PORTSMOUTH HIGH SCHOOL
TURF REPLACEMENT
PORTSMOUTH, NH

TABLE OF CONTENTS

TECHNICAL SPECIFICATIONS

END OF TABLE OF CONTENTS

G:\718920\02 Design\specs\TABLE OF CONTENTS.docx

SECTION 01 01 00 – SUMMARY OF WORK

PART 1 - GENERAL

1.1 GENERAL PROVISIONS

A. Attention is directed to the CONTRACT AND GENERAL CONDITIONS and all Sections within DIVISION 00 – PROCUREMENT AND CONTRACTING REQUIREMENTS (PCR), which are hereby made a part of this Section of the Specifications.

1.2 RELATED SECTIONS

A. Section 00 21 13 – Information for Bidders

B. Section 01 31 14 – Conduct of the Work

1.3 GENERAL SCOPE OF WORK

A. The Synthetic Turf Replacements project at Portsmouth High School shall include:

1. The demolition of existing site features to include, but not limited to, the existing synthetic turf and other appurtenances as detailed in the contract documents.
2. The reconstruction of the synthetic turf field and other appurtenances, as detailed in the contract documents.
3. The restoration of any items damaged or destroyed by encroaching upon areas outside the Project Site.
4. Providing and restoring, where appropriate, all temporary facilities.
5. All other work indicated on the contract plans and/or specifications.

1.4 TIME OF COMPLETION

A. Start Construction – June 19, 2023

B. Substantial Completion – August 1, 2023

C. Final Completion – August 15, 2023

D. Prior to construction, the Contractor shall provide a detailed Gantt Chart schedule noting the start and end date of each task to be completed. The schedule shall include submission dates for key product submittals.

1.5 TESTING

A. The Contractor will retain and pay for the services of a certified independent testing laboratory in good standing to perform inspections, tests and other services required by the Specification including the expense of all failed tests, including retests as required to obtain approval. Contractor shall submit testing lab certifications and qualifications to the Owner for approval. However, the Owner shall pay for testing of concrete. The Contractor shall coordinate and schedule concrete testing.

1.6 MEETINGS

A. A competent representative of the Contractor who is familiar with the site and progress of the work is required to attend weekly jobsite meeting during the period of construction.

PART 2 - PRODUCTS (Not Used)

PART 3 - EXECUTION (Not Used)

END OF SECTION

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SECTION 01 23 00 - ALTERNATES

PART 1 - GENERAL

1.1 GENERAL PROVISIONS

A. Attention is directed to the CONTRACT AND GENERAL CONDITIONS and all Sections within DIVISION 00 – PROCUREMENT AND CONTRACTING REQUIREMENTS (PCR), which are hereby made a part of this Section of the Specifications.

1.2 SCOPE

A. This section lists the Alternates which appear in the Contract Documents.

B. Prices for each Alternate shall include overhead bonding, profit, and all other expenses incidental to the Work under each Alternate.

C. The Contractor and Subcontractors shall be responsible for examining the scope of each Alternate generally defined herein and for recognizing modifications to the Work caused by the Alternates and including the cost thereof in the bid price.

1.3 ALTERNATES

A. Add: Alternate No. 1 – In lieu of crumb rubber/sand infill contractor shall provide a performance infill consisting natural material/sand as manufactured by GreenPlay or approved equal.

B. Add: Alternate No. 2 – In lieu of crumb rubber/sand infill, contractor shall provide a synthetic turf system consisting of 1.75” dual-fiber pile height with acrylic-coated sand infill (Envirofill) as manufactured by U.S. Greentech or approved equal.

PART 2 - PRODUCTS (Not Used)

PART 3 - EXECUTION (Not Used)

END OF SECTION

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SECTION 01 31 14 – CONDUCT OF THE WORK

PART 1 - GENERAL

1.1 GENERAL PROVISIONS

A. Attention is directed to the CONTRACT AND GENERAL CONDITIONS and all Sections within DIVISION 00 – PROCUREMENT AND CONTRACTING REQUIREMENTS (PCR), which are hereby made a part of this Section of the Specifications.

1.2 RELATED SECTIONS

A. Section 00 21 13 – Information for Bidders

B. Section 01 01 00 – Summary of Work

1.3 PROJECT MANAGEMENT

A. Adjacent school buildings proximate to the project sites may be occupied during construction. The Contractor will take all necessary precautions to ensure the public safety and convenience of the occupants during construction. Use of any on-sites structures by the Contractor, proximate to the work site as a construction office, will not be allowed unless the Owner gives express written consent.

B. The work must be completed in a continuous uninterrupted operation. The Contractor must use sufficient personnel and adequate equipment to complete all the necessary work requirements within a minimum period of time.

C. Unless specifically authorized by the Owner, in writing, the work must be conducted between the hours of 7:00 A.M. and 5:00 P.M., Monday through Friday. No work is to be done on holidays or Sundays, other than for emergencies or as approved by the Owner. Work may be allowed on Saturdays, provided the Contractor obtains the Owner's written approval at least one week prior to the date of such work.

D. The Contractor is responsible for the security of partially completed work until the Owner accepts the project.

E. There will be no storage of materials, tools, and/or equipment within any of the adjacent buildings. The Owner, in writing, must authorize any storage within the school facilities.

F. Only materials and/or equipment intended and necessary for immediate use will be brought onto the site. At the end of each workday and at the completion of each phase of work, equipment and leftover or unused materials will be removed from the site.

1.4 SHUTDOWN OF SERVICES

A. The Contractor's attention is especially called to the fact that the continuous operation of services for the Owner is mandatory. The work cannot result in the shutdown of any major utilities in adjacent facilities without the Owner's consent, in writing. If the Owner will not allow this shutdown, but wants instead a temporary means of supplying said services, the Contractor will supply all labor, materials or whatever may be required to supply said temporary services, at no extra cost to the Owner and in accordance with the state and local regulations on health and safety.

1.5 COORDINATION

A. At the pre-construction conference, the Contractor will submit to the Owner for approval, a detailed project progress schedule showing the sequence of operations. The progress schedule will be in a Gantt chart or CPM format with tasks on the critical path clearly identified. The progress schedule must reflect achievements of the required substantial and final completion dates. The Owner may request a revised progress schedule at any point in the project when the working progress schedule is determined to be out of date. The Owner must approve any changes to this operational plan.

B. The Contractor must retain on the worksite, during the work's progress, a competent, full-time representative, satisfactory to the Owner. This representative will not be changed, except with the consent of the Owner. The representative will be in full charge of the work and all instructions given to this person by the Engineer will be binding.

C. The Contractor must supply to the Owner the home telephone number of responsible persons who may be contacted during non-workhours for emergencies on the Project.

PART 2 - PRODUCTS (Not Used)

PART 3 - EXECUTION (Not Used)

END OF SECTION

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SECTION 013302 – SUBMITTAL REQUIREMENTS

PART 1 - GENERAL

1.1 GENERAL PROVISIONS.

A. Attention is directed to the CONTRACT AND GENERAL CONDITIONS and all Sections within DIVISION 00 – PROCUREMENT AND CONTRACTING REQUIREMENTS (PCR), which are hereby made a part of this Section of the Specifications.

1.2 RELATED DOCUMENTS

A. Consult the individual sections of the specifications for the specific submittals required under those sections and for further details and descriptions of the requirements.

1.3 GENERAL PROCEDURES FOR SUBMITTALS

A. Submittal Register: Within seven (7) days of receipt of a Notice to Proceed, the Contractor will furnish to the Engineer a complete listing of all submittals (Shop Drawings, Manufacturer's Data, Samples, etc.) required by these specifications in tabular form. This form will include columns sufficient to manage and track the submission and action for each submission. The Contractor will revise and update this form upon request of the Engineer.

B. Schedule of Values: Within seven (7) days of receipt of a Notice to Proceed, the Contractor will furnish to the Engineer a Schedule of Values for review and approval. The Contractor will revise and update this form upon request of the Engineer.

C. Timeliness: The Contractor will transmit each submittal to the Engineer sufficiently in advance of performing related Work or other applicable activities so that the installation is not delayed by processing times, including disapproval and resubmittal (if required), coordination with other submittals, testing, purchasing, fabrication, delivery, and similar sequenced activities. No extension of time will be authorized because of the Contractor's failure to transmit submittals to the Engineer in advance of the Work.

D. Sequence: The Contractor will transmit each submittal in a sequence which will not result in the Engineer's approval having to be later modified or rescinded by reason of subsequent submittals which should have been processed earlier or concurrently for coordination.

E. Contractor's Review and Approval: Only submittals received from and bearing the stamp of approval of the Contractor will be considered for review by the Engineer. Submittals will be accompanied by a transmittal notice stating name of Project, date of submittal, "To", "From" (Contractor, Subcontractor, Installer, Manufacturer, Supplier), Specification Section, or Drawing No. to which the submittal refers, purpose (first submittal, resubmittal), description, remarks, distribution record, and signature of transmitter.

F. Engineer's Action: The Engineer will review the Contractor's submittals and return them with one of the following actions recorded thereon by appropriate markings:

1. Final Unrestricted Release: Where marked "Approved" the Work covered by the submittal may proceed provided it complies with the requirements of the Contract Documents.
2. Final-But-Restricted Release: When marked "Approved As Noted" the Work may proceed provided it complies with the Engineer' s notations or corrections on the submittal and complies with the requirements of the Contract Documents. Acceptance of the Work will depend on these compliances.
3. Returned for Resubmittal: When marked "Revise and Resubmit" or "Disapproved", the Work covered by the submittal (such as purchasing, fabrication, delivery, or other activity) should not proceed. The submittal should be revised or a new submittal resubmitted without delay, in accordance with the Engineer's notations stating the reasons for returning the submittal.

G. Processing: All costs for printing, preparing, packaging, submitting, resubmitting, and mailing, or delivering submittals required by this contract will be included in the Contract Sum.

1.4 OR EQUALS

A. Definition: Whenever a specification section names one or more brands for a given item, and the Contractor wishes to submit, for consideration, another brand, the submission will be considered an "or-equal" or a "material substitution". For the purposes of this Contract, the terms "or-equal" and "material substitution" will be considered synonymous.

B. In no case may an item be furnished on the Work other than the item named or described, unless the Engineer, will consider the item equal to the item so named or described.

C. The equality of items offered as "equal" to items named or described will be proved to the satisfaction of the Engineer at the expense of the Contractor submitting the substitution.

D. The Engineer and/or the Owner may require that full size samples of both the specified and proposed products be submitted for review and evaluation. The Contractor will bear full cost for providing, delivering, and disposal of all such samples.

E. The Contractor will assume full responsibility for the performance of any item submitted as an "Or-Equal" and assume the costs of any changes in any Work which may be caused by such substitution.

F. Or Equal Approval Process: On the transmittal, or on a separate sheet attached to the submission, the Contractor will direct attention to any deviations, including minor limitations and variations, from the Contract Documents.

1. The Contractor will submit to the Engineers for consideration of any or-equal substitution a written point-by-point comparison containing the name and full particulars of the proposed product and the product named or described in the Contract Documents.
2. Such submittal will in no event be made later than 10 calendar days prior to the incorporation of the item into the Work. This requirement may be waived by the Engineer upon written request.
3. Upon receipt of a written request for approval of an or-equal substitution, the Engineer will investigate whether the proposed item will be considered equal to the item named or described in the Contract Documents. Upon conclusion of the investigation, the Engineer will promptly advise the Contractor that the item is, or is not, considered acceptable as on Or-Equal substitution. Such written notice must have the concurrence of the Owner.

1.5 SUBMISSION OF SHOP DRAWINGS

A. Shop Drawings will be complete and to scale, giving all information necessary or requested in the individual section of the specifications. They will also show adjoining Work and details of connection thereto.

B. Shop Drawings will be for whole systems. Partial submissions will not be accepted.

C. The Engineer reserves the right to review and approve shop drawings only after approval of related product data and samples.

D. Shop drawings will be properly identified and contain the name of the project, name of the firm submitting the shop drawings, shop drawing number, date of shop drawings and revisions, Contractor's stamp of approval, and sufficient spaces near the title block for the Engineer's stamp.

E. The Contractor will submit to the Engineer legible, shop drawings. Shop drawings shall be electronic PDF format. Each submittal will be accompanied by a transmittal notice.

F. When the shop drawings are returned by the Engineer with the stamp "Revise and Resubmit", “Disapproved", the Contractor will correct the original drawing or prepare a new drawing and resubmit to the Engineer for approval. This procedure will be repeated until the Engineer’s approval is obtained.

G. When the shop drawings are returned by the Engineer with the stamp "Approved" or "Approved as Noted", the Contractor will provide and distribute the drawings for all Contractors and Subcontractors use.

H. The Contractor will maintain one full set of approved shop drawings at the site. The Contractor will produce a set of coordination drawings before the installation of any electrical work.

I. Changes on the submitted shop drawings that deviate from the Design Drawings must be brought to the Owners and Designers attention in writing prior to review. Changes must be clearly visible on the shop drawings in the form of written notation, ballooning or highlighting the intended change. A written description for the proposed change must also be included and submitted on company letterhead. Changes to drawings and details not submitted in accordance with these requirements will not be recognized as an approved deviation from the Design of Record. Construction repairs, renovations or replacements required as a result of shop drawing and submittal deviations that are not documented in accordance with these requirements are subject to removal and/or replacement by the Contractor, at the sole cost of the Contractor.

1.6 SUBMISSION OF PRODUCT DATA

A. The Contractor will submit Product Data to the Engineer via electronic PDF Format. All such data will be specific and identification of material or equipment submitted will be clearly marked in ink. Data of general nature will not be accepted.

B. Product Data will be accompanied by a transmittal notice. The Contractor's stamp of approval will appear on the information itself, in a location which will not impair legibility.

C. Product Data returned by the Engineer as "Disapproved" will be resubmitted until the Engineers approval is obtained.

D. When the Product Data is acceptable, the Engineer will stamp them "Approved" or "Approved as Noted" and return to the Contractor. The Contractor will provide and distribute as may be required to complete the Work.

E. The Contractor will maintain one full set of approved, Product Data at the site.

1.7 SUBMISSION OF SAMPLES

A. Unless otherwise specified in the individual section, the Contractor will submit two (2) specimens of each sample required for submission.

B. Samples will be of adequate size to permit proper evaluation of materials. Where variations in color or in other characteristics are to be expected, samples will show the maximum range of variation. Materials exceeding the variation of approved samples will not be approved on the Work.

C. Samples which can be conveniently mailed will be sent directly to the Engineer, accompanied by a transmittal notice. All transmittals will be stamped with the Contractor's approval stamp of the material submitted.

D. All other samples will be delivered at the field office of the Project Representative with sample identification tag attached and properly filled in. Transmittal notice of samples so delivered with the Contractor's stamp of approval will be mailed to the Engineer.

E. If a sample is rejected by the Engineer, a new sample will be resubmitted in the manner specified herein above. This procedure will be repeated until the sample is approved by the Engineer.

F. Samples will not be returned unless return is requested at the time of submission. The right is reserved to require submission of samples whether or not particular mention is made in the specifications, at no additional cost to the Owner.

PART 2 - PRODUCTS (Not Used)

PART 3 - EXECUTION (Not used)

END OF SECTION

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SECTION 01 35 43 – ENVIROMENTAL PROTECTION PROCEDURES

PART 1 - GENERAL

1.1 GENERAL PROVISIONS

A. Attention is directed to the CONTRACT AND GENERAL CONDITIONS and all Sections within DIVISION 00 – PROCUREMENT AND CONTRACTING REQUIREMENTS (PCR), which are hereby made a part of this Section of the Specifications.

1.2 SUMMARY

A. Furnishing all labor, materials, equipment and perform all work required for the prevention of environmental pollution in conformance with applicable laws and regulations, during and, as the result, of construction operation under this Contract. For the purpose of this Section, environmental pollution is defined as the presence of chemical, physical or biological elements, or agents, which adversely affect human health or welfare; unfavorably alter ecological balances of importance to human life; affect other species of importance to man; or degrade the utility of the environment for aesthetic and/or recreational purposes.

B. The control of environmental pollution requires consideration of air, water, and land, and involves management of runoff, dust, noise, and solid waste, as well as other pollutants. Work will include installing, maintaining, and removing sedimentation and erosion control components within the Limits of Work.

C. This Section does not address erosion and sedimentation control requirements, which are addressed in Section 31 25 00 of these Specifications.

1.3 SECTION INCLUDES

A. Applicable Regulations

B. Notifications

C. Protection of Groundwater

D. Protection of Streams And Wetlands

E. Protection of Land Resources

F. Protection of Air Quality

G. Maintenance of Pollution Control Facilities During Construction

H. Noise Control

I. Diesel Equipment Emission Controls

J. Spill And Discharge Control

1.4 RELATED SECTIONS

A. Section 01 50 00 - TEMPORARY FACILITIES

B. Section 31 25 00 - EROSION AND SEDIMENTATION CONTROL

1.5 APPLICABLE REGULATIONS

A. The General Contractor will comply with all applicable Federal, State, and local laws and regulations concerning environmental pollution control and abatement.

B. Fines and related costs resulting from failure to provide adequate protection against any environmentally objectionable acts and corrective action to be taken are the obligations of the General Contractor.

1.6 NOTIFICATIONS

A. Engineer may notify the General Contractor, in writing, of any non-compliance with the foregoing provisions or of any environmentally objectionable acts and corrective action to be taken. State or local agencies responsible for verification of certain aspects of the environmental protection requirements may notify the General Contractor, in writing, through the Engineer, of any non-compliance with State or local requirements. After receipt of such notice from the Engineer or from the regulatory agency, through the Engineer, the General Contractor will immediately take corrective action. Such notice, when delivered to the General Contractor or his/her authorized representative at the site of the Work, will be deemed sufficient for the purpose. If the General Contractor fails or refuses to comply promptly, the Engineer may issue an order stopping all or part of the Work until satisfactory corrective action has been taken. No part of the time lost, due to any such stop orders, will be made the subject of a claim for extension of time or for excess costs or damages by the General Contractor, unless it is later determined that the General Contractor was in compliance.

PART 2 - MATERIALS

2.1 WATER

A. Water used for dust control and equipment washes will be clean and free of salt, oil, and other injurious materials. The General Contractor will provide all necessary water.

B. ONSITE SPILL KIT

1. The General Contractor will provide the following minimum equipment to be kept onsite, at all times, during site work activities for any unexpected spills or discharges:

2. Sand, clean fill and absorbent pillows;

3. One (1) drum (55 gallon, U.S. DOT 17-E or 17-H);

4. Shovels; and

5. Steam cleaner for decontamination of tools and equipment.

PART 3 - EXECUTION

3.1 PROTECTION OF GROUNDWATER – NOT USED

3.2 PROTECTION OF STREAMS AND WETLANDS

A. Care will be taken to prevent, or reduce to a minimum, any damage to any wetland from pollution by debris, sediment, or other material. Manipulation of equipment and/or materials in delineated wetland areas is prohibited. Water that has been used for washing or processing, or that contains oils or sediments that will reduce the quality of the water in downstream waters of the state will not be discharged from the Site. Such waters will be collected and disposed of by the General Contractor, in accordance with all applicable Federal, State, and local regulations.

