition to the backing, the backing coating, and the installation method.
   2. Shall have manufactured a minimum of two million (2,000,000) square feet of tufted turf for sports field use in the past five (5) years
   3. Shall have installations in place that are a minimum of six (6) years old, of the specific type (or substantially equal type) of turf to be used on this project. This includes the tufting, backing, backing coating, and installation method.

C. Installer: Company shall specialize in performing the work of this section. The Contractor shall provide competent workmen skilled in this specific type of synthetic grass installation.
   1. The designated Supervisory Personnel on the project shall be certified, in writing by the turf manufacturer, as competent in the installation of specified monofilament and/or slit-film material, including sewing seams and proper installation of the infill mixture.
   2. Installer shall be certified by the manufacturer and licensed.
   3. The installer supervisor shall have a minimum of 5 years experience as
either a construction manager or a supervisor of synthetic turf installations.

4. The contracting company shall have installed a minimum of twenty five (25) full sized synthetic turf fields with similar characteristics, within the past four (4) years.

D. Pre-Installation Conference: Conduct conference at project site at time to be determined by Owner/Engineer. Review methods and procedures related to installation including, but not limited to, the following:
   1. Inspect and discuss existing conditions and preparatory work performed under other contracts.
   2. In addition to the Contractor and the installer, arrange for the attendance of installers affected by the Work, The University’s representative, and the Architect/Engineer.

E. The Contractor shall verify special conditions required for the installation of the system.

F. The Contractor shall notify the Architect/Engineer of any discrepancies.

G.  

1.06 DELIVERY, STORAGE AND HANDLING

A. Prevent contact with materials that may cause dysfunction.

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

C. Store materials/components in a safe place, under cover, and elevated above grade.

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

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

F. Comply with manufacturer’s recommendations.

1.07 SEQUENCING AND SCHEDULING

A. Coordinate the Work with installation of work of related trades as the Work proceeds.
B. Sequence the Work in order to prevent deterioration of installed system.

1.08 WARRANTY

A. Warranty: The Synthetic Turf Contractor shall submit it Manufacturer’s Warranty, which guarantees the usability and playability of the synthetic turf system for its intended uses for an eight (8) year period commencing with the date of Substantial Completion.

B. The warranty submitted must have the following characteristics:
   1. Must provide full-synthetic field coverage for eight (8) years from date of Substantial Completion.
   2. Must warrant materials and workmanship.
   3. Must warrant that the materials installed meet or exceed the product specifications within manufacturing tolerances.
   4. Must have a provision to either repair or replace such portion of the installed materials that are no longer serviceable to maintain a serviceable and playable surface.
   5. Must be a Manufacturer’s warranty from a single source covering workmanship and all self-manufactured or procured materials.
   6. Warranties for the synthetic turf field systems shall address the following:
      1) Acceptable uses for the field
      2) Fading
      3) Color match within specifications
      4) Excessive fiber wear
         a) Synthetic turf installer to provide attic stock and provisions for replacement of lacrosse goal areas.
      5) Wrinkling and panel movement
      6) Shock absorbency (G-max)
      7) Seam Integrity
      8) Drainage - Turf
      9) Flammability
     10) Response time for required repairs/replacement

1.09 MAINTENANCE SERVICE

A. Contractor shall train the Owner's facility maintenance staff in the use of the turf manufacturer's recommended maintenance equipment.

B. Manufacturer must provide maintenance guidelines and a maintenance video to the facility maintenance staff.
PART 2 - PRODUCTS

2.01 APPROVED MANUFACTURERS/SUPPLIERS – BASE BID & ALTERNATES

A. Approved Providers – Baseball Field Complex
   1. Astroturf; astroturf.com
   2. FieldTurf; fieldturf.com
   3. Shaw Sports Turf; shawsportsturf.com

B. Synthetic Turf System Alternates
   1. See Section 32 92 11 SYNTHETIC TURF PLAYING SURFACE – Alternate #1 – AstroTurf – Diamond OPS/ RBI
   2. See Section 32 92 12 SYNTHETIC TURF PLAYING SURFACE – Alternate #2 – Fieldturf – Double Play Fast Clay/Fast Grass
   3. See Section 32 92 13 SYNTHETIC TURF PLAYING SURFACE – Alternate #3 – Shaw Sports Turf – B1K Six4Three / TagUp 2.0

2.02 MATERIALS & EQUIPMENT

A. The synthetic turf playing field system is to include a turf sweeper and grooming brush, which consists of a 46” wide field sweeper and 72” wide grooming brush designed to groom the exposed grass fibers to keep them from matting down excessively. This equipment shall be approved by the turf manufacturer and the County to be used as directed by the Manufacturer. No additional payment will be made for providing the equipment, but the costs for providing the equipment shall be included in the price bid for the synthetic turf. The equipment shall include the manufacturer’s standard warranty and County training.

PART 3 - EXECUTION

3.01 EXECUTION

A. See Section 32 92 11 to 13 – SYNTHETIC TURF PLAYING SURFACE … for the approved and alternate turf fabric and infill system(s) installation requirements/procedures.

END OF SECTION 329205
SECTION 32 92 10
SYNTHETIC TURF - SUBSURFACE DRAINAGE & AGGREGATE BASE

PART 1 - GENERAL

1.01 RELATED DOCUMENTS
A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 1 Specification Sections, apply to this Section.

1.02 SUMMARY
A. This Section includes the following:
   1. Furnishing all labor, materials, tools and equipment necessary to install, in place, all subsurface drainage and aggregate base materials as indicated on the plans and as specified herein. The installation of all new materials shall be performed in strict accordance with the Selected Turf Manufacturer’s written installation instructions, and in accordance with all approved shop drawings. Any variance from these requirements must be accepted in writing, by the Selected Turf Manufacturer’s on-site representative, and submitted to the University, verifying that the changes do not in any way affect the warranty.

B. Related Sections
   1. SECTION 312201 – FIELD GRADING: Subgrade preparation and compaction.
   2. Section 329205 – Synthetic Turf Project Requirements And Conditions: Project Requirements and Conditions
   4. SECTION 334000 – STORM DRAINAGE UTILITIES: Collector piping materials and installation requirements.

1.03 REFERENCES
A. ASTM International:
   2. Standard Classification for Sizes of Aggregate for Road and Bridge Construction (ASTM D-448-03a).
   3. Standard Test Methods for Laboratory Compaction Characteristics of Soil Using Standard Effort (12,400 ft-lbf/ft³ (600 kN-m/m³)) (ASTM D-698-00a).
   4. Standard Test Method for Density and Unit Weight of Soil in Place by the Sand-Cone Method (ASTM D-1556-00).
   5. Standard Test Methods for Laboratory Compaction Characteristics of Soil Using Modified Effort (56,000 lb-lbf/ft³ (2,700 kN-m/m³))
1.04 SUBMITTALS
A. Quality Control Submittals (Test Reports): Submit the following in accordance with the GENERAL REQUIREMENTS:
   1. Perforated panel drains.
   2. Sieve analyses on crushed stone
   3. Geotextile filter fabric

PART 2 - PRODUCTS

2.01 MATERIALS
A. Perforated (Flat) Panel Drains:
   1. Pipe shall be a 12" standard perforated “panel-type” design, installed in a 45° herringbone orientation, with a geotextile wrap. Panel shall have a minimum compressive strength of 3000lbs/ft² tested normal to the plane and 1500lb/ft² tested at 50° from normal at 20% deflection (ASTM D2412).

