SECTION 02 05 00

REPORTS ON EXPLORATION

PART 1 - GENERAL

1.01 RELATED DOCUMENTS

A. Drawings and general provisions of the Contract including other Division 1 and Technical Specification Sections apply to this Section.

1.02 SUMMARY

A. Section includes reference data collected by the Owner prior to the bidding period as follows:

1. No geotechnical evaluation of the site is available.

1.03 REPORTS

A. Any Prime Contract, both during bidding and after execution of the Contract, are permitted to investigate the nature, character, quality and quantity of above ground and below ground conditions apt to be encountered. Any reliance on data made available by the Owner is at the Contractor's risk.

B. No claim whatsoever shall be made by any Contractor against the Owner or the Project Designer for, or on account of such available data, or neglected of such data to be made available by the Owner or the Project Design team.

PART 2 PRODUCTS

NOT USED

PART 3 EXECUTION

3.01 APPENDIX

A. No Specific geotechnical evaluation information developed for this project.

END OF SECTION

SECTION 02 41 13

SELECTIVE SITE DEMOLITION

PART 1 - GENERAL

1.01 SECTION INCLUDES

A. Demolition of existing site improvements
B. Disposal of demolition debris
C. Backfilling and grading of demolished areas
D. Owner salvage of materials

1.02 RELATED SECTIONS

A. Section 31 00 00 – Earthwork
B. Section 32 92 00 – Turf and Grasses

1.03 SUBMITTALS

A. Comply with the requirements of Section 01 33 00 – Submittal Procedures and as modified below.

B. Quality Control Submittals

1. Permits: Submit one copy of each permit required for the demolition work required to the Owner's Representative.
2. Demolition Plan: For information only, submit one copy of the demolition plan to the Owner's Representative and the Project Designer as required under the "Quality Assurance" article below.

1.04 QUALITY ASSURANCE

A. Permits: Prior to starting demolition work outlined as part of this section, obtain all permits required by Federal, State and/or local jurisdictions for all phases and operations of the work.

B. Demolition Plan: Prior to starting demolition work outlined as part of this section, the contractor shall prepare a detailed demolition plan. The demolition plan shall include, but is not limited to, the detailed outline of intended demolition and disposal procedures. The demolition plan will not relieve the Contractor of complete responsibility for the successful performance of the work in accordance with all Federal, State and local codes and restrictions.

1.05 PROJECT CONDITIONS

A. Recycling: The Contractor shall recycle demolition debris to the greatest extent possible.

B. Burning: The Contractor is prohibited from burning demolition materials on the project site.

C. Explosives: The Contractor is prohibited from using explosive materials on the project site.

D. Access: Demolition related equipment shall access the site at northeast corner of the field unless otherwise approved in writing by the Owner's Representative or the Project Designer.

E. Utility Location: Verify the location and status of all utilities within the contract limit line prior to beginning demolition work.

F. Utility Protection: Protect existing utilities scheduled to remain while work required as part of this section is being performed. Do not interrupt utility services to adjacent buildings or other site improvements.

G. Utility Disconnection: Disconnect utilities as required. Coordinate and pay for all work with applicable utility companies.

H. Site Maintenance: Keep streets, sidewalks and adjacent site areas clean and free from debris at all times.

I. Storm Drainage: Maintain street and site drains open for free drainage. Install temporary measures as required to prevent silt and debris from entering storm runoff leaving the site.

J. Objectionable Noises: Limit the use of air hammers, and other excessively noisy equipment as much as is practical. Conform to local governing requirements.

K. Area Safety: Employ watchpersons to patrol the site 24 hours per day, 7 days per week from the time demolition has started until the site can be secured in a safe manner.

1.06 SEQUENCING AND SCHEDULING

A. Proceed with and complete demolition operations as rapidly as portions of the site become available, working within seasonal limitations for the work required.

PART 2 PRODUCTS

2.01 MATERIALS

A. On-Site Backfill Material: Acceptable on-site fill material approved by the Owner's Testing Agency or the Project Designer for use as backfill in locations where backfill material is not otherwise specified, free of stones larger than 6", roots, organic matter, construction debris, trash or other deleterious matter.

B. Selects Type 1 Granular Material: Where indicated supply stockpiled, sound, durable, sand, gravel, stone, or blends of these materials, free from organic and other deleterious materials. Comply with New York State Department of Transportation gradation and material requirements specified below:

Sieve		Percent Passing
Sieve Size	Size opening (mm)	
3 inch	76.2	100
2 inch	50.8	90-100
1/4 inch	6.35	30-65
No. 40	0.425	5-40
No. 200	0.075	0-10

PART 3 EXECUTION

3.01 EXAMINATION

A. Demolition Contractor Verification of Conditions: Examine conditions under which site demolition work is to be accomplished with the materials and components specified in this section. Affected Contractors, the Owner's Representative and the Project Designer shall be notified in writing of any conditions detrimental to the proper and timely installation of the work.

1. When the Demolition Contractor confirms conditions as being acceptable to ensure proper and timely completion of the work and to ensure requirements of applicable warranties or guarantees can be satisfied, submit written confirmation to the Project Designer. Failure to submit written confirmation will be assumed to indicate conditions are acceptable to the installer.

3.02 PREPARATION

A. Temporary Fencing: Install temporary six foot high chain link fencing, including access gates around the demolition area prior to starting work specified in this section. Remove temporary fence in its entirety, including all anchorage materials upon completion of backfill operations.

B. Site Inspection: Search site scheduled for removal prior to beginning demolition operations. .

C. Material Removal: Remove loose equipment, materials, and supplies from site scheduled for demolition.

D. Salvaged Materials: No removed items are scheduled to be salvaged for the Owner at this time.

3.03 DEMOLITION

A. Perform demolition in a systematic manner, beginning at the south end of the field.

B. Remove walks, roads, pavements, curbs, slabs on grade, fences and other site improvements with the contract limit line as shown, unless specifically indicated or directed otherwise.

3.04 DISPOSAL

A. Remove demolition debris and any excess fill from the project site as soon as practical.

B. Do not store, sell or burn materials on the project property.

3.05 BACKFILLING AND GRADING

A. Place fill in voids within the contract limit line. Broken concrete and masonry shall not be used as fill on the site.

B. Rough grade backfill to the contour indicated on the drawings. If no contour information is provided, grade the area to provide positive drainage.

C. Install a minimum of 6" of topsoil over backfilled areas. Finish grade the surface to be free of depressions that will trap water and seed the entire area.

END OF SECTION

SECTION 11 68 33

ATHLETIC FIELD EQUIPMENT

PART 1 - GENERAL

1.01 SECTION INCLUDES

A. Soccer goals and accessories
B. Ball safety netting
C. Lacrosse goals and accessories

1.02 RELATED SECTIONS

A. Section 31 00 00 – Earthwork
B. Section 32 18 13 – Synthetic Grass Surfaces (Slit Film)
C. Section 32 92 30 – Athletic Field Construction

1.03 SUBMITTALS

A. Comply with the requirements of Section 01 33 00 – Submittal Procedures and as modified below.

B. Product Data: Submit manufacturer's name, specifications and installation instructions for each item specified.

C. Quality Control Submittals

1. Qualifications Certification: Submit written certification or similar documentation signed by the applicable subcontractor, prime contractor and/or manufacturer (where applicable) indicating compliance with the requirements of this specification.
2. Experience Listing: Submit a list of completed projects using the products proposed for this project, including owner's contact information and telephone number for each project, demonstrating compliance with the applicable portions of this specification.

D. Closeout Procedures: Comply with the requirements of Section 01 77 00.

1.04 QUALITY ASSURANCE

A. Manufacturer Qualifications: Provide products by a company specializing in the manufacture of athletic equipment with at least five years experience.

1.05 PROJECT CONDITIONS

A. Field Measurements: Establish and maintain required lines and elevations for grade control.

1.06 DELIVERY, STORAGE AND HANDLING

A. Packing and Shipping: Deliver all equipment in a manner to protect the material from dirt, water, chemical or mechanical injury.

B. Acceptance at the Project Site: Deliver all athletic equipment to the site to designated representatives of the Prime Contractor responsible for athletic field equipment for storage and handling when required. The Owner or other contractors on the project site shall not store or handle any athletic equipment.

1.07 SEQUENCING AND SCHEDULING

A. Proceed with and complete athletic field equipment installation as rapidly as portions of the site become available, working within seasonal limitations for the work required.

PART 2 PRODUCTS

2.01 MANUFACTURERS

A. For convenience, details and specifications have been based on the following products by the following manufacturers:

1. Sportsfield Specialties, Inc; Delhi, New York (Telephone# 1-888-975-3343):

a. Soccer Goals

(1) "Round Faced Soccer Goal with Mobility Wheel Kit and Safety System" – Model Nos. SG4950, SG4955, SG Mobile and SG 2S.

b. Lacrosse Goals

(1) "Heavy Duty Lacrosse Goal with Flat Iron Base" – Model No. LCG01.

2.02 MATERIALS

A. Soccer Goals and Accessories

1. Round Faced Soccer Goal with Mobility Wheel Kit and Safety System: Steel and aluminum framed soccer goals with nylon nets and related accessories complying with the following:

a. Crossbar: White powder coated, 24' long, round face, 4.375" square X 4.688" 6061 T6 extruded aluminum tube with radius backside corners and 7 gauge steel crossbar attachment brackets.
b. End Frame: White powder coated, round face with radius back corners, 4.375" X 4.688" corner upright posts fabricated of 6061 T6 extruded aluminum tube with 2" X 3" X 0.125" rolled side frame welded to corner upright posts.
c. Bottom Ground Bar: White powder coated, 2" square X 0.250" thick 6061 T6 extruded aluminum tube.
d. Net Clips: Welded aluminum.
e. Net: Orange polypropylene.
f. Portable Wheel Mobility Kit: Wheel insert with welded 13 gauge stainless steel frame, UHMW plastic wheel, all stainless steel hardware and mobility handle.
g. Safety Clamp Kit: 0.25", white powder coated aluminum safety clamp with stainless steel hardware and access kit fabricated of 16 gauge, 0.125" aluminum stainless steel with 0.25" and 0.75" weather resistant plywood cover plug, stainless steel assembly hardware and galvanized steel anchoring hardware.

2. Semi Permanent Round Soccer Goal: Steel and aluminum framed soccer goals with nylon nets and related accessories meeting NFSHSA, NCAA and FIFA standards and complying with the following:

a. Size: 8'H X 24'W X 4'B X 10'D

b. Uprights and Crossbars: White powder coated, 4" O.D. X .125" round aluminum.
c. Net Support Frame: Counterweighted, 2" O.D. galvanized steel backstays and rear crossbar.
d. Ground Sleeve Accessories: Ground sleeve, sleeve bottom cap and sleeve top plug.
e. Net: 8' high X 24' wide X 4' deep at top X 10' deep at bottom, 4 mm, coated #24 knotted, nylon, 4" mesh net with steel net ties to connect to goal framework. Color to be orange.
f. Concrete: 3000 lb. concrete mix for footing installation.

3. Portable Round Soccer Goal: Steel and aluminum framed soccer goals with nylon nets and related accessories meeting NFSHSA, NCAA and FIFA standards and complying with the following:

a. Size: 8'H X 24'W X 4'B X 10'D
b. Uprights and Crossbars: White powder coated, 4" O.D. X .125" round aluminum.
c. Net Support Frame: Counterweighted, 2" O.D. galvanized steel backstays and rear crossbar.
d. Net: 8' high X 24' wide X 4' deep at top X 10' deep at bottom, 4 mm, coated #24 knotted, nylon, 4" mesh net with steel net ties to connect to goal framework. Color to be orange.
e. Ground Anchors: 14" steel auger with steel lanyard to attach to goal framework. Two anchors per goal are required.

4. Soccer Corner Flags: Set of four, weighted soccer corner flags for synthetic turf field use meeting NCAA and FIFA standards and complying with the following:

a. Size: 60" high.
b. Uprights: White, high impact PVC, minimum 1.050" diameter with 0.060" wall thickness .
c. Base: Round, black, 12" diameter stackable base standing 5.094" high and weighing 8.50 pounds per flag unit.
d. Flag Color: Red.

B. Lacrosse Goal and Accessories

1. Heavy duty lacrosse goal with flat iron base and net complying with the following:

a. Frame: Orange powder coated uprights and top bar fabricated from TIG welded 1.50" Schedule 40 steel pipe.
b. Ground Bar: Orange powder coated TIG welded steel bar.
c. Assembly Hardware: Stainless steel.
d. Net: Heavy duty, minimum 5mm, white, braided, knotless polyester similar to netting manufactured by STX.

3.01 EXAMINATION

A. Installer Verification of Conditions: Examine conditions under which athletic field equipment is to be installed with the materials and components specified in this section. Affected Prime Contractors, the Owner's Representative and the Project Designer shall be notified in writing of any conditions detrimental to the proper and timely installation of the work.

1. When the installer confirms conditions as being acceptable to ensure proper and timely installation of the work and to ensure the requirements of applicable warranties or

guarantees can be satisfied, submit written confirmation to the Project Designer. Failure to submit written confirmation and subsequent installation will be assumed to indicate conditions are acceptable to the installer.

3.02 INSTALLATION

A. Install athletic equipment in accordance with the manufacturer's written instructions under the supervision of a manufacturer's representative.

3.03 ADJUSTING AND CLEANING

A. Repairs and Protection of Athletic Field Equipment

1. Repair or replace broken or defective components athletic field equipment components as directed by the Project Designer.
2. Protect athletic field equipment from damage until acceptance of the installation.

END OF SECTION

SECTION 13 34 24

PRESSBOX

PART 1 GENERAL

1.01 SECTION INCLUDES

A. Engineering, materials, freight, installation and supervision for new modular pressbox structure.

1.02 RELATED SECTIONS

A. Section 13 34 17 – Angle Frame Bleachers
B. Division 26 – Electrical
C. Section 31 20 00 – Earth Moving
D. Section 32 13 13 – Concrete Paving
E. Section 32 31 13 – Chain Link Fences and Gates

1.03 SUBMITTALS

A. Comply with the requirements of Section 01 33 00 – Submittal Procedures as modified below.

B. Product Data: Submit manufacturer's name, specifications and installation instructions for the press box system specified including the following standard shop drawings:

1. Press box plan view including relationship to adjacent facilities.
2. Press box sections and elevations.
3. Press box electrical/mechanical plan.

C. Quality Control Submittals

1. Qualifications Certification: Submit written certification or similar documentation signed by the applicable subcontractor, prime contractor and/or manufacturer (where applicable) indicating compliance with the requirements specified below in the "Quality Assurance" section of this specification.
2. Existing Installation Listing: Provide a list, including project name, owner's representative name and telephone number for a minimum of thirty press boxes installed in the United States during the past five years with the same manufacturer, product and company proposed for this project.

D. Closeout Procedures: Comply with the requirements of Section 01 77 00.

1.04 QUALITY ASSURANCE

A. Experience: A company specializing in modular building construction with a minimum of five years of experience in the fabrication of pressbox structures. The installer of the structure shall be the manufacturer or a certified manufacturer subcontractor.

B. Warranty: Upon substantial completion of the project, the pressbox shall be guaranteed for a minimum period of one year against defective materials and workmanship.

C. Engineer Qualifications: The design of the pressbox system shall be reviewed and sealed by a licensed professional engineer in the State of New York prior to the Contractor's submittal of the pressbox package for the Project Designer's review.

D. Regulatory Requirements: Obtain written permission from applicable agencies prior to the start of construction. Submit one copy of the permit as specified in "Submittals-Quality Control Submittals" above.

1.05 DESIGN CRITERIA

A. All materials shall be new unless specifically noted otherwise.

B. Code Compliance: All materials, design and workmanship shall be in accordance with the following:

1. Building code of the State of New York.
2. Current edition of the IBC.
3. NFPA codes and standards.
4. All electrical components shall be U.L listed.

C. Design Loads

1. Live Load

a. 100 psf for floor
b. 100 psf for roof with camera deck

2. Wind: Comply with applicable requirements of the building codes within the State of New York including applicable portions of ASCE 7 for Wind Load Pressure.

3. Seismic: Comply with the applicable requirements of the building code for the State of New York. Calculations and design shall be based on the following criteria:

a. Seismic Use Group 1
b. Seismic Importance factor 1.0
c. Seismic Design Category D
d. Design Spectral Response Acceleration At Short Period, SDS = 0.492

1.06 PROJECT CONDITIONS

A. Field Measurements: Establish and maintain required lines and elevations for grade control.

1.07 SEQUENCING AND SCHEDULING

A. Proceed with and complete press box installation as rapidly as portions of the site become available, working within seasonal limitations for the work required.

PART 2 PRODUCTS

2.01 MANUFACTURER

A. For convenience, details and specifications have been based on modular pressbox systems manufactured by Dant Clayton Corporation, Louisville, Kentucky (1-800-626-2177) or approved equal to establish quality and function.

B. Alternate modular press box manufacturer's will be reviewed and accepted based on the requirements within this section and as shown on the drawings.

C. Refer to the Instructions to Bidders, General Conditions and Division 1 of the Project Manual for additional provisions and requirements relating to equivalent products or substitutions.

2.02 MATERIALS

A. Size: Overall size of the pressbox shall be 10'-1 1/4" deep by 24'-0" with access to a camera roof deck. The interior configuration shall have no interior partitions with an access door out the back side of the press box to a stair to grade.

