

*Project Manual and Specifications*

**Synthetic Turf Field  
Biscoglio Field—Berlin High School**

**139 Patterson Way  
Berlin, CT**

**Bid No. 2023-18**

**Issued for BID  
February 17, 2023**

**K<sup>A</sup>ESTLE BOOS**  
associates, inc

416 Slater Road, P.O. Box 2590  
New Britain, CT 06050-2590  
Phone: 860-229-0361  
Fax: 860-229-5303

**PROJECT MANUAL AND SPECIFICATIONS**

TABLE OF CONTENTS

LIST OF DRAWINGS

**BIDDING AND CONTRACT REQUIREMENTS**

INVITATION TO BID

INSTRUCTIONS TO BIDDERS

NON-COLLUSION AFFIDAVIT OF PRIME BIDDER

STANDARD FORM OF AGREEMENT BETWEEN OWNER AND CONTRACTOR, AIA  
DOCUMENT A101

BIDDERS STATEMENT OF QUALIFICATIONS

BID BOND, AIA DOCUMENT A310

GENERAL CONDITIONS OF THE CONTRACT FOR CONSTRUCTION, AIA DOCUMENT A201

PAYMENT BOND, AIA DOCUMENT A312

PERFORMANCE BOND, AIA DOCUMENT A312

**DIVISION 01 - GENERAL REQUIREMENTS**

01 10 00	SUMMARY
01 22 00	UNIT PRICES
01 23 00	ALTERNATIVES
01 26 00	CONTRACT MODIFICATION PROCEDURES
	ASI BLANK
	RRFI BLANK
	PR BLANK
	RCOP BLANK
01 29 00	PAYMENT PROCEDURES
01 31 00	PROJECT MANAGEMENT AND COORDINATION
	ELECTRONIC FILE RELEASE AND LIABILITY WAIVER
01 33 00	SUBMITTAL PROCEDURES
	SUBMITTAL STAMP
01 40 00	QUALITY REQUIREMENTS
01 42 00	REFERENCES
01 50 00	TEMPORARY FACILITIES AND CONTROLS
01 60 00	SUBSTITUTION REQUEST (AFTER BID)
01 73 00	EXECUTION
01 77 00	CLOSEOUT PROCEDURES
01 78 23	OPERATION AND MAINTENANCE DATA

**DIVISION 02 – EXISTING CONDITIONS**

02 41 00	DEMOLITION
----------	------------

**DIVISION 03 - CONCRETE**

03 30 00	CAST-IN-PLACE CONCRETE
----------	------------------------

**DIVISION 11 – EQUIPMENT**

11 68 43 SCOREBOARDS

**DIVISION 31 - EARTHWORK**

31 10 00 SITE CLEARING

31 20 00 EARTH MOVING

**DIVISION 32 – EXTERIOR IMPROVEMENTS**

32 12 16 ASPHALT PAVING

32 12 16.01 ASPHALT PAVING – RUNNING TRACK

32 18 13 SYNTHETIC GRASS SURFACING

32 18 13.10 SYNTHETIC GRASS WARRANTY

32 18 23.31 POLYURETHANE RUNNING TRACK – STRUCTURAL SPRAY

32 18 23.33 POLYURETHANE RUNNING TRACK – EMBEDDED SANDWICH SYSTEM

32 18 23.35 RUNNING TRAK SURFACING - MARKINGS

32 31 13 CHAIN LINK FENCES AND GATES

32 86 00 ATHLETIC FIELD EQUIPMENT

32 91 01 TOPSOIL

32 92 00 TURF AND GRASSES

**DIVISION 33 - UTILITIES**

33 46 16.01 FIELD SUBDRAINAGE SYSTEM

**END OF TABLE OF CONTENTS**

SECTION 00 00 00.03 - LIST OF DRAWINGS

PROJECT COVER SHEET

S1.00	SITE SURVEY
C1.0	EROSION & SEDIMENTATION CONTROL PLAN
C2.0	DRAINAGE PLAN
C3.0	CIVIL DETAILS
L1.00	SITE DEMOLITION PLAN
L2.00	SITE LAYOUT & MATERIALS PLAN – <i>(BASE BID)</i>
L2.01	SITE LAYOUT & MATERIALS PLAN – <i>(ALTERNATES)</i>
L3.00	SITE GRADING PLAN
L4.00	SITE DETAILS
L4.01	SITE DETAILS
L4.02	SITE DETAILS
L4.03	SITE DETAILS
L4.04	SITE DETAILS – <i>(ALTERNATES)</i>
L4.05	SITE DETAILS – <i>(ALTERNATES)</i>

**END OF LIST OF DRAWINGS**



LEGAL NOTICE

**TOWN OF BERLIN  
LEGAL NOTICE  
INVITATION TO BID  
CONSTRUCTION OF A SYNTHETIC TURF FIELD  
FOR BISCOGLIO FIELD AT BERLIN HIGH SCHOOL  
BID # 2023-18**

The Town of Berlin (hereinafter "Town"), is seeking contractor bids for the conversion of the natural grass field to synthetic turf for Biscoglio Field at Berlin High School, 139 Patterson Way, Berlin, CT 06037.

One (1) original and two (2) copies (3 total) of sealed bids clearly labeled BISCOGLIO FIELD SYNTHETIC TURF FIELD PROJECT – BID #2023-18, addressed to the Town of Berlin, Town Managers Office, Room 101, 240 Kensington Road, Berlin, CT, 06037, no later than **11:00 A.M.** local time on **Thursday, March 16, 2023**. The Town will not accept submissions by e-mail or fax. The Town will reject bids received after the date and time noted above.

The project Bid Documents may be obtained on the Town's website, [www.berlinct.gov](http://www.berlinct.gov), under Departments, Purchasing, Current Bids and RFPs. Each proposer is responsible for checking the Town's website to determine if the Town has issued any addenda and, if so, to complete its bid in accordance with the Invitation to Bid as modified by the addenda.

All Bidders must submit a Contractors Qualification Statement with the bid as outlined in the specification. The project is funded through the Connecticut Department of Energy and Environmental Protection and all contractors are to be listed as an approved contractor under the Department of Administrative Services Contractor Prequalification Program at the time of bidding. Program requirements are described at [DAS.Prequalification@ct.gov](mailto:DAS.Prequalification@ct.gov) or (860) 713-5280.

The Connecticut Department of Energy and Environmental Protection is an Affirmative Action and Equal Opportunity Employer that is committed to complying with the Americans with Disabilities Act. To request accommodation contact them at (860) 418-5910 or [deep.accommodations@ct.gov](mailto:deep.accommodations@ct.gov)

The Town of Berlin is an Affirmative Action/Equal Opportunity Employer; Minority/Women's Enterprises are encouraged to respond. The Town reserves the right to amend or terminate this Invitation to Bid, reject all bids, waive any informalities, and award the contract to the bidder that is deemed to be in the best interests of the Town.

Maryssa Tsolis  
Purchasing Agent

## **INSTRUCTION TO BIDDERS**

### **Synthetic Turf Field - Biscoglio Field at Berlin High School Project**

#### **INVITATION TO BID**

The Town of Berlin (hereinafter "Town"), is seeking contractor bids for the conversion of the natural grass field to synthetic turf for Biscoglio Field at Berlin High School, 139 Patterson Way, Berlin, CT 06037. All work shall be done in full accordance with the plans and specifications.

The project Bid Documents, dated February 17, 2023, may be obtained on the Town's website, [www.town.berlin.ct.us](http://www.town.berlin.ct.us), under Departments, Purchasing, Current Bids and RFPs. Each proposer is responsible for checking the Town's website to determine if the Town has issued any addenda and, if so, to complete its bid in accordance with the Invitation to Bid as modified by the addenda.

All Bidders must submit a Contractors Qualification Statement with the bid as outlined in the specification. The project is funded through the Connecticut Department of Energy and Environmental Protection and all contractors are to be listed as an approved contractor under the Department of Administrative Services Contractor Prequalification Program at the time of bidding. Program requirements are described at [DAS.Prequalification@ct.gov](mailto:DAS.Prequalification@ct.gov) or (860) 713-5280.

#### **KEY EVENT DATES**

- Bid Documents Available: Friday, February 24, 2023.
- **NON-MANDATORY** Pre-Bid Construction Meeting: Tuesday, February 28, 2023, 10:00 a.m.
- **FINAL QUESTIONS BY CONTRACTORS:** Tuesday, March 7, 2023 by noon.
- **FINAL ADDENDUM ISSUED:** Thursday, March 9, 2023 by noon.
- **BIDS DUES:** Thursday, March 16, 2023 no later than 11:00 am. No bids will be accepted after said date and time
- **BIDDER SCOPE REVIEWS:** March 21, 2023 between 10:00 am and 1:00 pm.

#### **ALTERNATE BIDS**

No Alternate or Supplementary Bids will be considered unless such Bids are specifically requested in the Supplemental Specifications and shown on the Bid Proposal Form.

#### **PREPARATION OF PROPOSAL**

Each bid shall be handwritten in ink or typed and submitted on the prescribed form and all blank spaces for bid prices must be filled in both words and figures. Bid prices shall include all labor, materials, and equipment necessary to complete the work in accordance with the Contract Documents.

#### **SECURITY FOR PROPOSAL**

Each proposal must be accompanied by a bid bond with a surety acceptable to the Town in the amount equal to at least five percent (5%) of the amount of the bid. The successful Bidder, upon his failure or refusal to execute and deliver the Contract, certificates of insurance, or bonds required within ten days, unless otherwise agreed upon, after he has received notice of the acceptance of the Proposal, shall forfeit to the Town, as liquidated damages for such failure or refusal, the security deposit with his Proposal.

### **RECEIPT AND OPENING OF BIDS**

Separate sealed bids will be received in the Town of Berlin, Town Managers Office, Room 101, 240 Kensington Road, Berlin, CT, 06037 until the time and date stated in the Invitation to Bid. The Town will reject bids received after the date and time noted above. Bids, including all Alternate pricing, must be held firm and may not be withdrawn for Sixty (60) days after the bid opening. Bidders shall not include Federal Excise Taxes or State of Connecticut Sales Taxes. Public projects are exempt.

One (1) original and two (2) copies (3 total) shall be submitted in sealed envelopes clearly labeled with the name and address of the Bidder, the date and time of the bid opening, and the words **BISCOGLIO FIELD SYNTHETIC TURF FIELD PROJECT - BID #2023-18** so as to guard against opening prior to the time set therefore. Bid proposals including all required bidding documents described within the Form of Proposal. If mailed, the sealed envelope containing the proposal, marked as described above, shall be enclosed in another envelope properly addressed for mailing and received in time for bid. The Town will not accept submissions by e-mail or fax.

Bids, including all Alternate pricing, must be held firm and may not be withdrawn for Sixty (60) days after the bid opening.

Any bid may be withdrawn prior to the above scheduled time for the opening thereof.

Bids shall then be recorded and results posted to the Towns website.

### **DETERMINATION OF AWARD**

This Contract will be awarded to the lowest, responsible, and qualified bidder. The Town shall determine the "lowest, responsible, qualified bidder" on the basis of the bidder submitting the lowest total base bid and alternates chosen at the time of award; responsiveness of his/her proposal; demonstration of qualification, history of the ability and necessary equipment to perform the required work; previous experience within the Town of Berlin, and certification that he/she can perform the required work in accordance with the Contract Documents.

Bidder scope reviews will be scheduled for March 21, 2023 between 10:00 am and 1:00 pm. All bidders to keep this date available for a scope review meeting at Town Hall. Bidders to be scope reviewed shall be notified within 24 hours of bid opening.

### **UNIT PRICES**

The unit prices for each of the several items in the proposal of each bidder shall include its prorated share of overhead so that the sum of the products obtained by multiplying the quantity shown for each item by the unit price represents the total bid. Any bid not conforming to this requirement may be rejected as informal. The special attention of all bidders is called to this provision, for should conditions make it necessary to revise the quantities, increase or decrease thereof may be made without limit, and adjustment and compensation shall be made on the basis of the unit prices for such items.

### **COLLUSIVE AGREEMENTS**

Each Bidder submitting a Bid to the Town of Berlin for the work contemplated by the Documents, on which bidding is based, shall execute and attach thereto the Non-Collusion Affidavit on the form herein provided, to the effect that he/she has not colluded with any other person, firm or corporation in regard to any Bid submitted.

Before executing any Subcontract, the successful Bidder shall submit the name of any proposed Subcontractor for prior approval and an affidavit in the form provided herein.

#### **BIDDER'S QUALIFICATION STATEMENT**

Each Bidder shall submit on the form furnished for that purpose (a copy of which is included in the Contract Documents) a Bidder's qualification statement, his/her experience record in the type of work embraced in the Contract, and his/her organization and equipment available for the work contemplated, and other pertinent information so contained on said form, and when specifically requested, the Town of Berlin shall have the right to take such steps as it deems necessary to determine the ability of the Bidder to perform his/her obligations under the Contract, and the Bidder shall furnish the Town of Berlin all such information and data for this purpose as it may request. The right is reserved to reject any Bid where an investigation of the available evidence or information does not satisfy the Town of Berlin that the Bidder is qualified to carry out properly the terms of the Contract.

Bidders must have prior specific experience consisting of the successful construction of no less than five (5) synthetic turf fields that are 75,000 sf or greater in the past five (5) years. General Contractors synthetic turf field construction shall have consisted of demolition of existing conditions, concrete anchor curbing, field subsurface drainage, field stone base, laser grading of base stone, and coordination of synthetic turf manufactures and installers as subcontractors. Bidders must provide verification of experience with Form of Proposal and Bidders Qualification Statement. The Town of Berlin reserves the right to consider as not responsible any Bidder who is not able to provide documentation of experience with his/her own forces at least fifty-one (51%) percent of the dollar value of the work involved in this Contract. Bidders must provide verification of experience with Form of Proposal and Bidders Qualification Statement.

All general contractors shall also be prequalified for general site construction by the Connecticut Department of Administrative services (DAS) at the time of submitting a bid proposal. The right is reserved to reject any Bid submitted by a general contractor not prequalified at the time of bidding.

#### **ACT CONCERN WORKERS' COMPENSATION**

Effective October 1, 1986, an Act concerning Workers' compensation insurance requirements for Contractors on public works projects and state licenses requires that municipalities, prior to entering into contractual obligation for construction or repair of any public works project, must obtain the evidence that the Contractor can prove that he/she is not liable to the State for any workers' compensation payments.

#### **WITHDRAWAL OF BIDS**

Bids may be withdrawn personally by the bidder in time for delivery in the normal course of business prior to the time fixed for opening. Negligence on the part of the bidder in preparing his/her bid confers no right of withdrawal or modification of his/her bid after such bid has been opened.

#### **FAMILIARITY WITH LAWS, SITE CONDITIONS, AND DOCUMENTS**

Each bidder is required to be familiar with and to comply with the terms and conditions of the specifications and all other Contract Documents and with all Federal, State and Local Laws, Ordinances or Regulations, which in any manner relate to the performance of the work in accordance with the Contract.



### **TAX EXEMPTION**

The Town is exempt from paying tax and for that reason the bid price shall *not* include any tax on the items specified.

### **INSURANCE**

The Contract requires the Contractor to maintain in force during the performance of the Work, policies of Workmen's' Compensation Insurance and Public Liability and Property Damage Insurance, covering the operations of the Contractor, subcontractors, and the agents of any of them, the use of any motor vehicles employed by the Contractor, subcontractors, and the agents of any of them.

Certificates evidencing the fact that the Contractor has procured the required insurance must be filed with the Town of Ledyard Finance Office at the time of the execution of the Contract. Bidders should examine the General Conditions for the details of the insurance requirements.

### **ERRORS, INTERPRETATIONS, AND ADDENDA**

Should a bidder find any omissions, discrepancies, or errors in the Specifications or other Contract Documents or should he/she be in doubt as to the meaning of the Specifications or other Contract Documents, he/she should immediately notify the Town of Berlin's Authorized Representative which may correct, amend, or clarify such documents by a written interpretation or addendum. No oral interpretations shall be made to any bidder and no oral statement of the Town of Berlin shall be effective to modify any of the provisions of the Contract Documents.

All Requests for Information (RFI) are to be emailed to KBA, attention of Luke McCoy, PLA at [lmccoy@kba-architects.com](mailto:lmccoy@kba-architects.com). RFIs must be received by the Architect no later than **Tuesday, March 7, 2023 at NOON – Last day to receive RFIs.**

### **EMPLOYEE DISCRIMINATION**

The Contractor agrees and warrants that in the performance of this Contract, he/she will not discriminate or permit discrimination against any person or groups of persons on the grounds of race, color, religion or national origin, age, marital status, sex, or physical disability, including, but not limited to, blindness, unless it is shown by such Contractor that such disability prevents performance of the work involved in any manner prohibited by the laws of the United States or the State of Connecticut and further agrees to provide such information requested by the Town concerning the employment practices and procedures of the Contract as related to the provisions of this section.

### **SUBCONTRACTORS**

The bidder is specifically advised that any person, firm, or other party to whom it is proposed to award a subcontract under this Contract must be acceptable to the Town of Berlin and that approval of the proposed subcontract award cannot be given by the Town unless and until the successful bidder submits all information and evidence requested by the Town regarding the proposed subcontractor. Although the bidder is not required to attach such information and evidence to his/her bid, the bidder is hereby advised of this requirement so that appropriate action will be taken to prevent subsequent delay in subcontract awards.

All contracts made by the Contractor with subcontractors shall be governed by the terms and conditions of the prime Contract. The Contractor shall see to it that his/her subcontractors are fully informed in regard to these terms and conditions.

### **EXECUTION OF CONTRACT**

If notified of the acceptance of this proposal within the acceptance period of Sixty (60) days, the bidder agrees to execute the contract and all related documents for this work within ten (10) business days of receipt of the "Notice to Proceed."

### **TIME REQUIREMENTS**

Time is a major factor for the completion of this contract. All work must be completed within the time limitations stipulated in the Supplemental Conditions. A monetary penalty as stipulated in the Supplemental Conditions will be imposed for work under this contract not completed within the aforementioned time period.

### **RIGHT OF THE TOWN TO TERMINATE CONTRACT**

In the event that any of the provisions of this Contract are violated by the Contractor, or by any of his/her subcontractors, the Town of Berlin may serve written notice upon the Contractor of its intention to terminate the Contract, such notices to contain the reasons for such intention to terminate the contract, and unless within five (5) days after the serving of such notice upon the Contractor, such violation or delay shall cease and satisfactory arrangement for correction be made, the Contract shall, upon expiration of said five days, cease and terminate. In the event of any such termination, the Town of Berlin shall immediately serve notice thereof upon the Contractor.

### **PAYMENTS**

Monthly Requests for Payment shall be furnished to the Town of Berlin for verification and approval of the amount of work done and the amount earned by the Contractor. An amount of 95% of the estimated amount due, less any payments previously made and/or any monies to be held will be paid to the Contractor. The balance will be retained by the Town of Berlin until final completion of the work. Final payment will not be made until final completion and acceptance by the Town of all work covered by the contract. The Contractor agrees that he will indemnify and save the Town of Berlin harmless for all claims growing out of the lawful demands of subcontractors, laborers, suppliers, and assignees.

The Connecticut Department of Energy and Environmental Protection is an Affirmative Action and Equal Opportunity Employer that is committed to complying with the Americans with Disabilities Act. To request accommodation contact them at (860) 418-5910 or [deep.accommodations@ct.gov](mailto:deep.accommodations@ct.gov)

The Town of Berlin is an Affirmative Action/Equal Opportunity Employer; Minority/Women's Enterprises are encouraged to respond. The Town reserves the right to amend or terminate this Invitation to Bid, reject all bids, waive any informalities, and award the contract to the bidder that is deemed to be in the best interests of the Town.

**END OF SECTION 00 00 00.06**

**NON-COLLUSION AFFIDAVIT OF PRIME BIDDER**

(To be included with bid)

State of.....)

County of.....)

\_\_\_\_\_, being first duly sworn, deposes and says that:

(1) He is \_\_\_\_\_ of \_\_\_\_\_  
\_\_\_\_\_, the Bidder that has submitted the attached Bid;

(2) He is fully informed respecting the preparation and contents of the attached Bid and of all pertinent circumstances respecting such bid;

(3) Such Bid is genuine and is not a collusive or sham Bid;

(4) Neither the said Bidder nor any of its officers, partners, owners, representatives, employees or parties in interest, including this affidavit, has in any way colluded, conspired, connived or agreed, directly or indirectly with any other Bidder, firm or person to submit a collusive or sham Bid in connection with the Contract for which the attached Bid has been submitted or to refrain from bidding in connection with such Contract, or has in any manner, directly or indirectly, sought by agreement or collusion or communication or conference with any other Bidder, firm or person to fix the price or prices in the attached Bid or of any other Bidder, or to fix any overhead, profit or cost element of the Bid price or the Bid price of any Bidder, or to secure through any collusion, conspiracy, connivance or unlawful agreement any advantage against the Town of Berlin, owner, or any person interested in the proposed Contract; and

(5) The price or prices quoted in the attached Bid are fair and proper and are not tainted by any collusion, conspiracy, connivance or unlawful agreement on the part of the Bidder or any of its agents, representatives, owners, employees, or parties in interest, including this affiant.

\_\_\_\_\_  
(Signed)

\_\_\_\_\_  
(Title)

Subscribed and sworn to before me this \_\_\_\_\_ day of \_\_\_\_\_, 20\_\_\_\_.

\_\_\_\_\_(Title)

My Commission Expires: \_\_\_\_\_

# DRAFT AIA® Document A101™ – 2017

## Standard Form of Agreement Between Owner and Contractor where the basis of payment is a Stipulated Sum

**AGREEMENT** made as of the « » day of « » in the year « »  
(In words, indicate day, month and year.)

**BETWEEN** the Owner:  
(Name, legal status, address and other information)

«Town of Berlin»  
«240 Kensington Road»  
«Berlin, CT 06037»

and the Contractor:  
(Name, legal status, address and other information)

« »  
« »  
« »  
« »

for the following Project:  
(Name, location and detailed description)

«Synthetic Turf Field»  
«Biscoglio Field – Berlin High School»  
«Berlin, CT»

The Architect:  
(Name, legal status, address and other information)

«Kaestle Boos Associates, Inc.»  
«416 Slater Road»  
«New Britain, CT 06053»

The Owner and Contractor agree as follows.

**ADDITIONS AND DELETIONS:**  
The author of this document has added information needed for its completion. The author may also have revised the text of the original AIA standard form. An *Additions and Deletions Report* that notes added information as well as revisions to the standard form text is available from the author and should be reviewed.

This document has important legal consequences. Consultation with an attorney is encouraged with respect to its completion or modification.

The parties should complete A101™-2017, Exhibit A, Insurance and Bonds, contemporaneously with this Agreement. AIA Document A201™-2017, General Conditions of the Contract for Construction, is adopted in this document by reference. Do not use with other general conditions unless this document is modified.

**ELECTRONIC COPYING** of any portion of this AIA® Document to another electronic file is prohibited and constitutes a violation of copyright laws as set forth in the footer of this document.

## TABLE OF ARTICLES

- 1 THE CONTRACT DOCUMENTS
- 2 THE WORK OF THIS CONTRACT
- 3 DATE OF COMMENCEMENT AND SUBSTANTIAL COMPLETION
- 4 CONTRACT SUM
- 5 PAYMENTS
- 6 DISPUTE RESOLUTION
- 7 TERMINATION OR SUSPENSION
- 8 MISCELLANEOUS PROVISIONS
- 9 ENUMERATION OF CONTRACT DOCUMENTS

## EXHIBIT A INSURANCE AND BONDS

### ARTICLE 1 THE CONTRACT DOCUMENTS

The Contract Documents consist of this Agreement, Conditions of the Contract (General, Supplementary, and other Conditions), Drawings, Specifications, Addenda issued prior to execution of this Agreement, Invitation to Bid #2019-13 issued by the Town of Berlin (including the Invitation to Bid, General Conditions and Instructions to Bidders, General Specifications and Special Provisions, Bid Form, Non-Collusion/Non-Conflict Affidavit, Prevailing Wage Information, and all Appendices and Addenda), Contractor's Bid (dated April 3, 2019), other documents listed in this Agreement, and Modifications issued after execution of this Agreement, all of which form the Contract, and are as fully a part of the Contract as if attached to this Agreement or repeated herein. The Contract represents the entire and integrated agreement between the parties hereto and supersedes prior negotiations, representations, or agreements, either written or oral. An enumeration of the Contract Documents, other than a Modification, appears in Article 9.

### ARTICLE 2 THE WORK OF THIS CONTRACT

The Contractor shall fully execute the Work described in the Contract Documents, except as specifically indicated in the Contract Documents to be the responsibility of others.

### ARTICLE 3 DATE OF COMMENCEMENT AND SUBSTANTIAL COMPLETION

§ 3.1 The date of commencement of the Work shall be: **On or before June 19, 2023.** Contractor shall coordinate the scheduling and performance of the Work with the Town.  
(Check one of the following boxes.)

§ 3.2 The Contract Time shall be measured from the date of commencement of the Work.

#### § 3.3 Substantial Completion

§ 3.3.1 Subject to adjustments of the Contract Time as provided in the Contract Documents, the Contractor shall achieve Substantial Completion of the entire Work and the facility turned over to the Town for use by not later than: **Friday September 22, 2023.** The Contractor shall achieve Final Completion of the entire Work by not later than: **Friday October 20, 2023.**

TIME IS OF THE ESSENCE IN THE COMPLETION OF THIS PROJECT. If, in the sole opinion of the Town, the Contractor is not adhering to the Project schedule and/or is not supplying sufficient labor and/or equipment to complete the work by the substantial completion date contained herein, upon forty-eight (48) hours written notice, the Town shall have the right to direct the Contractor to increase its labor and/or equipment to meet established project schedules without additional compensation provided the Town is not responsible or in any way liable for the Contractor not adhering to the Project schedule. Any and all such additional labor or supervision shall be at Contractor's sole cost and expense and may include, but shall not be limited to, Town directing the Contractor to increase the workers on its crews, supply additional equipment, work overtime, work a second shift during a single day, work weekends, or any combination thereof, without any additional compensation being due to Contractor for such additional personnel.

« **Liquidated Damages.** It is understood by the parties that time is of the essence with regard to the timely completion of the Project. Failure of the Contractor to achieve substantial completion of the Project within the calendar days stated herein will result in the Owner and the public incurring damages, additional costs and inconveniences that would be impossible or extremely difficult to accurately quantify at the time. Therefore, the parties agree that, if the Contractor fails to satisfactorily complete the Project hereunder within the time specified or within any extension of time that may have been allowed, there shall be deducted from any monies due or that may become due the Bidder, the sum of **FIVE HUNDRED DOLLARS AND NO CENTS (\$500.00)** for each and every calendar day, including Saturdays, Sundays and legal holidays, that the Project remains incomplete. This sum shall not be imposed as a penalty, but as liquidated damages due Owner from Contractor by reason of the damages incurred, inconvenience and additional costs and expenses to the public together with other problems suffered as a result of any such delay thereby occasioned.

»

§ 3.3.2 Subject to adjustments of the Contract Time as provided in the Contract Documents, if portions of the Work are to be completed prior to Substantial Completion of the entire Work, the Contractor shall achieve Substantial Completion of such portions by the following dates:

Portion of Work	Substantial Completion Date
100% with punchlist	Friday September 22, 2023
Architect & Owner Sign-off	Final Completion Date Friday October 20, 2023

§ 3.3.3 If the Contractor fails to achieve Substantial Completion as provided in this Section 3.3, liquidated damages, if any, shall be assessed as set forth in Section 4.5.

#### ARTICLE 4 CONTRACT SUM

§ 4.1 The Owner shall pay the Contractor the Contract Sum in current funds for the Contractor's performance of the Contract. The Contract Sum shall be « » (\$ « »), subject to additions and deductions as provided in the Contract Documents.

#### § 4.2 Alternates

§ 4.2.1 Alternates, if any, included in the Contract Sum:

Item	Price

§ 4.2.2 Subject to the conditions noted below, the following alternates may be accepted by the Owner following execution of this Agreement. Upon acceptance, the Owner shall issue a Modification to this Agreement.  
(Insert below each alternate and the conditions that must be met for the Owner to accept the alternate.)

Item	Price	Conditions for Acceptance

§ 4.3 Allowances, if any, included in the Contract Sum:  
(Identify each allowance.)

Item	Price
New Electrical Service	\$75,000

§ 4.4 Unit prices, if any:  
(Identify the item and state the unit price and quantity limitations, if any, to which the unit price will be applicable.)

Item	Units and Limitations	Price per Unit (\$0.00)

§ 4.5 Liquidated damages, if any:  
(Insert terms and conditions for liquidated damages, if any.)

«\$500/day »

§ 4.6 Other:  
(Insert provisions for bonus or other incentives, if any, that might result in a change to the Contract Sum.)

<< >>

## ARTICLE 5 PAYMENTS

### § 5.1 Progress Payments

§ 5.1.1 Based upon Applications for Payment submitted to the Architect by the Contractor and Certificates for Payment issued by the Architect, the Owner shall make progress payments on account of the Contract Sum to the Contractor as provided below and elsewhere in the Contract Documents.

§ 5.1.2 The period covered by each Application for Payment shall be one calendar month ending on the last day of the month, or as follows:

<< >>

§ 5.1.3 Provided that an Application for Payment is received by the Architect not later than the «First» day of a month, the Owner shall make payment of the amount certified to the Contractor not later than the «Thirtieth» day of the «same» month. If an Application for Payment is received by the Architect after the application date fixed above, payment of the amount certified shall be made by the Owner not later than «Thirty» ( «30» ) days after the Architect receives the Application for Payment.

(Federal, state or local laws may require payment within a certain period of time.)

§ 5.1.4 Each Application for Payment shall be based on the most recent schedule of values submitted by the Contractor in accordance with the Contract Documents. The schedule of values shall allocate the entire Contract Sum among the various portions of the Work. The schedule of values shall be prepared in such form, and supported by such data to substantiate its accuracy, as the Architect may require. This schedule of values shall be used as a basis for reviewing the Contractor's Applications for Payment.

§ 5.1.5 Applications for Payment shall show the percentage of completion of each portion of the Work as of the end of the period covered by the Application for Payment.



§ 5.1.6 In accordance with AIA Document A201™–2017, General Conditions of the Contract for Construction, and subject to other provisions of the Contract Documents, the amount of each progress payment shall be computed as follows:

§ 5.1.6.1 The amount of each progress payment shall first include:

- .1 That portion of the Contract Sum properly allocable to completed Work;
- .2 That portion of the Contract Sum properly allocable to materials and equipment delivered and suitably stored at the site for subsequent incorporation in the completed construction, or, if approved in advance by the Owner, suitably stored off the site at a location agreed upon in writing; and
- .3 That portion of Construction Change Directives that the Architect determines, in the Architect's professional judgment, to be reasonably justified.

§ 5.1.6.2 The amount of each progress payment shall then be reduced by:

- .1 The aggregate of any amounts previously paid by the Owner;
- .2 The amount, if any, for Work that remains uncorrected and for which the Architect has previously withheld a Certificate for Payment as provided in Article 9 of AIA Document A201–2017;
- .3 Any amount for which the Contractor does not intend to pay a Subcontractor or material supplier, unless the Work has been performed by others the Contractor intends to pay;
- .4 For Work performed or defects discovered since the last payment application, any amount for which the Architect may withhold payment, or nullify a Certificate of Payment in whole or in part, as provided in Article 9 of AIA Document A201–2017; and
- .5 Retainage withheld pursuant to Section 5.1.7.

#### § 5.1.7 Retainage

§ 5.1.7.1 For each progress payment made prior to Substantial Completion of the Work, the Owner may withhold the following amount, as retainage, from the payment otherwise due:

*(Insert a percentage or amount to be withheld as retainage from each Application for Payment. The amount of retainage may be limited by governing law.)*

«5% »

§ 5.1.7.1.1 The following items are not subject to retainage:

*(Insert any items not subject to the withholding of retainage, such as general conditions, insurance, etc.)*

«Insurance and Bonding»

§ 5.1.7.2 Reduction or limitation of retainage, if any, shall be as follows:

*(If the retainage established in Section 5.1.7.1 is to be modified prior to Substantial Completion of the entire Work, including modifications for Substantial Completion of portions of the Work as provided in Section 3.3.2, insert provisions for such modifications.)*

« »

§ 5.1.7.3 Except as set forth in this Section 5.1.7.3, upon Substantial Completion of the Work, the Contractor may submit an Application for Payment that includes the retainage withheld from prior Applications for Payment pursuant to this Section 5.1.7. The Application for Payment submitted at Substantial Completion shall not include retainage as follows:

*(Insert any other conditions for release of retainage upon Substantial Completion.)*

« »

§ 5.1.8 If final completion of the Work is materially delayed through no fault of the Contractor, the Owner shall pay the Contractor any additional amounts in accordance with Article 9 of AIA Document A201–2017.

§ 5.1.9 Except with the Owner's prior approval, the Contractor shall not make advance payments to suppliers for materials or equipment which have not been delivered and stored at the site.



## § 5.2 Final Payment

§ 5.2.1 Final payment, constituting the entire unpaid balance of the Contract Sum, shall be made by the Owner to the Contractor when

- .1 the Contractor has fully performed the Contract except for the Contractor's responsibility to correct Work as provided in Article 12 of AIA Document A201–2017, and to satisfy other requirements, if any, which extend beyond final payment; and
- .2 a final Certificate for Payment has been issued by the Architect and all conditions precedent to final payment have been satisfied.

§ 5.2.2 The Owner's final payment to the Contractor shall be made no later than 30 days after the issuance of the Architect's final Certificate for Payment, or as follows:

<< >>

## ARTICLE 6 DISPUTE RESOLUTION

### § 6.1 Initial Decision Maker

The Architect will serve as the Initial Decision Maker pursuant to Article 15 of AIA Document A201–2017, unless the parties appoint below another individual, not a party to this Agreement, to serve as the Initial Decision Maker. *(If the parties mutually agree, insert the name, address and other contact information of the Initial Decision Maker, if other than the Architect.)*

<< >>

<< >>

<< >>

<< >>

### § 6.2 Binding Dispute Resolution

For any Claim subject to, but not resolved by, mediation pursuant to Article 15 of AIA Document A201–2017, the method of binding dispute resolution shall be as follows:

*(Check the appropriate box.)*

☐ Arbitration pursuant to Section 15.4 of AIA Document A201–2017

☒ Litigation in a court of competent jurisdiction

☐ Other *(Specify)*

<< >>

If the Owner and Contractor do not select a method of binding dispute resolution, or do not subsequently agree in writing to a binding dispute resolution method other than litigation, Claims will be resolved by litigation in a court of competent jurisdiction.

## ARTICLE 7 TERMINATION OR SUSPENSION

§ 7.1 The Contract may be terminated by the Owner or the Contractor as provided in Article 14 of AIA Document A201–2017.

§ 7.2 The Work may be suspended by the Owner as provided in Article 14 of AIA Document A201–2017.

## ARTICLE 8 MISCELLANEOUS PROVISIONS

§ 8.1 Where reference is made in this Agreement to a provision of AIA Document A201–2017 or another Contract Document, the reference refers to that provision as amended or supplemented by other provisions of the Contract Documents.

§ 8.2 The Owner's representative:

*(Name, address, email address, and other information)*

« Jennifer Ochoa, Director Parks and Recreation »  
« Town of Berlin »  
« 230 Kensington Road »  
« Berlin, CT 06037 »  
« (860) 828-7010 »

§ 8.3 The Contractor's representative:  
(Name, address, email address, and other information)

« »  
« »  
« »  
« »  
« »  
« »

§ 8.4 Neither the Owner's nor the Contractor's representative shall be changed without ten days' prior notice to the other party.

### § 8.5 Insurance and Bonds

§ 8.5.1 The Owner and the Contractor shall purchase and maintain insurance as set forth in AIA Document A101™–2017, Standard Form of Agreement Between Owner and Contractor where the basis of payment is a Stipulated Sum, Exhibit A, Insurance and Bonds, and elsewhere in the Contract Documents.

§ 8.5.2 The Contractor shall provide bonds as set forth in AIA Document A101™–2017 Exhibit A, and elsewhere in the Contract Documents.

§ 8.6 Notice in electronic format, pursuant to Article 1 of AIA Document A201–2017, may be given in accordance with AIA Document E203™–2013, Building Information Modeling and Digital Data Exhibit, if completed, or as otherwise set forth below:

*(If other than in accordance with AIA Document E203–2013, insert requirements for delivering notice in electronic format such as name, title, and email address of the recipient and whether and how the system will be required to generate a read receipt for the transmission.)*

« »

§ 8.7 Other provisions:

« »

## ARTICLE 9 ENUMERATION OF CONTRACT DOCUMENTS

§ 9.1 This Agreement is comprised of the following documents:

- .1 AIA Document A101™–2017, Standard Form of Agreement Between Owner and Contractor
- .2 AIA Document A101™–2017, Exhibit A, Insurance and Bonds
- .3 AIA Document A201™–2017, General Conditions of the Contract for Construction
- .4 AIA Document E203™–2013, Building Information Modeling and Digital Data Exhibit, dated as indicated below:

*(Insert the date of the E203-2013 incorporated into this Agreement.)*

« »

- .5 Drawings

Number

Title

Date

- .6 Specifications

Section	Title	Date	Pages

.7 Addenda, if any:

Number	Date	Pages

Portions of Addenda relating to bidding or proposal requirements are not part of the Contract Documents unless the bidding or proposal requirements are also enumerated in this Article 9.

.8 Other Exhibits:

*(Check all boxes that apply and include appropriate information identifying the exhibit where required.)*

[ ☐ ] AIA Document E204™–2017, Sustainable Projects Exhibit, dated as indicated below:  
*(Insert the date of the E204-2017 incorporated into this Agreement.)*

☐ ☐

[ ☐ ] The Sustainability Plan:

Title	Date	Pages

[ ☐ ] Supplementary and other Conditions of the Contract:

Document	Title	Date	Pages

.9 Other documents, if any, listed below:

*(List here any additional documents that are intended to form part of the Contract Documents. AIA Document A201™–2017 provides that the advertisement or invitation to bid, Instructions to Bidders, sample forms, the Contractor's bid or proposal, portions of Addenda relating to bidding or proposal requirements, and other information furnished by the Owner in anticipation of receiving bids or proposals, are not part of the Contract Documents unless enumerated in this Agreement. Any such documents should be listed here only if intended to be part of the Contract Documents.)*

☐ ☐

This Agreement entered into as of the day and year first written above.

OWNER (Signature)

☐ ☐ ☐

(Printed name and title)

CONTRACTOR (Signature)

☐ ☐ ☐

(Printed name and title)

STATEMENT OF BIDDER'S QUALIFICATIONS

(To be submitted by the Bidder on separate sheets WITH THE BID)

To be considered for this proposal the bidder must be able to certify that he/she meets or exceeds the required qualifications.

The project is funded through the Connecticut Department of Energy and Environmental Protection and all contractors are to be listed as an approved contractor under the Department of Administrative Services Contractor Prequalification Program at the time of bidding. Program requirements are described at DAS.Prequalification@ct.gov or (860) 713-5280.

Bidders must have prior specific experience consisting of the successful construction of no less than five (5) synthetic turf fields that are 75,000 sf or greater in the past five (5) years. General Contractors synthetic turf field construction shall have consisted of demolition of existing conditions, concrete anchor curbing, field subsurface drainage, field stone base, laser grading of base stone, and coordination of synthetic turf manufactures and installers as subcontractors. Bidders must provide verification of experience with Form of Proposal and Bidders Qualification Statement. The Town of Berlin reserves the right to consider as not responsible any Bidder who is not able to provide documentation of experience with his/her own forces at least fifty-one (51%) percent of the dollar value of the work involved in this Contract.

All questions must be answered and the data given must be clear and comprehensive. This statement must be notarized. The Bidder may submit any additional information he desires.

1. Name of Bidder and IRS Employers Identification Number.
2. Permanent main office address.
3. When organized.
4. If a corporation, where incorporated.
5. How many years have you been engaged in the contracting business under your present firm or trade name?
6. General character of work performed by your company.
7. Have you ever failed to complete any work awarded to you? If so, where and why?
8. List any pending or current litigation that involves your company.
9. Provide copy of current DAS prequalification.
10. List five (5) successful synthetic turf field projects as described above.
11. List your major equipment available for this contract.
12. Provide background and experience resumes for the project manager and project superintendent listing similar recent work or ASBA certified field builder.
13. Experience in construction work similar in importance to this project.
14. Will you, upon request, fill out a detailed financial statement and furnish any other information that may be required by the Owner.
15. Include the following certification on qualification statements: The undersigned hereby authorizes and requests any person, firm, or corporation to furnish any information requested by the Owner in verification of the recitals comprising this Statement of Bidder's Qualifications.

Enclose answers on separate pages with your Bid

BID BOND

KNOW ALL MEN BY THESE PRESENT, that we, the undersigned, \_\_\_\_\_ as Principal;  
and \_\_\_\_\_ as Surety, are hereby held and firmly bound unto the  
\_\_\_\_\_, in the penal sum of \_\_\_\_\_ Dollars (\$ \_\_\_\_\_)  
lawful money of the United States of America to be paid to the Said \_\_\_\_\_, as  
liquidated damages for the payment of which sum, well and truly to be made, we jointly and severally  
bind ourselves, our heirs, executors, administrators, successors, and assigns.

Signed this \_\_\_\_\_ day of \_\_\_\_\_, 2023

The condition of the above obligation is such that whereas the Principal has submitted to the  
\_\_\_\_\_, a certain Bid (Proposal), attached hereto and hereby made a part hereof, to  
enter into a contract in writing for the Construction of BISCOGLIO FIELD AT BERLIN HIGH SCHOOL.  
NOW THEREFORE,

- (a) if said Bid shall be rejected, or in the alternate,
- (b) if said Bid shall be accepted and the Principal shall execute and deliver a contract in the form of  
contract attached hereto (properly completed in accordance with said Bid) and shall furnish a bond for  
his faithful performance of said contract, and for the payment of all persons performing labor or  
furnishing materials in connection therewith, and shall in all other respects perform the agreement  
created by the acceptance of said Bid, then, this obligation shall be void, otherwise the same shall  
remain in force and effect; it being expressly understood and agreed that the liability of the Surety for  
any and all claims hereunder shall, in no event, exceed the amount of this obligation as herein stated.

The Surety, for value received, hereby stipulates and agrees that the obligations of said Surety and its  
bond shall be in no way impaired or affected by and extension of the time within which the Principal may  
accept such Bid; and said Surety does hereby waive notice of any such extension.

(SEAL)

\_\_\_\_\_  
Notary Public

\_\_\_\_\_  
(L.S.)

By \_\_\_\_\_  
Title

BISCOGLIO FIELD - BERLIN HIGH SCHOOL  
BERLIN, CT

SYNTHETIC TURF FIELD  
KBA #22024.00

---

Surety

\*By 

---

Attorney-in-Fact

Signed and Sealed in the Presence of:

---

---

\*Important:     Furnish proof of authority of officers or agents of Surety to this document.

# DRAFT AIA® Document A201™ – 2017

## General Conditions of the Contract for Construction

for the following PROJECT:

(Name and location or address)

«Synthetic Turf Field»  
Biscoglio Field – Berlin High School»  
«Berlin, CT»

THE OWNER:

(Name, legal status and address)

«Town of Berlin»  
«240 Kensington Road»  
«Berlin, CT 06037»

THE ARCHITECT:

(Name, legal status and address)

«Kaestle Boos Associates, Inc.»  
«16 Slater Road»  
«New Britain, CT 06053»

### TABLE OF ARTICLES

- |    |  |
|----|--|
| 1  | GENERAL PROVISIONS                               |
| 2  | OWNER  |
| 3  | CONTRACTOR                                       |
| 4  | ARCHITECT  |
| 5  | SUBCONTRACTORS                                   |
| 6  | CONSTRUCTION BY OWNER OR BY SEPARATE CONTRACTORS |
| 7  | CHANGES IN THE WORK                              |
| 8  | TIME   |
| 9  | PAYMENTS AND COMPLETION                          |
| 10 | PROTECTION OF PERSONS AND PROPERTY               |
| 11 | INSURANCE AND BONDS                              |
| 12 | UNCOVERING AND CORRECTION OF WORK                |
| 13 | MISCELLANEOUS PROVISIONS                         |

### ADDITIONS AND DELETIONS:

The author of this document has added information needed for its completion. The author may also have revised the text of the original AIA standard form. An *Additions and Deletions Report* that notes added information as well as revisions to the standard form text is available from the author and should be reviewed.