3.3 PROTECTION OF LAND RESOURCES

A. Land resources, within the project boundaries and outside the limits of permanent work, will be restored to a condition, after completion of remediation activities that will appear to be natural and not detract from the appearance of the project. Confine all construction activities to Limits of Work areas shown on the Drawing.

B. Outside of the Limits of Work as shown on the Drawing, do not deface, injure, or destroy trees or shrubs, nor remove or cut them without prior approval. Snow fence or other approved equal will be erected at the “fall line” of the tree canopy, and no vehicles or storage will be permitted within, to prevent damage to trees.

C. The locations of storage and other facilities, required in the performance of the Work, will not be within wetlands or resource areas.

3.4 PROTECTION OF AIR QUALITY

A. Burning – The use of burning at the project site for the disposal of refuse and debris will not be permitted.

B. Dust Control – Maintain all demolition excavations, stockpiles, waste areas and all other work areas within or without the project boundaries free from dust, which could cause the standards for air pollution to be exceeded and, which would cause a hazard or nuisance to others.

C. The General Contractor will provide adequate means for the purpose of preventing dust and odor caused by construction operations throughout the period of the construction contract. If the Designer indicates that the level of dust or odors is unacceptable, the General Contractor will employ measures necessary to reduce dust or odors to an acceptable level.

D. The General Contractor will implement engineering controls (e.g., watering, misting) to control dust whenever required by the Engineer.

3.5 MAINTENANCE OF POLLUTION CONTROL FACILITIES DURING CONSTRUCTION

A. During the life of this Contract, maintain all facilities constructed for pollution, erosion, and sedimentation control as long as the operations creating the particular pollutant area being carried out.

3.6 NOISE CONTROL

A. The General Contractor will develop and maintain a noise-abatement program and enforce strict discipline over all personnel to keep noise to a minimum. Local noise ordinances will govern.

B. The General Contractor will execute construction work by methods and by use of equipment, which will reduce excess noise.

C. Equipment will be equipped with silencers or mufflers designed to operate with the least possible noise in compliance with Federal and State regulations.

D. The General Contractor will manage vehicular traffic and scheduling to reduce noise.

3.7 DIESEL EQUIPMENT EMISSION CONTROLS

A. All motor vehicles and construction equipment will comply with all pertinent local, state, and federal regulations covering exhaust emission controls and safety.

B. All General Contractor and Subcontractor diesel-powered, non-road construction equipment with engine horsepower (HP) ratings of 50HP and above, which are used on the Project Site, for a period in excess of 30 calendar days over the course of the construction period on the Project Site, will be retrofitted with Emission Control Devices in order to reduce diesel emissions.

C. The reduction of emissions of volatile organic compounds (VOCs), carbon monoxide (CO) and particulate matter (PM) from diesel-powered equipment will be accomplished by installing Retrofit Emission Control Devices.

D. Construction will not proceed until the General Contractor has submitted a certified list of the non-road, diesel-powered, construction equipment subject to this specification which are, or will be, retrofitted with emission control devices. The list will include: (1) the equipment number, type, make and General Contractor/Subcontractor name; and (2) the emission control device make, model, and EPA verification number. General Contractors will also submit a receipt or other documentation from a manufacturer or installer that verifies that the appropriate equipment has been installed. The General Contractor will also identify any vehicles that will use Clean Fuels. Equipment that has been retrofitted with an emission control device will be stenciled, or otherwise clearly marked as "Low Emission Equipment".

E. The General Contractor will submit monthly reports, updating the same information stated in Paragraph D above, including the quantity of Clean Fuel utilized. The addition, or deletion, of non-road diesel equipment will be indicated in the report.

F. The General Contractor will use methods to control nuisance odors associated with diesel emissions from construction equipment including, but not limited to, the following: (1) turning off diesel combustion engines on construction equipment not in active use and on trucks that are idling for five (5) minutes or more; and (2) locating diesel equipment away from the general public and sensitive receptors.

G. All costs associated with implementation of the diesel equipment emissions control will be borne by the respective General Contractor and included in their cost for performing the work of the Contract.

3.8 SPILL AND DISCHARGE CONTROL

A. The General Contractor will provide equipment and personnel to perform emergency measures required to contain any spillage and to remove spilled materials and soils or liquids that become contaminated due to spillage. The collected spill material will be properly disposed of at the General Contractor's expense.

B. Costs to provide the above spill and discharge control materials will be included in the contract base bid price.

END OF SECTION

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SECTION 01 50 00 – TEMPORARY FACILITIES

PART 1 - GENERAL

1.1 GENERAL PROVISIONS

A. Attention is directed to the CONTRACT AND GENERAL CONDITIONS and all Sections within DIVISION 00 – PROCUREMENT AND CONTRACTING REQUIREMENTS (PCR), which are hereby made a part of this Section of the Specifications.

1.2 GENERAL REQUIREMENTS

A. The Contractor will be responsible for providing and maintaining all temporary facilities until Substantial Completion. Removal of such, prior to Substantial Completion, must be with the concurrence of the Engineer. The Contractor bears full responsibility for providing any facility removed prior to Substantial Completion

B. Removal of all temporary facilities will be a condition precedent to Substantial Completion unless directed otherwise by the Engineer or specifically noted in the Specifications.

C. The Contractor must comply with all safety laws and regulations of the State of New Hampshire, the United States Government, and local government agencies applicable to Work under this contract. The Contractor's attention is directed to the State of New Hampshire, Department of Labor and Industries Regulations.

D. Submittals:

1. Within seven (7) days from a Notice to Proceed, the Contractor will submit for the approval of the Engineer a site layout plan indicating the location of all temporary facilities described within this Specification.
2. Shop drawings showing proposed project sign (if applicable).
3. Manufacturer’s Data for proposed field offices (if applicable).

1.3 FIELD OFFICES

A. A field office is not required for this project.

1.4 TEMPORARY TELEPHONES

A. The Contractor will provide a cell phone on site at all times with the same phone number. This will be the number that the Engineer or Owner may contact in times of emergency.

1.5 TEMPORARY TOILETS

A. The Contractor will provide and service an adequate number of toilet booths, with chemical type toilets.

B. The toilets will be maintained by the Contractor in a clean and orderly condition, in compliance with all local and state health requirements.

C. Under no circumstances will the Contractor's personnel be allowed to use Owner's toilets.

1.6 TEMPORARY CONSTRUCTION FENCE

A. The Contractor will be responsible for providing and maintaining temporary fencing or barricades around the construction site, as may be necessary to ensure the safety of all persons authorized or unauthorized. Such protective measures will be located and constructed as required by local, state, and federal ordinances, laws, codes, or regulations and as required by the Engineer or Owner. The contractor will provide at the pre-construction conference a site operation plan that indicates construction entrance, lay down areas, stockpile areas, and construction fencing locations for Owner review.

1.7 TEMPORARY STRUCTURES AND MATERIAL HANDLING

A. The Contractor will provide such storage sheds, temporary buildings, or trailers, as required for the performance of the Contract. Subcontractors will provide their own temporary buildings and trailers. The locations of such items are to be approved by the Engineer.

B. Materials will be handled, stored, installed, cleaned, and protected in accordance with the best practice in the industry and, except where otherwise specified in the Contract Documents, in accordance with manufacturer's specifications and directions.

C. The Contractor must obtain the permission of the Owner for the use of any storage facilities available on site, but the Owner assumes no responsibility for articles stored.

1.8 HOISTING FACILTIIES

A. Except as otherwise specified, the Contractor will provide, operate, and remove material hoists, cranes, and other hoisting, as required for the performance of the Work by all trades. All such hoisting service will be without cost to the Subcontractors.

1.9 TEMPORARY WATER

A. The Contractor may make use of the available water supply at the site for construction purposes, provided the permission of the Owner is obtained beforehand and only as long as the water is metered and paid for by the contractor. If onsite water is not available, the contractor is responsible for supplying temporary water.

B. The Contractor will provide all necessary backflow preventers, piping, and hoses to utilize the available sources of water.

C. The Contractor will provide an adequate supply of cool drinking water, with individual drinking cups, for personnel on the job.

1.10 TEMPORARY ELECTRICITY

A. The Contractor may make use of the electricity as available at the site as long as the electricity is metered and paid for by the contractor, provided that the Contractor will supply proper adapters and extension cords. Power requirements that cannot be met with onsite power will be the responsibility of the Contractor.

1. Where heavy duty electric equipment drawing current in excess of 15 amperes is involved, the Contractor will provide temporary service to supply the power.

2. The temporary electric service will include, but not be limited to, labor, materials, and equipment necessary to supply temporary power of adequate capacity for the project.

3. Transformers and meters, when required by the power company, will be furnished by the power company and the Contractor will pay the costs thereof.

B. Temporary electrical Work will be performed under the direct supervision of at least one master electrician, who will be present on the project at all times when such work is being performed.

C. All temporary work will be provided in conformity with the National Electric Code, state and local laws, and the requirements of the power company.

D. Dismantle and completely remove from the project site all temporary electrical facilities, only when the permanent electrical system is operational and accepted by the Engineer.

E. Electrical permits will be the responsibility of the Contractor to obtain.

1.11 WEATHER PROTECTION

A. It is to be specifically understood that the Contractor shall do no work under any conditions deemed unsuitable by the manufacturer of various materials to be installed or the Owner for the execution of the Work. This provision will not constitute any waiver, release, or lessening of the Contractor's obligation to bring the Work to Substantial Completion within the period of time set forth in the Contract Documents.

END OF SECTION

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SECTION 01 70 00 – PROJECT CLOSEOUT

PART 1 - GENERAL

1.1 GENERAL PROVISIONS

A. Attention is directed to the CONTRACT AND GENERAL CONDITIONS and all Sections within DIVISION 00 – PROCUREMENT AND CONTRACTING REQUIREMENTS (PCR), which are hereby made a part of this Section of the Specifications.

1.2 RELATED DOCUMENTS

A. Consult the individual sections of the specifications for specific items required under those sections.

1.3 PERMITS

A. The Contractor will coordinate the efforts of all Subcontractors and obtain any final permits that may be required.

1.4 SUBSTANTIAL COMPLETION

A. Prior to requesting Substantial Completion, the Contractor will make a thorough inspection of the Work. During this inspection, the Contractor will prepare a comprehensive list of all items remaining to be completed or corrected. This list will include all remaining Contractor and Subcontractor items to be provided under the Contract Documents.

B. Upon completion of the items, noted on the Contractor's list, the Contractor will notify the Engineer that the Work is Substantially Complete. The Engineer will then conduct a similar thorough inspection. If the Engineer agrees that the Work is Substantially Complete, the Engineer will promptly make a thorough inspection and prepare a punch list, setting forth, in accurate detail, any items on the Contractor's list in additional to items that are not acceptable or incomplete. The Contractor will coordinate all Subcontractors to achieve prompt completion of the punch list.

C. The Contractor will not be relieved of the responsibility to provide Contract items omitted on the Engineer's punch list.

D. If the Engineer determines that the Work is not substantially complete, the Engineer will inform the Contractor of those items that must be completed before the Engineer will prepare a punch list. Upon completion of those items, the Contractor will again request the Engineer to prepare a punch list.

E. When the punch list has been prepared, the Engineer will arrange a meeting with the Contractor and Subcontractors to identify and explain all punch list items and answer questions on work which must be done before final acceptance.

F. The Engineer may revise the punch list, from time to time, to ensure that all items of Work are properly completed.

G. The Engineer will prepare the Certificate of Substantial Completion.

1.5 RECORD DRAWINGS

A. See Section 01 71 23 – Surveys and Record Drawings

1.6 OPERATING AND MAINTENANCE INSTRUCTIONS

A. Consult the individual sections of the specifications for the specific requirements for those sections and for further details and descriptions of the requirements.

B. Prior to final payment and completion, the Contractor will provide all Operating Manuals and Maintenance Instructions, as required by the Contract Documents.

C. Operating Instructions and Manuals

1. Subcontractors, installers, and suppliers will furnish to the Contractor two (2) sets of operating and maintenance instructions of all equipment furnished and installed by them.

2. The Contractor will collect all of the above instructions, bind them into two (2) complete sets and submit them to the Engineer who will deliver them to the Owner.

3. Submission of operating and maintenance instructions will be a condition precedent to final payment.

D. Instruction of Owner's Personnel

1. Where specified, in the individual sections of the specifications, the Contractor and Subcontractor will instruct the Owner's personnel at the site in the use and maintenance of equipment installed under the Contract.

2. Submission to the Engineer of a Certificate of Compliance to this requirement, signed by the Contractor and the Owner's Representative, will be a condition precedent to final payment.

1.7 FINAL COMPLETION

A. Full Release of Retainage

1. Upon completion of all work, and after receipt of all appropriate marked up As-Built Drawings, Operating Manuals, Warranties, Guarantees and Spare Parts required by the Contract Documents, the Engineer will prepare the Certificate of Final Completion.

2. The Contractor's signature on this Certificate will be notarized.

3. The Contractor will provide a final Application for Payment to complement the close-out process.

1.8 PARTIAL RELEASE OF RETAINAGE

A. If, within sixty (60) days after Substantial Completion, any of the items on the Engineer's punch list are not complete or if the Contractor has not provided the appropriate marked up As-Built Drawings, Operating Manuals, Warranties, Guarantees, or Spare Parts, the Engineer will assign a monetary value for each incomplete item as well as any other items, and the Engineer will prepare a Certificate for Partial Release of Retainage.

1. If the Engineer is required to prepare a Certificate for Partial Release of Retainage, the Contractor will still complete all remaining Work.
2. The Contractor's signature on this Certificate will be notarized.
3. The Contractor may make a request for additional Releases of Retainage when portions of the Work listed on the Engineer's punch list have been satisfactorily completed. Each request will be accompanied by a new application for payment and a new signed and notarized Certificate for Partial Release of Retainage.
4. Upon completion of all remaining items, the Final Release of Retainage will be processed in accordance with Paragraph A above.

END OF SECTION

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SECTION 01 71 23 – SURVEYS AND RECORD DRAWINGS

PART 1 - GENERAL

1.1 GENERAL PROVISIONS

A. Attention is directed to the CONTRACT AND GENERAL CONDITIONS and all Sections within DIVISION 00 – PROCUREMENT AND CONTRACTING REQUIREMENTS (PCR), which are hereby made a part of this Section of the Specifications.

1.2 RECORD DRAWINGS

A. Prior to final payment, the Contractor will engage a qualified professional to complete an "on-the ground" detailed survey and provide an as-built plan of all facilities within the limit of work. This includes grading, field layout, fencing, utilities, walkways, and all other related amenities within the project scope. The final submitted as built will demonstrate compliance with all NHIAA, American Sports Builders Association (ASBA), and Americans with Disabilities Act (ADA) requirements for layout, geometry, striping and slope requirements. An electronic version of the as-built plan in AutoCAD 2018 or later format shall be provided. As-Built drawings that consist of the Engineer's electronic design file will not be accepted.

B. Record Drawings will consist of all the Contract Drawings with mark-ups made during construction.

C. From the sets of drawings furnished by the Owner, the Contractor will reserve one (1) set for record purposes.

D. The Contractor will keep their marked-up record set on the site at all times and note on it in colored ink or pencil, neatly and accurately, at the end of each working day, the exact location of their work as actually installed. This will include the location and dimensions of underground and concealed Work and any variations from the Contract Drawings. All changes, including those issued by Addendum, Change Order, or instructions by the Engineer will be recorded. Marked-up record drawings will be prepared for the entire project and include all Work, including, but not limited to:

E. The location of all underground utilities and appurtenances referenced to permanent surface improvements, both horizontally and vertically, at ten-foot (10') intervals and at all changes of direction.

F. The Engineer may periodically inspect the marked-up record drawings at the site. The proper and current maintenance of the information required on these drawings will be a condition precedent to approval of the monthly applications for payment.

G. At Substantial Completion, the Contractor will submit the complete set of marked-up as-built drawings to the Engineer. The Contractor will check all marked-up record drawings prepared by subcontractors and certify, in writing, on the title sheet of the drawings, that they are complete and correct prior to submission to the Engineer.

H. The Engineer will review the marked-up record drawings and verify by letter to the Owner that the Work is complete. The Contractor will incorporate any and all changes into the as-built drawings.

I. The Contractor may make a written request for copies of the completed Record Drawings. The Contractor will reimburse the Owner directly for the cost of printing of any requested Record Drawings.

J. Submission of accurate marked-up record drawings, as-built drawings and their approval by the Engineer will be a condition precedent to final payment.

PART 2 - PRODUCTS (Not Used)

PART 3 - EXECUTION (Not Used)

END OF SECTION

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SECTION 01 74 19 – CLEANING UP

PART 1 - GENERAL

1.1 GENERAL PROVISIONS

A. Attention is directed to the CONTRACT AND GENERAL CONDITIONS and all Sections within DIVISION 00 – PROCUREMENT AND CONTRACTING REQUIREMENTS (PCR), which are hereby made a part of this Section of the Specifications.

1.2 RELATED DOCUMENTS

A. Consult the individual sections of the specifications for cleaning of Work installed under those sections.

1.3 CLEANING DURING CONSTRUCTION

A. Conduct cleaning and disposal operations to comply with local ordinances, anti-pollution laws and the Owner.

B. Do not burn or bury rubbish and waste materials on the site.

C. Do not dispose of volatile wastes such as mineral spirits, oil, or paint thinner in storm or sanitary drains.

D. Do not dispose of wastes into streams or waterways.

E. Wet down dry materials and rubbish to lay dust and prevent blowing dust.

F. Maintain the site free from accumulations of waste, debris, and rubbish.

G. Provide on-site containers for collection of waste materials and rubbish.

H. At the end of each day, remove and legally dispose of waste materials and rubbish from site.

I. Schedule cleaning operations so that dust and other contaminants, resulting from cleaning process, will not fall on wet, newly applied surfaces.

J. Disposal of materials will be in compliance with all applicable laws, ordinances, codes, and by-laws.

1.4 FINAL CLEANING

A. Prior to submitting a request to the Engineer to certify Substantial Completion of the Work, the Contractor will inspect all spaces and verify that all waste materials, rubbish, tools, equipment, machinery, and surplus materials have been removed, and that all sight-exposed surfaces are clean. Leave the Project clean and ready for occupancy.

B. Unless otherwise specified under other sections of the Specifications, the Contractor will perform final cleaning operations as herein specified prior to final inspection.