B. Floor System: Floor construction to comply with the following:

1. Bottom Board: CCX foundation grade, ½" thick treated plywood with industrial grade asphalt based paint and continuous aluminum vents on 8' centers.
2. Insulation: 6", R19 fiberglass batts with vapor barrier.
3. Joists: Longitudinal framing consisting of 2" X 6" #1 SYP installed 16" on center.
4. Decking: ¾" Sturdifloor, underlayment grade, tongue and groove fir plywood (Index 24" O.C.).
5. Covering: 1/8" vinyl composition tile similar to Armstrong Excelon, cottage tan color.
6. Molding: 4" thermoplastic rubber base molding similar to product manufactured by Roppe.

C. Wall System: Wall construction to comply with the following:

1. Studs: 2" X 4", #2 or better SPF in stalled 16" on center.
2. Bottom Plate: 2" X 4", #2 or better SPF.
3. Top Plate: 2" X 4", #2 or better SPF.
4. Headers: As span and design load requires, see plans.
5. Ceiling Height: 8'-0" to 7'-10", front to back.
6. Covering: 5/8", vinyl faced gypsum finished interior wall panels, Class A, F.S.R.
7. Insulation: 3½", R13 fiberglass batts with vapor barrier.
8. Sheathing: ½"CDX plywood with house wrap air infiltration barrier.
9. Siding: MBCI "U-Panel" .026 gauge ribbed steel panels with Kynar 500 finish in Royal Blue.

D. Roof System: Roof construction to comply with the following:

1. Joists: 2" X 8", #1 SYP joists at 16' on center spacing.
2. Overhang: 15½" over the front wall, 6" over the rear wall with 0.019 aluminum fascia with perforated aluminum soffit panels.
3. Ceiling: 5/8" Type X fired rated gypsum board, UL fastening, taped and bedded with spray textured finish, Class A, F.S.R.
4. Insulation: 6", R19 fiberglass batts with vapor barrier.
5. Decking: ¾" tongue and groove oriented strand board (Index 24" O.C.).
6. Covering: 0.060 single ply, fully adhered, EPDM rubber membrane.

E. Window Systems: Window systems complying with the following:

1. Exterior : Horizontal sliders with extruded vinyl frames, AAMA LC-25 structural rating with ¾" clear insulated, Low-E tempered glass and removable insect screens similar to American Window "Earthwise Series".
2. Interior : ¼" tempered safety glass fixed pan with stained jambs and casing.

F. Door System: Door systems complying with the following:

1. Exterior: 36" X 80", 18 gauge, insulated galvanized hollow metal doors with 16 gauge steel wrap around frames (painted white) including 16" insulated/tempered 10" lite,

aluminum threshold, vinyl weather stops, hydraulic closer and illuminated exit signs. The units shall be equipped with commercial lever handled keyed locks, dull chromium plated, US 26D, SP series/Spirit Grade 2. Lever lock set #116 (classroom lockset function) as manufactured by PDQ or similar.

G. Electrical System: Electrical construction to comply with the following:

1. General: All work shall comply with the National Electric Code and all components shall be U.L. listed.
2. Service Entrance Panel: Square D QO112M100 with main disconnect rated at 120/240v single phase, 100 amp capacity. Mount flush in press box with 2" conduit stub out through the floor for service line to be connected by the Electrical Contractor.
3. Receptacles: 125 volt/15 amp duplex spec grade heavy duty, spaced at maximum 8' O.C. at the rear wall and maximum 4' O.C. at the front wall, minimum five per room. Mount at 18" above the floor on the back wall. Install Wiremold 5400 Series two piece multi-channel non-metallic surface raceway along the front wall below the scorers counter.
4. Wiring: Pre-wired utilizing Type MC cable.
5. Lighting: Lithonia M232PC1S four foot, two tube, fluorescent strips with low glare parabolic diffusers, one installed every 8'.
6. Circuits: All branch circuit wiring shall be minimum #12 THHN encased in EMT thin wall conduit.

H. HVAC: Electric baseboard heaters with integral thermostats and sized to match the room size.

I. Scorer's Counter: 18" deep constructed of ¾" luan grade plywood with 1½" X 2" edge surfaced with 0.060 plastic laminate similar to Nevamar Neutra Matrix.

J. Camera Deck System: Camera deck construction to comply with the following:

1. Hatch: 2'-6" X 4'-6" aluminum roof hatch similar to Bilco Model #NB50 with Bil-Guard NB hatch rail system.
2. Ladder: Aluminum, 70 degree ships ladder similar to Alaco Model 370.
3. Roof Surface: 0.060 polyester reinforced skid and spike resistant fully adhered PVC membrane.
4. Railings: Two line, 1 5/8" O.D., black vinyl guardrails fastened with ½" galvanized threaded bolts and nuts through roof fascia on 4'-0" centers along the perimeter edge of the roof. Through bolting or penetrating of the roof deck is prohibited. The railings shall be infilled with 6 gauge black vinyl coated chain link fence. Provide a 4'wide swing gate centered on exterior ladder as shown on drawings.
5. Emergency Ladder: Emergency ladder with walk through rail extension and security panel similar to O'Keefe Model #504.

PART 3 EXECUTION

3.01 EXAMINATION

A. Installer Verification of Conditions: Examine conditions under which the press box is to be constructed with the materials and components specified in this section. Contractor, the Owner's Representative and the Project Designer shall be notified in writing of any conditions detrimental to the proper and timely installation of the work.

1. When the installer confirms conditions as being acceptable to ensure proper and timely installation of the work and to ensure requirements of applicable warranties or guarantees can be satisfied, submit written confirmation to the Project Designer. Failure to submit

written confirmation and subsequent installation will be assumed to indicate conditions are acceptable to the installer.

3.02 INSTALLATION

A. Install modular pressbox in accordance with the manufacturer's instructions and final shop drawings by factory certified installation personnel . Provide accessories indicated and other items required for installation and attachment to adjoining construction. All interior electrical fixtures shall be connected to the electrical junction panel by the pressbox manufacturer. Open conduit shall be stubbed at the bottom of the pressbox floor for electrical service tie in by the Contractor.

3.03 ADJUSTING AND CLEANING

A. Repairs and Protection of Pressbox

1. Clean installed pressbox unit on exposed and semi-exposed surfaces. Touch-up shop applied finishes to restore damaged or soiled areas.
2. Repair or replace broken or defective pressbox components as directed by the Project Designer.
3. Protect the structure from damage until Substantial Completion.

END OF SECTION 13 34 24

SECTION 31 00 00

EARTHWORK

PART 1 GENERAL

1.01 SECTION INCLUDES

A. Clearing and grubbing
B. Removal of topsoil
C. Underground utilities
D. Excavation
E. Dewatering
F. Placing fill and backfill
G. Placing fill to support structures
H. Compaction
I. Rough grading
J. Subgrade surface for walks and pavement
K. Finish grading
L. Subgrade and base preparation for synthetic grass surfacing
M. Maintenance and restoration
N. Disposal of excess and unstable materials
O. Field quality control
P. Protection

1.02 RELATED WORK SPECIFIED ELSEWHERE

A. Section 02 41 13 – Selective Site Demolition
B. Section 31 10 00 – Site Preparation
C. Section 31 23 17 – Site Trenching
D. Section 32 12 16 – Asphalt Paving
E. Section 32 13 13 – Concrete Paving
F. Section 32 18 13 – Synthetic Grass Surfaces
G. Section 33 40 00 – Storm Drainage Utilities

1.03 DEFINITIONS

A. The following terms shall have the meanings ascribed to them in this Article, wherever they appear in this Section.

1. Earth Excavation: The removal of all surface and subsurface material not classified as rock (as defined below).
2. Rock: Limestone, sandstone, shale, granite, and similar material in solid beds or masses in its original or stratified position which can be removed only by blasting operations, drilling, wedging, or use of pneumatic tools, and boulders with a volume greater than 1.5 cubic yards.
3. Materials which can be loosened with a pick or backhoe, frozen materials, soft laminated shale or hardpan, pavements, curbs, and similar materials shall be classified as earth excavation.
4. Unclassified Earth Excavation: The excavation and disposal of all surface and subsurface materials of any description necessary to perform the work of this contract. This shall include:

a. All soil deposits of any description both above and below groundwater levels. These may be naturally deposited or placed by previous construction operations.

b. Ledge rock of all quality. (Limestone, sandstone, shale, granite and similar materials in solid beds or masses in its original or stratified position which can only be removed by drilling, wedging, use of pneumatic tools or heavy ripping equipment.) Blasting operations will not be permitted to loosen any ledge rock necessary to be removed in this contract without prior written permission from the Project Designer and the Owner's Representative.
c. Boulders of any size.
d. Any materials of man-made origin.

5. Subgrade Surface: Surface upon which gravel base or topsoil is placed.
6. Base: Select granular material or base course Type 2 which is placed immediately beneath pavement or concrete slabs.
7. Fill: Placement of specified fill materials, in layers, above ground surface to required elevations.
8. Backfill: Placement of specified backfill material, in layers, in excavations to required subgrade elevations.
9. Foundation Bearing Grade: Grade/elevation at which the bottom-of-footings are constructed.
10. Maximum Density: The dry unit weight in pounds per cubic foot of the soil at "Optimum Moisture Content" when determined by ASTM D 698 (Standard Proctor), or ASTM D 1557 (Modified Proctor).
11. Structures: Buildings, footings, foundations, retaining walls, slabs, tanks, mechanical and electrical appurtenances, or other man-made stationary features constructed above or below the ground surface.
12. Landscaped Areas: Areas not covered by structures, walks, roads, paving, or parking.
13. Unauthorized Excavation: The removal of material below required elevations indicated on the Drawings or beyond lateral dimensions indicated or specified without specific written direction by the Owner's Representative.

1.04 SUBMITTALS

A. Comply with requirements of Section 01 33 00 - Submittal Procedures and as modified as below.

B. Samples: Submit samples as follows. At the owner's discretion, take the samples in the presence of the Owner's Representative, and submit to the Owner's Representative the laboratory test results for gradation, proctors and soundness tests, when required. These tests shall be performed in accordance with ASTM standards, shall be performed and signed by a certified soils laboratory, and shall be submitted as part of the original submittal. At a minimum, the samples taken shall be of the following quantities:

1. Select Type 1 Granular Material: 40 - 50 lbs.
2. Synthetic Turf Dynamic Base: 40 - 50 lbs. of each required gradation.

C. Quality Control Submittals:

1. Base Materials: Name and location of source and the DOT Source Number. If the material is not being taken from an approved DOT Source, the results of the gradation and soundness tests performed by an ASTM certified soils laboratory will be required.
2. Other Aggregates: Name and location of source and soil laboratory test results.
3. Excavation Procedure: Submit a lay out drawing or detailed outline of intended excavation procedure for the Owner's information. This submittal will not relieve the Contractor of responsibility for the successful performance of intended excavation methods.
4. Soil Erosion and Sediment Control: Submit plan complying with the requirements of Section 01 57 13.

D. Closeout Procedures: Comply with the requirements of Section 01 77 00.

DELIVERY, STORAGE, AND HANDLING

A. Protect filter fabric from sunlight during transportation and storage.

PROJECT CONDITIONS

A. Protect existing trees and plants during performance of the Work unless otherwise indicated. Box trees and plants indicated to remain within the grading limit line with temporary fencing or solidly constructed wood barricades as required. Protect root systems from smothering. Do not store excavated material or allow vehicular traffic or parking within the branch drip line. Restrict foot traffic to prevent excessive compaction of soil over root systems.

B. Cold Weather Requirements:

1. Excavation: When freezing temperatures are anticipated, do not excavate to final required elevations for concrete work unless concrete can be placed immediately.
2. Backfilling: If backfill is being placed during freezing temperatures, the backfilling operations shall be monitored by the Owner's Representative and the following procedures shall be followed:
   a. Frozen ground shall be removed in its entirety from beneath and five (5) feet beyond the area of fill placement.
   b. The fill material placed shall consist of Selected Fill and shall be free of all frozen chunks that exceed four (4) inches in size. The material transported to the project site shall only consist of material excavated from below the frost depth.
   c. At the end of the work day, the area of fill placement shall be covered with insulated blankets, or left unprotected. Other means of protection (hay, wood chips etc.) may also be used for protection provided it is approved by the Owner's Representative.
   d. Following work day - Remove the insulated blankets and/or strip the area of all frozen material as specified previously.
   e. Upon establishing the subgrade elevations, protect the grades with insulated blankets or place additional material that will adequately insulate the exposed earth surface from frost. This additional fill or protective material shall be stripped just prior to pouring concrete.

C. Subsurface Information/Site Investigation Reports: Site investigation reports including soil boring logs and similar data included in the project documents are intended to represent only conditions found at locations indicated at time investigations were conducted. Data on indicated subsurface conditions are not intended as representations or warranties of accuracy or of continuity of such conditions. The Owner will not be responsible for interpretation or conclusions drawn by the contractor.

1. The contractor may perform additional test borings and other exploratory operations at no additional cost to the Owner upon approval of the project designer.

D. Land Survey Information: Field verify provided existing boundary and topographic information prior to beginning site work. Immediately report any discrepancies in boundary locations or topographic elevations affecting site construction to the Owner's Representative. Provide profile information on existing site conditions and verification of existing topographic information to the Owner's Representative prior to beginning site construction. Beginning site work construction without this profile information and written notification indicates Contractor's acceptance of existing land survey data indicated on the drawings as accurate. Adjustments to the contract will not be made for discrepancies brought to the Owner's attention after site construction has begun.

PART 2 PRODUCTS

2.01 MATERIALS

A. Base Course Type 2 Crushed Stone: Where indicated supply stockpiled, crushed ledge rock or approved blast furnace slag. Comply with New York State Department of transportation gradation and material requirements modified below:

Sieve		Percent Passing
Sieve Size	Size opening (mm)	
2 inch	50.8	100
1/4 inch	6.35	25-60
No. 40	0.425	5-40
No. 200	0.075	0-7

B. Dynamic Base for Synthetic Grass Surfacing: refer to Section 32 18 13 for additional information.

Sieve		Percent Passing	
Sieve Size	Sieve Size (mm)	Base Stone	Finishing Stone
2 inch	50.8	100	
1 ½ inch	38.1	90-100	
1 inch	25.4	75-100	
¾ inch	19.05	65-95	
½ inch	12.7	55-85	100
3/8 inch	9.53	40-75	85-100
¼ inch	6.35	25-65	75-100
No. 4 Sieve	4.76	15-60	60-90
No. 8 Sieve	2.38	0-40	35-75
No. 16 Sieve	1.191	0-20	10-55
No. 30 Sieve	0.594	0-7	0-40
No. 60 Sieve	0.249	0-5	0-15
No. 100 Sieve	0.150	0-3	0-8
No. 200 Sieve	0.075	0-2	0-2

1. Restrictions

   a. To Ensure structural Stability: $D_{60}/D_{10} > 5$ and $1 < D^2_{30}/D_{10}\ D_{60} < 3$. Fragmentation must be 100 percent.

   b. To Ensure Separation Of Both Stones: D_{85} of finishing stone / D_{15} of base stone > 2 and $3 < D_{50}$ of base stone / D_{50} of finishing stone < 6

   c. To Ensure Proper Drainage:

      1) Permeability of base stone > 500 in/hr (3.5×10^{-1} cm/sec)
      2) Permeability of finishing stone > 20 in/hr (1.4×10^{-2} cm/sec)
      3) Porosity of both stones > 25% (When stone is saturated & compacted to 95% Proctor.
      4) "D_x" in preceding subparagraphs = Size of sieve (in mm) that lets pass x percent of stone. For example, D_{60} = size of sieve that lets 60 percent of stone pass. For

calculation purposes, sizes may be obtained by interpolation on semi-log graph of sieve analysis.

d. Depending on type of rock present in crushed stone mix, other mechanical characteristics may be necessary for approval.

e. Where field supports heavy vehicles, give consideration for load bearing requirements of base.

PART 3 EXECUTION

3.01 EXAMINATION

A. Verification of Conditions: Examine conditions under which earthwork is to be accomplished in coordination with the installer of materials and components specified in this Section and notify affected Prime Contractors, Owner's Representative and the Project Designer in writing of any conditions detrimental to proper and timely accomplishment. Do not proceed with earthwork until unsatisfactory conditions have been corrected in a manner acceptable to the installer.

1. When the installer confirms conditions as acceptable to ensure proper and timely installation and to ensure requirements for applicable warranty or guarantee can be satisfied, submit to the Project Designer written confirmation from the applicable installer. Failure to submit written confirmation and subsequent installation will be assumed to indicate conditions are acceptable to the installer.

3.02 PREPARATION

A. Protection

1. Use of explosives: Do not bring explosives onto the site or use in the project without prior written permission from the Project Designer and the Owner's Representative. The Contractor remains solely responsible for the handling, storage and use of explosive materials when permitted. Use explosives in strict compliance with State, Local and OSHA regulations.

2. Protection of Persons and Property

a. Barricade open excavations and post with warning lights for safety of persons. Operate warning lights during hours from dusk to dawn each day.
b. Protect structures, utilities, sidewalks, pavements and other facilities immediately adjacent to excavations from damage caused by settlement, lateral movement, undermining, washout and other hazards.
c. Take precautions and provide necessary bracing and shoring to guard against movement and settlement of existing improvements or new construction. Contractor remains entirely responsible for strength and adequacy of bracing and shoring, and for safety and support of construction from damage or injury caused by lack of adequate protection or by movement or settlement.

3.03 CLEARING AND GRUBBING

A. Clear and grub the site within the grading limit lines of trees, shrubs, brush, other prominent vegetation, debris, and obstructions except for those items indicated to remain. Completely remove stumps and roots protruding through the ground surface.