B. Aggregate Base: Type 2 Base Stone: Crushed #57 limestone meeting the following gradation specifications:

<table>
<thead>
<tr>
<th>Sieve Size</th>
<th>Percent Passing</th>
</tr>
</thead>
<tbody>
<tr>
<td>1 - 1/2&quot;</td>
<td>100</td>
</tr>
<tr>
<td>1&quot;</td>
<td>95 to 100</td>
</tr>
<tr>
<td>1/2&quot;</td>
<td>25 to 60</td>
</tr>
<tr>
<td>#4</td>
<td>0 to 10</td>
</tr>
<tr>
<td>#8</td>
<td>0 to 5</td>
</tr>
</tbody>
</table>

C. Finishing/Leveling Stone: Crushed “#8” limestone screenings:
   1. The upper 2” thickness of gravel below the carpet shall meet the following gradations or as required and approved by the turf contractor.

<table>
<thead>
<tr>
<th>Sieve Size</th>
<th>Percent Passing</th>
</tr>
</thead>
<tbody>
<tr>
<td>1/2&quot;</td>
<td>100</td>
</tr>
<tr>
<td>Grade</td>
<td>Size (Inches)</td>
</tr>
<tr>
<td>---------</td>
<td>--------------</td>
</tr>
<tr>
<td>3/8&quot;</td>
<td>85 to 100</td>
</tr>
<tr>
<td>#4</td>
<td>10 to 30</td>
</tr>
<tr>
<td>#8</td>
<td>0 to 10</td>
</tr>
<tr>
<td>#16</td>
<td>0 to 5</td>
</tr>
</tbody>
</table>

E. These gradation specifications are provided for guidance only. It is the sole responsibility of the turf contractor to select and install a finishing gravel that will provide sufficient surface stability and vertical drainage capacity to meet the performance criteria and warranty requirements of these specifications.

F. Perimeter Edge: A perimeter concrete curb with a composite wood-polymer nailer board, 2×4 nominal dimension.

G. Geotextile fabric: Mirafi 500x, or equal, with the following characteristics:

<table>
<thead>
<tr>
<th>Property</th>
<th>Specification</th>
</tr>
</thead>
<tbody>
<tr>
<td>Tensile Strength</td>
<td>200 lbs.</td>
</tr>
<tr>
<td>Elongation at Break</td>
<td>15 %</td>
</tr>
<tr>
<td>Mullen Burst</td>
<td>400 psi</td>
</tr>
<tr>
<td>Puncture Strength</td>
<td>90 lbs.</td>
</tr>
<tr>
<td>Trapezoidal Tear</td>
<td>75 lbs.</td>
</tr>
<tr>
<td>Apparent Opening</td>
<td>50 US Sieve</td>
</tr>
<tr>
<td>Permittivity</td>
<td>0.05 Sec⁻¹</td>
</tr>
<tr>
<td>UV Resistance Retained</td>
<td>70%</td>
</tr>
<tr>
<td>Flow Rate</td>
<td>5 g/m/sf</td>
</tr>
</tbody>
</table>

H. Collector Pipes: Perforated, corrugated High Density Polyethylene (HDPE) Pipe and Fittings at the diameter shown on the Drawings, meeting the material requirements specified in Section 334000 – Storm Drainage Utilities.

PART 3 - EXECUTION

3.01 GENERAL

A. Sub-Grade Preparation:
1. The soil bed or subgrade is to be sloped to match the proposed finished surface grades as indicated in the Drawings.
2. The soil bed or sub-grade must be compacted in both directions to attain the compaction rate specified in Section 312201 – FIELD GRADING.
3. The soil bed or subgrade must be prepared to tolerances of not more than 1/4” from design grade to allow for even drainage.
4. Cover the prepared subgrade with the Geotextile fabric, overlapping the seams a minimum of 12” in the direction the runoff flows.
B. Installation of Collector Pipes:
1. Excavate drainage collector trenches minimum 20" wide to the invert depth and longitudinal slope shown on the Drawings. Collection trenches should be void of all debris.
2. Place geotextile fabric in the trenches first, overlapping the seams a minimum of 12" in the direction the runoff flows. The fabric in the trenches is to be separate from the fabric on the field. Overlap field and trench liners at least 18" in the direction of runoff flow.
3. Place a minimum of 2" clean, Aggregate Base material in the bottom of the collector trenches, on top of the geotextile and compacted to a minimum 98% of the maximum dry density.
4. Place the collector pipes in the trenches. The centerline of the pipe shall coincide with the centerline of the trench. Pre-manufactured fittings shall be used for all connections into the collector drainage network.
5. Backfill trench with Aggregate Base material specified above and compact to a minimum 98% of the maximum density, placing a minimum of 4" clean, crushed aggregate on the sides of the underdrain pipes and collectors, and 6" minimum of the aggregate on top of the pipe network.

C. Installation of the perforated (flat) panel drains:
1. Install perforated (flat) panel underdrain system in a 45° herringbone pattern at 25' on center as shown on the Drawings.
2. Tape the underdrain pipes every 15 feet to the fabric with waterproof tape.
3. Use due care when applying aggregate not to crush or otherwise damage the panel drains.

D. Installation of Type 2 Aggregate Base Stone Course:
1. Place base stone without damaging or disturbing the prepared subgrade soil bed, geotextile fabric liner or flat panel drains. Do not create any depressions in the subgrade. Stone shall be damp when transported to site and shall be kept damp during installation, to minimize segregation of the materials.
2. Compact base course to a minimum depth of 4” in all areas of the field. Slope top of stone layer to match the proposed finished surface grades as indicated in the Drawings. Where the compacted depth of the base course exceeds 6”, install in two layers of approximate equal thickness. Each layer must be compacted in both directions to a minimum 98% of the maximum density.
3. The grade of the base course shall not vary from the specified grade by more than 1/4" from design grade.

E. Finishing Stone
1. The final grade aggregate layer should not be more than 2” deep.
2. The final grade material must be sloped 0.5% from the center longitudinal axis towards the field perimeter unless otherwise specified.
3. The final grade must be compacted in both directions to attain the specified compaction rate of 98% standard Proctor.
4. The final grade of the finishing stone shall not vary from the specified grade by more than 1/4" from design grade, nor by more than ¼" in 10ft. Laser guided grading is highly recommended.

F. Synthetic Turf and Infill Material: Install in conformance with Section 32 92 [11,12,or13] – SYNTHETIC TURF – PLAYING SURFACE

END OF SECTION 329210
PART 1 - GENERAL

1.01 RELATED DOCUMENTS

A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 1 Specification Sections, apply to this Section.

1.02 SUMMARY

A. This Section includes the following:
   1. Furnishing all labor, materials, tools and equipment necessary to install, in place, all synthetic turf and infill materials as indicated on the plans and as specified herein. The installation of all new materials shall be performed in strict accordance with the manufacturer’s written installation instructions, and in accordance with all approved shop drawings.

B. Related Sections
   1. Section 312201 – Field Grading
   2. Section 321800 – Infield Surfacing
   3. Section 329205 – Synthetic Turf – Project Requirements And Conditions
   4. Section 329210 – Synthetic Turf – Drainage And Base

PART 2 - PRODUCTS

2.01 MATERIALS AND PRODUCTS

A. Synthetic turf system materials shall consist of the following:
   1. Carpet made of a combination of monofilament polyethylene fiber, slit-film polyethylene fibers and manufacturer’s standard thatch layer per manufacturer’s baseball specific installation specifications into a free draining backing with minimum pile heights as noted within the Drawings and specifications herein.
   2. Infill component of the synthetic turf system shall consist of the following:
a. Controlled mixture of graded sand and crumb rubber installed per manufacturer’s baseball specific installation specifications.