C. Cleaning will include all surfaces which Contractor has had access to, whether new or existing.

D. Employ experienced workmen or professional cleaners for final cleaning.

E. Use only cleaning materials recommended by the manufacturer of the surface to be cleaned.

F. Use cleaning materials which will not create a hazard to health or property and will not damage surfaces.

G. Remove grease, mastic, adhesive, dust, dirt, stains, labels, fingerprints, and other foreign materials from sight-exposed surfaces. This includes cleaning of the Work of all finishing trades where needed, whether or not cleaning by such trades is included in their respective specifications.

H. Repair, patch and touch up marred surfaces to the specified finish, to match adjacent surfaces.

I. In cleaning items with manufacturer's finish, or items previously finished by a Subcontractor, care will be taken not to damage such manufacturer's or Subcontractor's finish. Any damage to finishes caused by cleaning operations will be repaired at the Contractor's expense.

J. Broom clean exposed concrete surfaces and paved surfaces. Rake clean other surfaces of grounds.

K. The Owner’s responsibility for cleaning commences at Substantial Completion and transfer of occupancy from the Contractor to the Owner.

PART 2 - PRODUCTS (Not Used)

PART 3 - EXECUTION (Not Used)

END OF SECTION

SECTION 01 76 00 – PROTECTION

PART 1 - GENERAL

1.1 GENERAL PROVISIONS

A. Attention is directed to the CONTRACT AND GENERAL CONDITIONS and all Sections within DIVISION 00 – PROCUREMENT AND CONTRACTING REQUIREMENTS (PCR), which are hereby made a part of this Section of the Specifications.

1.2 PROTECTION OF PERSONS & PROPERTIES

A. All Owner facilities may be occupied during construction. The Contractor will take all necessary precautions to ensure public safety and convenience of the occupants during construction

B. Any damage to buildings, roads, (public and private), bituminous concrete areas, fences, lawn areas, trees, shrubbery, poles, underground utilities, etc. will be made good by and at the Contractor's own expense, all to the satisfaction of the Owner.

C. The Contractor will patch, repair and/or replace all adjacent materials and surfaces damaged after the installation of new work, at no expense to the Owner. All repair and replacement work will match the existing in kind and appearance.

1.3 TEMPORARY PROTECTION

A. The Contractor Will:

1. Protect all existing vegetation to remain that is in proximity to the site work required for completion of the construction project.

2. Protect the private property of the Owner. Any areas damaged by the Contractor will be restored to the original condition or compensated at the Contractor's expense.

3. After the installation of the Work by any Subcontractor is completed, the Contractor will be responsible for its protection and for repairing, replacing, or cleaning any such Work, which has been damaged by other trades or by any other cause, so that all Work is in first class condition at the time of Substantial Completion.

1.4 ACCESS

A. The Contractor will, at all times, leave an unobstructed way along walks, parking lots and roadways outside the indicated limit of work and will maintain barriers and lights for the protection of all persons and property in all locations where materials are stored or work is in progress.

1.5 SECURITY

A. The Contractor will be responsible for providing all security precautions necessary to protect the Contractor's and Owner's interests.

B. Where excavation is involved, the Contractor will be responsible for providing continuous watchmen service, as necessary, to insure adequate protection of the general public.

1.6 NOISE AND DUST CONTROL

A. The Contractor will take special measures to protect the neighbors and general public from noise, dust, and other disturbances, as needed, and/or directed by the Owner throughout construction by:

1. Keeping common pedestrian and vehicular circulation areas clean and unobstructed
2. Applying water or other dust palliatives, as needed, for dust mitigation.
3. Keeping all loose trash picked up and preventing it from blowing outside the limit or work.

1.7 FIRE PROTECTION

A. The Contractor will take necessary precautions to insure against fire during construction. The Contractor will be responsible to ensure that the area within contract limits is kept orderly and clean and all combustible rubbish and construction debris is promptly removed from the site.

B. Installation of equipment suitable for fire protection will be done as soon as possible after commencement of the Work.

1.8 WIND PROTECTION

A. Should high wind or severe weather warnings be issued by the U.S. Weather Bureau, the Contractor will take every precaution to minimize danger to persons, to the Work and to the adjacent property.

1.9 WEATHER PROTECTION

A. The Contractor will provide Weather Protection, as required by Specification Section 01 50 00, Temporary Facilities, and any other specific requirements of the Contract Documents.

1.10 COORDINATION - NOTIFICATIONS

A. The Contractor will coordinate all work activities with the Owner.

PART 2 - PRODUCTS (Not Used)

PART 3 - EXECUTION (Not Used)

END OF SECTION

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SECTION 02 21 13 – EXISTING CONDITIONS

PART 1 - GENERAL

1.1 GENERAL PROVISIONS

A. Attention is directed to the CONTRACT AND GENERAL CONDITIONS and all Sections within DIVISION 00 – PROCUREMENT AND CONTRACTING REQUIREMENTS (PCR), which are hereby made a part of this Section of the Specifications.

1.2 RELATED SECTIONS

A. Section 01 01 00 – Summary of Work

B. Section 01 31 14 – Conduct of the Work

C. Section 02 41 13 – Selective Site Demolition

1.3 EXISTING CONDITIONS

A. Before submitting a bid, the Contractor will make a thorough examination of the conditions at the site, checking the requirements of the Plans and Specifications with the existing conditions.

B. The Contractor will be provided an electronic copy of all drawings (if requested in writing) for purposes of laying out their work. No claim for extra compensation or extension of time will be allowed on account of the Contractor's failure to estimate properly the quantities, locations and measurements of all items required to complete the work, which could be discerned from visiting the site and a thorough review of the Bid Documents, Drawings and Specifications.

C. The Contractor will report any discrepancies to the Engineer and request an interpretation prior to bid submission. Discrepancies discovered after award of Contract will be handled as detailed in the General Conditions.

D. Existing Utilities exist on site and are shown on the drawings for reference only. Locations shown do not relieve the Contractor from the responsibility for accurately locating and protecting utilities in place. The Contractor is responsible for repair and replacement of all utilities to remain that are damaged by his work.

PART 2 - PRODUCTS (Not Used)

PART 3 - EXECUTION (Not Used)

END OF SECTION

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SECTION 02 41 13 – SELECTIVE SITE DEMOLITION

PART 1 - GENERAL

1.1 GENERAL PROVISIONS

A. Attention is directed to the CONTRACT AND GENERAL CONDITIONS and all Sections within DIVISION 00 – PROCUREMENT AND CONTRACTING REQUIREMENTS (PCR) which are hereby made a part of this Section of the Specifications.

1.2 SUMMARY

A. Work to include the demolition of the existing synthetic turf and infill.

B. Except for items or materials indicated to be reused, salvaged, recycled, reinstalled, or otherwise indicated to remain the Owner's property, demolished materials shall become the Contractor's property and shall be removed from the site with further disposition at the Contractor's option and in full compliance with all applicable disposal regulations.

1.3 DESCRIPTION OF WORK

A. Work Included:
1. Demolition and removal of selected site elements as required for new work. Refer to the Drawings for additional requirements.
2. Salvage of existing items to be reused or turned over to the Owner.
3. Removal and legal disposal of demolished materials off site. Except those items specifically designated to be recycled, relocated, reused, or turned over to the owner, all existing removed materials, items, trash, unsuitable soils, stumps, and debris shall become property of the Contractor and shall be completely removed from the site and legally disposed of at her/his expense. Salvage value belongs to the Contractor. On-site sale of materials is not permitted.
4. Demolition and removal work shall properly prepare for alteration work and new construction to be provided under the Contract.
5. Scheduling and sequencing operations without interrupting utilities serving occupied areas. If interruption is required, obtain written permission from the utility company. Provide temporary services as necessary to serve occupied and usable facilities when permanent utilities must be interrupted, and schedule interruption when the least amount of inconvenience will result.

B. Related Work: The following items are not included in this Section and will be performed under the designated Sections:
1. Section 01 50 00 - TEMPORARY FACILITIES: Maintenance of access, cleaning during construction, dust, and noise control.

1.4 DEFINITIONS

A. Remove: Detach items from existing construction and legally dispose of them off-site, unless indicated to be removed and salvaged or removed and reinstalled.

B. Remove and Recycle: Detach items designated as remove and recycle from existing construction and send the items to a recycling facility specifically equipped to recycle the materials or components. Destination facility acceptance receipts/invoices shall be submitted to the Owner.

C. Remove and Salvage: Detach items from existing construction and deliver them to the Owner ready for reuse, at a location designated by the Owner. Protect from weather until accepted by Owner.

D. Remove and Reinstall: Detach items from existing construction, prepare them for reuse, and reinstall them where indicated. Protect from weather until reinstallation.

E. Existing to Remain: Existing items of construction that are not to be removed and that are not otherwise indicated to be removed, removed, and salvaged, or removed and reinstalled.

1.5 MATERIALS OWNERSHIP

A. Where indicated on plan, Historic items, relics, and similar objects including, but not limited to, ornamental signage, metalwork, cornerstones and their contents, commemorative plaques, antiques, and other items of interest or value that may be encountered during demolition shall remain property of the Owner as applicable. Carefully remove each item or object in a manner to prevent damage and deliver promptly to a location acceptable to the Owner.

B. Except for materials indicated to be stockpiled, reused, recycled, or to remain as the Owner's property, cleared materials shall become the Contractor's property and shall be removed from the site.

1.6 SUBMITTALS

A. Schedule of Selective Demolition Activities: Indicate the following:
1. Detailed sequence of selective demolition and removal work, with early and late starting and finishing dates for each activity. Ensure Owner's on-site operations are uninterrupted if applicable.
2. Coordination of Owner's continuing occupancy of portions of existing site.
3. Means of protection for items to remain and items in path of removal.

B. Submit photographs or videotape, sufficiently detailed, of existing conditions of adjoining construction and site improvements that might be misconstrued as damage caused by selective demolition operations. Submit photographs of existing items to be removed and reinstalled to record original condition of objects to be retained.

C. Prior to demolition, Contractor shall submit designated turf recycling facility contact information.

D. Submit recycling facility acceptance receipts, invoices, and/or scale receipts, detailing facility name, date, recycled item name, and quantity.

1.7 RECORD DRAWINGS

A. Record drawings at Project Closeout shall be in accordance with Division 1.

B. Identify and accurately locate capped utilities and other subsurface conditions.

1.8 REGULATORY REQUIREMENTS

A. Comply with governing State and EPA notification regulations, before starting selective demolition. Comply with the hauling and disposal regulations of any authorities having jurisdiction.

B. The Owner will occupy portions of the facilities and fields immediately adjacent to selective demolition areas. Conduct selective demolition so that the Owner's operations will not be disrupted. Provide not less than 72 hours of notice to the Owner of activities (if any) that may affect the Owner's operations.

C. The Owner assumes no responsibility for the actual condition of facilities or items to be selectively demolished or removed and reused.

D. Storage or sale of removed items or materials on-site will not be permitted without the Owner’s permission.

1.9 QUALITY ASSURANCE

A. Examination of Existing Conditions: The Contractor shall examine the Contract Drawings for demolition and removal requirements and provisions for new work. Verify all existing conditions and dimensions before commencing work. The Contractor shall visit the site and examine the existing conditions as he finds them and shall inform herself/himself of the character, extent and type of demolition and removal work to be performed. Submit any questions regarding the extent and character of the demolition and removal work in the manner and within the time period established for receipt of such questions during the bidding period.

1.10 WARRANTY

A. Existing Warranties: Remove, replace, patch, and repair materials and surfaces cut or damaged during selective demolition, by methods and with materials so as not to void existing warranties.

PART 2 - PRODUCTS (NOT USED)

PART 3 - EXECUTION

3.1 EXECUTION

A. Prior to commencing any excavation or demolition, the Contractor shall take all actions necessary to fully protect the existing facilities from damage. The Contractor shall take all actions required to repair any damage and return the fields to their existing conditions.

B. Survey the condition of the site to determine whether removing any element might result in the undesirable damage of any portion of the adjacent facilities during selective demolition.

C. Perform surveys as the Work progresses to detect hazards resulting from selective demolition activities.

D. Conduct demolition operations and remove debris to ensure minimum interference with roads, parking lots, streets, walks and other adjacent occupied and utilized facilities.

E. Conduct demolition operations to prevent injury to people and damage to adjacent buildings, facilities, and site improvements to remain. Ensure safe passage of people around selective demolition areas.

F. Use water mist and other suitable methods, as necessary, to limit the spread of dust and dirt. Comply with governing environmental protection regulations.

G. Remove and transport debris in a manner that will prevent spillage on adjacent surfaces and areas.

H. Clean adjacent structures and improvements of dust, dirt, and debris caused by selective demolition operations. Return adjacent areas to conditions existing before the start of selective demolition.

I. Demolish and remove existing construction only to the extent required by new construction and as indicated. The Contractor is to be responsible for any cutting and patching that is required.

J. Promptly patch and repair holes and damaged surfaces caused to adjacent construction by selective demolition operations.

K. Where repairs to existing surfaces are required, patch to produce surfaces suitable for new materials.

L. Restore exposed finishes of patched areas and extend finish restoration into adjoining construction to remain in a manner that eliminates evidence of patching and refinishing.

M. Disposal: Promptly dispose of demolished materials. Do not allow demolished materials to accumulate on-site. All removed turf and infill to be placed in dumpsters until removed from the site.

N. Do not burn demolished materials.

O. Transport demolished materials off the Owner's property and legally dispose of them if they are not designated for salvage by the Owner or reuse.

P. In areas where bituminous concrete is to be removed, the edge of any bituminous concrete to remain must be a sawcut edge.

Q. Items to be removed and reset may be stored on site, at a location approved by the Owner.

R. Maintain existing utilities indicated to remain in service and protect them against damage during selective demolition operations.

3.2 PREPARATION

A. Site Access and Temporary Controls: Conduct selective demolition and debris-removal operations to ensure minimum interference with roads, streets, walks, walkways, and other adjacent occupied and used facilities.

1. Comply with requirements for access and protection specified in Section 01 50 00 - TEMPORARY FACILITIES.

B. Conduct demolition operations to prevent injury to people and damage to adjacent buildings and facilities to remain. Ensure safe passage of people around demolition area(s).
   1. Erect temporary protection, such as walks, fences, railings, canopies, and covered passageways, where required by authorities having jurisdiction. Provide temporary barricades as required to limit access to demolition areas.
   2. Protect existing site improvements, appurtenances, and landscaping to remain.

3.3 DISCOVERY OF HAZARDOUS MATERIALS

A. If hazardous materials, such as chemicals, asbestos-containing materials, or other hazardous materials are discovered during the course of the work, cease work in affected area only and immediately notify the Engineer of such discovery. Do not proceed with work in such areas until instructions are issued by the Engineer. Continue work in other areas.

B. If unmarked containers are discovered during the course of the work, cease work in the affected area only and immediately notify the Engineer of such discovery. Do not proceed with work in such areas until instructions are issued by the Engineer. Take immediate precautions to prohibit endangering the containers integrity. Continue work in other areas.

3.4 CUTTING

A. Provide a flush saw cut edge where pavement, curb and concrete removals abut new construction work or existing surfaces to remain undisturbed.

3.5 DISPOSAL OF DEMOLISHED MATERIALS

A. General: Comply with requirements of Section 01 74 19 - CLEANING UP and the following.
   1. Do not allow demolished materials to accumulate on-site.
   2. Remove and transport debris in a manner that will prevent spillage on adjacent surfaces and areas.
   3. Remove debris from elevated portions of building by chute, hoist, or other device that will convey debris to grade level in a controlled descent.

B. Burning: Do not burn demolished materials.

C. Burying: Do not bury demolished materials.

3.6 CLEANING

A. Clean adjacent structures and improvements of dust, dirt, and debris caused by selective demolition operations. Premises shall be left in a clean condition and ready to accept alteration work and new construction.

END OF SECTION

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SECTION 033000 – CAST-IN-PLACE CONCRETE

PART 1 - GENERAL

1.1 GENERAL PROVISIONS

A. Attention is directed to the CONTRACT AND GENERAL CONDITIONS and all Sections within DIVISION 00 – PROCUREMENT AND CONTRACTING REQUIREMENTS (PCR), which are hereby made a part of this Section of the Specifications.

1.2 SCOPE OF WORK

A. In general, the Contractor shall supply all labor, materials, equipment, temporary protection, tools and appliances necessary for the proper completion of the work in this section, as required in the specifications and in accordance with good construction practice. The work under this Section includes cast-in-place concrete as shown on the contract documents.

B. Clean all areas affected by the work to the satisfaction of the Owner.

1.3 JOB CONDITIONS

A. The Contractor shall provide all protection, barriers, and guards necessary to segregate his work area and the areas below, from pedestrian and vehicular traffic. Also protect existing buildings, landscaping and paved areas from damage.

B. The Contractor shall be responsible for securing and protecting his/her equipment, materials and tools (as well as partially completed construction) from wind blow-off and vandalism or abuse.

C. Environmental Requirements: Do not place concrete during rain, sleet or snow unless adequate protection is provided, and the Engineer's approval is obtained. Do not allow rainwater to increase the mixing water or damage the surface finish.

D. Cold Weather Concreting:

1. Conform to ACI 306 latest edition, "Recommended Practice for Cold Weather Concreting."

2. Temperature of concrete when placed shall not be less than the following:

Minimum Concrete Temperature °F
Sections with Least Dimension

Air Temp (°F)	Under 12"	12" and Over
30 to 45	60	50
0 to 30	65	55
Below 0	70	60

3. When placed, heated concrete shall not be warmer than 80° F.
4. Prior to placing concrete, all ice, snow, and surface and subsurface frost shall be removed, and the temperature of the surfaces to be in contact with the new concrete shall be raised to the temperature specified above for placing.
5. Protect the concrete from freezing for four (4) days after placement.
6. Heated enclosures shall be strong and windproof to ensure adequate protection of corners, edges and thin sections. Do not permit heating units to locally heat or dry the concrete. Do not use combustion heaters during the first 24 hours unless the concrete is protected from exposure to exhaust gases which contain carbon dioxide.
7. When air temperature gets below 25 degrees F, two (2) additional ASTM C39 cylinders shall be made and located at the site in a location and under conditions which will match the placement that they represent. After seven (7) days of site conditions, the cylinders shall be placed in a steam room for twenty-one (21) days.

E. Hot Weather Concreting:
1. Conform to ACI 305 latest edition, "Recommended Practice for Hot Weather Concreting." Take precautions when the ambient air temperature is 90° or above. Temperature of the concrete when placed shall not exceed 80° F. Cool forms and reinforcing to a maximum of 90° F by spraying with water prior to placing concrete. Do not use cement that has reached temperatures in excess of 170° F.

F. Prevent plastic shrinkage cracking due to rapid evaporation of moisture. Do not place concrete when the evaporation rate (actual or anticipated) equals or exceeds 0.20 pounds per square foot per hour, as determined by Figure 2.1.4 of ACI 305.
1. Set-retarding admixtures may be used with Engineer's approval when the ambient air temperature is 90° F or above to off-set the accelerating effects of high temperatures.