1. Use only hand methods for grubbing inside the drip line of trees indicated to be left standing.
2. Where roots and branches of trees indicated to be saved interfere with new construction, carefully and cleanly cut them back to point of branching.

B. Fill depressions caused by the clearing and grubbing operations in accordance with the requirements for filling and backfilling, unless further excavation is indicated.

3.04 REMOVAL OF TOPSOIL

A. Remove existing topsoil from areas within the grading limit lines where excavation or fill is required.

B. Stockpile approved topsoil where directed until required for use. Place, grade, and shape stockpiles for proper drainage.

1. Topsoil shall be tested prior to stockpiling. Stockpile only quantities of topsoil approved in writing for re-use.

3.05 UNDERGROUND UTILITIES

A. Locate existing underground utilities prior to commencing excavation work. Determine exact utility locations by hand excavated test pits. Support and protect utilities to remain in place.

B. Do not interrupt existing utilities that are in service until temporary or new utilities are installed and operational.

C. Utilities to remain in service shall be re-routed as shown on the Contract Drawings.

D. Utilities abandoned beneath and five (5) feet laterally beyond a structure's proposed footprint shall be removed in their entirety. Excavations required for their removal shall be backfilled and compacted as specified herein.

E. Unless otherwise noted in the Contract Documents, utilities extending outside the limit specified above (5 feet) may be abandoned in place provided their ends are adequately plugged as described below.

1. Permanently close open ends of abandoned underground utilities exposed by excavations, which extend outside the limits of the area to be excavated.
2. Close open ends of metallic conduit and pipe with threaded galvanized metal caps or plastic plugs or other approved method for the type of material and size of pipe. Do not use wood plugs.
3. Close open ends of concrete and masonry utilities with concrete or flow-able fill.

F. Coordinate with other Prime Contractors or with local utility companies, as applicable, for shutoff service if lines are active.

G. Coordinate scheduling of removal to accommodate relocation of lines when necessary.

H. Demolish and remove or relocate additional uncharted underground utilities conflicting with construction operations as directed by the Project Designer. Measure additional removal and relocations as directed by the Project Designer and paid for by the Owner as a Change Order.

3.06 EXCAVATION

A. Excavate earth as required for the work. Remove and dispose of all materials encountered to obtain required subgrade elevations. Remove from property and legally dispose of all excess fill material.

B. Install and maintain all erosion and sedimentation controls during all earthwork operations as specified in Section 01 57 13, on the Contract Drawings or as directed by local officials.

C. Maintain sides and slopes of excavations in a safe condition until completion of backfilling. Comply with Code of Federal Regulations Title 29 - Labor, Part 1926 (OSHA).

1. Trenches: Deposit excavated material on one side of trench only. Trim banks of excavated material to prevent cave-ins and prevent material from falling or sliding into trench. Keep a clear footway between excavated material and trench edge. Maintain areas to allow free drainage of surface water.

D. Stockpile excavated materials classified as suitable material where directed, until required for backfill or fill. Place, grade, and shape stockpiles for proper drainage as approved by the Owner's Representative.

E. Excavation for Structures: Conform to elevations, lines, and limits indicated. Excavate to a vertical tolerance of plus or minus 1 inch. Extend excavation a sufficient lateral distance to provide clearance to execute the work.

F. Footings and Foundations: The foundation bearing grade shall be established just prior to constructing the concrete foundations when concrete is to bear on undisturbed soil.

1. Stepping Footings: Cut sloping surfaces under footings, foundations, steps, and where required for other work as indicated.
2. Pile Foundations: Stop excavations 6 to 12 inches above the bottom of pile cap elevation before the piles are placed. After pile installation, remove loose and displaced material and excavate to final grade, leaving a solid base to receive concrete pile caps.
3. Where footings and other work requiring similar soil support will rest entirely on rock, remove loose soil and loose rock and place concrete to the required elevations. Where footings and other work requiring similar soil support will rest partially on rock and partially on soil, immediately notify the Owner's Representative before any backfilling or concrete placement occurs; the Owner's Representative will determine the correct foundation treatment for the work.

G. Slabs and Floors: Excavate to the following depths below bottom of concrete for addition of select granular material:

1. Interior Floors: 6 inches unless otherwise indicated.
2. Exterior Slabs and Steps: 12 inches unless otherwise indicated.

H. Pipe Trenches: Refer to Section 31 23 17.

I. Pavement: Excavate to subgrade surface elevation.

J. Unauthorized Excavations: Unless otherwise directed, backfill unauthorized excavation under footings, foundation bases, and retaining walls with compacted select granular Type 1 material without altering the required footing elevation. Elsewhere, backfill and compact unauthorized

excavation as specified for authorized excavation of the same classification, unless otherwise directed by the Owner's Representative.

1. Unauthorized excavations under structural work such as footings, foundation bases, and retaining walls shall be reported immediately to the Owner's Representative before any concrete or backfilling work commences.

K. Notify the Owner's Representative upon completion of excavation operations. Do not proceed with the work until the excavation is inspected and approved.

L. Removal of Unsuitable Material Beneath Structures and Other Improvements: Excavate encountered unsuitable materials, which extend below required elevations, to additional depth as directed by the Owner's Representative. Have cross sections taken, under the supervision of an independent Land Surveyor, to determine the quantity of such excavation. Do not backfill this excavation prior to quantity measurement.

1. Such additional excavation and backfilling, not due to error, fault or neglect of the Contractor and exceeding the numeric quantities indicated on the Drawings, will be paid for at a pre-negotiated or pre-established unit price by Change Order.

3.07 DEWATERING

A. Prior to the performance of any excavations provide dewatering methods such that the groundwater table is maintained at an elevation that is beneath the excavated depth.

B. Prevent surface and subsurface water from flowing into excavations and trenches and from flooding the site and surrounding area.

C. Do not allow water to accumulate in excavations or trenches. Remove water from all excavations immediately to prevent softening of foundation bottoms, undercutting footings, and soil changes detrimental to the stability of subgrades and foundations. Furnish and maintain pumps, sumps, suction and discharge piping systems, and other system components necessary to convey the water away from the Site.

D. Convey water removed from excavations, and rain water, to collecting or run-off area. Cut and maintain temporary drainage ditches and provide other necessary diversions outside excavation limits for each structure. Do not use trench excavations as temporary drainage ditches.

E. Provide temporary controls to restrict the velocity of discharged water as necessary to prevent erosion and siltation of receiving areas.

3.08 PLACING FILL AND BACKFILL

A. Surface Preparation of Fill Areas: Strip topsoil, remaining vegetation, and other deleterious materials prior to placement of fill. Refer to Section 31 10 00 – Site Preparation for additional information.

1. Remove all asphalt pavement in its entirety from areas requiring the placement of fill.
2. After topsoil is stripped and other improvements specifically indicated to be removed on the Contract Documents are removed, proof roll the site with a ten ton vibratory compactor (minimum six overlapping passes required) or similar equipment. Excavate soft or loose soils identified during rolling and replace with properly compacted select Type 1 granular material as directed by the Owner's Representative or the Project Designer. Measure additional excavation and backfill as directed by the Owner's Representative or the Project Designer and paid for by the Owner as a Change Order.

3. Plow, strip, or break up sloped surfaces steeper than 1 vertical to 4 horizontal so that fill materials bond with the existing surface.

B. Excavations: Backfill as promptly as work permits, but not until completion of the following:

1. Acceptance by the Owner's Representative of construction below finish grade including, where applicable, dampproofing, waterproofing, perimeter insulation, and bearing capacity of supporting soil.
2. Inspection, testing, approval, and recording locations of underground utilities.
3. Removal of concrete formwork.
4. Removal of temporary sheeting (or sheet piling) and backfilling of voids caused by removals.
5. Cutting off top of permanent sheeting (or sheet piling).
6. Removal of trash and debris.
7. Installation of permanent or temporary bracing on horizontally supported walls.

C. Place backfill and fill materials in layers not more than 8 inches thick in loose depth unless otherwise specified. Before compaction, moisten or aerate each layer as necessary to facilitate compaction to the required density. Do not place backfill or fill material on surfaces that are muddy, frozen, or covered with ice.

1. Place fill and backfill against foundation walls and in confined areas (such as trenches) not easily accessible by larger compaction equipment, in maximum 6 inch thick (loose depth) layers.
2. For large fill areas, the layer thickness may be modified by the Owner's Representative, at the Contractor's written request, if in the Owner's Representative's judgment, the equipment used is capable of compacting the fill material in a greater layer thickness. This request shall include the type and specifications of compaction equipment intended for use.

D. Prevent wedging action of backfill against structures by placing backfill uniformly around structure to approximately same elevation in each layer. Place backfill against walls of structures containing basements or crawl spaces only after the first floor structural members are in place.

E. Under exterior concrete slabs and steps, utilize the following fill materials:

1. Type 1 granular material from subgrade to within 6" of the concrete slab or steps.
2. Select Type 2 crushed stone for the next 6".

F. Under Pavements and Walks:

1. Utilize select Type 2 crushed stone as indicated on the construction drawings and in the applicable specification sections in the Project Manual.

G. Landscaped Areas: Place suitable material when required to complete fill or backfill areas up to subgrade surface elevation. Do not use material containing rocks over 4 inches in diameter within the top 12 inches of suitable material.

3.09 ADDITIONAL REQUIREMENTS FOR PLACING FILL TO SUPPORT STRUCTURES

A. Place fill at the perimeter of the structure to be constructed as follows:

1. Strip the area in accordance with the requirements for Surface Preparation of Fill Areas.
2. Compact the stripped surface to 95 percent of maximum density.
3. Place fill in horizontal layers not exceeding 8 inches loose depth and compact layers as specified.

B. Place fill within the perimeter of the structure to be constructed as follows:

1. Strip the area in accordance with the requirements for Surface Preparation of Fill Areas.
2. Proof roll the stripped surface with at least 5 passes of a vibratory drum compactor having a minimum unsprung drum weight of 7 tons unless specifically indicated otherwise in the Contract Documents. Notify the Owner's Representative of the proposed date for beginning proof rolling at least 2 working days prior to commencing proof rolling.
3. Excavate unsuitable materials (soft and unstable earth) disclosed by the proof rolling operation and replace with compacted selected Type 1 granular material.
4. Place fill in horizontal layers not exceeding 8 inches loose depth and compact layers as specified.

C. Obtain written approval of fill area compaction before excavating for footing.

D. Excavate for footing width plus 1 foot on each side.

E. Excavate 1 foot below footing elevations where bottom of footings are 2 feet or less above or 4 feet or less below original ground surface.

1. Compact footing bottom and place a 1 foot bed of select granular material. Compact select granular material in 6 inch layers.
2. Omit excavation and select granular material below bottom of footings where footing elevations are more than 2 feet above or more than 4 feet below original ground surface.

3.14 COMPACTION

A. Compact each layer of fill and backfill for the following area classifications to the percentage of maximum density specified below and at a moisture content suitable to obtain the required densities, but at not less than 3 percent drier or more than 2 percent wetter than the optimum content as determined by ASTM D 698 (Standard Proctor) or ASTM D 1557 (Modified Proctor).

1. Concrete Slabs and Steps: Compact subgrade and each layer of backfill or fill material to 95 percent.
3. Landscaped Areas: Compact the top 2'-0" to a maximum of 85% and compact all subgrade areas beneath the upper 2'-0" to 95%.
4. Synthetic Turf Playfields: Compact subgrade and each layer of backfill or fill material to 95 percent.
6. Pavements and Walks: Compact subgrade and each layer of backfill or fill material to 95 percent.

Compaction Equipment:

1. Provide compaction equipment of suitable size and number and in satisfactory working condition to complete construction on schedule.
2. Use sheepsfoot rollers, pneumatic tired rollers, vibrating tampers, or other compaction equipment capable of obtaining required density throughout the entire layer being compacted.

B. When the existing ground surface to be compacted has a density less than that specified for the particular area classification, break up and pulverize, and moisture condition to facilitate compaction to the required percentage of maximum density.

C. Moisture Control:

1. Where fill or backfill must be moisture conditioned before compaction, uniformly apply water to the surface and to each layer of fill or backfill. Prevent ponding or other free water on surface subsequent to, and during compaction operations.
2. Remove and replace, or scarify and air dry, soil that is too wet to permit compaction to specified density. Soil that has been removed because it is too wet to permit compaction may be stockpiled or spread and allowed to dry. Assist drying by discing, harrowing or pulverizing, until moisture content is reduced to a value which will permit compaction to the percentage of maximum density specified.

D. If a compacted layer fails to meet the specified percentage of maximum density, the layer shall be recompacted and retested. If compaction cannot be achieved the material/layer shall be removed and replaced. No additional material may be placed over a compacted layer until the specified density is achieved.

3.15 ROUGH GRADING

A. Exterior Grading: Trim and grade area within the grading limits of the Contract Documents and excavations outside the limits, required by this Contract, to a level of 6 inches below the finish grades indicated unless otherwise specified herein or where greater depths are indicated. Provide a smooth uniform transition to adjacent areas.

1. Grade areas outside building lines for each structure to drain away from structures and to prevent ponding of water. Finish surfaces free from irregular surface changes, large stones.
2. Landscaped Areas: Provide uniform subgrade surface within 1 inch of required level to receive topsoil thickness specified. Compact fill as specified to within 2 inches of subgrade surface. Remove objectionable material detrimental to proper compaction or to placing full depth of topsoil. If the top 4 inches of subgrade has become compacted before placement of topsoil, harrow or otherwise loosen rough graded surface to receive topsoil to a depth of 4 inches immediately prior to placing topsoil.

3.16 SUBGRADE SURFACE FOR WALKS AND PAVEMENT

A. Shape and grade subgrade surface as follows:

1. Walks: Shape the surface of areas under walks to required line, grade and cross section, with the finish surface not more than ½ inch above or below the required subgrade surface elevation.
2. Pavements: Shape the surface of areas under pavement to required line, grade and cross section, with the finish surface not more than ½ inch above or below the required subgrade surface elevation.

B. Grade Control: During construction, maintain lines and grades including crown and cross-slope of subbase course.

C. Thoroughly compact subgrade surface for walks and pavement by mechanical rolling, tamping, or with vibratory equipment as approved to the density specified.

D. Shoulders: Place shoulders along edges of filled subgrades to prevent lateral movement. Construct shoulders of specified fill material, placed in such quantity to compact to thickness of each subgrade course layer. Compact and roll at least a 1'-0" wide additional layer of each subgrade course.

3.17 FINISH GRADING

A. Uniformly grade rough graded areas within the grading limits to finish grade elevations indicated.

B. Grade and compact to smooth finished surface within tolerances specified, and to uniform levels or slopes between points where finish elevations are indicated or between such points and existing finished grade.

C. Grade areas adjacent to building lines so as to drain away from structures and to prevent ponding.

D. Finish surfaces free from irregular surface changes, and as follows:

1. Grassed Areas: Finish areas to receive topsoil to within 1 inch above or below the required subgrade surface elevations.
2. Walks: Place and compact base material as specified. Shape surface of areas under walks to required line, grade and cross section, with the finish surface not more than ½ inch above or below the required subbase elevation.
3. Pavements: Place and compact base material as specified. Shape surface of areas under pavement to required line, grade and cross section, with the finish surface not more than ½ inch above or below the required subbase elevation.

E. Spread topsoil directly upon prepared subgrade surface to a depth measuring a minimum of 6 inches after natural settlement of the topsoil has occurred in areas to be seeded or to receive sod unless specifically indicated otherwise within the Contract Documents. Place to greater depth when necessary to adjust grades to required elevations.

1. Only approved existing topsoil within the grading limits may be used. Provide additional topsoil from outside sources as required.

F. Finish topsoil surface free of depressions which will trap water, free of stones over ½ inch in any dimension, and free of debris.

3.18 SUBGRADE & BASE PREPARATION FOR SYNTHETIC GRASS SURFACING

A. Subgrade Preparation

1. Establish a single benchmark prior to excavation and maintain by a licensed surveyor of record during the entire subgrade preparation and dynamic base installation construction process.
2. Remove all topsoil, organic, deleterious or non-compactable materials. Excavate playfield area to the depth indicated on the Contract Documents.
3. Grade playfield area to minimum 0.5% or more slope from longitudinal center of the field towards the sidelines.
4. Compact the soil bed in a minimum of two directions to attain minimum 95% standard proctor compaction rate unless specifically noted otherwise within the Contract Documents.
5. Laser grade subgrade to tolerances of not more than ¼” in 10’ from required elevation to allow for even drainage flow.
6. Excavate perimeter drainage collector trenches to the elevation and profile as indicated on the Contract Documents. All loose debris shall be removed from the trenches prior to pipe installation. Trenches shall be backfilled with specified drainage fill material compacted by hand tamping or similar mechanical means to a minimum 95% of standard proctor maximum density.
7. Install engineering fabric to cover subgrade as detailed on the drawings. Place fabric in accordance with the “Placing Engineering Fabric” paragraph above.

B. Stone Base Installation

1. Provide and install a minimum four inch layer of specified uniformly mixed stone base without damaging the composite drain system and engineering fabric or forming depressions in the subgrade below.
2. If required compacted stone base exceeds 6" in depth, construct base in two or more layers or lifts of approximate equal thickness. Each layer shall be compacted in minimum two directions to attain required compaction rate.
3. Laser grade stone base at 0.5% from the center longitudinal axis of the playfield towards the sidelines or as specified on the Contract Documents. Ensure elevations of the stone base do not vary from the specified grade by more than ¼" in ten feet in any direction.
4. Place specified finishing stone layer no more than 2" thick and laser grade at 0.5% from the center longitudinal axis of the playfield towards the sidelines or as specified on the Contract Documents. Compact finishing stone in minimum two directions to attain required compaction rate. Ensure that elevations of the stone base do not vary from the specified grade by more than ¼" in ten feet in any direction over the entire playfield area.
5. Mark areas that deviate from the required elevations with spray paint. Correct grade with additional finishing stone rolled tight to comply with required compaction densities.
6. Surface of synthetic turf stone base shall be maintained so as to be well drained at all times, standing water is not permitted.