3. Glue, thread, paint, seaming fabric and other materials used to install and mark the playing surface.

B. The installed artificial playing surface shall have the following physical characteristics (+/-5%) as tested according to ASTM F1551 Standard Test Methods for Comprehensive Characterization of Synthetic Turf Playing Surfaces and Materials:

<table>
<thead>
<tr>
<th>Property</th>
<th>Value (Infield/Warning Track) Diamond Series OPS</th>
<th>Value (Grass Areas) Diamond Series RBI</th>
<th>Units</th>
<th>ASTM</th>
</tr>
</thead>
<tbody>
<tr>
<td>Pile Yarn Type</td>
<td>UV-resistant polyethylene</td>
<td>n/a</td>
<td>n/a</td>
<td>n/a</td>
</tr>
<tr>
<td>Yarn Structure</td>
<td>Monofilament, Slit Film and Thatch Blend</td>
<td>Monofilament/Slit Film Blend</td>
<td>n/a</td>
<td>n/a</td>
</tr>
<tr>
<td>Yarn Denier</td>
<td>15,800</td>
<td>15,800</td>
<td>Denier</td>
<td>D1577</td>
</tr>
<tr>
<td>Yarn Breaking Strength</td>
<td>&gt;20 nominal</td>
<td>lbs</td>
<td>D2256</td>
<td></td>
</tr>
<tr>
<td>Yarn Maximum Elongation</td>
<td>&gt;50 nominal</td>
<td>%</td>
<td>D2256</td>
<td></td>
</tr>
<tr>
<td>Pile Height</td>
<td>1.50”</td>
<td>2.00”</td>
<td>inches</td>
<td>D5823</td>
</tr>
<tr>
<td>Pile Weight</td>
<td>52</td>
<td>60</td>
<td>Oz/yd2</td>
<td>D5848</td>
</tr>
<tr>
<td>Primary Backing Weight</td>
<td>8</td>
<td>8</td>
<td>Oz/yd2</td>
<td>D5848</td>
</tr>
<tr>
<td>Secondary Backing Weight</td>
<td>20</td>
<td>20</td>
<td>Oz/yd2</td>
<td>D5848</td>
</tr>
<tr>
<td>Total Weight</td>
<td>80</td>
<td>88</td>
<td>Oz/yd2</td>
<td>D5848</td>
</tr>
<tr>
<td>Stitch Gauge</td>
<td>3/8”</td>
<td>3/8”</td>
<td>D5793</td>
<td></td>
</tr>
<tr>
<td>Tuft Bind</td>
<td>≥12</td>
<td>lbs/force</td>
<td>D1335</td>
<td></td>
</tr>
<tr>
<td>Grab Tear Length</td>
<td>≥200</td>
<td>lbs/force</td>
<td>D5034</td>
<td></td>
</tr>
<tr>
<td>Grab Tear Width</td>
<td>≥200</td>
<td>lbs/force</td>
<td>D5034</td>
<td></td>
</tr>
<tr>
<td>Pill Burn Test</td>
<td>Pass</td>
<td>D2859</td>
<td></td>
<td></td>
</tr>
<tr>
<td>-------------------------------</td>
<td>------</td>
<td>-------</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Yarn Melting Point</td>
<td>&gt;245</td>
<td>Degrees F</td>
<td>D7138</td>
<td></td>
</tr>
<tr>
<td>Impact Attenuation (Gmax)</td>
<td>&lt;175</td>
<td>GMax</td>
<td>F355</td>
<td></td>
</tr>
<tr>
<td>Water Permeability (w/ infill)</td>
<td>≥15</td>
<td>inch/hr</td>
<td>DIN 18-035</td>
<td></td>
</tr>
<tr>
<td>(w/o infill)</td>
<td>≥30</td>
<td>inch/hr</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

C. Carpet Rolls shall be 15’ wide rolls.
   1. Rolls shall be long enough to go from field sideline to sideline.
   2. The perimeter white line shall be tufted into the individual sideline rolls, where applicable.

D. Backing:
   1. Primary backing shall be a double-layered polypropylene fabric treated with UV inhibitors.
   2. Secondary backing shall consist of an application of a heat-activated urethane to permanently lock the fiber tufts in place.

E. Fibers shall be low friction, and UV-resistant fiber measuring not less than 1.5 inches high for the warning track and infield areas and not less than 2.0 inches for the outfield and foul territory areas.

F. Infill materials shall be installed to a depth as approved by the respective manufacturer.
   1. Infill shall consist of a resilient layered granular system, comprising of a selected and graded dust-free silica sand and ambient rubber crumb installed at the following percentages of total infill by weight, to optimize baseball specific performance characteristics:
      a. Infield areas: 50% sand, 50% rubber
      b. Grass areas: 50% sand, 50% rubber
      c. Warning Track: 75% sand, 25% rubber

G. Non-tufted or inlaid lines and markings shall be painted with paint approved by the synthetic turf manufacturer.
H. Thread for sewing seams of turf shall be compatible by the synthetic turf manufacturer.

I. Glue and seaming fabric for inlaying lines and markings shall be compatible by the synthetic turf manufacturer.

2.02 QUALITY CONTROL IN MANUFACTURING

A. The manufacturer shall own and operate its own manufacturing plant in North America. Both tufting of the field fibers into the backing materials and coating of the turf system must be done in-house by the turf manufacturer. Outsourcing of either is unacceptable.

B. The manufacturer shall have full-time certified in-house inspectors at their manufacturing plant that are experts with industry standards.

C. The manufacturer’s full-time in-house certified inspectors shall perform pre-tufting fiber testing on tensile strength, elongation, tenacity, denier, shrinkage, and twist i.e., turns per inch, upon receipt of fiber spools from fiber manufacturer.

D. Primary backing shall be inspected by the manufacturer’s full-time certified in-house inspectors before tufting begins.

E. The manufacturer’s full-time in-house certified inspectors shall verify “pick count”, yarn density in relation to the backing, to ensure the accurate amount of face yarn per square inch.

F. The manufacturer’s full-time, in-house, certified inspectors shall perform turf inspections at all levels of production including during the tufting process and at the final stages before the turf is loaded onto the truck for delivery.

G. The manufacturer shall have its own, in-house laboratory where samples of turf are retained and analyzed, based on standard industry tests, performed by full-time, in-house, certified inspectors.

PART 3 - EXECUTION

3.01 EXAMINATION

A. Verify that all sub-base leveling is complete prior to installation.
B. Installer shall examine the surface to receive the synthetic turf and accept the sub-base planarity in writing prior to the beginning of installation.
   1. Acceptance is dependent upon the Contractors test results indicating compaction and planarity are in compliance with manufacturer’s specifications.
   2. The surface shall be accepted by Installer as “clean” as installation commences and shall be maintained in that condition throughout the process.

C. The surface tolerance shall not exceed 0-1/4 inch over 10 feet and 0-½" from design grade.

D. Correct conditions detrimental to timely and proper completion of Work.

E. Do not proceed until unsatisfactory conditions are corrected.

F. Beginning of installation means acceptance of existing conditions

3.02 PREPARATION

A. Prior to the beginning of installation, inspect the sub-base for tolerance to grade.

B. Sub-base acceptance shall be subject to receipt of test results (by others) for compaction and planarity that sub-base is in compliance with manufacturer’s specifications and recommendations.

C. Dimensions of the field and locations for markings shall be measured by a registered surveyor to verify conformity to the specifications and applicable standards. A record of the finished field as-built measurements shall be made.