This document has important legal consequences. Consultation with an attorney is encouraged with respect to its completion or modification.

For guidance in modifying this document to include supplementary conditions, see AIA Document A503™, Guide for Supplementary Conditions.

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- 14      TERMINATION OR SUSPENSION OF THE CONTRACT
- 15      CLAIMS AND DISPUTES





## INDEX

(Topics and numbers in bold are Section headings.)

### **Acceptance of Nonconforming Work**

9.6.6, 9.9.3, **12.3**

#### Acceptance of Work

9.6.6, 9.8.2, 9.9.3, 9.10.1, 9.10.3, 12.3

### **Access to Work**

**3.16**, 6.2.1, 12.1

#### Accident Prevention

10

#### Acts and Omissions

3.2, 3.3.2, 3.12.8, 3.18, 4.2.3, 8.3.1, 9.5.1, 10.2.5,  
10.2.8, 13.3.2, 14.1, 15.1.2, 15.2

#### Addenda

1.1.1

#### Additional Costs, Claims for

3.7.4, 3.7.5, 10.3.2, 15.1.5

### **Additional Inspections and Testing**

9.4.2, 9.8.3, 12.2.1, **13.4**

### **Additional Time, Claims for**

3.2.4, 3.7.4, 3.7.5, 3.10.2, 8.3.2, **15.1.6**

### **Administration of the Contract**

3.1.3, **4.2**, 9.4, 9.5

#### Advertisement or Invitation to Bid

1.1.1

#### Aesthetic Effect

4.2.13

### **Allowances**

**3.8**

### **Applications for Payment**

4.2.5, 7.3.9, 9.2, **9.3**, 9.4, 9.5.1, 9.5.4, 9.6.3, 9.7, 9.10

#### Approvals

2.1.1, 2.3.1, 2.5, 3.1.3, 3.10.2, 3.12.8, 3.12.9,  
3.12.10.1, 4.2.7, 9.3.2, 13.4.1

#### Arbitration

8.3.1, 15.3.2, **15.4**

## **ARCHITECT**

**4**

### **Architect, Definition of**

**4.1.1**

#### Architect, Extent of Authority

2.5, 3.12.7, 4.1.2, 4.2, 5.2, 6.3, 7.1.2, 7.3.4, 7.4, 9.2,  
9.3.1, 9.4, 9.5, 9.6.3, 9.8, 9.10.1, 9.10.3, 12.1, 12.2.1,  
13.4.1, 13.4.2, 14.2.2, 14.2.4, 15.1.4, 15.2.1

#### Architect, Limitations of Authority and

#### Responsibility

2.1.1, 3.12.4, 3.12.8, 3.12.10, 4.1.2, 4.2.1, 4.2.2,  
4.2.3, 4.2.6, 4.2.7, 4.2.10, 4.2.12, 4.2.13, 5.2.1, 7.4,  
9.4.2, 9.5.4, 9.6.4, 15.1.4, 15.2

#### Architect's Additional Services and Expenses

2.5, 12.2.1, 13.4.2, 13.4.3, 14.2.4

#### Architect's Administration of the Contract

3.1.3, 3.7.4, 15.2, 9.4.1, 9.5

#### Architect's Approvals

2.5, 3.1.3, 3.5, 3.10.2, 4.2.7

#### Architect's Authority to Reject Work

3.5, 4.2.6, 12.1.2, 12.2.1

#### Architect's Copyright

1.1.7, 1.5

#### Architect's Decisions

3.7.4, 4.2.6, 4.2.7, 4.2.11, 4.2.12, 4.2.13, 4.2.14, 6.3,  
7.3.4, 7.3.9, 8.1.3, 8.3.1, 9.2, 9.4.1, 9.5, 9.8.4, 9.9.1,  
13.4.2, 15.2

#### Architect's Inspections

3.7.4, 4.2.2, 4.2.9, 9.4.2, 9.8.3, 9.9.2, 9.10.1, 13.4

#### Architect's Instructions

3.2.4, 3.3.1, 4.2.6, 4.2.7, 13.4.2

#### Architect's Interpretations

4.2.11, 4.2.12

#### Architect's Project Representative

4.2.10

#### Architect's Relationship with Contractor

1.1.2, 1.5, 2.3.3, 3.1.3, 3.2.2, 3.2.3, 3.2.4, 3.3.1, 3.4.2,  
3.5, 3.7.4, 3.7.5, 3.9.2, 3.9.3, 3.10, 3.11, 3.12, 3.16,  
3.18, 4.1.2, 4.2, 5.2, 6.2.2, 7, 8.3.1, 9.2, 9.3, 9.4, 9.5,  
9.7, 9.8, 9.9, 10.2.6, 10.3, 11.3, 12, 13.3.2, 13.4, 15.2

#### Architect's Relationship with Subcontractors

1.1.2, 4.2.3, 4.2.4, 4.2.6, 9.6.3, 9.6.4, 11.3

#### Architect's Representations

9.4.2, 9.5.1, 9.10.1

#### Architect's Site Visits

3.7.4, 4.2.2, 4.2.9, 9.4.2, 9.5.1, 9.9.2, 9.10.1, 13.4

#### Asbestos

10.3.1

#### Attorneys' Fees

3.18.1, 9.6.8, 9.10.2, 10.3.3

#### Award of Separate Contracts

6.1.1, 6.1.2

### **Award of Subcontracts and Other Contracts for Portions of the Work**

**5.2**

### **Basic Definitions**

**1.1**

#### Bidding Requirements

1.1.1

#### Binding Dispute Resolution

8.3.1, 9.7, 11.5, 13.1, 15.1.2, 15.1.3, 15.2.1, 15.2.5,  
15.2.6.1, 15.3.1, 15.3.2, 15.3.3, 15.4.1

#### Bonds, Lien

7.3.4.4, 9.6.8, 9.10.2, 9.10.3

### **Bonds, Performance, and Payment**

7.3.4.4, 9.6.7, 9.10.3, **11.1.2**, 11.1.3, **11.5**

### **Building Information Models Use and Reliance**

**1.8**

#### Building Permit

3.7.1

### **Capitalization**

**1.3**

#### Certificate of Substantial Completion

9.8.3, 9.8.4, 9.8.5

### **Certificates for Payment**

4.2.1, 4.2.5, 4.2.9, 9.3.3, **9.4**, 9.5, 9.6.1, 9.6.6, 9.7,  
9.10.1, 9.10.3, 14.1.1.3, 14.2.4, 15.1.4

Certificates of Inspection, Testing or Approval  
13.4.4  
Certificates of Insurance  
9.10.2  
**Change Orders**  
1.1.1, 3.4.2, 3.7.4, 3.8.2.3, 3.11, 3.12.8, 4.2.8, 5.2.3,  
7.1.2, 7.1.3, **7.2**, 7.3.2, 7.3.7, 7.3.9, 7.3.10, 8.3.1,  
9.3.1.1, 9.10.3, 10.3.2, 11.2, 11.5, 12.1.2  
**Change Orders**, Definition of  
**7.2.1**  
**CHANGES IN THE WORK**  
2.2.2, 3.11, 4.2.8, **7**, 7.2.1, 7.3.1, 7.4, 8.3.1, 9.3.1.1,  
11.5  
**Claims**, Definition of  
**15.1.1**  
Claims, Notice of  
1.6.2, 15.1.3  
**CLAIMS AND DISPUTES**  
3.2.4, 6.1.1, 6.3, 7.3.9, 9.3.3, 9.10.4, 10.3.3, **15**, 15.4  
Claims and Timely Assertion of Claims  
15.4.1  
**Claims for Additional Cost**  
3.2.4, 3.3.1, 3.7.4, 7.3.9, 9.5.2, 10.2.5, 10.3.2, **15.1.5**  
**Claims for Additional Time**  
3.2.4, 3.3.1, 3.7.4, 6.1.1, 8.3.2, 9.5.2, 10.3.2, **15.1.6**  
**Concealed or Unknown Conditions, Claims for**  
**3.7.4**  
Claims for Damages  
3.2.4, 3.18, 8.3.3, 9.5.1, 9.6.7, 10.2.5, 10.3.3, 11.3,  
11.3.2, 14.2.4, 15.1.7  
Claims Subject to Arbitration  
15.4.1  
**Cleaning Up**  
**3.15**, **6.3**  
Commencement of the Work, Conditions Relating to  
2.2.1, 3.2.2, 3.4.1, 3.7.1, 3.10.1, 3.12.6, 5.2.1, 5.2.3,  
6.2.2, 8.1.2, 8.2.2, 8.3.1, 11.1, 11.2, **15.1.5**  
**Commencement of the Work**, Definition of  
**8.1.2**  
**Communications**  
3.9.1, **4.2.4**  
Completion, Conditions Relating to  
3.4.1, 3.11, 3.15, 4.2.2, 4.2.9, 8.2, 9.4.2, 9.8, 9.9.1,  
9.10, 12.2, 14.1.2, 15.1.2  
**COMPLETION, PAYMENTS AND**  
**9**  
Completion, Substantial  
3.10.1, 4.2.9, 8.1.1, 8.1.3, 8.2.3, 9.4.2, 9.8, 9.9.1,  
9.10.3, 12.2, 15.1.2  
Compliance with Laws  
2.3.2, 3.2.3, 3.6, 3.7, 3.12.10, 3.13, 9.6.4, 10.2.2,  
13.1, 13.3, 13.4.1, 13.4.2, 13.5, 14.1.1, 14.2.1.3,  
15.2.8, 15.4.2, 15.4.3  
Concealed or Unknown Conditions  
3.7.4, 4.2.8, 8.3.1, 10.3  
Conditions of the Contract  
1.1.1, 6.1.1, 6.1.4

Consent, Written  
3.4.2, 3.14.2, 4.1.2, 9.8.5, 9.9.1, 9.10.2, 9.10.3, 13.2,  
15.4.4.2  
**Consolidation or Joinder**  
**15.4.4**  
**CONSTRUCTION BY OWNER OR BY**  
**SEPARATE CONTRACTORS**  
1.1.4, **6**  
**Construction Change Directive**, Definition of  
**7.3.1**  
**Construction Change Directives**  
1.1.1, 3.4.2, 3.11, 3.12.8, 4.2.8, 7.1.1, 7.1.2, 7.1.3,  
**7.3**, 9.3.1.1  
Construction Schedules, Contractor's  
3.10, 3.11, 3.12.1, 3.12.2, 6.1.3, 15.1.6.2  
**Contingent Assignment of Subcontracts**  
**5.4**, 14.2.2.2  
**Continuing Contract Performance**  
**15.1.4**  
**Contract**, Definition of  
**1.1.2**  
**CONTRACT, TERMINATION OR**  
**SUSPENSION OF THE**  
5.4.1.1, 5.4.2, 11.5, **14**  
Contract Administration  
3.1.3, 4, 9.4, 9.5  
Contract Award and Execution, Conditions Relating  
to  
3.7.1, 3.10, 5.2, 6.1  
Contract Documents, Copies Furnished and Use of  
1.5.2, 2.3.6, 5.3  
**Contract Documents**, Definition of  
**1.1.1**  
**Contract Sum**  
2.2.2, 2.2.4, 3.7.4, 3.7.5, 3.8, 3.10.2, 5.2.3, 7.3, 7.4,  
**9.1**, 9.2, 9.4.2, 9.5.1.4, 9.6.7, 9.7, 10.3.2, 11.5, 12.1.2,  
12.3, 14.2.4, 14.3.2, 15.1.4.2, **15.1.5**, **15.2.5**  
**Contract Sum**, Definition of  
**9.1**  
Contract Time  
1.1.4, 2.2.1, 2.2.2, 3.7.4, 3.7.5, 3.10.2, 5.2.3, 6.1.5,  
7.2.1.3, 7.3.1, 7.3.5, 7.3.6, 7, 7.3.10, 7.4, 8.1.1,  
8.2.1, 8.2.3, 8.3.1, 9.5.1, 9.7, 10.3.2, 12.1.1, 12.1.2,  
14.3.2, 15.1.4.2, 15.1.6.1, 15.2.5  
**Contract Time**, Definition of  
8.1.1  
**CONTRACTOR**  
**3**  
Contractor, Definition of  
**3.1**, **6.1.2**  
**Contractor's Construction and Submittal**  
**Schedules**  
**3.10**, 3.12.1, 3.12.2, 4.2.3, 6.1.3, 15.1.6.2  
Contractor's Employees  
2.2.4, 3.3.2, 3.4.3, 3.8.1, 3.9, 3.18.2, 4.2.3, 4.2.6,  
10.2, 10.3, 11.3, 14.1, 14.2.1.1  
**Contractor's Liability Insurance**  
**11.1**

Contractor's Relationship with Separate Contractors and Owner's Forces  
3.12.5, 3.14.2, 4.2.4, 6, 11.3, 12.2.4

Contractor's Relationship with Subcontractors  
1.2.2, 2.2.4, 3.3.2, 3.18.1, 3.18.2, 4.2.4, 5, 9.6.2, 9.6.7, 9.10.2, 11.2, 11.3, 11.4

Contractor's Relationship with the Architect  
1.1.2, 1.5, 2.3.3, 3.1.3, 3.2.2, 3.2.3, 3.2.4, 3.3.1, 3.4.2, 3.5.1, 3.7.4, 3.10, 3.11, 3.12, 3.16, 3.18, 4.2, 5.2, 6.2.2, 7, 8.3.1, 9.2, 9.3, 9.4, 9.5, 9.7, 9.8, 9.9, 10.2.6, 10.3, 11.3, 12, 13.4, 15.1.3, 15.2.1

Contractor's Representations  
3.2.1, 3.2.2, 3.5, 3.12.6, 6.2.2, 8.2.1, 9.3.3, 9.8.2

Contractor's Responsibility for Those Performing the Work  
3.3.2, 3.18, 5.3, 6.1.3, 6.2, 9.5.1, 10.2.8

Contractor's Review of Contract Documents  
3.2

Contractor's Right to Stop the Work  
2.2.2, 9.7

Contractor's Right to Terminate the Contract  
14.1

Contractor's Submittals  
3.10, 3.11, 3.12, 4.2.7, 5.2.1, 5.2.3, 9.2, 9.3, 9.8.2, 9.8.3, 9.9.1, 9.10.2, 9.10.3

Contractor's Superintendent  
3.9, 10.2.6

Contractor's Supervision and Construction Procedures  
1.2.2, 3.3, 3.4, 3.12.10, 4.2.2, 4.2.7, 6.1.3, 6.2.4, 7.1.3, 7.3.4, 7.3.6, 8.2, 10, 12, 14, 15.1.4

Coordination and Correlation  
1.2, 3.2.1, 3.3.1, 3.10, 3.12.6, 6.1.3, 6.2.1

Copies Furnished of Drawings and Specifications  
1.5, 2.3.6, 3.11

Copyrights  
1.5, **3.17**

Correction of Work  
2.5, 3.7.3, 9.4.2, 9.8.2, 9.8.3, 9.9.1, 12.1.2, **12.2**, 12.3, 15.1.3.1, 15.1.3.2, 15.2.1

**Correlation and Intent of the Contract Documents**  
**1.2**

**Cost**, Definition of  
**7.3.4**

Costs  
2.5, 3.2.4, 3.7.3, 3.8.2, 3.15.2, 5.4.2, 6.1.1, 6.2.3, 7.3.3.3, 7.3.4, 7.3.8, 7.3.9, 9.10.2, 10.3.2, 10.3.6, 11.2, 12.1.2, 12.2.1, 12.2.4, 13.4, 14

**Cutting and Patching**  
**3.14**, 6.2.5

Damage to Construction of Owner or Separate Contractors  
3.14.2, 6.2.4, 10.2.1.2, 10.2.5, 10.4, 12.2.4

Damage to the Work  
3.14.2, 9.9.1, 10.2.1.2, 10.2.5, 10.4, 12.2.4

Damages, Claims for  
3.2.4, 3.18, 6.1.1, 8.3.3, 9.5.1, 9.6.7, 10.3.3, 11.3.2, 11.3, 14.2.4, 15.1.7

Damages for Delay  
6.2.3, 8.3.3, 9.5.1.6, 9.7, 10.3.2, 14.3.2

**Date of Commencement of the Work**, Definition of  
**8.1.2**

**Date of Substantial Completion**, Definition of  
**8.1.3**

**Day**, Definition of  
**8.1.4**

Decisions of the Architect  
3.7.4, 4.2.6, 4.2.7, 4.2.11, 4.2.12, 4.2.13, 6.3, 7.3.4, 7.3.9, 8.1.3, 8.3.1, 9.2, 9.4, 9.5.1, 9.8.4, 9.9.1, 13.4.2, 14.2.2, 14.2.4, 15.1, 15.2

**Decisions to Withhold Certification**  
9.4.1, **9.5**, 9.7, 14.1.1.3

Defective or Nonconforming Work, Acceptance, Rejection and Correction of  
2.5, 3.5, 4.2.6, 6.2.3, 9.5.1, 9.5.3, 9.6.6, 9.8.2, 9.9.3, 9.10.4, 12.2.1

Definitions  
1.1, 2.1.1, 3.1.1, 3.5, 3.12.1, 3.12.2, 3.12.3, 4.1.1, 5.1, 6.1.2, 7.2.1, 7.3.1, 8.1, 9.1, 9.8.1, 15.1.1

**Delays and Extensions of Time**  
**3.2**, **3.7.4**, 5.2.3, 7.2.1, 7.3.1, **7.4**, **8.3**, **9.5.1**, **9.7**, 10.3.2, **10.4**, 14.3.2, **15.1.6**, 15.2.5

**Digital Data Use and Transmission**  
**1.7**

Disputes  
6.3, 7.3.9, 15.1, 15.2

**Documents and Samples at the Site**  
**3.11**

**Drawings**, Definition of  
**1.1.5**

Drawings and Specifications, Use and Ownership of  
3.11

Effective Date of Insurance  
8.2.2

**Emergencies**  
**10.4**, 14.1.1.2, **15.1.5**

Employees, Contractor's  
3.3.2, 3.4.3, 3.8.1, 3.9, 3.18.2, 4.2.3, 4.2.6, 10.2, 10.3.3, 11.3, 14.1, 14.2.1.1

Equipment, Labor, or Materials  
1.1.3, 1.1.6, 3.4, 3.5, 3.8.2, 3.8.3, 3.12, 3.13, 3.15.1, 4.2.6, 4.2.7, 5.2.1, 6.2.1, 7.3.4, 9.3.2, 9.3.3, 9.5.1.3, 9.10.2, 10.2.1, 10.2.4, 14.2.1.1, 14.2.1.2

Execution and Progress of the Work  
1.1.3, 1.2.1, 1.2.2, 2.3.4, 2.3.6, 3.1, 3.3.1, 3.4.1, 3.7.1, 3.10.1, 3.12, 3.14, 4.2, 6.2.2, 7.1.3, 7.3.6, 8.2, 9.5.1, 9.9.1, 10.2, 10.3, 12.1, 12.2, 14.2, 14.3.1, 15.1.4

Extensions of Time  
3.2.4, 3.7.4, 5.2.3, 7.2.1, 7.3, 7.4, 9.5.1, 9.7, 10.3.2, 10.4, 14.3, 15.1.6, **15.2.5**

**Failure of Payment**  
9.5.1.3, **9.7**, 9.10.2, 13.5, 14.1.1.3, 14.2.1.2

Faulty Work  
(See Defective or Nonconforming Work)

**Final Completion and Final Payment**  
4.2.1, 4.2.9, 9.8.2, **9.10**, 12.3, 14.2.4, 14.4.3

Financial Arrangements, Owner's

2.2.1, 13.2.2, 14.1.1.4

## **GENERAL PROVISIONS**

### **1**

#### **Governing Law**

##### **13.1**

Guarantees (See Warranty)

#### **Hazardous Materials and Substances**

10.2.4, **10.3**

Identification of Subcontractors and Suppliers

5.2.1

#### **Indemnification**

3.17, **3.18**, 9.6.8, 9.10.2, 10.3.3, 11.3

#### **Information and Services Required of the Owner**

2.1.2, **2.2**, 2.3, 3.2.2, 3.12.10.1, 6.1.3, 6.1.4, 6.2.5,

9.6.1, 9.9.2, 9.10.3, 10.3.3, 11.2, 13.4.1, 13.4.2,

14.1.1.4, 14.1.4, 15.1.4

#### **Initial Decision**

##### **15.2**

#### **Initial Decision Maker, Definition of**

1.1.8

Initial Decision Maker, Decisions

14.2.4, 15.1.4.2, 15.2.1, 15.2.2, 15.2.3, 15.2.4, 15.2.5

Initial Decision Maker, Extent of Authority

14.2.4, 15.1.4.2, 15.2.1, 15.2.2, 15.2.3, 15.2.4, 15.2.5

#### **Injury or Damage to Person or Property**

**10.2.8**, 10.4

Inspections

3.1.3, 3.3.3, 3.7.1, 4.2.2, 4.2.6, 4.2.9, 9.4.2, 9.8.3,

9.9.2, 9.10.1, 12.2.1, 13.4

Instructions to Bidders

1.1.1

Instructions to the Contractor

3.2.4, 3.3.1, 3.8.1, 5.2.1, 7, 8.2.2, 12, 13.4.2

#### **Instruments of Service, Definition of**

##### **1.1.7**

Insurance

6.1.1, 7.3.4, 8.2.2, 9.3.2, 9.8.4, 9.9.1, 9.10.2, 10.2.5,

### **11**

Insurance, Notice of Cancellation or Expiration

11.1.4, 11.2.3

#### **Insurance, Contractor's Liability**

##### **11.1**

Insurance, Effective Date of

8.2.2, 14.4.2

#### **Insurance, Owner's Liability**

##### **11.2**

#### **Insurance, Property**

**10.2.5**, 11.2, 11.4, 11.5

Insurance, Stored Materials

9.3.2

## **INSURANCE AND BONDS**

### **11**

Insurance Companies, Consent to Partial Occupancy

9.9.1

Insured loss, Adjustment and Settlement of

11.5

Intent of the Contract Documents

1.2.1, 4.2.7, 4.2.12, 4.2.13

## **Interest**

### **13.5**

#### **Interpretation**

1.1.8, 1.2.3, **1.4**, 4.1.1, 5.1, 6.1.2, 15.1.1

Interpretations, Written

4.2.11, 4.2.12

Judgment on Final Award

15.4.2

#### **Labor and Materials, Equipment**

1.1.3, 1.1.6, **3.4**, 3.5, 3.8.2, 3.8.3, 3.12, 3.13, 3.15.1,  
5.2.1, 6.2.1, 7.3.4, 9.3.2, 9.3.3, 9.5.1.3, 9.10.2, 10.2.1,

10.2.4, 14.2.1.1, 14.2.1.2

Labor Disputes

8.3.1

Laws and Regulations

1.5, 2.3.2, 3.2.3, 3.2.4, 3.6, 3.7, 3.12.10, 3.13, 9.6.4,  
9.9.1, 10.2.2, 13.1, 13.3.1, 13.4.2, 13.5, 14, 15.2.8,

15.4

Liens

2.1.2, 9.3.1, 9.3.3, 9.6.8, 9.10.2, 9.10.4, 15.2.8

Limitations, Statutes of

12.2.5, 15.1.2, 15.4.1.1

Limitations of Liability

3.2.2, 3.5, 3.12.10, 3.12.10.1, 3.17, 3.18.1, 4.2.6,  
4.2.7, 6.2.2, 9.4.2, 9.6.4, 9.6.7, 9.6.8, 10.2.5, 10.3.3,

11.3, 12.2.5, 13.3.1

Limitations of Time

2.1.2, 2.2, 2.5, 3.2.2, 3.10, 3.11, 3.12.5, 3.15.1, 4.2.7,  
5.2, 5.3, 5.4.1, 6.2.4, 7.3, 7.4, 8.2, 9.2, 9.3.1, 9.3.3,

9.4.1, 9.5, 9.6, 9.7, 9.8, 9.9, 9.10, 12.2, 13.4, 14, 15,  
15.1.2, 15.1.3, 15.1.5

#### **Materials, Hazardous**

10.2.4, **10.3**

Materials, Labor, Equipment and

1.1.3, 1.1.6, 3.4.1, 3.5, 3.8.2, 3.8.3, 3.12, 3.13, 3.15.1,  
5.2.1, 6.2.1, 7.3.4, 9.3.2, 9.3.3, 9.5.1.3, 9.10.2,

10.2.1.2, 10.2.4, 14.2.1.1, 14.2.1.2

Means, Methods, Techniques, Sequences and

Procedures of Construction

3.3.1, 3.12.10, 4.2.2, 4.2.7, 9.4.2

Mechanic's Lien

2.1.2, 9.3.1, 9.3.3, 9.6.8, 9.10.2, 9.10.4, 15.2.8

#### **Mediation**

8.3.1, 15.1.3.2, 15.2.1, 15.2.5, 15.2.6, **15.3**, 15.4.1,  
15.4.1.1

#### **Minor Changes in the Work**

1.1.1, 3.4.2, 3.12.8, 4.2.8, 7.1, **7.4**

## **MISCELLANEOUS PROVISIONS**

### **13**

#### **Modifications, Definition of**

##### **1.1.1**

Modifications to the Contract

1.1.1, 1.1.2, 2.5, 3.11, 4.1.2, 4.2.1, 5.2.3, 7, 8.3.1, 9.7,  
10.3.2

#### **Mutual Responsibility**

##### **6.2**

## **Nonconforming Work, Acceptance of**

9.6.6, 9.9.3, **12.3**

Nonconforming Work, Rejection and Correction of  
2.4, 2.5, 3.5, 4.2.6, 6.2.4, 9.5.1, 9.8.2, 9.9.3, 9.10.4,  
12.2

## **Notice**

**1.6**, 1.6.1, 1.6.2, 2.1.2, 2.2.2., 2.2.3, 2.2.4, 2.5, 3.2.4,  
3.3.1, 3.7.4, 3.7.5, 3.9.2, 3.12.9, 3.12.10, 5.2.1, 7.4,  
8.2.2 9.6.8, 9.7, 9.10.1, 10.2.8, 10.3.2, 11.5, 12.2.2.1,  
13.4.1, 13.4.2, 14.1, 14.2.2, 14.4.2, 15.1.3, 15.1.5,  
15.1.6, 15.4.1

Notice of Cancellation or Expiration of Insurance  
11.1.4, 11.2.3

## **Notice of Claims**

1.6.2, 2.1.2, 3.7.4, 9.6.8, 10.2.8, **15.1.3**, 15.1.5,  
15.1.6, 15.2.8, 15.3.2, 15.4.1

Notice of Testing and Inspections  
13.4.1, 13.4.2

Observations, Contractor's  
3.2, 3.7.4

Occupancy

2.3.1, 9.6.6, 9.8

Orders, Written

1.1.1, 2.4, 3.9.2, 7, 8.2.2, 11.5, 12.1, 12.2.2.1, 13.4.2,  
14.3.1

## **OWNER**

**2**

**Owner**, Definition of

### **2.1.1**

**Owner**, Evidence of Financial Arrangements

**2.2**, 13.2.2, 14.1.1.4

**Owner**, Information and Services Required of the

2.1.2, **2.2**, 2.3, 3.2.2, 3.12.10, 6.1.3, 6.1.4, 6.2.5,  
9.3.2, 9.6.1, 9.6.4, 9.9.2, 9.10.3, 10.3.3, 11.2, 13.4.1,  
13.4.2, 14.1.1.4, 14.1.4, 15.1.4

Owner's Authority

1.5, 2.1.1, 2.3.32.4, 2.5, 3.4.2, 3.8.1, 3.12.10, 3.14.2,  
4.1.2, 4.2.4, 4.2.9, 5.2.1, 5.2.4, 5.4.1, 6.1, 6.3, 7.2.1,  
7.3.1, 8.2.2, 8.3.1, 9.3.2, 9.5.1, 9.6.4, 9.9.1, 9.10.2,  
10.3.2, 11.4, 11.5, 12.2.2, 12.3, 13.2.2, 14.3, 14.4,  
15.2.7

**Owner's Insurance**

### **11.2**

Owner's Relationship with Subcontractors

1.1.2, 5.2, 5.3, 5.4, 9.6.4, 9.10.2, 14.2.2

**Owner's Right to Carry Out the Work**

**2.5**, 14.2.2

**Owner's Right to Clean Up**

### **6.3**

**Owner's Right to Perform Construction and to  
Award Separate Contracts**

### **6.1**

**Owner's Right to Stop the Work**

### **2.4**

Owner's Right to Suspend the Work

14.3

Owner's Right to Terminate the Contract

14.2, 14.4

## **Ownership and Use of Drawings, Specifications and Other Instruments of Service**

1.1.1, 1.1.6, 1.1.7, **1.5**, 2.3.6, 3.2.2, 3.11, 3.17, 4.2.12,  
5.3

## **Partial Occupancy or Use**

9.6.6, **9.9**

## **Patching, Cutting and**

**3.14**, 6.2.5

Patents

3.17

## **Payment, Applications for**

4.2.5, 7.3.9, 9.2, **9.3**, 9.4, 9.5, 9.6.3, 9.7, 9.8.5, 9.10.1,  
14.2.3, 14.2.4, 14.4.3

## **Payment, Certificates for**

4.2.5, 4.2.9, 9.3.3, **9.4**, 9.5, 9.6.1, 9.6.6, 9.7, 9.10.1,  
9.10.3, 14.1.1.3, 14.2.4

## **Payment, Failure of**

9.5.1.3, **9.7**, 9.10.2, 13.5, 14.1.1.3, 14.2.1.2

Payment, Final

4.2.1, 4.2.9, **9.10**, 12.3, 14.2.4, 14.4.3

## **Payment Bond, Performance Bond and**

7.3.4.4, 9.6.7, 9.10.3, **11.1.2**

## **Payments, Progress**

9.3, **9.6**, 9.8.5, 9.10.3, 14.2.3, 15.1.4

## **PAYMENTS AND COMPLETION**

**9**

Payments to Subcontractors

5.4.2, 9.5.1.3, 9.6.2, 9.6.3, 9.6.4, 9.6.7, 14.2.1.2

PCB

10.3.1

## **Performance Bond and Payment Bond**

7.3.4.4, 9.6.7, 9.10.3, **11.1.2**

## **Permits, Fees, Notices and Compliance with Laws**

2.3.1, **3.7**, 3.13, 7.3.4.4, 10.2.2

## **PERSONS AND PROPERTY, PROTECTION OF**

**10**

Polychlorinated Biphenyl

10.3.1

**Product Data**, Definition of

### **3.12.2**

**Product Data and Samples, Shop Drawings**

3.11, **3.12**, 4.2.7

## **Progress and Completion**

4.2.2, **8.2**, 9.8, 9.9.1, 14.1.4, 15.1.4

## **Progress Payments**

9.3, **9.6**, 9.8.5, 9.10.3, 14.2.3, 15.1.4

**Project**, Definition of

### **1.1.4**

Project Representatives

4.2.10

## **Property Insurance**

10.2.5, **11.2**

## **Proposal Requirements**

1.1.1

## **PROTECTION OF PERSONS AND PROPERTY 10**

## Regulations and Laws

1.5, 2.3.2, 3.2.3, 3.6, 3.7, 3.12.10, 3.13, 9.6.4, 9.9.1, 10.2.2, 13.1, 13.3, 13.4.1, 13.4.2, 13.5, 14, 15.2.8, 15.4

## Rejection of Work

4.2.6, 12.2.1

## Releases and Waivers of Liens

9.3.1, 9.10.2

## Representations

3.2.1, 3.5, 3.12.6, 8.2.1, 9.3.3, 9.4.2, 9.5.1, 9.10.1

## Representatives

2.1.1, 3.1.1, 3.9, 4.1.1, 4.2.10, 13.2.1

## Responsibility for Those Performing the Work

3.3.2, 3.18, 4.2.2, 4.2.3, 5.3, 6.1.3, 6.2, 6.3, 9.5.1, 10

## Retainage

9.3.1, 9.6.2, 9.8.5, 9.9.1, 9.10.2, 9.10.3

## Review of Contract Documents and Field Conditions by Contractor

3.2, 3.12.7, 6.1.3

## Review of Contractor's Submittals by Owner and Architect

3.10.1, 3.10.2, 3.11, 3.12, 4.2, 5.2, 6.1.3, 9.2, 9.8.2

## Review of Shop Drawings, Product Data and Samples by Contractor

3.12

## Rights and Remedies

1.1.2, 2.4, 2.5, 3.5, 3.7.4, 3.15.2, 4.2.6, 5.3, 5.4, 6.1, 6.3, 7.3.1, 8.3, 9.5.1, 9.7, 10.2.5, 10.3, 12.2.1, 12.2.2, 12.2.4, 13.3, 14, 15.4

## Royalties, Patents and Copyrights

3.17

## Rules and Notices for Arbitration

15.4.1

## Safety of Persons and Property

10.2, 10.4

## Safety Precautions and Programs

3.3.1, 4.2.2, 4.2.7, 5.3, 10.1, 10.2, 10.4

## Samples, Definition of

3.12.3

## Samples, Shop Drawings, Product Data and

3.11, 3.12, 4.2.7

## Samples at the Site, Documents and

3.11

## Schedule of Values

9.2, 9.3.1

## Schedules, Construction

3.10, 3.12.1, 3.12.2, 6.1.3, 15.1.6.2

## Separate Contracts and Contractors

1.1.4, 3.12.5, 3.14.2, 4.2.4, 4.2.7, 6, 8.3.1, 12.1.2

## Separate Contractors, Definition of

6.1.1

## Shop Drawings, Definition of

3.12.1

## Shop Drawings, Product Data and Samples

3.11, 3.12, 4.2.7

## Site, Use of

3.13, 6.1.1, 6.2.1

## Site Inspections

3.2.2, 3.3.3, 3.7.1, 3.7.4, 4.2, 9.9.2, 9.4.2, 9.10.1, 13.4

## Site Visits, Architect's

3.7.4, 4.2.2, 4.2.9, 9.4.2, 9.5.1, 9.9.2, 9.10.1, 13.4

## Special Inspections and Testing

4.2.6, 12.2.1, 13.4

## Specifications, Definition of

1.1.6

## Specifications

1.1.1, 1.1.6, 1.2.2, 1.5, 3.12.10, 3.17, 4.2.14

## Statute of Limitations

15.1.2, 15.4.1.1

## Stopping the Work

2.2.2, 2.4, 9.7, 10.3, 14.1

## Stored Materials

6.2.1, 9.3.2, 10.2.1.2, 10.2.4

## Subcontractor, Definition of

5.1.1

## SUBCONTRACTORS

5

## Subcontractors, Work by

1.2.2, 3.3.2, 3.12.1, 3.18, 4.2.3, 5.2.3, 5.3, 5.4, 9.3.1.2, 9.6.7

## Subcontractual Relations

5.3, 5.4, 9.3.1.2, 9.6, 9.10, 10.2.1, 14.1, 14.2.1

## Submittals

3.10, 3.11, 3.12, 4.2.7, 5.2.1, 5.2.3, 7.3.4, 9.2, 9.3, 9.8, 9.9.1, 9.10.2, 9.10.3

## Submittal Schedule

3.10.2, 3.12.5, 4.2.7

## Subrogation, Waivers of

6.1.1, 11.3

## Substances, Hazardous

10.3

## Substantial Completion

4.2.9, 8.1.1, 8.1.3, 8.2.3, 9.4.2, 9.8, 9.9.1, 9.10.3, 12.2, 15.1.2

## Substantial Completion, Definition of

9.8.1

## Substitution of Subcontractors

5.2.3, 5.2.4

## Substitution of Architect

2.3.3

## Substitutions of Materials

3.4.2, 3.5, 7.3.8

## Sub-subcontractor, Definition of

5.1.2

## Subsurface Conditions

3.7.4

## Successors and Assigns

13.2

## Superintendent

3.9, 10.2.6

## Supervision and Construction Procedures

1.2.2, 3.3, 3.4, 3.12.10, 4.2.2, 4.2.7, 6.1.3, 6.2.4, 7.1.3, 7.3.4, 8.2, 8.3.1, 9.4.2, 10, 12, 14, 15.1.4



## Suppliers

1.5, 3.12.1, 4.2.4, 4.2.6, 5.2.1, 9.3, 9.4.2, 9.5.4, 9.6, 9.10.5, 14.2.1

## Surety

5.4.1.2, 9.6.8, 9.8.5, 9.10.2, 9.10.3, 11.1.2, 14.2.2, 15.2.7

## Surety, Consent of

9.8.5, 9.10.2, 9.10.3

## Surveys

1.1.7, 2.3.4

## Suspension by the Owner for Convenience

### 14.3

#### Suspension of the Work

3.7.5, 5.4.2, 14.3

#### Suspension or Termination of the Contract

5.4.1.1, 14

## Taxes

3.6, 3.8.2.1, 7.3.4.4

## Termination by the Contractor

14.1, 15.1.7

## Termination by the Owner for Cause

5.4.1.1, 14.2, 15.1.7

## Termination by the Owner for Convenience

### 14.4

#### Termination of the Architect

2.3.3

#### Termination of the Contractor Employment

14.2.2

## TERMINATION OR SUSPENSION OF THE CONTRACT

### 14

#### Tests and Inspections

3.1.3, 3.3.3, 3.7.1, 4.2.2, 4.2.6, 4.2.9, 9.4.2, 9.8.3, 9.9.2, 9.10.1, 10.3.2, 12.2.1, 13.4

## TIME

### 8

#### Time, Delays and Extensions of

3.2.4, 3.7.4, 5.2.3, 7.2.1, 7.3.1, 7.4, 8.3, 9.5.1, 9.7, 10.3.2, 10.4, 14.3.2, 15.1.6, 15.2.5

#### Time Limits

2.1.2, 2.2, 2.5, 3.2.2, 3.10, 3.11, 3.12.5, 3.15.1, 4.2, 5.2, 5.3, 5.4, 6.2.4, 7.3, 7.4, 8.2, 9.2, 9.3.1, 9.3.3, 9.4.1, 9.5, 9.6, 9.7, 9.8, 9.9, 9.10, 12.2, 13.4, 14, 15.1.2, 15.1.3, 15.4

## Time Limits on Claims

3.7.4, 10.2.8, 15.1.2, 15.1.3

## Title to Work

9.3.2, 9.3.3

## UNCOVERING AND CORRECTION OF WORK

### 12

#### Uncovering of Work

##### 12.1

#### Unforeseen Conditions, Concealed or Unknown

3.7.4, 8.3.1, 10.3

#### Unit Prices

7.3.3.2, 9.1.2

#### Use of Documents

1.1.1, 1.5, 2.3.6, 3.12.6, 5.3

## Use of Site

3.13, 6.1.1, 6.2.1

## Values, Schedule of

9.2, 9.3.1

#### Waiver of Claims by the Architect

13.3.2

#### Waiver of Claims by the Contractor

9.10.5, 13.3.2, 15.1.7

#### Waiver of Claims by the Owner

9.9.3, 9.10.3, 9.10.4, 12.2.2.1, 13.3.2, 14.2.4, 15.1.7

#### Waiver of Consequential Damages

14.2.4, 15.1.7

#### Waiver of Liens

9.3, 9.10.2, 9.10.4

## Waivers of Subrogation

6.1.1, 11.3

## Warranty

3.5, 4.2.9, 9.3.3, 9.8.4, 9.9.1, 9.10.2, 9.10.4, 12.2.2, 15.1.2

#### Weather Delays

8.3, 15.1.6.2

#### Work, Definition of

##### 1.1.3

#### Written Consent

1.5.2, 3.4.2, 3.7.4, 3.12.8, 3.14.2, 4.1.2, 9.3.2, 9.10.3, 13.2, 13.3.2, 15.4.4.2

#### Written Interpretations

4.2.11, 4.2.12

#### Written Orders

1.1.1, 2.4, 3.9, 7, 8.2.2, 12.1, 12.2, 13.4.2, 14.3.1

## **ARTICLE 1 GENERAL PROVISIONS**

### **§ 1.1 Basic Definitions**

#### **§ 1.1.1 The Contract Documents**

The Contract Documents are enumerated in the Agreement between the Owner and Contractor (hereinafter the Agreement) and consist of the Agreement, Conditions of the Contract (General, Supplementary and other Conditions), Drawings, Specifications, Addenda issued prior to execution of the Contract, other documents listed in the Agreement, and Modifications issued after execution of the Contract. A Modification is (1) a written amendment to the Contract signed by both parties, (2) a Change Order, (3) a Construction Change Directive, or (4) a written order for a minor change in the Work issued by the Architect.

#### **§ 1.1.2 The Contract**

The Contract Documents form the Contract for Construction. The Contract represents the entire and integrated agreement between the parties hereto and supersedes prior negotiations, representations, or agreements, either written or oral. The Contract may be amended or modified only by a Modification. The Contract Documents shall not be construed to create a contractual relationship of any kind (1) between the Contractor and the Architect or the Architect's consultants, (2) between the Owner and a Subcontractor or a Sub-subcontractor, (3) between the Owner and the Architect or the Architect's consultants, or (4) between any persons or entities other than the Owner and the Contractor. The Architect shall, however, be entitled to performance and enforcement of obligations under the Contract intended to facilitate performance of the Architect's duties. There are no intended third-party beneficiaries to the Agreement.

#### **§ 1.1.3 The Work**

The term "Work" means the construction and services required by the Contract Documents, whether completed or partially completed, and includes all other labor, materials, equipment, and services provided or to be provided by the Contractor to fulfill the Contractor's obligations. The Work may constitute the whole or a part of the Project.

#### **§ 1.1.4 The Project**

The Project is the total construction of which the Work performed under the Contract Documents may be the whole or a part and which may include construction by the Owner and by Separate Contractors.

#### **§ 1.1.5 The Drawings**

The Drawings are the graphic and pictorial portions of the Contract Documents showing the design, location and dimensions of the Work, generally including plans, elevations, sections, details, schedules, and diagrams.

#### **§ 1.1.6 The Specifications**

The Specifications are that portion of the Contract Documents consisting of the written requirements for materials, equipment, systems, standards and workmanship for the Work, and performance of related services.

#### **§ 1.1.7 Instruments of Service**

Instruments of Service are representations, in any medium of expression now known or later developed, of the tangible and intangible creative work performed by the Architect and the Architect's consultants under their respective professional services agreements. Instruments of Service may include, without limitation, studies, surveys, models, sketches, drawings, specifications, and other similar materials.

#### **§ 1.1.8 Initial Decision Maker**

The Initial Decision Maker is the person identified in the Agreement to render initial decisions on Claims in accordance with Section 15.2. The Initial Decision Maker shall not show partiality to the Owner or Contractor and shall not be liable for results of interpretations or decisions rendered in good faith.

### **§ 1.2 Correlation and Intent of the Contract Documents**

**§ 1.2.1** The intent of the Contract Documents is to include all items necessary for the proper execution and completion of the Work by the Contractor. The Contract Documents are complementary, and what is required by one shall be as binding as if required by all; performance by the Contractor shall be required only to the extent consistent with the Contract Documents and reasonably inferable from them as being necessary to produce the indicated results.

**§ 1.2.1.1** The invalidity of any provision of the Contract Documents shall not invalidate the Contract or its remaining provisions. If it is determined that any provision of the Contract Documents violates any law, or is otherwise invalid or unenforceable, then that provision shall be revised to the extent necessary to make that provision legal and



enforceable. In such case the Contract Documents shall be construed, to the fullest extent permitted by law, to give effect to the parties' intentions and purposes in executing the Contract.

**§ 1.2.2** Organization of the Specifications into divisions, sections and articles, and arrangement of Drawings shall not control the Contractor in dividing the Work among Subcontractors or in establishing the extent of Work to be performed by any trade.

**§ 1.2.3** Unless otherwise stated in the Contract Documents, words that have well-known technical or construction industry meanings are used in the Contract Documents in accordance with such recognized meanings.

### **§ 1.3 Capitalization**

Terms capitalized in these General Conditions include those that are (1) specifically defined, (2) the titles of numbered articles, or (3) the titles of other documents published by the American Institute of Architects.