C. Testing and Survey Verification of Dynamic Base

1. Provide gradation testing for all stone base layers prior to installation. Submit test results to the Project Designer and the Synthetic Turf Installer for joint approval of the product.
2. Independently confirm compliance with specified tolerances, planarity and elevation of the playfield subgrade and base elevations to be verified by a licensed surveyor and compaction, gradation and permeability verified by a geotechnical engineer.
3. Permeability: The contractor shall verify permeability of aggregate using DIN 8035 Part 7 (preferred method), ASTM 2434 (constant head), or ASTM D3385 (double ring) testing methods. Take a minimum of one sample per 5000 square feet unless otherwise directed by the Project Designer.
4. Topographical Survey: A professional land surveyor shall prepare a topographical survey with shots on a ten foot square grid, a minimum of 72 hours prior to the start of the synthetic turf surfacing installation. The survey shall be submitted to the Owner's Representative and the Project Designer for evaluation for acceptable planarity and tolerance.

    a. In the event that the synthetic turf base as constructed does not meet the specified requirements, make all necessary repairs within 24 hours to avoid delay in installation of the synthetic grass surfacing.
    b. Coordinate with synthetic grass surfacing installer to ensure synthetic grass installers equipment can run smoothly upon installed granular base without sinking or in any other way disturbing the sub base and base layers.
    c. When directed by the Owner's Representative or the Project Designer, upon the request of the synthetic grass surfacing installer, the contractor shall provide a porosity report prior to the installation of the synthetic grass surfacing.

3.19 MAINTENANCE AND RESTORATION

A. Restore grades to indicated levels where settlement or damage due to performance of the work has occurred. Correct conditions contributing to settlement. Remove and replace improperly placed or poorly compacted fill materials.

B. Restore pavements, walks, curbs, lawns, and other exterior surfaces damaged during performance of the work to match the appearance and performance of existing corresponding surfaces as closely as practicable.

C. Topsoil and seed or sod damaged lawn areas inside and outside the indicated grading limits. Water as required until lawn areas are accepted by the Owner's Representative.

3.20 DISPOSAL OF EXCESS AND UNSUITABLE MATERIALS

A. Remove from the work site and dispose of excess and unsuitable materials, including materials resulting from clearing and grubbing and removal of existing improvements.

B. If acceptable to the Owner's Representative, transport excess and unsuitable materials, including materials resulting from clearing and grubbing and removal of existing improvements, to spoil areas on the project site designated by the Owner's Representative, and dispose of such materials as directed.

C. Transport excess topsoil to areas on the project site designated by the Owner's Representative. Smooth grade deposited topsoil.

3.21 FIELD QUALITY CONTROL

A. Tests: The Owner may provide soil testing and inspection services during earthwork operations. The Owner reserves the right to test and approve all subgrades and fill layers before construction proceeds. Refer to Section 01400 – Quality Control for additional requirements relating to testing.

1. Compaction Testing: Provide the Owner's Representative adequate notice for all phases of filling and backfilling operations. Compaction testing will be performed by the Owner's Testing Agency to ascertain the compacted density of the fill and backfill materials. Compaction testing will be performed on certain layers of the fill and backfill as determined by the Owner's Representative and the Testing Agency. If a compacted layer fails to meet the specified percentage of maximum density, the layer shall be recompacted and retested. No additional material may be placed over a compacted layer until the specified density is achieved.
2. Tests of subgrades and fill layers may, at the Owner's option, include:

    a. Observation of proof rolling procedures.
    b. Observation and or inspection of unsuitable soil material.
    c. Footing subgrades, for each strata of soil for which footings will be placed, at least one plate bearing test and field density test may be conducted if the subgrade is non-cohesive, or unconfined compression test may be conducted if the subgrade is cohesive, to verify design bearing capacities shown on the drawings. Subsequent verification and approval of each footing subgrade may be based on visual comparison of each subgrade with tested strata when acceptable to the Project Designer.
    d. Paved areas and building subgrade areas, at least one field density test of subgrade for every 2000 square feet of paved area or building slab, but not less than three tests may be made. In addition, in each compacted fill layer, at least one field density test of subgrade for every 2000 square feet of paved area or building slab, but not less than three tests may be made.
    e. Foundation wall backfill, field density tests at locations and elevations as directed may be made, with at least one test made for every 50 feet of wall.
    f. Fill under footings, in each compacted fill layer; one compaction test for every 30 LF of wall may be taken. One compaction test may be made under each individual footing.

g. Fill under natural turf playfields, at least one field density test of subgrade for every 2000 square feet of playfield area, but not less than three tests may be made. In addition, in each compacted fill layer, at least one field density test of subgrade for every 2000 square feet of overlaying playfield, but not less than three tests may be made.

3. If in the opinion of the Project Designer and based on reports of the testing service, completed subgrades or fills are below the specified density, provide additional compaction and testing at no additional expense to the Owner.

3.22 PROTECTION

A. Protect graded areas from traffic and erosion, and keep them free of trash and debris.

B. Repair and re-establish grades and seeding in settled and rutted areas to specified tolerances.

END OF SECTION 31 00 00

SECTION 31 10 00

SITE PREPARATION

PART 1 GENERAL

1.01 SUMMARY

A. Section Includes

1. Protection of trees, shrubs and other vegetation
2. Clearing and grubbing of site
3. Implementation of soil erosion and sediment control procedures
4. Demolition and removal of existing site features
5. Disposal of waste materials

1.02 DESCRIPTION

A. Design Requirements

1. The contractor shall clear and grub the site as required to perform the construction shown on the contract documents. Clearing and grubbing of the site shall be confined closely to the limits shown on the contract documents.
2. Site preparation operations required, but not limited to in the work, include:
   a. Removal of existing synthetic turf and infill
   b. Protection of existing trees, shrubs and vegetation.
   c. Removal of existing trees, shrubs and vegetation as indicated on the contract documents.
   d. Clearing and grubbing.
   e. Temporary fencing.
   f. Topsoil stripping.
   g. Removal of above grade improvements and subsurface infrastructure.
   h. Disconnecting and removing all existing utilities except those designated to remain.
   i. Removal of debris.
   j. Dust control.

1.03 SEQUENCING AND SCHEDULING

A. Coordinate site preparation operations with the following:

1. Work with other prime contractors.
2. Shut down and relocation of site utilities in field of operations.
3. Various stages of completion in the project schedule.

PART 2 PRODUCTS

NOT USED

PART 3 EXECUTION

3.01 EXAMINATION

A. Verification of Conditions: Examine conditions under which site preparation work is to be accomplished in coordination with the installer components specified in this Section. Notify affected Prime Contractors, the Owner's Representative and the Project Designer in writing of any

conditions detrimental to proper and timely accomplishment of the required work. Do not proceed with site preparation work until unsatisfactory conditions have been corrected in a manner acceptable to the installer.

1. When the installer confirms conditions as acceptable to ensure proper and timely installation and to ensure requirements for applicable warranty or guarantee can be satisfied, submit to the Project Designer written confirmation from the applicable installer. Failure to submit written confirmation and subsequent installation will be assumed to indicate conditions are acceptable to the installer.

B. Perform the following prior to starting site preparation work:

1. Inspect the entire project site including all objects that are designated to remain or to be removed.
2. Locate all underground infrastructure and utilities and determine requirement for their protection.
3. Preserve in operating condition all active utilities traversing the site and designated to remain.
4. Schedule site preparation work in consideration of adjacent public and private property owners.
5. Avoid interference with use of and passage to and from adjacent buildings and facilities.

3.02 PREPARATION

A. Protect existing objects designated to remain, both on and off the project site. In the event of damage, immediately make all repairs and replacements necessary for approval of the Owner's Representative and the Project Designer.

B. Prevent spread of dust during performance of the work throughout the life of the project. Thoroughly moisten all site areas as required to prevent dust from being a nuisance to the Owner, public, neighbors and performance of other work on the site.

C. Use all means necessary to minimize interference with roads, streets, walks, and other traveled areas. Do not close, obstruct, or cause to make impassable any traveled areas without first obtaining permission from the appropriate agencies.

D. Remove, relocate, store and protect from damage items designated to be savaged.

3.03 PROTECTION OF EXISTING TREES, SHRUBS AND VEGETATION

A. Install temporary fencing as required to protect existing trees, shrubs and other vegetation which are scheduled to remain from above ground damage including smothering of root systems. Do not store construction materials, debris or excavated materials within the drip line of trees. Restrict vehicular traffic, parking and pedestrian traffic from tree drip line areas to prevent excessive compaction of soil over root systems.

B. Trees, shrubs or vegetation scheduled to be saved that are damaged during construction work due to contractor negligence shall be placed under the care of a certified nurseryman or arborist. The Prime Contractor responsible for the damage to the plant material shall be liable for the cost of all required work. Trees, shrubs or vegetation that die as a result of contractor negligence shall be evaluated by a qualified nursery industry professional selected by the Owner's Representative. The removal and replacement of the affected trees, shrubs or vegetation and the associated evaluation expenses shall be the responsibility of the contractor.

3.04 CLEARING AND GRUBBING

A. Remove trees, shrubs and other vegetation that interfere with the installation of new construction or grading work, except for those indicated to remain. Use only hand methods for grubbing inside the drip line of trees indicated to remain. Removal of plant material includes the excavation and off-site disposal of new and old stumps of trees, shrubs and other vegetation and their entire root mass.

B. Depressions caused by clearing operations shall be filled with satisfactory soil material unless further excavation or earthwork is required.

3.05 IMPLEMENTATION OF SOIL EROSION AND SEDIMENT CONTROL PROCEDURES

A. Install temporary and permanent measures to mitigate soil erosion and sediment control issues as directed by the Project Designer or interested State Agencies. Work may include the installation of berms, dikes, dams, sediment basins, fiber mats, netting, gravel, mulches, grasses, sloped drains and other erosion control devices.

B. The temporary soil erosion and sediment control measures indicated on the Contract Documents shall be coordinated with the specified permanent erosion control features to the extent practical to assure economical, effective and continuous erosion control.

3.06 DEMOLITION AND REMOVAL OF EXISTING SITE FEATURES

A. Remove foundations, pavement, sidewalks, curbs, retaining walls and other site features noted for removal that are encountered as part of the work.

1. Remove asphalt concrete paving material to full depth and remove from site.
2. Gravel and stone fill under removed sidewalks may be reused if suitable for the particular new use and approved by the Project Designer.
3. Remove below grade structures such as retaining walls to a minimum depth of 2’-0” below new finished grade unless specifically noted otherwise within the Contract Documents.
4. Break up and completely remove miscellaneous concrete such as small foundations.

B. Leave cut edge neat and square where existing material is cut to adjoin new work.

3.07 DISPOSAL OF WASTE MATERIALS

A. Burning on the Owner’s property of combustible cleared and grubbed material is not permitted.

B. Remove all combustible cleared and grubbed material, excess excavated subgrade material, broken stone, broken concrete, masonry materials, and debris from the Owner’s property and legally dispose of it. Obtain all permits for off-site disposal and submit a copy of each permit to the Owner’s Representative.

END OF SECTION 31 10 00

SECTION 31 23 17

SITE TRENCHING

PART 1 - GENERAL

1.01 SECTION INCLUDES

A. Trench excavation backfill and compaction of underground piping and underdrainage.

1.02 RELATED SECTIONS

A. Section 31 00 00 – Earthwork

1.03 SUBMITTALS

A. Comply with the requirements of Section 01 33 00 – Submittal Procedures and as modified below.

B. Backfill Product Data: Submit test reports for each type of gravel and/or stone specified for backfill naming the source of each material. Submit evidence that each backfill material complies with Department of Transportation standard specifications for the materials specified.

C. Quality Control Submittals

1. Experience Listing: Submit a list of completed projects similar to this project, including owner's contact information and telephone number for each project.

D. Closeout Procedures: Comply with the requirements of Section 01 77 00.

1.04 QUALITY ASSURANCE

A. Regulatory Requirements: Obtain written permission from applicable agencies prior to the start of construction. Submit one copy of the permit as specified in "Submittals-Quality Control Submittals" above.

1.05 PROJECT CONDITIONS

A. Field Measurements: Establish and maintain required lines and elevations for grade control.

1.06 SEQUENCING AND SCHEDULING

A. Proceed with and complete trenching operations as rapidly as portions of the site become available, working within seasonal limitations for the work required.

PART 2 PRODUCTS

2.01 MATERIALS

A. Excavated Material: Utilize on-site excavated materials consisting of loam, clay, sand, gravel or other material suitable for backfilling as approved by the Project Designer when the type of backfill material is not indicated on the Contract Documents.

B. Sand: Natural bank sand complying with the following gradation requirements:

1. 100% passing the ¾" sieve
2. Less than 5% passing the Number 200 sieve.

C. Select Type 1 Granular Material: Where indicated supply stockpiled, sound, durable, sand, gravel, stone, or blends of these materials, free from organic and other deleterious materials. Comply with New York State Department of Transportation gradation and material requirements specified below:

Sieve		Percent Passing
Sieve Size	Size opening (mm)	
3 inch	76.2	100
2 inch	50.8	90-100
1/4 inch	6.35	30-65
No. 40	0.425	5-40
No. 200	0.075	0-10

D. Bedding Material: Mixture of 50% No. 1 and 50% No. 2 stone complying with the following New York State Department of Transportation Standard Specifications:

No. 1 Stone Gradation Requirements

Sieve		Percent Passing
Sieve Size	Size opening (mm)	
1 inch	25.4	100
1/2 inch	12.70	90-100
1/4 inch	6.35	0-15
No. 200	0.075	0-1

No. 2 Stone Gradation Requirements

Sieve		Percent Passing
Sieve Size	Size opening (mm)	
1 ½ inch	38.1	100
1 inch	25.4	90-100
1/2 inch	12.7	30-65
No. 200	0.075	0-10

PART 3 EXECUTION

3.01 EXAMINATION

A. Installer Verification of Conditions: Examine conditions under which trenching operations are to occur with the materials and components specified in this section. Affected Prime Contractors, the Owner's Representative and the Project Designer shall be notified in writing of any conditions detrimental to the proper and timely installation of the work.

1. When the installer confirms conditions as being acceptable to ensure proper and timely installation of the work and to ensure requirements of applicable warranties or guarantees can be satisfied, submit written confirmation to the Project Designer. Failure to submit written confirmation and subsequent installation will be assumed to indicate conditions are acceptable to the installer.

3.02 EXCAVATION

A. Excavate trenches to line and depth as indicated on the Contract Documents. Provide consistent, uniform support for the bottom quadrant of each section of piping, fittings and associated materials.

1. Excavate no more than length of trench that can receive infrastructure installation and backfill.
2. Brace and drain trenches as required. Accumulations of groundwater or storm runoff shall be immediately discharged by dewatering pumps to siltation basins or protected channels, drains or storms sewers.
3. Provide adequate trench width to permit successful laying and joining of pipe, proper placement of backfill and clearance of at least 8" on either side of the pipe barrel.
4. Prepare the finish grade of the trench bottom with hand tools. Where elevations are not shown on the Contract Documents, excavate the trench to place a minimum of 18" of fill above the top of the pipe. Provide "bell holes" at each pipe joint for proper joining to eliminate point bearing. Stones of 2" or greater in any dimension or as recommended by the pipe manufacturer, whichever is smaller, shall be removed to avoid point bearing.
5. Where trench excavation is carried below the specified elevation as a result of Contractor error or negligence, backfill the trench with Select Type 1 Granular Material and compact to required densities at no cost to the Owner.
6. When trenching is required within the dripline of trees, tunnel under or around roots by hand digging. Do not cut tap roots or main lateral roots.

B. Rock Excavation: Comply with the requirements outline in Project Manual Section 02300-Earthwork.

C. Excavated Materials

1. Materials satisfactory for backfilling shall be stockpiled in an orderly manner at a distance from the banks of the trench sufficient to avoid overloading and to prevent slides and cave-ins.
2. Adequate drainage shall be provided for the stockpiles and surrounding areas by means of ditches, dikes and other approved methods.
3. Stockpiles shall be protected from contamination with unsatisfactory excavated material or other material that destroy the quality and fitness of the stockpiled material. If the Contractor fails to protect the stockpiles and any material becomes unsatisfactory as a result, such material shall be removed and replaced with satisfactory on site or imported materials from approved sources at no additional cost to the Owner.
4. Excavated material not required or not satisfactory for backfill shall be removed from the site.

3.03 BACKFILLING

A. Trench Backfill: Trenches shall be backfilled to grade upon completion of required testing work.

B. Bedding and Initial Backfill: Bedding shall be of the type and thickness as indicated on the Contract Documents or as recommended by the pipe manufacturer.

1. Initial backfill material shall be placed in layers of a maximum of 6" loose thickness and compacted with approved tampers to the density of the adjacent in-situ soil, and to a height of at least one foot above the utility pipe, conduit or other infrastructure item. The backfill shall be brought up evenly on both sides of the pipe for the full length of the pipe.
2. Care shall be taken to ensure thorough compaction of the fill under the haunches of the pipe.