D. When requested by Architect/Engineer, installed sub-base shall be tested for porosity prior to the installation of the synthetic turf. A sub base that drains poorly is an unacceptable substrate.

3.03 INSTALLATION – GENERAL

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

B. Only trained technicians, skilled in the installation of athletic caliber synthetic turf systems working under the direct supervision of the approved installer supervisors, shall undertake any cutting, sewing, gluing, shearing, topdressing, or brushing operations.
C. The designated Supervisory personnel on the project must be certified, in writing by the turf manufacturer, as competent in the installation of this material, including sewing seams and proper installation of the Infill mixture.

D. Designs, markings and layouts shall first be approved by the Architect or Owner in the form of final shop drawings. All markings will be in full compliance with final shop drawings.

3.04 INSTALLATION

A. Install at location(s) indicated, to comply with final shop drawings, manufacturers’/installer’s instructions.

B. The Contractor shall strictly adhere to specified procedures. Any variance from these requirements shall be provided in writing, by the manufacturer’s on-site representative, and submitted to the Architect and/or Owner, 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.

C. Full width rolls shall be laid out across the field.
   1. Turf shall be of sufficient length to permit full cross-field installation from sideline to sideline.
   2. No cross seams will be allowed in the main playing area between the sidelines.
   3. Each roll shall be attached to the next roll utilizing standard state-of-the-art sewing procedures.
   4. When all of the rolls of the playing surface have been installed, the sideline areas shall be installed at right angles to the playing surface.

D. Artificial turf panel seams shall be sewn or glued per manufacturer’s turf system specifications along the selvedge edging flap of the turf roll.
   1. Seams shall be flat, tight, and permanent with no separation or fraying.
   2. In the case of all lines and logos, turf carpet must be sheared to the backing (do not cut the backing) and adhered using hot melt adhesives.

E. Infill Materials:
   1. Infill materials shall be applied in lifts as necessary to allow for even distribution of infill throughout the pile height. The turf shall be brushed as the mixture is applied. The infill material shall be installed to a depth determined by the manufacturer.
2. Layered infill shall be installed in a systematic order as per manufacturer’s standard installation procedures.
3. Infill materials shall be installed to fill the voids between the fibers and allow the fibers to remain vertical and non-directional. Install sand and rubber infill in such a manner to minimize fiber entrapment wherever possible. Install infill in uniform layers to ensure a consistent, predictable playing surface. A final application of specifically sized non-marking rubber completes the system. The Infill shall be installed to the depth as specified by manufacturer’s baseball specific playing system.

F. Non-tufted or inlaid lines and markings shall be painted in accordance with turf and paint manufacturers’ recommendations. Number of applications will be dependent upon installation and field conditions.

G. Synthetic turf shall be attached to the perimeter edge detail in accordance with the manufacturer’s standard procedures.

H. Upon completion of installation, the finished field shall be inspected by the installation crew and an installation supervisor.

3.05 FIELD MARKINGS

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

B. Field markings will be inlaid or painted in accordance with the Drawings.

3.06 ADJUSTMENT AND CLEANING

A. Do not permit traffic over unprotected surface.

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

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

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

E. Surfaces, recesses, enclosures, and related spaces shall be cleaned as necessary to leave the work area in a clean, immaculate condition ready for immediate occupancy and use by the Owner.
3.07 PROTECTION

A. Protect installation throughout construction process until date of final completion.

END OF SECTION 329211
SECTION 32 92 12
SYNTHETIC TURF PLAYING SURFACE
ALTERNATE #2
FieldTurf – DoublePlay Fast Clay / DoublePlay Fast Grass

PART 1 - GENERAL

1.01 RELATED DOCUMENTS

A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 1 Specification Sections, apply to this Section.

1.02 SUMMARY

A. This Section includes the following:
   1. Furnishing all labor, materials, tools and equipment necessary to install, in place, all synthetic turf and infill materials as indicated on the plans and as specified herein. The installation of all new materials shall be performed in strict accordance with the manufacturer’s written installation instructions, and in accordance with all approved shop drawings.

B. Related Sections
   1. Section 312201 – Field Grading
   2. Section 321800 – Infield Surfacing
   3. Section 329205 – Synthetic Turf – Project Requirements And Conditions
   4. Section 329210 – Synthetic Turf – Drainage And Base

PART 2 - PRODUCTS

2.01 MATERIALS AND PRODUCTS

A. Synthetic turf system materials shall consist of the following:
   1. Carpet made of a combination of monofilament polyethylene fiber, slit-film polyethylene fibers and manufacturer’s standard thatch layer per manufacturer’s baseball specific installation specifications into a free draining backing with minimum pile heights as noted within the Drawings and specifications herein.
   2. Infill component of the synthetic turf system shall consist of the following:
1. Controlled mixture of graded sand and crumb rubber installed per manufacturer’s baseball specific installation specifications.

3. Glue, thread, paint, seaming fabric and other materials used to install and mark the playing surface.

B. The installed artificial playing surface shall have the following physical characteristics (+/-5%) as tested according to ASTM F1551 Standard Test Methods for Comprehensive Characterization of Synthetic Turf Playing Surfaces and Materials:

<table>
<thead>
<tr>
<th>Property</th>
<th>Value (Infield/Warning Track) Double Play Fast Clay</th>
<th>Value (Outfield) Double Play Fast Grass</th>
<th>Units</th>
<th>ASTM</th>
</tr>
</thead>
<tbody>
<tr>
<td>Pile Yarn Type</td>
<td>UV-resistant polyethylene</td>
<td></td>
<td>n/a</td>
<td></td>
</tr>
<tr>
<td>Yarn Structure</td>
<td>Slit Film and Thatch Blend</td>
<td>Monofilament/Slit Film Blend</td>
<td>n/a</td>
<td></td>
</tr>
<tr>
<td>Yarn Denier</td>
<td>Slit Film: 10,000 Thatch: 5,000</td>
<td>Mono: 14,500 Slit Film: 5,000</td>
<td>Denier</td>
<td>D1577</td>
</tr>
<tr>
<td>Yarn Breaking Strength</td>
<td>&gt;20 nominal</td>
<td></td>
<td>lbs</td>
<td>D2256</td>
</tr>
<tr>
<td>Yarn Maximum Elongation</td>
<td>&gt;50 nominal</td>
<td></td>
<td>%</td>
<td>D2256</td>
</tr>
<tr>
<td>Pile Height</td>
<td>1.60”</td>
<td>2.00”</td>
<td>inches</td>
<td>D5823</td>
</tr>
<tr>
<td>Pile Weight</td>
<td>50</td>
<td>39</td>
<td>Oz/yd2</td>
<td>D5848</td>
</tr>
<tr>
<td>Primary Backing Weight</td>
<td>8</td>
<td>7</td>
<td>Oz/yd2</td>
<td>D5848</td>
</tr>
<tr>
<td>Secondary Backing Weight</td>
<td>20</td>
<td>20</td>
<td>Oz/yd2</td>
<td>D5848</td>
</tr>
<tr>
<td>Total Weight</td>
<td>78</td>
<td>60</td>
<td>Oz/yd2</td>
<td>D5848</td>
</tr>
<tr>
<td>Stitch Gauge</td>
<td>3/8”</td>
<td>3/4”</td>
<td></td>
<td>D5793</td>
</tr>
<tr>
<td>Tuft Bind</td>
<td>≥8</td>
<td></td>
<td>lbs/force</td>
<td>D1335</td>
</tr>
<tr>
<td>Grab Tear Length</td>
<td>≥200</td>
<td></td>
<td>lbs/force</td>
<td>D5034</td>
</tr>
<tr>
<td>Grab Tear Width</td>
<td>≥200</td>
<td></td>
<td>lbs/force</td>
<td>D5034</td>
</tr>
<tr>
<td>Pill Burn Test</td>
<td>Pass</td>
<td></td>
<td></td>
<td>D2859</td>
</tr>
</tbody>
</table>
C. Carpet Rolls shall be 15’ wide rolls.
   1. Rolls shall be long enough to go from field sideline to sideline.
   2. The perimeter white line shall be tufted into the individual sideline rolls, where applicable.