1.4 QUALITY ASSURANCE

A. Reference Standards: Except as modified or supplemented herein, all concrete materials, placing, furnishing, curing and all other appurtenant work shall meet the requirements of the latest edition of the following Standard Specifications. Pertinent portions of the reference standards are included herein. Refer to the standards for detailed requirements.
1. AMERICAN CONCRETE INSTITUTE STANDARDS (ACI)

a. 301 - Standard Specifications for Structural Concrete for Buildings.
b. 304 - Recommended Practice for Measuring, Mixing, Transporting, and Placing Concrete.
c. 316 - Building Code Requirements for Reinforced Concrete

B. AMERICAN SOCIETY FOR TESTING AND MATERIALS (ASTM)
1. ATMS C109 "Test Method for Compressive Strength of Hydraulic Cement Mortars"

1.5 SUBMITTALS

A. Refer to Section 01 3302 - Submittals. Supplement with the following:

B. Test Reports: Perform and submit test reports for the following products in accordance with above general reference standards and specific standards set forth hereafter.

C. Proposed Mix Design:
1. Prior to commencing concrete work submit and obtain Engineer's approval of certified test report describing proposed concrete mix design, including:
a. Fine Aggregates - Source, type, gradation, deleterious substances and saturated surface dry specific gravity (ASTM C128).
b. Coarse Aggregates - Source, type, gradation, deleterious substances and saturated surface dry specific gravity (ASTM C127); soundness (ASTM C88).
c. Ratio of fine to total aggregates.
d. Weight (surface dry) of each aggregate per cubic yard.
e. Total water content (gallons) per cubic yard, water/cementitious materials ratio and proposed source.
f. Slump on which design is based, ASTM C143.
g. Brand, type and quantity of cement.
h. 7-day and 28-day compressive strength results from each of two sets of test cylinders for each proposed mix.
i. Air Content, ASTM C231 or ASTM C173.
j. Certifications of Chloride Content of admixtures.
k. Water soluble chloride ion content of concrete, ASTM G1218.
l. Proportions of all ingredients including all admixtures added either at time of batching or at job site.

D. Cylinder Compression Test Reports:
1. Submit two copies of certified test reports to Engineer indicating results of tests required in Part 3 hereof.

E. Ready-Mix Delivery Tickets:
1. Submit one copy to the Engineer of ready-mix delivery ticket for each load delivered.

2. Include identification and quantity of concrete supplied.
3. Include time loaded and time unloaded.
4. Reading of revolution counter at times initial water added, supplemental water added, and unloading completed.
5. Amounts of initial and supplemental water added, and name of individual authorizing supplementing water.

1.6 DELIVERY, STORAGE, AND HANDLING

A. Store cement in watertight enclosures and protect against dampness, contamination and warehouse set.

B. Stockpile aggregates to prevent segregation, or contamination with other materials or other sizes of aggregates. Use only one supply source for each aggregate stockpile.

C. Store admixtures to prevent contamination, evaporation or damage. Protect liquid admixtures from freezing or harmful temperature ranges. Agitate emulsions prior to use.

D. Store rubber and plastic materials in a cool place away from direct sunlight.

1.7 INSPECTION AND TESTING

A. The Contractor agrees to accept as final the results of tests, inspection and reports as may be made by the testing laboratory.

B. Inspection
1. During the progress of the work, the General Contractor shall provide free and safe access to the work at all times to the Engineer and the Owner's representative. He/she shall cooperate with the Engineer to obtain proper inspection of all work and shall furnish any required samples of concrete for testing.

C. Laboratory Inspection and Testing
1. During the progress of the work, a testing laboratory paid for by the Contractor, contacted and coordinated by the Contractor, and approved by the Engineer, shall conduct necessary field tests and make compensation for any variation in water content of the aggregate; and shall further direct that all batches shall be as nearly uniform as possible by the use of selected materials which are accurately measured, thoroughly mixed, and maintained at a constant water-cement ratio and consistency.
2. Provide the Owner and Engineer with necessary reports covering all of the above.
3. The payment for laboratory inspection and testing will be the responsibility of the Contractor.
4. Coordination and scheduling of tests by the testing lab shall be the responsibility of the Contractor.

5. Testing required because of changes requested by the Owner in materials, sources of materials, or mix proportions; and extra testing of concrete or materials because of failure to meet the Specification requirements are to be paid for by the Owner.

D. Required Testing During Construction:

The following minimum testing shall be performed, and field/ lab- results submitted to the structural Engineer for approval:

1. Air entrainment at placement – ASTM C231
2. Slump – ASTM C143
3. Compressive strength – ASTM C39

Concrete cylinder samples shall be obtained from each concrete delivery truck for compressive strength testing. Five (5) cylinders shall be made from each sample. Each cylinder shall be standard 6" diameter by 12" tall. One (1) cylinder will be tested at 7-day cure, and three (3) cylinders will be tested at 28-day cure to determine compressive strength of the concrete in accordance with ASTM C39. Air entrainment and slump will be tested at each sample as well. Retain the fifth cylinder sample for potential 56-day compressive testing and/ or petrographic examination. Test results which are determined by the Engineer to be deficient or questionable will require that the contractor pay for additional testing and coring of the in-place concrete, including petrographic examination with report as direct by the Engineer. Concrete determined by the Engineer to remain deficient after final testing shall be entirely removed and replaced at no additional cost.

1.8 GUARANTEES

Upon completion of the work and prior to final payment, the Contractor shall submit a guarantee of his work as free from defect in materials and workmanship. The guarantee shall be for a period of three (3) years. The guarantee shall be signed by an officer of the Contractor's firm and sealed if a corporation.

PART 2 - PRODUCTS

2.1 CONCRETE MATERIALS

A. Portland Cement: ASTM C 150, Type I or II.

B. Aggregate: ASTM C 33, uniformly graded, from a single source. Maximum aggregate size = 1 ½" at foundations and ¾" at slabs.

C. Water: ASTM C 94.

D. Air-Entraining Admixture: ASTM C 260.

E. Water-Reducing Admixture: ASTM C 494, Type A.

F. High-Range, Water-Reducing Admixture: ASTM C 494, Type F.

G. Water-Reducing and Accelerating Admixture: ASTM C 494, Type E.

H. Water-Reducing and Retarding Admixture: ASTM C 494, Type D.

2.2 CONCRETE PRODUCTION

A. Concrete Mixes, General - Prepare design mixes, proportioned according to ACI 211.1 and ACI 301-05.

Refer to the Contract Drawings for additional information.

B. Ready-Mixed Concrete: Measure, batch, mix, and deliver concrete according to ASTM C 94 and ASTM C 1116 and furnish batch ticket information.

C. Concrete shall have a minimum compressive strength of 4500 psi for foundations and 4500 psi for slabs at 28 days with a slump of no more than 4” and air entrainment of 4 ½ to 7 ½%.

D. Proportioning: Proportion ingredients to produce a well-graded mix of high density and maximum workability consistent with approved mix design and subject to the characteristics as specified in the Contract Drawings.

E. Mixing:

1. Central Mixed Concrete - 1 minute for mixer capacities one cubic yard or less plus 15 seconds for each cubic yard or fraction thereof of additional capacity.
2. Truck Mixed Concrete - 100 revolutions after the introduction of all ingredients.

F. Tempering and Control of Mixing Water:

1. Mix concrete only in quantities for immediate use. Do not use concrete which has stiffened due to initial set or concrete which cannot be discharged within 1-1/2 hours or 300 revolutions of the mixer drum after the introduction of the mixing water.
2. Water may be added to concrete arriving at the site, only if neither the maximum slump nor the maximum water cement ratio is exceeded. Provide additional cement if required by the addition of water to maintain water cement ratio within specified limits. Obtain Engineer's approval prior to adding water or cement.
3. Incorporate any added water or cement by additional mixing equal to half the total mixing required.

2.3 CURING MATERIALS

A. Impervious-sheet materials shall conform to ASTM C 171, type optional, except that polyethylene sheet shall not be used.

B. Burlap and cotton mat used for curing shall conform to AASHTO M 182, Class 2.

C. Topically applied and admix curing compounds and/or agents are not allowed due to project required epoxy floor coating and concrete densifier.

2.4 WATER

A. Water for mixing and curing shall be fresh, clean, potable, and free of injurious amounts of oil, acid, salt, or alkali, except that non-potable water may be used if it meets the requirements of ASTM C94.

2.5 EMBEDDED ITEMS

A. Embedded items shall be of the size and type indicated or as needed for the application.

B. All other embedded items shall also be securely anchored and protected from damage or displacement.

2.6 JOINT MATERIALS

A. Expansion joint fillers shall be preformed materials conforming to ASTM D 1751.

B. Sawable type contraction joint inserts shall conform to COE CRD-C 540. Nonsawable joint inserts shall have sufficient stiffness to permit placement in plastic concrete without undue deviation from a straight line and shall conform to the physical requirements of COE CRD-C 540, with the exception of Section 3.4 "Resistance to Sawing". Plastic inserts shall be polyvinyl chloride conforming to the materials requirements of COE CRD-C 572.

C. Expansion joint fillers shall be a closed-cell, non-absorbent, synthetic foam, and as recommended by the sealant manufacturer. Filler shall be totally compatible with sealant, primer, and substrates. Backers shall conform to the requirements of ASTM C 962, Type A, such as Ceramar as manufactured by W.R. Meadows, Expansion Joint Filler as manufactured by BASF-Sonneborn, or approved equal. LIQUID DENSIFIER/ SEALER

D. Liquid densifier sealer shall be a high performance, deeply penetrating concrete densifier; odorless, colorless, VOC – compliant, non-yellowing silicate and siliconate based solution designed to hard, dustproof and protect concrete floors and to resist black rubber tire marks. The compound must contain a minimum solids content of 30% of which 50% is siliconate.

1. Basis of Design: Euco Diamond Hard by The Euclid Chemical Co.

PART 3 - EXECUTION

3.1 PREPARATION FOR PLACING

A. Before commencing concrete placement, the following shall be performed:

B. Surface Preparation:

1. Surfaces to receive concrete shall be clean and free from frost, ice, mud, and water.
2. Earth (subgrade, base, or subbase courses) surfaces upon which concrete is to be placed shall be clean, damp, and free from debris, frost, ice, and standing or running water. The foundation shall be well drained and shall be satisfactorily graded and uniformly compacted.
3. Rock surfaces upon which concrete is to be placed shall be free from oil, standing or running water, ice, mud, drummy rock, coating, debris, and loose, semi-detached or unsound fragments. Joints in rock shall be cleaned to a satisfactory depth, as determined by the Engineer, and to firm rock on the sides. Immediately before the concrete is placed, rock surfaces shall be cleaned thoroughly by the use of air-water jets or sandblasting as specified below for Previously Placed Concrete. Rock surfaces shall be kept continuously moist for at least 24 hours immediately prior to placing concrete thereon. All horizontal and approximately horizontal surfaces shall be covered, immediately before the concrete is placed, with a layer of mortar proportioned similar to that in the concrete mixture. Concrete shall be placed before the mortar stiffens.
4. Concrete surfaces to which other concrete is to be bonded shall be abraded in an approved manner that will expose sound aggregate uniformly without damaging the concrete. Laitance and loose particles shall be removed. Surfaces shall be thoroughly washed and shall be moist but without free water when concrete is placed.

C. Equipment:

1. Transporting and conveying equipment shall be in-place, ready for use, clean, and free of hardened concrete and foreign material.
2. Equipment for consolidating concrete shall be at the placing site and in proper working order.
3. Equipment and material for curing and for protecting concrete from weather or mechanical damage shall be at the placing site, in proper working condition, and in sufficient amount for the entire placement.

D. When hot, windy conditions during concreting appear probable, equipment and material shall be at the placing site to provide windbreaks, shading, fogging, or other action to prevent plastic shrinkage, cracking, or other damaging drying of the concrete.

E. Before placement of concrete, care shall be taken to determine that all embedded items are firmly and securely fastened in place as indicated on the drawings or required. Conduit and other embedded items shall be clean and free of oil and other foreign matter such as loose coatings or rust, paint, and scale. The embedding of wood in concrete will be permitted only when specifically authorized or directed. Voids in sleeves, inserts, and anchor slots shall be filled temporarily with readily removable materials to prevent the entry of concrete into voids. Welding shall not be performed on embedded metals within 2 feet of the surface of the concrete. Tack welding shall not be performed on or to embedded items.

F. Forms shall be in place, cleaned, coated, and adequately supported, in accordance with Section 03 1000, CONCRETE FORMWORK. Reinforcing steel shall be in place, cleaned, tied, and adequately supported, in accordance with Section 03 2000, CONCRETE REINFORCEMENT.

3.2 INSTALLATION

A. Conveying:

1. Convey concrete from mixer to final position as rapidly as practical without segregation or loss of material.
2. Use only metal or metal lined chutes with maximum length of 20 feet, maximum slope 1 vertical to 2 horizontal and minimum slope 1 vertical to 3 horizontal.
3. Provide a hopper at the end of long belt conveyors and chutes not meeting the above requirements.
4. Conveying by pumping methods shall conform to ACI 304. Maximum loss of slump, 2 inches. Do not use pipe made of aluminum or aluminum alloy to convey concrete. Should pumping be required for this project, all costs for pumping shall be borne by the Contractor. No additional compensation will be considered for any pumping costs.

B. Depositing:

1. Deposit concrete in a continuous operation until the section is completed. Regulate rate of placement so concrete remains plastic and flows into position.
2. Maximum height of concrete free fall is 4 feet.
3. All concrete shall be placed within 2 hours of batching. All concrete on site more than 2 hours from batching time shall be rejected and sent back to the plant.

C. Consolidation:

1. Use mechanical vibrating, rodding or spading for consolidation. Conform to 309-72, "Recommended Practice For Consolidation of Concrete."
2. Do not use vibrators to transport concrete in forms.
3. Minimum vibrator speed 8000 rpm.
4. Vertically invert vibrators at points 18 inches apart to a depth sufficient to penetrate 6 inches into the preceding layer. Vibrate each location for a length of time to obtain adequate consolidation (generally 5 to 15 seconds).

D. Embedments:

1. Accurately position and securely fasten all anchor bolts, castings, steel shapes, conduit, sleeves, and other materials to be embedded in the concrete.
2. Embedments shall be clean when installed. Remove concrete spatter from all surfaces not in contact with concrete.

E. Wash-out:

1. The Contractor shall remove residue from concrete mixing wash-out from all landscape, walkways, curbs, driveways, and similar surfaces to the satisfaction of the Owner.

3.3 CURING

A. Normal Conditions

1. All concrete shall be prevented from drying for at least the first 7 days after placing. All slabs shall be cured by spraying on the specified curing compound as per the manufacturer's printed instructions. Concrete walls shall be cured as carefully as the slabs. However, instead of covering the sides with the curing compound, it would be satisfactory if the forms were "loosened after the concrete had hardened" and the wall sprinkled with water frequently for at least five (5) days allowing the water to flow down the sides between the forms and the concrete. After the five-day wetting the forms may be removed. Curing compounds which discolor the concrete are not permitted.

B. Cold Weather Conditions

1. Whenever the temperature of the surrounding air is below 40 degrees F, all concrete shall be maintained at a temperature of not less than 50 degrees F for at least 72 hours and shall be protected from freezing for at least another 72 hours, or for as much time as is necessary to insure proper curing of the concrete. The housing, covering or other protection used in connection with the curing shall remain in place and intact for at least 24 hours after the artificial heating is discontinued. No dependence shall be placed on salt or other chemicals for the prevention of freezing. The approved practice for Winter Concreting are those outlined in ACI 306.

C. Alternates

1. Methods of curing other than those specified above shall be approved by the Engineer before being used.

3.4 FINISHING CONCRETE

A. Defective Concrete:

1. Any concrete which is not formed as shown on the plans or for any reason is out of alignment or level, or shows a defective surface shall be corrected or replaced as directed by the Engineer.
2. Repair all surface defects and tie holes immediately after form removal.

3. Remove honeycombed or otherwise defective concrete to sound concrete with square cut edges to avoid feathering.

B. Patching:
   1. Immediately after removing the forms, all concrete surfaces shall be inspected and any poor joints, voids, stone pockets or other defective areas and all tie holes shall at once be patched before the concrete is thoroughly dry. The patching shall be done in such a manner that it shall form a homogeneous part, in appearance, and action of the main concrete. Fins shall be removed and patched as required where concrete is exposed.

C. Exposed Concrete:
   1. All exposed concrete finish shall be as produced through the use of new smooth plywood or metal forms.

D. Rubbing:
   1. Smooth rubbed finish shall be provided for exposed surfaces including walls and spandrels.
   2. Smooth rubbed finish shall be produced on green concrete. All necessary patching shall be done immediately after forms have been removed and rubbing shall be completed not later than the following day. Surfaces shall be wetted and rubbed with carborundum brick or other abrasive until a uniform color and texture is produced. No cement grout or slush shall be used other than the cement paste drawn from the green concrete itself by the rubbing process.

E. Finishing Floors and Slabs: Comply with recommendations in ACI 302.1R for screeding, restraightening, and finishing operations for concrete surfaces.

F. Float Finish: Apply float finish, defined in ACI 301, to surfaces indicated, to surfaces to receive trowel finish.

G. Trowel Finish: Apply a trowel finish to surfaces indicated and to surfaces exposed to view or to be covered with resilient flooring, carpet, ceramic or quarry tile set over a cleavage membrane, paint, or another thin film-finish coating system.

H. After apply float finish, apply first trowel finish and consolidate concrete by hand or power-driven trowel. Continue troweling passes and restraighten until surface is free of trowel marks and uniform in texture and appearance. Grind smooth any surface defects that would telegraph through applied coatings or floor coverings.

I. Finish and measure surface so gap at any point between concrete surface and an unleveled free-standing 10-foot long straightedge, resting on two high spots and placed anywhere on the surface, does not exceed the following: 1/8 inch.

J. Trowel and Fine-Broom Finish: Apply a partial trowel finish, stopping after second troweling, to surfaces indicated and to surfaces where ceramic or quarry tile is to be installed by either thickset or thin-set method. Immediately after second troweling, and when concrete is still plastic, slightly scarify surface with a fine broom.

3.5 FIELD QUALITY CONTROL

A. Concrete Tests: Conduct the following minimum tests in accordance with the requirements of ACI 301, Section 16.3.

1. Strength Test:
    a. Mold and cure five (5) cylinders from each sample. Test one at 7 days for information and three (3) at 28 days for acceptance. Retain one (1) cylinder for potential 56-day compressive testing and/ or petrographic examination.
2. Slump Test: Conduct test for each strength test sample and whenever consistency of concrete appears to vary.
3. Air Content: Conduct test from one of first three batches mixed each day and for each strength test sample.