C. Final Backfill: The remainder of the trench shall be backfilled with satisfactory material removed from the trench. Backfill material shall be deposited and compacted as follows:

1. Under building slabs, roads, walks, parking lots and other structural areas, backfill shall be deposited in maximum 8" loose thickness layers and compacted to 95% maximum dry density at +/-2% of optimum moisture content.
2. Under tracks, tennis courts and other structural athletic areas, backfill shall be deposited in maximum 8" loose thickness layers and compacted to 95% maximum dry density at +/-2% of optimum moisture content.
3. Under synthetic turf playfield areas, backfill shall be deposited in maximum 8" loose thickness layers and compacted to 95% maximum dry density at +/-2% of optimum moisture content.
4. Under general landscape and natural turf playfield areas, backfill shall be deposited in maximum 12" loose thickness layers and compacted to 95% maximum dry density at +/-2% of optimum moisture content.

3.04 FIELD QUALITY CONTROL

A. Testing

1. The Owner may provide soil testing and inspection services during the backfill of trenches as outlined in Project Manual Section 01 40 00 – Quality Requirements.
2. Contractor shall employ the services of an independent testing agent to observe and test backfill operations performed by other Prime Contractors that may affect their work. An independent testing laboratory shall certify that the backfill is suitable for finish construction to be installed over trenches.
3. Contractor shall submit copies of testing laboratory reports to the Owner's Representative and the Project Designer for information only.
4. The Contractor shall accept in writing any trench backfill and compaction by others before installing the remaining finish construction over trench work.

END OF SECTION 31 23 17

SECTION 32 12 16

ASPHALT PAVING

PART 1 - GENERAL

1.01 SECTION INCLUDES

A. Aggregate base for asphalt paving
B. Asphalt paving installation over aggregate base **(To be part of Alternate #3)**
C. Joining new asphalt pavement to adjacent construction
D. Field quality control

1.02 RELATED SECTIONS

A. Section 31 00 00 - Earthwork
B. Section 33 40 00 – Storm Drainage Utilities

1.03 SUBMITTALS

A. Comply with the requirements of Section 01 33 00 – Submittal Procedures and as modified below.

B. Product Data: Submit manufacturer's name, specifications and installation instructions for each item specified.

C. Job Mix Formulas: Submit job mix formulas for asphalt paving indicating compliance with the requirements of each asphalt type specified including the name and location of the supplier.

D. Quality Control Submittals

1. Certificates: Submit one copy of all permits obtained from local regulatory agencies and the New York State Department of Transportation.
2. Qualifications Certification: Submit written certification or similar documentation signed by the applicable subcontractor, prime contractor and/or manufacturer (where applicable) indicating compliance with the requirements specified below in the "Quality Assurance" section of this specification.
3. Experience Listing: Submit a list of completed projects using the products proposed for this project, including owner's contact information and telephone number for each project, demonstrating compliance with applicable requirements specified in the "Quality Assurance" section of this specification.

E. Closeout Procedures: Comply with the requirements of Section 01 77 00.

1.04 QUALITY ASSURANCE

A. Asphalt Producer Qualifications: Use only materials furnished by bulk asphalt producer regularly engaged in the production of hot-mix, hot laid asphalt.

B. Regulatory Requirements

1. Conform to the requirements of local regulatory agencies, or if applicable, the New York State Department of Transportation, which ever is more stringent for methods and materials in work areas subject to applicable agency's review and approval. Provide materials complying with referenced New York State Department of Transportation Standard Specifications where indicated.
2. Obtain written permission from applicable agencies prior to the start of construction. Submit one copy of the permit as specified in "Submittals-Quality Control Submittals" above.

1.05 PROJECT CONDITIONS

A. Environmental Requirements:

1. Do not apply tack coats when ambient temperature is below 50 degrees F., and when the temperature has not been above 35 degrees for 12 hours immediately prior to the application. Do not apply a tack coat when an asphalt base is wet or contains an excess of moisture.
2. Do not construct asphalt surface courses when the atmospheric temperature is below 40 degrees F., and when base material is not dry. Asphalt may only be placed when air temperatures are a minimum of 40 degrees F. and rising.

B. Field Measurements: Establish and maintain required lines and elevations for grade control.

PART 2 PRODUCTS

2.01 MATERIALS

A. Aggregate Base: Comply with the New York State Department of Transportation Standard Specification, Section 304, Paragraph 304-2, as modified in Section 31 00 00 – Earthwork.

a. Base Course: Type 2 crushed stone or select RCA granular material as modified in Section 31 00 00 – Earthwork unless specifically noted otherwise on the Contract Documents.

B. Asphalt Pavement: Paving materials shall comply with the New York State Department of Transportation Standard Specification. Section 400 for the materials indicated.

1. Binder Course: Hot plant mixed asphalt, complying with the New York State Department of Transportation Standard Specification, Section 401 and 403 for Asphalt – Type 3 Binder.

Sieve		Percent Passing	
Sieve Size	Sieve Size (mm)	General Limits	Job Limit Tol. %
1 ½”	37.5	100	-
1”	25.0	95 – 100	-
½”	12.5	70 – 90	+/-6
¼”	6.3	48 – 74	+/-7
No. 6 Sieve	3.2	32 – 62	+/-7
No. 20 Sieve	.850	15 – 39	+/-7
No. 40 Sieve	.425	8 – 27	+/-7
No. 80 Sieve	.180	4 – 16	+/-4
No. 200 Sieve	.075	2 – 8	+/-2

a. The PGB content shall be 4.5 – 6.5%, +/-0.4%.
b. The mixing and placement temperature range shall be 120 – 165 degrees C.

2. Topcourse: Hot plant mixed asphalt, complying with the New York State Department of Transportation Standard Specification, Section 401 and 403 for Asphalt – Type 7 Topcourse.

Sieve		Percent Passing	
Sieve Size	Sieve Size (mm)	General Limits	Job Limit Tol. %
½”	12.5	100	-
¼”	6.3	90 – 100	-
No. 6 Sieve	3.2	45 – 70	+/-6
No. 20 Sieve	.850	15 – 40	+/-7
No. 40 Sieve	.425	8 – 27	+/-7
No. 80 Sieve	.180	4 – 16	+/-4

No. 200 Sieve	.075	2 – 6	+/-2

a. The PGB content shall be 5.7 – 8.0%.
b. The mixing and placement temperature range shall be 120 – 165 degrees C.

C. Coatings: Comply with the New York State Department of Transportation Standard Specification, Section 702 for material designations indicated.

1. Tack Coat: Emulsified asphalt, slow setting type, New York State Department of Transportation designation 702-3601 (SS-1h) or 702-4501 (CSS-1h).
2. Asphalt Cement Filler: New York State Department of Transportation Designation 702-05.

2.02 EQUIPMENT

A. Paving Equipment: Spreading, self propelled asphalt paving machines capable of maintaining the line, grade and minimum surface thickness specified. Spreader boxes may be used in areas where specifically approved by the Project Designer.

B. Compacting Equipment: Self-propelled tandem roller with a minimum 10 ton weight. Hand held vibrator compactor may be used in areas not accessible to rollers when specifically approved by the Project Designer.

PART 3 EXECUTION

3.01 EXAMINATION

A. Installer Verification of Conditions: Examine conditions under which pavement is to be constructed with the materials and components specified in this section. Affected Prime Contractors, the Owner's Representative and the Project Designer shall be notified in writing of any conditions detrimental to the proper and timely installation of the work.

b. When the installer confirms conditions as being acceptable to ensure proper and timely installation of the work and to ensure requirements of applicable warranties or guarantees can be satisfied, submit written confirmation to the Project Designer. Failure to submit written confirmation and subsequent installation will be assumed to indicate conditions are acceptable to the installer.

3.02 PREPARATION

A. Final Preparation of Subgrades: Upon completion of preparation of subgrades as specified in Section 02300, thoroughly scarify the entire area to be paved and compact by rolling to smooth, hard, even surface. Finish to required grades with allowance for pavement courses above.

3.03 INSTALLATION

A. Aggregate Base: Comply with the requirements of the New York State Department of Transportation Standard Specification, Section 304-3, for aggregate gradations specified, unless otherwise indicated.

1. Base Course: Completely fill voids with grits and roll with a 10 ton roller, eliminating movement of the material ahead of the roller. After rolling, verify grading with a minimum ten foot long straight edge. Satisfactorily eliminate any depression over ¼" deep. Obtain approval of base prior to installing asphalt courses above

a. Light Duty Sidewalk Thickness: Minimum 6" thickness unless otherwise noted.

B. Asphalt Paving: Pave finished surface free from depressions that may collect water. The Contractor shall remove any depressions at their own expense over 1/8" deep when tested with a six foot straight edge without evidence of patching.

1. Light Duty Paving: Pave over aggregate base in two courses, 1½" compacted depth top course over 2" compacted depth binder course. Comply with the New York State Department of Transportation Standard Specification, paragraph 401-3 and paragraph 403-3 for asphalt types specified.

C. Joining New Asphalt Pavement to Adjacent Construction

1. Carefully construct joints between old and new pavements, or between successive days work to ensure continuous bond between adjoining paving. Construct joints with the same texture, density and smoothness as adjacent sections of asphalt courses. Clean sand, dirt and other deleterious material from contact surfaces and apply tack coat.
2. Offset traverse joints a minimum of 24" between succeeding courses. Cut back pavement to the edge of previously placed courses to expose an even, vertical surface for the full course thickness.
3. Offset longitudinal joints a minimum of 6" between succeeding courses. When edges of longitudinal joints are irregular, honeycombed or inadequately compacted, cut back all unsatisfactory sections to expose an even, vertical surface for the full course thickness.
4. In horizontal joints between the binder and the topcourse, clean all contact surfaces and spray a tack coat prior to the installation of the topcourse if the binder has been in place for longer than seven days or if the pavement is determined to be excessively dirty by the Project Designer.
5. Seal joints with the application of asphalt cement filler, a minimum of 2" to each side of the joint.

3.04 FIELD QUALITY CONTROL

A. Flood Tests: Perform a flood test in the presence of the Owner's Representative or the Project Designer utilizing a water tank truck. If a depression ponding water more than 1/8" in depth is found, provide corrective measures to provide proper drainage.

END OF SECTION 32 12 16

SECTION 32 18 14

SYNTHETIC GRASS SURFACES

PART 1 – GENERAL

1.01 SECTION INCLUDES

A. Multi-purpose infilled synthetic turf playfield.

1.02 RELATED SECTIONS

A. Section 11 68 33 – Athletic Field Equipment
B. Section 31 00 00 – Earthwork
C. Section 31 23 17 – Site Trenching

1.03 REFERENCES

A. Comply with applicable requirements of the following standards. Where these standards conflict with other specified requirements, the most restrictive requirements shall govern. The latest edition of the following standards as referenced herein shall be applicable.

1. National Collegiate Athletic Association (NCAA), "Rules and Interpretations" for the following sports:

a. Football
b. Soccer
c. Men's Lacrosse

2. US Lacrosse, "Official Rules for Girl's and Women's Lacrosse" for Women's Lacrosse.

B. Factory Mutual Research Corporation: FM P7825 Approval Guide

C. American Society for Testing and Materials Standards

1. ASTM C88 – "Standard Test Method for Soundness of Aggregates by Use of Sodium Sulfate or Magnesium Sulfate"
2. ASTM D418 – "Standard Method of Testing Pile Yarn Floor Covering Construction"
3. ASTM D422 – "Standard Test Method for Particle Size Analysis of Soils"
4. ASTM D698 – "Standard Test Method for Laboratory Compaction Characteristics of Soil Using Standard Effort (12,400 ft-lbf/cubic foot)"
5. ASTM D1335 – "Standard Test Method for Tuft Bind of Pile Yarn Coverings"
6. ASTM D1557 – "Standard Test Method for Laboratory Compaction Characteristics of Soil Using Modified Effort (56,000 ft-lbf/cubic foot)"
7. ASTM D1577 – "Standard Test Method for Linear Density of Textile Fibers"
8. ASTM D1682 – "Standard Method of Tests for Breaking Load and Elongation of textile Fabrics"
9. ASTM D2256 – "Standard Test Method for Tensile Properties of Yarns by the Single Strand Method"
10. ASTM D2859 – "Standard Test Method for Ignition Characteristics of Finished Textile Floor Covering Materials"
11. ASTM D2922 – "Standard Test Methods for Density of Soil and Soil Aggregate in Place by Nuclear Methods"
12. ASTM D3385 – "Standard Test Method for Infiltration Rate of Soils in Field Using Double Ring Infiltrometer"

13. ASTM D5034 – "Standard Test Method for Breaking Strength and Elongation of Textile fabrics (Grab Test)"
14. ASTM D5848 – "Standard Test Method for Mass per Unit Area of Pile Yarn Floor Coverings"
15. ASTM F355 – "Standard Test Method for Shock Absorbing Properties of Playing Surface Systems and Materials"
16. ASTM F1015 – "Standard Test Method for Relative Abrasiveness of Synthetic Turf Playing Surfaces"
17. ASTM F1551 – "Standard Test Method for Comprehensive Characterization of Synthetic Turf Playing Surfaces and Materials"
18. ASTM F1936 – "Standard Test Method for Shock Absorbing Properties of North American Football Field Playing Systems as Measured in the Field"

1.04 SYSTEM DESCRIPTION

A. Design Requirements

1. Labor, materials, tools and equipment necessary to install multipurpose, infilled artificial turf playfield as indicated on the contract documents in strict accordance with the manufacturer's installation instructions and all approved shop drawings.
   a. Ensure that the synthetic turf system maintains ASTM F355 G-max measurements of between 100 and 165 for the life of the warranty. G-max measurement at the time of installation shall not exceed 125.

1.05 SUBMITTALS

A. Comply with the requirements of Section 01 33 00 – Submittal Procedures and as modified below.

B. Product Data

1. Submit manufacturer's product literature, technical specifications, product characteristics, performance characteristics, installation instructions and similar information demonstrating compliance with the specified requirements.
2. Submit fiber manufacturer's name, type of fiber and composition of fiber.
3. Provide sample copy of all required warranties as specified in this section.

C. Shop Drawings: Provide submissions of the following shop drawings indicating:

1. Field layout.
2. Field marking plan and details for the specified sports. Provide individual colored plans for each sport specified and a colored composite plan that shows the lines and markings in relation to each other. Details shall be at a scale that provides a clear presentation.
3. Roll and seaming layout.
4. Methods of attachment, field openings and perimeter conditions. Include all details for conditions where synthetic turf will be applied to covers, plugs, etc.

D. Samples: Provide submissions of the following samples:

1. Synthetic Turf and Infill Systems: One boxed sample, minimum 12" X 12" in size.
2. Synthetic Turf: Two samples, minimum 12" X 12" in size.
3. Infills: One sample of sand/rubber infill, and one sample of warning track mix in the proper mix ratio applicable to this project.

E. Quality Control Submittals

1. Test Reports

a. Submit certified copies of independent, third party laboratory test reports for synthetic turf playfield system components as follows:

(1) Pile height, face width and total fabric weight per ASTM D418 or D5848.
(2) Primary and secondary backing weights per ASTM D418 or D5848.
(3) Tuft bind per ASTM D1335.
(4) Grab tear strength per ASTM D1682 or D5034.
(5) Pill burn test per ASTM D2859.

b. Submit necessary test data from the Installer to the Owner indicating that the finished field meets the required shock attenuation as per ASTM F355.

2. Existing Installation Listing: Provide a list, including project name, owner's representative name and telephone number for a minimum of ten fields of 65,000 SF or more installed in the United States during the past two years with the same manufacturer and company, including the exact same infill system, fiber and fiber manufacturer proposed for this project.

3. Base Stone Materials Acceptance: Prior to beginning installation of new synthetic turf over the existing stone base, arrange for a representative of the synthetic turf manufacturer and installer to inspect the base stone. The manufacturer and the installer must certify the acceptance of the base stone for the purpose of obtaining the manufacturer's warranty for the finished synthetic playing surface.

4. Lead Components – As part of the approval process of the submitted product, the synthetic turf playfield system supplier must certify in writing that no lead or lead chromate components are utilized in the manufacturing of the turf.

F. Closeout Procedures: Comply with the requirements of Division 1. The submission shall include maintenance instructions as specified in the "Operating and Maintenance Data" manual requirements described in this section including all necessary instructions for the proper care and preventative maintenance of the new infilled synthetic turf system including painting and inlaid or tufted markings and actual locations of seams, drains or other pertinent information.

1.06 QUALITY ASSURANCE

A. Manufacturer Qualifications: Company specializing in the manufacturing of products specified in this section.

B. Installer Qualifications: Company specializing in the installation of synthetic turf and infill systems specified for this project and complying with the following requirements:

1. Provide trained technicians skilled in the installation of athletic caliber synthetic turf systems working under the direct supervision of approved supervisors to provide cutting, sewing, gluing, shearing, topdressing or brushing operations.
2. Designated supervisory personnel on the project certified by the synthetic turf manufacturer as competent in installation of the proposed material, including sewing seams and the proper installation of the infill mixtures.
3. Provide representatives on the site to certify installation and warranty compliance.

C. Pre-Installation Meeting: Schedule and conduct a pre-installation meeting at least one week prior to the beginning of the installation of the synthetic grass surfacing system including the Owner, Owner's Designated Representative, Project Designer, Contractor or designated representative, applicable subcontractor representatives and synthetic grass surfacing representative.

D. Independent G-max and Infill Depth Testing: The Prime Contractor is to provide for independent testing for shock attenuation per ASTM F355 and ASTM F1936. Independent testing lab performing such services includes Hummel & Company, Inc., Trumansburg, New York (Telephone #607-387-5694).

1.07 PROJECT CONDITIONS

A. Existing Conditions: Repair damage to any porous stone base prior to installation of the synthetic grass surfacing system.