D. Backing:
   1. Primary backing shall be a double-layered polypropylene fabric treated with UV inhibitors.
   2. Secondary backing shall consist of an application of a heat-activated urethane to permanently lock the fiber tufts in place.

E. Fibers shall be low friction, and UV-resistant fiber measuring not less than 1.5 inches high for the warning track and infield areas and not less than 2.0 inches for the outfield and foul territory areas.

F. Infill materials shall be installed to a depth as approved by the respective manufacturer.
   1. Infill shall consist of a resilient layered granular system, comprising of a selected and graded dust-free silica sand and ambient rubber crumb installed at the following unit weights, to optimize baseball specific performance characteristics:
      a. Infield and Warning Track areas: 3.50 lbs./square foot sand, 1.0 lbs./square foot rubber
      b. Grass areas: 5.4 lbs./square foot sand, 1.5 lbs./square foot rubber

G. Non-tufted or inlaid lines and markings shall be painted with paint approved by the synthetic turf manufacturer.

H. Thread for sewing seams of turf shall be compatible by the synthetic turf manufacturer.
I. Glue and seaming fabric for inlaying lines and markings shall be compatible by the synthetic turf manufacturer.

2.02 QUALITY CONTROL IN MANUFACTURING

A. The manufacturer shall own and operate its own manufacturing plant in North America. Both tufting of the field fibers into the backing materials and coating of the turf system must be done in-house by the turf manufacturer. Outsourcing of either is unacceptable.

B. The manufacturer shall have full-time certified in-house inspectors at their manufacturing plant that are experts with industry standards.

C. The manufacturer’s full-time in-house certified inspectors shall perform pre-tufting fiber testing on tensile strength, elongation, tenacity, denier, shrinkage, and twist i.e., turns per inch, upon receipt of fiber spools from fiber manufacturer.

D. Primary backing shall be inspected by the manufacturer’s full-time certified in-house inspectors before tufting begins.

E. The manufacturer’s full-time in-house certified inspectors shall verify “pick count”, yarn density in relation to the backing, to ensure the accurate amount of face yarn per square inch.

F. The manufacturer’s full-time, in-house, certified inspectors shall perform turf inspections at all levels of production including during the tufting process and at the final stages before the turf is loaded onto the truck for delivery.

G. The manufacturer shall have its own, in-house laboratory where samples of turf are retained and analyzed, based on standard industry tests, performed by full-time, in-house, certified inspectors.

PART 3 - EXECUTION

3.01 EXAMINATION

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

B. Installer shall examine the surface to receive the synthetic turf and accept the sub-base planarity in writing prior to the beginning of installation.
1. Acceptance is dependent upon the Contractors test results indicating compaction and planarity are in compliance with manufacturer’s specifications.
2. The surface shall be accepted by Installer as “clean” as installation commences and shall be maintained in that condition throughout the process.

C. The surface tolerance shall not exceed 0-1/4 inch over 10 feet and 0-1/2" from design grade.

D. Correct conditions detrimental to timely and proper completion of Work.
E. Do not proceed until unsatisfactory conditions are corrected.
F. Beginning of installation means acceptance of existing conditions

3.02 PREPARATION

A. Prior to the beginning of installation, inspect the sub-base for tolerance to grade.

B. Sub-base acceptance shall be subject to receipt of test results (by others) for compaction and planarity that sub-base is in compliance with manufacturer’s specifications and recommendations.

C. Dimensions of the field and locations for markings shall be measured by a registered surveyor to verify conformity to the specifications and applicable standards. A record of the finished field as-built measurements shall be made.

D. When requested by Architect/Engineer, installed sub-base shall be tested for porosity prior to the installation of the synthetic turf. A sub base that drains poorly is an unacceptable substrate.

3.03 INSTALLATION – GENERAL

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

B. Only trained technicians, skilled in the installation of athletic caliber synthetic turf systems working under the direct supervision of the approved installer supervisors, shall undertake any cutting, sewing, gluing, shearing, topdressing, or brushing operations.
C. The designated Supervisory personnel on the project must be certified, in writing by the turf manufacturer, as competent in the installation of this material, including sewing seams and proper installation of the Infill mixture.

D. Designs, markings and layouts shall first be approved by the Architect or Owner in the form of final shop drawings. All markings will be in full compliance with final shop drawings.

3.04 INSTALLATION

A. Install at location(s) indicated, to comply with final shop drawings, manufacturers’/installer’s instructions.

B. The Contractor shall strictly adhere to specified procedures. Any variance from these requirements shall be provided in writing, by the manufacturer’s on-site representative, and submitted to the Architect and/or Owner, 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.

C. Full width rolls shall be laid out across the field.
   1. Turf shall be of sufficient length to permit full cross-field installation from sideline to sideline.
   2. No cross seams will be allowed in the main playing area between the sidelines.
   3. Each roll shall be attached to the next roll utilizing standard state-of-the-art sewing procedures.
   4. When all of the rolls of the playing surface have been installed, the sideline areas shall be installed at right angles to the playing surface.

D. Artificial turf panel seams shall be sewn or glued per manufacturer’s turf system specifications along the selvedge edging flap of the turf roll.
   1. Seams shall be flat, tight, and permanent with no separation or fraying.
   2. In the case of all lines and logos, turf carpet must be sheared to the backing (do not cut the backing) and adhered using hot melt adhesives.

E. Infill Materials:
   1. Infill materials shall be applied in lifts as necessary to allow for even distribution of infill throughout the pile height. The turf shall be brushed as the mixture is applied. The infill material shall be installed to a depth determined by the manufacturer.
   2. Layered infill shall be installed in a systematic order as per manufacturer’s standard installation procedures.
3. Infill materials shall be installed to fill the voids between the fibers and allow the fibers to remain vertical and non-directional. Install sand and rubber infill in such a manner to minimize fiber entrapment wherever possible. Install infill in uniform layers to ensure a consistent, predictable playing surface. A final application of specifically sized non-marking rubber completes the system. The Infill shall be installed to the depth as specified by manufacturer’s baseball specific playing system.

F. Non-tufted or inlaid lines and markings shall be painted in accordance with turf and paint manufacturers’ recommendations. Number of applications will be dependent upon installation and field conditions.

G. Synthetic turf shall be attached to the perimeter edge detail in accordance with the manufacturer’s standard procedures.

H. Upon completion of installation, the finished field shall be inspected by the installation crew and an installation supervisor.

3.05 FIELD MARKINGS

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

B. Field markings will be inlaid or painted in accordance with the Drawings.

3.06 ADJUSTMENT AND CLEANING

A. Do not permit traffic over unprotected surface.

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

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

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

E. Surfaces, recesses, enclosures, and related spaces shall be cleaned as necessary to leave the work area in a clean, immaculate condition ready for immediate occupancy and use by the Owner.

3.07 PROTECTION
A. Protect installation throughout construction process until date of final completion.

END OF SECTION 329212
PART 1 - GENERAL

1.01 RELATED DOCUMENTS

A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 1 Specification Sections, apply to this Section.