### **§ 1.4 Interpretation**

In the interest of brevity the Contract Documents frequently omit modifying words such as "all" and "any" and articles such as "the" and "an," but the fact that a modifier or an article is absent from one statement and appears in another is not intended to affect the interpretation of either statement.

### **§ 1.5 Ownership and Use of Drawings, Specifications, and Other Instruments of Service**

**§ 1.5.1** The Architect and the Architect's consultants shall be deemed the authors and owners of their respective Instruments of Service, including the Drawings and Specifications, and retain all common law, statutory, and other reserved rights in their Instruments of Service, including copyrights. The Contractor, Subcontractors, Sub-subcontractors, and suppliers shall not own or claim a copyright in the Instruments of Service. Submittal or distribution to meet official regulatory requirements or for other purposes in connection with the Project is not to be construed as publication in derogation of the Architect's or Architect's consultants' reserved rights.

**§ 1.5.2** The Contractor, Subcontractors, Sub-subcontractors, and suppliers are authorized to use and reproduce the Instruments of Service provided to them, subject to any protocols established pursuant to Sections 1.7 and 1.8, solely and exclusively for execution of the Work. All copies made under this authorization shall bear the copyright notice, if any, shown on the Instruments of Service. The Contractor, Subcontractors, Sub-subcontractors, and suppliers may not use the Instruments of Service on other projects or for additions to the Project outside the scope of the Work without the specific written consent of the Owner, Architect, and the Architect's consultants.

### **§ 1.6 Notice**

**§ 1.6.1** Except as otherwise provided in Section 1.6.2, where the Contract Documents require one party to notify or give notice to the other party, such notice shall be provided in writing to the designated representative of the party to whom the notice is addressed and shall be deemed to have been duly served if delivered in person, by mail, by courier, or by electronic transmission if a method for electronic transmission is set forth in the Agreement.

**§ 1.6.2** Notice of Claims as provided in Section 15.1.3 shall be provided in writing and shall be deemed to have been duly served only if delivered to the designated representative of the party to whom the notice is addressed by certified or registered mail, or by courier providing proof of delivery.

### **§ 1.7 Digital Data Use and Transmission**

The parties shall agree upon protocols governing the transmission and use of Instruments of Service or any other information or documentation in digital form. The parties will use AIA Document E203™-2013, Building Information Modeling and Digital Data Exhibit, to establish the protocols for the development, use, transmission, and exchange of digital data.

### **§ 1.8 Building Information Models Use and Reliance**

Any use of, or reliance on, all or a portion of a building information model without agreement to protocols governing the use of, and reliance on, the information contained in the model and without having those protocols set forth in AIA Document E203™-2013, Building Information Modeling and Digital Data Exhibit, and the requisite AIA Document G202™-2013, Project Building Information Modeling Protocol Form, shall be at the using or relying party's sole risk and without liability to the other party and its contractors or consultants, the authors of, or contributors to, the building information model, and each of their agents and employees.

## ARTICLE 2 OWNER

### § 2.1 General

§ 2.1.1 The Owner is the person or entity identified as such in the Agreement and is referred to throughout the Contract Documents as if singular in number. The Owner shall designate in writing a representative who shall have express authority to bind the Owner with respect to all matters requiring the Owner's approval or authorization. Except as otherwise provided in Section 4.2.1, the Architect does not have such authority. The term "Owner" means the Owner or the Owner's authorized representative.

### § 2.3 Information and Services Required of the Owner

§ 2.3.1 Except for permits and fees that are the responsibility of the Contractor under the Contract Documents, including those required under Section 3.7.1, the Owner shall secure and pay for necessary approvals, easements, assessments and charges required for construction, use or occupancy of permanent structures or for permanent changes in existing facilities.

§ 2.3.2 The Owner shall retain an architect lawfully licensed to practice architecture, or an entity lawfully practicing architecture, in the jurisdiction where the Project is located. That person or entity is identified as the Architect in the Agreement and is referred to throughout the Contract Documents as if singular in number.

§ 2.3.3 If the employment of the Architect terminates, the Owner shall employ a successor to whom the Contractor has no reasonable objection and whose status under the Contract Documents shall be that of the Architect.

§ 2.3.4 The Owner shall furnish surveys describing physical characteristics, legal limitations and utility locations for the site of the Project, and a legal description of the site. The Contractor shall be entitled to rely on the accuracy of information furnished by the Owner but shall exercise proper precautions relating to the safe performance of the Work. Contractor shall conduct its own due diligence and familiarize itself with the site(s) where the Work will be performed.

§ 2.3.5 The Owner shall furnish information or services required of the Owner by the Contract Documents with reasonable promptness. The Owner shall also furnish any other information or services under the Owner's control and relevant to the Contractor's performance of the Work with reasonable promptness after receiving the Contractor's written request for such information or services.

§ 2.3.6 Unless otherwise provided in the Contract Documents, the Owner shall furnish to the Contractor one copy of the Contract Documents for purposes of making reproductions pursuant to Section 1.5.2.

### § 2.4 Owner's Right to Stop the Work

If the Contractor fails to correct Work that is not in accordance with the requirements of the Contract Documents as required by Section 12.2 or repeatedly fails to carry out Work in accordance with the Contract Documents, the Owner may issue a written order to the Contractor to stop the Work, or any portion thereof, until the cause for such order has been eliminated; however, the right of the Owner to stop the Work shall not give rise to a duty on the part of the Owner to exercise this right for the benefit of the Contractor or any other person or entity, except to the extent required by Section 6.1.3.

### § 2.5 Owner's Right to Carry Out the Work

If the Contractor defaults or neglects to carry out the Work in accordance with the Contract Documents and fails within a ten-day period after receipt of notice from the Owner to commence and continue correction of such default or neglect with diligence and promptness, the Owner may, without prejudice to other remedies the Owner may have, correct such default or neglect. Such action by the Owner and amounts charged to the Contractor are both subject to prior approval of the Architect and the Architect may, pursuant to Section 9.5.1, withhold or nullify a Certificate for Payment in whole or in part, to the extent reasonably necessary to reimburse the Owner for the reasonable cost of correcting such deficiencies, including Owner's expenses and compensation for the Architect's additional services made necessary by such default, neglect, or failure. If current and future payments are not sufficient to cover such amounts, the Contractor shall pay the difference to the Owner. If the Contractor disagrees with the actions of the Owner or the Architect, or the amounts claimed as costs to the Owner, the Contractor may file a Claim pursuant to Article 15.

## **ARTICLE 3 CONTRACTOR**

### **§ 3.1 General**

**§ 3.1.1** The Contractor is the person or entity identified as such in the Agreement and is referred to throughout the Contract Documents as if singular in number. The Contractor shall be lawfully licensed, if required in the jurisdiction where the Project is located. The Contractor shall designate in writing a representative who shall have express authority to bind the Contractor with respect to all matters under this Contract. The term “Contractor” means the Contractor or the Contractor’s authorized representative.

**§ 3.1.2** The Contractor shall perform the Work in accordance with the Contract Documents.

**§ 3.1.3** The Contractor shall not be relieved of its obligations to perform the Work in accordance with the Contract Documents either by activities or duties of the Architect in the Architect’s administration of the Contract, or by tests, inspections or approvals required or performed by persons or entities other than the Contractor.

### **§ 3.2 Review of Contract Documents and Field Conditions by Contractor**

**§ 3.2.1** Execution of the Contract by the Contractor is a representation that the Contractor has visited the site, become generally familiar with local conditions under which the Work is to be performed, conducted its own due diligence and correlated personal observations with requirements of the Contract Documents.

**§ 3.2.2** Because the Contract Documents are complementary, the Contractor shall, before starting each portion of the Work, carefully study and compare the various Contract Documents relative to that portion of the Work, as well as the information furnished by the Owner pursuant to Section 2.3.4, shall take field measurements of any existing conditions related to that portion of the Work, and shall observe any conditions at the site affecting it. These obligations are for the purpose of facilitating coordination and construction by the Contractor and are not for the purpose of discovering errors, omissions, or inconsistencies in the Contract Documents; however, the Contractor shall promptly report to the Architect any errors, inconsistencies or omissions discovered by or made known to the Contractor as a request for information in such form as the Architect may require. It is recognized that the Contractor’s review is made in the Contractor’s capacity as a contractor and not as a licensed design professional, unless otherwise specifically provided in the Contract Documents.

**§ 3.2.3** The Contractor is not required to ascertain that the Contract Documents are in accordance with applicable laws, statutes, ordinances, codes, rules and regulations, or lawful orders of public authorities, but the Contractor shall promptly report to the Architect any nonconformity discovered by or made known to the Contractor as a request for information in such form as the Architect may require.

**§ 3.2.4** If the Contractor believes that additional cost or time is involved because of clarifications or instructions the Architect issues in response to the Contractor’s notices or requests for information pursuant to Sections 3.2.2 or 3.2.3, the Contractor shall submit Claims as provided in Article 15. If the Contractor fails to perform the obligations of Sections 3.2.2 or 3.2.3, the Contractor shall pay such costs and damages to the Owner, subject to Section 15.1.7, as would have been avoided if the Contractor had performed such obligations. If the Contractor performs those obligations, the Contractor shall not be liable to the Owner or Architect for damages resulting from errors, inconsistencies or omissions in the Contract Documents, for differences between field measurements or conditions and the Contract Documents, or for nonconformities of the Contract Documents to applicable laws, statutes, ordinances, codes, rules and regulations, and lawful orders of public authorities.

### **§ 3.3 Supervision and Construction Procedures**

**§ 3.3.1** The Contractor shall supervise and direct the Work, using the Contractor’s best skill and attention. The Contractor shall be solely responsible for, and have control over, construction means, methods, techniques, sequences, and procedures, and for coordinating all portions of the Work under the Contract. If the Contract Documents give specific instructions concerning construction means, methods, techniques, sequences, or procedures, the Contractor shall evaluate the jobsite safety thereof and shall be solely responsible for the jobsite safety of such means, methods, techniques, sequences, or procedures. If the Contractor determines that such means, methods, techniques, sequences or procedures may not be safe, the Contractor shall give timely notice to the Owner and Architect, and shall propose alternative means, methods, techniques, sequences, or procedures. The Architect shall evaluate the proposed alternative solely for conformance with the design intent for the completed construction. Unless the Architect objects to the Contractor’s proposed alternative, the Contractor shall perform the Work using its alternative means, methods, techniques, sequences, or procedures.

§ 3.3.2 The Contractor shall be responsible to the Owner for acts and omissions of the Contractor's employees, Subcontractors and their agents and employees, and other persons or entities performing portions of the Work for, or on behalf of, the Contractor or any of its Subcontractors.

§ 3.3.3 The Contractor shall be responsible for inspection of portions of Work already performed to determine that such portions are in proper condition to receive subsequent Work.

#### § 3.4 Labor and Materials

§ 3.4.1 Unless otherwise provided in the Contract Documents, the Contractor shall provide and pay for labor, materials, equipment, tools, construction equipment and machinery, water, heat, utilities, transportation, and other facilities and services necessary for proper execution and completion of the Work, whether temporary or permanent and whether or not incorporated or to be incorporated in the Work.

§ 3.4.2 Except in the case of minor changes in the Work approved by the Architect in accordance with Section 3.12.8 or ordered by the Architect in accordance with Section 7.4, the Contractor may make substitutions only with the consent of the Owner, after evaluation by the Architect and in accordance with a Change Order or Construction Change Directive.

§ 3.4.3 The Contractor shall enforce strict discipline and good order among the Contractor's employees and other persons carrying out the Work. The Contractor shall not permit employment of unfit persons or persons not properly skilled in tasks assigned to them.

§ 3.4.4 The Contractor shall pay prevailing wages and require all subcontractor to pay prevailing wage rates in accordance with Connecticut law.

#### § 3.5 Warranty

§ 3.5.1 The Contractor warrants to the Owner and Architect that materials and equipment furnished under the Contract will be of good quality and new unless the Contract Documents require or permit otherwise. The Contractor further warrants that the Work will conform to the requirements of the Contract Documents and will be free from defects, except for those inherent in the quality of the Work the Contract Documents require or permit. Work, materials, or equipment not conforming to these requirements may be considered defective. The Contractor's warranty excludes remedy for damage or defect caused by abuse, alterations to the Work not executed by the Contractor, improper or insufficient maintenance, improper operation, or normal wear and tear and normal usage. If required by the Architect, the Contractor shall furnish satisfactory evidence as to the kind and quality of materials and equipment.

§ 3.5.2 All material, equipment, or other special warranties required by the Contract Documents shall be issued in the name of the Owner, or shall be transferable to the Owner, and shall commence in accordance with Section 9.8.4.

#### § 3.6 Taxes

The Contractor shall pay sales, consumer, use and similar taxes for the Work provided by the Contractor that are legally enacted when bids are received or negotiations concluded, whether or not yet effective or merely scheduled to go into effect. The Town of Berlin is exempt from the payment of Connecticut sales tax.

#### § 3.7 Permits, Fees, Notices and Compliance with Laws

§ 3.7.1 Unless otherwise provided in the Contract Documents, the Contractor shall secure and pay for the building permit as well as for other permits, fees, licenses, and inspections by government agencies necessary for proper execution and completion of the Work that are customarily secured after execution of the Contract and legally required at the time bids are received or negotiations concluded.

§ 3.7.2 The Contractor shall comply with and give notices required by applicable laws, statutes, ordinances, codes, rules and regulations, and lawful orders of public authorities applicable to performance of the Work.

§ 3.7.3 If the Contractor performs Work knowing it to be contrary to applicable laws, statutes, ordinances, codes, rules and regulations, or lawful orders of public authorities, the Contractor shall assume appropriate responsibility for such Work and shall bear the costs attributable to correction.

#### **§ 3.7.4 Concealed or Unknown Conditions**

If the Contractor encounters conditions at the site that are (1) subsurface or otherwise concealed physical conditions that differ materially from those indicated in the Contract Documents or (2) unknown physical conditions of an unusual nature that differ materially from those ordinarily found to exist and generally recognized as inherent in construction activities of the character provided for in the Contract Documents, the Contractor shall promptly provide notice to the Owner and the Architect before conditions are disturbed and in no event later than 14 days after first observance of the conditions. The Architect will promptly investigate such conditions and, if the Architect determines that they differ materially and cause an increase or decrease in the Contractor's cost of, or time required for, performance of any part of the Work, will recommend that an equitable adjustment be made in the Contract Sum or Contract Time, or both. If the Architect determines that the conditions at the site are not materially different from those indicated in the Contract Documents and that no change in the terms of the Contract is justified, the Architect shall promptly notify the Owner and Contractor, stating the reasons. If either party disputes the Architect's determination or recommendation, that party may submit a Claim as provided in Article 15. Failure to provide notice within the time period and in the form required herein shall constitute a knowing waiver of claim by Contractor.

**§ 3.7.5** If, in the course of the Work, the Contractor encounters human remains or recognizes the existence of burial markers, archaeological sites or wetlands not indicated in the Contract Documents, the Contractor shall immediately suspend any operations that would affect them and shall notify the Owner and Architect. Upon receipt of such notice, the Owner shall promptly take any action necessary to obtain governmental authorization required to resume the operations. The Contractor shall continue to suspend such operations until otherwise instructed by the Owner but shall continue with all other operations that do not affect those remains or features. Requests for adjustments in the Contract Sum and Contract Time arising from the existence of such remains or features may be made as provided in Article 15.

#### **§ 3.8 Allowances**

**§ 3.8.1** The Contractor shall include in the Contract Sum all allowances stated in the Contract Documents. Items covered by allowances shall be supplied for such amounts and by such persons or entities as the Owner may direct, but the Contractor shall not be required to employ persons or entities to whom the Contractor has reasonable objection.

**§ 3.8.2** Unless otherwise provided in the Contract Documents,

- .1 allowances shall cover the cost to the Contractor of materials and equipment delivered at the site and all required taxes, less applicable trade discounts;
- .2 Contractor's costs for unloading and handling at the site, labor, installation costs, overhead, profit, and other expenses contemplated for stated allowance amounts shall be included in the Contract Sum but not in the allowances; and
- .3 whenever costs are more than or less than allowances, the Contract Sum shall be adjusted accordingly by Change Order. The amount of the Change Order shall reflect (1) the difference between actual costs and the allowances under Section 3.8.2.1 and (2) changes in Contractor's costs under Section 3.8.2.2.

**§ 3.8.3** Materials and equipment under an allowance shall be selected by the Owner with reasonable promptness.

#### **§ 3.9 Superintendent**

**§ 3.9.1** The Contractor shall employ a competent superintendent and necessary assistants who shall be in attendance at the Project site during performance of the Work. The superintendent shall represent the Contractor, and communications given to the superintendent shall be as binding as if given to the Contractor.

**§ 3.9.2** The Contractor, as soon as practicable after award of the Contract, shall notify the Owner and Architect of the name and qualifications of a proposed superintendent. Within 14 days of receipt of the information, the Architect may notify the Contractor, stating whether the Owner or the Architect (1) has reasonable objection to the proposed superintendent or (2) requires additional time for review. Failure of the Architect to provide notice within the 14-day period shall constitute notice of no reasonable objection.

**§ 3.9.3** The Contractor shall not employ a proposed superintendent to whom the Owner or Architect has made reasonable and timely objection. The Contractor shall not change the superintendent without the Owner's consent, which shall not unreasonably be withheld or delayed.



### **§ 3.10 Contractor's Construction and Submittal Schedules**

**§ 3.10.1** The Contractor, promptly after being awarded the Contract, shall submit for the Owner's and Architect's information a Contractor's construction schedule for the Work. The schedule shall contain detail appropriate for the Project, including (1) the date of commencement of the Work, interim schedule milestone dates, and the date of Substantial Completion; (2) an apportionment of the Work by construction activity; and (3) the time required for completion of each portion of the Work. The schedule shall provide for the orderly progression of the Work to completion and shall not exceed time limits current under the Contract Documents. The schedule shall be revised at appropriate intervals as required by the conditions of the Work and Project.

**§ 3.10.2** The Contractor, promptly after being awarded the Contract and thereafter as necessary to maintain a current submittal schedule, shall submit a submittal schedule for the Architect's approval. The Architect's approval shall not be unreasonably delayed or withheld. The submittal schedule shall (1) be coordinated with the Contractor's construction schedule, and (2) allow the Architect reasonable time to review submittals. If the Contractor fails to submit a submittal schedule, or fails to provide submittals in accordance with the approved submittal schedule, the Contractor shall not be entitled to any increase in Contract Sum or extension of Contract Time based on the time required for review of submittals.

**§ 3.10.3** The Contractor shall perform the Work in general accordance with the most recent schedules submitted to the Owner and Architect.

### **§ 3.11 Documents and Samples at the Site**

The Contractor shall make available, at the Project site, the Contract Documents, including Change Orders, Construction Change Directives, and other Modifications, in good order and marked currently to indicate field changes and selections made during construction, and the approved Shop Drawings, Product Data, Samples, and similar required submittals. These shall be in electronic form or paper copy, available to the Architect and Owner, and delivered to the Architect for submittal to the Owner upon completion of the Work as a record of the Work as constructed.

### **§ 3.12 Shop Drawings, Product Data and Samples**

**§ 3.12.1** Shop Drawings are drawings, diagrams, schedules, and other data specially prepared for the Work by the Contractor or a Subcontractor, Sub-subcontractor, manufacturer, supplier, or distributor to illustrate some portion of the Work.

**§ 3.12.2** Product Data are illustrations, standard schedules, performance charts, instructions, brochures, diagrams, and other information furnished by the Contractor to illustrate materials or equipment for some portion of the Work.

**§ 3.12.3** Samples are physical examples that illustrate materials, equipment, or workmanship, and establish standards by which the Work will be judged.

**§ 3.12.4** Shop Drawings, Product Data, Samples, and similar submittals are not Contract Documents. Their purpose is to demonstrate how the Contractor proposes to conform to the information given and the design concept expressed in the Contract Documents for those portions of the Work for which the Contract Documents require submittals. Review by the Architect is subject to the limitations of Section 4.2.7. Informational submittals upon which the Architect is not expected to take responsive action may be so identified in the Contract Documents. Submittals that are not required by the Contract Documents may be returned by the Architect without action.

**§ 3.12.5** The Contractor shall review for compliance with the Contract Documents, approve, and submit to the Architect, Shop Drawings, Product Data, Samples, and similar submittals required by the Contract Documents, in accordance with the submittal schedule approved by the Architect or, in the absence of an approved submittal schedule, with reasonable promptness and in such sequence as to cause no delay in the Work or in the activities of the Owner or of Separate Contractors.

**§ 3.12.6** By submitting Shop Drawings, Product Data, Samples, and similar submittals, the Contractor represents to the Owner and Architect that the Contractor has (1) reviewed and approved them, (2) determined and verified materials, field measurements and field construction criteria related thereto, or will do so, and (3) checked and coordinated the information contained within such submittals with the requirements of the Work and of the Contract Documents.

§ 3.12.7 The Contractor shall perform no portion of the Work for which the Contract Documents require submittal and review of Shop Drawings, Product Data, Samples, or similar submittals, until the respective submittal has been approved by the Architect.

§ 3.12.8 The Work shall be in accordance with approved submittals except that the Contractor shall not be relieved of responsibility for deviations from the requirements of the Contract Documents by the Architect's approval of Shop Drawings, Product Data, Samples, or similar submittals, unless the Contractor has specifically notified the Architect of such deviation at the time of submittal and (1) the Architect has given written approval to the specific deviation as a minor change in the Work, or (2) a Change Order or Construction Change Directive has been issued authorizing the deviation. The Contractor shall not be relieved of responsibility for errors or omissions in Shop Drawings, Product Data, Samples, or similar submittals, by the Architect's approval thereof.

§ 3.12.9 The Contractor shall direct specific attention, in writing or on resubmitted Shop Drawings, Product Data, Samples, or similar submittals, to revisions other than those requested by the Architect on previous submittals. In the absence of such notice, the Architect's approval of a resubmission shall not apply to such revisions.

§ 3.12.10 The Contractor shall not be required to provide professional services that constitute the practice of architecture or engineering unless such services are specifically required by the Contract Documents for a portion of the Work or unless the Contractor needs to provide such services in order to carry out the Contractor's responsibilities for construction means, methods, techniques, sequences, and procedures. The Contractor shall not be required to provide professional services in violation of applicable law.

§ 3.12.10.1 If professional design services or certifications by a design professional related to systems, materials, or equipment are specifically required of the Contractor by the Contract Documents, the Owner and the Architect will specify all performance and design criteria that such services must satisfy. The Contractor shall be entitled to rely upon the adequacy and accuracy of the performance and design criteria provided in the Contract Documents. The Contractor shall cause such services or certifications to be provided by an appropriately licensed design professional, whose signature and seal shall appear on all drawings, calculations, specifications, certifications, Shop Drawings, and other submittals prepared by such professional. Shop Drawings, and other submittals related to the Work, designed or certified by such professional, if prepared by others, shall bear such professional's written approval when submitted to the Architect. The Owner and the Architect shall be entitled to rely upon the adequacy and accuracy of the services, certifications, and approvals performed or provided by such design professionals, provided the Owner and Architect have specified to the Contractor the performance and design criteria that such services must satisfy. Pursuant to this Section 3.12.10, the Architect will review and approve or take other appropriate action on submittals only for the limited purpose of checking for conformance with information given and the design concept expressed in the Contract Documents.

§ 3.12.10.2 If the Contract Documents require the Contractor's design professional to certify that the Work has been performed in accordance with the design criteria, the Contractor shall furnish such certifications to the Architect at the time and in the form specified by the Architect.

### § 3.13 Use of Site

The Contractor shall confine operations at the site to areas permitted by applicable laws, statutes, ordinances, codes, rules and regulations, lawful orders of public authorities, and the Contract Documents and shall not unreasonably encumber the site with materials or equipment.

### § 3.14 Cutting and Patching

§ 3.14.1 The Contractor shall be responsible for cutting, fitting, or patching required to complete the Work or to make its parts fit together properly. All areas requiring cutting, fitting, or patching shall be restored to the condition existing prior to the cutting, fitting, or patching, unless otherwise required by the Contract Documents.

§ 3.14.2 The Contractor shall not damage or endanger a portion of the Work or fully or partially completed construction of the Owner or Separate Contractors by cutting, patching, or otherwise altering such construction, or by excavation. The Contractor shall not cut or otherwise alter construction by the Owner or a Separate Contractor except with written consent of the Owner and of the Separate Contractor. Consent shall not be unreasonably withheld. The Contractor shall not unreasonably withhold, from the Owner or a Separate Contractor, its consent to cutting or otherwise altering the Work.

### **§ 3.15 Cleaning Up**

**§ 3.15.1** The Contractor shall keep the premises and surrounding area free from accumulation of waste materials and rubbish caused by operations under the Contract. At completion of the Work, the Contractor shall remove waste materials, rubbish, the Contractor's tools, construction equipment, machinery, and surplus materials from and about the Project.

**§ 3.15.2** If the Contractor fails to clean up as provided in the Contract Documents, the Owner may do so and the Owner shall be entitled to reimbursement from the Contractor.

### **§ 3.16 Access to Work**

The Contractor shall provide the Owner and Architect with access to the Work in preparation and progress wherever located.

### **§ 3.17 Royalties, Patents and Copyrights**

The Contractor shall pay all royalties and license fees. The Contractor shall defend suits or claims for infringement of copyrights and patent rights and shall hold the Owner and Architect harmless from loss on account thereof, but shall not be responsible for defense or loss when a particular design, process, or product of a particular manufacturer or manufacturers is required by the Contract Documents, or where the copyright violations are contained in Drawings, Specifications, or other documents prepared by the Owner or Architect. However, if an infringement of a copyright or patent is discovered by, or made known to, the Contractor, the Contractor shall be responsible for the loss unless the information is promptly furnished to the Architect.

### **§ 3.18 Indemnification**

**§ 3.18.1** To the fullest extent permitted by law, the Contractor shall indemnify, defend and hold harmless the Owner, Architect, Architect's consultants, and agents and employees of any of them from and against claims, damages, losses, and expenses, including but not limited to attorneys' fees, arising out of or resulting from performance of the Work, provided that such claim, damage, loss, or expense is attributable to bodily injury, sickness, disease or death, or to injury to or destruction of tangible property (other than the Work itself), but only to the extent caused by the negligent acts or omissions of the Contractor, a Subcontractor, anyone directly or indirectly employed by them, or anyone for whose acts they may be liable, regardless of whether or not such claim, damage, loss, or expense is caused in part by a party indemnified hereunder. Such obligation shall not be construed to negate, abridge, or reduce other rights or obligations of indemnity that would otherwise exist as to a party or person described in this Section 3.18.

**§ 3.18.2** In claims against any person or entity indemnified under this Section 3.18 by an employee of the Contractor, a Subcontractor, anyone directly or indirectly employed by them, or anyone for whose acts they may be liable, the indemnification obligation under Section 3.18.1 shall not be limited by a limitation on amount or type of damages, compensation, or benefits payable by or for the Contractor or a Subcontractor under workers' compensation acts, disability benefit acts, or other employee benefit acts.

## **ARTICLE 4 ARCHITECT**

### **§ 4.1 General**

**§ 4.1.1** The Architect is the person or entity retained by the Owner pursuant to Section 2.3.2 and identified as such in the Agreement.

**§ 4.1.2** Duties, responsibilities, and limitations of authority of the Architect as set forth in the Contract Documents shall not be restricted, modified, or extended without written consent of the Owner, Contractor, and Architect. Consent shall not be unreasonably withheld.

### **§ 4.2 Administration of the Contract**

**§ 4.2.1** The Architect will provide administration of the Contract as described in the Contract Documents and will be an Owner's representative during construction until the date the Architect issues the final Certificate for Payment. The Architect will have authority to act on behalf of the Owner only to the extent provided in the Contract Documents.

**§ 4.2.2** The Architect will visit the site at intervals appropriate to the stage of construction, or as otherwise agreed with the Owner, to become generally familiar with the progress and quality of the portion of the Work completed, and to determine in general if the Work observed is being performed in a manner indicating that the Work, when



fully completed, will be in accordance with the Contract Documents. However, the Architect will not be required to make exhaustive or continuous on-site inspections to check the quality or quantity of the Work. The Architect will not have control over, charge of, or responsibility for the construction means, methods, techniques, sequences or procedures, or for the safety precautions and programs in connection with the Work, since these are solely the Contractor's rights and responsibilities under the Contract Documents.

**§ 4.2.3** On the basis of the site visits, the Architect will keep the Owner reasonably informed about the progress and quality of the portion of the Work completed, and promptly report to the Owner (1) known deviations from the Contract Documents, (2) known deviations from the most recent construction schedule submitted by the Contractor, and (3) defects and deficiencies observed in the Work. The Architect will not be responsible for the Contractor's failure to perform the Work in accordance with the requirements of the Contract Documents. The Architect will not have control over or charge of, and will not be responsible for acts or omissions of, the Contractor, Subcontractors, or their agents or employees, or any other persons or entities performing portions of the Work.

#### **§ 4.2.4 Communications**

The Owner and Contractor shall include the Architect in all communications that relate to or affect the Architect's services or professional responsibilities. The Owner shall promptly notify the Architect of the substance of any direct communications between the Owner and the Contractor otherwise relating to the Project. Communications by and with the Architect's consultants shall be through the Architect. Communications by and with Subcontractors and suppliers shall be through the Contractor. Communications by and with Separate Contractors shall be through the Owner. The Contract Documents may specify other communication protocols.

**§ 4.2.5** Based on the Architect's evaluations of the Contractor's Applications for Payment, the Architect will review and certify the amounts due the Contractor and will issue Certificates for Payment in such amounts.

**§ 4.2.6** The Architect has authority to reject Work that does not conform to the Contract Documents. Whenever the Architect considers it necessary or advisable, the Architect will have authority to require inspection or testing of the Work in accordance with Sections 13.4.2 and 13.4.3, whether or not the Work is fabricated, installed or completed. However, neither this authority of the Architect nor a decision made in good faith either to exercise or not to exercise such authority shall give rise to a duty or responsibility of the Architect to the Contractor, Subcontractors, suppliers, their agents or employees, or other persons or entities performing portions of the Work.

**§ 4.2.7** The Architect will review and approve, or take other appropriate action upon, the Contractor's submittals such as Shop Drawings, Product Data, and Samples, but only for the limited purpose of checking for conformance with information given and the design concept expressed in the Contract Documents. The Architect's action will be taken in accordance with the submittal schedule approved by the Architect or, in the absence of an approved submittal schedule, with reasonable promptness while allowing sufficient time in the Architect's professional judgment to permit adequate review. Review of such submittals is not conducted for the purpose of determining the accuracy and completeness of other details such as dimensions and quantities, or for substantiating instructions for installation or performance of equipment or systems, all of which remain the responsibility of the Contractor as required by the Contract Documents. The Architect's review of the Contractor's submittals shall not relieve the Contractor of the obligations under Sections 3.3, 3.5, and 3.12. The Architect's review shall not constitute approval of safety precautions or of any construction means, methods, techniques, sequences, or procedures. The Architect's approval of a specific item shall not indicate approval of an assembly of which the item is a component.

**§ 4.2.8** The Architect will prepare Change Orders and Construction Change Directives, and may order minor changes in the Work as provided in Section 7.4. The Architect will investigate and make determinations and recommendations regarding concealed and unknown conditions as provided in Section 3.7.4.

**§ 4.2.9** The Architect will conduct inspections to determine the date or dates of Substantial Completion and the date of final completion; issue Certificates of Substantial Completion pursuant to Section 9.8; receive and forward to the Owner, for the Owner's review and records, written warranties and related documents required by the Contract and assembled by the Contractor pursuant to Section 9.10; and issue a final Certificate for Payment pursuant to Section 9.10.

**§ 4.2.10** If the Owner and Architect agree, the Architect will provide one or more Project representatives to assist in carrying out the Architect's responsibilities at the site. The Owner shall notify the Contractor of any change in the duties, responsibilities and limitations of authority of the Project representatives.

§ 4.2.11 The Architect will interpret and decide matters concerning performance under, and requirements of, the Contract Documents on written request of either the Owner or Contractor. The Architect's response to such requests will be made in writing within any time limits agreed upon or otherwise with reasonable promptness.

§ 4.2.12 Interpretations and decisions of the Architect will be consistent with the intent of, and reasonably inferable from, the Contract Documents and will be in writing or in the form of drawings. When making such interpretations and decisions, the Architect will endeavor to secure faithful performance by both Owner and Contractor, will not show partiality to either, and will not be liable for results of interpretations or decisions rendered in good faith.

§ 4.2.13 The Architect's decisions on matters relating to aesthetic effect will be final if consistent with the intent expressed in the Contract Documents.

§ 4.2.14 The Architect will review and respond to requests for information about the Contract Documents. The Architect's response to such requests will be made in writing within any time limits agreed upon or otherwise with reasonable promptness. If appropriate, the Architect will prepare and issue supplemental Drawings and Specifications in response to the requests for information.

## **ARTICLE 5 SUBCONTRACTORS**

### **§ 5.1 Definitions**

§ 5.1.1 A Subcontractor is a person or entity who has a direct contract with the Contractor to perform a portion of the Work at the site. The term "Subcontractor" is referred to throughout the Contract Documents as if singular in number and means a Subcontractor or an authorized representative of the Subcontractor. The term "Subcontractor" does not include a Separate Contractor or the subcontractors of a Separate Contractor.

§ 5.1.2 A Sub-subcontractor is a person or entity who has a direct or indirect contract with a Subcontractor to perform a portion of the Work at the site. The term "Sub-subcontractor" is referred to throughout the Contract Documents as if singular in number and means a Sub-subcontractor or an authorized representative of the Sub-subcontractor.

### **§ 5.2 Award of Subcontracts and Other Contracts for Portions of the Work**

§ 5.2.1 Unless otherwise stated in the Contract Documents, the Contractor, as soon as practicable after award of the Contract, shall notify the Owner and Architect of the persons or entities proposed for each principal portion of the Work, including those who are to furnish materials or equipment fabricated to a special design. Within 14 days of receipt of the information, the Architect may notify the Contractor whether the Owner or the Architect (1) has reasonable objection to any such proposed person or entity or (2) requires additional time for review. Failure of the Architect to provide notice within the 14-day period shall constitute notice of no reasonable objection.

§ 5.2.2 The Contractor shall not contract with a proposed person or entity to whom the Owner or Architect has made reasonable and timely objection. The Contractor shall not be required to contract with anyone to whom the Contractor has made reasonable objection.

§ 5.2.3 If the Owner or Architect has reasonable objection to a person or entity proposed by the Contractor, the Contractor shall propose another to whom the Owner or Architect has no reasonable objection. If the proposed but rejected Subcontractor was reasonably capable of performing the Work, the Contract Sum and Contract Time shall be increased or decreased by the difference, if any, occasioned by such change, and an appropriate Change Order shall be issued before commencement of the substitute Subcontractor's Work. However, no increase in the Contract Sum or Contract Time shall be allowed for such change unless the Contractor has acted promptly and responsively in submitting names as required.

§ 5.2.4 The Contractor shall not substitute a Subcontractor, person, or entity for one previously selected if the Owner or Architect makes reasonable objection to such substitution.

### **§ 5.3 Subcontractual Relations**

By appropriate written agreement, the Contractor shall require each Subcontractor, to the extent of the Work to be performed by the Subcontractor, to be bound to the Contractor by terms of the Contract Documents, and to assume toward the Contractor all the obligations and responsibilities, including the responsibility for safety of the Subcontractor's Work that the Contractor, by these Contract Documents, assumes toward the Owner and Architect.

Each subcontract agreement shall preserve and protect the rights of the Owner and Architect under the Contract Documents with respect to the Work to be performed by the Subcontractor so that subcontracting thereof will not prejudice such rights, and shall allow to the Subcontractor, unless specifically provided otherwise in the subcontract agreement, the benefit of all rights, remedies, and redress against the Contractor that the Contractor, by the Contract Documents, has against the Owner. Where appropriate, the Contractor shall require each Subcontractor to enter into similar agreements with Sub-subcontractors. The Contractor shall make available to each proposed Subcontractor, prior to the execution of the subcontract agreement, copies of the Contract Documents to which the Subcontractor will be bound, and, upon written request of the Subcontractor, identify to the Subcontractor terms and conditions of the proposed subcontract agreement that may be at variance with the Contract Documents. Subcontractors will similarly make copies of applicable portions of such documents available to their respective proposed Sub-subcontractors.

#### **§ 5.4 Contingent Assignment of Subcontracts**

**§ 5.4.1** Each subcontract agreement for a portion of the Work is assigned by the Contractor to the Owner, provided that

- .1 assignment is effective only after termination of the Contract by the Owner for cause pursuant to Section 14.2 and only for those subcontract agreements that the Owner accepts by notifying the Subcontractor and Contractor; and
- .2 assignment is subject to the prior rights of the surety, if any, obligated under bond relating to the Contract.

When the Owner accepts the assignment of a subcontract agreement, the Owner assumes the Contractor's rights and obligations under the subcontract.

**§ 5.4.2** Upon such assignment, if the Work has been suspended for more than 30 days, the Subcontractor's compensation shall be equitably adjusted for increases in cost resulting from the suspension.

**§ 5.4.3** Upon assignment to the Owner under this Section 5.4, the Owner may further assign the subcontract to a successor contractor or other entity. If the Owner assigns the subcontract to a successor contractor or other entity, the Owner shall nevertheless remain legally responsible for all of the successor contractor's obligations under the subcontract.

### **ARTICLE 6 CONSTRUCTION BY OWNER OR BY SEPARATE CONTRACTORS**

#### **§ 6.1 Owner's Right to Perform Construction and to Award Separate Contracts**

**§ 6.1.1** The term "Separate Contractor(s)" shall mean other contractors retained by the Owner under separate agreements. The Owner reserves the right to perform construction or operations related to the Project with the Owner's own forces, and with Separate Contractors retained under Conditions of the Contract substantially similar to those of this Contract, including those provisions of the Conditions of the Contract related to insurance and waiver of subrogation.

**§ 6.1.2** When separate contracts are awarded for different portions of the Project or other construction or operations on the site, the term "Contractor" in the Contract Documents in each case shall mean the Contractor who executes each separate Owner-Contractor Agreement.

**§ 6.1.3** The Owner shall provide for coordination of the activities of the Owner's own forces and of each Separate Contractor with the Work of the Contractor, who shall cooperate with them. The Contractor shall participate with any Separate Contractors and the Owner in reviewing their construction schedules. The Contractor shall make any revisions to its construction schedule deemed necessary after a joint review and mutual agreement. The construction schedules shall then constitute the schedules to be used by the Contractor, Separate Contractors, and the Owner until subsequently revised.

**§ 6.1.4** Unless otherwise provided in the Contract Documents, when the Owner performs construction or operations related to the Project with the Owner's own forces or with Separate Contractors, the Owner or its Separate Contractors shall have the same obligations and rights that the Contractor has under the Conditions of the Contract, including, without excluding others, those stated in Article 3, this Article 6, and Articles 10, 11, and 12.

## **§ 6.2 Mutual Responsibility**

**§ 6.2.1** The Contractor shall afford the Owner and Separate Contractors reasonable opportunity for introduction and storage of their materials and equipment and performance of their activities, and shall connect and coordinate the Contractor's construction and operations with theirs as required by the Contract Documents.

**§ 6.2.2** If part of the Contractor's Work depends for proper execution or results upon construction or operations by the Owner or a Separate Contractor, the Contractor shall, prior to proceeding with that portion of the Work, promptly notify the Architect of apparent discrepancies or defects in the construction or operations by the Owner or Separate Contractor that would render it unsuitable for proper execution and results of the Contractor's Work. Failure of the Contractor to notify the Architect of apparent discrepancies or defects prior to proceeding with the Work shall constitute an acknowledgment that the Owner's or Separate Contractor's completed or partially completed construction is fit and proper to receive the Contractor's Work. The Contractor shall not be responsible for discrepancies or defects in the construction or operations by the Owner or Separate Contractor that are not apparent.

**§ 6.2.3** The Contractor shall reimburse the Owner for costs the Owner incurs that are payable to a Separate Contractor because of the Contractor's delays, improperly timed activities or defective construction. The Owner shall be responsible to the Contractor for costs the Contractor incurs because of a Separate Contractor's delays, improperly timed activities, damage to the Work or defective construction.

**§ 6.2.4** The Contractor shall promptly remedy damage that the Contractor wrongfully causes to completed or partially completed construction or to property of the Owner or Separate Contractor as provided in Section 10.2.5.

**§ 6.2.5** The Owner and each Separate Contractor shall have the same responsibilities for cutting and patching as are described for the Contractor in Section 3.14.

## **§ 6.3 Owner's Right to Clean Up**

If a dispute arises among the Contractor, Separate Contractors, and the Owner as to the responsibility under their respective contracts for maintaining the premises and surrounding area free from waste materials and rubbish, the Owner may clean up and the Architect will allocate the cost among those responsible.

## **ARTICLE 7 CHANGES IN THE WORK**

### **§ 7.1 General**

**§ 7.1.1** Changes in the Work may be accomplished after execution of the Contract, and without invalidating the Contract, by Change Order, Construction Change Directive or order for a minor change in the Work, subject to the limitations stated in this Article 7 and elsewhere in the Contract Documents.

**§ 7.1.2** A Change Order shall be based upon agreement among the Owner, Contractor, and Architect. A Construction Change Directive requires agreement by the Owner and Architect and may or may not be agreed to by the Contractor. An order for a minor change in the Work may be issued by the Architect alone.

**§ 7.1.3** Changes in the Work shall be performed under applicable provisions of the Contract Documents. The Contractor shall proceed promptly with changes in the Work, unless otherwise provided in the Change Order, Construction Change Directive, or order for a minor change in the Work.

### **§ 7.2 Change Orders**

**§ 7.2.1** A Change Order is a written instrument prepared by the Architect and signed by the Owner, Contractor, and Architect stating their agreement upon all of the following:

- .1 The change in the Work;
- .2 The amount of the adjustment, if any, in the Contract Sum; and
- .3 The extent of the adjustment, if any, in the Contract Time.

### **§ 7.3 Construction Change Directives**

**§ 7.3.1** A Construction Change Directive is a written order prepared by the Architect and signed by the Owner and Architect, directing a change in the Work prior to agreement on adjustment, if any, in the Contract Sum or Contract Time, or both. The Owner may by Construction Change Directive, without invalidating the Contract, order changes in the Work within the general scope of the Contract consisting of additions, deletions, or other revisions, the Contract Sum and Contract Time being adjusted accordingly.

§ 7.3.2 A Construction Change Directive shall be used in the absence of total agreement on the terms of a Change Order.

§ 7.3.3 If the Construction Change Directive provides for an adjustment to the Contract Sum, the adjustment shall be based on one of the following methods:

- .1 Mutual acceptance of a lump sum properly itemized and supported by sufficient substantiating data to permit evaluation;
- .2 Unit prices stated in the Contract Documents or subsequently agreed upon;
- .3 Cost to be determined in a manner agreed upon by the parties and a mutually acceptable fixed or percentage fee; or
- .4 As provided in Section 7.3.4.

§ 7.3.4 If the Contractor does not respond promptly or disagrees with the method for adjustment in the Contract Sum, the Architect shall determine the adjustment on the basis of reasonable expenditures and savings of those performing the Work attributable to the change, including, in case of an increase in the Contract Sum, an amount for overhead and profit as set forth in the Agreement, or if no such amount is set forth in the Agreement, a reasonable amount. In such case, and also under Section 7.3.3.3, the Contractor shall keep and present, in such form as the Architect may prescribe, an itemized accounting together with appropriate supporting data. Unless otherwise provided in the Contract Documents, costs for the purposes of this Section 7.3.4 shall be limited to the following:

- .1 Costs of labor, including applicable payroll taxes, fringe benefits required by agreement or custom, workers' compensation insurance, and other employee costs approved by the Architect;
- .2 Costs of materials, supplies, and equipment, including cost of transportation, whether incorporated or consumed;
- .3 Rental costs of machinery and equipment, exclusive of hand tools, whether rented from the Contractor or others;
- .4 Costs of premiums for all bonds and insurance, permit fees, and sales, use, or similar taxes, directly related to the change; and
- .5 Costs of supervision and field office personnel directly attributable to the change.

§ 7.3.5 If the Contractor disagrees with the adjustment in the Contract Time, the Contractor may make a Claim in accordance with applicable provisions of Article 15.