B. Acceptance of Concrete:

1. The strength level of concrete will be considered satisfactory so long as the average of all sets of three consecutive strength test results equals or exceeds the specified 28-day strength and no individual strength test result falls below the specified strength by more than 200 psi.
2. Upon failure of test cylinder results, the Owner may require the Contractor, at his/her expense, to obtain and test at least three 2-inch diameter core samples from the area in question. Conform to ASTM C42. Concrete will be considered adequate if the average of the three cores is at least 85% of, and if no single core is less than 75% of the specified 28-day strength.
3. Upon failure of core test results, the Owner may require the Contractor, at his/her expense, to perform load tests as specified in ACI 318, Chapter 20. Should load tests fail to prove the concrete has reached the required strength; the Contractor shall remove and replace all defective concrete at no additional cost to the Owner. No contract extension will be considered for the time required to remove and replace defective concrete.
4. Fill all core holes as specified for repairing defective concrete.

END OF SECTION

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SECTION 116833 – ATHLETIC FIELD EQUIPMENT

PART 1 - GENERAL

1.1 GENERAL PROVISIONS

A. Attention is directed to the CONTRACT AND GENERAL CONDITIONS and all Sections within DIVISION 00 – PROCUREMENT AND CONTRACTING REQUIREMENTS (PCR), which are hereby made a part of this Section of the Specifications.

1.2 WORK INCLUDED

A. Provide all equipment and materials, and do all Work necessary to furnish, assemble and install the athletic field equipment, (fixed and non-fixed), as indicated on the Drawings and as specified herein. Certain items shall be carried as Alternate Bid items. All items shall be included in the base bid unless labeled as (ALTERNATE).

B. All equipment and materials shall meet or exceed the New Hampshire Interscholastic Athletic Association (NHIAA), the National Federation of State High School Associations (NFHS) and the American Sports Builders Association (ASBA) Rules and Regulations.

1.3 RELATED WORK

A. Examine the Contract Documents for requirements that affect the work of this Section.

1.4 SUBMITTALS

A. Shop Drawings of each equipment item, including foundations and footings to be installed will be submitted for the Engineer’s approval. Indicate methods for allowing each item to properly drain.

B. Catalog Cuts, manufacturer’s data and manufacturer’s installation instructions will be submitted on each item of non-fixed and fixed field equipment to be provided in accordance with this Specification.

1.5 PRODUCT DELIVERY AND STORAGE

A. Materials, when delivered to site, will be stacked and stored above the ground and under protective coverings, or indoors, in such a manner as to allow for proper drainage, ventilation and protection.

B. Non-fixed equipment will be delivered to the site and stored local to the project site, as directed by the Owner and/or the Engineer.

PART 2 - PRODUCTS

2.1 ADJUSTABLE BASE PLATE MOUNT FOOTBALL GOAL POSTS

A. Base Plate Mount Football Goal Posts (2) with 20 ft. uprights, directional wind flags and hardware kit, shall be Model Number GP820HSPL as manufactured by Sportsfield Specialties, Inc., 41155 State Highway 10, Delhi, NY 13753, or approved equal.

1. Contractor shall field-verify base type/bolt pattern (if applicable) and submit to manufacturer prior to ordering.
2. Goal post color to be approved by owner.

PART 3 - EXECUTION

3.1 ATHLETIC FIELD EQUIPMENT

A. Install equipment at the locations indicated on the Drawings and in strict accordance with the manufacturer's printed instructions. Non-fixed equipment will be assembled by the Contractor.

3.2 CLEANING

A. Upon completion of the Work in any given area, remove all rubbish and debris from the Work area and leave it in clean condition.

END OF SECTION

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SECTION 312000 - EARTH MOVING

PART 1 - GENERAL

1.1 GENERAL PROVISIONS

A. Attention is directed to the CONTRACT AND GENERAL CONDITIONS and all Sections within DIVISION 00 – PROCUREMENT AND CONTRACTING REQUIREMENTS (PCR) which are hereby made a part of this Section of the Specifications.

1.2 DESCRIPTION OF WORK

A. Work Included: Provide labor, materials and equipment necessary to complete the work of this Section, including but not limited to the following:
   1. Preparing subgrades for structures and landscaping.
   2. Excavating and backfilling for pavements and structures.
   3. Subbase course for concrete pavements.
   4. Subbase and base course for asphalt paving.
   5. Remove and replace unsuitable existing fill material.
   6. Over excavation for structures.

1.3 Related Work:

A. The following items are not included in this Section and will be performed under the designated Sections:
   1. Section 03 3000 - CAST-IN-PLACE CONCRETE for granular course if placed over vapor retarder and beneath the slab-on-grade.
   2. Section 31 1000 - SITE CLEARING for site stripping, grubbing, stripping and stockpiling topsoil, and removal of above- and below-grade improvements and utilities.
   3. Section 31 2500 – EROSION AND SEDIMENTATION CONTROLS for temporary erosion and sedimentation control measures.

1.4 DEFINITIONS

A. Backfill: Soil material or controlled low-strength material used to fill an excavation.
   1. Initial Backfill: Backfill placed beside and over pipe in a trench, including haunches to support sides of pipe.
   2. Final Backfill: Backfill placed over initial backfill to fill a trench.

B. Base Course: Course placed between the subbase course and hot-mix asphalt paving.

C. Bedding Course: Course placed over the excavated subgrade in a trench before laying pipe.

D. Borrow Soil: Satisfactory soil imported from off-site for use as fill or backfill.

E. Drainage Course: Course supporting the slab-on-grade that also minimizes upward capillary flow of pore water.

F. Excavation: Removal of material encountered above subgrade elevations and to lines and dimensions indicated.
   1. Authorized Additional Excavation: Excavation below subgrade elevations or beyond indicated lines and dimensions as directed by Designer. Authorized additional excavation and replacement material will be paid for according to Contract provisions for unit prices.
   2. Bulk Excavation: Excavation more than 10 feet in width and more than 30 feet in length.
   3. Unauthorized Excavation: Excavation below subgrade elevations or beyond indicated lines and dimensions without direction by Designer. Unauthorized excavation, as well as remedial work directed by Designer, shall be without additional compensation.

G. Fill: Suitable soil materials used to raise existing grades.

H. Rock: Rock material in beds, ledges, unstratified masses, conglomerate deposits, and boulders of rock material that exceed 1 cu. yd. for bulk excavation or 3/4 cu. yd. for footing, trench, and pit excavation that cannot be removed by rock excavating equipment without systematic drilling, ram hammering, ripping, or blasting, when permitted.

I. Structures: Buildings, footings, foundations, retaining walls, slabs, tanks, curbs, mechanical and electrical appurtenances, or other man-made stationary features constructed above or below the ground surface.

J. Subbase Course: Course placed between the subgrade and base course for hot-mix asphalt pavement, or course placed between the subgrade and a cement concrete pavement or a cement concrete or hot-mix asphalt walk.

K. Subgrade: Surface or elevation remaining after completing excavation, or top surface of a fill or backfill immediately below subbase, drainage fill, or topsoil materials.

L. Utilities: On-site underground pipes, conduits, ducts, and cables, as well as underground services within buildings.

1.5 SITE INVESTIGATION

A. The Contractor shall satisfy himself to the nature and location of the work, the general and local conditions, particularly those bearing upon transportation, disposal, handling and storage of materials, availability of labor, water, electric power, roads and uncertainties of weather, groundwater table or similar physical conditions at the site, the confirmation of subsurface materials to be encountered, the character of equipment and facilities needed prior to and during the prosecution of work and other matters which can affect the work or the cost thereof under this contract. Failure by the Contractor to acquaint himself with all information concerning these conditions will not relieve him from responsibility for properly estimating the difficulty or cost of successfully performing the work.

1.6 SUBSURFACE DATA

A. Variations in existing ground or subsurface soil conditions from those indicated on the test pit or boring logs shall not constitute grounds for changes in contract price or completion dates of this contract.

1.7 SUBMITTALS

A. Product Data: For the following:
   1. Each type of plastic warning tape.
   2. Geotextile.
   3. Controlled low-strength material, including design mixture.

B. Material Test Reports: From a qualified testing agency indicating and interpreting test results for compliance of the following with requirements indicated:
   1. Classification according to ASTM D 2487 of each on-site and borrow soil material proposed for fill and backfill.
   2. Laboratory compaction curve according to ASTM D 1557 for each onsite and borrow soil material proposed for fill and backfill.

C. Pre-excavation Photographs and Videotape: Show existing conditions of adjoining construction and site improvements, including finish surfaces that might be misconstrued as damage caused by earthwork operations. Submit before earthwork begins. Maintain catalog of up-to-date photographs at the site.

1.8 PROJECT CONDITIONS

A. Existing Utilities: Do not interrupt utilities serving facilities occupied by the Owner or others unless permitted in writing by Designer and then only after arranging to provide temporary utility services according to requirements indicated.
   1. Notify the Owner not less than two days in advance of proposed utility interruptions.
   2. Do not proceed with utility interruptions without the Owner's written permission.
   3. Contact utility-locator service for area where Project is located before excavating.

B. Demolish and completely remove from site existing underground utilities indicated to be removed. Coordinate with utility companies to shut off services if lines are active.

1.9 QUALITY CONTROL

A. Compaction and materials testing results shall be submitted to the Engineer for review as outlined in the following sections.

PART 2 – PRODUCTS

2.1 SOIL MATERIALS

A. General: Provide borrow soil materials when sufficient satisfactory soil materials are not available from excavations.

B. Satisfactory Soils: ASTM D 2487 Soil Classification Groups GW, GP, GM, SW, SP, and SM or a combination of these groups; free of rock or gravel larger than 3 inches in any dimension, debris, waste, frozen materials, vegetation, and other deleterious matter.

C. Common Fill: Imported Common Fill should consist of Satisfactory Soils having a maximum particle size of 6 inches and no more than 25 percent by weight passing the US No. 200 sieve.

D. Unsatisfactory Soils: Soil Classification Groups GC, SC, CL, ML, OL, CH, MH, OH, and PT according to ASTM D 2487, or a combination of these groups.
   1. Unsatisfactory soils also include satisfactory soils not maintained within 2 percent of optimum moisture content at time of compaction.

E. Subbase Material: Material meeting the minimum requirements for Crushed Gravel, as defined by the New Hampshire Department of Transportation (NHDOT) Standard Specifications for Road and Bridge Construction (Section 304.3). The gradation requirements for Crushed Gravel for Subbase are as follows:

Percent Passing	
Sieve Size	By Weight
3 in.	100
2-in.	95-100
1-in.	55-85
No. 4	27-52
No. 200	0-12

F. Base Course: Material meeting the minimum requirements for crushed stone (fine), as defined by the New Hampshire Department of Transportation (NHDOT) Standard Specifications for Road and Bridge Construction (Section 304.4). The gradation requirements for Crushed Stone (fine) for base course are as follows:

Percent Passing	
Sieve Size	By Weight
2 in.	100
1½ in.	85-100
¾ in.	45-75
No. 4	10-45
No. 200	0-5

G. Engineered Fill (Structural Fill): Material meeting the minimum requirements for crushed gravel for structural fill, as defined by the New Hampshire Department of Transportation (NHDOT) Standard Specification for Road and Bridge Construction (Section 508.2.1.1.1). The gradation requirements for Engineered Fill (Structural Fill) are as follows:

Percent Passing	
Sieve Size	By Weight
3 in.	100
2-in.	95-100
1-in.	55-85
No. 4	27-52
No. 200	0-12

H. Gravel Borrow: Material meeting the minimum requirements for gravel, as defined by the New Hampshire Department of Transportation (NHDOT) Standard Specification for Road and Bridge Construction (Section 304.2). The gradation requirements for gravel are as follows:

Percent Passing

Sieve Size	By Weight
6-in.	100
No. 4	25-70
No. 200	0-12

**2" maximum stone.*

I. Three quarter inch stone: Imported 3/4-inch stone meeting the minimum requirements for Stone Size #67, as defined by the New Hampshire Department of Transportation (NHDOT) Standard Specification for Road and Bridge Construction (Section 703). The gradation requirements for Stone size #67 are as follows:

Sieve Size	Percent Passing
1 inch	100
3/4 inch	90-100
3/8 inch	20-55
No. 4	0-10
No. 8	0-5

J. Bedding Course: Bedding course for utilities shall comply with the requirements of Sand listed below.

K. Filter Material: Narrowly graded mixture of natural or crushed gravel, or crushed stone and natural sand; ASTM D 448; coarse-aggregate grading Size 67; with 100 percent passing a 1-inch sieve and 0 to 10 percent passing a No. 4 sieve.

L. Sand: ASTM C 33; fine aggregate, natural, or manufactured sand.

M. Impervious Fill: Clayey gravel and sand mixture capable of compacting to a dense state.

N. Free draining angular washed stone: Imported angular double washed stone with particle size ranging from ¾ inch to 1-1/2 inch.

O. Peastone: Shall be crushed or natural stone meeting the following gradation

Sieve Size	Percent Passing
1/2 inch	100
3/8 inch	90-100
No 4	20-55
No 8	5-30
No. 16	0-10
No. 50	0-5

P. Stonedust: Shall be stone screenings the meet the gradation requirements below for fine aggregate as specified in New Hampshire Department of Transportation (NHDOT) Specification Section 520.

Sieve Size	Percent Passing
No 4	95-100
No 8	80-100

2.2 GEOTEXTILES

A. Geotextile Filter Fabric: Nonwoven needle-punched geotextile, manufactured for subsurface drainage applications, made from polyolefins or polyesters; with elongation greater than 50 percent; complying with AASHTO M 288 and the following, measured per test methods referenced:
   1. Survivability: Class 2; AASHTO M 288.
   2. Grab Tensile Strength: 157 lbf; ASTM D 4632.
   3. Sewn Seam Strength: 142 lbf; ASTM D 4632.
   4. Tear Strength: 56 lbf; ASTM D 4533.
   5. Puncture Strength: 56 lbf; ASTM D 6241.
   6. Apparent Opening Size: No. 40 sieve, maximum; ASTM D 4751.
   7. UV Stability: 50 percent after 500 hours' exposure; ASTM D 4355.

B. Geotextile Stabilization Fabric: Woven geotextile fabric, manufactured for separation applications, made from polyolefins or polyesters; with elongation less than 50 percent; complying with AASHTO M 288 and the following, measured per test methods referenced:
   1. Survivability: Class 2; AASHTO M 288.
   2. Grab Tensile Strength: 247 lbf; ASTM D 4632.
   3. Sewn Seam Strength: 222 lbf; ASTM D 4632.
   4. Tear Strength: 90 lbf; ASTM D 4533.
   5. Puncture Strength: 90 lbf; ASTM D 6241.
   6. Apparent Opening Size: No. 60 sieve, maximum; ASTM D 4751.
   7. Permittivity: 0.02 per second, minimum; ASTM D 4491.
   8. UV Stability: 50 percent after 500 hours' exposure; ASTM D 4355.

2.3 ACCESSORIES

A. Detectable Warning Tape: Acid- and alkali-resistant polyethylene film warning tape manufactured for marking and identifying underground utilities, a minimum of 6 inches wide and 4 mils thick, continuously inscribed with a description of the utility, with metallic core encased in a protective jacket for corrosion protection, detectable by metal detector when tape is buried up to 30 inches deep; colored as follows:
   1. Red: Electric.
   2. Yellow: Gas, oil, steam, and dangerous materials.
   3. Orange: Telephone and other communications.
   4. Blue: Water systems.
   5. Green: Sewer systems.

PART 3 – EXECUTION

3.1 PREPARATION

A. Protect structures, utilities, sidewalks, pavements, and other facilities from damage caused by settlement, lateral movement, undermining, washout, and other hazards created by earthwork operations.

B. Preparation of subgrade for earthwork operations including removal of vegetation, topsoil, debris, obstructions, and deleterious materials from ground surface is specified in Section 02 41 13 – SELECTIVE SITE DEMOLITION.

C. Protect and maintain erosion and sedimentation controls, which are specified in Section 31 25 00 – EROSION AND SEDIMENTATION CONTROLS, during earthwork operations.

D. Provide protective insulating materials to protect subgrades and foundation soils against freezing temperatures or frost.

3.2 DEWATERING

A. Prevent surface water and ground water from entering excavations, from ponding on prepared subgrades, and from flooding Project site and surrounding area. Dispose of contaminated water in accordance with regulations of authorities having jurisdiction.

B. Protect subgrades from softening, undermining, washout, and damage by rain or water accumulation.
   1. Reroute surface water runoff away from excavated areas. Do not allow water to accumulate in excavations. Do not use excavated trenches as temporary drainage ditches.
   2. Install a dewatering system to keep subgrades dry and convey ground water away from excavations. Maintain until dewatering is no longer required.

3.3 EXPLOSIVES

A. Explosives: Do not use explosives.

3.4 EXCAVATION, GENERAL

A. Unclassified Excavation: Excavate to subgrade elevations regardless of the character of surface and subsurface conditions encountered. Unclassified excavated materials may include rock, soil materials, and obstructions. No changes in the Contract Sum or the Contract Time will be authorized for rock excavation or removal of obstructions.
   1. If excavated materials intended for fill and backfill include unsatisfactory soil materials and rock, replace with satisfactory soil materials.
   2. Remove rock to lines and grades indicated to permit installation of permanent construction without exceeding the following dimensions:
      a. 24 inches outside of concrete forms other than at footings.
      b. 12 inches outside of concrete forms at footings.
      c. 6 inches outside of minimum required dimensions of concrete cast against grade.
      d. Outside dimensions of concrete walls indicated to be cast against rock without forms or exterior waterproofing treatments.

e. 6 inches beneath bottom of concrete slabs on grade.
f. 6 inches beneath pipe in trenches, and the greater of 24 inches wider than pipe or 42 inches wide.

3.5 EXCAVATION FOR STRUCTURES

A. Excavate to indicated elevations and dimensions within a tolerance of plus or minus 1 inch If applicable, extend excavations a sufficient distance from structures for placing and removing concrete formwork, for installing services and other construction, and for inspections.
   1. Excavations for Footings and Foundations: Do not disturb bottom of excavation. Excavate by hand to final grade just before placing concrete reinforcement. Trim bottoms to required lines and grades to leave solid base to receive other work.
   2. Excavation for Underground Tanks, Basins, and Mechanical or Electrical Utility Structures: Excavate to elevations and dimensions indicated within a tolerance of plus or minus 1 inch. Do not disturb bottom of excavations intended as bearing surfaces.

3.6 EXCAVATION FOR WALKS AND PAVEMENTS

A. Excavate surfaces under walks and pavements to indicated lines, cross sections, elevations, and subgrades.

3.7 EXCAVATION FOR UTILITY TRENCHES

A. Excavate trenches to indicated gradients, lines, depths, and elevations.
   1. Beyond building perimeter, excavate trenches to allow installation of top of pipe below frost line.