1.02 SUMMARY

A. This Section includes the following:
   1. Furnishing all labor, materials, tools and equipment necessary to install, in place, all synthetic turf and infill materials as indicated on the plans and as specified herein. The installation of all new materials shall be performed in strict accordance with the manufacturer’s written installation instructions, and in accordance with all approved shop drawings.

B. Related Sections
   1. Section 312201 – Field Grading
   2. Section 321800 – Infield Surfacing
   3. Section 329205 – Synthetic Turf – Project Requirements And Conditions
   4. Section 329210 – Synthetic Turf – Drainage And Base

PART 2 - PRODUCTS

2.01 MATERIALS AND PRODUCTS

A. Synthetic turf system materials shall consist of the following:
   1. Carpet made of a combination of monofilament polyethylene fiber, slit-film polyethylene fibers and manufacturer’s standard thatch layer per manufacturer’s baseball specific installation specifications into a free draining backing with minimum pile heights as noted within the Drawings and specifications herein.
   2. Infill component of the synthetic turf system shall consist of the following:
a. Controlled mixture of graded sand and crumb rubber installed per manufacturer’s baseball specific installation specifications.

3. Glue, thread, paint, seaming fabric and other materials used to install and mark the playing surface.

B. The installed artificial playing surface shall have the following physical characteristics (+/-5%) as tested according to ASTM F1551 Standard Test Methods for Comprehensive Characterization of Synthetic Turf Playing Surfaces and Materials:

<table>
<thead>
<tr>
<th>Property</th>
<th>Value (Infield/Warning Track) B1K Six4Three</th>
<th>Value (Grass Areas) B1K TagUp 1.75</th>
<th>Units</th>
<th>ASTM</th>
</tr>
</thead>
<tbody>
<tr>
<td>Pile Yarn Type</td>
<td>UV-resistant polyethylene</td>
<td>n/a</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Yarn Structure</td>
<td>Slit Film w/Thatch</td>
<td>Monofilament/Slit Film Blend</td>
<td>n/a</td>
<td></td>
</tr>
<tr>
<td>Yarn Denier</td>
<td>Slit Film: 8,000 Thatch: 4,400</td>
<td>Mono: 10,800 Slit Film: 5,000</td>
<td>Denier</td>
<td>D1577</td>
</tr>
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<td>Yarn Breaking Strength</td>
<td>Slit Film &gt; 20</td>
<td>Mono &gt; 20 Slit Film &gt; 12</td>
<td>lbs</td>
<td>D2256</td>
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<td>Yarn Maximum Elongation</td>
<td>&gt;30 nominal</td>
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<td>1.625”</td>
<td>1.75”</td>
<td>inches</td>
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<tr>
<td>Pile Weight</td>
<td>55</td>
<td>40</td>
<td>Oz/yd2</td>
<td>D5848</td>
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<td>8</td>
<td>Oz/yd2</td>
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<tr>
<td>Secondary Backing Weight</td>
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<td>Stitch Gauge</td>
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<td>Tuft Bind</td>
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<td>D1335</td>
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<tr>
<td>Grab Tear Length</td>
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<td>lbs/force</td>
<td></td>
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<tr>
<td>Grab Tear Width</td>
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<td>lbs/force</td>
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<tr>
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<td>Degrees F</td>
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C. Carpet Rolls shall be 15’ wide rolls.
   1. Rolls shall be long enough to go from field sideline to sideline.
   2. The perimeter white line shall be tufted into the individual sideline rolls, where applicable.

D. Backing:
   1. Primary backing shall be a double-layered polypropylene fabric treated with UV inhibitors.
   2. Secondary backing shall consist of an application of a heat-activated urethane to permanently lock the fiber tufts in place.

E. Fibers shall be low friction, and UV-resistant fiber measuring not less than 1.5 inches high for the warning track and infield areas and not less than 2.0 inches for the outfield and foul territory areas.

F. Infill materials shall be installed to a depth as approved by the respective manufacturer.
   1. Infill shall consist of a resilient layered granular system, comprising of a selected and graded dust-free silica sand and ambient rubber crumb installed at the following percentages of total infill by weight, to optimize baseball specific performance characteristics:
      a. Infield areas: 50% sand, 50% rubber
      b. Grass areas: 50% sand, 50% rubber
      c. Warning Track: 75% sand, 25% rubber

G. Non-tufted or inlaid lines and markings shall be painted with paint approved by the synthetic turf manufacturer.

H. Thread for sewing seams of turf shall be compatible by the synthetic turf manufacturer.
I. Glue and seaming fabric for inlaying lines and markings shall be compatible by the synthetic turf manufacturer.

2.02 QUALITY CONTROL IN MANUFACTURING

A. The manufacturer shall own and operate its own manufacturing plant in North America. Both tufting of the field fibers into the backing materials and coating of the turf system must be done in-house by the turf manufacturer. Outsourcing of either is unacceptable.

B. The manufacturer shall have full-time certified in-house inspectors at their manufacturing plant that are experts with industry standards.

C. The manufacturer’s full-time in-house certified inspectors shall perform pre-tufting fiber testing on tensile strength, elongation, tenacity, denier, shrinkage, and twist i.e., turns per inch, upon receipt of fiber spools from fiber manufacturer.

D. Primary backing shall be inspected by the manufacturer’s full-time certified in-house inspectors before tufting begins.

E. The manufacturer’s full-time in-house certified inspectors shall verify “pick count”, yarn density in relation to the backing, to ensure the accurate amount of face yarn per square inch.

F. The manufacturer’s full-time, in-house, certified inspectors shall perform turf inspections at all levels of production including during the tufting process and at the final stages before the turf is loaded onto the truck for delivery.

G. The manufacturer shall have its own, in-house laboratory where samples of turf are retained and analyzed, based on standard industry tests, performed by full-time, in-house, certified inspectors.

EXECUTION

2.03 EXAMINATION

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

B. Installer shall examine the surface to receive the synthetic turf and accept the sub-base planarity in writing prior to the beginning of installation.

   1. Acceptance is dependent upon the Contractors test results indicating compaction and planarity are in compliance with manufacturer’s specifications.
2. The surface shall be accepted by Installer as “clean” as installation commences and shall be maintained in that condition throughout the process.

C. The surface tolerance shall not exceed 0-1/4 inch over 10 feet and 0-½" from design grade.

D. Correct conditions detrimental to timely and proper completion of Work.

E. Do not proceed until unsatisfactory conditions are corrected.

F. Beginning of installation means acceptance of existing conditions

2.04 PREPARATION

A. Prior to the beginning of installation, inspect the sub-base for tolerance to grade.

B. Sub-base acceptance shall be subject to receipt of test results (by others) for compaction and planarity that sub-base is in compliance with manufacturer’s specifications and recommendations.

C. Dimensions of the field and locations for markings shall be measured by a registered surveyor to verify conformity to the specifications and applicable standards. A record of the finished field as-built measurements shall be made.

D. When requested by Architect/Engineer, installed sub-base shall be tested for porosity prior to the installation of the synthetic turf. A sub base that drains poorly is an unacceptable substrate.

2.05 INSTALLATION – GENERAL

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

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

C. The designated Supervisory personnel on the project must be certified, in writing by the turf manufacturer, as competent in the installation of this material, including sewing seams and proper installation of the Infill mixture.
D. Designs, markings and layouts shall first be approved by the Architect or Owner in the form of final shop drawings. All markings will be in full compliance with final shop drawings.