§ 7.3.6 Upon receipt of a Construction Change Directive, the Contractor shall promptly proceed with the change in the Work involved and advise the Architect of the Contractor's agreement or disagreement with the method, if any, provided in the Construction Change Directive for determining the proposed adjustment in the Contract Sum or Contract Time.

§ 7.3.7 A Construction Change Directive signed by the Contractor indicates the Contractor's agreement therewith, including adjustment in Contract Sum and Contract Time or the method for determining them. Such agreement shall be effective immediately and shall be recorded as a Change Order.

§ 7.3.8 The amount of credit to be allowed by the Contractor to the Owner for a deletion or change that results in a net decrease in the Contract Sum shall be actual net cost as confirmed by the Architect. When both additions and credits covering related Work or substitutions are involved in a change, the allowance for overhead and profit shall be figured on the basis of net increase, if any, with respect to that change.

§ 7.3.9 Pending final determination of the total cost of a Construction Change Directive to the Owner, the Contractor may request payment for Work completed under the Construction Change Directive in Applications for Payment. The Architect will make an interim determination for purposes of monthly certification for payment for those costs and certify for payment the amount that the Architect determines, in the Architect's professional judgment, to be reasonably justified. The Architect's interim determination of cost shall adjust the Contract Sum on the same basis as a Change Order, subject to the right of either party to disagree and assert a Claim in accordance with Article 15.

§ 7.3.10 When the Owner and Contractor agree with a determination made by the Architect concerning the adjustments in the Contract Sum and Contract Time, or otherwise reach agreement upon the adjustments, such agreement shall be effective immediately and the Architect will prepare a Change Order. Change Orders may be issued for all or any part of a Construction Change Directive.



## **§ 7.4 Minor Changes in the Work**

The Architect may order minor changes in the Work that are consistent with the intent of the Contract Documents and do not involve an adjustment in the Contract Sum or an extension of the Contract Time. The Architect's order for minor changes shall be in writing. If the Contractor believes that the proposed minor change in the Work will affect the Contract Sum or Contract Time, the Contractor shall notify the Architect and shall not proceed to implement the change in the Work. If the Contractor performs the Work set forth in the Architect's order for a minor change without prior notice to the Architect that such change will affect the Contract Sum or Contract Time, the Contractor waives any adjustment to the Contract Sum or extension of the Contract Time.

## **ARTICLE 8 TIME**

### **§ 8.1 Definitions**

**§ 8.1.1** Unless otherwise provided, Contract Time is the period of time, including authorized adjustments, allotted in the Contract Documents for Substantial Completion of the Work.

**§ 8.1.2** The date of commencement of the Work is the date established in the Agreement.

**§ 8.1.3** The date of Substantial Completion is the date certified by the Architect in accordance with Section 9.8.

**§ 8.1.4** The term "day" as used in the Contract Documents shall mean calendar day unless otherwise specifically defined.

### **§ 8.2 Progress and Completion**

**§ 8.2.1** Time limits stated in the Contract Documents are of the essence of the Contract. By executing the Agreement, the Contractor confirms that the Contract Time is a reasonable period for performing the Work.

**§ 8.2.2** The Contractor shall not knowingly, except by agreement or instruction of the Owner in writing, commence the Work prior to the effective date of insurance required to be furnished by the Contractor and Owner.

**§ 8.2.3** The Contractor shall proceed expeditiously with adequate forces and shall achieve Substantial Completion within the Contract Time.

### **§ 8.3 Delays and Extensions of Time**

**§ 8.3.1** If the Contractor is delayed at any time in the commencement or progress of the Work by (1) an act or neglect of the Owner or Architect, of an employee of either, or of a Separate Contractor; (2) by changes ordered in the Work; (3) by labor disputes, fire, unusual delay in deliveries, unavoidable casualties, adverse weather conditions documented in accordance with Section 15.1.6.2, or other causes beyond the Contractor's control; (4) by delay authorized by the Owner pending mediation and binding dispute resolution; or (5) by other causes that the Contractor asserts, and the Architect determines, justify delay, then the Contract Time shall be extended for such reasonable time as the Architect may determine. Under no circumstances shall Owner be responsible or liable for any delay damages, including any Eichleay or other type of extended overhead or lost profit claims or damages, idle equipment costs, lost productivity or labor inefficiency costs or lost opportunity costs. Contractor acknowledges that it was aware of and considered this provision when submitting its bid and Contractor accepts the risk of delays.

**§ 8.3.2** Claims relating to time shall be made in accordance with applicable provisions of Article 15.

**§ 8.3.3** This Section 8.3 does preclude recovery of damages for delay by either party under other provisions of the Contract Documents, except for Owner's right to recover liquidated damages in the event of Contractor's failure to achieve substantial completion by the stated date.

## **ARTICLE 9 PAYMENTS AND COMPLETION**

### **§ 9.1 Contract Sum**

**§ 9.1.1** The Contract Sum is stated in the Agreement and, including authorized adjustments, is the total amount payable by the Owner to the Contractor for performance of the Work under the Contract Documents.

§ 9.1.2 If unit prices are stated in the Contract Documents or subsequently agreed upon, and if quantities originally contemplated are materially changed so that application of such unit prices to the actual quantities causes substantial inequity to the Owner or Contractor, the applicable unit prices shall be equitably adjusted.

## § 9.2 Schedule of Values

Where the Contract is based on a stipulated sum or Guaranteed Maximum Price, the Contractor shall submit a schedule of values to the Architect before the first Application for Payment, allocating the entire Contract Sum to the various portions of the Work. The schedule of values shall be prepared in the form, and supported by the data to substantiate its accuracy, required by the Architect. This schedule, unless objected to by the Architect, shall be used as a basis for reviewing the Contractor's Applications for Payment. Any changes to the schedule of values shall be submitted to the Architect and supported by such data to substantiate its accuracy as the Architect may require, and unless objected to by the Architect, shall be used as a basis for reviewing the Contractor's subsequent Applications for Payment.

## § 9.3 Applications for Payment

§ 9.3.1 At least ten days before the date established for each progress payment, the Contractor shall submit to the Architect an itemized Application for Payment prepared in accordance with the schedule of values, if required under Section 9.2, for completed portions of the Work. The application shall be notarized, if required, and supported by all data substantiating the Contractor's right to payment that the Owner or Architect require, such as copies of requisitions, and releases and waivers of liens from Subcontractors and suppliers, and shall reflect retainage if provided for in the Contract Documents.

§ 9.3.1.1 As provided in Section 7.3.9, such applications may include requests for payment on account of changes in the Work that have been properly authorized by Construction Change Directives, or by interim determinations of the Architect, but not yet included in Change Orders.

§ 9.3.1.2 Applications for Payment shall not include requests for payment for portions of the Work for which the Contractor does not intend to pay a Subcontractor or supplier, unless such Work has been performed by others whom the Contractor intends to pay.

§ 9.3.2 Unless otherwise provided in the Contract Documents, payments shall be made on account of materials and equipment delivered and suitably stored at the site for subsequent incorporation in the Work. If approved in advance by the Owner, payment may similarly be made for materials and equipment suitably stored off the site at a location agreed upon in writing. Payment for materials and equipment stored on or off the site shall be conditioned upon compliance by the Contractor with procedures satisfactory to the Owner to establish the Owner's title to such materials and equipment or otherwise protect the Owner's interest, and shall include the costs of applicable insurance, storage, and transportation to the site, for such materials and equipment stored off the site.

§ 9.3.3 The Contractor warrants that title to all Work covered by an Application for Payment will pass to the Owner no later than the time of payment. The Contractor further warrants that upon submittal of an Application for Payment all Work for which Certificates for Payment have been previously issued and payments received from the Owner shall, to the best of the Contractor's knowledge, information, and belief, be free and clear of liens, claims, security interests, or encumbrances, in favor of the Contractor, Subcontractors, suppliers, or other persons or entities that provided labor, materials, and equipment relating to the Work.

## § 9.4 Certificates for Payment

§ 9.4.1 The Architect will, within seven days after receipt of the Contractor's Application for Payment, either (1) issue to the Owner a Certificate for Payment in the full amount of the Application for Payment, with a copy to the Contractor; or (2) issue to the Owner a Certificate for Payment for such amount as the Architect determines is properly due, and notify the Contractor and Owner of the Architect's reasons for withholding certification in part as provided in Section 9.5.1; or (3) withhold certification of the entire Application for Payment, and notify the Contractor and Owner of the Architect's reason for withholding certification in whole as provided in Section 9.5.1.

§ 9.4.2 The issuance of a Certificate for Payment will constitute a representation by the Architect to the Owner, based on the Architect's evaluation of the Work and the data in the Application for Payment, that, to the best of the Architect's knowledge, information, and belief, the Work has progressed to the point indicated, the quality of the Work is in accordance with the Contract Documents, and that the Contractor is entitled to payment in the amount certified. The foregoing representations are subject to an evaluation of the Work for conformance with the Contract

Documents upon Substantial Completion, to results of subsequent tests and inspections, to correction of minor deviations from the Contract Documents prior to completion, and to specific qualifications expressed by the Architect. However, the issuance of a Certificate for Payment will not be a representation that the Architect has (1) made exhaustive or continuous on-site inspections to check the quality or quantity of the Work; (2) reviewed construction means, methods, techniques, sequences, or procedures; (3) reviewed copies of requisitions received from Subcontractors and suppliers and other data requested by the Owner to substantiate the Contractor's right to payment; or (4) made examination to ascertain how or for what purpose the Contractor has used money previously paid on account of the Contract Sum.

## **§ 9.5 Decisions to Withhold Certification**

**§ 9.5.1** The Architect may withhold a Certificate for Payment in whole or in part, to the extent reasonably necessary to protect the Owner, if in the Architect's opinion the representations to the Owner required by Section 9.4.2 cannot be made. If the Architect is unable to certify payment in the amount of the Application, the Architect will notify the Contractor and Owner as provided in Section 9.4.1. If the Contractor and Architect cannot agree on a revised amount, the Architect will promptly issue a Certificate for Payment for the amount for which the Architect is able to make such representations to the Owner. The Architect may also withhold a Certificate for Payment or, because of subsequently discovered evidence, may nullify the whole or a part of a Certificate for Payment previously issued, to such extent as may be necessary in the Architect's opinion to protect the Owner from loss for which the Contractor is responsible, including loss resulting from acts and omissions described in Section 3.3.2, because of

- .1 defective Work not remedied;
- .2 third party claims filed or reasonable evidence indicating probable filing of such claims, unless security acceptable to the Owner is provided by the Contractor;
- .3 failure of the Contractor to make payments properly to Subcontractors or suppliers for labor, materials or equipment;
- .4 reasonable evidence that the Work cannot be completed for the unpaid balance of the Contract Sum;
- .5 damage to the Owner or a Separate Contractor;
- .6 reasonable evidence that the Work will not be completed within the Contract Time, and that the unpaid balance would not be adequate to cover actual or liquidated damages for the anticipated delay;
- or
- .7 repeated failure to carry out the Work in accordance with the Contract Documents.

**§ 9.5.2** When either party disputes the Architect's decision regarding a Certificate for Payment under Section 9.5.1, in whole or in part, that party may submit a Claim in accordance with Article 15.

**§ 9.5.3** When the reasons for withholding certification are removed, certification will be made for amounts previously withheld.

**§ 9.5.4** If the Architect withholds certification for payment under Section 9.5.1.3, the Owner may, at its sole option, issue joint checks to the Contractor and to any Subcontractor or supplier to whom the Contractor failed to make payment for Work properly performed or material or equipment suitably delivered. If the Owner makes payments by joint check, the Owner shall notify the Architect and the Contractor shall reflect such payment on its next Application for Payment.

## **§ 9.6 Progress Payments**

**§ 9.6.1** After the Architect has issued a Certificate for Payment, the Owner shall make payment in the manner and within the time provided in the Contract Documents, and shall so notify the Architect.

**§ 9.6.2** The Contractor shall pay each Subcontractor, no later than seven days after receipt of payment from the Owner, the amount to which the Subcontractor is entitled, reflecting percentages actually retained from payments to the Contractor on account of the Subcontractor's portion of the Work. The Contractor shall, by appropriate agreement with each Subcontractor, require each Subcontractor to make payments to Sub-subcontractors in a similar manner.

**§ 9.6.3** The Architect will, on request, furnish to a Subcontractor, if practicable, information regarding percentages of completion or amounts applied for by the Contractor and action taken thereon by the Architect and Owner on account of portions of the Work done by such Subcontractor.



§ 9.6.4 The Owner has the right to request written evidence from the Contractor that the Contractor has properly paid Subcontractors and suppliers amounts paid by the Owner to the Contractor for subcontracted Work. If the Contractor fails to furnish such evidence within seven days, the Owner shall have the right to contact Subcontractors and suppliers to ascertain whether they have been properly paid. Neither the Owner nor Architect shall have an obligation to pay, or to see to the payment of money to, a Subcontractor or supplier, except as may otherwise be required by law.

§ 9.6.5 The Contractor's payments to suppliers shall be treated in a manner similar to that provided in Sections 9.6.2, 9.6.3 and 9.6.4.

§ 9.6.6 A Certificate for Payment, a progress payment, or partial or entire use or occupancy of the Project by the Owner shall not constitute acceptance of Work not in accordance with the Contract Documents.

§ 9.6.7 Unless the Contractor provides the Owner with a payment bond in the full penal sum of the Contract Sum, payments received by the Contractor for Work properly performed by Subcontractors or provided by suppliers shall be held by the Contractor for those Subcontractors or suppliers who performed Work or furnished materials, or both, under contract with the Contractor for which payment was made by the Owner. Nothing contained herein shall require money to be placed in a separate account and not commingled with money of the Contractor, create any fiduciary liability or tort liability on the part of the Contractor for breach of trust, or entitle any person or entity to an award of punitive damages against the Contractor for breach of the requirements of this provision.

§ 9.6.8 Provided the Owner has fulfilled its payment obligations under the Contract Documents, the Contractor shall defend and indemnify the Owner from all loss, liability, damage or expense, including reasonable attorney's fees and litigation expenses, arising out of any lien claim or other claim for payment by any Subcontractor or supplier of any tier. Upon receipt of notice of a lien claim or other claim for payment, the Owner shall notify the Contractor. If approved by the applicable court, when required, the Contractor may substitute a surety bond for the property against which the lien or other claim for payment has been asserted.

#### § 9.7 Failure of Payment

If the Architect does not issue a Certificate for Payment, through no fault of the Contractor, within seven days after receipt of the Contractor's Application for Payment, or if the Owner does not pay the Contractor within seven days after the date established in the Contract Documents, the amount certified by the Architect or awarded by binding dispute resolution, then the Contractor may, upon seven additional days' notice to the Owner and Architect, stop the Work until payment of the amount owing has been received. The Contract Time shall be extended appropriately and the Contract Sum shall be increased by the amount of the Contractor's reasonable costs of shutdown, delay and start-up, plus interest as provided for in the Contract Documents.

#### § 9.8 Substantial Completion

§ 9.8.1 Substantial Completion is the stage in the progress of the Work when the Work or designated portion thereof is sufficiently complete in accordance with the Contract Documents so that the Owner can occupy or utilize the Work for its intended use.

§ 9.8.2 When the Contractor considers that the Work, or a portion thereof which the Owner agrees to accept separately, is substantially complete, the Contractor shall prepare and submit to the Architect a comprehensive list of items to be completed or corrected prior to final payment. Failure to include an item on such list does not alter the responsibility of the Contractor to complete all Work in accordance with the Contract Documents.

§ 9.8.3 Upon receipt of the Contractor's list, the Architect will make an inspection to determine whether the Work or designated portion thereof is substantially complete. If the Architect's inspection discloses any item, whether or not included on the Contractor's list, which is not sufficiently complete in accordance with the Contract Documents so that the Owner can occupy or utilize the Work or designated portion thereof for its intended use, the Contractor shall, before issuance of the Certificate of Substantial Completion, complete or correct such item upon notification by the Architect. In such case, the Contractor shall then submit a request for another inspection by the Architect to determine Substantial Completion.

§ 9.8.4 When the Work or designated portion thereof is substantially complete, the Architect will prepare a Certificate of Substantial Completion that shall establish the date of Substantial Completion; establish responsibilities of the Owner and Contractor for security, maintenance, heat, utilities, damage to the Work and

insurance; and fix the time within which the Contractor shall finish all items on the list accompanying the Certificate. Warranties required by the Contract Documents shall commence on the date of Substantial Completion of the Work or designated portion thereof unless otherwise provided in the Certificate of Substantial Completion.

**§ 9.8.5** The Certificate of Substantial Completion shall be submitted to the Owner and Contractor for their written acceptance of responsibilities assigned to them in the Certificate. Upon such acceptance, and consent of surety if any, the Owner shall make payment of retainage applying to the Work or designated portion thereof. Such payment shall be adjusted for Work that is incomplete or not in accordance with the requirements of the Contract Documents.

### **§ 9.9 Partial Occupancy or Use**

**§ 9.9.1** The Owner may occupy or use any completed or partially completed portion of the Work at any stage when such portion is designated by separate agreement with the Contractor, provided such occupancy or use is consented to by the insurer and authorized by public authorities having jurisdiction over the Project. Such partial occupancy or use may commence whether or not the portion is substantially complete, provided the Owner and Contractor have accepted in writing the responsibilities assigned to each of them for payments, retainage, if any, security, maintenance, heat, utilities, damage to the Work and insurance, and have agreed in writing concerning the period for correction of the Work and commencement of warranties required by the Contract Documents. When the Contractor considers a portion substantially complete, the Contractor shall prepare and submit a list to the Architect as provided under Section 9.8.2. Consent of the Contractor to partial occupancy or use shall not be unreasonably withheld. The stage of the progress of the Work shall be determined by written agreement between the Owner and Contractor or, if no agreement is reached, by decision of the Architect.

**§ 9.9.2** Immediately prior to such partial occupancy or use, the Owner, Contractor, and Architect shall jointly inspect the area to be occupied or portion of the Work to be used in order to determine and record the condition of the Work.

**§ 9.9.3** Unless otherwise agreed upon, partial occupancy or use of a portion or portions of the Work shall not constitute acceptance of Work not complying with the requirements of the Contract Documents.

### **§ 9.10 Final Completion and Final Payment**

**§ 9.10.1** Upon receipt of the Contractor's notice that the Work is ready for final inspection and acceptance and upon receipt of a final Application for Payment, the Architect will promptly make such inspection. When the Architect finds the Work acceptable under the Contract Documents and the Contract fully performed, the Architect will promptly issue a final Certificate for Payment stating that to the best of the Architect's knowledge, information and belief, and on the basis of the Architect's on-site visits and inspections, the Work has been completed in accordance with the Contract Documents and that the entire balance found to be due the Contractor and noted in the final Certificate is due and payable. The Architect's final Certificate for Payment will constitute a further representation that conditions listed in Section 9.10.2 as precedent to the Contractor's being entitled to final payment have been fulfilled.

**§ 9.10.2** Neither final payment nor any remaining retained percentage shall become due until the Contractor submits to the Architect (1) an affidavit that payrolls, bills for materials and equipment, and other indebtedness connected with the Work for which the Owner or the Owner's property might be responsible or encumbered (less amounts withheld by Owner) have been paid or otherwise satisfied, (2) a certificate evidencing that insurance required by the Contract Documents to remain in force after final payment is currently in effect, (3) a written statement that the Contractor knows of no reason that the insurance will not be renewable to cover the period required by the Contract Documents, (4) consent of surety, if any, to final payment, (5) documentation of any special warranties, such as manufacturers' warranties or specific Subcontractor warranties, and (6) if required by the Owner, other data establishing payment or satisfaction of obligations, such as receipts and releases and waivers of liens, claims, security interests, or encumbrances arising out of the Contract, to the extent and in such form as may be designated by the Owner. If a Subcontractor refuses to furnish a release or waiver required by the Owner, the Contractor may furnish a bond satisfactory to the Owner to indemnify the Owner against such lien, claim, security interest, or encumbrance. If a lien, claim, security interest, or encumbrance remains unsatisfied after payments are made, the Contractor shall refund to the Owner all money that the Owner may be compelled to pay in discharging the lien, claim, security interest, or encumbrance, including all costs and reasonable attorneys' fees.

**§ 9.10.3** If, after Substantial Completion of the Work, final completion thereof is materially delayed through no fault of the Contractor or by issuance of Change Orders affecting final completion, and the Architect so confirms, the

Owner shall, upon application by the Contractor and certification by the Architect, and without terminating the Contract, make payment of the balance due for that portion of the Work fully completed, corrected, and accepted. If the remaining balance for Work not fully completed or corrected is less than retainage stipulated in the Contract Documents, and if bonds have been furnished, the written consent of the surety to payment of the balance due for that portion of the Work fully completed and accepted shall be submitted by the Contractor to the Architect prior to certification of such payment. Such payment shall be made under terms and conditions governing final payment, except that it shall not constitute a waiver of Claims.

§ 9.10.4 Acceptance of final payment by the Contractor, a Subcontractor, or a supplier, shall constitute a waiver of claims by that payee except those previously and expressly made in writing and expressly identified by that payee as unsettled at the time of final Application for Payment.

## **ARTICLE 10 PROTECTION OF PERSONS AND PROPERTY**

### **§ 10.1 Safety Precautions and Programs**

The Contractor shall be responsible for initiating, maintaining, and supervising all safety precautions and programs in connection with the performance of the Contract.

### **§ 10.2 Safety of Persons and Property**

§ 10.2.1 The Contractor shall take reasonable precautions for safety of, and shall provide reasonable protection to prevent damage, injury, or loss to

- .1 employees on the Work and other persons who may be affected thereby;
- .2 the Work and materials and equipment to be incorporated therein, whether in storage on or off the site, under care, custody, or control of the Contractor, a Subcontractor, or a Sub-subcontractor; and
- .3 other property at the site or adjacent thereto, such as trees, shrubs, lawns, walks, pavements, roadways, structures, and utilities not designated for removal, relocation, or replacement in the course of construction.

§ 10.2.2 The Contractor shall comply with, and give notices required by applicable laws, statutes, ordinances, codes, rules and regulations, and lawful orders of public authorities, bearing on safety of persons or property or their protection from damage, injury, or loss.

§ 10.2.3 The Contractor shall implement, erect, and maintain, as required by existing conditions and performance of the Contract, reasonable safeguards for safety and protection, including posting danger signs and other warnings against hazards; promulgating safety regulations; and notifying the owners and users of adjacent sites and utilities of the safeguards.

§ 10.2.4 When use or storage of explosives or other hazardous materials or equipment, or unusual methods are necessary for execution of the Work, the Contractor shall exercise utmost care and carry on such activities under supervision of properly qualified personnel.

§ 10.2.5 The Contractor shall promptly remedy damage and loss (other than damage or loss insured under property insurance required by the Contract Documents) to property referred to in Sections 10.2.1.2 and 10.2.1.3 caused in whole or in part by the Contractor, a Subcontractor, a Sub-subcontractor, or anyone directly or indirectly employed by any of them, or by anyone for whose acts they may be liable and for which the Contractor is responsible under Sections 10.2.1.2 and 10.2.1.3. The Contractor may make a Claim for the cost to remedy the damage or loss to the extent such damage or loss is attributable to acts or omissions of the Owner or Architect or anyone directly or indirectly employed by either of them, or by anyone for whose acts either of them may be liable, and not attributable to the fault or negligence of the Contractor. The foregoing obligations of the Contractor are in addition to the Contractor's obligations under Section 3.1.8.

§ 10.2.6 The Contractor shall designate a responsible member of the Contractor's organization at the site whose duty shall be the prevention of accidents. This person shall be the Contractor's superintendent unless otherwise designated by the Contractor in writing to the Owner and Architect.

§ 10.2.7 The Contractor shall not permit any part of the construction or site to be loaded so as to cause damage or create an unsafe condition.

### **§ 10.2.8 Injury or Damage to Person or Property**

If either party suffers injury or damage to person or property because of an act or omission of the other party, or of others for whose acts such party is legally responsible, notice of the injury or damage, whether or not insured, shall be given to the other party within a reasonable time not exceeding 21 days after discovery. The notice shall provide sufficient detail to enable the other party to investigate the matter.

### **§ 10.3 Hazardous Materials and Substances**

**§ 10.3.1** The Contractor is responsible for compliance with any requirements included in the Contract Documents regarding hazardous materials or substances. If the Contractor encounters a hazardous material or substance not addressed in the Contract Documents and if reasonable precautions will be inadequate to prevent foreseeable bodily injury or death to persons resulting from a material or substance, including but not limited to asbestos or polychlorinated biphenyl (PCB), encountered on the site by the Contractor, the Contractor shall, upon recognizing the condition, immediately stop Work in the affected area and notify the Owner and Architect of the condition.

**§ 10.3.2** Upon receipt of the Contractor's notice, the Owner shall obtain the services of a licensed laboratory to verify the presence or absence of the material or substance reported by the Contractor and, in the event such material or substance is found to be present, to cause it to be rendered harmless. Unless otherwise required by the Contract Documents, the Owner shall furnish in writing to the Contractor and Architect the names and qualifications of persons or entities who are to perform tests verifying the presence or absence of the material or substance or who are to perform the task of removal or safe containment of the material or substance. The Contractor and the Architect will promptly reply to the Owner in writing stating whether or not either has reasonable objection to the persons or entities proposed by the Owner. If either the Contractor or Architect has an objection to a person or entity proposed by the Owner, the Owner shall propose another to whom the Contractor and the Architect have no reasonable objection. When the material or substance has been rendered harmless, Work in the affected area shall resume upon written agreement of the Owner and Contractor. By Change Order, the Contract Time shall be extended appropriately and the Contract Sum shall be increased by the amount of the Contractor's reasonable additional costs of shutdown, delay, and start-up.

**§ 10.3.3** To the fullest extent permitted by law, the Owner shall indemnify and hold harmless the Contractor, Subcontractors, Architect, Architect's consultants, and agents and employees of any of them from and against claims, damages, losses, and expenses, including but not limited to attorneys' fees, arising out of or resulting from performance of the Work in the affected area if in fact the material or substance presents the risk of bodily injury or death as described in Section 10.3.1 and has not been rendered harmless, provided that such claim, damage, loss, or expense is attributable to bodily injury, sickness, disease or death, or to injury to or destruction of tangible property (other than the Work itself), except to the extent that such damage, loss, or expense is due to the fault or negligence of the party seeking indemnity.

**§ 10.3.4** The Owner shall not be responsible under this Section 10.3 for hazardous materials or substances the Contractor brings to the site unless such materials or substances are required by the Contract Documents. The Owner shall be responsible for hazardous materials or substances required by the Contract Documents, except to the extent of the Contractor's fault or negligence in the use and handling of such materials or substances.

**§ 10.3.5** The Contractor shall reimburse the Owner for the cost and expense the Owner incurs (1) for remediation of hazardous materials or substances the Contractor brings to the site and negligently handles, or (2) where the Contractor fails to perform its obligations under Section 10.3.1, except to the extent that the cost and expense are due to the Owner's fault or negligence.

**§ 10.3.6** If, without negligence on the part of the Contractor, the Contractor is held liable by a government agency for the cost of remediation of a hazardous material or substance solely by reason of performing Work as required by the Contract Documents, the Owner shall reimburse the Contractor for all cost and expense thereby incurred.

### **§ 10.4 Emergencies**

In an emergency affecting safety of persons or property, the Contractor shall act, at the Contractor's discretion, to prevent threatened damage, injury, or loss. Additional compensation or extension of time claimed by the Contractor on account of an emergency shall be determined as provided in Article 15 and Article 7.

## **ARTICLE 11 INSURANCE AND BONDS**

### **§ 11.1 Contractor's Insurance and Bonds**

**§ 11.1.1** The Contractor shall purchase and maintain insurance of the types and limits of liability, containing the endorsements, and subject to the terms and conditions, as described in the Agreement or elsewhere in the Contract Documents. The Contractor shall purchase and maintain the required insurance from an insurance company or insurance companies lawfully authorized to issue insurance in the jurisdiction where the Project is located. The Owner, Architect, and Architect's consultants shall be named as additional insureds under the Contractor's commercial general liability policy or as otherwise described in the Contract Documents.

**§11.1.1a** The insurance required by Section 11.1.1 shall be written for not less than limits of liability specified in the Contract Documents or required by law, whichever coverage is greater. All insurance shall be written on an occurrence basis unless the Owner approves in writing coverage on a claims made basis. Coverages, whether written on an occurrence or claims-made basis, shall be maintained without interruption from the date of commencement of the Work until the date of final payment and termination of any coverage required to be maintained after final payment and without limitation of the foregoing, shall be written with minimum coverage as follows:

### **INSURANCE REQUIREMENTS**

**The selected vendor must maintain insurance that meets the Town of Berlin's insurance requirements (listed below), to protect the Town of Berlin from claims for loss or injury which might arise out of or result from the operations under this contract. Additionally, the selected vendor must file Certificates of Insurance with the Town of Berlin, naming the Town of Berlin as an additional insured.**

**Worker's Compensation, employer liability (or statutory limits - greater of two), \$1,000,000.**

**Comprehensive General Liability with limits of not less than \$1,000,000.00 per occurrence.**

**Professional Liability with limits not less than \$1,000,000.**

**Umbrella Liability of not less than \$1,000,000.**

**Comprehensive Automobile Liability (owned, non-owned, hired) of \$1,000,000.00 each accident**

**§ 11.1.2** The Contractor shall provide payment and performance bonds in the amount of the full penal sum of the Agreement and subject to such terms and conditions as required by the Contract Documents. The Contractor shall purchase and maintain the required bonds from a company or companies lawfully authorized to issue surety bonds in the jurisdiction where the Project is located.

**§ 11.1.3** Upon the request of any person or entity appearing to be a potential beneficiary of bonds covering payment of obligations arising under the Contract, the Contractor shall promptly furnish a copy of the bonds or shall authorize a copy to be furnished.

**§ 11.1.4 Notice of Cancellation or Expiration of Contractor's Required Insurance.** Within three (3) business days of the date the Contractor becomes aware of an impending or actual cancellation or expiration of any insurance required by the Contract Documents, the Contractor shall provide notice to the Owner of such impending or actual cancellation or expiration. Upon receipt of notice from the Contractor, the Owner shall, unless the lapse in coverage arises from an act or omission of the Owner, have the right to stop the Work until the lapse in coverage has been cured by the procurement of replacement coverage by the Contractor. The furnishing of notice by the Contractor shall not relieve the Contractor of any contractual obligation to provide any required coverage.

### **§ 11.2 Owner's Insurance**

**§ 11.2.1** The Owner shall purchase and maintain insurance of the types and limits of liability, containing the endorsements, and subject to the terms and conditions, as described in the Agreement or elsewhere in the Contract Documents. The Owner shall purchase and maintain the required insurance from an insurance company or insurance companies lawfully authorized to issue insurance in the jurisdiction where the Project is located.



**§ 11.2.2 Failure to Purchase Required Property Insurance.** If the Owner fails to purchase and maintain the required property insurance, with all of the coverages and in the amounts described in the Agreement or elsewhere in the Contract Documents, the Owner shall inform the Contractor in writing prior to commencement of the Work. Upon receipt of notice from the Owner, the Contractor may delay commencement of the Work and may obtain insurance that will protect the interests of the Contractor, Subcontractors, and Sub-Subcontractors in the Work. When the failure to provide coverage has been cured or resolved, the Contract Sum and Contract Time shall be equitably adjusted. In the event the Owner fails to procure coverage, the Owner waives all rights against the Contractor, Subcontractors, and Sub-subcontractors to the extent the loss to the Owner would have been covered by the insurance to have been procured by the Owner. The cost of the insurance shall be charged to the Owner by a Change Order. If the Owner does not provide written notice, and the Contractor is damaged by the failure or neglect of the Owner to purchase or maintain the required insurance, the Owner shall reimburse the Contractor for all reasonable costs and damages attributable thereto.

**§ 11.2.3 Notice of Cancellation or Expiration of Owner's Required Property Insurance.** Within three (3) business days of the date the Owner becomes aware of an impending or actual cancellation or expiration of any property insurance required by the Contract Documents, the Owner shall provide notice to the Contractor of such impending or actual cancellation or expiration. Unless the lapse in coverage arises from an act or omission of the Contractor: (1) the Contractor, upon receipt of notice from the Owner, shall have the right to stop the Work until the lapse in coverage has been cured by the procurement of replacement coverage by either the Owner or the Contractor; (2) the Contract Time and Contract Sum shall be equitably adjusted; and (3) the Owner waives all rights against the Contractor, Subcontractors, and Sub-subcontractors to the extent any loss to the Owner would have been covered by the insurance had it not expired or been cancelled. If the Contractor purchases replacement coverage, the cost of the insurance shall be charged to the Owner by an appropriate Change Order. The furnishing of notice by the Owner shall not relieve the Owner of any contractual obligation to provide required insurance.

### **§ 11.3 Waivers of Subrogation**

**§ 11.3.1** The Owner and Contractor waive all rights against (1) each other and any of their subcontractors, sub-subcontractors, agents, and employees, each of the other; (2) the Architect and Architect's consultants; and (3) Separate Contractors, if any, and any of their subcontractors, sub-subcontractors, agents, and employees, for damages caused by fire, or other causes of loss, to the extent those losses are covered by property insurance required by the Agreement or other property insurance applicable to the Project, except such rights as they have to proceeds of such insurance. The Owner or Contractor, as appropriate, shall require similar written waivers in favor of the individuals and entities identified above from the Architect, Architect's consultants, Separate Contractors, subcontractors, and sub-subcontractors. The policies of insurance purchased and maintained by each person or entity agreeing to waive claims pursuant to this section 11.3.1 shall not prohibit this waiver of subrogation. This waiver of subrogation shall be effective as to a person or entity (1) even though that person or entity would otherwise have a duty of indemnification, contractual or otherwise, (2) even though that person or entity did not pay the insurance premium directly or indirectly, or (3) whether or not the person or entity had an insurable interest in the damaged property.

**§ 11.3.2** If during the Project construction period the Owner insures properties, real or personal or both, at or adjacent to the site by property insurance under policies separate from those insuring the Project, or if after final payment property insurance is to be provided on the completed Project through a policy or policies other than those insuring the Project during the construction period, to the extent permissible by such policies, the Owner waives all rights in accordance with the terms of Section 11.3.1 for damages caused by fire or other causes of loss covered by this separate property insurance.

### **§ 11.4 Loss of Use, Business Interruption, and Delay in Completion Insurance**

The Owner, at the Owner's option, may purchase and maintain insurance that will protect the Owner against loss of use of the Owner's property, or the inability to conduct normal operations, due to fire or other causes of loss. The Owner waives all rights of action against the Contractor and Architect for loss of use of the Owner's property, due to fire or other hazards however caused.

### **§11.5 Adjustment and Settlement of Insured Loss**

**§ 11.5.1** A loss insured under the property insurance required by the Agreement shall be adjusted by the Owner as fiduciary and made payable to the Owner as fiduciary for the insureds, as their interests may appear, subject to requirements of any applicable mortgagee clause and of Section 11.5.2. The Owner shall pay the Architect and

Contractor their just shares of insurance proceeds received by the Owner, and by appropriate agreements the Architect and Contractor shall make payments to their consultants and Subcontractors in similar manner.

**§ 11.5.2** Prior to settlement of an insured loss, the Owner shall notify the Contractor of the terms of the proposed settlement as well as the proposed allocation of the insurance proceeds. The Contractor shall have 14 days from receipt of notice to object to the proposed settlement or allocation of the proceeds. If the Contractor does not object, the Owner shall settle the loss and the Contractor shall be bound by the settlement and allocation. Upon receipt, the Owner shall deposit the insurance proceeds in a separate account and make the appropriate distributions. Thereafter, if no other agreement is made or the Owner does not terminate the Contract for convenience, the Owner and Contractor shall execute a Change Order for reconstruction of the damaged or destroyed Work in the amount allocated for that purpose. If the Contractor timely objects to either the terms of the proposed settlement or the allocation of the proceeds, the Owner may proceed to settle the insured loss, and any dispute between the Owner and Contractor arising out of the settlement or allocation of the proceeds shall be resolved pursuant to Article 15. Pending resolution of any dispute, the Owner may issue a Construction Change Directive for the reconstruction of the damaged or destroyed Work.

## **ARTICLE 12 UNCOVERING AND CORRECTION OF WORK**

### **§ 12.1 Uncovering of Work**

**§ 12.1.1** If a portion of the Work is covered contrary to the Architect's request or to requirements specifically expressed in the Contract Documents, it must, if requested in writing by the Architect, be uncovered for the Architect's examination and be replaced at the Contractor's expense without change in the Contract Time.

**§ 12.1.2** If a portion of the Work has been covered that the Architect has not specifically requested to examine prior to its being covered, the Architect may request to see such Work and it shall be uncovered by the Contractor. If such Work is in accordance with the Contract Documents, the Contractor shall be entitled to an equitable adjustment to the Contract Sum and Contract Time as may be appropriate. If such Work is not in accordance with the Contract Documents, the costs of uncovering the Work, and the cost of correction, shall be at the Contractor's expense.

### **§ 12.2 Correction of Work**

#### **§ 12.2.1 Before Substantial Completion**

The Contractor shall promptly correct Work rejected by the Architect or failing to conform to the requirements of the Contract Documents, discovered before Substantial Completion and whether or not fabricated, installed or completed. Costs of correcting such rejected Work, including additional testing and inspections, the cost of uncovering and replacement, and compensation for the Architect's services and expenses made necessary thereby, shall be at the Contractor's expense.

#### **§ 12.2.2 After Substantial Completion**

**§ 12.2.2.1** In addition to the Contractor's obligations under Section 3.5, if, within one year after the date of Substantial Completion of the Work or designated portion thereof or after the date for commencement of warranties established under Section 9.9.1, or by terms of any applicable special warranty required by the Contract Documents, any of the Work is found to be not in accordance with the requirements of the Contract Documents, the Contractor shall correct it promptly after receipt of notice from the Owner to do so, unless the Owner has previously given the Contractor a written acceptance of such condition. The Owner shall give such notice promptly after discovery of the condition. During the one-year period for correction of Work, if the Owner fails to notify the Contractor and give the Contractor an opportunity to make the correction, the Owner waives the rights to require correction by the Contractor and to make a claim for breach of warranty. If the Contractor fails to correct nonconforming Work within a reasonable time during that period after receipt of notice from the Owner or Architect, the Owner may correct it in accordance with Section 2.5.

**§ 12.2.2.2** The one-year period for correction of Work shall be extended with respect to portions of Work first performed after Substantial Completion by the period of time between Substantial Completion and the actual completion of that portion of the Work.

**§ 12.2.2.3** The one-year period for correction of Work shall not be extended by corrective Work performed by the Contractor pursuant to this Section 12.2.

**§ 12.2.3** The Contractor shall remove from the site portions of the Work that are not in accordance with the requirements of the Contract Documents and are neither corrected by the Contractor nor accepted by the Owner.

**§ 12.2.4** The Contractor shall bear the cost of correcting destroyed or damaged construction of the Owner or Separate Contractors, whether completed or partially completed, caused by the Contractor's correction or removal of Work that is not in accordance with the requirements of the Contract Documents.

**§ 12.2.5** Nothing contained in this Section 12.2 shall be construed to establish a period of limitation with respect to other obligations the Contractor has under the Contract Documents. Establishment of the one-year period for correction of Work as described in Section 12.2.2 relates only to the specific obligation of the Contractor to correct the Work, and has no relationship to the time within which the obligation to comply with the Contract Documents may be sought to be enforced, nor to the time within which proceedings may be commenced to establish the Contractor's liability with respect to the Contractor's obligations other than specifically to correct the Work.

### **§ 12.3 Acceptance of Nonconforming Work**

If the Owner prefers to accept Work that is not in accordance with the requirements of the Contract Documents, the Owner may do so instead of requiring its removal and correction, in which case the Contract Sum will be reduced as appropriate and equitable. Such adjustment shall be effected whether or not final payment has been made.

## **ARTICLE 13 MISCELLANEOUS PROVISIONS**

### **§ 13.1 Governing Law**

The Contract shall be governed by the law of the place where the Project is located, excluding that jurisdiction's choice of law rules. If the parties have selected arbitration as the method of binding dispute resolution, the Federal Arbitration Act shall govern Section 15.4.

### **§ 13.2 Successors and Assigns**

**§ 13.2.1** The Owner and Contractor respectively bind themselves, their partners, successors, assigns, and legal representatives to covenants, agreements, and obligations contained in the Contract Documents. Except as provided in Section 13.2.2, neither party to the Contract shall assign the Contract as a whole without written consent of the other. If either party attempts to make an assignment without such consent, that party shall nevertheless remain legally responsible for all obligations under the Contract.

**§ 13.2.2** The Owner may, without consent of the Contractor, assign the Contract to a lender providing construction financing for the Project, if the lender assumes the Owner's rights and obligations under the Contract Documents. The Contractor shall execute all consents reasonably required to facilitate the assignment.

### **§ 13.3 Rights and Remedies**

**§ 13.3.1** Duties and obligations imposed by the Contract Documents and rights and remedies available thereunder shall be in addition to and not a limitation of duties, obligations, rights, and remedies otherwise imposed or available by law.

**§ 13.3.2** No action or failure to act by the Owner, Architect, or Contractor shall constitute a waiver of a right or duty afforded them under the Contract, nor shall such action or failure to act constitute approval of or acquiescence in a breach thereunder, except as may be specifically agreed upon in writing.

### **§ 13.4 Tests and Inspections**

**§ 13.4.1** Tests, inspections, and approvals of portions of the Work shall be made as required by the Contract Documents and by applicable laws, statutes, ordinances, codes, rules, and regulations or lawful orders of public authorities. Unless otherwise provided, the Contractor shall make arrangements for such tests, inspections, and approvals with an independent testing laboratory or entity acceptable to the Owner, or with the appropriate public authority, and shall bear all related costs of tests, inspections, and approvals. The Contractor shall give the Architect timely notice of when and where tests and inspections are to be made so that the Architect may be present for such procedures. The Owner shall bear costs of tests, inspections, or approvals that do not become requirements until after bids are received or negotiations concluded. The Owner shall directly arrange and pay for tests, inspections, or approvals where building codes or applicable laws or regulations so require.

**§ 13.4.2** If the Architect, Owner, or public authorities having jurisdiction determine that portions of the Work require additional testing, inspection, or approval not included under Section 13.4.1, the Architect will, upon written authorization from the Owner, instruct the Contractor to make arrangements for such additional testing, inspection, or approval, by an entity acceptable to the Owner, and the Contractor shall give timely notice to the Architect of



when and where tests and inspections are to be made so that the Architect may be present for such procedures. Such costs, except as provided in Section 13.4.3, shall be at the Owner's expense.

**§ 13.4.3** If procedures for testing, inspection, or approval under Sections 13.4.1 and 13.4.2 reveal failure of the portions of the Work to comply with requirements established by the Contract Documents, all costs made necessary by such failure, including those of repeated procedures and compensation for the Architect's services and expenses, shall be at the Contractor's expense.

**§ 13.4.4** Required certificates of testing, inspection, or approval shall, unless otherwise required by the Contract Documents, be secured by the Contractor and promptly delivered to the Architect.

**§ 13.4.5** If the Architect is to observe tests, inspections, or approvals required by the Contract Documents, the Architect will do so promptly and, where practicable, at the normal place of testing.

**§ 13.4.6** Tests or inspections conducted pursuant to the Contract Documents shall be made promptly to avoid unreasonable delay in the Work.

## **ARTICLE 14 TERMINATION OR SUSPENSION OF THE CONTRACT**

### **§ 14.1 Termination by the Contractor**

**§ 14.1.1** The Contractor may terminate the Contract if the Work is stopped for a period of 30 consecutive days through no act or fault of the Contractor, a Subcontractor, a Sub-subcontractor, their agents or employees, or any other persons or entities performing portions of the Work, for any of the following reasons:

- .1 Issuance of an order of a court or other public authority having jurisdiction that requires all Work to be stopped;
- .2 An act of government, such as a declaration of national emergency, that requires all Work to be stopped;
- .3 Because the Architect has not issued a Certificate for Payment and has not notified the Contractor of the reason for withholding certification as provided in Section 9.4.1, or because the Owner has not made payment on a Certificate for Payment within the time stated in the Contract Documents; or
- .4 The Owner has failed to furnish to the Contractor reasonable evidence as required by Section 2.2.