B. Excavate trenches to uniform widths to provide the following clearance on each side of pipe or conduit. Excavate trench walls vertically from trench bottom to 12 inches higher than top of pipe or conduit, unless otherwise indicated.
   1. Clearance: 12 inches each side of pipe or conduit.

C. Trench Bottoms: Excavate and shape trench bottoms to provide uniform bearing and support of pipes and conduit. Shape subgrade to provide continuous support for bells, joints, and barrels of pipes and for joints, fittings, and bodies of conduits. Remove projecting stones and sharp objects along trench subgrade.
   1. For pipes and conduit less than 6 inches in nominal diameter and flat-bottomed, multiple-duct conduit units, hand-excavate trench bottoms and support pipe and conduit on an undisturbed subgrade.
   2. For pipes and conduit 6 inches or larger in nominal diameter, shape bottom of trench to support bottom 90 degrees of pipe circumference. Fill depressions with tamped sand backfill.
   3. Excavate trenches 6 inches deeper than elevation required in rock or other unyielding bearing material to allow for bedding course.

3.8 OVER-EXCAVATION OF UNSUITABLE SOILS

A. When approved by the Engineer, the Contractor may be required to remove unsuitable soils, fill, or natural soil materials in areas where fills are to be placed when determined to be undesirable in their location or condition. The Contractor shall be required to remove the undesirable material and backfill with approved material properly compacted.

B. At locations where unstable soil is identified, the removal and replacement of such soil shall be as directed as recommended by the Engineer.

C. At locations where soil is wet of optimum moisture, the Contractor shall provide a “good faith” effort in drying and discing these areas prior to completing over-excavation as approved by the Engineer.

D. Where over-excavations are required adjacent or beneath the location of the proposed drainage structure, undercut and backfill shall be done over a sufficient distance adjacent to the installation to prevent future operations from disturbing the completed drainage structure.

E. All material removed in the work of over-excavation will be classified by the Engineer and Owner as either suitable for other use without excessive manipulation and utilized by the Contractor elsewhere in the work, or unsuitable for future use and disposed of by the Contractor as directed by the Engineer.

F. The Contractor shall conduct over-excavation operations in such a way that the necessary measurements can be taken before any backfill is placed.

G. Backfill in over-excavation areas shall be placed as a continuous operation along with the over-excavation operation. Backfill materials shall be consistent with the intended use. No backfill material shall be placed in water unless otherwise permitted by the Engineer.

3.9 SUBGRADE INSPECTION

A. Notify Designer when excavations have reached required subgrade.

B. If Designer determines that unsatisfactory soil is present, continue excavation and replace with compacted backfill or fill material as directed and specified herein.

C. Proof-roll subgrade below the building slabs and pavements with suitable equipment, as specified herein, to identify soft pockets and areas of excess yielding. During the proof rolling process, the subgrade shall be reviewed by the Engineer to identify unstable zones. Where fine-grained subgrades are present, proof rolling may need to be accomplished statically, to reduce the potential for disturbing the subgrade. Do not proof-roll wet or saturated subgrades.
   1. Completely proof-roll subgrade in one direction, repeating proof-rolling in direction perpendicular to first direction. Limit vehicle speed to 3 mph.
   2. Proof-roll with minimum 10-ton vibratory rollers or a loaded 10-wheel, tandem-axle dump truck weighing not less than 15 tons, in open areas or a minimum 1-ton walk-behind roller or large plate compactor in trenches or confined areas.
   3. Excavate soft spots, unsatisfactory soils, and areas of excessive pumping or rutting, as determined by Designer, and replace with compacted backfill or fill as recommended by the Engineer.

D. The Contractor shall be responsible for maintaining stable soil subgrades. Fine-grained subgrade soils exposed during construction are anticipated to be easily disturbed by construction traffic and are likely to become unstable when above the optimum moisture content. The Contractor shall be responsible for managing construction traffic, stockpiling of materials, and providing routine maintenance to protect subgrades from disturbance. Where subgrades are damaged by freezing temperatures, frost, rain, accumulated water, or construction activities, they shall be reconstructed as directed by the Designer, without additional compensation.

3.10 UNAUTHORIZED EXCAVATION

A. Fill unauthorized excavation under foundations or wall footings by extending bottom elevation of concrete foundation or footing to excavation bottom, without altering top elevation. Alternatively, the unauthorized excavation may be backfilled to design elevation using appropriate soil for the intended use. Lean concrete fill, with 28-day compressive strength of 2500 psi may also be used when approved by Designer.
   1. Fill unauthorized excavations under other construction or utility pipe as directed by Designer.

3.11 STORAGE OF SOIL MATERIALS

A. Stockpile borrow soil materials and excavated satisfactory soil materials without intermixing. Place, grade, and shape stockpiles to drain surface water. Cover to prevent windblown dust.
   1. Stockpile soil materials away from edge of excavations. Do not store within drip line of remaining trees, if applicable.

3.12 BACKFILL

A. Place and compact backfill in excavations promptly, but not before completing the following:
   1. Construction below finish grade including, where applicable, subdrainage, damp proofing, waterproofing, and perimeter insulation.
   2. Observing and accepting subgrade.
   3. Surveying locations of underground utilities for Record Documents.
   4. Testing and inspecting underground utilities.
   5. Removing concrete formwork.
   6. Removing trash and debris.
   7. Removing temporary shoring and bracing, and sheeting.
   8. Installing permanent or temporary horizontal bracing on horizontally supported walls.

B. Place backfill on subgrades free of mud, frost, snow, or ice.

3.13 UTILITY TRENCH BACKFILL

A. Place backfill on subgrades free of mud, frost, snow, or ice.

B. Place and compact bedding course on trench bottoms and where indicated. Shape bedding course to provide continuous support for bells, joints, and barrels of pipes and for joints, fittings, and bodies of conduits.

C. Backfill trenches excavated under footings and within 18 inches of bottom of footings with satisfactory soil; fill with concrete to elevation of bottom of footings. Concrete is specified in Section 03 3000 - CAST-IN-PLACE CONCRETE.

D. Place and compact initial backfill of subbase material free of particles larger than 1 inch in any dimension, to a height of 12 inches over the utility pipe or conduit.
   1. Carefully compact initial backfill under pipe haunches and compact evenly up on both sides and along the full length of utility piping or conduit to avoid damage or displacement of piping or conduit. Coordinate backfilling with utilities testing.

E. Backfill voids with satisfactory soil while installing and removing shoring and bracing.

F. Place and compact final backfill of satisfactory soil to final subgrade elevation.

G. Install warning tape directly above utilities, 12 inches below finished grade, except 6 inches below subgrade under pavements and slabs.

3.14 SOIL FILL

A. Plow, scarify, bench, or break up sloped surfaces steeper than 1 vertical to 4 horizontal so fill material will bond with existing material.

B. Place and compact fill material in layers to required elevations as shown on the contract drawings.

C. Place soil fill on subgrades free of mud, frost, snow, or ice.

D. All soils to be compacted to a minimum of 95% of its maximum density at optimum moisture content or as otherwise specified.

3.15 SOIL MOISTURE CONTROL

A. Uniformly moisten or aerate subgrade and each subsequent fill or backfill soil layer before compaction to within 2 percent of optimum moisture content.
   1. Do not place backfill or fill soil material on surfaces that are muddy, frozen, or contain frost or ice.
   2. Remove and replace or scarify and air dry otherwise satisfactory soil material that exceeds optimum moisture content by 2 percent and is too wet to compact to specified dry unit weight.

3.16 COMPACTION OF SOIL BACKFILLS AND FILLS

A. Place backfill and fill soil materials in layers not more than 8 inches in loose depth for material compacted by heavy compaction equipment, and not more than 4 inches in loose depth for material compacted by hand-operated tampers.

B. Place backfill and fill soil materials evenly on all sides of structures to required elevations, and uniformly along the full length of each structure.

C. Compact soil materials to not less than the following percentages of maximum dry unit weight according to ASTM D 1557:

1. Under structures, building slabs, steps, and pavements, scarify and recompact top 12 inches of existing subgrade and each layer of backfill or fill soil material at 95 percent; and areas within 10 feet of structures, building slabs, steps, and pavements at 92 percent.
2. Under walkways, scarify and recompact top 6 inches below subgrade and compact each layer of backfill or fill soil material at 95 percent.
3. Under lawn or unpaved areas, scarify and recompact top 6 inches below subgrade and compact each layer of backfill or fill soil material at 90 percent.
4. For utility trenches, compact each layer of initial and final backfill soil material at 95 percent.

3.17 GRADING

A. General: Uniformly grade areas to a smooth surface, free of irregular surface changes. Comply with compaction requirements and grade to cross sections, lines, and elevations indicated.
   1. Provide a smooth transition between adjacent existing grades and new grades.
   2. Cut out soft spots, fill low spots, and trim high spots to comply with required surface tolerances.

B. Site Grading: Slope grades to direct water away from buildings and to prevent ponding. Finish subgrades to required elevations within the following tolerances:
   1. Lawn or Unpaved Areas: Plus or minus 1 inch.
   2. Walks: Plus or minus 1/2 inch. Tolerance will not alleviate the contractor's responsibility to meet required slopes in Accessible areas.
   3. Pavements: Plus or minus 1/4 inch.

C. Grading inside Building Lines: Finish subgrade to a tolerance of 1/2 inch when tested with a 10-foot straightedge.

3.18 SUBBASE AND BASE COURSES

A. Place subbase and base course on subgrades free of mud, frost, snow, or ice.

B. On prepared subgrade, place subbase and base course under pavements and walks as follows:
   1. Install separation geotextile on prepared subgrade according to manufacturer's written instructions, overlapping sides and ends.
   2. Place base course material over subbase course under hot-mix asphalt pavement.
   3. Shape subbase and base course to required crown elevations and cross-slope grades.
   4. Place subbase and base course 6 inches or less in compacted thickness in a single layer.
   5. Place subbase and base course that exceeds 6 inches in compacted thickness in layers of equal thickness, with no compacted layer more than 6 inches thick or less than 3 inches thick.
   6. Compact subbase and base course at optimum moisture content to required grades, lines, cross sections, and thickness to not less than 95 percent of maximum dry unit weight according to ASTM D 1557.

3.19 FIELD QUALITY CONTROL

A. Testing Agency: Engage a qualified independent materials testing agency to perform field quality-control testing.

B. Allow testing agency to inspect and test subgrades and each fill or backfill layer. Proceed with subsequent earthwork only after test results for previously completed work comply with requirements.

C. Footing Subgrade: At footing subgrades, at least one test of each soil stratum will be performed to verify design bearing capacities. Subsequent verification and approval of other footing subgrades may be based on a visual comparison of subgrade with tested subgrade when approved by Designer.

D. Testing agency will test compaction of soils in place according to ASTM D 1556, ASTM D 2167, ASTM D 2922, and ASTM D 2937, as applicable. Tests will be performed at the following locations and frequencies:
   1. Paved/Slab Areas: At subgrade and at each compacted fill and backfill layer, at least 1 test for every 2000 sq. ft. or less of paved area or building slab, but in no case fewer than 3 tests.
   2. Trench Backfill: At each compacted initial and final backfill layer, at least 1 test for each 150 feet or less of trench length, but no fewer than 2 tests.

E. When testing agency reports that subgrades, fills, or backfills have not achieved degree of compaction specified, scarify and moisten or aerate, or remove and replace soil to depth required; recompact and retest until specified compaction is obtained.

3.20 PROTECTION

A. Protecting Graded Areas: Protect newly graded areas from traffic, freezing, and erosion. Keep free of trash and debris.

B. Repair and reestablish grades to specified tolerances where completed or partially completed surfaces become eroded, rutted, settled, or where they lose compaction due to subsequent construction operations or weather conditions.
   1. Scarify or remove and replace soil material to depth as directed by Designer; reshape and recompact.

C. Where settling occurs before Project correction period elapses, remove finished surfacing, backfill with additional soil material, compact, and reconstruct surfacing.
   1. Restore appearance, quality, and condition of finished surfacing to match adjacent work, and eliminate evidence of restoration to greatest extent possible.

3.21 DISPOSAL OF SURPLUS AND WASTE MATERIALS

A. Disposal: Remove surplus satisfactory soil and waste material, including unsatisfactory soil, trash, and debris, and legally dispose of it off the property.

END OF SECTION

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SECTION 31 25 00 - EROSION AND SEDIMENTATION CONTROLS

PART 1 - GENERAL

1.1 GENERAL PROVISIONS

A. Attention is directed to the CONTRACT AND GENERAL CONDITIONS and all Sections within DIVISION 00 – PROCUREMENT AND CONTRACTING REQUIREMENTS (PCR) which are hereby made a part of this Section of the Specifications.

1.2 DESCRIPTION OF WORK

A. Work Included: Provide labor, materials, and equipment necessary to complete the work of this Section, including but not limited to the following:

1. Control measures to prevent all erosion, siltation and sedimentation of wetlands, waterways, construction areas, adjacent areas, and off-site areas.
2. Control measures shall be accomplished adjacent to or in the following work areas:
   a. Soil stockpiles and on-site storage and staging areas.
   b. Cut and fill slopes and other stripped and graded areas.
   c. Constructed and existing swales and ditches.
   d. Protection of drainage structure inlets.
   e. At edge of wetlands areas, if applicable, as shown on Drawings.
   f. Protection of stockpile areas.
3. Additional means of protection shall be provided by the Contractor as required for continued or unforeseen erosion problems, at no additional cost to the Owner.
4. Periodic maintenance of all sediment control structures shall be provided to ensure intended purpose is accomplished. Sediment control measures shall be in working condition at the end of each day.
5. On a weekly basis and after any significant rainfall, sediment control structures shall be inspected for integrity. Any damaged device shall be corrected immediately.

B. Alternates: Not Applicable.

C. Items To Be Installed Only: Not Applicable.

D. Items To Be Furnished Only: Not Applicable.

1.3 QUALITY ASSURANCE

A. If applicable, the Contractor shall develop, submit, and comply with the requirements of Stormwater Pollution Prevention Plan (SWPPP) prepared for the NPDES permit, and all

other applicable requirements of governing authorities having jurisdiction. The specifications and drawings are not represented as being comprehensive, but rather convey the intent to provide complete slope protection and erosion control for both the Owner's and adjacent property. It shall be the responsibility of the Contractor to prepare the required SWPPP plan and to file for a Construction General Permit through the EPA at least 14-business days prior to the start of work. The Contractor shall prepare the SWPPP in advance and submit to Engineer and Town for review. The Engineer may review, and request changes / modifications as required.

1. Provide temporary erosion and sedimentation control measures to prevent soil erosion and discharge of soil-bearing water runoff or airborne dust to adjacent properties and walkways, according to a sediment and erosion control plan specific to the site that complies with EPA 832/R-92-005 or requirements of authorities having jurisdiction whichever is more stringent.

B. Erosion control measures shall be established at the beginning of construction and maintained during the entire period of construction. On-site areas which are subject to severe erosion, and off-site areas which are especially vulnerable to damage from erosion and/or sedimentation, are to be identified and receive special attention.

C. All land-disturbing activities are to be planned and conducted to minimize the size of the area to be exposed at any one time, and the length of time of exposure.

D. Surface water runoff originating upgrade of exposed areas should be controlled to reduce erosion and sediment loss during the period of exposure.

E. When the increase in the peak rates and velocity of storm water runoff resulting from a land-disturbing activity is sufficient to cause accelerated erosion of the receiving stream bed, provide measures to control both the velocity and rate of release so as to minimize accelerated erosion and increased sedimentation of the stream.

F. All land-disturbing activities are to be planned and conducted so as to minimize off-site sedimentation damage.

G. The Contractor is responsible for cleaning out and disposing of all sediment once the storage capacity of the sediment facility is reduced by one-half

H. Inspect, repair, and maintain erosion and sedimentation control measures during construction until permanent vegetation has been established.

I. Remove erosion and sedimentation controls and restore and stabilize areas disturbed during removal.

PART 2 - PRODUCTS

2.1 MATERIALS

A. Siltation Fence: Fabricated or prefabricated unit consisting of the following filter fabric properties:

1)	Grab Tensile Strength	90	ASTM D1682
2)	Elongation at Failure (%)	50	ASTM D1682
3)	Mullen Burst Strength (PSI)	190	ASTM D3786
4)	Puncture Strength (lbs)	70	ASTMD751(modified)
5)	Slurry Flow Rate (gal/min/sf)	0.5	Virginia DOT VTM-51
6)	Equivalent Opening Size	40-80	US Std Sieve CW-02215
7)	Ultraviolet Radiation Stability (%)	90	ASTM G26

B. Fencing: Steel posts shall be standard 6-foot-long metal stamped drive stakes commonly used to support snow fences. Fencing shall be new four-foot height wood lath snow fencing. Provide suitable steel staples or heavy nylon cord for securing filter cloth to support system.

C. Silt Socks: The silt socks for construction of erosion control devices shall be 12” in diameter. In areas of slope greater than 2:1(horizontal: vertical), silt sock must be secured in place by stakes. Silt socks shall be either lapped or butted at the ends to create a continuous line.

D. Stakes: Stakes for silt socks shall be one of the following materials: Wood stakes of sound hardwood 2 by 2 inches in size or steel reinforcing bars of at least No. 4 size. Lengths shall be approximately three feet.

E. Protective Measures: As temporary coverings on ground areas subject to erosion, provide one of the following protective measures, and as directed by the Engineer:

1. Straw temporary mulch, 100 pounds per 1,000 square feet.
2. Wood fiber cellulose temporary mulch, 35 pounds per 1,000 square feet.
3. Tackifier for anchoring mulch or straw shall be a non-petroleum based liquid bonding agent specifically made for anchoring straw.
4. Provide natural (jute, wood excelsior) covering with suitable staples or anchors to secure to ground surface. Note that wire stapes and non-biodegradable coverings shall not be used for any area that will be mown turf.
5. Temporary vegetative cover for graded areas shall be undamaged, air dry threshed straw free of undesirable weed seed.
6. Provide temporary settling basis as shown on the contract drawings and described in the specifications.

F. Stone for Construction Entrance: Shall be ASTM designation C-33, size No. 2 (1-1/2” to 2-1/2”) crushed stone.

PART 3 - EXECUTION

3.1 STABILIZED CONSTRUCTION ENTRANCE AND STONE BERMS

A. Stone as specified above.

B. Length: As effective, but not less than 40 feet.

C. Thickness: Not less than eight inches.

D. Width: Not less than full width of all points on ingress or egress, but not less than 20 feet.

E. Washing: When necessary, wheels shall be cleaned to remove sediment prior to entrance onto public right-of-way. When washing is required, it shall be done on an area stabilized with crushed stone which drains into an approved sediment trap or sediment basin. All sediment shall be prevented from entering any storm drain, ditch, or watercourse through the use of sandbags, gravel boards or other approved methods.