B. Field Measurements: Establish and maintain required lines and elevations for grade control. Verify measurements shown on the Contract Documents in field prior to ordering or installing materials.

1.08 SEQUENCING AND SCHEDULING

A. Proceed with and complete synthetic turf playfield construction as rapidly as portions of the site become available, working within seasonal limitations for the work required.

B. Coordinate synthetic turf playfield installation to ensure perimeter edge details, underground storm piping and connections and other associated work required for the system as detailed and recommended by the manufacturer and approved by the Project designer are provided.

1.09 WARRANTY

A. The Prime Contractor and/or Manufacturer shall provide a warranty to the Owner that includes the following in writing in the warranty document:

1. The turf warranty shall be from a single source and shall provide full coverage for all defects in all materials and workmanship of the synthetic turf for its intended usability and playability for a period of eight years from the date of Final Completion and acceptance of the turf field. The turf manufacturer must verify that their on-site representative has inspected the installation and that the work conforms to the manufacturer's requirements.
2. In addition to the Turf Contractor's/Manufacturer's single source warranty, an additional prepaid insurance policy supported from a third party, A.M. Best, A-rated or better domestic insurance carrier shall be provided for the full eight year warranty period. The insurance policy should be written specifically naming the field being constructed as part of this project and shall additionally require payment of a claim be made directly to the Owner of said field. Evidence of such coverage must be submitted and approved.
3. The turf warranty shall include general wear and damage caused from ultra-violet degradation.
4. The turf warranty shall specifically list what components and properties are covered by the warranty. The list shall include but not limited to any and all defects or failures relating to construction of the synthetic turf system and stone base, drainage through the synthetic turf system and dynamic base stone, synthetic turf seam rupture, synthetic turf yarn ultra-violet stability, excessive wear and tensile strength.
5. The turf warranty shall cover defects in the workmanship of installation and further warrants that the installation was done in accordance with both the manufacturer's recommendations and any written directives of the manufacturer's on-site representative.
6. The turf warranty shall include all necessary materials, labor, transportation costs, etc., to complete repairs or replacements. The warranty shall guarantee the availability of the same or better replacement materials for the synthetic turf system for the warranty period.
7. The turf warranty shall be non-prorated and shall not place limits on the amount of field's usage.
8. The turf warranty shall clearly define the conditions under which the manufacturer considers the warranty to be void.

9. The turf warranty shall define the typical time frame within which repairs will be initiated by the synthetic turf contractor, once notice has been received requesting repairs.
10. The warranty shall guarantee the G-max ratings at the completion of construction and for the duration of the warranty as described in this specification.

1.10 MAINTENANCE

A. The synthetic turf contractor shall provide training for the Owner regarding the recommended maintenance program for the synthetic turf field. The training shall include a detailed review of the turf maintenance manual required to be provided by the synthetic turf manufacturer.

B. The synthetic turf contractor shall provide training for the Owner's facility maintenance staff in the use of the field groomer and all other equipment to be utilized for maintenance of the synthetic turf field.

C. Extra Materials: Upon final completion, provide the following materials directly to the Owner in the minimum quantities specified:

1. Seaming Tape – 200 LF
2. Seaming Epoxy – One standard sized pail.
3. Turf fabric (for each color provided) – 200 SF of each color used in playing field areas and logos, excluding the field line colors, with at least one piece of each color being 15' wide by 10' long.
4. 4" Wide Colored Fabric – Minimum 100 LF of each color specified for inlaid line striping.
5. One set (4 total) of both Men's and Women's lacrosse goal circles with all overlapping lines from other sports permanently installed.
6. One set (4 total) of the 1st, 2nd, 3rd, and home plate colored areas with all overlapping lines from other sports permanently installed.
7. 1000 pounds each of silica sand and ground rubber in weatherproof bags.
8. 1000 pounds each of all materials comprising the warning track mix in weatherproof bags

PART 2 PRODUCTS

2.01 MATERIALS

A. For convenience, synthetic turf and infill system details and specifications have been based on "A-Turf Titan System" by A-Turf Inc., Cheektowaga, NY (Tel. #1-888-777-6910), or the pre approved equals listed below.

1. "Legion 46", by "Shaw Sports Turf", 1201 Roberts Blvd NW, Suite 220, Kennesaw, GA (Tel. #866-703-4004) complying with, but not limited to, the following minimum properties.

2. "Astroturf Game Day Grass Q448" by Astroturf LLC., Dalton, Georgia 30721 (Tel. #1-800-723-8873) complying with, but not limited to, the following minimum properties.

B. Synthetic Turf and Infill System Minimum Properties

Standard	Property	Specification

1.	ASTM D1907	Fiber Denier	12,200denier(4 ends/1,800 per end for Mono, 5,000 denier per end for XP)
2.	ISO 4892-2	U.V. Performance	resistant
3.	ASTM D3575	Yarn Breaking Strength	33.44 lbs
4.	ASTM D3575	Yarn Maximum Elongation	73.10%
5.	ASTM D789	Yarn Melting Point	233 degrees F.
6.	ASTM D418/D5848	Pile Height	2 .25" nominal
7.	ASTM D5848	Pile Weight	50 oz./sq. yd.
8.	ASTM D418	Tuft Gauge	1/2"
9.	ASTM D5848	Primary Backing Weight	7.0 oz./sq. yd.
10.	ASTM D5848	Secondary Backing Weight	22 oz/sq. yd.
11.	ASTM D1335	Tuft Withdrawal Force	>9 lbs
12.	ASTM D1335	Tuft Bind	>9 lbs (without fill)
13.	ASTM D1335	Tuft Bind	12 lbs (with fill)
14.	ASTM1682/D5034	Grab Tear (width)	351 lbs/force
15.	ASTM 1682/D5034	Grab Tear (length)	350 lbs/force
16.	ASTM F1015	Relative Abrasive Index	<30
17.	ASTM D4491	Carpet Permeability	Greater than 20"/hour
18.	ASTM D2859	Flammability (Pill Burn)	Pass
19.	ASTM F1551	Permeability w/o infill	>20"+/-/hr

C. Carpet: 100% polyethylene parallel long slit fiber (TenCate XP Blade) and monofilament (TenCate Monoslide Ultra XQ, four ply) blended in dual yarn types and dual yarn thicknesses. Yarn thickness to be 310 Microns and 100 Microns. Fibers to be broadloom tufted into fibrous, perforated primary backing with secondary backing, furnished in 15' wide rolls by sufficient length to extend from sideline to sideline without splices and including white perimeter line tufted into individual sideline rolls; head seams, other than at sidelines are not acceptable.

1. Primary Backing: C18, D18 or H18 dimensionally stable 1-part (3 components) polypropylene, polyester and fiber backing.
2. Secondary Backing: Application of porous, heat activated urethane to permanently lock fiber tufts in place.
3. Color: Custom 75% Field Green/ 25% Lime Green configuration for natural aesthetics.

D. Standard Infill Mix: Controlled resilient layered granular mixture, partially covering carpet, consisting of rounded or non-angular uniformly sized silica sand installed minimum of 3lbs. per square yard, ambient ground SBR rubber crumb, and non-marking rubber installed at 3 lbs per square yard. Total weight shall be 6 lbs per square foot and will leave .25" void space between the finish infill level of 2.00" and the top of the fiber at 2.25".

E. Accessories: Glue, thread, paint, seaming fabric and other materials used to install and mark the synthetic grass surfacing system shall be provided as recommended by the synthetic turf manufacturer.

F. Base Stone Materials: Refer to Project Manual Section 31 00 00 – Earthwork and details on the Drawings for additional information on the Dynamic Finish Stone and Drainage Stone layers.

G. Perimeter Edging: As shown on the contract documents.

PART 3 EXECUTION

3.01 EXAMINATION

A. Installer Verification of Conditions: Examine conditions under which the synthetic turf playfield is to be constructed with the materials and components specified in this section. Affected Prime Contractors, the Owner's Representative and the Project Designer shall be notified in writing of any conditions detrimental to the proper and timely installation of the work.

1. Arrange for synthetic turf installer to inspect the base stone and accept in writing this sub-base surface for planarity and compaction. Arrange for installer to have dimensions of the field and locations for markings measured by a registered land surveyor to verify conformity to the specifications and applicable standards and make record of finished field as-built measurements.
2. Verify the compaction of the base stone course is 95% according to the Modified Proctor procedure (ASTM D1557), and that the surface tolerance does not exceed ¼" over 10 feet and ½" from design grade. The synthetic turf contractor shall provide a minimum of 48 hours notice to the Owner and their Designated Representative prior to scheduling final compaction or planarity testing.
3. Arrange for the inspection of the base stone and curbs using a laser level and plot on a 10 foot topographical grid. Based on this topographical survey, arrange for the suitable fine grading of the stone area, including proper rolling and compacting. Do not approve the dynamic base stone for tolerance to grade without obtaining topographic survey.
4. Arrange for the synthetic grass surfacing manufacturer to inspect and certify that the base stone area to receive the synthetic grass surfacing is ready for installation of the system , is perfectly clean as the installation commences, and will be maintained in that condition throughout the installation process.
5. When the installer confirms conditions as being acceptable to ensure proper and timely installation of the work and to ensure requirements of applicable warranties or guarantees can be satisfied, submit written confirmation to the Project Designer. Failure to submit written confirmation and subsequent installation will be assumed to indicate conditions are acceptable to the installer.

3.02 INSTALLATION

A. Install infilled synthetic turf system in accordance with the manufacturer's instructions: obtain written acceptance of any variance from the manufacturer's on-site representative (submit copy to the Project Designer), verifying that changes do not in any way affect warranty.

1. Preparation of the playfield subgrade and base stone shall be performed in accordance with Section 31 00 00 – Earthwork.

3.03 FIELD MARKINGS

A. Standards: All designs, markings, layouts, field lines and materials for the sports of soccer, men's and women's lacrosse and field hockey shall be in accordance with the current NCAA "Rules and Interpretations" for each sport and per the Contract Documents.

B. All lines and markings shall either be tufted and/or inlaid. There shall be no painted lines on the new synthetic turf playfield surface.

C. Preliminary colors of field lines and markings are included in this specification section. Final color selection will be made by the Owner.

D. For the purpose of developing the Contract Bid Price, the Contractor shall assume that all field lines are independent of each other and that no common field lines will be permitted. In all instances where field lines for different sports are defined to be in the same location, the lines shall be tufted or inlaid directly adjacent to each other. Installation of common sport field lines will be considered as part of a playfield linestriping shop drawing provided by the contractor during the submittal process.

E. If NCAA rules provide a range of acceptable line widths, the contractor shall include the cost to provide the widest for the bid price, unless specifically indicated otherwise on the Contract Documents. The final determination of line widths will be made during the review of submittals.

F. Inlay College approved logo's as indicated on the Contract Documents. Color selections to be during the shop drawing process.

G. The following are additional line striping requirements

1. Soccer

   a. Rules Manuals: All field lines and markings for the sport of soccer shall be in accordance with the current NCAA Soccer Rules and Interpretations Manual and per the Contract Documents.
   b. Field Size: 210' by 345'
   c. Linestriping Color: As indicated on the drawings.
   d. Field Linestriping: Provide tufted or inlayed 4" wide lines as denoted on the Contract Documents.
   e. Center Marking: Inlaid 9" diameter spot. Color selections to be during the shop drawing process.

2. Field Hockey

   a. Rules Manuals: All field lines and markings for the sport of field hockey shall be in accordance with the current NCAA Field Hockey Rules and Interpretations Manual and per the Contract Documents.
   b. Field Size: 180' by 300'
   c. Linestriping Color: As indicated on the drawings
   d. Field Linestriping: All lines shall be 4" wide, tufted or inlaid, unless specifically indicated otherwise in the rules manual or within the Contract Documents.

3. Women's Lacrosse

   a. Rules Manuals: All field lines and markings for the sport of women's lacrosse shall be in accordance with the current US Lacrosse "Official Rules for Girl's and Women's Lacrosse" Manual and per the Contract Documents.
   b. Field Size: 210' x 345'
   c. Linestriping Color: As indicate don the drawings
   d. Field Linestriping: All lines shall be 4" wide, tufted or inlaid, unless specifically indicated otherwise in the rules manual or within the Contract Documents.

4. Men's Lacrosse

   a. Rules Manuals: All field lines and markings for the sport of men's lacrosse shall be in accordance with the current NCAA Men's Lacrosse Rules and Interpretations Manual and per the Contract Documents.
   b. Field Size: 180' by 330'
   c. Linestriping Color: As indicated on the drawings
   d. Field Linestriping: All lines shall be 4" wide, tufted or inlaid, unless specifically indicated otherwise in the rules manual or within the Contract Documents.

3.04 FIELD QUALITY CONTROL

A. Material Testing: The Owner shall retain and pay for the services the services of an independent testing agency to provide the following testing services. The frequency of testing and the number of tests performed will be determined by the Owner's Designated Representative, the Consulting Geotechnical Engineer and the Project Designer, unless specifically noted otherwise in the Contract Documents. If any tested material is found to be non-compliant with the requirements of the Contract Documents, the Contractor shall bear the cost of correcting the non-compliant condition, including if necessary, the removal of all non-compliant material from the project site and replacement of the materials to comply with the required specifications. All retesting associated with non-compliant material shall be paid for by the Site Contractor.

1. In-Place Density Testing: Density testing shall be performed on the installed and prepared base stone in accordance with ASTM D2922, "Standard Test Methods for Density of Soil and Soil Aggregate in Place by Nuclear Methods". One density test will be performed per 2,500 SF of placed base stone.
2. In-Place Infiltration Testing: Infiltration testing shall be performed on the installed and prepared base stone in accordance with ASTM D3385, "Standard Test Method for Infiltration Rate of Soils In Field Using Double-Ring Infiltrometer" or ASTM D2434, "Standard Test Method for Permeability of Granular Soils (Constant Head). Eight to ten inflitration tests shall be performed per field.
3. Gradation Testing: Gradation testing shall be performed on the base stone delivered to the project site in accordance with ASTM D422, "Standard Test Method for Particle Size Analysis of Soils".
4. Porosity Testing: Testing to be performed on delivered base stone.
5. Additional Testing: The Owner reserves the right to have additional tests performed that are deemed necessary to confirm that the installation of materials associated with the new synthetic turf playfield system comply with the requirements of the Contract Documents.

B. Depth of Infill and G-Max Testing: Verification of installed infill depth and G-max testing to be performed by an independent testing firm retained and paid by the contractor. The testing firm must be approved by the Owner prior to Contractor authorizing any testing work.

1. Infill Depth: Measurement of infill to verify depth shall be taken at a minimum of ten locations throughout each installed playfield area. The amount of installed infill shall in all cases meet the minimum specified depth with an allowable tolerance of plus ¼".
2. G-Max: Testing shall be performed to verify that shock attenuation properties of the field meet the requirements indicated in this specification. Upon construction completion of the synthetic turf playfield, in place G-Max testing of the synthetic turf system shall be performed in accordance with ASTM F355 and ASTM F1936. At the time of completion and final acceptance of the playfield, G-Max ratings shall fall between 100 and 125 at all test locations.
    a. The Owner shall periodically test the playfield area for G-Max properties throughout the entire warranty period of the synthetic turf playfield at their own expense. If test results show that G-Max readings exceed 165 at any location, the synthetic turf contractor shall take all steps necessary to correct the condition. The synthetic turf contractor shall provide the Owner with adequate information to describe the corrective measures to be utilized and shall follow-up in writing confirming that the work provided was successful.

3.05 ADJUSTING AND CLEANING

A. Provide final cleaning of synthetic grass surfacing installations and maintain the area clean and free from debris during installation. Clean surfaces, recesses, enclosures and similar areas as required, leaving the area of installation in a clean, immaculate condition ready for immediate occupancy and use by the Owner.

B. Protect the installed synthetic grass surfacing from subsequent construction operations. Do not permit traffic over unprotected surfacing.

C. Repairs and Protection of Infilled Synthetic Turf Playfield System

1. Repair or replace defective synthetic turf areas as directed by the Project Designer.
2. Protect infilled synthetic turf from damage until acceptance of the playfield construction.

END OF SECTION 32 18 14

SECTION 32 31 13

CHAIN LINK FENCES AND GATES

PART 1 - GENERAL

1.01 SECTION INCLUDES

A. Excavation for fence post bases
B. Concrete anchorage for posts
C. Installation of chain link fences
D. Installation of chain link gates
E. Installation of slat systems

1.02 RELATED SECTIONS

A. Section 32 12 16 – Asphalt Paving
B. Section 32 92 00 – Turf and Grasses

1.03 REFERENCES

A. Comply with ASTM A 53 for requirements of Schedule 40 piping.

1.04 DEFINITIONS

A. Height of Fence: Distance measured from the top of the concrete footing to the top of the fabric.

1.05 SUBMITTALS

A. Comply with the requirements of Section 01 33 00 – Submittal Procedures and as modified below.

B. Product Data: Submit manufacturer's name, specifications and installation instructions for each item specified.

C. Shop Drawings: Complete detailed drawings for each height and style of fence and gate required. Include separate schedule for each, listing all materials required and technical data such as size, weight and finish to ensure conformance to the specifications.

D. Quality Control Submittals

1. Qualifications Certification: Submit written certification or similar documentation signed by the applicable subcontractor, prime contractor and/or manufacturer (where applicable) indicating compliance with the "Qualifications" requirements specified below in the "Quality Assurance" section of this specification.
2. Experience Listing: Submit a list of completed projects using the products proposed for this project, including owner's contact information and telephone number for each project, demonstrating compliance with applicable "Qualifications" requirements specified in the "Quality Assurance" section of this specification.