**§ 14.1.2** The Contractor may terminate the Contract if, through no act or fault of the Contractor, a Subcontractor, a Sub-subcontractor, their agents or employees, or any other persons or entities performing portions of the Work, repeated suspensions, delays, or interruptions of the entire Work by the Owner as described in Section 14.3, constitute in the aggregate more than 100 percent of the total number of days scheduled for completion, or 120 days in any 365-day period, whichever is less.

**§ 14.1.3** If one of the reasons described in Section 14.1.1 or 14.1.2 exists, the Contractor may, upon seven days' notice to the Owner and Architect, terminate the Contract and recover from the Owner payment for Work executed.

**§ 14.1.4** If the Work is stopped for a period of 60 consecutive days through no act or fault of the Contractor, a Subcontractor, a Sub-subcontractor, or their agents or employees or any other persons or entities performing portions of the Work because the Owner has repeatedly failed to fulfill the Owner's obligations under the Contract Documents with respect to matters important to the progress of the Work, the Contractor may, upon seven additional days' notice to the Owner and the Architect, terminate the Contract and recover from the Owner as provided in Section 14.1.3.

### **§ 14.2 Termination by the Owner for Cause**

**§ 14.2.1** The Owner may terminate the Contract if the Contractor

- .1 refuses or fails to supply enough properly skilled workers or proper materials;
- .2 fails to make payment to Subcontractors or suppliers in accordance with the respective agreements between the Contractor and the Subcontractors or suppliers;
- .3 disregards applicable laws, statutes, ordinances, codes, rules and regulations, or lawful orders of a public authority; or
- .4 otherwise commits a substantial breach of a provision of the Contract Documents.

§ 14.2.2 When any of the reasons described in Section 14.2.1 exist, the Owner may, without prejudice to any other rights or remedies of the Owner and after giving the Contractor and the Contractor's surety, if any, seven days' notice, terminate employment of the Contractor and may, subject to any prior rights of the surety:

- .1 Exclude the Contractor from the site and take possession of all materials, equipment, tools, and construction equipment and machinery thereon owned by the Contractor;
- .2 Accept assignment of subcontracts pursuant to Section 5.4; and
- .3 Finish the Work by whatever reasonable method the Owner may deem expedient. Upon written request of the Contractor, the Owner shall furnish to the Contractor a detailed accounting of the costs incurred by the Owner in finishing the Work.

§ 14.2.3 When the Owner terminates the Contract for one of the reasons stated in Section 14.2.1, the Contractor shall not be entitled to receive further payment until the Work is finished.

§ 14.2.4 If the unpaid balance of the Contract Sum exceeds costs of finishing the Work, including compensation for the Architect's services and expenses made necessary thereby, and other damages incurred by the Owner and not expressly waived, such excess shall be paid to the Contractor. If such costs and damages exceed the unpaid balance, the Contractor shall pay the difference to the Owner. The amount to be paid to the Contractor or Owner, as the case may be, shall be certified by the Initial Decision Maker, upon application, and this obligation for payment shall survive termination of the Contract.

### § 14.3 Suspension by the Owner for Convenience

§ 14.3.1 The Owner may, without cause, order the Contractor in writing to suspend, delay or interrupt the Work, in whole or in part for such period of time as the Owner may determine.

§ 14.3.2 The Contract Sum and Contract Time shall be adjusted for increases in the cost and time caused by suspension, delay, or interruption under Section 14.3.1. No adjustment shall be made to the extent

- .1 that performance is, was, or would have been, so suspended, delayed, or interrupted, by another cause for which the Contractor is responsible; or
- .2 that an equitable adjustment is made or denied under another provision of the Contract.

### § 14.4 Termination by the Owner for Convenience

§ 14.4.1 The Owner may, at any time, terminate the Contract for the Owner's convenience and without cause.

§ 14.4.2 Upon receipt of notice from the Owner of such termination for the Owner's convenience, the Contractor shall

- .1 cease operations as directed by the Owner in the notice;
- .2 take actions necessary, or that the Owner may direct, for the protection and preservation of the Work; and
- .3 except for Work directed to be performed prior to the effective date of termination stated in the notice, terminate all existing subcontracts and purchase orders and enter into no further subcontracts and purchase orders.

§ 14.4.3 In case of such termination for the Owner's convenience, the Owner shall pay the Contractor for Work properly executed.

## ARTICLE 15 CLAIMS AND DISPUTES

### § 15.1 Claims

#### § 15.1.1 Definition

A Claim is a demand or assertion by one of the parties seeking, as a matter of right, payment of money, a change in the Contract Time, or other relief with respect to the terms of the Contract. The term "Claim" also includes other disputes and matters in question between the Owner and Contractor arising out of or relating to the Contract. The responsibility to substantiate Claims shall rest with the party making the Claim. This Section 15.1.1 does not require the Owner to file a Claim in order to impose liquidated damages in accordance with the Contract Documents.

#### § 15.1.2 Time Limits on Claims

The Owner and Contractor shall commence all Claims and causes of action against the other and arising out of or related to the Contract, whether in contract, tort, breach of warranty or otherwise, in accordance with the requirements of the binding dispute resolution method selected in the Agreement and within the period specified by

applicable law, but in any case not more than 10 years after the date of Substantial Completion of the Work. The Owner and Contractor waive all Claims and causes of action not commenced in accordance with this Section 15.1.2.

### **§ 15.1.3 Notice of Claims**

**§ 15.1.3.1** Claims by either the Owner or Contractor, where the condition giving rise to the Claim is first discovered prior to expiration of the period for correction of the Work set forth in Section 12.2.2, shall be initiated by notice to the other party and to the Initial Decision Maker with a copy sent to the Architect, if the Architect is not serving as the Initial Decision Maker. Claims by either party under this Section 15.1.3.1 shall be initiated within 21 days after occurrence of the event giving rise to such Claim or within 21 days after the claimant first recognizes the condition giving rise to the Claim, whichever is later.

**§ 15.1.3.2** Claims by either the Owner or Contractor, where the condition giving rise to the Claim is first discovered after expiration of the period for correction of the Work set forth in Section 12.2.2, shall be initiated by notice to the other party. In such event, no decision by the Initial Decision Maker is required.

### **§ 15.1.4 Continuing Contract Performance**

**§ 15.1.4.1** Pending final resolution of a Claim, except as otherwise agreed in writing or as provided in Section 9.7 and Article 14, the Contractor shall proceed diligently with performance of the Contract and the Owner shall continue to make payments in accordance with the Contract Documents.

**§ 15.1.4.2** The Contract Sum and Contract Time shall be adjusted in accordance with the Initial Decision Maker's decision, subject to the right of either party to proceed in accordance with this Article 15. The Architect will issue Certificates for Payment in accordance with the decision of the Initial Decision Maker.

### **§ 15.1.5 Claims for Additional Cost**

If the Contractor wishes to make a Claim for an increase in the Contract Sum, notice as provided in Section 15.1.3 shall be given before proceeding to execute the portion of the Work that is the subject of the Claim. Prior notice is not required for Claims relating to an emergency endangering life or property arising under Section 10.4.

### **§ 15.1.6 Claims for Additional Time**

**§ 15.1.6.1** If the Contractor wishes to make a Claim for an increase in the Contract Time, notice as provided in Section 15.1.3 shall be given. The Contractor's Claim shall include an estimate of cost and of probable effect of delay on progress of the Work. In the case of a continuing delay, only one Claim is necessary.

**§ 15.1.6.2** If adverse weather conditions are the basis for a Claim for additional time, such Claim shall be documented by data substantiating that weather conditions were abnormal for the period of time, could not have been reasonably anticipated, and had an adverse effect on the scheduled construction.

### **§ 15.1.7 Waiver of Claims for Consequential and Incidental Damages**

The Contractor and Owner waive Claims against each other for consequential and incidental damages arising out of or relating to this Contract. This mutual waiver includes

- .1 damages incurred by the Owner for rental expenses, for losses of use, income, profit, financing, business and reputation, and for loss of management or employee productivity or of the services of such persons; and
- .2 damages incurred by the Contractor for principal office expenses including the compensation of personnel stationed there, for losses of financing, business and reputation, and for loss of profit, except anticipated profit arising directly from the Work.

This mutual waiver is applicable, without limitation, to all consequential damages due to either party's termination in accordance with Article 14. Nothing contained in this Section 15.1.7 shall be deemed to preclude assessment of liquidated damages, when applicable, in accordance with the requirements of the Contract Documents.

### **§ 15.2 Initial Decision**

**§ 15.2.1** Claims, excluding those where the condition giving rise to the Claim is first discovered after expiration of the period for correction of the Work set forth in Section 12.2.2 or arising under Sections 10.3, 10.4, and 11.5, shall be referred to the Initial Decision Maker for initial decision. The Architect will serve as the Initial Decision Maker, unless otherwise indicated in the Agreement. Except for those Claims excluded by this Section 15.2.1, an initial decision shall be required as a condition precedent to mediation of any Claim. If an initial decision has not been

rendered within 30 days after the Claim has been referred to the Initial Decision Maker, the party asserting the Claim may demand mediation and binding dispute resolution without a decision having been rendered. Unless the Initial Decision Maker and all affected parties agree, the Initial Decision Maker will not decide disputes between the Contractor and persons or entities other than the Owner.

**§ 15.2.2** The Initial Decision Maker will review Claims and within ten days of the receipt of a Claim take one or more of the following actions: (1) request additional supporting data from the claimant or a response with supporting data from the other party, (2) reject the Claim in whole or in part, (3) approve the Claim, (4) suggest a compromise, or (5) advise the parties that the Initial Decision Maker is unable to resolve the Claim if the Initial Decision Maker lacks sufficient information to evaluate the merits of the Claim or if the Initial Decision Maker concludes that, in the Initial Decision Maker's sole discretion, it would be inappropriate for the Initial Decision Maker to resolve the Claim.

**§ 15.2.3** In evaluating Claims, the Initial Decision Maker may, but shall not be obligated to, consult with or seek information from either party or from persons with special knowledge or expertise who may assist the Initial Decision Maker in rendering a decision. The Initial Decision Maker may request the Owner to authorize retention of such persons at the Owner's expense.

**§ 15.2.4** If the Initial Decision Maker requests a party to provide a response to a Claim or to furnish additional supporting data, such party shall respond, within ten days after receipt of the request, and shall either (1) provide a response on the requested supporting data, (2) advise the Initial Decision Maker when the response or supporting data will be furnished, or (3) advise the Initial Decision Maker that no supporting data will be furnished. Upon receipt of the response or supporting data, if any, the Initial Decision Maker will either reject or approve the Claim in whole or in part.

**§ 15.2.5** The Initial Decision Maker will render an initial decision approving or rejecting the Claim, or indicating that the Initial Decision Maker is unable to resolve the Claim. This initial decision shall (1) be in writing; (2) state the reasons therefor; and (3) notify the parties and the Architect, if the Architect is not serving as the Initial Decision Maker, of any change in the Contract Sum or Contract Time or both. The initial decision shall be final and binding on the parties but subject to mediation and, if the parties fail to resolve their dispute through mediation, to binding dispute resolution.

**§ 15.2.6** Either party may file for mediation of an initial decision at any time, subject to the terms of Section 15.2.6.1.

**§ 15.2.6.1** Either party may, within 30 days from the date of receipt of an initial decision, demand in writing that the other party file for mediation. If such a demand is made and the party receiving the demand fails to file for mediation within 30 days after receipt thereof, then both parties waive their rights to mediate or pursue binding dispute resolution proceedings with respect to the initial decision.

**§ 15.2.7** In the event of a Claim against the Contractor, the Owner may, but is not obligated to, notify the surety, if any, of the nature and amount of the Claim. If the Claim relates to a possibility of a Contractor's default, the Owner may, but is not obligated to, notify the surety and request the surety's assistance in resolving the controversy.

**§ 15.2.8** If a Claim relates to or is the subject of a mechanic's lien, the party asserting such Claim may proceed in accordance with applicable law to comply with the lien notice or filing deadlines.

### **§ 15.3 Mediation**

**§ 15.3.1** Claims, disputes, or other matters in controversy arising out of or related to the Contract, except those waived as provided for in Sections 9.10.4, 9.10.5, and 15.1.7, shall be subject to mediation as a condition precedent to binding dispute resolution.

**§ 15.3.2** The parties shall endeavor to resolve their Claims by mediation which, unless the parties mutually agree otherwise, shall be administered by the American Arbitration Association in accordance with its Construction Industry Mediation Procedures in effect on the date of the Agreement. A request for mediation shall be made in writing, delivered to the other party to the Contract, and filed with the person or entity administering the mediation. The request may be made concurrently with the filing of binding dispute resolution proceedings but, in such event, mediation shall proceed in advance of binding dispute resolution proceedings, which shall be stayed pending

mediation for a period of 60 days from the date of filing, unless stayed for a longer period by agreement of the parties or court order. If an arbitration is stayed pursuant to this Section 15.3.2, the parties may nonetheless proceed to the selection of the arbitrator(s) and agree upon a schedule for later proceedings.

**§ 15.3.3** Either party may, within 30 days from the date that mediation has been concluded without resolution of the dispute or 60 days after mediation has been demanded without resolution of the dispute, demand in writing that the other party file for binding dispute resolution. If such a demand is made and the party receiving the demand fails to file for binding dispute resolution within 60 days after receipt thereof, then both parties waive their rights to binding dispute resolution proceedings with respect to the initial decision.

**§ 15.3.4** The parties shall share the mediator's fee and any filing fees equally. The mediation shall be held in the place where the Project is located, unless another location is mutually agreed upon. Agreements reached in mediation shall be enforceable as settlement agreements in any court having jurisdiction thereof.

**PERFORMANCE BOND**

KNOW ALL MEN BY THESE PRESENTS, that \_\_\_\_\_ of ,  
\_\_\_\_\_ as Principal hereinafter called Principal, and  
\_\_\_\_\_, a Corporation, organized and existing under the laws of the  
State of \_\_\_\_\_, as Surety, hereinafter called Surety, are held and firmly bound  
unto the **Town of Berlin** as Obligee, hereinafter called the Obligee, in the full penal sum of  
\_\_\_\_\_ Dollars \$ \_\_\_\_\_ for the  
payment whereof Principal and Surety bind themselves, their heirs, executors, administrators, successors  
and assigns, jointly and severally, firmly by these presents.

---

THE CONDITION OF THIS OBLIGATION IS SUCH THAT WHEREAS said Principal has entered into  
a certain written contract with said Obligee, dated the day of this \_\_\_\_\_ day of \_\_\_\_\_, 2023  
for the Construction of *BERLIN HIGH SCHOOL, BISCOGLIO SYNTHETIC TURF FIELD PROJECT*  
which contract, together with all Contract Documents now made or which may hereafter be made in  
extension, modification or alternation thereof, any hereby referred to, incorporation in and made a part of  
this bond as though herein fully set forth.

NOW, THEREFORE, if the said Principal shall well and truly keep, perform and execute all the terms,  
conditions and stipulations of said contract according to its provisions on his or its part to be kept and  
performed and shall indemnify and reimburse the obligee for any loss that it may suffer through failure of  
the Principal to faithfully observe and perform each and every obligation and duty imposed upon the  
Principal by the said contract, at the time and in the manner therein specified, then this obligation shall be  
null and void, otherwise it shall remain and be in full force and effect.

PROVIDED, HOWEVER, that any alterations which may be made in the terms of said contract or in the  
work done or to be done under it, or the giving by the Obligee of any extension of time for the  
performance of said contract or any other, shall not in any way release the Principal and/or the Surety, or  
either of them, their representative, heirs, executors, administrators, successors or assigns from liability  
hereunder, notice to the Surety or Sureties of any such alteration, extension or forbearance being hereby  
specifically and absolutely waived.

AND PROVIDED FURTHER that no action, suit or proceeding shall be had or maintained against the  
Surety on this instrument unless the same be brought or instituted and process served upon the Surety  
within three years from the expiration of the guaranty period provided in the contract, whether the work  
be completed by the Principal, Surety, or Obligee.

**PERFORMANCE BOND, Cont.**

IN WITNESS WHEREOF, the said Principal and Surety have SIGNED AND SEALED this instrument  
this \_\_\_\_\_ day of \_\_\_\_\_, 2023.

Attest:

Principal

\_\_\_\_\_ By: \_\_\_\_\_

Surety

\_\_\_\_\_ By: \_\_\_\_\_

Approved as to form and correctness

---

Important: Attach herewith proof of authority of officers or agents to sign bond.

**LABOR AND MATERIAL PAYMENT BOND**

KNOW ALL MEN BY THESE PRESENTS, that \_\_\_\_\_ of ,  
\_\_\_\_\_  
\_\_\_\_\_ as Principal hereinafter called Principal, and  
\_\_\_\_\_, a Corporation, organized and existing under the laws of the  
State of \_\_\_\_\_, as Surety, hereinafter called Surety, are held and firmly bound  
unto the **Town of Berlin** as Obligee, hereinafter called the Obligee, in the full penal sum of  
\_\_\_\_\_ Dollars \$ \_\_\_\_\_ for the  
payment whereof Principal and Labor bind themselves, their heirs, executors, administrators, successors  
and assigns, jointly and severally, firmly by these presents.

---

(\$ \_\_\_\_\_) for the payment whereof Principal and Surety bind themselves, their heirs,  
executors, administrators, successors and assigns, jointly and severally, firmly by these presents.

---

THE CONDITION OF THIS OBLIGATION IS SUCH THAT WHEREAS said Principal has entered into  
a certain written contract with said Obligee, dated the day of this \_\_\_\_\_ day of \_\_\_\_\_, 2023  
for the Construction of *BERLIN HIGH SCHOOL, BISCOGLIO SYNTHETIC TURF FIELD PROJECT*  
which contract, together with all Contract Documents now made or which may hereafter be made in  
extension, modification or alternation thereof, any hereby referred to, incorporation in and made a part of  
this bond as though herein fully set forth.

NOW, THEREFORE, THE CONDITION OF THIS OBLIGATION IS SUCH, that if the said Principal  
shall pay for all labor and materials furnished to himself or his subcontractors for use in the prosecution of  
the work and used therein, then this obligation to be void; otherwise to remain in full force and effect.

PROVIDED, HOWEVER, that this bond is executed, pursuant to the provision of Section 49-41 of the  
General Statutes of the State of Connecticut, Revision of 1958, and Sections 49-42 and 49-43 of the 1961  
Supplement to the General Statutes; and the rights and liabilities hereunder shall be determined and  
limited by said sections to the same extent as if they were copies at length herein.

**LABOR AND MATERIAL PAYMENT BOND, Cont.**



IN WITNESS WHEREOF, the said Principal and Surety have SIGNED AND SEALED this instrument  
this \_\_\_\_\_ day of \_\_\_\_\_, 2023.

Attest:

Principal

\_\_\_\_\_ By: \_\_\_\_\_

Surety

\_\_\_\_\_ By: \_\_\_\_\_

Approved as to form and correctness

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Important: Attach herewith proof of authority of officers or agents to sign bond.

## SECTION 01 10 00 – SUMMARY

### PART 1 - GENERAL

#### 1.1 RELATED DOCUMENTS

1. Instructions to Bidders, AIA Document A201, “General Conditions of the Contract for Construction, 2007 Edition as amended, and Division 01 General Requirements are bound herein, are hereby made a part of this Section, and shall be binding on all Contractors and Subcontractors who perform this work.

#### 1.2 SUMMARY

A. This Section includes the following:

1. Project information.
2. Work covered by the Contract Documents.
3. Work under other contracts.
4. Use of premises.
5. Owner's occupancy requirements.
6. Work restrictions.
7. Specification formats and conventions.

B. Related Sections include the following:

1. Division 01 Section “Temporary Facilities and Controls” for limitations and procedures governing temporary use of Owner’s facilities.

#### 1.3 PROJECT INFORMATION

C. Project Funding:

The project is funded through the Connecticut Department of Energy and Environmental Protection and all contractors are to be listed as an approved contractor under the Department of Administrative Services Contractor Prequalification Program at the time of bidding. Program requirements are described at [DAS.Prequalification@ct.gov](mailto:DAS.Prequalification@ct.gov) or (860) 713-5280.

D. Project Identification:

Synthetic Turf Field, Biscoglio Field – Berlin High School

Project Location: Berlin High School, 139 Patterson Way, Berlin, CT 06037

E. Owner's Representative:

Jennifer Ochoa, Director of Community, Recreation and Parks Services  
230 Kensington Rd. Berlin, CT 06037  
[jochoa@town.berlin.ct.us](mailto:jochoa@town.berlin.ct.us)

F. Architect Identification:

Luke McCoy, Project Manager  
Kaestle Boos Associates, Inc., New Britain, CT  
[lmccoy@kba-architects.com](mailto:lmccoy@kba-architects.com)

#### 1.4 WORK COVERED BY THE CONTRACT DOCUMENTS

G. The Work includes but is not necessarily limited to:

1. The Work includes selective demolition of the existing natural grass field and track, including removal of the existing topsoil, irrigation, fixed sports equipment, and subsoils as required to accommodate the new cross-section and elevations, goal posts, chain link fencing, ball safety netting, concrete curb/wall, and miscellaneous underground utilities and site features. Existing bleachers and surrounding pavements and fencing to remain and be protected, unless otherwise noted. Construction includes installation of a new synthetic turf athletic field and fixed athletic equipment, a renovations to the existing track adjacent to the field, fencing & gates, and miscellaneous site improvements. Alternates include turf field graphics, a scoreboard, athletic equipment, and new electrical services.
2. The bid drawings, bid documents and project manual for ‘Synthetic Turf Field, Biscoglio Field – Berlin High School, Berlin CT’ as modified by addenda are hereby incorporated into this specification in whole. All Materials, installation and warranties required for a working, acceptable athletic field shall be included in the bid price.

#### 1.5 WORK SEQUENCE

- H. General: The Contractor shall utilize the proposed Schedule as the basis for a detailed construction schedule, to be submitted to the Owner and Architect for review and approval. The schedule must clearly demonstrate the proper sequencing of construction and relocation activities, and how operational and environmental conditions will be satisfactorily maintained in all occupied spaces.
- I. The Sequence of work is to be completed per the following schedule:

<b>Bids Due</b>	<b>Thursday, March 16, 2023</b>
a. Bidder Interviews / Scope Reviews	Tuesday March 21, 2023
b. Recommendation to Town Council	Monday March 27, 2023
c. Town Council Approval	Tuesday, April 4, 2023
d. Town and Contractor Executions	April 4 – April 14, 2023
<b>Construction (June 2023-September 2023)</b>	<b>COMPLETED BY:</b>
a. Construction Submittals & Shop Drawings	April 17 – May 26, 2023
b. Mobilization and Construction	June 19 – September 21, 2023
<b>c. Substantial Completion</b>	<b>September 22, 2023</b>
d. Close-Out, Warranty & Training	Sept. 23 – Oct. 19, 2023
<b>e. Project Complete</b>	<b>October 20, 2023</b>

#### 1.6 CONTRACTOR USE OF PREMISES

- A. General: Contractor shall have limited use of premises for construction operations as indicated on Drawings by the Contract limits.
- B. Use of Site: Confine operations to areas within Contract limits indicated. Do not disturb portions of the Project site beyond areas in which Work is indicated.
  - 1. Confine the parking of workmen's and construction vehicles, and the storage of construction materials to a designated staging area determined by the **Architect and Owner**
  - 2. Keep driveways and entrances clear and available to Owner, Owner's employees, and emergency vehicles at all times. Staging at access ways may be required in order to permit completion of the work of this Project. Do not use these areas for parking or storage of materials.
  - 3. Schedule deliveries to minimize space and time requirements for storage of materials and equipment on-site.
- C. Site Security: Continuously maintain the security of the site and the Work. Cooperate with the Owner in particularly sensitive areas where security and special safeguards are required.
  - 1. Provide security guards or patrols as necessary for adequate protection of the interests of the Contractor, Owner, and the general public on the site, or in public ways around the site.
  - 2. Ensure that all gates and other openings are secured at the end of each work day.
  - 3. Ensure property signage is installed to signify the project areas is closed.

#### 1.7 OWNER OCCUPANCY

- A. Completion Requirements: Timely completion of the project is critical. Aggressive construction scheduling and careful monitoring of crucial path milestones cannot be overemphasized.
- B. Partial Owner Occupancy: Owner will occupy the remainder of Sage park premises during entire construction period, with the exception of areas under construction. Cooperate with Owner during construction operations to minimize conflicts and facilitate Owner usage. Perform the Work so as not to interfere with Owner's operations. Maintain existing exits, unless otherwise directed by authorities having jurisdiction.
  - 1. Maintain access to existing walkways, driveway, concession building, and other adjacent occupied or used facilities. Do not close or obstruct walkways, corridors, or other occupied or used facilities without written permission from Owner, and authorities having jurisdiction.
  - 2. Provide not less than 72 hours' notice to Owner and Architect of activities that will affect Owner's operations.

#### 1.8 WORK RESTRICTIONS

- A. On-Site Work Hours: Work shall be generally performed inside the existing building during normal business working hours of 7:00 a.m. to 6:00 p.m., Monday through Friday, except otherwise indicated.

1. Extended & Weekend Hours:  
(8:00 am to 4:00 pm maximum weekend) as Approved by Owner

#### 1.9 CODES, STANDARDS AND PERMITS

- A. All work under this contract shall conform to all codes and standards in effect as of the date of receipt of Bids which are applicable to this Project. All work shall further conform to specific requirements and interpretations of local authorities having jurisdiction over the Project, These Codes, standards, and authorities are referred to collectively as “the governing codes and authorities”, and similar terms, throughout the Specifications. Determination of applicable codes and standards and of the authorities having jurisdiction, shall be the responsibility of each Contractor, as shall be the analysis of all such codes and standards in regard to their applicability to the Project for the purposes of determining necessary construction to conform to such code requirements, for securing all approvals and permits necessary to proceed with construction, and to obtain all permits necessary for the Owner to occupy the facilities for their intended use. In the case of conflicts between the requirements of different codes and standards, the most restrictive or stringent requirements shall be met.
  1. The Contractor shall maintain at the site, for the duration of the construction operations at the site, two (2) copies of all relevant codes and standards listed herein or determined to be applicable to the work. Maintain one copy of such codes in the Construction Manager’s site office, for the exclusive use of the Owner the Architect and its consultants.
- B. The codes that were used in the design of the Project are as follows:
  1. State of Connecticut State Building Code
  2. National Fire Protection Association (NFPA) codes and standards.
  3. Architectural Access Board 521 CMR, as amended (AAB)
  4. The Americans with Disabilities Act, Title II, including ADA Regulations.
  5. ADA Standards for Accessible Design, 28 CFR 36 (7-1-94 Edition) ADA Accessibility Guidelines (ADAAG).
  6. Section 504, Rehabilitation Act 1973 including 504 Regulations.
  7. Uniform Federal Accessibility Standards, 41 CFR 101-19.6.
- C. Code Enforcement and Approvals: Secure the general building permit for the work. Conform to all conditions and requirements of the permit and code enforcement authorities. Provide names and license numbers of its responsible representatives to complete application for permit.

#### 1.10 SPECIFICATION FORMATS AND CONVENTIONS

- A. These Specifications with the accompanying Drawings are intended to describe and illustrate all material, labor, and equipment necessary to complete ‘Synthetic Turf Field, Biscoglio Field – Berlin High School, Berlin CT’
- B. Specification Format: The Specifications are organized into Divisions and Sections using the 48-division format and CSI/CSC’s “MasterFormat” numbering system.
  1. Section Identification: The Specifications use Section numbers and titles to help cross-referencing in the Contract Documents. Sections in the Project Manual are in numeric sequence; however, the sequence is incomplete because all available Section numbers are

- not used. Consult the table of contents at the beginning of the Project Manual to determine numbers and names of Sections in the Contract Documents.
2. Division 01: Sections in Division 01 govern the execution of the Work of all Sections in the Specifications.
- C. Specification Content: The Specifications use certain conventions for the style of language and the intended meaning of certain terms, words, and phrases when used in particular situations. These conventions are as follows:
3. Abbreviated Language: Language used in the Specifications and other Contract Documents is abbreviated. Words and meanings shall be interpreted as appropriate. Words implied, but not stated, shall be inferred as the sense requires. Singular words shall be interpreted as plural, and plural words shall be interpreted as singular where applicable as the context of the Contract Documents indicates.
  4. Imperative mood and streamlined language are generally used in the Specifications. Requirements expressed in the imperative mood are to be performed by Contractor. Occasionally, the indicative or subjunctive mood may be used in the Section Text for clarity to describe responsibilities that must be fulfilled indirectly by Contractor or by others when so noted.
    - a. The words "shall," "shall be," or "shall comply with," depending on the context, are implied where a colon (:) is used within a sentence or phrase.
- D. In general, the Specifications will describe the “quality” of the work and the Drawings, the “extent” of the work. The Drawings and Specifications are cooperative and supplementary, however, and each item of the work is not necessarily mentioned in both the Drawings and the Specifications. All work necessary to complete the project, so described, is to be included in this Contract.
- E. In case of disagreement between Drawings and Specifications, or within either document itself, the Architect shall construe the Documents to require the better quality or greater quantity of work for the Owner that can reasonably be construed therefrom. Any work done by the Contractor without consulting the Architect, when the same requires a decision, shall be done at the Contractor’s risk.

#### 1.11 SOCIAL SECURITY TAXES

- A. The Contractor and each Subcontractor shall pay the taxes measured by the wages of all their employees as required by the Federal Social Security Act all amendments thereto, and accept the exclusive liability for said taxes. The Contractor shall also indemnify and hold the Owner, and its respective officers, agents and servants, and the Architect harmless on account of any tax measured by the wages aforesaid of employees of the Contractor and his Subcontractors, assessed against the Owner under authority of said law.

1.12 UNEMPLOYMENT INSURANCE

- A. The Contractor and each Subcontractor shall pay unemployment insurance measured by the wages of his employees as required by law and accept the exclusive liability for said contributions. The Contractor shall also indemnify and hold harmless the Owner, and the Architect on account of any contribution measured by the wages of aforesaid employees of the Contractor and his Subcontractors, assessed against the Owner under authority of law.

1.13 OCCUPATIONAL SAFETY AND HEALTH ACT

- A. The Contractor shall comply with the requirements of the Occupational Safety and Health Act of 1970 and the Construction Safety Act of 1969, including all standards and regulations which have been promulgated by the Governmental Authorities which administer such Acts and said requirements, standards and regulations are incorporated herein by reference.
  - 1. The Contractor shall comply with M.G.L. Chapter 306 of the Acts of 2004, which requires that everyone employed at the job site to complete a course in construction safety and health approved by the U.S. Occupational Safety and Health Administration, known as the "OSHA-10 hour course".
- B. The Contractor shall comply with said regulations, requirements and standards and require and be directly responsible for compliance therewith on the part of his agents, employees material men and Subcontractors; and shall directly receive and be responsible for all citations, assessments, fines or penalties which may be incurred by reason of his agents, employees, material men or Subcontractors failing to so comply.
- C. The Contractor shall indemnify the Owner and Architect and save them harmless from any and all losses, costs and expenses, including fines and reasonable attorney's fees incurred by the Owner, the Construction Manager and Architect by reason of the real or alleged violation of such laws. Ordinances, regulations and directives, Federal, State, and Local, which are currently in effect or which become effective in the future, by the Contractor, his Subcontractors or material men.

PART 2 - PRODUCTS (Not applicable)

PART 3 - EXECUTION (Not applicable)

**END OF SECTION 01 10 00**

## **SECTION 01 22 00 — UNIT PRICES**

### **PART 1 - GENERAL**

#### **1.1 RELATED DOCUMENTS**

- A. The Contractor, Subcontractors, and/or suppliers providing goods and services referenced in or related to this Section shall also be bound by the Related Documents identified in Division 01 Section "Summary."

#### **1.2 SUMMARY**

- A. This Section includes administrative and procedural requirements for unit prices.
- B. Related Sections include the following:
  - 1. Division 01 Section "Contract Modification Procedures" for procedures for submitting and handling Change Orders.
  - 2. Division 01 Section "Quality Requirements" for general testing and inspecting requirements.

#### **1.3 DEFINITIONS**

- A. Unit price is an amount proposed by bidders, stated on the Bid Form, as a price per unit of measurement for materials or services added to or deducted from the Contract Sum by appropriate modification, if estimated quantities of Work required by the Contract Documents are increased or decreased.
- B. Abbreviations: The following abbreviations for units of measurement are used in unit prices:
  - 1. C.Y.: cubic yard
  - 2. S.Y.: square yard
  - 3. S.F.: square foot
  - 4. L.F.: linear foot
  - 5. EA.: each
  - 6. LB.: pound

#### **1.4 PROCEDURES**

- A. Unit prices include all necessary material, plus cost for delivery, installation, insurance, overhead and profit.
  - 1. Unit price amounts are net changes in the Contract Sum for additional work and include the Contractor's and any Subcontractor's amount for overhead and profit.
  - 2. For deleted work, the net credit to the Contract Sum shall be 10% less.
- B. Owner reserves the right to reject Contractor's measurement of work-in-place that involves use of established unit prices and to have this work measured, at Owner's expense, by an independent surveyor acceptable to Contractor.
- C. List of Unit Prices: A list of unit prices is included in Part 3. Specification Sections referenced in the schedule contain requirements for materials described under each unit price.



PART 2 - PRODUCTS (NOT USED)

PART 3 - EXECUTION

3.1 LIST OF UNIT PRICES

A. Provide the following unit prices as listed on the Bid Form:

1. Mass Earth Excavation:
  - a. Description: Mass Earth Excavation including the completion of the excavation, formation and compaction of the subgrade, and the disposal of surplus or unsuitable material according to Division 31 Section "Earth Moving."
  - b. Unit of Measurement: C.Y.
2. Granular Base Fill:
  - a. Description: Granular base fill (in place) including compaction according to Division 31 Section "Earth Moving."
  - b. Unit of Measurement: C.Y.
3. Processed Aggregate:
  - a. Description: Processed Aggregate (in place) including compaction according to Division 31 Section "Earth Moving."
  - b. Unit of Measurement: C.Y.
4. Concrete Anchor Curbing:
  - a. Description: Synthetic turf system concrete anchor curb (6" wide x 12" deep), including forming, concrete, rebar, labor, and finishing according to Detail "Perimeter Collector Drain"
  - b. Unit of Measurement: L.F.
5. Field Base, Collector Pipe Stone:
  - a. Description: Field base collector pipe stone according to Division 33 Section "Field Subdrainage system"
  - b. Unit of Measurement: C.Y.
6. Field Base, Bottom Stone:
  - a. Description: Field base bottom stone according to Division 33 Section "Field Subdrainage system"
  - b. Unit of Measurement: C.Y.
7. Field Base, Top Stone:
  - a. Description: Field base top stone according to Division 33 Section "Field Subdrainage system"
  - b. Unit of Measurement: C.Y.

8. Flat Panel Drain:
  - a. Description: Flat panel drain, including manufacturing, shipping, and installation according to Division 33 Section "Field Subdrainage System."
  - b. Unit of Measurement: L.F.

**END OF SECTION 01 22 00**

## SECTION 01 26 00 - CONTRACT MODIFICATION PROCEDURES

### PART 1 - GENERAL

#### 1.1 RELATED DOCUMENTS

- A. The Contractor, Subcontractors, and/or suppliers providing goods and services referenced in or related to this Section shall also be bound by the Related Documents identified in Division 01 Section "Summary."

#### 1.2 SUMMARY

- A. This Section specifies administrative and procedural requirements for handling and processing Contract modifications.
- B. Related Sections include the following:
  - 1. Division 01 Section "Product Requirements" for administrative procedures for handling requests for substitutions made after Contract award.

#### 1.3 MINOR CHANGES IN THE WORK

- A. Architect will issue supplemental instructions authorizing Minor Changes in the Work, not involving adjustment to the Contract Sum or the Contract Time, as follows:
  - 1. "Architect's Supplemental Instruction" (ASI) form, included at end of Part 3, is an Owner/Architect-initiated supplemental instruction.
    - a. Architect's Supplemental Instructions, including attachments, will be issued to the contractor electronically via email, in the form of a "portable document file" (.PDF).

#### 1.4 CONTRACTOR REQUEST FOR INFORMATION

- A. Contractor-Initiated Requests for Information: If clarification is required to the Contract Documents, the Contractor may submit a "Request for Information" (RFI) to the Architect. This request will be responded to by the Architect with a "Response to Request for Information" (RRFI) form.
  - 1. RFI forms shall be submitted in a typewritten, standardized format, including title and description, and sequentially numbered.
  - 2. Submit RFI, including attachments, electronically in the form of a "portable document file" (.PDF).
  - 3. RFI forms are not to be submitted as requests for shop drawing approval. Comply with requirements in Division 01 Section "Submittal Procedures."
  - 4. **"Response to Request for Information" (RRFI)**, included at the end of Part 3, will be issued in response to Contractor's Request for Information (RFI).
    - a. A Response to Request for Information (RRFI), including attachments, will be issued to the contractor electronically via email, in the form of a "portable document file" (.PDF).

- b. If the RRFI directs the Contractor to carry out the Work with no change in Contract Sum or Contract Time, but the Contractor anticipates a change associated with the Work, the Contractor must submit to the Architect in writing within 5 days of receipt of the RRFI, the reason for the anticipated change in Contract Sum and/or Contract Time. A change in Contract Time must be submitted with a revised CPM Schedule in accordance with Division 01 Section "Construction Progress Documentation."
- B. The Contractor shall review any RFI's submitted by Subcontractors prior to submission to the Architect to ensure such RFI's are not already clearly and unambiguously answered in the Contract Documents.
  1. The Contractor shall pay for the Architect's time and expenses for reviewing RFI's which are already clearly answered or inferable from the Contract Documents in accordance with the Architect's standard rates. Such payments will be paid by the Contractor through the Owner.

#### 1.5 PROPOSAL REQUESTS

- A. Owner-Initiated Proposal Requests: Architect will issue a detailed description of proposed changes in the Work that may require adjustment to the Contract Sum or the Contract Time. If necessary, the description will include supplemental or revised Drawings and Specifications.
  1. "Proposal Requests" (PR) included at the end of Part 3, including attachments, will be issued to the contractor electronically via email, in the form of a "portable document file" (.PDF).
  2. Proposal Requests issued by the Architect are for information only. Do not consider them instructions either to stop work in progress or to execute the proposed change.
- B. Contractor-Initiated Proposals: If latent or unforeseen conditions require modifications to the Contract, Contractor may propose changes by first submitting a "Request for Information" (RFI) to Architect. This request will be responded to by the Architect with a "Response to Request for Information" form, wherein the Contractor may submit a Change Order Proposal.
  1. Include a statement outlining reasons for the change and the effect of the change on the Work. Provide a complete description of the proposed change. Indicate the effect of the proposed change on the Contract Sum and the Contract Time.
  2. Include a list of quantities of products required or eliminated and unit costs, with total amount of purchases and credits to be made; and the labor hours for each class of labor at the hour rate. If requested, furnish survey data to substantiate quantities.
  3. Indicate applicable taxes, delivery charges, equipment rental, and amounts of trade discounts.
  4. Include an updated Contractor's Construction Schedule that indicates the effect of the change, including, but not limited to, changes in activity duration, start and finish times, and activity relationship. Use available total float before requesting an extension of the Contract Time.
  5. Comply with requirements in Division 01 Section "Product Requirements" if the proposed change requires substitution of one product or system for product or system specified.
- C. Change Order Proposal Form: Use CSI Form 13.6A, "Change Order Request (Proposal)," with attachments CSI Form 13.6D, "Proposal Worksheet Summary," and Form 13.6C, "Proposal Worksheet Detail," or similar document acceptable to Architect, for Change Order Proposals.

1. Submit Change Order Proposals (COP), including attachments from vendors and subcontractors and the initiating document, electronically in the form of a “portable document file” (.PDF).
2. Each Change Order Proposal is to include reference to the initiating document (PR, RRFI, etc.), a title and description, and be sequentially numbered.
3. “Response to Change Order Proposal” (RCOP), included at the end of Part 3, will be issued in response to Contractor’s Change Order Proposal (COP).
  - a. A Response to Change Order Proposal (RCOP) will be issued to the Contractor electronically via email, in the form of a “portable document file” (.PDF).
  - b. Following review of a COP by the Architect, if corrections are required prior to inclusion in a Change Order, resubmit revised COP with revision number and include all backup documentation and the initiating document.

#### 1.6 CHANGE ORDER PROCEDURES

- A. On Owner's approval of a Proposal Request, Architect will issue a Change Order for signatures of Owner and Contractor on **AIA Document G701**.

#### 1.7 CONSTRUCTION CHANGE DIRECTIVE

- A. Construction Change Directive: Architect may issue a Construction Change Directive on **AIA Document G714**. Construction Change Directive instructs Contractor to proceed with a change in the Work, for subsequent inclusion in a Change Order.
  1. Construction Change Directive contains a complete description of change in the Work. It also designates method to be followed to determine change in the Contract Sum or the Contract Time.
- B. Documentation: Maintain detailed records of time and material for work required by the Construction Change Directive.
  1. After completion of change, submit a Change Order Proposal associated with the Work of a Construction Change Directive, including an itemized account and supporting data necessary to substantiate cost and time adjustments to the Contract.
  2. The Architect will prepare a Change Order upon approval by the Architect and Owner of a Change Order Proposal.

#### PART 2 - PRODUCTS (Not Used)

#### PART 3 - EXECUTION

##### 3.1 FORMS

- A. The following forms referenced in this Section are attached:
  1. ASI – Architect’s Supplemental Instructions, 1 page.
  2. RRFI – Response to Request for Information, 1 page.
  3. PR – Proposal Request, 1 pageRCOP – Response to Change Order Proposal, 1 page.

END OF SECTION 01 26 00

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## ASI - ARCHITECT'S SUPPLEMENTAL INSTRUCTIONS

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***SYNTHETIC TURF FIELD  
BISCOGLIO FIELD AT  
BERLIN HIGH SCHOOL  
Berlin, CT***

KBA #22024.00

Page: 1 of 1

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<b>CONTRACTOR:</b> (or CM)	<b>GENERAL CONTRACTOR OR CM</b> Address  City, State, Zip Attn: M.	<b>ASI NO. (3 digit)-(2 digit)</b>
<b>ISSUED BY:</b>	<u>(Name and Credentials)</u> <u>(Project Architect, Landscape Architect, etc.)</u>	<b>COPIES TO:</b> <input type="checkbox"/> KBA – CT/MA <input type="checkbox"/> Owner <input type="checkbox"/> Official
<b>DATE:</b>	<u>(Month, Day, Year)</u>	<input type="checkbox"/> Consultant <input type="checkbox"/> Consultant

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The Work shall be carried out in accordance with the following supplemental instructions issued in accordance with the Contract Documents without change in Contract Sum or Contract Time. Proceeding with the Work in accordance with these instructions indicates your acknowledgement that there will be no change in the Contract Sum or Contract Time. If the Contractor believes that additional cost or time is involved, the Contractor shall make Claims as provided in the General Conditions of the Contract.

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**Description:** ASI Title

Description of work.....

**Attachments:** Sketches, Bulletins, etc.

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# PR – PROPOSAL REQUEST

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***SYNTHETIC TURF FIELD  
BISCOGLIO FIELD AT  
BERLIN HIGH SCHOOL  
Berlin, CT***

KBA # 22024.00  
Page: 1 of 1

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**CONTRACTOR:**      **GENERAL CONTRACTOR OR CM**  
**(or CM)**              Address

City, State, Zip  
Attn: M.

**PR NO. (3 digit)-(2 digit)**

**ISSUED BY:**              (Name and Credentials)  
                                    (Project Architect, Landscape Architect, etc.)

**DATE:**                      (Month, Day, Year)

**COPIES TO:**

- ☐ KBA – CT/MA
- ☐ Owner
- ☐ Official
- ☐ Consultant
- ☐ Consultant

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*Please submit an itemized quotation for changes in the Contract Sum and/or Contract Time for proposed modifications to the Contract Documents described herein. Notify the Architect in writing of the date on which you anticipate submitting your proposal.*

***THIS IS NOT A CHANGE ORDER, CONSTRUCTION CHANGE DIRECTIVE, OR A DIRECTION TO PROCEED WITH THE WORK DESCRIBED IN THE PROPOSED MODIFICATIONS.***

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**Description: PR Title**

Response .....