2.06 INSTALLATION

A. Install at location(s) indicated, to comply with final shop drawings, manufacturers’/installer’s instructions.

B. The Contractor shall strictly adhere to specified procedures. Any variance from these requirements shall be provided in writing, by the manufacturer’s on-site representative, and submitted to the Architect and/or Owner, 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.

C. Full width rolls shall be laid out across the field.
   1. Turf shall be of sufficient length to permit full cross-field installation from sideline to sideline.
   2. No cross seams will be allowed in the main playing area between the sidelines.
   3. Each roll shall be attached to the next roll utilizing standard state-of-the-art sewing procedures.
   4. When all of the rolls of the playing surface have been installed, the sideline areas shall be installed at right angles to the playing surface.

D. Artificial turf panel seams shall be sewn or glued per manufacturer’s turf system specifications along the selvedge edging flap of the turf roll.
   1. Seams shall be flat, tight, and permanent with no separation or fraying.
   2. In the case of all lines and logos, turf carpet must be sheared to the backing (do not cut the backing) and adhered using hot melt adhesives.

E. Infill Materials:
   1. Infill materials shall be applied in lifts as necessary to allow for even distribution of infill throughout the pile height. The turf shall be brushed as the mixture is applied. The infill material shall be installed to a depth determined by the manufacturer.
   2. Layered infill shall be installed in a systematic order as per manufacturer’s standard installation procedures.
   3. Infill materials shall be installed to fill the voids between the fibers and allow the fibers to remain vertical and non-directional. Install sand and rubber infill in such a manner to minimize fiber entrapment wherever possible. Install infill in uniform layers to ensure a consistent, predictable playing
surface. A final application of specifically sized non-marking rubber completes the system. The Infill shall be installed to the depth as specified by manufacturer’s baseball specific playing system.

F. Non-tufted or inlaid lines and markings shall be painted in accordance with turf and paint manufacturers’ recommendations. Number of applications will be dependent upon installation and field conditions.

G. Synthetic turf shall be attached to the perimeter edge detail in accordance with the manufacturer’s standard procedures.

H. Upon completion of installation, the finished field shall be inspected by the installation crew and an installation supervisor.

2.07 FIELD MARKINGS

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

B. Field markings will be inlaid or painted in accordance with the Drawings.

2.08 ADJUSTMENT AND CLEANING

A. Do not permit traffic over unprotected surface.

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

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

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

E. Surfaces, recesses, enclosures, and related spaces shall be cleaned as necessary to leave the work area in a clean, immaculate condition ready for immediate occupancy and use by the Owner.

2.09 PROTECTION

A. Protect installation throughout construction process until date of final completion.

END OF SECTION 329213
PART 1 – GENERAL

1.01 SECTION INCLUDES

A. Production and installation of a natural grass sod turf system.

1.02 SUBMITTALS

A. Submit the name, location and contact information for the grower who will produce the natural grass sod, in conformance with General Requirements.

B. Submit the natural grass sod seed blend broken down by seed variety and percent, in conformance with General Requirements.

C. Submit the soil mix design and particle size analysis for the sand/silt/clay soil growing media, in conformance with General Requirements.

D. Submit a copy of the natural grass sod grower/supplier warranty and ensure that forms have been completed in the University’s name and registered with approved natural grass sod grower/supplier.

1.03 QUALITY ASSURANCE

A. The turf system consists of a high-quality, fine leaf variety bluegrass natural grass sod blend grown on sandy loam-type soil for irrigated athletic fields in full sun areas that is adaptable to different environmental conditions as well as disease resistant.

B. Prior to installation, the contractor shall be responsible for all recommended pre-plant fertility applications, installation of the turf and one sand top dressing following installation, if requested by the University.

1.04 WARRANTY

A. The warranty submitted must have the following characteristics:

1. Must provide full-field coverage for one (1) full year from date of Substantial Completion.

2. Must warrant natural grass sod materials and workmanship.
3. Must warrant that the natural grass sod materials installed meet or exceed the product specifications within sod growing tolerances.

4. Must have a provision to either repair or replace such portion of the installed natural grass sod materials that are no longer serviceable to maintain a serviceable and playable surface.

5. Must be a grower/supplier’s warranty from a single source covering the natural grass sod material and workmanship.

PART 2 – PRODUCTS

2.01 MATERIALS

A. The natural grass sod Bluegrass seed blend shall be as follows:

   40%  P105 Kentucky Bluegrass
   30%  Midnight Star Kentucky Bluegrass
   30%  Brilliant Kentucky Bluegrass

B. The natural grass sod sand/silt/clay soil growing media shall be within the following limits:

   90% - 92%  Sand
   6% - 7%    Silt
   2% - 3%    Clay
   0% - 0.2%  Gravel

C. The natural grass sod shall be a “thick cut” sod with minimum 1” thick soil suitable for installation in the summer months.

D. Approved sod grower/supplier(s) is (are) as follows:

   Hillcrest Grass Sod Farm
   32609 Pennsylvania Road
   Romulus, MI 48174
   734-941-9595

   -OR-
   DeBuck’s Sod Farm
   12163 Lippincott Blvd
   Davison, MI 48423
   810-653-2201

   -OR-

   Owner/Engineer Approved Equal
PART 3 – EXECUTION

3.01 INSTALLATION

A. Prior to installation of the natural grass sod, pre-plant fertility applications are the responsibility of the sod grower/supplier. Applications will likely include, but may not be limited to organic or composted fertilizers, starter fertilizers, dolomitic limestone and granulated micronutrients.

B. Natural grass sod shall be harvested using big roll equipment.

C. Harvested sod shall be laid within 24hrs of stripping from the farm. Sod shall be laid with tightly fitting joints and seams, with butted joints staggered no less than 3’ apart. Laying equipment must have high flotation tires or tracks and not damage the prepared surface. If, in the opinion of the Architect/Engineer, the laying equipment or operation is damaging the surface of the rootzone and resulting in deviations from designated grade requirements, or severely rutting adjacent sod strips, he may require the contractor to work from boards.

D. Patches must fit tightly on all sides and be a minimum of 18” in length and the full width of the roll.

E. After laying, roll the sod with a light drum roller (less than 10 tons). Inspect the sod and hand-fill any seams that are in excess of 1/4”. Areas that deviate more than 1/4” outside of grade specifications must be lifted, filled and compacted below the sod piece.

F. Irrigate the sod as soon as possible after installation and on a consistent basis as needed. The contractor accepts full responsibility for managing the frequency and rate of the irrigation cycles.

G. If the School District concludes that a sand topdressing and deep-core aeration is required following installation of the sod, the contractor shall undertake the operation according to the School District’s guidelines.

END OF SECTION 329225
SECTION 33 40 00
STORM DRAINAGE UTILITIES

PART 1 - GENERAL

1.01 RELATED DOCUMENTS

A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 1 Specification Sections, apply to this Section.

1.02 SUMMARY

A. Section includes storm sewer removal and installation from building and site to existing storm system.

B. Section 31 23 33 – Trenching and Backfilling:
   1. Bedding and fill materials.
   2. Protection for existing items.
   3. Excavation, fill placement, compaction, backfilling and grading.
   4. Measures to protect the Work of this Section.