E. Closeout Procedures: Comply with the requirements of Section 01 77 00.

1.06 QUALITY ASSURANCE

A. Comply with the standards of the Chain Link Fence manufacturer's Institute, including (unless otherwise indicated):

1. Specification for Metallic Coated Steel Chain Link Fence Fabric
2. Industrial Steel Specification for Fence Rails, Posts, Gates and Accessories
3. ASTM F-567 - Standard Practice for Installation of Chain Link Fence for installation unless otherwise indicated on the Contract Documents.

B. Qualifications

1. Provide metal fences and gates as a complete unit produced by a single manufacturer, including necessary erection accessories, fitting and fasteners. Products shall be provided by a company specializing in commercial quality chain link fencing with at least five years experience.

C. Regulatory Requirements

1. Obtain written permission from applicable agencies prior to the start of construction. Submit one copy of the permit as specified in "Submittals-Quality Control Submittals" above.

1.07 PROJECT CONDITIONS

A. Field Measurements: Establish and maintain required lines and elevations for grade control.

1.08 SEQUENCING AND SCHEDULING

A. Proceed with and complete chain link fence and gate installation as rapidly as portions of the site become available, working within seasonal limitations for the work required.

PART 2 PRODUCTS

2.01 MATERIALS

A. Framework Standards

1. Steel Pipe: Cold rolled steel pipe meeting the requirements of ASTM A-569 with a minimum yield strength of 50,000 psi.
2. Interior Coating: In line applied zinc rich coating with zinc powder loading of a minimum 90% by weight applied after fabrication conforming to ASTM B 6 high grade and Special High Grade Zinc.
3. Exterior Coatings

   a. Base Coat: Minimum .9 ounces zinc per square foot.
   b. Intermediate Coat: Minimum 15 microgram chromate conversion per square inch.
   c. Top Coat: Minimum 0.3 mil cross link polyurethane acrylic exterior coating.
   d. PVC exterior coating: Fusion bonded polyvinyl chloride similar to Brighton Colorbond Fence System by Merchant Metals, Brighton, Michigan. Color to be black unless specifically noted otherwise on the Contract Documents.

4. Size of Pipe: As indicated.
5. Similar to SS-40 Pipe with Flo-Coat by Allied Tube and Conduit Corporation, Harvey, Illinois.

B. Framework and Footings for Fences Up To 6'-0" High

1. End Posts, Corner Posts and Pull Posts.

a. Pipe: 2.50" O.D.
b. Set pull posts at the midway point of all lines 500 feet or longer and at all changes of direction or grade of 15 degrees or more. Place pull posts at each radius point within the curved line where the internal angle is 30 degrees or more.
c. Footing Size: 12" O.D. by 4'-0" deep.

2. Line Posts

a. Pipe: 2.00" O.D.
b. Space line posts at a maximum of 10 feet on center unless specifically noted otherwise on the contract documents.
c. Footing Size: 12" O.D. by 4'-0" deep.

C. Framework and Footings for Fences 7'-0" To 9'-0" High

1. End Posts, Corner Posts and Pull Posts.

a. Pipe: 3.00" O.D.
b. Set pull posts at the midway point of all lines 500 feet or longer and at all changes of direction or grade of 15 degrees or more. Place pull posts at each radius point within the curved line where the internal angle is 30 degrees or more.
c. Footing Size: 12" O.D. by 4'-0" deep.

2. Line Posts

a. Pipe: 2.50" O.D.
b. Space line posts at a maximum of 10 feet on center unless specifically noted otherwise on the contract documents.
c. Footing Size: 12" O.D. by 4'-0" deep.

D. Framework and Footings for Fences 10'-0" To 12'-0" High

1. End Posts, Corner Posts and Pull Posts.

a. Pipe: 4.00" O.D.
b. Set pull posts at the midway point of all lines 500 feet or longer and at all changes of direction or grade of 15 degrees or more. Place pull posts at each radius point within the curved line where the internal angle is 30 degrees or more.
c. Footing Size: 12" O.D. by 4'-0" deep.

2. Line Posts

a. Pipe: 3.00" O.D.
b. Space line posts at a maximum of 10 feet on center unless specifically noted otherwise on the contract documents.
c. Footing Size: 12" O.D. by 4'-0" deep.

E. Framework and Footings for Fences Over 12'-0" High

1. End Posts, Corner Posts and Pull Posts.

a. Pipe: 4.00" O.D. unless specifically noted otherwise on the Contract Documents.
b. Set pull posts at the midway point of all lines 500 feet or longer and at all changes of direction or grade of 15 degrees or more. Place pull posts at each radius point within the curved line where the internal angle is 30 degrees or more.
c. Footing Size: 12" O.D. by 4'-0" deep.

2. Line Posts

   a. Pipe: 4.00" O.D.
   b. Space line posts at a maximum of 10 feet on center unless specifically noted otherwise on the contract documents.
   c. Footing Size: 12" O.D. by 4'-0" deep.

F. Post Brace: Provide manufacturer's standard adjustable brace at gate posts and at both sides of corner and pull posts, with a horizontal brace located at the mid-height of the fabric. Unless otherwise specified, provide PVC coating to match color of adjacent fence components.

G. Top Intermediate and Bottom Rails

1. 1.66" O.D. pipe, weighing 1.84 pounds per linear foot. Install rails in the manufacturer's longest lengths utilizing expansion couplings, approximately 6" long at each joint. Provide means for attaching the top rail securely to each gate post, corner post, pull post and end post.

   a. Provide new bottom rail for all fences.
   b. Unless otherwise specified, provide PVC coating to match color of adjacent fence components.

H. Swing Gate Posts

1. Single leaf of gate up to 6' wide and less than 10' in height: 2.875" O.D. pipe, 5.79 pounds per linear foot.
2. Single leaf of gate 6' to 12' wide or over 10' in height: 4.00" O.D. pipe, 9.11 pounds per linear foot.
3. Single leaf of gate 12' to 18' wide: 6.625" O.D. pipe, 18.97 pounds per linear foot.
4. Single leaf of gate over 18' wide and less than 10' in height: 8.625" O.D. pipe, 24.70 pounds per linear foot.

I. Swing Gate Framework

1. Up to 6'-0" high and leaf width of 8'-0" or less: 1.660" O.D. pipe, 2.27 pounds per linear foot.
2. 6'-0" to 12'-0" height or leaf width exceeding 8'-0": 1.90" O.D. pipe, 2.72 pounds per linear foot.
3. 12'-1" to 20'-0" height: 2.375" O.D. pipe, 3.65 pounds per linear foot.
4. Assemble gate frames by welding. Install mid-height horizontal rails on gates over 10'-0" in height. When the width of a gate leaf exceeds 10'-0", install mid-distance vertical bracing of the same size and weight as frame members. When either horizontal or vertical bracing is not required, provide truss rods as cross bracing to prevent sag or twist.

J. Swing Gate Hardware

1. Hinges: Non-lift type, offset to permit 180 degree swing and of a suitable size and weight to support the gate. Provide 1½ pair of hinges for each leaf over 6' high.
2. Latch: Forked type for single gates 10 feet wide or less. Drop bar type with keeper for double gates and single gates over 10 feet wide complete with flush plate set in concrete. Drop bar length shall be 2/3 the height of the gate. A padlock eye shall be an integral part of the latch construction.
3. Holdbacks for Vehicular Gates: Type which automatically engages the gate leaf and holds the gate in the open position until manually released.

4. Unless otherwise specified, provide PVC coating to match color of adjacent fence components.

K. Sliding Gate Framework

1. Posts: 4.50" O.D. pipe, 10.79 pounds per linear foot.
2. Frames: 1.90" O.D. pipe, 2.72 pounds per linear foot.
3. Unless otherwise specified, provide PVC coating to match color of adjacent fence components.

L. Sliding Gate Hardware: Cantilever type with enclosed tracks and integral latch assembly. Unless otherwise specified, provide PVC coating to match color of adjacent fence components. Hardware shall be similar to products manufactured by the following:

1. Ty-Metal Corporation, Clifton Park, New York (Tel. #1-800-328-4283).
2. Anchor Fence, Baltimore, Maryland (Tel. #410-633-6500).

M. Chain Link Fabric

1. PVC Coated Fabric: Unless otherwise specified, provide 2" mesh, 9 gauge steel wires, with one piece fabric widths for fencing up to 12 feet high. The PVC coating is to be fused and adhered to galvanized wire in accordance with Federal Specification RR-F-191 H/ID, ASTM F-668 Class 2B, and ASTM F934. Coating thickness to be 7 mils.

   a. Manufacturer: Brighton Colorbond Fence System by Merchant Metals, Brighton, Michigan or similar.
   b. Color to be black unless specifically noted otherwise on the Contract Documents.

2. Selvages: Top and bottom selvages to be knuckled unless specifically noted otherwise on the Contract Documents. Unless otherwise specified, provide PVC coating to match color of adjacent fence components.

N. Post Caps:
1. Weather tight closure cap, one cap per post.
2. Furnish caps with openings to permit passage of rail.
3. Fasteners: Tamper resistant cadmium plated steel screws.
4. PVC Coated: Complying with the requirements of Brighton Colorbond Fence System by Merchant Metals, Brighton, Michigan.

O. Stretcher Bars: One piece equal to the full length of the fabric, minimum cross section 3/16" by ¾". Unless otherwise specified, provide PVC coating to match color of adjacent fence components.

P. Metal Bands (for securing stretcher bars): Steel, wrought iron or malleable iron. Unless otherwise specified, provide PVC coating to match color of adjacent fence components.

Q. Hardware: Self locking bands, tie wires and similar accessories. All hardware ends to pipe rails and other fence components must be of solid construction that prevents access to wasps and similar insects.

1. Aluminum Coated Hardware: Aluminum coating to be minimum of 0.40 ounces per square foot in accordance with ASTM F 626-96.
2. PVC Coated Hardware: Complying with the requirements of Brighton Colorbond Fence System by Merchant Metals, Brighton, Michigan to match color of adjacent fence components.

R. Tension Wire: Manufacturer's standard 7 gauge coiled spring steel wire system installed at the bottom of the fabric for fencing less than 10'-0" in height unless specifically noted otherwise on the Contract Documents. Unless otherwise specified, provide PVC coating to match color of adjacent fence components.

S. Wire Ties: PVC finish complying with ASTM A809, 0.40 ounces per square foot.

1. For tying fabric to line posts, rails, and braces: 9 gauge steel wire installed at 12" O.C.
2. For tying tension wire to fabric: 11 gauge steel hog rings at 24" O.C.

T. Truss Rods: 3/8" diameter. Unless otherwise specified, provide PVC coating to match color of adjacent fence components.

U. Bolts and Nuts: ASTM A 307, Grade A. Unless otherwise specified, provide PVC coating to match color of adjacent fence components.

V. Concrete: Portland cement concrete having a minimum compressive strength of 2500 psi at 28 days.

W. Cold Galvanizing Compound: Single component compound giving 93% pure zinc in a dried film and meeting the requirements of DOD-P-21035A (NAVY)

X. Shrink Resistant Grout: Factory packaged, non-catalyzed, ferrous aggregate mortar grouting compound for installation of posts in bedrock areas. Manufacturer's with products complying with the specifications include:

1. Embeco 636 by Master Builders, Cleveland, Ohio (Tel.# 1-800-227-3350).
2. Ferrolith G-NC by Sonneborn/Chemrex, Inc., Maspeth, NY (Tel# 1-800-433-9517).

PART 3 EXECUTION

3.01 EXAMINATION

A. Installer Verification of Conditions: Examine conditions under which chain link fences and gates are to be constructed with the materials and components specified in this section. Affected Prime Contractors, the Owner's Representative and the Project Designer shall be notified in writing of any conditions detrimental to the proper and timely installation of the work.

1. When the installer confirms conditions as being acceptable to ensure proper and timely installation of the work and to ensure requirements of applicable warranties or guarantees can be satisfied, submit written confirmation to the Project Designer. Failure to submit written confirmation and subsequent installation will be assumed to indicate conditions are acceptable to the installer.

3.02 PREPARATION

A. Clear and grub plant material along the fence line as required to eliminate growth interfering with the fence alignment. Remove all debris from the project property.

B. Do not begin installation of the fence until finish grading in area has been completed.

3.03 INSTALLATION

A. Space posts equidistant in the fence line at a maximum of 10 feet on center unless specifically noted otherwise on the Contract Documents.

B. Setting Post in Earth: Drill holes for fence footings. Set posts in the center of the hole and fill the hole with concrete. Plumb and align posts, vibrate or tamp concrete for consolidation. Finish concrete in a dome shape above the finish grade elevation to shed water. Do not attach fabric to posts until the concrete has cured a minimum of seven days.

C. Located corner posts at corners and at changes in direction. Use pull posts at all abrupt changes in grade and at intervals no greater than 500 feet. On runs over 500 feet, space pull posts evenly between corner or end posts. On long curves, space pull posts so that the strain of the fence will not bend line posts.

D. Install top rail continuously through post tops or extension arms, bending to radius for curved runs. Install expansion couplings as recommended by the fencing manufacturer.

E. Install bottom and intermediate rails in one piece between posts and flush with the post on the fabric side using special offset fittings where necessary.

F. Brace corner posts, pull posts, end posts and gate posts to adjacent line posts with horizontal rails.

G. Diagonally brace corner posts, pull posts, end posts and gate posts to adjacent line posts with truss rods and turnbuckles.

H. Attach the fabric to the active playfield or security side of the fence. Maintain a 1 inch clearance above the finished grade except where indicated otherwise. Thread stretcher bars through the fabric using one bar for each gate and end post and two for each corner and pull post. Pull fabric tight so that the maximum deflection of the fabric is 2 inches when a 30 pound pull is exerted perpendicular to the center of a panel. Maintain tension by securing stretcher bars to posts with metal bands spaced at 15” O.C. Fasten fabric to steel framework with wire ties spaced 12” O.C. for line posts and 24” O.C. for rails and braces. Bend back wire ends to prevent injury. Tighten stretcher bar bands, wire ties and other fasteners securely.

1. When the fabric height exceeds 12’, overlap horizontal splices 6”at the intermediate rail and secure with wire ties spaced at 12” O.C.

I. Position bolts for securing metal bands and hardware so nuts are located opposite the fabric side of the fence. Tighten nuts and cut off excess threads so no more than 1/8” is exposed. Peen ends to prevent loosening or removal of nuts. Secure post tops and extension arms with tamper resistant screws.

J. Install gates plumb and level and adjust for full opening without interference. Install ground set items in concrete for anchorage as recommended by the fence manufacturer. Adjust hardware for smooth operation and lubricate where necessary.

K. Tension Wire: Support bottom edge of fabric with a tension wire unless specifically indicated otherwise on the Contract Documents. Weave the tension wire through the fabric and fasten with hog rings at 24” O.C. Tie the tension wire to the post with 7 gauge wire ties.

L. Wire brush and repair welded and abraded areas with one coat of cold galvanizing compound.

M. Restore disturbed ground areas to their original condition. Topsoil and seed to match adjacent areas.

3.04 ADJUSTING AND CLEANING

A. Repairs and Protection of chain link fences and gates.

1. Repair or replace broken or defective chain link fences and gates as directed by the Project Designer.
2. Protect chain link fences and gates from damage until acceptance of the fencing construction.

END OF SECTION 32 31 13

SECTION 32 92 00

LAWNS AND GRASSES

PART 1 GENERAL

1.01 SECTION INCLUDES

A. Subsoil preparation
B. Placement of topsoil
C. Seeding and application of soil amendments and fertilizers
D. Mulching
E. Protection of seeded areas
F. Turf maintenance during warranty period
G. Cleanup and protection
H. Inspections and final acceptance

1.02 RELATED SECTIONS

A. Section 31 20 00 – Earth Moving

1.03 SUBMITTALS

A. Comply with the requirements of Section 01 33 00 – Submittal Procedures and as modified below.

B. Quality Control Submittals

1. Experience Listing: Submit a list of completed projects including owner's contact information and telephone number for each project, demonstrating compliance with applicable "Qualifications" requirements specified in the "Quality Assurance" section of this specification.
2. Submit seed vendor's certified statement for each grass seed mixture required, stating botanical and common name, percentage by weight, and percentages of purity, germination, and weed seed for each grass seed species.

C. Contract Closeout Submittals: Comply with the requirements of Section 01 77 00.

1.04 QUALITY ASSURANCE

A. Worker's Qualifications: The person's performing the planting and their direct supervisor shall be personally experienced in the construction and caring of lawn areas. On site supervisory personnel shall have been employed by the company engaged in the installation and care of lawn areas for a minimum of five years. All other individuals on the landscape crew must have a minimum of six months experience in the landscape contracting industry.

1.05 DELIVERY, STORAGE AND HANDLING

A. Packing and Shipping: Ship seed and associated materials with certificates of inspection required by governing authorities.

B. Do not make substitutions. If specified seed material is not obtainable, submit to the Project Designer proof of non-availability and a proposal for use of equivalent material.

C. Store all seed at the site in a cool, dry place as approved by the Owner's Representative. Replace any seed damaged during storage.

D. Deliver seed in vendor's unopened packages bearing labels showing the vendor's name and seed analysis by weight.

E. Deliver fertilizer in the manufacturer's standard sized bags showing the weight, analysis, and manufacturer's name. Store all fertilizer under a waterproof cover or in a dry place as approved by the Owner's Representative.

1.06 PROJECT CONDITIONS

A. Water: If available on the site, water will be supplied for the purpose of watering newly planted lawn areas at no cost to the contractor. If water is not available on site, the contractor shall supply water at their own cost as required to maintain the health of the newly planted material.