F. Maintenance: The entrance shall be maintained in a condition which will prevent tracking or flowing of sediment onto public rights-or-way. This may require periodic top dressing with additional stone as conditions demand and repair and/or cleanout of any measures used to trap sediment. All sediment spoiled, dropped, washed, or tracked onto public rights-of-way must be removed immediately.

G. Place crushed stone berms in locations required and as directed. Berms shall have side slopes of 1:3 or less.

H. Inspect stone berms periodically and replace and/or regrade crushed stone as required.

3.2 SILT FENCING

A. Excavate a 6-inch trench along the upstream side of the desired fence location.

B. Drive fence posts a minimum of 1’-6” into the ground. Install fence, well-staked at maximum eight-foot intervals in locations as shown on Drawings. Secure fabric to fence and bury fabric end within the six-inch-deep trench cut.

C. Lay lower 12 inches of silt fence into the trench, 6 inches deep and 6 inches wide. Backfill trench and compact.

D. Overlap joints in fabric at post to prevent leakage of silt at seam.

3.3 VEGETATIVE STABILIZATION / TEMPORARY SEEDING

A. Seeding of disturbed areas shall be in accordance with the pertinent parts of the New Hampshire Department of Transportation Standard Specifications, Section 644.

3.4 INLET PROTECTION

A. Install silt fence or straw bales around inlet as specified herein.

3.5 DUST CONTROL

A. Throughout the construction period the Contractor shall carry on an active program for the control of fugitive dust within all site construction zones, or areas disturbed as a result of construction. Control methods shall include the following: Apply calcium chloride at a uniform rate of one and one-half (1 ½) pounds per square yard in areas subject to blowing. For emergency control of dust apply water to affected areas. The source of supply and the method of application for water are the responsibility of the contractor.

B. The frequency and methods of application for fugitive dust control shall be as directed by the Engineer.

3.6 TEMPORARY PROTECTIVE COVERINGS (AFTER GROWING SEASON)

A. Place temporary covering for erosion and sedimentation control on all areas that have been graded and left exposed after October 30. Contractor shall have the choice to use either or both of the methods described herein.

B. Straw shall be anchored in-place by one of the following methods and as approved by the Engineer: Mechanical “crimping” with a tractor drawn device specifically devised to cut mulch into top two inches of soil surface or application of non-petroleum based liquid tackifier, applied at a rate and in accordance with manufacturer’s instructions for specific mulch material utilized.

C. Placement of mesh or blanket matting and anchoring in place shall be in accordance with manufacturer’s printed instructions.

D. Inspect protective coverings periodically and reset or replace materials as required.

3.7 SILT SOCKS

A. Silt Socks shall be constructed and installed as required by the order of conditions prior to the start of work.

END OF SECTION

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SECTION 32 18 23 SYNTHETIC FIELD SURFACING

PART 1 – GENERAL

1.1 GENERAL PROVISIONS

A. Attention is directed to the CONTRACT AND GENERAL CONDITIONS and all Sections within DIVISION 00 – PROCUREMENT AND CONTRACTING REQUIREMENTS (PCR) which are hereby made a part of this Section of the Specifications.

1.2 GENERAL REQUIREMENTS

A. It is the intent of this specification to specify an Infilled Synthetic Turf System that provides a high-quality playing surface for multi-purpose athletic uses installed by experienced crews under the direct supervision of an experienced foreman/superintendent. The finished surfaces shall be immediately firm, and stable while providing long term durability, safety, and shock attenuation. The Infilled Synthetic Turf System Supplier/Installer's attention is called to the testing requirements related to G-Max rating per ASTM F355-01, current edition. As a result, the following minimum requirements must be met by all turf systems to be favorably considered:

1. The synthetic turf shall be manufactured and supplied by a company which has been in business continuously for a period of a minimum of five (5) years under the same name and ownership and with at least five (5) years' experience in the manufacture and supply and of the type of materials specified herein on projects of comparable size to this Project.
2. The synthetic turf manufacturer must have completed a minimum of twenty-five (25) synthetic turf installations in the last 5 years, each in excess of 75,000 square feet.
3. Turf Installation Crew: Synthetic turf installation crew shall have installed a minimum of ten (10) outdoor athletic field systems of similar type measuring 75,000 square feet or greater. The Turf Installation Crew shall contain at least three (3) members who have installed at least five (5) similar outdoor turf installations each greater than 75,000 square feet. The designated crew foreman shall have installed at least ten (10) similar outdoor turf installations greater than 75,000 square feet and shall be subject to the approval of the Engineer. The crew foreman shall be on site during all turf installation procedures and shall not be replaced without Owner approval. Installation crew and foreman shall submit a list of previously installed projects, by type, size, and location for the Owner's representative inspection at the pre-construction conference and prior to start of Work.
4. The General Contractor shall submit a list of previously installed projects, to include individual owner contact information, by the proposed Synthetic Turf Supplier/Installer, along with crew and foreman qualifications at the pre-construction conference that demonstrates compliance with the minimum requirements of this Section, 1.02, Paragraphs 1-3.
5. The General Contractor must coordinate all work items with the Turf Supplier/Installer.

6. ***Turf systems must meet European Registration, Evaluation, Authorisation and Restriction of Chemicals (REACH) and The State of California PROP 65 standards. Turf systems should be non-detect (ND) for 29 PFAS compounds tested via EPA Method 533 and 537.1 and have a statement from the vendor that the turf does not contain and is not manufactured with the 29 tested PFAS compounds.***

1.3 DESCRIPTION OF WORK

A. Provide labor equipment and materials necessary to remove and dispose of existing synthetic turf surfacing system, laser grade existing stone base, install new shock absorbing pad underlayment, install new dual fiber synthetic turf surfacing system with rubber infill mix. including all tufted and/or inlaid sports field linings and markings as indicated on the Drawings.

Regardless of the final turf system to be installed, the Turf Supplier/Installer will meet or exceed the requirements of this specification related to materials, performance, and qualifications.

Work shall include but shall not be limited to:

1. Provide an inspection and certification of existing subsurface drainage system and Free Draining Base prior to commencement of subsequent work.
2. Furnish and install an Infilled Synthetic Turf System including supplementation as needed of existing finish stone, a dual fiber carpet of polyethylene parallel long-slit and monofilament polyethylene fibers with nominal height of 2.25” tufted into a high-quality polyurethane coated backing, and a rubber infill mix.
3. Provide infiltration testing by means of Dual-Ring Infiltrometer at a minimum of six (6) locations for every 80,000 square feet of field area after completion of Free Draining Finishing Stone layer.
4. Provided tufted, inlaid, and painted lines and markings or other such graphics as described herein and shown on the Contract Drawings and approved Shop Drawings.
5. Provide all attachments and penetrations as required to complete the work as shown on the Contract Drawings and approved Shop Drawings, all in full compliance with NHIAA and NFHS rules for the intended sports.
6. Provide eight (8) year warranty and one (1) field maintenance training session prior to final closeout as further described within this section.
7. Provide Third Party Insured Warranty as further described within this section.

1.4 RELATED SECTIONS

A. Examine Contract Documents for requirements that affect work of this Section. Other Specification Sections that directly relate to work of this Section include, but are not limited to:

1. Section 31 20 00 – Earth Moving

1.5 REFERENCES

A. Comply with applicable requirements of the following standards. Where these standards

conflict with other specified requirements, the most restrictive requirement shall govern.

1. American Society for Testing and Materials (ASTM):
   - D 1557 Yarn Denier
   - D 3218 Fiber Microns
   - D 5823 Pile Height
   - D 1335 Turf Bind
   - F 1936 Shock Absorbing Properties of Playing Surface Systems and Materials.
   - D 5034 Grab Breaking Strength
   - D 5848 Pile Height, Face Weight, Primary and Secondary Backing, and Total Weight
   - D 2859 Flammability (Pill test)
   - F 1551 Water Permeability (after install)
   - D 5793 Stitch Gauge
2. United States Environmental Protection Agency (EPA)
   - 533 Per- And Polyfluoroalkyl Substances In Drinking Water
   - 537.1 Selected Per- And Polyfluorinated Alkyl Substances In Drinking Water

1.6 SUBMITTALS

A. Manufacturer's Literature

1. Submit a signed statement from the Infilled Synthetic Turf System Manufacturer that the Drawings and Specifications have been reviewed by a qualified representative of the Infilled Synthetic Turf System Manufacturer and major materials suppliers, and that they are in agreement that the materials and installation methods to be used for the Infilled Synthetic Turf System are proper and adequate for use as a multi-purpose athletic field in New England.
2. Submit a recent reference list for the turf system manufacturer/supplier of at least twenty-five (25) outdoor installations of a tufted polyethylene infilled synthetic turf system, each in excess of 75,000 square feet.
3. Submit a recent reference list for the turf system installation crew of at least ten (10) outdoor installations of a tufted polyethylene infilled synthetic turf system, each in excess of 75,000 square feet.
4. Job resumes of Infilled Synthetic Turf System Manufacturer's Installation Foreman (showing supervision of at least ten (10) similar infilled turf installations) and Infilled Synthetic Turf System Installers.
5. Cut Sheets for all materials required under this Section (turf, fiber, infill, etc.) including third party ASTM certified lab gradation reports.
6. Provide a sample written 8-year labor and materials warranty from the Infilled Synthetic Turf System Manufacturer.
7. Provide a sample Written Third Party Insured Warranty (described herein) at the pre-construction conference.
8. A signed letter on turf manufacturer company letterhead holding the Owner, Designer, and all other project consultants harmless for any violation of patent rights or

infringements and claims related to hazardous materials or other environmental impacts.

9. **Submit test results from an EPA certified lab showing compliance with Section 32 18 23 Part 1.2.A.6.**

B. Shop Drawings
   1. Provide a carpet seaming plan.
   2. Supply shop drawings (including details) at an approved scale for location, installation, and erection of the synthetic turf anchoring system.
   3. Provide a striping and marking plan for all intended sports in compliance with NHIAA and NFHS and the Drawings for approval by the Owner and Designer.

C. Product Samples and Information
   1. Provide color samples of manufacturer's standard slit film and monofilament polyethylene fibers for approval.
   2. Provide a minimum of 12" x 12" sample of the slit film and monofilament dual-fiber polyethylene carpet. Provide additional carpet samples for other colors required under this Section.
   3. Provide 12" long sample of seaming tape.
   4. Provide a 12"x12" sample of the shock absorbing pad.
   5. Provide certified sieve analysis of infill materials for approval.
   6. Provide a 1-quart sample of the infill mix at the Designer's approved mix ratio.

D. Delivery slips for all aggregate base and Infilled Synthetic Turf System materials delivered to the site.

E. Provide three (3) copies of the synthetic turf manufacturer's Maintenance Manual to the Owner. The synthetic turf manufacturer shall also provide the necessary instructions and training for proper care and preventative maintenance of the synthetic turf system.

F. Substrate Acceptability: Submit a certified statement issued by the synthetic field surfacing materials Supplier/Installer, attesting that all areas and surfaces designated to receive synthetic field surfacing have been inspected and found satisfactory for the reception of the Work covered under this Section; and are not in conflict with the "Guarantee" requirements. Installation of synthetic field surfacing materials may not commence until final acceptance of finished crushed stone/aggregate base has been received by the Engineer.

G. Statement of Supervision: Upon completion of the Work, submit a written statement signed by the Synthetic Turf Supplier/Installer stating that the field supervision of the manufacturer's representative was sufficient to ensure proper application of the materials, that the Work was installed in accordance with the Contract Documents, and that the installation is acceptable to the manufacturer.

H. Synthetic Turf Supplier shall provide a written statement that their product is lead free prior to installation.

1.7 QUALITY ASSURANCE

A. Inspection and Acceptance: The Infilled Synthetic Turf System Supplier/Installer and General Contractor shall inspect the subgrade and drainage system to verify their acceptance of installation and condition in writing, per Section 1.6 (G). The turf manufacturer/supplier shall include in their cost sufficient site visits during subbase and base construction, along with any testing they require to determine the adequacy of the drainage and base construction. Commencement of subsequent installation in a given work area indicates acceptance of underlying substrates and systems. Testing of drainage capacity shall be by Dual Ring Infiltrometer at a minimum of six (6) locations per 80,000 square feet of each field area after completion of free draining finishing stone. The Owner's testing and inspection consultant shall be present for these testing operations.

B. Planarity and Grade: Deviation in planarity of the Free Draining Finish Stone layer and finished surface shall not exceed 1/4" beneath a 10' straightedge. Deviation from a straight grade between levels on drawings shall not exceed 1/4". Final grading shall be performed with a dual laser-controlled finish grader.

C. Protection: Only low ground pressure equipment shall be allowed on the subbase or base surfaces of the field. Heavy equipment, dual articulating vehicles, lulls, or vehicles of any kind without flotation tires shall not be allowed on the field area subsequent to the completion of the drainage system.

1.8 DELIVERY, STORAGE AND HANDLING

A. Deliver materials in original, unopened packages with manufacturer's labels intact and clearly identifying products.

B. Store materials elevated above grade and under cover; keep them dry and protected from weather, direct sunlight, surface contamination, construction traffic and other causes.

C. Comply with procedures recommended by the manufacturer.

1.9 TESTING AND INSPECTION

A. The General Contractor shall engage a materials testing agency. The testing agency will observe the aggregate placement, concrete placement, drainage product installation, backfill, compaction and moisture and permeability tests. Weekly testing results shall be provided to the Owner for review. Submission of testing results will be a requirement for the processing of partial payment requests.

B. The General Contractor shall engage a certified third-party testing agency qualified to conduct field infiltration tests of the in-place base and subbase materials per ASTM D3385, Standard Test Method for Infiltration Rate of Soils in Field using a Dual-Ring Infiltrometer or an equivalent percolation test to affirm the subsurface drainage system's water permeability rates prior to carpet installation.

C. In addition to the required Dual-Ring Infiltrometer testing, the General Contractor shall verify that the subsurface drainage system is functioning properly prior to the commencement of the infilled synthetic turf system installation by thoroughly flooding each field in a minimum of six (6) areas and verifying and recording flow from the drainage system outlet. This can also be accomplished by recording a naturally occurring rain event with greater than ½" of rainfall.

D. G-Max:

1. The General Contractor shall provide the necessary testing data to the Owner, verifying that the finished field meets the required shock attenuation (GMax), as per ASTM F355/F1936: Immediately upon substantial completion, the General Contractor shall arrange for shock absorbency testing by a certified laboratory subject to approval by the Designer in accordance with ASTM F 335-Method A. Testing will be performed at a minimum of ten locations selected by the Designer. "In-house" laboratories with a business affiliation to the turf manufacturer and/or installer are unacceptable.
2. The average G-max value at installation shall be between 90 and 130. The Synthetic Turf Installer, prior to acceptance, shall remedy an average G-max value outside this range, or individual reading more than 15% outside this range. Satisfactory G-max testing shall be a fixed requirement for final acceptance of the synthetic turf installation. It is understood that testing at substantial completion may result in G-max valves less than the specified range. The turf manufacturer/installer will arrange for repeat G-max testing at the six (6) month anniversary of field delivery and will take any and all action required to gain compliance with the specified range.
3. Over the life of the guarantee, the Synthetic Turf Manufacturer/Installer shall arrange and pay for annual re-testing of the field using the same procedure, if requested by the Owner. The Synthetic Turf Manufacturer/Installer shall take whatever action is required to remedy any average G-max value greater than 15% of the average value at installation, and to remedy any areas with individual readings over 160. These costs will be included in the turf unit price proposal. Over the life of the warranty, changes in the average G-Max that exceed +15% of the original installed system shall be remedied by the synthetic turf manufacturer/Installer within 30-days of the deficient test result.

E. HIC:

1. The General Contractor shall provide the necessary testing data to the Owner, verifying that the finished field meets the required hemisphere impact attenuation (HIC), as per ASTM F1292. Immediately upon substantial completion, the General Contractor shall arrange for HIC testing by a certified laboratory subject to approval by Designer. Testing will be performed at a minimum of ten locations selected by the Designer "In-House" laboratories with a business affiliation to the turf manufacturer and/or installer are unacceptable.
2. The HIC value at installation shall be below 1,000 at 1.3 m for each location tested. The turf manufacturer/installer will arrange for repeat HIC testing at the six (6) month anniversary of field delivery and will take any and all action required to gain compliance with the specified value.
3. Over the life of the guarantee, the synthetic turf manufacturer/installer shall arrange and pay for annual re-testing of the field using the same procedure if requested by the Owner. The synthetic turf manufacturer/installer shall take whatever action is

required to remedy any HIC value greater than 1,000. These costs will be included in the turf unit price proposal. Over the life of the warranty, changes in HIC values greater that 1,000 shall be remedied by the synthetic turf manufacturer/installer within 30-days of the deficient test result.

F. Vertical Deformation (AAA):

1. The General Contractor shall provide the necessary testing to the Owner, verifying that the finished field meets the required vertical deformation test using the Advanced Artificial Athlete (AAA) method. Immediately upon substantial completion, the General Contractor shall arrange for testing by a certified laboratory subject to approval by the Designer. Testing will be performed at a minimum of ten locations. “In-House” laboratories with a business affiliation to the turf manufacturer and/or installer are unacceptable.
2. The vertical deformation value at installation shall be between 5mm and 10mm.

G. Surface Regularity:

1. The General Contractor shall provide the necessary testing to the Owner, verifying that the finished stone base of the field meets the required surface regularity, as per EN 13036. Prior to turf installation, the General Contractor shall arrange for testing by a certified laboratory subject to approval by the Designer. “In-House” laboratories with a business affiliation to the turf manufacturer and/or installer are unacceptable.
2. The surface regularity value at installation shall be <10mm differential over 3m straight edge.

1.10 GUARANTEE

A. The Synthetic Turf Supplier shall provide a written guarantee stating that all work executed under this section will be free from defects of material and workmanship for a period of eight (8) years from date of Substantial Completion, and that any defects will be remedied on written notice at no additional cost to the Owner. The warranty shall be in writing and shall be signed by the Installer and synthetic field surfacing materials manufacturer. Guarantee shall include removal and replacement of materials as required, to repair synthetic field surfacing at no cost to the Owner. This warranty shall not be pro-rated, rather it shall provide for the full replacement value of defective aspects of the installation throughout the life of the warranty, with no maximum per claim coverage amount. Nothing contained in the manufacturer’s written warranty language or failure to provide a manufacturer’s written warranty shall supersede or limit the contractual obligations in this Specification.