1.03 REFERENCES

A. ASTM International:

B. Standard Practice for Installing Vitrified Clay Pipe Lines (ASTM C-12-00).

C. Standard Specification for Concrete Sewer, Storm Drain, and Culvert Pipe


E. Standard Specification for Reinforced Concrete Culvert, Storm Drain, and Sewer Pipe (ASTM C-76-00).


M. Ohio Department of Transportation Construction and Material Specifications (ODOT CMS), 2010 edition.

1.04 SUBMITTALS

A. Submit the following in accordance with the GENERAL REQUIREMENTS:

1. Product Data for pipes and fittings.

1.05 PROJECT CONDITIONS

A. Environmental Requirements (Pipe Laying in Cold Weather):

1. Do not lay pipe on frozen ground or frozen bedding material.

B. Heat pipe as recommended by the Pipe Manufacturer.

PART 2 - PRODUCTS

2.01 MATERIALS

A. Polyvinyl Chloride (PVC) Pipe and Fittings:

1. 4- through 15-inch diameter: Solid wall plastic pipe and fittings per ASTM F-789 or ASTM D-3034, SDR 35.


C. High Density Polyethylene (HDPE) Pipe and Fittings:

1. 12 inch through 36 inch diameter: AASHTO M294 Type S, Type III, Class C, Category 5, Grade P34:
a. Perforated, corrugated pipe under Synthetic and Natural Turf Playing Systems and swales.

b. Solid corrugated pipe with smooth interior under pavement and lawn areas.

D. PLASTIC STORMWATER INLETS

1. General

a. PVC surface drainage inlets shall be of the inline drain type as indicated on the drawings. The ductile iron grates for each of these fittings are to be considered an integral part of the surface drainage inlet and shall be furnished by the same manufacturer. The surface drainage inlets shall be as manufactured by Nyloplast a division of Advanced Drainage System, Inc., or an approved equal.

2. Materials

a. The inline drain required for this project shall be manufactured from PVC pipe stock, utilizing a thermo-molding process to reform the pipe stock to the furnished configuration. The drainage pipe connection stubs shall be manufactured from PVC pipe stock and formed to provide a watertight connection with the specified pipe system. This joint tightness shall conform to ASTM D3212 for joints for drain and sewer plastic pipe using flexible elastomeric seals. The flexible elastomeric seals shall conform to ASTM F477. The pipe bell spigot shall be joined to the inline body by use of swage mechanical joint. The raw material used to manufacture the pipe stock that is used to manufacture the inline drain body and pipe stubs of the surface drainage inlets shall conform to ASTM D1784 cell class 12454.

b. The grates furnished for all surface drainage inlets shall be ductile iron grates for sizes 8”, 10”, 12”, 15”, or 18” (as called for on the plans) shall be specifically for each fitting so as to provide a round bottom flange that closely matches the diameter of the surface inlet.

PART 3 - EXECUTION

3.01 INSTALLATION

A. Pipe Preparation and Handling:

1. Inspect pipe and fittings prior to lowering into trench to ensure no cracked, broken, or otherwise defective materials are being used. Clean
ends of pipe thoroughly. Remove foreign matter and dirt from inside of pipe and keep clean during and after laying.

B. Use proper implements, tools, and facilities for the safe and proper protection of the work. Lower pipe into the trench in such a manner as to avoid physical damage to the pipe. Remove damaged pipe from the Site. Do not drop or dump pipe into trenches under any circumstances.

C. Excavate bell holes at each joint to permit proper assembly and inspection of entire joint.

D. Laying and Jointing Pipe and Fittings:

1. Start pipe laying proceeding upgrade with spigot ends pointing in direction of flow. After a section of pipe has been lowered into the prepared trench; clean the end of the pipe to be joined, the inside of the joint, and if applicable, the rubber ring, immediately before joining the pipe. Assemble the joint following manufacturer's recommendations for type of joint used. Provide special tools and appliances required for the jointing assembly.

E. Lay pipes uniformly to line and grade so that finished sewer will present a uniform bore. Variations from line and grade in excess of the specified tolerances will be considered sufficient cause for rejection of the Work.

F. When pipes are to be jointed with rubber gaskets, warm the gasket or joint material sufficiently to facilitate making a proper joint.

G. Prevent excavated or other foreign material from getting into the pipe during the laying operation. Close and block the open end of the last laid section of pipe to prevent entry of foreign material or creep of the gasketed joints:

1. When laying operations are not in progress.

2. At the close of the day's work.

3. Whenever the workers are absent.

H. Plug or close off pipes which are stubbed off for manhole construction or for connection by others with temporary plugs.

I. Take necessary precautions to prevent the "uplift" or floating of the line prior to the completion of the backfilling operation.

J. Make connections of non-reinforced pipe to manholes or concrete structures, so that a standard pipe joint is located not more than one foot from the outside edge of the structure.
K. When field cutting or machining the pipe is necessary, use only tools and methods recommended by the Pipe Manufacturer and approved by the Engineer.

L. Check pipe for alignment and grade after joint has been made. Ensure pipe bedding forms a continuous and uniform bearing and support for the pipe barrel between joints. Apply sufficient pressure in making the joint to assure the joint is "home" as defined in Pipe Manufacturer's standard installation instructions. Place sufficient pipe cover material to secure pipe from movement before next joint is installed to assure proper pipe alignment and joint makeup.

M. Line and Grade: Do not deviate from line and grade, as established by the drawings, more than 1/2 inch for line and 1/4 inch for grade, provided that such variation does not result in a level or reverse sloping invert. Measure for grade at the pipe invert, not at the top of the pipe, because of the permissible variation in pipe wall thickness. Furnish and set the line and grade boards at maximum intervals of 25 feet. If grade boards prove impractical because of trench or other conditions, other methods of controlling line and grade may be submitted to the Engineer for approval.

N. Dewatering: Employ such means as well pointing, ditching, pumping or bailing to prevent water from entering the trench during the laying operation and allow for proper construction of the backfill in the pipe zone. Do not lay pipe in water.

O. Installation of Plastic Stormwater Inlets

1. The specified PVC drainage inlet shall be installed using conventional flexible pipe backfill materials and procedures. The backfill material shall be crushed stone or granular material meeting the requirements of class 2 material as defined in ASTM D2321. Bedding and backfill for surface drainage inlets shall be placed and compacted uniformly in accordance with ASTM D2321. The drain basin body will be cut at the time of the final grade. No brick, stone or concrete block will be required to set the grate to the final grade height.

3.02 FIELD QUALITY CONTROL

A. Notify the Engineer or local utility owner at least 24 hours prior to tapping existing main to enable inspector to witness all taps. If required, submit portion of pipe removed by boring machine to inspector.

B. Perform cleaning and testing of sewers following the current and applicable standards of the Authority having Jurisdiction.

3.03 CLEANING
A. Prior to final acceptance and final manhole to manhole inspection of the sewer system by the Owner/Engineer, flush and clean all parts of the system. Remove accumulated construction debris, rocks, gravel, sand, silt, and other foreign material from the sewer system at or near the closest downstream manhole. If necessary, use mechanical rodding or bucketing equipment.

B. Upon the Owner/Engineer's final manhole to manhole inspection of the sewer system, if foreign matter is still present in the system, re-flush and clean the sections and portions of the lines as required.

C. Measure the infiltration using a suitable weir or other acceptable device when the water table is two feet or more above of the top of the pipe line section to be tested.

D. When infiltration cannot be properly tested, test exfiltration by filling the line to be tested with water so that a head of at least two feet is provided above the water table and the top of the pipe at the upper end of the pipe line. Allow to stand until the pipe has reached its maximum absorption, but not less than four hours. After absorption, re-establish the head. Measure the amount of water required to maintain this water level during a two hour test period.

E. When leakage exceeds 250 gallons per inch of diameter per mile of pipeline per day as measured by either the infiltration or exfiltration test, take corrective measures and retest.

END OF SECTION 334400