**Attachments:**

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# RCOP – RESPONSE TO CHANGE ORDER PROPOSAL

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***SYNTHETIC TURF FIELD  
BISCOGLIO FIELD AT  
BERLIN HIGH SCHOOL  
Berlin, CT***

KBA # 22024.00  
Page: 1 of 1

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**CONTRACTOR:**    **GENERAL CONTRACTOR OR CM**  
**(or CM)**                      Address

City, State, Zip  
Attn: M.

**ISSUED BY:**            (Name and Credentials)  
                                  (Project Architect, Landscape Architect, etc.)

**DATE:**                    (Month, Day, Year)

**RCOP NO. (3 digit)-(2 digit)**

**COPIES TO:**

- ☐ KBA – CT/MA/NH  
☐ Owner  
☐ Official  
☐ Consultant  
☐ Consultant

- 
- ☐ Change Order Proposal has been reviewed by the Architect and is recommended to the Owner for approval.
- ☐ Change Order Proposal is rejected.
- ☐ Owner will not require the Contractor to proceed with the Work described in Change Order Proposal
- ☐ Work described in Change Order Proposal is required by the Contract Documents.    ☐ Refer to comments below.
- ☐ Revise and resubmit Change Order Proposal.
- ☐ Overhead/Profit is incorrect.                      ☐ Labor and material costs breakdown is insufficient.
- ☐ Backup documentation is insufficient.            ☐ Refer to comments below.
- 

**Description: RCOP Title**

Response.....

**Attachments:** COP No.

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## RRFI – RESPONSE TO REQUEST FOR INFORMATION

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***SYNTHETIC TURF FIELD  
BISCOGLIO FIELD AT  
BERLIN HIGH SCHOOL  
Berlin, CT***

KBA # 22024.00  
Page: 1 of 1

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**CONTRACTOR:**    **GENERAL CONTRACTOR OR CM**  
**(or CM)**                      Address

City, State, Zip  
Attn: M.

**ISSUED BY:**            (Name and Credentials)  
                                  (Project Architect, Landscape Architect, etc.)

**DATE:**                    (Month, Day, Year)

**RRFI NO.: (3 digit)-(2 digit)**

**COPIES TO:**

- ☐ KBA – CT/MA
- ☐ Owner
- ☐ Official
- ☐ Consultant
- ☐ Consultant

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The Work shall be carried out in accordance with the following supplemental instructions issued in accordance with the Contract Documents without change in Contract Sum or Contract Time. Proceeding with the Work in accordance with these instructions indicates your acknowledgement that there will be no change in the Contract Sum or Contract Time. If the Contractor believes that additional cost or time is involved, the Contractor shall make Claims as provided in the General Conditions of the Contract.

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**Description: RRFI Title**

Response.....

**Attachments: RFI #**

## **SECTION 01 29 00 - PAYMENT PROCEDURES**

### **PART 1 - GENERAL**

#### **1.1 RELATED DOCUMENTS**

- A. The Contractor, Subcontractors, and/or suppliers providing goods and services referenced in or related to this Section shall also be bound by the Related Documents identified in Division 01 Section "Summary."

#### **1.2 SUMMARY**

- A. This Section specifies administrative and procedural requirements necessary to prepare and process Applications for Payment.
- B. Related Sections include the following:
  - 1. Division 01 Section "Allowances" for procedural requirements governing handling and processing of allowances.
  - 2. Division 01 Section "Contract Modification Procedures" for administrative procedures for handling changes to the Contract.
  - 3. Division 01 Section "Unit Prices" for administrative requirements governing use of unit prices.

#### **1.3 DEFINITIONS**

- A. Schedule of Values: A statement furnished by Contractor allocating portions of the Contract Sum to various portions of the Work and used as the basis for reviewing Contractor's Applications for Payment.

#### **1.4 SCHEDULE OF VALUES**

- A. Coordination: Coordinate preparation of the Schedule of Values with preparation of Contractor's Construction Schedule.
  - 1. Correlate line items in the Schedule of Values with other required administrative forms and schedules, including the following:
    - a. Application for Payment forms with Continuation Sheets.
    - b. Submittals Schedule.
    - c. Contractor's Construction Schedule.
  - 2. Submit the Schedule of Values to Architect at earliest possible date but no later than seven days before the date scheduled for submittal of initial Applications for Payment. No payment shall be processed until schedule of values has been submitted and approved by the Architect.

- B. Format and Content: Use the Project Manual table of contents as a guide to establish line items for the Schedule of Values. Provide at least one line item for each Specification Section. For major trades with line item values exceeding \$25,000, provide separate line items for identifiable units of work within such trade with a value not exceeding \$25,000. Provide separate line items for labor and material.

1. Identification: Include the following Project identification on the Schedule of Values:
  - a. Project name and location.
  - b. Name of Architect.
  - c. Architect's project number.
  - d. Contractor's name and address.
  - e. Date of submittal.
2. Submit draft of AIA Document G702 and AIA Document G703 Continuation Sheets.
3. Arrange the Schedule of Values in tabular form with separate columns to indicate the following for each item listed:
  - a. Related Specification Section or Division.
  - b. Description of the Work.
  - c. Change Orders (numbers) that affect value.
  - d. Dollar value.
    - 1) Percentage of the Contract Sum to nearest one-hundredth percent, adjusted to total 100 percent.
4. Provide a breakdown of the Contract Sum in enough detail to facilitate continued evaluation of Applications for Payment and progress reports. Coordinate with the Project Manual table of contents. Provide several line items for principal subcontract amounts, where appropriate. Include separate line items under required principal subcontracts for operation and maintenance manuals, punch list activities, Project Record Documents, and demonstration and training in the amount of 5 percent of the Contract Sum. Include the following mandatory line items:
  - a. Mobilization
  - b. Demobilization
  - c. Builders Risk Insurance
  - d. Bonds
  - e. Scheduling
  - f. Construction Photographic Documentation
  - g. Field Engineering
  - h. Daily Site Cleanup
  - i. Safety Program
  - j. Full-Time Project Manager
  - k. Full-Time Project Superintendent
  - l. Dumpsters

General Contract O & P (not to be included in each line item).

5. Round amounts to nearest whole dollar; total shall equal the Contract Sum.

6. Provide a separate line item in the Schedule of Values for each part of the Work where Applications for Payment may include materials or equipment purchased or fabricated and stored, but not yet installed.
  - a. Differentiate between items stored on-site and items stored off-site. Include evidence of insurance or bonded warehousing.
7. Provide separate line items in the Schedule of Values for initial cost of materials, for each subsequent stage of completion, and for total installed value of that part of the Work.
8. Allowances: Provide a separate line item in the Schedule of Values for each allowance. Show line-item value of unit-cost allowances, as a product of the unit cost, multiplied by measured quantity. Use information indicated in the Contract Documents to determine quantities.
9. Each item in the Schedule of Values and Applications for Payment shall be complete. Include total cost and proportionate share of general overhead and profit for each item.
  - a. Temporary facilities and other major cost items that are not direct cost of actual work-in-place may be shown either as separate line items in the Schedule of Values or distributed as general overhead expense, at Contractor's option.

#### 1.5 APPLICATIONS FOR PAYMENT

- A. Each Application for Payment shall be consistent with previous applications and payments as certified by Architect and paid for by Owner.
  1. Initial Application for Payment, Application for Payment at time of Substantial Completion, and final Application for Payment involve additional requirements.
- B. Payment Application Times: The date for each progress payment is indicated in the Agreement between Owner and Contractor. The period of construction Work covered by each Application for Payment is the period indicated in the Agreement.
  1. In order to expedite monthly payment during the course of the Project, the Contractor shall review with the Architect a preliminary draft of each Application for Payment before final copies of the Application are formally submitted. The draft copy shall be typed and include the application date and application number. The draft copy shall include the total of each column and extension of each row on the Application as if this was the formal submission. The cover sheet shall include the Original Contract Sum and a summary of Changes to the Contract Sum, retainage, and payments to date as if this was the formal submission.
- C. Payment Application Forms: Use AIA Document G702 and AIA Document G703 Continuation Sheets as form for Applications for Payment.
- D. Application Preparation: Complete every entry on form. Notarize and execute by a person authorized to sign legal documents on behalf of Contractor. Architect will return incomplete applications without action.
  1. Entries shall match data on the Schedule of Values and Contractor's Construction Schedule. Use updated schedules if revisions were made.

2. Include amounts of Change Orders issued before last day of construction period covered by application.
  - a. List each Change Order at the end of the Schedule of Values. Under each Change Order number, list each Change Order Proposal by number with a brief description of the Work and its value.
- E. Transmittal: Submit five signed and notarized original copies of each Application for Payment to Architect by a method ensuring receipt within 24 hours. One copy shall include waivers of lien and similar attachments if required.
  1. Transmit each copy with a transmittal form listing attachments and recording appropriate information about application.
- F. Waivers of Mechanic's Lien: With each Application for Payment, submit waivers of mechanic's liens from subcontractors, sub-subcontractors, and suppliers for construction period covered by the previous application.
  1. Submit partial waivers on each item for amount requested in previous application, after deduction for retainage, on each item.
  2. When an application shows completion of an item, submit final or full waivers.
  3. Owner reserves the right to designate which entities involved in the Work must submit waivers.
  4. Submit final Application for Payment with or preceded by final waivers from every entity involved with performance of the Work covered by the application who is lawfully entitled to a lien.
  5. Waiver Forms: Submit waivers of lien on forms, executed in a manner acceptable to Owner.
- G. Initial Application for Payment: Administrative actions and submittals that must precede or coincide with submittal of first Application for Payment include the following:
  1. List of subcontractors.
  2. Schedule of Values.
  3. Contractor's Construction Schedule (preliminary if not final).
  4. Products list.
  5. Schedule of unit prices.
  6. Submittals Schedule (preliminary if not final).
  7. List of Contractor's staff assignments.
  8. List of Contractor's principal consultants.
  9. Copies of building permits.
  10. Copies of authorizations and licenses from authorities having jurisdiction for performance of the Work.
  11. Initial progress report.
  12. Report of preconstruction conference.
  13. Certificates of insurance and insurance policies.
  14. Performance and payment bonds.
  15. Data needed to acquire Owner's insurance.

- H. Application for Payment at Substantial Completion: After issuing the Certificate of Substantial Completion, submit an Application for Payment showing 100 percent completion for portion of the Work claimed as substantially complete.
  - 1. Include documentation supporting claim that the Work is substantially complete and a statement showing an accounting of changes to the Contract Sum.
  - 2. This application shall reflect Certificates of Partial Substantial Completion issued previously for Owner occupancy of designated portions of the Work.
- I. Final Payment Application: Submit final Application for Payment with releases and supporting documentation not previously submitted and accepted, including, but not limited, to the following:
  - 1. Evidence of completion of Project closeout requirements.
  - 2. Insurance certificates for products and completed operations where required and proof that taxes, fees, and similar obligations were paid.
  - 3. Updated final statement, accounting for final changes to the Contract Sum.
  - 4. AIA Document G706, "Contractor's Affidavit of Payment of Debts and Claims."
  - 5. AIA Document G706A, "Contractor's Affidavit of Release of Liens."
  - 6. AIA Document G707, "Consent of Surety to Final Payment."
  - 7. Evidence that claims have been settled.
  - 8. Final meter readings for utilities, a measured record of stored fuel, and similar data as of date of Substantial Completion or when Owner took possession of and assumed responsibility for corresponding elements of the Work.
  - 9. Final, liquidated damages settlement statement.

PART 2 - PRODUCTS (Not Used)

PART 3 - EXECUTION (Not Used)

END OF SECTION 01 29 00



## **SECTION 01 31 00 - PROJECT MANAGEMENT AND COORDINATION**

### **PART 1 - GENERAL**

#### **1.1 RELATED DOCUMENTS**

- A. The Contractor, Subcontractors, and/or suppliers providing goods and services referenced in or related to this Section shall also be bound by the Related Documents identified in Division 01 Section "Summary."

#### **1.2 SUMMARY**

- A. This Section includes administrative provisions for coordinating construction operations on Project including, but not limited to, the following:
  - 1. Coordination Drawings.
  - 2. Contractor's use of Architect's CAD files.
  - 3. Administrative and supervisory personnel.
  - 4. Project meetings.
- B. The Contractor shall participate in coordination requirements. Certain areas of responsibility will be assigned to specific Subcontractors.
- C. Related Sections include the following:
  - 1. Division 01 Section "Execution" for procedures for coordinating general installation and field-engineering services, including establishment of benchmarks and control points.
  - 2. Division 01 Section "Closeout Procedures" for coordinating Contract closeout.

#### **1.3 COORDINATION**

- A. Coordination: Coordinate construction operations included in different Sections of the Specifications to ensure efficient and orderly installation of each part of the Work. Coordinate construction operations, included in different Sections that depend on each other for proper installation, connection, and operation.
  - 1. Schedule construction operations in sequence required to obtain the best results where installation of one part of the Work depends on installation of other components, before or after its own installation.
  - 2. Coordinate installation of different components with subcontractors to ensure maximum accessibility for required maintenance, service, and repair.
  - 3. Make adequate provisions to accommodate items scheduled for later installation.
  - 4. Where availability of space is limited, coordinate installation of different components to ensure maximum performance and accessibility for required maintenance, service, and repair of all components, including mechanical and electrical.
  - 5. No claim for extra compensation of extension of Contract time will be allowed for conditions resulting from a lack of said coordination.

- B. Prepare memoranda outlining special procedures required for coordination. Include such items as required notices, reports, and list of attendees at meetings.
  - 1. Prepare similar memoranda for Owner and separate contractors if coordination of their Work is required.
- C. Administrative Procedures: Coordinate scheduling and timing of required administrative procedures with other construction activities and activities of subcontractors to avoid conflicts and to ensure orderly progress of the Work. Such administrative activities include, but are not limited to, the following:
  - 1. Preparation of Contractor's Construction Schedule.
  - 2. Preparation of the Schedule of Values.
  - 3. Installation and removal of temporary facilities and controls.
  - 4. Delivery and processing of submittals.
  - 5. Progress meetings.
  - 6. Preinstallation conferences.
  - 7. Project closeout activities.
  - 8. Startup and adjustment of systems.
  - 9. Project closeout activities.
- D. Conservation: Coordinate construction activities to ensure that operations are carried out with consideration given to conservation of energy, water, and materials.
  - 1. Salvage materials and equipment involved in performance of, but not actually incorporated into, the Work. Refer to other Sections for disposition of salvaged materials that are designated as Owner's property.

#### 1.4 CONTRACTOR'S USE OF ARCHITECT'S DIGITAL DATA FILES

- A. Architect's Digital Data Files: Electronic digital data files of the Contract Drawings will be provided by Architect for Contractor's use in preparing Coordination Drawings.
  - 1. At the Contractor's written request, Architect will furnish Contractor one set of digital data drawing files of the Contract Drawings for use in preparing Coordination Drawings, subject to the terms and conditions of the Contractor's use of CAD Files Agreement attached after this Section.
    - a. Architect makes no representations as to the accuracy or completeness of digital data drawing files as they relate to the Contract Drawings.
    - b. The following digital data files will be furnished for each appropriate discipline:
      - 1) Site Layout Plans.

#### 1.5 ADMINISTRATIVE AND SUPERVISORY PERSONNEL

- A. General: In addition to Project superintendent, provide other administrative and supervisory personnel as required for proper performance of the Work.
- B. Key Personnel Names: Within 7 days of starting construction operations, submit a list of key personnel assignments, including superintendent and other personnel in attendance at Project site.

Identify individuals and their duties and responsibilities; list addresses and telephone numbers, including home and office telephone numbers. Provide names, addresses, and telephone numbers of individuals assigned as standbys in the absence of individuals assigned to Project.

1. Post copies of list in Project meeting room, in temporary field office, and by each temporary telephone. Keep list current at all times.

## 1.6 PROJECT MEETINGS

- A. General: Schedule and conduct weekly meetings and conferences at Project site, unless otherwise indicated.

1. Attendees: Inform participants and others involved, and individuals whose presence is required, of date and time of each meeting.
2. Agenda: Prepare the meeting agenda, and distribute the agenda to all invited attendees.
3. Minutes: Record significant discussions and agreements achieved and distribute the meeting minutes to everyone concerned, including the Owner and Architect within 3 days of the meeting.

- B. Preconstruction Conference: Schedule a preconstruction conference before starting construction, at a time convenient to Owner, Project Manager, and Architect, but no later than 15 days after execution of the Agreement. Hold the conference at Project site or another convenient location. Conduct the meeting to review responsibilities and personnel assignments.

1. Attendees: Authorized representatives of Owner and Architect; Contractor and its superintendent; major subcontractors; suppliers; and other concerned parties shall attend the conference. All participants at the conference shall be familiar with Project and authorized to conclude matters relating to the Work.
2. Agenda: Discuss items of significance that could affect progress, including the following:
  - a. Tentative construction schedule.
  - b. Phasing.
  - c. Critical work sequencing and long-lead items.
  - d. Designation of key personnel and their duties.
  - e. Procedures for processing field decisions and Change Orders.
  - f. Procedures for requests for information (RFIs).
  - g. Procedures for testing and inspecting.
  - h. Procedures for processing Applications for Payment.
  - i. Distribution of the Contract Documents.
  - j. Submittal procedures.
  - k. Preparation of Record Documents.
  - l. Use of the premises and existing building.
  - m. Work restrictions.
  - n. Owner's occupancy requirements.
  - o. Responsibility for temporary facilities and controls.
  - p. Parking availability.
  - q. Office, work, and storage areas.
  - r. Equipment deliveries and priorities.
  - s. First aid.

- t. Security.
    - u. Progress cleaning.
    - v. Working hours.
  - 3. Minutes: The Architect will record and distribute meeting minutes.
- C. Preinstallation Conferences: Conduct a preinstallation conference at Project site before each construction activity that requires coordination with other construction.
- 1. Attendees: Installer and representatives of manufacturers and fabricators involved in or affected by the installation and its coordination or integration with other materials and installations that have preceded or will follow, shall attend the meeting. Advise Architect of scheduled meeting dates.
  - 2. Agenda: Review progress of other construction activities and preparations for the particular activity under consideration, including requirements for the following:
    - a. The Contract Documents.
    - b. Options.
    - c. Related requests for information (RFIs).
    - d. Related Change Orders.
    - e. Purchases.
    - f. Deliveries.
    - g. Submittals.
    - h. Review of mockups.
    - i. Possible conflicts.
    - j. Compatibility problems.
    - k. Time schedules.
    - l. Weather limitations.
    - m. Manufacturer's written recommendations.
    - n. Warranty requirements.
    - o. Compatibility of materials.
    - p. Acceptability of substrates.
    - q. Temporary facilities and controls.
    - r. Space and access limitations.
    - s. Regulations of authorities having jurisdiction.
    - t. Testing and inspecting requirements.
    - u. Installation procedures.
    - v. Coordination with other work.
    - w. Required performance results.
    - x. Protection of adjacent work.
    - y. Protection of construction and personnel.
  - 3. Record significant conference discussions, agreements, and disagreements, including required corrective measures and actions.
  - 4. Reporting: The Contractor shall distribute minutes of the meeting to everyone concerned, including the Owner, Project Manager, and Architect within 3 days of the meeting.
  - 5. Do not proceed with installation if the conference cannot be successfully concluded. Initiate whatever actions are necessary to resolve impediments to performance of the Work and reconvene the conference at earliest feasible date.

- D. Progress Meetings: Schedule weekly progress meetings. Coordinate dates of meetings with preparation of payment requests.
1. Attendees: In addition to representatives of Owner and Architect, each contractor concerned with current progress or involved in planning, coordination, or performance of future activities shall be represented at these meetings. All participants at the conference shall be familiar with Project and authorized to conclude matters relating to the Work.
  2. Agenda: Review and correct or approve minutes of previous progress meeting. Review other items of significance that could affect progress. Include topics for discussion as appropriate to status of Project.
    - a. Construction Schedule: Review progress since the last meeting. Determine whether each activity is on time, ahead of schedule, or behind schedule, in relation to Contractor's Construction Schedule. Determine how construction behind schedule will be expedited; secure commitments from parties involved to do so. Discuss whether schedule revisions are required to ensure that current and subsequent activities will be completed within the Contract Time.
      - 1) Review schedule for next period.
    - b. Review present and future needs of each entity present, including the following:
      - 1) Interface requirements.
      - 2) Sequence of operations.
      - 3) Status of submittals.
      - 4) Deliveries.
      - 5) Off-site fabrication.
      - 6) Access.
      - 7) Site utilization.
      - 8) Temporary facilities and controls.
      - 9) Work hours.
      - 10) Hazards and risks.
      - 11) Progress cleaning.
      - 12) Quality and work standards.
      - 13) Status of correction of deficient items.
      - 14) Field observations.
      - 15) Requests for information (RFIs).
      - 16) Status of proposal requests.
      - 17) Pending changes.
      - 18) Status of Change Orders.
      - 19) Pending claims and disputes.
      - 20) Documentation of information for payment requests.
  3. Minutes: The Architect will record and distribute the meeting minutes.
- E. Coordination Meetings: Schedule Project coordination meetings at regular intervals. Project coordination meetings are in addition to specific meetings held for other purposes, such as progress meetings and preinstallation conferences.

1. Attendees: In addition to representatives of the Contractor, each subcontractor, supplier, and other entity concerned with current progress or involved in planning, coordination, or performance of future activities shall be represented at these meetings. All participants at the conference shall be familiar with Project and authorized to conclude matters relating to the Work.
2. Agenda: Review and correct or approve minutes of the previous coordination meeting. Review other items of significance that could affect progress. Include topics for discussion as appropriate to status of Project.
  - a. Contractor's Construction Schedule: Review progress since the last coordination meeting. Determine whether each contract is on time, ahead of schedule, or behind schedule. Determine how construction behind schedule will be expedited; secure commitments from parties involved to do so. Discuss whether schedule revisions are required to ensure that current and subsequent activities will be completed within the Contract Time.
  - b. Schedule Updating: Revise Contractor's Construction Schedule after each coordination meeting where revisions to the schedule have been made or recognized. Issue revised schedule concurrently with report of each meeting.
  - c. Review present and future needs of each contractor present, including the following:
    - 1) Interface requirements.
    - 2) Sequence of operations.
    - 3) Status of submittals.
    - 4) Deliveries.
    - 5) Off-site fabrication.
    - 6) Access.
    - 7) Site utilization.
    - 8) Temporary facilities and controls.
    - 9) Work hours.
    - 10) Hazards and risks.
    - 11) Progress cleaning.
    - 12) Quality and work standards.
    - 13) Change Orders.
3. Reporting: The Contractor shall record meeting results and distribute copies to everyone in attendance and to others affected by decisions or actions resulting from each meeting.

## PART 2 - PRODUCTS (Not Used)

## PART 3 - EXECUTION

### 3.1 FORMS

- A. The following forms referenced in this Section are attached:
  1. CAD Files Agreement, 1 page.

END OF SECTION 01 31 00

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## ELECTRONIC FILES USE AND LIABILITY WAIVER

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At the request of the Contractor, Kaestle Boos Associates, Inc. (KBA) agrees to provide you with electronic files developed by KBA for the above referenced project ("the Project") for your use and convenience for this project exclusively and subject to the following terms and conditions:

KBA's electronic files are compatible with\_\_\_\_\_. KBA makes no representation as to the compatibility of these files with your hardware or your software beyond the specified release of the referenced specifications.

Data contained on these electronic files are part of KBA's instruments of service and must not be used by the undersigned for any purpose other than as a convenience and reference for the Project and shall not be used in place of Contract Documents. Each party receiving these files is required to sign this waiver. Any other use by others will be at the sole risk of the undersigned without liability or legal exposure to KBA. By signing this document, the undersigned agrees to make no claim and hereby waive, to the fullest extent permitted by law, any claim or cause of action of any nature against KBA, its officers, directors, employees, agents or subconsultants which may arise out of or in connection with your use of the electronic files.

Furthermore, you shall, to the fullest extent permitted by law, indemnify and hold harmless KBA from all claims, damages, losses and expenses, including attorney's fees arising out of or resulting from your use of these electronic files.

These electronic files are not Contract Documents. Significant differences may exist between these electronic files and corresponding hard copy Contract Documents due to addenda, change orders or other revisions. KBA makes no representation regarding the accuracy or completeness of the electronic files. In the event that a conflict arises between the Contract Documents prepared by KBA and electronic files, the signed contract documents shall govern. KBA shall not be held responsible for determining if any conflict exists. The use of these electronic files, shall not relieve the duty of the Contractor to fully comply with the Contract Documents, including and without limitation, the need to check, confirm and coordinate all dimensions and details, take field measurements, verify field conditions and coordinate work with that of other contractors for the project.

Because of the potential that the information contained in the electronic files can be modified, unintentionally or otherwise, KBA reserves the right to remove all indicia of its ownership and/or involvement from the electronic files.

Under no circumstances shall delivery of the electronic files for use by you be deemed a sale by KBA and KBA makes no warranties, either express or implied, of merchantability or fitness for any particular purpose. In no event shall KBA be liable for any loss of profit or any consequential damages.

Agreed to by,

---

CONTRACTOR – COMPANY NAME

---

TRADE

---

COMPANY OFFICER - [PRINT NAME]

---

SIGNATURE

---

TITLE

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DATE



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## **SECTION 01 33 00—SUBMITTAL PROCEDURES**

### **PART 1 - GENERAL**

#### **1.1 RELATED DOCUMENTS**

- A. The Contractor, Subcontractors, and/or suppliers providing goods and services referenced in or related to this Section shall also be bound by the Related Documents identified in Division 01 Section "Summary."

#### **1.2 SUMMARY**

- A. Section includes requirements for the submittal schedule and administrative and procedural requirements for submitting Shop Drawings, Product Data, Samples, and other submittals.
- B. Related Sections include the following:
  - 1. Division 01 Section "Payment Procedures" for submitting Applications for Payment and the Schedule of Values.
  - 2. Division 01 Section "Project Management and Coordination" for submitting and distributing meeting and conference minutes and for submitting Coordination Drawings.
  - 3. Division 01 Section "Closeout Procedures" for submitting warranties.
  - 4. Divisions 02 through 33 Sections for specific requirements for submittals in those Sections.

#### **1.3 DEFINITIONS**

- A. Action Submittals: Written and graphic information that requires Architect's responsive action.
- B. Informational Submittals: Written information that does not require Architect's responsive action. Submittals may be rejected for not complying with requirements.
- C. File Transfer Protocol (FTP): Communications protocol that enables transfer of files to and from another computer over a network and that serves as the basis for standard Internet protocols. An FTP site is a portion of a network located outside of network firewalls within which internal and external users are able to access files.
- D. Portable Document Format (PDF): An open standard file format licensed by Adobe Systems used for representing documents in a device-independent and display resolution-independent fixed-layout document format.

#### **1.4 ACTION SUBMITTALS**

- A. Submittal Schedule: Submit a schedule of submittals, arranged in chronological order by dates required by construction schedule. Include time required for review, ordering, manufacturing, fabrication, and delivery when establishing dates. Include additional time required for making corrections or revisions to submittals noted by Architect and additional time for handling and reviewing submittals required by those corrections.
  - 1. Coordinate submittal schedule with list of subcontracts, the schedule of values, and Contractor's construction schedule.

2. Final Submittal: Submit concurrently with the first complete submittal of Contractor's construction schedule.
  - a. Submit revised submittal schedule to reflect changes in current status and timing for submittals.
3. Format: Arrange the following information in a tabular format:
  - a. Scheduled date for first submittal.
  - b. Specification Section number and title.
  - c. Submittal category: Action; informational.
  - d. Name of subcontractor.
  - e. Description of the Work covered.
  - f. Scheduled date for Architect's final release or approval.
  - g. Scheduled date of fabrication.

#### 1.5 SUBMITTAL ADMINISTRATIVE REQUIREMENTS

- A. General: Electronic copies of CAD Drawings of the Contract Drawings will not be provided by Architect for Contractor's use in preparing submittals, except as permitted in Division 01 Section "Project Management and Coordination" for use in preparing coordination drawings.
- B. Coordination: Coordinate preparation and processing of submittals with performance of construction activities.
  1. Coordinate each submittal with fabrication, purchasing, testing, delivery, other submittals, and related activities that require sequential activity.
  2. Submit all submittal items required for each Specification Section concurrently unless partial submittals for portions of the Work are indicated on approved submittal schedule.
    - a. Architect reserves the right to withhold action on a submittal requiring coordination with other submittals until related submittals are received.
- C. Processing Time: Allow enough time for submittal review, including time for resubmittals, as follows. Time for review shall commence on Architect's receipt of submittal. No extension of the Contract Time will be authorized because of failure to transmit submittals enough in advance of the Work to permit processing, including resubmittals.
  1. Initial Review: Allow two weeks for initial review of each submittal. Allow additional time if coordination with subsequent submittals is required. Architect will advise Contractor when a submittal being processed must be delayed for coordination.
  2. Intermediate Review: If intermediate submittal is necessary, process it in same manner as initial submittal.
  3. Resubmittal Review: Allow two weeks for review of each resubmittal.

- a. Resubmittals will be reviewed no more than two times at the Owner's expense. Resubmittals which fail to comply with Contract requirements will be reviewed at the Contractor's expense, based on an hourly rate of \$75 per hour, not to exceed \$600 for each subsequent submittal.
  - b. The Owner reserves the right to deduct said reimbursement from the Contractor's application for payment on a monthly basis.
- D. Identification: Place a permanent label or title block on each submittal for identification.
  1. Indicate name of firm or entity that prepared each submittal on label or title block.
  2. Provide a space approximately 6 by 8 inches on label or beside title block to record Contractor's review and approval markings and action taken by Architect.
  3. Include the following information on label for processing and recording action taken:
    - a. Project name.
    - b. Date.
    - c. Name and address of Architect.
    - d. Name and address of Contractor.
    - e. Name and address of supplier.
    - f. Name of manufacturer.
    - g. Number and title of appropriate Specification Section.
    - h. Drawing number and detail references, as appropriate.
    - i. Other necessary identification.
  4. Additional Paper Copies: Unless additional copies are required for final submittal, and unless Architect observes noncompliance with provisions in the Contract Documents, initial submittal may serve as final submittal.
    - a. Submit one copy of submittal to concurrent reviewer in addition to specified number of copies to Architect.
  5. Transmittal: Package each submittal individually and appropriately for transmittal and handling. Transmit each submittal using a transmittal form. Architect will return submittals, without review, received from sources other than Contractor.
    - a. Transmittal Form: Provide locations on form for the following information:
      - 1) Revise list below to suit Project.
      - 2) Project name.
      - 3) Date.
      - 4) Destination (To:).
      - 5) Source (From:).
      - 6) Names of subcontractor, manufacturer, and supplier.

- 7) Category and type of submittal.
- 8) Submittal purpose and description.
- 9) Specification Section number and title.
- 10) Drawing number and detail references, as appropriate.
- 11) Transmittal number, numbered consecutively.
- 12) Submittal and transmittal distribution record.
- 13) Remarks.
- 14) Signature of transmitter.

E. Electronic Submittals: Identify and incorporate information in each electronic submittal file as follows:

1. Assemble complete submittal package into a single indexed file incorporating submittal requirements of a single Specification Section and transmittal form with links enabling navigation to each item.
2. Name file with submittal number or other unique identifier, including revision identifier.
3. Provide means for insertion to permanently record Contractor's review and approval markings and action taken by Architect.
4. Transmittal Form for Electronic Submittals: Use electronic form acceptable to Owner, containing the following information:
  - a. Project name.
  - b. Date.
  - c. Name and address of Architect.
  - d. Name of Contractor.
  - e. Name of firm or entity that prepared submittal.
  - f. Names of subcontractor, manufacturer, and supplier.
  - g. Category and type of submittal.
  - h. Submittal purpose and description.
  - i. Specification Section number and title.
  - j. Specification paragraph number or drawing designation and generic name for each of multiple items.
  - k. Drawing number and detail references, as appropriate.
  - l. Location(s) where product is to be installed, as appropriate.
  - m. Related physical samples submitted directly.
  - n. Indication of full or partial submittal.
  - o. Transmittal number.

- p. Submittal and transmittal distribution record.
  - q. Other necessary identification.
  - r. Remarks.
- F. Options: Identify options requiring selection by Architect.
- G. Deviations and Additional Information: On an attached separate sheet, prepared on Contractor's letterhead, record relevant information, requests for data, revisions other than those requested by Architect on previous submittals, and deviations from requirements in the Contract Documents, including minor variations and limitations. Include same identification information as related submittal.
- H. Resubmittals: Make resubmittals in same form and number of copies as initial submittal.
  - 1. Note date and content of previous submittal.
  - 2. Note date and content of revision in label or title block and clearly indicate extent of revision.
  - 3. Resubmit submittals until they are marked "Approved" or "Approved as Corrected."
- I. Distribution: Furnish copies of final submittals to manufacturers, subcontractors, suppliers, fabricators, installers, authorities having jurisdiction, and others as necessary for performance of construction activities. Show distribution on transmittal forms.
- J. Use for Construction: Use only final submittals with mark indicating "No Exception Taken" or "Make Corrections Noted" taken by Architect.

## PART 2 - PRODUCTS

### 2.1 SUBMITTAL PROCEDURES

- A. General Submittal Procedure Requirements: Prepare and submit submittals required by individual Specification Sections. Types of submittals are indicated in individual Specification Sections.
  - 1. Submit electronic submittals via email as PDF electronic files.
    - a. Architect will return annotated file. Annotate and retain one copy of file as an electronic Project record document file.
- B. Product Data: Collect information into a single submittal for each element of construction and type of product or equipment.
  - 1. If information must be specially prepared for submittal because standard printed data are not suitable for use, submit as Shop Drawings, not as Product Data.
  - 2. Mark each copy of each submittal to show which products and options are applicable.
  - 3. Include the following information, as applicable:
    - a. Manufacturer's catalog cuts.
    - b. Manufacturer's product specifications.
    - c. Standard color charts.

- d. Statement of compliance with specified referenced standards.
    - e. Testing by recognized testing agency.
    - f. Application of testing agency labels and seals.
    - g. Notation of coordination requirements.
    - h. Availability and delivery time information.
  4. Submit Product Data before or concurrent with Samples.
  5. Submit Product Data in one of the following formats:
    - a. PDF electronic file.
    - b. Five paper copies of Product Data, unless otherwise indicated. Architect will return four copies. Mark up and retain one returned copy as a Project Record Document.
- C. Shop Drawings: Prepare Project-specific information, drawn accurately to scale. Do not base Shop Drawings on reproductions of the Contract Documents or standard printed data.
  1. Preparation: Fully illustrate requirements in the Contract Documents. Include the following information, as applicable:
    - a. Dimensions.
    - b. Identification of products.
    - c. Fabrication and installation drawings.
    - d. Roughing-in and setting diagrams.
    - e. Schedules.
    - f. Design calculations.
    - g. Compliance with specified standards.
    - h. Notation of dimensions established by field measurement.
    - i. Seal and signature of professional engineer if specified.
  2. Sheet Size: Except for templates, patterns, and similar full-size drawings, submit Shop Drawings on sheets at least 8-1/2 by 11 inches but no larger than 30 by 42 inches.
- D. Samples: Submit Samples for review of kind, color, pattern, and texture for a check of these characteristics with other elements and for a comparison of these characteristics between submittal and actual component as delivered and installed.
  1. Transmit Samples that contain multiple, related components such as accessories together in one submittal package.
  2. Identification: Attach label on unexposed side of Samples that includes the following:
    - a. Generic description of Sample.
    - b. Product name and name of manufacturer.



- c. Sample source.
  - d. Number and title of appropriate Specification Section.
- 3. Disposition: Maintain sets of approved Samples at Project site, available for quality-control comparisons throughout the course of construction activity. Sample sets may be used to determine final acceptance of construction associated with each set.
- 4. Samples for Verification: Submit full-size units or Samples of size indicated, prepared from same material to be used for the Work, cured and finished in manner specified, and physically identical with material or product proposed for use, and that show full range of color and texture variations expected. Samples include, but are not limited to, the following: partial sections of manufactured or fabricated components; small cuts or containers of materials; complete units of repetitively used materials; swatches showing color, texture, and pattern; color range sets; and components used for independent testing and inspection.
  - a. Number of Samples: Submit three sets of Samples. Architect will retain two Sample sets; remainder will be returned. Mark up and retain one returned Sample set as a Project Record Sample.
    - 1) Submit a single Sample where assembly details, workmanship, fabrication techniques, connections, operation, and other similar characteristics are to be demonstrated.
    - 2) If variation in color, pattern, texture, or other characteristic is inherent in material or product represented by a Sample, submit at least three sets of paired units that show approximate limits of variations.
- E. Coordination Drawings: Comply with requirements specified in Division 01 Section "Project Management and Coordination."
- F. Qualification Data: Prepare written information that demonstrates capabilities and experience of firm or person. Include lists of completed projects with project names and addresses, names and addresses of architects and owners, and other information specified.
- G. Installer Certificates: Prepare written statements on manufacturer's letterhead certifying that Installer complies with requirements in the Contract Documents and, where required, is authorized by manufacturer for this specific Project.
- H. Manufacturer Certificates: Prepare written statements on manufacturer's letterhead certifying that manufacturer complies with requirements in the Contract Documents. Include evidence of manufacturing experience where required.
- I. Product Certificates: Prepare written statements on manufacturer's letterhead certifying that product complies with requirements in the Contract Documents.
- J. Material Certificates: Prepare written statements on manufacturer's letterhead certifying that material complies with requirements in the Contract Documents.

- K. Material Test Reports: Prepare reports written by a qualified testing agency, on testing agency's standard form, indicating and interpreting test results of material for compliance with requirements in the Contract Documents.
- L. Product Test Reports: Prepare written reports indicating current product produced by manufacturer complies with requirements in the Contract Documents. Base reports on evaluation of tests performed by manufacturer and witnessed by a qualified testing agency, or on comprehensive tests performed by a qualified testing agency.
- M. Research/Evaluation Reports: Prepare written evidence, from a model code organization acceptable to authorities having jurisdiction, that product complies with building code in effect for Project. Include the following information:
  - 1. Name of evaluation organization.
  - 2. Date of evaluation.
  - 3. Time period when report is in effect.
  - 4. Product and manufacturers' names.
  - 5. Description of product.
  - 6. Test procedures and results.
  - 7. Limitations of use.
- N. Manufacturer's Instructions: Prepare written or published information that documents manufacturer's recommendations, guidelines, and procedures for installing or operating a product or equipment. Include name of product and name, address, and telephone number of manufacturer. Include the following, as applicable:
  - 1. Preparation of substrates.
  - 2. Required substrate tolerances.
  - 3. Sequence of installation or erection.
  - 4. Required installation tolerances.
  - 5. Required adjustments.
  - 6. Recommendations for cleaning and protection.
- O. Insurance Certificates and Bonds: Prepare written information indicating current status of insurance or bonding coverage. Include name of entity covered by insurance or bond, limits of coverage, amounts of deductibles, if any, and term of the coverage.
- P. Material Safety Data Sheets (MSDSs): Submit information as required by law.

### PART 3 - EXECUTION

#### 3.1 CONTRACTOR'S REVIEW

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

- B. Approval Stamp: Stamp each submittal with a uniform, approval stamp. Include Project name and location, submittal number, Specification Section title and number, name of reviewer, date of Contractor's approval, and statement certifying that submittal has been reviewed, checked, and approved for compliance with the Contract Documents.

1. Provide "Combined Contractor/KBA Inc. Submittal Review Stamp" attached after this Section.

### 3.2 ARCHITECT'S ACTION

- A. General: Architect will not review submittals that do not bear Contractor's approval stamp and will return them without action.
- B. Action Submittals: Architect will review each submittal, make marks to indicate corrections or modifications required, and return it. Architect will stamp each submittal with an action stamp and will mark stamp appropriately to indicate action taken, as follows:
1. "Approved": The portion of Work covered by the submittal may proceed provided it complies with the Contract Documents.
  2. "Approved as Corrected": The portion of Work covered by the submittal may proceed provided it complies with notations or corrections on the submittal, and with the Contract Documents.
  3. "Not Approved" or "Revise and Resubmit": Revise or prepare a new submittal in accordance with notations; resubmit. Do not proceed with that portion of the Work covered by the submittal.
- C. Informational Submittals: Architect will review each submittal and will not return it, or will return it if it does not comply with requirements. Architect will forward each submittal to appropriate party.
- D. Incomplete or partial submittals are not acceptable, will be considered nonresponsive, and will be returned without review.
- E. Submittals not required by the Contract Documents may not be reviewed and may be discarded.

### 3.3 FORMS

- A. The following form referenced in this Section is attached:
1. Combined Contractor/KBA Inc. Submittal Review Stamp, 1 page.

**END OF SECTION 01 33 00**

## COMBINED CONTRACTOR AND K.B.A. INC. SUBMITTAL REVIEW STAMP

CONTRACTOR: _____	
PROJECT: _____	
PARAGRAPH. NO.: _____	SUBMITTAL NO.: _____
CONTRACTOR HAS DETERMINED AND VERIFIED MATERIALS, FIELD MEASUREMENTS AND FIELD CONSTRUCTION CRITERIA AND HAS CHECKED AND COORDINATED THE INFORMATION CONTAINED IN THIS SUBMITTAL WITH THE REQUIREMENTS OF THE WORK AND OF THE CONTRACT DOCUMENTS AND RECOMMENDS APPROVAL BY THE ARCHITECT/ENGINEER.	
BY: _____ DATE: _____	
KAESTLE BOOS ASSOC. PROJECT NO.: <u>KBA# 18030.00</u>	
ARCHITECTS/ENGINEERS DATE RECEIVED STAMP:	<div style="border: 1px solid black; width: 200px; height: 100px; margin: 0 auto;"></div>
COMMENTS MADE ON THE SUBMITTALS DURING THIS REVIEW DO NOT RELIEVE THE CONTRACTOR FROM COMPLIANCE WITH REQUIREMENTS OF THE CONTRACT DOCUMENTS. REVIEWING IS ONLY FOR CONFORMANCE WITH THE DESIGN CONCEPT OF THE PROJECT AND COMPLIANCE WITH THE INFORMATION GIVEN IN THE CONTRACT DOCUMENTS. THE CONTRACTOR IS RESPONSIBLE FOR DIMENSIONS TO BE CONFIRMED AND CORRELATED AT THE SITE; FOR INFORMATION THAT PERTAINS SOLELY TO THE FABRICATION PROCESSES OR TO THE MEANS, METHODS, TECHNIQUES, SEQUENCES AND PROCEDURES OF CONSTRUCTION; AND FOR COORDINATION OF THIS WORK WITH THE WORK OF ALL TRADES.	
ACTION STAMP: <div style="border: 1px solid black; width: 420px; height: 60px; margin: 0 auto;"></div>	

↑  
TO BE FILLED IN BY THE CONTRACTOR  
\_\_\_\_\_  
TO BE FILLED IN BY KAESTLE BOOS ASSOC., INC.  
↓

## **SECTION 01 40 00 - QUALITY REQUIREMENTS**

### **PART 1 - GENERAL**

#### **1.1 RELATED DOCUMENTS**

- A. The Contractor, Subcontractors, and/or suppliers providing goods and services referenced in or related to this Section shall also be bound by the Related Documents identified in Division 01 Section "Summary."

#### **1.2 SUMMARY**

- A. This Section includes administrative and procedural requirements for quality assurance and quality control.
- B. Testing and inspecting services are required to verify compliance with requirements specified or indicated. These services do not relieve Contractor of responsibility for compliance with the Contract Document requirements.
  - 1. Specific quality-assurance and -control requirements for individual construction activities are specified in the Sections that specify those activities. Requirements in those Sections may also cover production of standard products.
  - 2. Specified tests, inspections, and related actions do not limit Contractor's other quality-assurance and -control procedures that facilitate compliance with the Contract Document requirements.
  - 3. Requirements for Contractor to provide quality-assurance and -control services required by Architect, Owner, or authorities having jurisdiction are not limited by provisions of this Section.
- C. Related Sections include the following:
  - 1. Division 01 Section "Construction Progress Documentation" for developing a schedule of required tests and inspections
  - 2. Divisions 02 through 48 Sections for specific test and inspection requirements.