B. In addition to the manufacturer’s warranty described above, the synthetic turf manufacturer will provide the Owner with a third party insurance policy acceptable to the Owner, with a minimum aggregate of $5,000,000 pre-paid for a full eight (8) years and not-cancelable, issued in the name of the Owner, by a US Insurance company with an A.M. Best rated “A” or better, which provides the same warranty coverage established above, in the event that the turf manufacturer is unable or unwilling to provide the specified coverage. A copy of the policy will be required prior to the General Contractor contract award and its review and approval by the Owner is a condition of the General Contract award. An executed policy in the Owner’s name will be required prior to final

payment. Policies that include self-insurance or self-retention clauses shall not be considered.

1.11 FOLLOW-UP VISITS

A. The Turf Installation Contractor shall include in their price, two (2) follow-up visits and a follow-up meeting with the owner at six (6) month intervals after the Final Turf Inspection date. The visits shall be scheduled by the Owner or Engineer to inspect the condition of the synthetic turf, infill material, seams, painted lines, anchorage, and peripheral attachments. These follow up inspection shall include G-max testing. Items found to require repair, amendment, or replacement shall be the responsibility of the Turf Manufacturer/Installer. Repairs, except those required due to vandalism, shall take place immediately upon notification by the Engineer.

PART 2 – PRODUCTS

2.1 GENERAL

A. This specification covers the installation of a new outdoor Infilled Synthetic Turf System comprised of tufted, slit and monofilament dual-fiber synthetic turf with a rubber infill mix filled into the pile. The installed system shall have a permeability rate in excess of 16 inches per hour. The tufted synthetic turf is comprised of polyethylene fibers tufted into a urethane backed, porous carpet, meeting F.D. Doc FF1-70 and ASTM D-2859 flammability requirements, with an abrasion index of less than 25 per ASTM F1015.

2.2 ARTIFICIAL TURF ANCHORING SYSTEM

A. Anchoring system shall be in accordance with the details provided in the construction plans.

2.3 SYSTEM COMPONENTS

A. The turf system consists of the following components:
   1. Existing Base Stone, A vertical draining base of crushed stone consisting of a permeable layer of crushed aggregate topped by a permeable existing Finish Stone course of finer crushed aggregate, 1” or less in thickness.
   2. A resilient shock-absorbing base pad consisting of an impact energy absorbing free-draining material designed specifically for use with synthetic turf field systems.
   3. A synthetic turf carpet consisting of nominal 2.25” long polyethylene slit and monofilament fibers (dual-fiber), regardless of the turf system to be installed, tufted into a permeable double-layered primary backing with a secondary backing. Dual fiber tufting shall be single needle stich such that both slit film and monofilament fibers are tufted simultaneously.

4. An infill system consisting of a mixture comprised of selected and graded dust-free silica sand and specially treated and mixed ground rubber. The infill material fills the voids between the fibers allowing the fibers to remain vertical and non-directional. The infill is installed to leave approximately 1/2" of the tufts clear of the top of the infill.

2.4 PREPARATION OF THE SOIL BED

A. **This section has been provided for reference only. Existing soil bed shall remain and be protected. It is not anticipated that the proposed work will require modifications to the existing soil bed.**

B. All topsoil, organic, and non-compactable materials shall be stripped, hauled, and disposed of. Final quantification of this material is the responsibility of the Contractor. The Engineer has provided a geotechnical engineering report and soil test pit data for the Contractor's use in quantifying material to be removed. If material is encountered below sub-grade elevations that does not meet the compaction requirements, the Contractor must notify the Engineer immediately prior to excavation of in-situ material.

C. The soil bed and subbase materials must be compacted in accordance with Specification Section 31 2000 Earth Moving.

D. The soil bed must be prepared to tolerances of not more than 1/4" in 10' from the nominal height to allow for even drainage. Laser grading is recommended.

E. A pervious geotextile fabric (Mirafi 140N or equal) shall be installed to cover the soil bed in accordance with installation details.

2.5 BASE STONE

A. **This section has been provided for reference only. Existing base stone shall remain and be protected. It is not anticipated that the proposed work will require modifications to the existing base stone.**

B. Dynamic Base stone shall be clean crushed rock consisting of the angular fragments obtained by breaking and crushing shattered natural rock, free from detrimental quantities of thin or elongated pieces, free from dirt or other objectionable materials, and shall have a percentage of wear as determined by the Los Angeles Abrasion Test (AASHTO-T96), of not more than 30.

C. Base stone must be laid without damaging the soil bed. It is very important to not create any depressions with heavy equipment. The specified stone or aggregate supplied must conform to the turf manufacturer's recommended specifications, as well as this specification. The crushed stone or aggregate base supplied must be stable and sufficiently permeable to ensure all-weather availability of the field.

D. The base shall be constructed in two (2) or more layers or lifts of approximate equal thickness. Each layer must be compacted in both directions to attain the specified compaction rate.

E. The finished crushed stone base surface of the leveling course shall not vary from the specified grade by more than ¼" in 10' when measured in any direction.

F. Aggregate base beneath final grade shall be a graded, granular, non-frost susceptible, free-drainage material, consisting of either durable stone or coarse sand blends practically free from loam and clay fines, and which can be readily compacted to form a stable foundation, graded as follows: **AASHTO No. 57 Stone, or meeting gradation requirements per following table:**

Sieve Size	% Passing by Weight
1 in.	100
3/4 in.	95-100
1/2 in.	75-95
3/8 in.	45-70
No. 4	30-45
No. 10	15-30
No. 40	5-10
No. 100	0-5
No. 200	0-2

2.6 FINISH STONE

A. **Existing finish stone shall remain and be protected. Contractor may need to supplement existing Finish Stone with additional material in order to prepare and laser grade the field prior to installation of new carpet. If Finish Stone modifications are required, they shall comply with the following:**

B. The finish stone aggregate layer should not be more than 1" thick.

C. The finish stone shall meet the following gradation requirements: **AASHTO No. 89 Stone, or meeting gradation requirements per following table:**

Sieve Size	% Passing by Weight
½"	100
3/8"	85-100
No. 8	35-75
No. 16	10-55
No. 30	0-40
No. 50/60	0-15
No. 100	0-8
No. 200	0-2

2.7 RESILIENT SHOCK-ABSORBING BASE PAD

A. An impact energy absorbing sub-base drainage material designed specifically for use with synthetic turf is required. The specified material shall be **Brock 14, Schmitz ProPlay Sport 20**, or approved equal, and must have both impact absorption and drainage properties that meet the performance requirements specified.

2.8 TURF SYSTEM COMPONENT MATERIALS

A. Carpet

Fiber: minimum 2.25-inch-long (Base bid and Alternate 1) or 1.75-inch-long (Alternate 2) polyethylene parallel long-slit and monofilament fiber with the following properties:

1. Face Yarn Type: Hybrid of Polyethylene Parallel long-slit & Monofilament single needle or A-B rows. If A-B rows the stitch gauge shall be 3/8".
2. Face Weight: Minimum 46 oz/sq. yd.
3. Yarn size: 5,000 min. (slit) and 10,000 min. (monofilament).
4. Yarn Thickness: 100 microns minimum (slit) and 300 microns (monofilament) minimum.
5. Pile Height (Finished): 2.25 inches (57.2 mm - Base Bid and Alternate 1); 1.75 inches (44.5 mm - Alternate 2).
6. Color: Green or Two-Tone Green upon owner's approval.
7. Tufting Gauge: 3/8"-3/4" (If A-B rows the stitch gauge shall be 3/8").
8. Primary Backing: Minimum Double Layered polypropylene fabric treated with UV inhibitors 8 oz/sy min.
9. Secondary Backing: 20 oz/sy urethane (min).
10. Total Product Weight (without infill): Minimum 70 oz/sy.
11. Finished Roll Width: 15 feet (4.6 m).
12. Finished Roll Length: Up to 240 feet (73 m).
13. Permeability: Minimum 16" per hour (carpet w/infill in place).
14. Tuft Bind: Minimum 10 lbs/force (with infill in place).
15. Total Infill: Provide ½" to ¾" turf fiber reveal.
16. Overall weight of infill shall be in accordance with manufacturer's recommendation to adhere to performance requirements outlined in the specification.

B. Infill (Base Bid)

1. Silica sand within the infill mix, 60% - 70% by weight for Track Field and 50% - 60% by weight for Field 2 or as recommended by the synthetic turf manufacturer in order to meet the performance and testing requirements of the entire synthetic turf system (carpet, infill, pad, etc.) specified within the Contract Documents, will meet the following size distribution:

US MESH	% Retained
16	0 to 5
20	10 to 20
30	20 to 40
40	0 to 20
50	0 to 5

2. Sand shall consist of uniform, sub-angular to rounded, single grains. It shall be dust free. Crusher fines are unacceptable.

3. Rubber crumb within the infill mix will meet the following size distribution and requirements:

US MESH	% Retained
8	0 to 5
10	5 to 15
14	20 to 55
16	20 to 55
20	10 to 30
30	0 to 5

   a. Rubber crumb shall consist of 100% recycled tires (also known as SBR rubber).
   b. Shall have less than 0.005% free metal content measured in accordance with the ASTM D 5603 7.3.2.
   c. Shall have less than 0.003% fee fiber content measured in accordance with ASTM D 5603 7.4.
   d. Shall have less than 0.005% free mineral content measured in accordance with ASTM D 5603 7.3.1.
   e. The bulk density shall be 26lbs/cubic foot +/-7%. Variation from bag to bag cannot exceed 7%.
   f. Third party testing documentation shall be submitted to the Engineer for source approval prior to installation. Submitted testing shall be no more than 12 months old.

C. Infill (Alternate 1)

1. Silica sand within the infill mix, 3 lbs. per square foot or as recommended by the synthetic turf manufacturer in order to meet the performance and testing requirements of the entire synthetic turf system (carpet, infill, pad, etc.) specified within the Contract Documents, will meet the following size distribution:

US MESH	% Retained
16	0 to 5
20	10 to 20
30	20 to 40
40	0 to 20
50	0 to 5

2. Sand shall consist of uniform, sub-angular to rounded, single grains. It shall be dust free. Crusher fines are unacceptable.
3. Infill shall be naturally processed coconut coir fiber that meets the following specifications:
   a. Fiber diameter: 0.05 mm – 0.3 mm
   b. Fiber length: 0.1 mm – 15 mm +/- 20%

c. Bulk Density: 0.142 g/cm3
d. Abrasive Index: 28 (Average) ASTM F1015
e. Application rate: 2 lbs. per square foot

D. Infill (Alternate 2)
1. Rounded and highly uniform quartz sand pigmented and sealed with an acrylic polymer.
2. Silica sand must have a coefficient of uniformity of <= 1.3
3. 98% of the particles retained on US standard sieves 12 through 20.
4. The coated particles shall be smooth to resist mounding and compaction and have an angle of repose of 30 degrees or less.
5. The finished product shall be 100% coated, shall repel water, be non-flammable, and have <.001% dust content.
6. When placed in the synthetic turf, the system shall have an abrasion index of 26+/- 2.
7. Color: Green

2.9 FIELD MARKING

A. Tufted and inlaid lines: shall be as specified in the drawings and listed in Section 3.4 and shall meet the above material specifications. Height of all inlaid lines shall be equal to that of the installed turf. Lines shall be tufted into the fabric to the extent possible and remaining shall be field inlaid. Provide all field lines and logos as indicated.

B. Marking Paint: shall be in conformance with NHIAA, ASBA and NFHS regulations, specifically formulated to be compatible with synthetic field surfacing. The contractor must submit a final striping plan for approval by the Owner and Engineer prior to painting of the synthetic turf fields.

2.10 ATTIC STOCK

A. The Contractor shall provide attic stock of 200 sf for carpet and 2,000 lbs. of infill material.

PART 3 - EXECUTION

3.1 GRADING

A. **This section has been provided for reference only. Existing soil bed shall remain and be protected. It is not anticipated that the proposed work will require modifications to the existing subgrade.**

B. Areas to be placed with turf will be compacted and brought approximately to subgrade elevation under Section 31 20 00 – Earth Moving before work of this section is performed. Final fine grading, filling, and compaction of subgrade to receive turf, as required to form a firm, uniform, and accurate subgrade at required elevations and to required lines, shall be done under this Section.

C. Subgrade of areas to be surfaced with synthetic turf shall be recompacted as required to bring top 9 in. of material immediately below gravel base course to a compaction of at least 90% of maximum density, as determined by ASTM D 1557, Method D. Subgrade compaction shall extend for a distance of a least 1 ft. beyond turf edge.

D. The subgrade shall be inspected by Contractor by means of a laser level on a 10-foot grid pattern. Based on Contractor's inspection of the topographical survey, the Contractor shall fine grade the subgrade suitably, including properly rolling and compacting the base.

E. Excavation required in gravel subgrade shall be completed before fine grading and final compaction of subgrade are performed. Where excavation must be performed in completed subgrade, subsequent backfill and compaction shall be performed as specified in Section 31 20 00 – Earth Moving. Completed subgrade after filling such areas shall be uniformly and properly graded.

F. Areas being graded or compacted shall be kept shaped and drained during construction. Ruts greater than or equal to 2 in. deep in subgrade, shall be graded out, reshaped as required, and recompacted before placing gravel base course.

G. Materials shall not be stored or stockpiled on subgrade.

H. Disposal of debris and other material excavated and/or stripped under this section, and material unsuitable for or in excess of requirements for completing work of this Section shall be legally disposed of off-site.

3.2 BASE STONE

A. **This section has been provided for reference only. Existing base stone shall remain and be protected. It is not anticipated that the proposed work will require modifications to the existing base stone.**

B. Aggregate base course for surfacing and the spreading, grading, and compaction methods employed shall conform to the specification.

C. Compaction of aggregate base course shall be to 90-95% of maximum density as determined by ASTM D 1557, Method D. Stone greater than 1 in. shall be excluded from course.

D. Width of base course shall be greater than the width of turf surface, if continuous lateral support is provided during rolling, and shall extend at least two (2) x base thickness beyond edge of the course above, if not so supported.

E. Aggregate material shall be applied in lifts less than or equal to 6 in. thick, compacted measure. Each lift shall be separately compacted to specified density, using a 6-ton steel wheel roller or vibratory roller equivalent to a 6-ton static roller, or an approved equivalent.

1. Material shall be placed adjacent to structures only after they have been set to required grade and level.

2. Rolling shall begin at sides and progress to center of crowned areas and shall begin on low side and progress toward high side of sloped areas. Rolling shall continue until material does not creep or wave ahead of roller wheels.
3. Surface irregularities which exceed 1/4 in. measured by means of a 10 ft. long straightedge shall be replaced and properly compacted.

F. Subgrade and base course shall be kept clean and uncontaminated. Less select materials shall not be permitted to become mixed with gravel. Materials spilled shall not be permitted to become mixed with gravel. Materials spilled outside specified lines shall be removed and areas repaired.

G. Portions of subgrade or of construction above which become contaminated, softened, or dislodged by passing of traffic, or otherwise damaged, shall be cleaned, replaced, and otherwise repaired to conform to the requirements of this specification before proceeding with next operation.

H. **Existing finish stone shall remain and be protected. Contractor may need to supplement existing finish stone with additional material in order to prepare and laser grade the field prior to the installation of new carpet. If finish stone modification/supplementation is required, it shall comply with the following:**

I. Finish stone shall be compacted (95% of the maximum density determined by ASTM D-1557) in both directions.

J. The finish stone material shall be sloped from the center longitudinal axis towards the side lines or as shown on the drawings. This layer must be graded using a dual laser guided fine grading system.

K. A soil test is required on the finished finish stone surface to be covered by the synthetic turf. These tests must provide the following information:
1. Permeability and/or hydraulic conductivity of drainage base (Lab)
2. Percolation rate of base (in-situ)
3. Moisture content at the time of the test
4. Sieve analysis and plasticity limits determination test (lab)
5. In-situ compaction (measured)

L. Turf carpet manufacturer shall approve the finish stone planarity and drainage characteristics in writing prior to installation of the turf carpet.

3.3 SYSTEM CHARACTERISTICS

A. Permeability (to ASTM D 4491): The system, turf, and base, shall allow a minimum percolation rate of sixteen (16) inches per hour.

B. Relative Abrasiveness (to ASTM F 1015): The system has an Abrasiveness Index of 20.2.

3.4 SYNTHETIC FIELD SURFACING

A. Prior to the installation of turf, the contractor shall have surveyed the area to be covered and the longitudinal and lateral center lines and perimeter edge lines shall be located, marked, and staked 5 ft. outside of the actual limits of the turf surface.

B. After acceptance of the constructed Base, the carpet is laid out on the site and consecutive panels are sewn together at the seams using procedures approved by the Supplier.

C. Synthetic field surfacing shall be installed by crews employed by the synthetic field surfacing manufacturer, in strict accordance with manufacturer's recommendations and instructions including but not limited to fabric, adhesives, seaming tape, sewing line, and abutting adjacent materials.

D. All turf seams shall be sewn with a double-locked stitch approved by the Turf Supplier. Glued seams may be permitted following review of gluing methods and materials and weather conditions by the Engineer. Glued seams shall be backed with seam tape.

E. Seams shall be combed to ensure that threads are not exposed but are hidden within the nap. After grooming, carpet seams which are inconsistent and obvious in the judgment of the Owner's representative will be repaired.

F. Synthetic Turf shall be installed with no wrinkles, ripples, or bubbles. Shearing of fibers, slits in fabric, or driven spikes to relieve such defects will not be permitted.

G. The infill shall be approved and installed according to the Supplier's approved procedures by qualified installers.

H. The bristles of any brooms used, either during the original installation, or in subsequent maintenance, shall be of nylon only, shall under no circumstances include any metal, and must be approved by the Supplier.

I. Installation Limitations
   1. Installation shall not proceed when:
      a. Ambient air temperature is below forty (40°) degrees Fahrenheit (F).
      b. Material temperature is below forty (40°) degrees Fahrenheit (F).
      c. Rain is falling or pending, unless acceptable to qualified installers.
      d. Conditions exist, or are pending, that will be unsuitable for the installation of the system.

J. Synthetic Field lines shall be Inlaid, Tufted or Painted as Follows.
   1. Tufted / Inlaid and Painted lining for all sports shall be four (4") inches in width, unless noted otherwise, and colored as follows:
      a. Soccer – Tufted/Inlaid – Yellow
      b. Football – Tufted/Inlaid - White
      c. Men's Lacrosse – Tufted/Inlaid – Black

d. Women's Lacrosse – Tufted/Inlaid – Blue
e. Field Hockey – Tufted/Inlaid – Red

2. Contractor shall include cost of the first painting for each of the sports mentioned above, to be completed following turf replacement.

3.5 PROTECTION

A. Installer shall advise the Contractor of procedures required for protection and maintenance of finished synthetic field surfacing during remainder of construction period so that surfacing will be undamaged at time of acceptance.

B. Upon completion of the synthetic field surface, the General Contractor shall be responsible for protection of the field surface for the remainder of the Contract, unless the Owner takes beneficial occupancy prior to contract completion.

END OF SECTION

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