B. Provide irrigation materials capable of adequately watering new lawn areas until acceptance.

1.07 PESTICIDE APPLICATIONS

A. Any contractor applying pesticides must notify the Owner's designated pesticide representative and all property neighbors not less than 48 hours in advance of any pesticide application including herbicides, insecticides and fungicides in accordance State

1.08 SEQUENCING AND SCHEDULING

A. Proceed with and complete lawn planting as rapidly as portions of the site become available, working within seasonal limitations for the work required.

B. Seed lawn areas during a period between August 15 and October 1. Seeding during unseasonable conditions must be reviewed and approved with the Project Designer at the sole risk of Contractor.

C. The Contractor shall complete a minimum of three mowings before requesting the Project Designer review for acceptance of seeding work.

PART 2 PRODUCTS

2.01 SEED

A. Grass seed shall be certified "Blue Tag" seed composed of a blend of varieties mixed in proportion by weight and tested for minimum percentages of purity and germination. Submit the proposed mixture to the Project Designer for approval.

1. Fall Seeding: Seed blend shall consist of 100% Kentucky Bluegrass on a weight basis. The seed shall be a blend of at least three Kentucky Bluegrass varieties of which no less than 60% of the seed shall be at least two of the following cultivars; Rambo, Princeton-105, Wildwood, Allure, Coventry, Champagne, Northstar, Cardiff, Nimbus, Raven, SR2100, Misty, America, Brilliant, Limousine, Conni, Liberator, Apollo, NuGlade, Total Eclipse, Unique, Impact, Midnight, Arcadia and Serene.

2. Spring Seeding (If approved by the Project Designer): Seed blend shall consist of 80% Kentucky Bluegrass and 20% Perennial Ryegrass on a weight basis. The seed shall be a blend of at least two Kentucky Bluegrass varieties of which no less than 60% of the seed shall be at least two of the following cultivars; Rambo, Princeton-105, Wildwood, Allure, Coventry, Champagne, Northstar, Cardiff, Nimbus, Raven, SR2100, Misty, America, Brilliant, Limousine, Conni, Liberator, Apollo, NuGlade, Total Eclipse, Unique, Impact, Midnight, Arcadia and Serene. The Perennial Ryegrass may be any one of the following

cultivars; Palmer III, Calypso II, Brightstar II, Secretariat, Monterey, Catalina, Pennant II, Premier II, Sonata, Sunshine and Ascend. The Perennial Ryegrass shall have a minimum germination percentage of 85%. The percentage of weed seed shall not exceed 1% and other crop seed shall not exceed 0.5% by weight of the mixture. Any variety substitutions or deviations from these specifications must be approved by the Project Designer.

2.02 TOPSOIL

A. Use either approved topsoil imported to the project site or approved on-site topsoil stripped, stockpiled and amended to meet the required specifications.

1. On-site topsoil shall be from existing stockpiles stripped from the project site and approved by the Project Designer.
2. Where quantity of topsoil required exceeds that available from on-site stockpiles, provide imported topsoil from local sources or from areas having similar soil characteristics to that found on the project site which are producing or have produced fair to good yield farm crops without unusual fertilization for a minimum period of ten years or from arable or cultivable areas supplied with good natural drainage. Do not obtain topsoil from bogs or marshes or from farmland that has utilized "Atrizine" or similar herbicide within the past five years.

B. Provide topsoil conforming to the following:

1. Original loam topsoil, well drained homogeneous texture and of uniform grade, without the admixture of subsoil material and entirely free of dense material, hardpan, sod, or any other objectionable foreign material.
2. Containing not less than four percent nor more than 20 percent organic matter in that portion of a sample passing a ¼" sieve when determined by the wet combustion method on a sample dried at 105 degrees F.
3. Containing a pH value within the range of 6.3 and 7.0 on that portion of the sample which passes a ¼" sieve.
4. On-site and imported topsoil shall be mechanically screened prior to respreading to comply with the following gradation:

SIEVE DESIGNATION	PERCENT PASSING
¾ inch	100
¼ inch	97 – 100
No. 200	20 - 65

2.03 FERTILIZER

A. Mixed commercial fertilizers containing total nitrogen, available phosphoric acid and soluble potash in the ratio of 10-6-4 (50% N/UF). 50% of the total nitrogen shall be derived from a urea form furnishing a minimum of 3.5% water insoluble nitrogen (3.5% WIN). The balance of the nitrogen shall be present as methylene urea, water soluble urea, nitrate and ammoniacal compounds.

2.04 MULCH

C. Hydro-Application: Colored wood cellulose fiber product specifically designed for use as a hydro-mechanical applied mulch.

1. For convenience, details and specifications have been based on the following manufacturers and their products:

b. Conwed Hydro Mulch as manufactured by Conwed Fibers, Hickory NC.

PART 3 EXECUTION

3.01 EXAMINATION

A. Installer Verification of Conditions: Examine conditions under which lawn installation is to be completed with the materials and components specified in this section. Affected Prime Contractors, the Owner's Representative and the Project Designer shall be notified in writing of any conditions detrimental to the proper and timely installation of the work.

1. When the installer confirms conditions as being acceptable, to ensure proper and timely installation of the work and to ensure requirements of applicable warranties or guarantees can be satisfied, submit written confirmation to the Project Designer. Failure to submit written confirmation and subsequent installation will be assumed to indicate conditions are acceptable to the installer.

3.02 PREPARATION

A. Strip and stockpile full depth of existing topsoil. Screen topsoil to comply with gradation specifications prior to respread of the material.

B. Perform earthwork operations to accomplish design elevations as indicated on the Contract Documents. Loosen subgrade of lawn areas to a minimum depth of four inches. Remove stone and any other deleterious matter encountered over 1½" in any dimension within the subgrade.

C. Respread screened topsoil in general lawn areas (non playfield areas) to a minimum depth of six inches as required to meet lines, grades, and elevations shown after light rolling and settlement.

D. Grade lawn areas to a smooth even surface with loose, uniformly fine texture. Roll, rake, remove ridges and fill depressions as required to meet finish grades. Limit fine grading operations to areas which can be planted immediately after grading.

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

F. Restore lawn areas to specified condition if eroded or otherwise disturbed after fine grading and prior to seeding.

G. Preparation of Unchanged Grades: Where lawns are to be seeded in areas that have not been altered or disturbed by excavating, grading, or stripping operations, prepare the soil bed for lawn planting as follows:

1. Prior to preparation of unchanged grades, remove existing grass, vegetation and turf. Dispose of such material outside of the Owner's property; do not turn over into the soil being prepared for lawns unless specifically indicated to do so on the Contract Drawings.
2. Till soil to a depth of not less than six inches.
3. Apply soil amendments and initial fertilizers as recommended.
4. Remove high areas and fill in depressions.
5. Till soil to a homogeneous mixture of fine texture, free of lumps, clods, stones, roots and other extraneous matter.

3.03 SEEDING

A. Do not use wet seed or seed which is moldy or otherwise damaged in transit or storage.

B. Application Rate: Six pounds of seed per 1000 square feet.

C. Hydroseeding

1. Apply seeding material with an approved hydroseeder.
2. Fill tank with water and agitate while adding seeding materials. Use sufficient fertilizer, mulch and seed to obtain the specified application rate. Maintain constant agitation to keep the contents in a homogeneous suspension. Prolonged delays in application or agitation that may cause injury to the seed will be the basis for rejection of the material remaining in the tank.
3. Distribute uniformly a slurry mixture of water, seed, fertilizer and mulch at a minimum rate of 57 gallons per 1000 square feet. (2500 gallons per acre).The Owner's Representative may order the amount of water increased if distribution of seeding materials is not uniform.

3.04 MULCHING

A. Hydro Application: Apply approved mulch in accordance with the manufacturer's written instructions and recommended rates of application.

3.05 PROTECTION OF SEEDED AREAS

A. Where grade is less than 3:1, mechanically spread mulch material and crimp into soil utilizing approved disc type machinery with rows at a 6" spacing.
B. Where grade is 3:1 or greater, cover seeded areas with jute matting and roll matting down over the slopes without stretching or pulling.

1. Lay the jute matting smoothly on the soil surface, burying the top end of each section in a narrow six inch trench. Leave a 12 inch overlap from the top roll over the bottom roll. Leave a four inch overlap over the adjacent section.
2. Staple outside edges and overlaps at 36 inch intervals.
3. Lightly dress slopes with topsoil to ensure close contact between the matting and the soil layer below.
4. In ditches, unroll matting in the direction of flow. Overlap ends of strips six inches with the upstream section on the top.

3.06 MAINTENANCE

A. Begin maintenance immediately after seeding. If seeded in the fall, continue maintenance the following spring until acceptable lawn conditions are established.

B. Water to ensure proper seed germination and to keep the surface of the seed bed damp. Continue watering new seeding until acceptance by the Owner. Apply water slowly so that the surface of the soil will not puddle or crust.

C. Cut grass for the first time when it reaches a height of 2½" and maintain a minimum height of 2". Do not cut more than 1/3 of the blade at any one mowing. Remove clippings.

D. Apply herbicide as soon as weeds germinate, during calm weather when the air temperature is above 50 degrees F. using a licensed applicator to apply the herbicide. When using herbicides, apply in accordance with the manufacturer's instructions.

E. Replant damaged grass areas showing root growth failure, deterioration, bare spots and eroded areas.

F. Refertilize newly seeded areas 28 days after the initial seeding. Apply a minimum of one pound of nitrogen per 1000 square feet of athletic field area. Use a complete fertilizer with a 2-1-1 ratio or as recommended by soil test results.

3.07 CLEANUP AND PROTECTION

A. During landscape construction work, keep pavements clean and the project area in an orderly condition.

B. Protect landscape construction and materials from damage due to landscape operations, operations by other contractors, trades and trespassers. Maintain protection during installation and maintenance periods. Treat, repair or replace damaged landscape construction as directed.

3.08 INSPECTIONS AND FINAL ACCEPTANCE

A. When seeding work and lawn establishment is completed, (including maintenance), request the Project Designer to make an inspection to determine acceptability. Final acceptance of lawn areas will be granted when a uniform stand of acceptable grass is obtained with a minimum of 95% coverage.

B. Where inspected lawn installation does not comply with the requirements of the Contract Documents, repair rejected work. The Contractor's maintenance responsibility shall continue until reinspected by the Project Designer and found acceptable. Maintenance responsibilities shall include refertilization, overseeding, watering and mowing of seeded areas.

END OF SECTION 32 92 00

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SECTION 33 40 00

STORM DRAINAGE UTILITIES

PART 1 - GENERAL

1.01 SECTION INCLUDES

A. Drainage pipe
B. Edge drains
C. Drainage structures
D. Frames, grates and covers
E. Trench drains
F. Filter fabric
G. Warning tape

1.02 RELATED SECTIONS

A. Section 31 00 00 – Earthwork
B. Section 31 23 17 – Site Trenching
C. Section 33 46 17 – Athletic Field Drainage

1.03 SUBMITTALS

A. Comply with the requirements of Section 01 33 00 – Submittal Procedures and as modified below.

B. Product Data: Submit manufacturer's name, specifications and installation instructions for each item specified.

C. Shop Drawings: Submit details of all underground structures including catch basins, drop inlets, storm manholes, drywells, trench drains, headwalls, outlet structures, frames and grates, frames and covers, culvert end sections and similar items indicated on the Contract Documents.

D. Closeout Procedures: Comply with the requirements of Section 01 77 00.

1.04 QUALITY ASSURANCE

A. Regulatory Requirements: Obtain written permission from applicable agencies prior to the start of construction. Submit one copy of the permit to the Owner's Representative.

B. Comply with applicable municipal regulations. Coordinate connections into existing municipal sewers with appropriate town/village/county/city or state representatives. Pay for all fees associated the connection to municipal sewer system.

1.05 PROJECT CONDITIONS

A. Field Measurements: Establish and maintain required lines and elevations for grade control.

1.06 SEQUENCING AND SCHEDULING

A. Proceed with and complete storm drainage installation as rapidly as portions of the site become available, working within seasonal limitations for the work required.

PART 2 PRODUCTS

2.01 PIPING

A. High Density Polyethylene Pipe (HDPE): Solid or perforated double wall smooth interior pipe complying with the following:

1. 4" to 10" diameter pipe to conform to AASHTO M 252. 12" to 36" diameter pipe to conform to AASHTO M 294.
2. Coefficient of Roughness (Interior Pipe Surface): 0.012 maximum (Manning Formula)
3. Classification: Type S
4. Minimum Pipe Stiffness Values

    a. 4" – 12" Diameter: 50 psi

5. Joint Couplings: Polyethylene, bell and spigot type couplers utilizing an elastrometric gasket conforming to ASTM F 477. Snap on type or split collar through 24" diameter, screw on type where applicable.

    a. Corrugated to match pipe corrugations, width not less than one half the pipe diameter.
    b. Split couplings shall engage an equal number of corrugations on each side of the joint

6. Fittings: Either molded or fabricated, high density polyethylene components meeting the properties specified for, and designed specifically for the pipe manufactured by the pipe manufacturer.
7. Perforated Pipe: Conform to AASHTO M-252 or AASHTO M-294, Type SP with Class I perorations.
8. Specifications have been based on products manufactured by Advanced Drainage Systems, Inc, Columbus, Ohio (Tel. #614-457-3051) or Hancor, Inc., Findlay, Ohio (Tel. #800-847-5880).

B. Corrugated Polyethylene Piping: Solid and perforated piping complying with the following:

1. Pipe Classification: AASHTO M252, Type S
2. Material Classification: ASTM D 3350
3. Property Description: Cell Class 324420C
4. Pipe Size: As indicated on the Contract Documents
5. Perforation Size: 9/16" by 1/16" slots with a minimum inlet area of 2.4" per lineal foot of pipe.
6. Joint Couplings: External snap couplers with gaskets for solid wall and external snap couplers without gaskets for perforated pipe
7. Specifications have been based on products manufactured by Advanced Drainage Systems, Inc, Columbus, Ohio (Tel. #614-457-3051) or Hancor, Inc., Findlay, Ohio (Tel. #800-847-5880).

1. Channel Profile: Standard units with full radius bottom including positive interlocking tongue and groove connections that can be sealed to provide watertight connections. Each one meter precast polymer concrete unit shall have a 0.5" longitudinal evacuation slot and horizontal cast in anchoring features on outside walls to ensure mechanical bond to surrounding bedding materials.

2.02 FILTER FABRIC

A. Continuous filament fabric consisting of polypropylene fibers and heat bonded nylon sheathed polypropylene fibers.

1. Specifications have been based on “Mirafi 140N” manufactured by Mirafi Construction Products, Pendergrass, Georgia (Tel. #706-693-2226).

PART 3 EXECUTION

3.01 EXAMINATION

A. Installer Verification of Conditions: Examine conditions under which storm drainage is to be installed with the materials and components specified in this section. Affected Prime Contractors, the Owner’s Representative and the Project Designer shall be notified in writing of any conditions detrimental to the proper and timely installation of the work.

1. When the installer confirms conditions as being acceptable to ensure proper and timely installation of the work and to ensure requirements of applicable warranties or guarantees can be satisfied, submit written confirmation to the Project Designer. Failure to submit written confirmation and subsequent installation will be assumed to indicate conditions are acceptable to the installer.

3.02 PREPARATION

A. Excavation of trenches and for appurtenances and backfilling for storm drains shall be in accordance with the applicable portions of Project Manual Section 312000 – Earth Moving and Section 312317 – Site Trenching.

B. Inspect all pipe and fittings prior to installation. Remove defective pipe and fittings from the site.

3.03 INSTALLATION

A. Pipe Installation

1. Lay pipes true to line and grade. Gravity flow storm drainage systems shall be laid with bells facing upgrade.
2. Do not lay pipe on unsuitable material, in wet trenches or when a trench and weather conditions are unsuitable for the work.
3. Support the pipe on compacted bedding material.
4. Clean interior of all pipe thoroughly before installation.
5. Lower pipe in to trench carefully and bring to the proper line, grade and joint. After joining, the interior of each pipe shall be thoroughly wiped or swabbed to remove any dirt, trash or excess jointing materials.
6. Do not walk on pipe in trenches until covered by layers of backfill to a minimum depth of 12” over the crown of the pipe.
7. Install gravity sewer pipe to comply with the manufacturer’s specifications.

B. Concrete Drainage Unit Installation

1. Pre-cast reinforced concrete rings shall be installed true and plumb on a minimum 6” aggregate base bedding compacted to 95% of the maximum density.
2. The joints between rings, the base and the top shall be sealed with preformed flexible gasket material specifically manufactured for this type of application. Adjust the length of rings so

that eccentric cone tops and top slabs will be at the required elevation. Cutting of the conical top section will not be acceptable.

3. Grout storm piping entering units in place with the ring penetration completely filled for the full depth of the wall.
4. Install drainage unit frames, covers and grates on a mortar bed flush with the finish pavement or surrounding lawn area.

C. Building Foundation Drainage: Install at interior and building perimeter areas in strict accordance with ASTM D 2321 and the manufacturer's specifications.

3.04 ADJUSTING AND CLEANING

A. Deflection Tests: Provided by the Prime Contractor in accordance with the requirements of Project Manual Section 01 40 00 – Quality Requirements.

B. Upon completion of the installation, leave all components of the storm drainage system completely free from silt, debris and other obstructions.

C. Repairs and Protection of Storm Drainage Infrastructure

1. Repair or replace broken or defective storm drainage components as directed by the Project Designer.
2. Protect storm drainage from damage until acceptance of the infrastructure construction.

END OF SECTION 33 40 00