#### **1.3 DEFINITIONS**

- A. Quality-Assurance Services: Activities, actions, and procedures performed before and during execution of the Work to guard against defects and deficiencies and substantiate that proposed construction will comply with requirements.

- B. Quality-Control Services: Tests, inspections, procedures, and related actions during and after execution of the Work to evaluate that actual products incorporated into the Work and completed construction comply with requirements. Services do not include contract enforcement activities performed by Architect or Project Manager.
- C. Mockups: Full-size, physical assemblies that are constructed on-site. Mockups are used to verify selections made under sample submittals, to demonstrate aesthetic effects and, where indicated, qualities of materials and execution, and to review construction, coordination, testing, or operation; they are not Samples. Approved mockups establish the standard by which the Work will be judged.
- D. Preconstruction Testing: Tests and inspections that are performed specifically for the Project before products and materials are incorporated into the Work to verify performance or compliance with specified criteria.
- E. Product Testing: Tests and inspections that are performed by an NRTL, an NVLAP, or a testing agency qualified to conduct product testing and acceptable to authorities having jurisdiction, to establish product performance and compliance with industry standards.
- F. Source Quality-Control Testing: Tests and inspections that are performed at the source, i.e., plant, mill, factory, or shop.
- G. Field Quality-Control Testing: Tests and inspections that are performed on-site for installation of the Work and for completed Work.
- H. Testing Agency: An entity engaged to perform specific tests, inspections, or both. Testing laboratory shall mean the same as testing agency.
- I. Installer/Applicator/Erector: Contractor or another entity engaged by Contractor as an employee, Subcontractor, or Sub-subcontractor, to perform a particular construction operation, including installation, erection, application, and similar operations.
  - 1. Using a term such as "carpentry" does not imply that certain construction activities must be performed by accredited or unionized individuals of a corresponding generic name, such as "carpenter." It also does not imply that requirements specified apply exclusively to tradespeople of the corresponding generic name.

#### 1.4 CONFLICTING REQUIREMENTS

- A. General: If compliance with two or more standards is specified and the standards establish different or conflicting requirements for minimum quantities or quality levels, comply with the most stringent requirement. Refer uncertainties and requirements that are different, but apparently equal, to Architect for a decision before proceeding.

- B. Minimum Quantity or Quality Levels: The quantity or quality level shown or specified shall be the minimum provided or performed. The actual installation may comply exactly with the minimum quantity or quality specified, or it may exceed the minimum within reasonable limits. To comply with these requirements, indicated numeric values are minimum or maximum, as appropriate, for the context of requirements. Refer uncertainties to Architect for a decision before proceeding.

#### 1.5 SUBMITTALS

- A. Qualification Data: For testing agencies specified in "Quality Assurance" Article to demonstrate their capabilities and experience. Include proof of qualifications in the form of a recent report on the inspection of the testing agency by a recognized authority.
- B. Schedule of Tests and Inspections: Prepare in tabular form and include the following:
  - 1. Specification Section number and title.
  - 2. Description of test and inspection.
  - 3. Identification of applicable standards.
  - 4. Identification of test and inspection methods.
  - 5. Number of tests and inspections required.
  - 6. Time schedule or time span for tests and inspections.
  - 7. Entity responsible for performing tests and inspections.
  - 8. Requirements for obtaining samples.
  - 9. Unique characteristics of each quality-control service.
- C. Reports: Prepare and submit certified written reports that include the following:
  - 1. Date of issue.
  - 2. Project title and number.
  - 3. Name, address, and telephone number of testing agency.
  - 4. Dates and locations of samples and tests or inspections.
  - 5. Names of individuals making tests and inspections.
  - 6. Description of the Work and test and inspection method.
  - 7. Identification of product and Specification Section.

8. Complete test or inspection data.
9. Test and inspection results and an interpretation of test results.
10. Record of temperature and weather conditions at time of sample taking and testing and inspecting.
11. Comments or professional opinion on whether tested or inspected Work complies with the Contract Document requirements.
12. Name and signature of laboratory inspector.
13. Recommendations on retesting and reinspecting.

- D. Permits, Licenses, and Certificates: For Owner's records, submit copies of permits, licenses, certifications, inspection reports, releases, jurisdictional settlements, notices, receipts for fee payments, judgments, correspondence, records, and similar documents, established for compliance with standards and regulations bearing on performance of the Work.

#### 1.6 QUALITY ASSURANCE

- A. General: Qualifications paragraphs in this Article establish the minimum qualification levels required; individual Specification Sections specify additional requirements.
- B. Installer Qualifications: A firm or individual experienced in installing, erecting, or assembling work similar in material, design, and extent to that indicated for this Project, whose work has resulted in construction with a record of successful in-service performance.
- C. Manufacturer Qualifications: A firm experienced in manufacturing products or systems similar to those indicated for this Project and with a record of successful in-service performance, as well as sufficient production capacity to produce required units.
- D. Fabricator Qualifications: A firm experienced in producing products similar to those indicated for this Project and with a record of successful in-service performance, as well as sufficient production capacity to produce required units.
- E. Professional Engineer Qualifications: A professional engineer who is legally qualified to practice in jurisdiction where Project is located and who is experienced in providing engineering services of the kind indicated. Engineering services are defined as those performed for installations of the system, assembly, or product that are similar to those indicated for this Project in material, design, and extent.
- F. Specialists: Certain sections of the Specifications require that specific construction activities shall be performed by entities who are recognized experts in those operations. Specialists shall satisfy qualification requirements indicated and shall be engaged for the activities indicated.



1. Requirement for specialists shall not supersede building codes and regulations governing the Work.
- G. Testing Agency Qualifications: An NRTL, an NVLAP, or an independent agency with the experience and capability to conduct testing and inspecting indicated, as documented according to ASTM E 548; and with additional qualifications specified in individual Sections; and where required by authorities having jurisdiction, that is acceptable to authorities.
1. NRTL: A nationally recognized testing laboratory according to 29 CFR 1910.7.
  2. NVLAP: A testing agency accredited according to NIST's National Voluntary Laboratory Accreditation Program.
- H. Factory-Authorized Service Representative Qualifications: An authorized representative of manufacturer who is trained and approved by manufacturer to inspect installation of manufacturer's products that are similar in material, design, and extent to those indicated for this Project.
- I. Preconstruction Testing: Where testing agency is indicated to perform preconstruction testing for compliance with specified requirements for performance and test methods, comply with the following:
1. Contractor responsibilities include the following:
    - a. Provide test specimens representative of proposed products and construction.
    - b. Submit specimens in a timely manner with sufficient time for testing and analyzing results to prevent delaying the Work.
    - c. Provide sizes and configurations of test assemblies, mockups, and laboratory mockups to adequately demonstrate capability of products to comply with performance requirements.
    - d. Build site-assembled test assemblies and mockups using installers who will perform same tasks for Project.
    - e. Build laboratory mockups at testing facility using personnel, products, and methods of construction indicated for the completed Work.
    - f. When testing is complete, remove test specimens, assemblies, mockups, and laboratory mockups; do not reuse products on Project.
    - g. Payment for preconstruction testing is the responsibility of the Contractor.

2. Testing Agency Responsibilities: Submit a certified written report of each test, inspection, and similar quality-assurance service to Architect with copy to Contractor. Interpret tests and inspections and state in each report whether tested and inspected work complies with or deviates from the Contract Documents.

#### 1.7 QUALITY CONTROL

- A. Contractor Responsibilities: Where quality-control services are indicated, Contractor shall engage a qualified testing agency to perform these services.
  1. Contractor will furnish Architect with names, addresses, and telephone numbers of testing agencies engaged and a description of types of testing and inspecting they are engaged to perform.
  2. Payment for these services will be made by the Contractor.
  3. Costs for retesting and re-inspecting construction that replaces or is necessitated by work that failed to comply with the Contract Documents will be the responsibility of the Contractor at no additional cost to the Owner.
- B. Tests and inspections Contractor's responsibility. Unless otherwise indicated, provide quality-control services specified and those required by authorities having jurisdiction. Perform quality-control services required of Contractor by authorities having jurisdiction, whether specified or not.
  1. Contractor shall engage a qualified testing agency to perform these quality-control services.
  2. Contractor shall coordinate all testing and is responsible for scheduling testing so as not to impact the overall project schedule.
  3. Contractor shall submit a certified written report, in duplicate, of each quality-control service.
  4. Testing and inspecting requested by Contractor and not required by the Contract Documents are Contractor's responsibility.
  5. Submit additional copies of each written report directly to authorities having jurisdiction, when they so direct.
- C. Manufacturer's Field Services: Where indicated, engage a factory-authorized service representative to inspect field-assembled components and equipment installation, including service connections. Report results in writing as specified in Division 01 Section "Submittal Procedures."

- D. Re-testing/Re-inspecting: Regardless of whether original tests or inspections were Contractor's responsibility, Contractor shall provide quality-control services, including retesting and re-inspecting, for construction that replaced Work that failed to comply with the Contract Documents.
- E. Testing Agency Responsibilities: Cooperate with Architect and Contractor in performance of duties. Provide qualified personnel to perform required tests and inspections.
  - 1. Notify Architect, and Contractor promptly of irregularities or deficiencies observed in the Work during performance of its services.
  - 2. Determine the location from which test samples will be taken and in which in-situ tests are conducted.
  - 3. Conduct and interpret tests and inspections and state in each report whether tested and inspected work complies with or deviates from requirements.
  - 4. Submit a certified written report, in duplicate, of each test, inspection, and similar quality-control service through Contractor.
  - 5. Do not release, revoke, alter, or increase the Contract Document requirements or approve or accept any portion of the Work.
  - 6. Do not perform any duties of Contractor.
- F. Associated Services: Cooperate with agencies performing required tests, inspections, and similar quality-control services, and provide reasonable auxiliary services as requested. Notify agency sufficiently in advance of operations to permit assignment of personnel. Provide the following:
  - 1. Access to the Work.
  - 2. Incidental labor and facilities necessary to facilitate tests and inspections.
  - 3. Adequate quantities of representative samples of materials that require testing and inspecting. Assist agency in obtaining samples.
  - 4. Facilities for storage and field curing of test samples.
  - 5. Delivery of samples to testing agencies.
  - 6. Preliminary design mix proposed for use for material mixes that require control by testing agency.
  - 7. Security and protection for samples and for testing and inspecting equipment at Project site.

- G. Coordination: Coordinate sequence of activities to accommodate required quality-assurance and -control services with a minimum of delay and to avoid necessity of removing and replacing construction to accommodate testing and inspecting.

1. Schedule times for tests, inspections, obtaining samples, and similar activities.

## PART 2 - PRODUCTS (Not Used)

## PART 3 - EXECUTION

### 3.1 TEST AND INSPECTION LOG

- A. Prepare a record of tests and inspections. Include the following:
1. Date test or inspection was conducted.
  2. Description of the Work tested or inspected.
  3. Date test or inspection results were transmitted to Architect.
  4. Identification of testing agency or special inspector conducting test or inspection.
- B. Maintain log at Project site. Post changes and modifications as they occur. Provide access to test and inspection log for Architect's reference during normal working hours.

### 3.2 REPAIR AND PROTECTION

- A. General: On completion of testing, inspecting, sample taking, and similar services, repair damaged construction and restore substrates and finishes.
1. Provide materials and comply with installation requirements specified in other Specification Sections. Restore patched areas and extend restoration into adjoining areas with durable seams that are as invisible as possible.
  2. Comply with the Contract Document requirements for Division 01 Section "Cutting and Patching."
- B. Protect construction exposed by or for quality-control service activities.
- C. Repair and protection are Contractor's responsibility, regardless of the assignment of responsibility for quality-control services.

**END OF SECTION 01 40 00**

## **SECTION 01 42 00 - REFERENCES**

### **PART 1 - GENERAL**

#### **1.1 RELATED DOCUMENTS**

- A. The Contractor, Subcontractors, and/or suppliers providing goods and services referenced in or related to this Section shall also be bound by the Related Documents identified in Division 01 Section "Summary."

#### **1.2 DEFINITIONS**

- A. General: Basic Contract definitions are included in the Conditions of the Contract.
- B. "Approved": When used to convey Architect's action on Contractor's submittals, applications, and requests, "approved" is limited to Architect's duties and responsibilities as stated in the Conditions of the Contract.
- C. "Directed": A command or instruction by Architect. Other terms including "requested," "authorized," "selected," "approved," "required," and "permitted" have the same meaning as "directed."
- D. "Indicated": Requirements expressed by graphic representations or in written form on Drawings, in Specifications, and in other Contract Documents. Other terms including "shown," "noted," "scheduled," and "specified" have the same meaning as "indicated."
- E. "Regulations": Laws, ordinances, statutes, and lawful orders issued by authorities having jurisdiction, and rules, conventions, and agreements within the construction industry that control performance of the Work.
- F. "Furnish": Supply and deliver to Project site, ready for unloading, unpacking, assembly, installation, and similar operations.
- G. "Install": Operations at Project site including unloading, temporarily storing, unpacking, assembling, erecting, placing, anchoring, applying, working to dimension, finishing, curing, protecting, cleaning, and similar operations.
- H. "Provide": Furnish and install, complete and ready for the intended use.
- I. "Project Site": Space available for performing construction activities. The extent of Project site is shown on Drawings and may or may not be identical with the description of the land on which Project is to be built.

#### **1.3 INDUSTRY STANDARDS**

- A. Applicability of Standards: Unless the Contract Documents include more stringent requirements, applicable construction industry standards have the same force and effect as if bound or copied directly into the Contract Documents to the extent referenced. Such standards are made a part of the Contract Documents by reference.
- B. Publication Dates: Comply with standards in effect as of date of the Contract Documents, unless otherwise indicated.

1.4 ABBREVIATIONS AND ACRONYMS

- A. Industry Organizations: Where abbreviations and acronyms are used in Specifications or other Contract Documents, they shall mean the recognized name of the entities indicated in Gale Research's "Encyclopedia of Associations" or in Columbia Books' "National Trade & Professional Associations of the U.S."

PART 2 - PRODUCTS (Not Used)

PART 3 - EXECUTION (Not Used)

**END OF SECTION 01 42 00**

## **SECTION 01 50 00 - TEMPORARY FACILITIES AND CONTROLS**

### **PART 1 - GENERAL**

#### **1.1 RELATED DOCUMENTS**

- A. The Contractor, Subcontractors, and/or suppliers providing goods and services referenced in or related to this Section shall also be bound by the Related Documents identified in Division 01 Section “Summary.”

#### **1.2 SUMMARY**

- A. This Section specifies requirements for temporary utilities, support facilities, and security and protection facilities.

- 1. Temporary utilities required include but are not limited to:
  - a. Water service and distribution.
  - b. Temporary electric power and light.
  - c. Storm and sanitary sewer.
- 2. Temporary support facilities required include but are not limited to:
  - a. Field offices and storage containers.
  - b. Dewatering facilities and drains.
  - c. Temporary enclosures.
  - d. Temporary Project identification signs.
  - e. Waste disposal services.
  - f. Construction aids and miscellaneous services and facilities.
  - g. Temporary roads and walks.
  - h. Tire cleaning surface.
- 3. Security and protection facilities required include but are not limited to:
  - a. Barricades, warning signs, lights.
  - b. Enclosure fence for the construction area.
  - c. Environmental protection.

- B. Related Sections include the following:

- 1. Division 32 Section “Synthetic Grass Sports Surfacing”

#### **1.3 DEFINITIONS**

- A. Permanent Enclosure: As determined by Architect, permanent or temporary roofing is complete, insulated, and weathertight; exterior walls are insulated and weathertight; and all openings are closed with permanent construction or substantial temporary closures.

#### 1.4 USE CHARGES

- A. General: Cost or use charges for temporary facilities shall be included in the Contract Sum and paid for by the Contractor unless explicitly stated otherwise in the Contract Documents. Allow other entities to use temporary services and facilities without cost, including, but not limited to, Architect, occupants of Project, testing agencies, and authorities having jurisdiction.
- B. Water Service: Cost or use of water from Owner's existing water system charges for temporary facilities shall be included in the Contract Sum and paid for by the Contractor. Provide connections, metering, and extensions of services as required for construction operations.
- C. Electric Power Service: Cost or use of electric power from Owner's existing system charges for temporary facilities shall be included in the Contract Sum and paid for by the Contractor. Provide connections, metering, and extensions of services as required for construction operations.
- D. Sanitary Facilities: Owners sanitary facilities are NOT to be utilized by the Contractor. Temporary sanitary facilities shall be included in the Contract Sum and paid for by the Contractor.
- E. Site Security: Security of the project site and materials stored on site shall be included in the Contract Sum and paid for by the Contractor.

#### 1.5 QUALITY ASSURANCE

- A. Regulations: Comply with industry standards and applicable laws and regulations of authorities having jurisdiction, including but not limited to:
  - 1. Building Code requirements.
  - 2. Health and safety regulations.
  - 3. Utility company regulations.
  - 4. Police and Fire Department rules.
  - 5. Environmental protection regulations.
- B. Standards: Comply with NFPA Code 241, "Building Construction and Demolition Operations", ANSI-A10 Series standards for "Safety Requirements for Construction and Demolition", OSHA Part 1926, Construction Safety and Health Regulations, and NECA Electrical Design Library "Temporary Electrical Facilities."
  - 1. Refer to "Guidelines for Bid Conditions for Temporary Job Utilities and Services", prepared jointly by AGC and ASC, for industry recommendations.

#### 1.6 PROJECT CONDITIONS

- A. Temporary Utilities (if required): Prepare a schedule indicating dates for implementation and termination of each temporary utility within 15 days of the date established for commencement of the Work.
- B. Conditions of Use: Keep temporary services and facilities clean and neat in appearance. Operate in a safe and efficient manner. Take necessary fire prevention measures. Do not overload facilities, or permit them to interfere with progress. Do not allow hazardous dangerous or unsanitary conditions, or public nuisances to develop or persist on the site.



- C. Prevention of Fire: Take all necessary precautions for the prevention of fire during construction. Keep the area within the contract limits orderly and clean and promptly remove combustible rubbish from the site.
  - 1. Store combustible materials on the site only as established in the Contractor's approved Safety Plan.
  - 2. Comply with all suggestions, official recommendations, and lawful requirements of the local fire department regarding fire protection.
- D. Provide and maintain in good working order under all conditions, suitable and adequate fire protection equipment and services.

## PART 2 - PRODUCTS

### 2.1 MATERIALS

- A. General: Provide new materials; if acceptable to the Architect, undamaged previously used materials in serviceable condition may be used. Provide materials suitable for the use intended.
- B. Lumber and Plywood: Comply with requirements in Division 06 Section "Miscellaneous Rough Carpentry."
  - 1. For signs and directory boards, provide exterior type, Grade B-B High Density Concrete Form Overlay Plywood conforming to PS-1, of sizes and thickness indicated.
  - 2. For fences, barriers, sidewalk bridges and similar uses, provide minimum 5/8" thick exterior plywood.
- C. Paint: Comply with requirements of Division 09 Section "Painting."
  - 1. For sign panels and applying graphics, provide exterior grade alkyd gloss enamel over exterior primer.
- D. Tarpaulins: Provide waterproof, fire-resistant, UL labeled tarpaulins with flame-spread rating of 15 or less. For temporary enclosures provide translucent nylon reinforced laminated polyethylene or polyvinyl chloride fire retardant tarpaulins.
- E. Portable Chain-Link Fencing: Minimum 2-inch, 9-gage, galvanized steel, chain-link fabric fencing; minimum 6 feet high with galvanized steel pipe posts; minimum 2-3/8-inch-OD line posts and 2-7/8-inch OD corner and pull posts, with 1-5/8-inch-OD top and bottom rails. Provide concrete bases for supporting posts.

### 2.2 EQUIPMENT

- A. General: Provide new equipment; if acceptable to the Architect, undamaged, previously used equipment in serviceable condition may be used. Provide equipment suitable for use intended.
- B. Water Hoses: Provide 3/4" heavy-duty, abrasion-resistant, flexible rubber hoses 100 ft. long, with pressure rating greater than the maximum pressure of the water distribution system; provide adjustable shut-off nozzles at hose discharge.

- C. Fire Extinguishers: Provide hand-carried, portable UL-rated, class “A” fire extinguishers for temporary offices and similar spaces. In other locations provide hand-carried, portable, UL-rated, class “ABC” dry chemical extinguishers, or a combination of extinguishers of NFPA recommended classes for the exposures.
  - 1. Comply with NFPA 10 and 241 for classification, extinguishing agent and size required by location and class of fire exposure.

### PART 3 - EXECUTION

#### 3.1 INSTALLATION, GENERAL

- A. Use qualified personnel for installation of temporary facilities. Locate facilities where they will serve the Project adequately and result in minimum interference with performance of the Work. Relocate and modify facilities as required by progress of the work, at no additional cost to the Owner.
- B. Provide each facility ready for use when needed to avoid delay. Maintain and modify as required. Do not remove until facilities are no longer needed, or are replaced by authorized use of completed permanent facilities.

#### 3.2 TEMPORARY UTILITY INSTALLATION

- A. Traffic Controls: Comply with requirements of authorities having jurisdiction.
  - 1. Protect existing site improvements to remain including curbs, pavement, and utilities.
  - 2. Maintain access for fire-fighting equipment and access to fire hydrants.
  - 3. Make all necessary arrangements and pay for the services of police officers and firefighters at the prevailing wage for such services as may be required for traffic control or fire watch for the performance of any portion of the Work.
- B. Parking: Use the Contractor Staging/Work area, as indicated in the Phasing Drawings, for construction personnel.
- C. Project Identification and Temporary Signs: Prepare one project identification and other signs of the size indicated; install signs where indicated to inform the public and persons seeking entrance to the Project. Support on posts or framing of preservative treated wood. Do not permit installation of unauthorized signs.
- D. Collection and Disposal of Waste: Collect waste from construction areas and elsewhere daily. Comply with requirements of NFPA 241 for removal of combustible waste material and debris. Enforce requirements strictly. Do not hold materials more than 7 days during normal weather or 3 days when the temperature is expected to rise above 80 deg F (27 deg C). Handle hazardous, dangerous, or unsanitary waste materials separately from other waste by containerizing properly. Dispose of material in a lawful manner.
  - 1. Provide sufficient quantity of dumpsters at strategic locations within the Contract limit lines for collection of waste from the work of all subcontractors on site.

### 3.3 SECURITY AND PROTECTION FACILITIES INSTALLATION

- A. Site Enclosure Fence: Before construction operations begin, furnish and install site enclosure fence and gates in a manner that will prevent people and animals from easily entering site except by entrance gates. Existing gates and Fence can be utilized for this purpose. Supplement existing fence as required to fully secure site. Remove temporary site enclosure fence when the need has ended or prior to substantial completion.
  - 1. Provide vehicle gates at site entrances.
  - 2. Maintain security by limiting number of keys and restricting distribution to authorized personnel. Provide Owner with one set of keys.
  - 3. Make all necessary arrangements with Municipal Police department when regular or off-duty police officers will be needed for traffic control for site operations.
- B. Temporary Enclosures: The Contractor shall provide all temporary enclosure for protection of construction in progress and completed, from exposure, foul weather, other construction operations and similar activities.
  - 1. Install tarpaulins securely, with fire-retardant-treated wood framing and other materials. Close openings of 25 square feet or less with plywood or similar materials.
  - 2. Where temporary wood or plywood enclosure exceeds 100 square feet in area, use UL-labeled fire-retardant treated material for framing and main sheathing.
- C. Protect all new finished surfaces against possible damage from operations under this Contract.
  - 1. Restore or replace all surfaces that are damaged by operations under this Contract to their original condition, to the satisfaction of the Architect, at no additional expense to the Owner.
- D. Temporary Fire Protection: Until fire protection needs are supplied by permanent facilities, install and maintain temporary fire protection facilities of the types needed to protect against reasonably predictable and controllable fire losses. Comply with NFPA 10 "Standard for Portable Fire Extinguishers," and NFPA 241 "Standard for Safeguarding Construction, Alterations and Demolition Operations."
  - 1. Locate fire extinguishers where convenient and effective for their intended purpose, but not less than one extinguisher on each floor at or near each usable stairwell.
  - 2. Store combustible materials, inflammable materials and volatile liquids in containers in fire-safe containers and locations under the Contractor's control and supervision, or without adequate ventilation and fire protection.
  - 3. Maintain unobstructed access to fire extinguishers, fire hydrants, temporary fire protection facilities, stairways and other access routes for fighting fires. Prohibit smoking in hazardous fire exposure areas.
  - 4. Do not permit accumulation of flammable rubbish to remain in the building overnight.

5. Observe strict safety precautions and provide supervision of welding operations, burning with a torch, combustion type temporary heating units, and similar sources of fire ignition.
6. No gasoline may be stored in or close to the field at any time.
7. Comply with requirements of local Fire Department, obtain Hot Work Permit for each day required, and pay all fees and other charges.

### 3.4 SITE CLEANING AND MAINTENANCE

- A. Perform an inspection of the site, including areas outside of the Site boundaries, with the Owner's Representative present, prior to the start of any Work, to determine the existing conditions.
- B. The Contractor shall take all necessary precautions to prevent the spreading of dirt and dust throughout the area of the Work. During demolition and all other work, take to contain dust and other debris from the Work within the limits of the site under the Contractor's control. Promptly clean up all dirt, dust and debris escaping from the work areas or dropped from vehicles traveling to and from the Work.
  1. Equip all vehicles used for transportation to, and removal of material from the site with covers, maintained in good condition, adequate to contain dust and debris within lawful acceptable limits.
  2. Provide facilities for preventing the spread of objectionable matter outside the site areas through washing of vehicles and vehicle wheels; decontamination of vehicles transporting hazardous waste containing materials such as asbestos, lead, or other matter; and by all other means necessary.
  3. When excavation begins, provide a 24' x 60', or larger as indicated, tire cleaning surface at each construction entrance. Provide adequate drainage and maintain surface for the duration of construction.
  4. Contractor shall keep all pavements and areas outside the area of the construction clean of dirt and debris.
- C. Prior to Substantial Completion, remove all spots, stains, dirt and dust from all surfaces, including areas within other buildings and any portion of property of others, which were the result of the work of this project, to the satisfaction of the Architect.
  1. Requirements for final cleaning are contained in Division 01 Section, "ACloseout Procedures."
- D. Repair any damage to the site, the property of others or the Owner's equipment caused by the Contractor or its Subcontractors, at no additional cost to the Owner.

### 3.5 OPERATION, TERMINATION, AND REMOVAL

- A. Supervision: Enforce strict discipline in use of temporary facilities. Limit availability of temporary facilities to essential and intended uses to minimize waste and abuse.
- B. Maintenance: Maintain facilities in good operating condition until removal. Protect from damage by freezing temperatures and similar elements.

1. Maintain operation of temporary enclosures, heating, cooling, humidity control, ventilation, and similar facilities on a 24-hour basis where required to achieve indicated results and to avoid possibility of damage.
  2. Protection: Prevent water filled piping from freezing. Maintain markers for underground lines. Protect from damage during excavation operations.
- C. Termination and Removal: Unless the Architect requests that it be maintained longer, remove each temporary facility when the need has ended, or when replaced by authorized use of a permanent facility, or no later than Substantial Completion. Complete or, if necessary, restore permanent construction that may have been delayed because of interference with the temporary facility. Repair damaged Work, clean exposed surfaces and replace construction that cannot be satisfactorily repaired. Temporary facilities provided by the Contractor shall be removed by the Contractor.
- D. As a condition of the Architect's certification of Substantial Completion, restore site areas of the site damaged by work under this Contract to their condition existing at the start of the work, unless otherwise directed by the Architect.

**END OF SECTION 01 50 00**

**SUBSTITUTION REQUEST****DATE:**

(After the Bidding Phase)

Project: **BISCOGLIO FIELD AT BERLIN HIGH SCHOOL** KBA Project Number: 22024.00

From: \_\_\_\_\_ Substitution Request Number: \_\_\_\_\_

Re: \_\_\_\_\_

Specification Title: \_\_\_\_\_ Description: \_\_\_\_\_

Section: \_\_\_\_\_ Page: \_\_\_\_\_

Article/Paragraph: \_\_\_\_\_

Proposed Substitution: \_\_\_\_\_

Manufacturer: \_\_\_\_\_

Trade Name: \_\_\_\_\_ Model No. \_\_\_\_\_

Website: \_\_\_\_\_ Contact: \_\_\_\_\_

Installer: \_\_\_\_\_

Address: \_\_\_\_\_ Phone: \_\_\_\_\_

Product History: ☐ New Product ☐ 2-5 years old ☐ 5-10 years old ☐ >10 years old

Differences between proposed substitution and specified product: \_\_\_\_\_

☐ Point-by-point comparative data attached – REQUIRED BY ARCHITECT

Reason for not providing specified item: \_\_\_\_\_

Proposed substitution affects other parts of Work: ☐ No ☐ Yes; Explain: \_\_\_\_\_

## Similar Installation:

Project: \_\_\_\_\_ Date Installed: \_\_\_\_\_

Address: \_\_\_\_\_

Architect: \_\_\_\_\_ Phone: \_\_\_\_\_

Owner: \_\_\_\_\_ Phone: \_\_\_\_\_

Proposed substitution affects other parts of Work: ☐ No ☐ Yes; Explain: \_\_\_\_\_

Deduct Saving: \_\_\_\_\_ (\$ \_\_\_\_\_)

Proposed substitution changes Contract Time: ☐ No ☐ Yes [Add] [Deduct] \_\_\_\_\_ daysSupporting Data Attached: ☐ Drawings ☐ Product Data ☐ Samples ☐ Tests ☐ Reports☐ \_\_\_\_\_

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**SUBSTITUTION REQUEST**

(After the Bidding Phase)

**DATE:**

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The Undersigned certifies:

- Proposed substitution has been fully investigated and determined to be equal or superior in all respects to specified product.
- Same warranty will be furnished for proposed substitution as for specified product.
- Same maintenance service and source of replacement parts, as applicable, is available.
- Proposed substitution will have no adverse effect on other trades and will not affect or delay progress schedule.
- Cost data as stated above is complete. Claims for addition costs related to accepted substitution which may subsequently become apparent are to be waived.
- Proposed substitution does not affect dimensions and functional clearances.
- Payment will be made for changes to building design, including A/E design, detailing, and construction costs caused by the substitution.
- Coordination, installation, and changes in the Work as necessary for accepted substitution will be complete in all aspects.

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Submitted by: \_\_\_\_\_ Title: \_\_\_\_\_

Signed: \_\_\_\_\_ Date: \_\_\_\_\_

Email: \_\_\_\_\_ Phone: \_\_\_\_\_

Company: \_\_\_\_\_

Address: \_\_\_\_\_

Attachments: \_\_\_\_\_

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**ARCHITECTS REVIEW AND ACTION**

- ☐ APPROVED - Make submittals in accordance with Specification Section 013300.
- ☐ APPROVED AS NOTED - Make submittals in accordance with Specification Section 013300.
- ☐ REJECTED – Use specified materials.
- ☐ SUBSTITUTION REQUEST RECEIVED TOO LATE – Use specified materials.

Reviewed by: \_\_\_\_\_ Title: \_\_\_\_\_

Signed: \_\_\_\_\_ Date: \_\_\_\_\_

Additional Comments: \_\_\_\_\_

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## **SECTION 01 73 00 - EXECUTION**

### **PART 1 - GENERAL**

#### **1.1 RELATED DOCUMENTS**

- A. The Contractor, Subcontractors, and/or suppliers providing goods and services referenced in or related to this Section shall also be bound by the Related Documents identified in Division 01 Section "Summary."

#### **1.2 SUMMARY**

- A. This Section includes general procedural requirements governing execution of the Work including, but not limited to, the following:
  - 1. Construction layout.
  - 2. Field engineering and surveying.
  - 3. General installation of products.
  - 4. Progress cleaning.
  - 5. Starting and adjusting.
  - 6. Protection of installed construction.
  - 7. Correction of the Work.
- B. Related Sections include the following:
  - 1. Division 01 Section "Submittal Procedures" for submitting surveys.
  - 2. Division 01 Section "Closeout Procedures" for submitting final property survey with Project Record Documents, recording of Owner-accepted deviations from indicated lines and levels, and final cleaning.

#### **1.3 SUBMITTALS**

- A. Qualification Data: For land surveyor and professional engineer.
- B. Certificates: Submit certificate signed by land surveyor or professional engineer certifying that location and elevation of improvements comply with requirements.
- C. Final As-Built Project Surveys: Submit two hard copies signed by land surveyor and one AutoCAD (2013 or newer) copy.

#### **1.4 QUALITY ASSURANCE**

- A. Land Surveyor Qualifications: A professional, land surveyor who is registered in the State of Connecticut to practice in the State of Connecticut and who is experienced in providing land-surveying services of the kind indicated.
- B. PRODUCTS (Not Used)



## PART 2 - EXECUTION

### 2.1 EXAMINATION

- A. Existing Conditions: The existence and location of site improvements, utilities, and other construction indicated as existing are not guaranteed. Before beginning work, investigate and verify the existence and location of mechanical and electrical systems and other construction affecting the Work.
  - 1. Before construction, verify the location and points of connection of utility services.
- B. Existing Utilities: The existence and location of underground and other utilities and construction indicated as existing are not guaranteed. Before beginning sitework, investigate and verify the existence and location of underground utilities and other construction affecting the Work.
  - 1. Before construction, verify the location and invert elevation at points of connection of sanitary sewer, storm sewer, and water-service piping; and underground electrical services.
  - 2. Furnish location data for work related to Project that must be performed by public utilities serving Project site.
- C. Acceptance of Conditions: Examine substrates, areas, and conditions, with Installer or Applicator present where indicated, for compliance with requirements for installation tolerances and other conditions affecting performance. Record observations.
  - 1. Written Report: Where a written report listing conditions detrimental to performance of the Work is required by other Sections, include the following:
    - a. Description of the Work.
    - b. List of detrimental conditions, including substrates.
    - c. List of unacceptable installation tolerances.
    - d. Recommended corrections.
  - 2. Verify compatibility with and suitability of substrates, including compatibility with existing finishes or primers.
  - 3. Examine roughing and finished work prior to proceeding with additional work.
  - 4. Proceed with installation only after unsatisfactory conditions have been corrected. Proceeding with the Work indicates acceptance of surfaces and conditions.

### 2.2 PREPARATION

- A. Existing Utility Information: Furnish information to Owner that is necessary to adjust, move, or relocate existing utility structures, utility poles, lines, services, or other utility appurtenances located in or affected by construction. Coordinate with authorities having jurisdiction.
- B. Field Measurements: Take field measurements as required to fit the Work properly. Recheck measurements before installing each product. Where portions of the Work are indicated to fit to other construction, verify dimensions of other construction by field measurements before fabrication. Coordinate fabrication schedule with construction progress to avoid delaying the Work.

- C. Space Requirements: Verify space requirements and dimensions of items shown diagrammatically on Drawings.
- D. Review of Contract Documents and Field Conditions: Immediately on discovery of the need for clarification of the Contract Documents, submit a request for information to Architect. Include a detailed description of problem encountered, together with recommendations.

## 2.3 CONSTRUCTION LAYOUT

- A. Verification: Before proceeding to lay out the Work, verify layout information shown on Drawings, in relation to the property survey and existing benchmarks. If discrepancies are discovered, notify Architect and Project Manager promptly.
- B. General: Engage a land surveyor to lay out the Work using accepted surveying practices.
  - 1. Establish benchmarks and control points to set lines and levels at each story of construction and elsewhere as needed to locate each element of Project.
  - 2. Establish dimensions within tolerances indicated. Do not scale Drawings to obtain required dimensions.
  - 3. Inform installers of lines and levels to which they must comply.
  - 4. Check the location, level and plumb, of every major element as the Work progresses.
  - 5. Notify Architect when deviations from required lines and levels exceed allowable tolerances.
  - 6. Close site surveys with an error of closure equal to or less than the standard established by authorities having jurisdiction.
- C. Site Improvements: Locate and lay out site improvements, including pavements, building structures, drainage structures, piping (inverts and elevations), grading, fill and topsoil placement, utility slopes, and all facility improvements as part of the project.
- D. Record Log: Maintain a log of layout control work. Record deviations from required lines and levels. Include beginning and ending dates and times of surveys, weather conditions, name and duty of each survey party member, and types of instruments and tapes used. Make the log available for reference by Architect.

## 2.4 FIELD ENGINEERING

- A. Identification: Identify existing benchmarks, control points, and property corners.
- B. Reference Points: Locate existing permanent benchmarks, control points, and similar reference points before beginning the Work. Preserve and protect permanent benchmarks and control points during construction operations.
  - 1. Do not change or relocate existing benchmarks or control points without prior written approval of Architect. Report lost or destroyed permanent benchmarks or control points promptly. Report the need to relocate permanent benchmarks or control points to Architect before proceeding.
  - 2. Replace lost or destroyed permanent benchmarks and control points promptly. Base replacements on the original survey control points.

- C. Benchmarks: Establish and maintain a minimum of two permanent benchmarks on Project site, referenced to data established by survey control points. Comply with authorities having jurisdiction for type and size of benchmark.
  - 1. Record benchmark locations, with horizontal and vertical data, on Project Record Documents.
  - 2. Where the actual location or elevation of layout points cannot be marked, provide temporary reference points sufficient to locate the Work.
  - 3. Remove temporary reference points when no longer needed. Restore marked construction to its original condition.

## 2.5 INSTALLATION

- A. General: Locate the Work and components of the Work accurately, in correct alignment and elevation, as indicated.
  - 1. Make vertical work plumb and make horizontal work level.
  - 2. Where space is limited, install components to maximize space available for maintenance and ease of removal for replacement.
  - 3. Conceal pipes, ducts, and wiring in finished areas, unless otherwise indicated.
  - 4. Maintain minimum headroom clearance of 7'-8" in spaces without a suspended ceiling.
- B. Comply with manufacturer's written instructions and recommendations for installing products in applications indicated.
- C. Install products at the time and under conditions that will ensure the best possible results. Maintain conditions required for product performance until Substantial Completion.
- D. Conduct construction operations so no part of the Work is subjected to damaging operations or loading in excess of that expected during normal conditions of occupancy.
- E. Tools and Equipment: Do not use tools or equipment that produce harmful noise levels.
- F. Templates: Obtain and distribute to the parties involved templates for work specified to be factory prepared and field installed. Check Shop Drawings of other work to confirm that adequate provisions are made for locating and installing products to comply with indicated requirements.
- G. Anchors and Fasteners: Provide anchors and fasteners as required to anchor each component securely in place, accurately located and aligned with other portions of the Work.
  - 1. Mounting Heights: Where mounting heights are not indicated, mount components at heights directed by Architect.
  - 2. Allow for building movement, including thermal expansion and contraction.
  - 3. Coordinate installation of anchorages. Furnish setting drawings, templates, and directions for installing anchorages, including sleeves, concrete inserts, anchor bolts, and items with integral anchors, that are to be embedded in concrete or masonry. Deliver such items to Project site in time for installation.
  - 4. All anchors and fasteners used on the exterior of the building and where dampness and corrosion can reasonably be anticipated to be corrosion resistant.
- H. Joints: Make joints of uniform width. Where joint locations in exposed work are not indicated, arrange joints for the best visual effect. Fit exposed connections together to form hairline joints.

- I. Hazardous Materials: Use products, cleaners, and installation materials that are not considered hazardous.
  - 1. All paint used on products to comply with federal regulations controlling the use of volatile organic components. (VOCs).

## 2.6 PROGRESS CLEANING

- A. General: Clean Project site and work areas daily, including common areas. Coordinate progress cleaning for joint-use areas where more than one installer has worked. Enforce requirements strictly. Dispose of materials lawfully.
  - 1. Comply with requirements in NFPA 241 for removal of combustible waste materials and debris.
  - 2. Do not hold materials more than 7 days during normal weather or 3 days if the temperature is expected to rise above 80 deg F.
  - 3. Containerize hazardous and unsanitary waste materials separately from other waste. Mark containers appropriately and dispose of legally, according to regulations.
- B. Site: Maintain Project site free of waste materials and debris.
- C. Work Areas: Clean areas where work is in progress to the level of cleanliness necessary for proper execution of the Work.
  - 1. Remove liquid spills promptly.
  - 2. Where dust would impair proper execution of the Work, broom-clean or vacuum the entire work area, as appropriate.
- D. Installed Work: Keep installed work clean. Clean installed surfaces according to written instructions of manufacturer or fabricator of product installed, using only cleaning materials specifically recommended. If specific cleaning materials are not recommended, use cleaning materials that are not hazardous to health or property and that will not damage exposed surfaces.
- E. Concealed Spaces: Remove debris from concealed spaces before enclosing the space.
- F. Exposed Surfaces in Finished Areas: Clean exposed surfaces and protect as necessary to ensure freedom from damage and deterioration at time of Substantial Completion.
- G. Waste Disposal: Burying or burning waste materials on-site will not be permitted. Washing waste materials down sewers or into waterways will not be permitted.
- H. During handling and installation, clean and protect construction in progress and adjoining materials already in place. Apply protective covering where required to ensure protection from damage or deterioration at Substantial Completion.
- I. Clean and provide maintenance on completed construction as frequently as necessary through the remainder of the construction period. Adjust and lubricate operable components to ensure operability without damaging effects.
- J. Limiting Exposures: Supervise construction operations to assure that no part of the construction, completed or in progress, is subject to harmful, dangerous, damaging, or otherwise deleterious exposure during the construction period.

2.7 STARTING AND ADJUSTING

- A. Adjust operating components for proper operation without binding. Adjust equipment for proper operation.
- B. Test each piece of equipment to verify proper operation. Test and adjust controls and safeties. Replace damaged and malfunctioning controls and equipment.
- C. Manufacturer's Field Service: If a factory-authorized service representative is required to inspect field-assembled components and equipment installation, comply with qualification requirements in Division 01 Section "Quality Requirements."

2.8 PROTECTION OF INSTALLED CONSTRUCTION

- A. Provide final protection and maintain conditions that ensure installed Work is without damage or deterioration at time of Substantial Completion.
- B. Comply with manufacturer's written instructions for temperature and relative humidity.

2.9 CORRECTION OF THE WORK

- A. Repair or remove and replace defective construction. Restore damaged substrates and finishes. Comply with requirements in Division 01 Section "Cutting and Patching."
  - 1. Repairing includes replacing defective parts, refinishing damaged surfaces, touching up with matching materials, and properly adjusting operating equipment.
- B. Restore permanent facilities used during construction to their specified condition.
- C. Remove and replace damaged surfaces that are exposed to view if surfaces cannot be repaired without visible evidence of repair.
- D. Repair components that do not operate properly. Remove and replace operating components that cannot be repaired.
- E. Remove and replace chipped, scratched, and broken glass or reflective surfaces.
- F. Final As-Built Project Surveys:
  - 1. Submit two hard copies signed by land surveyor and one AutoCAD (2018 or newer) copy of completed as-built survey.
  - 2. Survey shall include all improvements to the site during this project including underground storm drainage structures and piles, utility conduits, hardscape and curbing, fencing, bleachers, lighting, grading and elevations, and build structures.
  - 3. Survey shall be to a T-2 standard.

**END OF SECTION 01 73 00**

## **SECTION 01 77 00 - CLOSEOUT PROCEDURES**

### **PART 1 - GENERAL**

#### **1.1 RELATED DOCUMENTS**

- A. The Contractor, Subcontractors, and/or suppliers providing goods and services referenced in or related to this Section shall also be bound by the Related Documents identified in Division 01 Section "Summary."

#### **1.2 SUMMARY**

- A. This Section includes administrative and procedural requirements for contract closeout, including, but not limited to, the following:
  - 1. Inspection procedures.
  - 2. Warranties.
  - 3. Final cleaning.
  - 4. As-Built Survey
- B. Related Sections include the following:
  - 1. Division 01 Section "Execution" for progress cleaning of Project site.
  - 2. Division 01 Section "Operation and Maintenance Data" for operation and maintenance manual requirements.
  - 3. Division 01 Section "Demonstration and Training" for requirements for instructing Owner's personnel.
  - 4. Division 01 Section "Payment Procedures" for requirements for Applications for Payment for Substantial and Final Completion.
  - 5. Division 01 Section "Project Record Documents" for submitting Record Drawings, Record Specifications, and Record Product Data.
  - 6. Divisions 02 through 48 Sections for specific closeout and special cleaning requirements for the Work in those Sections.

#### **1.3 SUBSTANTIAL COMPLETION**

- A. Preliminary Procedures: Before requesting inspection for determining date of Substantial Completion, complete the following. List items below that are incomplete in request.
  - 1. Prepare a list of items to be completed and corrected (punch list), the value of items on the list, and reasons why the Work is not complete.
  - 2. Advise Owner of pending insurance changeover requirements.
  - 3. Submit specific warranties, workmanship bonds, maintenance service agreements, final certifications, and similar documents. Substantial Completion shall not be issued until all warranties, service agreements, and similar documents are submitted and approved.
  - 4. Obtain and submit releases permitting Owner unrestricted use of the Work and access to services and utilities. Include occupancy permits, operating certificates, and similar releases.

5. Prepare and submit Project Record Documents, operation and maintenance manuals, Final Completion construction photographs and photographic negatives, damage or settlement surveys, property surveys, and similar final record information.
  6. Provide final as-built survey as required under Section 01 73 00 – Execution.
  7. Deliver tools, spare parts, extra materials, and similar items to location designated by Owner. Label with manufacturer's name and model number where applicable.
  8. Make final changeover of permanent locks and deliver keys to Owner. Advise Owner's personnel of changeover in security provisions.
  9. Complete startup testing of systems and performance testing of all surfaces.
  10. Submit test/adjust/balance records.
  11. Terminate and remove temporary facilities from Project site, along with mockups, construction tools, and similar elements.
  12. Submit changeover information related to Owner's occupancy, use, operation, and maintenance.
  13. Complete final cleaning requirements, including touchup painting.
  14. Touch up and otherwise repair and restore marred exposed finishes to eliminate visual defects.
  15. Submit list of subcontractors, service providers, and principal vendors including contact information where they can be reached for emergency service.
- B. Inspection: Submit a written request for inspection for Substantial Completion. On receipt of request, Architect will either proceed with inspection or notify Contractor of unfulfilled requirements. Architect will prepare the Certificate of Substantial Completion after inspection or will notify Contractor of items, either on Contractor's list or additional items identified by Architect, that must be completed or corrected before certificate will be issued.
1. Reinspection: Within 30 days of original request for inspection, request reinspection when the Work identified in previous inspections as incomplete is completed or corrected.
  2. Results of completed inspection will form the basis of requirements for Final Completion.

#### 1.4 FINAL COMPLETION

- A. Preliminary Procedures: Before requesting final inspection for determining date of Final Completion, and within thirty (30) days of issuance of Certificate of Substantial Completion, complete the following:
1. Submit a final Application for Payment according to Division 01 Section "Payment Procedures."
  2. Submit certified copy of Architect's Substantial Completion inspection list of items to be completed or corrected (punch list), endorsed and dated by Architect. The certified copy of the list shall state that each item has been completed or otherwise resolved for acceptance.
  3. Submit all updates to the final as-built survey for work completed after issuance of the Certificate of Substantial Completion
  4. Submit evidence of final, continuing insurance coverage complying with insurance requirements.
  5. Instruct Owner's personnel in operation, adjustment, and maintenance of products, equipment, and systems. Submit demonstration and training videotapes.

- B. Inspection: Submit a written request for final inspection for acceptance. On receipt of request, Architect will either proceed with inspection or notify Contractor of unfulfilled requirements. Architect will prepare a final Certificate for Payment after inspection or will notify Contractor of construction that must be completed or corrected before certificate will be issued.
  - 1. Reinspection: Request reinspection when the Work identified in previous inspections as incomplete is completed or corrected.

#### 1.5 LIST OF INCOMPLETE ITEMS (PUNCH LIST)

- A. Preparation: Submit three copies of list. Include name and identification of each space and area affected by construction operations for incomplete items and items needing correction including, if necessary, areas disturbed by Contractor that are outside the limits of construction.
  - 1. Organize list of spaces in sequential order, starting with exterior areas first and proceeding from lowest floor to highest floor.
  - 2. Organize items applying to each space by major element, including categories for ceiling, individual walls, floors, equipment, and building systems.
  - 3. Include the following information at the top of each page:
    - a. Project name.
    - b. Date.
    - c. Name of Architect.
    - d. Name of Contractor.
    - e. Page number; 1 of x.

#### 1.6 WARRANTIES

- A. Submittal Time: Submit written warranties on request of Architect for designated portions of the Work where commencement of warranties other than date of Substantial Completion is indicated.
- B. Schedule of Warranties: Arrange a Schedule of Warranties in columnar format and include the Specification Section number and title, product name or description, and duration of the warranty. Indicate whether the warranty is by Installer, Manufacturer, or both. Under each of these headings, indicate whether the warranty includes labor only, material only, or both labor and material. Whenever there are differing warranty responsibilities between Installer and Manufacturer, list the responsibilities and duration of each separately.
- C. Organize warranty documents into an orderly sequence based on the table of contents of the Project Manual.
  - 1. Bind warranties and bonds in heavy-duty, 3-ring, vinyl-covered, loose-leaf binders, thickness as necessary to accommodate contents, and sized to receive 8-1/2-by-11-inch paper.
  - 2. Provide heavy paper dividers with plastic-covered tabs for each separate warranty. Mark tab to identify the product or installation. Provide a typed description of the product or installation, including the name of the product and the name, address, and telephone number of Installer.
  - 3. Identify each binder on the front and spine with the typed or printed title "WARRANTIES," Project name, and name of Contractor.



- D. Provide additional copies of each warranty to include in operation and maintenance manuals.

## PART 2 - PRODUCTS

### 2.1 MATERIALS

- A. Cleaning Agents: Use cleaning materials and agents recommended by manufacturer or fabricator of the surface to be cleaned. Do not use cleaning agents that are potentially hazardous to health or property or that might damage finished surfaces.

## PART 3 - EXECUTION

### 3.1 FINAL CLEANING

- A. General: Provide final cleaning. Conduct cleaning and waste-removal operations to comply with local laws and ordinances and Federal and local environmental and antipollution regulations.
- B. Cleaning: Employ experienced workers or professional cleaners for final cleaning. Clean each surface or unit to condition expected in an average commercial building cleaning and maintenance program. Comply with manufacturer's written instructions.
  - 1. Complete the following cleaning operations before requesting inspection for certification of Substantial Completion for entire Project or for a portion of Project:
    - a. Clean Project site, yard, and grounds, in areas disturbed by construction activities, including landscape development areas, of rubbish, waste material, litter, and other foreign substances.
    - b. Sweep paved areas broom clean. Remove petrochemical spills, stains, and other foreign deposits.
    - c. Remove tools, construction equipment, machinery, and surplus material from Project site.
    - d. Remove labels that are not permanent.
    - e. Touch up and otherwise repair and restore marred, exposed finishes and surfaces. Replace finishes and surfaces that cannot be satisfactorily repaired or restored or that already show evidence of repair or restoration.
      - 1) Do not paint over "UL" and similar labels, including mechanical and electrical nameplates.
    - f. Leave Project clean and ready for occupancy.
- C. Comply with safety standards for cleaning. Do not burn waste materials. Do not bury debris or excess materials on Owner's property. Do not discharge volatile, harmful, or dangerous materials into drainage systems. Remove waste materials from Project site and dispose of lawfully.

**END OF SECTION 01 77 00**

## **SECTION 01 78 23 - OPERATION AND MAINTENANCE DATA**

### **PART 1 - GENERAL**

#### **1.1 RELATED DOCUMENTS**

- A. The Vendor, Sub-vendors, and/or suppliers providing goods and services referenced in or related to this Section shall also be bound by the Related Documents identified in Division 01 Section "Summary."

#### **1.2 SUMMARY**

- A. This Section includes administrative and procedural requirements for preparing operation and maintenance manuals, including the following:
  - 1. Operation and maintenance documentation directory.
  - 2. Operation manuals for systems, subsystems, and equipment.
  - 3. Maintenance manuals for the care and maintenance of products, materials, finishes, systems, and equipment.

#### **1.3 DEFINITIONS**

- A. System: An organized collection of parts, equipment, or subsystems united by regular interaction.
- B. Subsystem: A portion of a system with characteristics similar to a system.

#### **1.4 SUBMITTALS**

- A. Submit one copy of each manual in final form at least fifteen (15) days before final inspection.
  - 1. Correct or modify each manual to comply with Architect's comments. Submit the (3) copies of each corrected manual within fifteen (15) days of receipt of Architect's comments.

#### **1.5 COORDINATION**

- A. Where operation and maintenance documentation includes information on installations by more than one factory-authorized service representative, assemble and coordinate information furnished by representatives and prepare manuals.

### **PART 2 - PRODUCTS**

#### **2.1 OPERATION AND MAINTENANCE DOCUMENTATION DIRECTORY**

- A. Organization: Include a section in the directory for each of the following:
  - 1. List of documents.
  - 2. List of systems.
  - 3. List of equipment.
  - 4. Table of contents.
- B. List of Systems and Subsystems: List systems alphabetically. Include references to operation and maintenance manuals that contain information about each system.

- C. List of Equipment: List equipment for each system, organized alphabetically by system. For pieces of equipment not part of system, list alphabetically in separate list.
- D. Tables of Contents: Include a table of contents for each emergency, operation, and maintenance manual.

## 2.2 MANUALS, GENERAL

- A. Organization: Unless otherwise indicated, organize each manual into a separate section for each system and subsystem, and a separate section for each piece of equipment not part of a system. Each manual shall contain the following materials, in the order listed:
  - 1. Title page.
  - 2. Table of contents.
  - 3. Manual contents.
- B. Title Page: Enclose title page in transparent plastic sleeve. Include the following information:
  - 1. Subject matter included in manual.
  - 2. Name and address of Project.
  - 3. Name and address of Owner.
  - 4. Date of submittal.
  - 5. Name, address, and telephone number of Contractor.
  - 6. Name and address of Architect.
  - 7. Cross-reference to related systems in other operation and maintenance manuals.
- C. Table of Contents: List each product included in manual, identified by product name, indexed to the content of the volume, and cross-referenced to Specification Section number in Project Manual.
  - 1. If operation or maintenance documentation requires more than one volume to accommodate data, include comprehensive table of contents for all volumes in each volume of the set.
- D. Manual Contents: Organize into sets of manageable size. Arrange contents alphabetically by system, subsystem, and equipment. If possible, assemble instructions for subsystems, equipment, and components of one system into a single binder or file.
  - 1. Binders: Heavy-duty, 3-ring, vinyl-covered, loose-leaf binders, in thickness necessary to accommodate contents, sized to hold 8-1/2-by-11-inch paper; with clear plastic sleeve on spine to hold label describing contents and with pockets inside covers to hold folded oversize sheets.
    - a. If two or more binders are necessary to accommodate data of a system, organize data in each binder into groupings by subsystem and related components. Cross-reference other binders if necessary to provide essential information for proper operation or maintenance of equipment or system.
    - b. Identify each binder on front and spine, with printed title "OPERATION AND MAINTENANCE MANUAL," Project title or name, and subject matter of contents, including Specification Section number. Indicate volume number for multiple-volume sets.

2. Dividers: Heavy-paper dividers with plastic-covered tabs for each section. Mark each tab to indicate contents. Include typed list of products and major components of equipment included in the section on each divider, cross-referenced to Specification Section number and title of Project Manual.
3. Protective Plastic Sleeves: Transparent plastic sleeves designed to enclose diagnostic software diskettes for computerized electronic equipment.
4. Supplementary Text: Prepared on 8-1/2-by-11-inch white bond paper.
5. Drawings: Attach reinforced, punched binder tabs on drawings and bind with text.
  - a. If oversize drawings are necessary, fold drawings to same size as text pages and use as foldouts.
  - b. If drawings are too large to be used as foldouts, fold and place drawings in labeled envelopes and bind envelopes in rear of manual. At appropriate locations in manual, insert typewritten pages indicating drawing titles, descriptions of contents, and drawing locations.
6. Digital Files: Each manual shall also be made into a .pdf version.

## 2.3 OPERATION MANUALS

- A. Content: In addition to requirements in this Section, include operation data required in individual Specification Sections and the following information:
  1. System, subsystem, and equipment descriptions.
  2. Performance and design criteria if Contractor is delegated design responsibility.
  3. Operating standards.
  4. Operating procedures.
  5. Operating logs.
  6. Wiring diagrams.
  7. Precautions against improper use.
  8. License requirements including inspection and renewal dates.
- B. Descriptions: Include the following:
  1. Product name and model number.
  2. Manufacturer's name.
  3. Equipment identification with serial number of each component.
  4. Equipment function.
  5. Operating characteristics.
  6. Limiting conditions.
  7. Complete nomenclature and number of replacement parts.

- C. Operating Procedures: Include the following, as applicable:
  - 1. Routine and normal operating instructions.
  - 2. Regulation and control procedures.
  - 3. Instructions on stopping.
  - 4. Normal shutdown instructions.
  - 5. Required sequences for electric or electronic systems.
  - 6. Special operating instructions and procedures.
- D. Systems and Equipment Controls: Describe the sequence of operation, and diagram controls as installed.

## 2.4 PRODUCT MAINTENANCE MANUAL

- A. Content: Organize manual into a separate section for each product, material, and finish. Include source information, product information, maintenance procedures, repair materials and sources, and warranties and bonds, as described below.
- B. Source Information: List each product included in manual identified by product name and arranged to match manual's table of contents. For each product, list name, address, and telephone number of Installer or supplier and maintenance service agent, and cross-reference Specification Section number and title in Project Manual.
- C. Product Information: Include the following, as applicable:
  - 1. Product name and model number.
  - 2. Manufacturer's name.
  - 3. Color, pattern, and texture.
  - 4. Material and chemical composition.
  - 5. Reordering information for specially manufactured products.
- D. Maintenance Procedures: Include manufacturer's written recommendations and the following:
  - 1. Inspection procedures.
  - 2. Types of cleaning agents to be used and methods of cleaning.
  - 3. List of cleaning agents and methods of cleaning detrimental to product.
  - 4. Schedule for routine cleaning and maintenance.
  - 5. Repair instructions.
- E. Repair Materials and Sources: Include lists of materials and local sources of materials and related services.
- F. Warranties and Bonds: Include copies of warranties and bonds and lists of circumstances and conditions that would affect validity of warranties or bonds.
  - 1. Include procedures to follow and required notifications for warranty claims.

## 2.5 SYSTEMS AND EQUIPMENT MAINTENANCE MANUAL

- A. Content: For each system, subsystem, and piece of equipment not part of a system, include source information, manufacturers' maintenance documentation, maintenance procedures, maintenance and service schedules, spare parts list and source information, maintenance service contracts, and warranty and bond information, as described below.

- B. Source Information: List each system, subsystem, and piece of equipment included in manual identified by product name and arranged to match manual's table of contents. For each product, list name, address, and telephone number of Installer or supplier and maintenance service agent, and cross-reference Specification Section number and title in Project Manual.
- C. Manufacturers' Maintenance Documentation: Manufacturers' maintenance documentation including the following information for each component part or piece of equipment:
  - 1. Standard printed maintenance instructions and bulletins.
  - 2. Drawings, diagrams, and instructions required for maintenance, including disassembly and component removal, replacement, and assembly.
  - 3. Identification and nomenclature of parts and components.
  - 4. List of items recommended to be stocked as spare parts.
- D. Maintenance Procedures: Include the following information and items that detail essential maintenance procedures:
  - 1. Test and inspection instructions.
  - 2. Troubleshooting guide.
  - 3. Precautions against improper maintenance.
  - 4. Disassembly; component removal, repair, and replacement; and reassembly instructions.
  - 5. Aligning, adjusting, and checking instructions.
  - 6. Demonstration and training videotape, if available.
- E. Maintenance and Service Schedules: Include service and lubrication requirements, list of required lubricants for equipment, and separate schedules for preventive and routine maintenance and service with standard time allotment.
  - 1. Scheduled Maintenance and Service: Tabulate actions for daily, weekly, monthly, quarterly, semiannual, and annual frequencies.
  - 2. Maintenance and Service Record: Include manufacturers' forms for recording maintenance.
- F. Spare Parts List and Source Information: Include lists of replacement and repair parts, with parts identified and cross-referenced to manufacturers' maintenance documentation and local sources of maintenance materials and related services.
- G. Maintenance Service Contracts: Include copies of maintenance agreements with name and telephone number of service agent.
- H. Warranties and Bonds: Include copies of warranties and bonds and lists of circumstances and conditions that would affect validity of warranties or bonds.
  - 1. Include procedures to follow and required notifications for warranty claims.

### PART 3 - EXECUTION

#### 3.1 MANUAL PREPARATION

- A. Operation and Maintenance Documentation Directory: Prepare a separate manual that provides an organized reference to emergency, operation, and maintenance manuals.
- B. Product Maintenance Manual: Assemble a complete set of maintenance data indicating care and maintenance of each product, material, and finish incorporated into the Work.

- C. Operation and Maintenance Manuals: Assemble a complete set of operation and maintenance data indicating operation and maintenance of each system, subsystem, and piece of equipment not part of a system.
  - 1. Engage a factory-authorized service representative to assemble and prepare information for each system, subsystem, and piece of equipment not part of a system.
  - 2. Prepare a separate manual for each system and subsystem, in the form of an instructional manual for use by Owner's operating personnel.
- D. Manufacturers' Data: Where manuals contain manufacturers' standard printed data, include only sheets pertinent to product or component installed. Mark each sheet to identify each product or component incorporated into the Work. If data include more than one item in a tabular format, identify each item using appropriate references from the Contract Documents. Identify data applicable to the Work and delete references to information not applicable.
  - 1. Prepare supplementary text if manufacturers' standard printed data are not available and where the information is necessary for proper operation and maintenance of equipment or systems.
- E. Drawings: Prepare drawings supplementing manufacturers' printed data to illustrate the relationship of component parts of equipment and systems and to illustrate control sequence and flow diagrams. Coordinate these drawings with information contained in Record Drawings to ensure correct illustration of completed installation.
- F. Submit a complete set of manuals electrically for review and approval by the Architect.
- G. Upon approval, submit two (2) hard copies and two (2) digital copies of the final manuals to the Architect for distribution to the Owner.

**END OF SECTION 01 78 23**

## **SECTION 02 41 00 — DEMOLITION**

### **PART 1 – GENERAL**

#### **1.1 RELATED DOCUMENTS**

- A. The Contractor, Subcontractors, and/or suppliers providing goods and services referenced in or related to this Section shall also be bound by the Related Documents identified in Division 01 Section “Summary.”

#### **1.2 DESCRIPTION OF WORK**

- A. All labor, material and equipment necessary to complete all phases of demolition work as shown on the Drawings, as specified, and as can be reasonably implied from Drawings, Specifications, and field conditions.
- B. Filling of depressions resulting from demolition activities.
- C. Removal of utilities, drainage structures, drainage piping, pavement, handrails, playscapes, sidewalks and curbing.
- D. Removal and disposal of resulting demolition materials.
- E. Salvaged Materials to Remain property of the Owner.
- F. Leaving site clean and ready for clearing required to install new construction.
- G. Maintaining streets and walks during demolition and the cleaning of them of debris resulting from demolition.
- H. Temporary shoring, bracing and framing where necessary for demolition work.
- I. Protecting adjoining construction that is to remain.
- J. Patching required as a result of demolition.
- K. Securing and maintaining in force the required permits and the payment of associated fees.
- L. Complying with all regulations for street and walk access and protection and fire access.

#### **1.3 RELATED WORK DESCRIBED ELSEWHERE**

- A. Section 31 20 00 – Earth Moving
- B. Section 31 25 00 – Erosion and Sedimentation Controls

#### **1.4 QUALITY ASSURANCE**

- A. Requirements of Regulatory Agencies:
  - 1. State of Connecticut/ National Building Code
  - 2. State of Connecticut Department of Health
  - 3. State of Connecticut Department of Energy and Environmental Protection (DEEP)
  - 4. Utility companies having jurisdiction of project site
  - 5. Town of Berlin, CT
  - 6. Berlin Public Schools

#### **1.5 JOB CONDITIONS**

- A. Traffic:
  - 1. Conduct demolition operations and the removal of debris in a manner to ensure minimum interference with roads, streets, walks, and other adjacent occupied or used facilities.
  - 2. Do not close or obstruct streets, walks, or other occupied or used facilities without permission from authorities having jurisdiction.



3. Provide alternate, adequately signed, routes around closed or obstructed traffic ways.
4. Ensure the safe passage of persons around the area of demolition.
- B. Conduct operations to buildings, to prevent damage or injury to adjacent buildings, structures, other facilities, and persons.
- C. Provide shoring, underpinning, excavation supports as necessary to protect structures and all adjacent properties.
- D. If applicable, provide and maintain fire protection.
- E. Promptly repair damages, to adjacent facilities caused by demolition operations. Replace glass breakage immediately.
- F. Maintain existing utilities not scheduled to be removed, keep in service, and protect against damage during demolition operations.
  1. Repair and, if necessary replace at Architects discretion, services damaged as result of demolition.
  2. Do not interrupt existing utilities if encountered serving occupied or used facilities, except when authorized in writing by authorities.
  3. Provide temporary services during interruptions to existing utilities, as acceptable to the governing authorities.
  4. The contractor shall arrange for any utility shut-offs and demolition permits required. The Contractor shall disconnect and seal utilities before starting demolition operations. Construction related work required by the Utility Companies is included in this Contract. Do not start demolition work until utility disconnections have been completed and verified in writing.
- B. Protection:
  1. Erect barriers, fences, guard rails, enclosures, chutes, and shoring to protect personnel, structures, and utilities remaining intact.

## PART 2 - PRODUCTS (NOT USED)

## PART 3 – EXECUTION

### 3.1 PREPARATION

- A. Review all limits of fencing, sedimentation control and other construction barriers with Owner and Engineer prior to installation.
- B. Arrange for, and verify termination, of utility services to include removing meters and capping lines, if necessary.
- C. Where trafficways will be closed or obstructed the Contractor shall provide alternate routes, including adequate signing and striping.
- D. Prior to demolition, removal, or abandonment of items within paved areas to remain the Contractor shall sawcut the bituminous concrete pavement.
- E. The Contractor shall obtain all necessary permits from agencies having jurisdiction.
- F. The contractor shall coordinate demolition activities with the Owner at least a week in advance to coordinate work to be performed by others

### 3.2 DEMOLITION

- A. Use water sprinkling, temporary enclosures, and other suitable methods to limit to the lowest practical level the amount of dust and dirt rising and scattering in the air.
  - 1. Comply with governing regulations pertaining to environmental protection and pollution.
  - 2. Do not use water when it may create hazardous or objectionable conditions, such as ice, flooding, and pollution.
- B. Remove below grade construction completely and fill below-grade areas and voids from resulting from demolition of structures and pavements.
  - 1. Use satisfactory materials consisting of stone, gravel, and sand, free from debris, trash, materials, roots, and other organic matter.
- C. Prior to placement of fill materials, ensure that areas to be filled are free of standing water, frost, frozen materials, roots and other organic matter.
- D. Place fill materials in horizontal layers generally not exceeding 6" in loose depth. Compact each layer at optimum moisture content of fill material to a density equal to original adjacent ground, unless subsequent excavation for new work is required.
  - 1. After fill placement and compaction, grade surface to meet adjacent contours and to provide flow to surface drainage structures.
  - 2. Where indicated on the Drawings demolish and remove foundation walls and retaining walls to an elevation two feet below existing or proposed finish grade, whichever is lower.
  - 3. Filling will be in conformance with the requirements of Section 31 20 00 – Earth Moving.
- E. Cap, plug with brick and mortar, or remove, as indicated, pipes and other conduits abandoned due to demolition. Holes left in existing structures left from the removal and/or demolition of piping shall also adequately plugged and capped. Coordinate all utility abandonment with affected utility. Perform utility in accordance with requirements of affected utility. Repair trenches and perform work within R.O.W. in accordance with the City's and utility company's requirements.

### 3.3 SALVAGED MATERIALS:

- A. Existing Flagpoles
- B. Existing Granite Monument
- C. Flagpoles and monument shall be carefully removed, protected, cleaned and properly stored on site for removal by the Owner.
- D. Prior to removal contractor shall document conditions with photographs, and written inventory.
- E. Concrete footings and sleeves shall be removed and disposed of by the contractor.

3.4 DISPOSAL OF DEMOLISHED MATERIALS

- A. Remove from the site debris, rubbish, and other materials resulting from demolition operations.
  - 1. Storing or burning of materials on the site will not be permitted.
- B. Transport materials of demolished structures and legally dispose of off-site in conformance with regulations of Department of Energy and Environmental Protection, and other regulating agencies as applicable.
- C. Remove demolition debris daily.
- D. Manner of disposal shall comply with all applicable local, state, and federal regulations.

**END OF SECTION 02 41 00**

## **SECTION 03 30 00 - CAST-IN-PLACE CONCRETE**

### **PART 1 - GENERAL**

#### **1.1 RELATED DOCUMENTS**

- A. The Contractor, Subcontractors, and/or suppliers providing goods and services referenced in or related to this Section shall also be bound by the Related Documents identified in Division 01 Section "Summary."

#### **1.2 SUMMARY**

- A. This Section specifies cast-in place concrete, including formwork, reinforcement, concrete materials, mixture design, placement procedures, and finishes in accordance with the Contract Documents and applicable Codes. The work shall include the following:
  - 1. Footings.
  - 2. Site Walls.
  - 3. Cast-in-Place curbs, pads & anchors
- B. Related Sections include the following:
  - 1. Division 31, Section "Structural Fill"
  - 2. Division 31, Section "Earthwork"
  - 3. Division 32 Section 'Concrete Paving'

#### **1.3 DEFINITIONS**

- A. Cementitious Materials: Portland cement alone or in combination with one or more of the following: blended hydraulic cement, fly ash and other pozzolans, ground granulated blast furnace slag, and silica fume; subject to compliance with requirements.

#### **1.4 QUALITY ASSURANCE**

- A. Concrete work shall conform to all requirements of A.C.I. 301-16 "Specifications for Structural Concrete ", published by the American Concrete Institute, Farmington Hills, Michigan, except as modified by the Supplemental Requirements below.
- B. Concrete supplier and Contractor shall certify that they are familiar with the above reference standard, and a copy shall be available on the job. A.C.I Standard 301-16 is available from American Concrete Institute, P.O. Box 9094, Farmington Hills, Michigan 48333-9094.
- C. Manufacturer Qualifications: A firm experienced in manufacturing ready-mixed concrete products and that complies with ASTM C 94/C 94M requirements for production facilities and equipment.
  - 1. Manufacturer certified according to NRMCA's "Certification of Ready Mixed Concrete Production Facilities."
- E. Testing Agency Qualifications: An independent agency, acceptable to authorities having jurisdiction, qualified according to ASTM C 1077 and ASTM E 329 for testing indicated, as documented according to ASTM E 548.
  - 1. Personnel conducting field tests will be qualified as ACI Concrete Field Testing Technician, Grade 1, according to ACI CP-01 or an equivalent certification program.
  - 2. Personnel performing laboratory tests will be ACI-certified Concrete Strength Testing Technician and Concrete Laboratory Testing Technician - Grade I. Testing Agency laboratory supervisor will be an ACI-certified Concrete Laboratory Testing Technician - Grade II.

- F. Source Limitations: Obtain each type or class of cementitious material of the same brand from the same manufacturer's plant, obtain aggregate from one source, and obtain admixtures through one source from a single manufacturer.
  - G. Concrete Testing Service: **Contractor** shall engage a qualified independent testing agency to perform material evaluation tests and to design concrete mixtures.
  - H. Testing Agency Qualifications: An independent agency, acceptable to authorities having jurisdiction, qualified according to ASTM C 1077 and ASTM E 329 for testing indicated, as documented according to ASTM E 548.
    - 1. Personnel conducting field tests will be qualified as ACI Concrete Field Testing Technician, Grade 1, according to ACI CP-01 or an equivalent certification program.
    - 2. Personnel performing laboratory tests will be ACI-certified Concrete Strength Testing Technician and Concrete Laboratory Testing Technician - Grade I.
  - I. ACI Publications: Comply with the following unless modified by requirements in the Contract Documents:
    - 1. ACI 117, "Specifications for Tolerances for Concrete Construction and Materials."
  - J. Pre-installation Conference: Conduct conference at Project site to comply with requirements in Division 1 Section "Project Management and Coordination."
    - 1. Before submitting design mixtures, review concrete design mixture and examine procedures for ensuring quality of concrete materials. Require representatives of each entity directly concerned with cast-in-place concrete to attend, including the following:
      - a. Contractor's superintendent.
      - b. Contractor's independent testing agency responsible for concrete design mixtures.
      - c. Ready-mix concrete manufacturer.
      - d. Concrete subcontractor.
    - 2. Review special inspection and testing and inspecting agency procedures for field quality control, concrete finishes and finishing, cold- and hot-weather concreting procedures, curing procedures, construction contraction and isolation joints, and joint-filler strips, semi rigid joint fillers, forms and form removal limitations, vapor-retarder installation, anchor rod and anchorage device installation tolerances, steel reinforcement installation, floor and slab flatness and levelness measurement, concrete repair procedures, and concrete protection.
- 1.5 ACTION SUBMITTALS
- A. Product Data: For each type of product indicated.
  - B. Design Mixtures: For each concrete mixture. Submit alternate design mixtures when characteristics of materials, Project conditions, weather, test results, or other circumstances warrant adjustments.
    - 1. Indicate amounts of mixing water to be withheld for later addition at Project site.

- C. Steel Reinforcement Shop Drawings: Submit reinforcing steel placing drawings for all reinforced concrete footings, buttresses, piers, walls and tie beams.
    - 1. Shop drawings for the reinforcement detailing, fabricating, bending and placing concrete reinforcement will comply with ACI 315 "Manual of Standard Practice for Detailing Reinforced Concrete Structures". All walls will be drawn in elevation with all reinforcing included in the elevation including corner bars, dropped bars at column and door pockets and openings. The elevations will be drawn to a minimum of 1/4" = 1'-0".
    - 2. Placing drawings that detail fabrication, bending, and placement. Include bar sizes, lengths, material, grade, bar schedules, stirrup spacing, bent bar diagrams, bar arrangement, splices and laps, mechanical connections, tie spacing, hoop spacing, and supports for concrete reinforcement. "SCHEDULING OF REINFORCING IS PROHIBITED"
    - 3. Subsequent submissions of shop drawings will be dated and numbered and will have all revision clearly noted with clouding of each revision.
    - 4. All reinforcing will be properly labeled and indicated in elevations.
  - D. Qualification Data: For Installer, manufacturers, and testing agency.
  - E. Material Test Reports: For the following, from a qualified testing agency, indicating compliance with requirements:
    - 1. Aggregates. Include service record data indicating absence of deleterious expansion of concrete due to alkali aggregate reactivity.
  - F. Material Certificates: For each of the following, signed by manufacturers:
    - 1. Cementitious materials.
    - 2. Admixtures.
    - 3. Form materials and form-release agents.
    - 4. Steel reinforcement and accessories.
    - 5. Repair materials.
  - G. Field quality-control test and inspection reports.
- 1.6 DELIVERY, STORAGE, AND HANDLING
- A. Steel Reinforcement: Deliver, store, and handle steel reinforcement to prevent bending and damage.
  - B. Store materials protected from exposure to harmful weather conditions and at a temperature above 40° Fahrenheit.

PART 2 - PRODUCTS

2.1 CONCRETE, GENERAL

- A. ACI Publications: Comply with the following unless modified by requirements in the Contract Documents:
  - 1. ACI 301-16
  - 2. ACI 117

## 2.2 CONCRETE

- A. Concrete compressive strength for foundation walls and footings will have:
  - 1. Compressive strength = 4000 psi minimum at 28 days.
  - 2. Slump = 4" +/- 1"
  - 3. Air Content = 6 to 8% for all walls, footings and slabs exposed to freezing temperatures.
- B. Source Limitations: Obtain each type or class of cementitious material of the same brand from the same manufacturer's plant, obtain aggregate from single source, and obtain admixtures from single source from single manufacturer.
- C. Cementitious Materials:
  - 1. Portland Cement: ASTM C 150, Type I/II gray
  - 2. Flyash ASTM C618 Class C and ACI318-05
  - 3. Sand ASTM C33 SSD
- D. Normal-Weight Aggregates: ASTM C 33. Class 3S coarse aggregate or better, graded. Provide aggregates from a single source with documented service record data of at least 10 years' satisfactory service in similar applications and service conditions using similar aggregates and cementitious materials.
  - 1. Maximum Coarse Aggregate Size:  $\frac{3}{4}$ " nominal.
  - 2. Fine Aggregate: Free of materials with deleterious reactivity to alkali in cement.
- E. Water: ASTM C94 and potable.
- F. Air-Entraining Admixture: ASTM C 260
  - 1. For Footings, foundation walls, column piers and buttresses and all other concrete exposed to freeze/thaw action. - Air Content: 6 percent, plus or minus 1.5 percent at point of delivery for  $\frac{3}{4}$ -inch nominal maximum aggregate size.
- G. Chemical Admixtures: Certified by manufacturer to be compatible with other admixtures and that do not contribute water-soluble chloride ions exceeding those permitted in hardened concrete. Do not use calcium chloride or admixtures containing calcium chloride.
  - 1. Water-Reducing Admixture: ASTM C 494
  - 2. Retarding Admixture: ASTM C 494
  - 3. Water-Reducing and Retarding Admixture: ASTM C 494
  - 4. High-Range, Water-Reducing Admixture: ASTM C 494
  - 5. High-Range, Water-Reducing and Retarding Admixture: ASTM C 494
  - 6. Plasticizing and Retarding Admixture: ASTM C 1017
- H. Do not use admixtures containing calcium chloride. All concrete will contain a water-reducing and densifying admixture such as MASTER BUILDERS POZZOLITH or an approved equal as follows:
  - 1. All admixtures shall be incorporated as an integral part of the mix design.
  - 2. Admixture shall be manufactured by a firm having not less than 10 years experience in manufacturing and field testing of the product

- I. Ready-Mixed Concrete: Measure, batch, mix, and deliver concrete according to ASTM C 94/C 94M, and furnish batch ticket information.
  1. When air temperature is between 85° and 90° F, reduce mixing and delivery time from 1-1/2 hours to 75 minutes.
  2. When air temperature is above 90° F, reduce mixing and delivery time to 60 minutes.
- 2.3 FORM-FACING MATERIALS
  - A. Smooth-Formed Finished Concrete: Form-facing panels that will provide continuous, true, and smooth concrete surfaces. Furnish in largest practicable sizes to minimize number of joints.
    1. Plywood, metal, or other approved panel materials.
    2. Exterior-grade plywood panels, suitable for concrete forms, complying with DOC PS 1, and as follows:
      - a. High-density overlay, Class 1 or better.
      - b. Medium-density overlay, Class 1 or better; mill-release agent treated and edge sealed.
      - c. Structural 1, B-B or better; mill oiled and edge sealed.
      - d. B-B (Concrete Form), Class 1 or better; mill oiled and edge sealed.
  - B. Rough-Formed Finished Concrete: Plywood, lumber, metal, or another approved material. Provide lumber dressed on at least two edges and one side for tight fit.
  - C. Chamfer Strips: Wood, metal, PVC, or rubber strips, 3/4 by 3/4 inch, minimum.
  - D. Form-Release Agent: Commercially formulated form-release agent that will not bond with, stain, or adversely affect concrete surfaces and will not impair subsequent treatments of concrete surfaces.
    1. Formulate form-release agent with rust inhibitor for steel form-facing materials.
  - E. Form Ties: Factory-fabricated, removable or snap-off metal or glass-fiber-reinforced plastic form ties designed to resist lateral pressure of fresh concrete on forms and to prevent spalling of concrete on removal.
    1. Furnish units that will leave no corrodible metal closer than 1 inch to the plane of exposed concrete surface.
    2. Furnish ties that, when removed, will leave holes no larger than 1 inch in diameter in concrete surface.
    3. Furnish ties with integral water-barrier plates to walls indicated to receive dampproofing or waterproofing.
- 2.4 STEEL REINFORCEMENT
  - A. Fabricate steel reinforcement according to CRSI's "Manual of Standard Practice."
  - B. Reinforcing Bars: ASTM A 615, Grade 60, deformed.
  - C. Plain-Steel Welded Wire Reinforcement: ASTM A 185, plain, fabricated from as-drawn steel wire into flat sheets.
- 2.5 REINFORCEMENT ACCESSORIES
  - A. Bar Supports: Bolsters, chairs, spacers, and other devices for spacing, supporting, and fastening reinforcing bars and welded wire reinforcement in place. Manufacture bar supports from steel wire, plastic, or precast concrete according to CRSI's "Manual of Standard Practice," of greater compressive strength than concrete and as follows:
    1. For concrete surfaces exposed to view where legs of wire bar supports contact forms, use CRSI Class 1 plastic-protected steel wire or CRSI Class 2 stainless-steel bar supports.



2.8 CURING MATERIALS

- A. Clear, Solvent-Borne, Membrane-Forming Curing and Sealing Compound: ASTM C 1315, Type 1, Class A.
- B. Clear, Waterborne, Membrane-Forming Curing and Sealing Compound: ASTM C 1315, Type 1, Class A.

2.9 MISCELANEOUS RELATED MATERIALS

- A. Grout for leveling plates shall be "Five Star" non-shrink, nonmetallic grout as manufactured by Five Star Products, or approved equal.
- B. Bonding Agent: ASTM C 1059, Type II, non-re-dispersible, acrylic emulsion or styrene butadiene.
- C. Epoxy Bonding Adhesive: ASTM C 881, two-component epoxy resin, capable of humid curing and bonding to damp surfaces, of class suitable for application temperature and of grade to suit requirements, and as follows:
  - 1. Types IV and V, load bearing, for bonding hardened or freshly mixed concrete to hardened concrete.

PART 3 - EXECUTION

3.1 INSTALLATION, GENERAL

- A. Give the RDP at least 2 working days' notice before placing concrete. Execution shall be in accordance with A.C.I. STANDARD 301-16, except as noted below.
- B. Employ a licensed land surveyor to check elevations of concrete and masonry bearing surfaces, and locations of anchor bolts and similar devices, before structural steel erection work proceeds. Contractor shall submit to the RDP the anchor bolt survey with all discrepancies between elevations, locations, conditions, shown on the drawings and those actually encountered in the field noted on the survey. Do not proceed with erection until corrections have been made or until compensating adjustments to structural steel work have been agreed upon with RDP.

3.2 FORMWORK

- A. Design, erect, shore, brace, and maintain formwork, according to ACI 301, to support vertical, lateral, static, and dynamic loads, and construction loads that might be applied, until structure can support such loads.
- B. Construct formwork so concrete members and structures are of size, shape, alignment, elevation, and position indicated, within tolerance limits of ACI 117.
- C. Limit concrete surface irregularities, designated by ACI 347R as abrupt or gradual, as follows:
  - 1. Class A, 1/8 inch for smooth-formed finished surfaces.
  - 2. Class B, 1/4 inch for rough-formed finished surfaces.
- D. Construct forms tight enough to prevent loss of concrete mortar.
- E. Fabricate forms for easy removal without hammering or prying against concrete surfaces. Provide crush or wrecking plates where stripping may damage cast concrete surfaces. Provide top forms for inclined surfaces steeper than 1.5 horizontal to 1 vertical.
  - 1. Install keyways, reglets, recesses, and the like, for easy removal.
  - 2. Do not use rust-stained steel form-facing material.

- F. Set edge forms, bulkheads, and intermediate screed strips for slabs to achieve required elevations and slopes in finished concrete surfaces. Provide and secure units to support screed strips; use strike-off templates or compacting-type screeds.
  - G. Provide temporary openings for cleanouts and inspection ports where interior area of formwork is inaccessible. Close openings with panels tightly fitted to forms and securely braced to prevent loss of concrete mortar. Locate temporary openings in forms at inconspicuous locations.
  - H. Chamfer exterior corners and edges of permanently exposed concrete.
  - I. Form openings, chases, offsets, sinkages, keyways, reglets, blocking, screeds, and bulkheads required in the Work. Determine sizes and locations from trades providing such items.
  - J. Clean forms and adjacent surfaces to receive concrete. Remove chips, wood, sawdust, dirt, and other debris just before placing concrete.
  - K. Retighten forms and bracing before placing concrete, to prevent mortar leaks and maintain proper alignment.
  - L. Coat contact surfaces of forms with form-release agent, according to manufacturer's written instructions, before placing reinforcement.
- 3.3 EMBEDDED ITEMS
- A. Place and secure anchorage devices and other embedded items required for adjoining work that is attached to or supported by cast-in-place concrete. Use setting drawings, templates, diagrams, instructions, and directions furnished with items to be embedded.
    - 1. Install anchor rods, accurately located, to elevations required and complying with tolerances in Section 7.5 of AISC's "Code of Standard Practice for Steel Buildings and Bridges."
    - 2. Install dovetail anchor slots in concrete structures as indicated.
- 3.4 REMOVING AND REUSING FORMS
- A. General: Formwork for sides of beams, walls, columns, and similar parts of the Work that does not support weight of concrete may be removed after cumulatively curing at not less than 50 deg F for 24 hours after placing concrete, if concrete is hard enough to not be damaged by form removal operations and curing and protection operations are maintained.
    - 1. Leave formwork for beam soffits, joists, slabs, and other structural elements that supports weight of concrete in place until concrete has achieved at least 70 percent of its 28-day design compressive strength.
    - 2. Remove forms only if shores have been arranged to permit removal of forms without loosening or disturbing shores.
  - B. Clean and repair surfaces of forms to be reused in the Work. Split, frayed, delaminated, or otherwise damaged form-facing material will not be acceptable for exposed surfaces. Apply new form-release agent.
  - C. When forms are reused, clean surfaces, remove fins and laitance, and tighten to close joints. Align and secure joints to avoid offsets. Do not use patched forms for exposed concrete surfaces unless approved by Architect.
- 3.5 STEEL REINFORCEMENT
- A. General: Comply with CRSI's "Manual of Standard Practice" for placing reinforcement.
    - 1. Do not cut or puncture vapor retarder. Repair damage and reseal vapor retarder before placing concrete.

- B. Clean reinforcement of loose rust and mill scale, earth, ice, and other foreign materials that would reduce bond to concrete.
- C. Accurately position, support, and secure reinforcement against displacement. Locate and support reinforcement with bar supports to maintain minimum concrete cover. Do not tack weld crossing reinforcing bars.
- D. Set wire ties with ends directed into concrete, not toward exposed concrete surfaces.

### 3.6 JOINTS

- A. General: Construct joints true to line with faces perpendicular to surface plane of concrete.
- B. Construction Joints: Install so strength and appearance of concrete are not impaired, at locations indicated.
  - 1. Place joints perpendicular to main reinforcement. Continue reinforcement across construction joints, unless otherwise indicated. Do not continue reinforcement through sides of strip placements of floors and slabs.
  - 2. Form keyed joints as indicated. Embed keys at least 1-1/2 inches into concrete.
  - 3. Locate joints for beams, slabs, joists, and girders in the middle third of spans. Offset joints in girders a minimum distance of twice the beam width from a beam-girder intersection.
  - 4. Space vertical joints in walls as indicated. Locate joints beside piers integral with walls, near corners, and in concealed locations where possible.
  - 5. Use a bonding agent at locations where fresh concrete is placed against hardened or partially hardened concrete surfaces.
  - 6. Use epoxy-bonding adhesive at locations where fresh concrete is placed against hardened or partially hardened concrete surfaces.

### 3.7 CONCRETE PLACEMENT

- A. Before placing concrete, verify that installation of formwork, reinforcement, and embedded items is complete and that required inspections have been performed.
- B. Do not add water to concrete during delivery, at Project site, or during placement unless approved by RDP.
- C. Deposit concrete continuously in one layer or in horizontal layers of such thickness that no new concrete will be placed on concrete that has hardened enough to cause seams or planes of weakness. If a section cannot be placed continuously, provide construction joints as indicated. Deposit concrete to avoid segregation.
  - 1. Deposit concrete in horizontal layers of depth to not exceed formwork design pressures and in a manner to avoid inclined construction joints.
  - 2. Consolidate placed concrete with mechanical vibrating equipment according to ACI 301.
  - 3. Do not use vibrators to transport concrete inside forms. Insert and withdraw vibrators vertically at uniformly spaced locations to rapidly penetrate placed layer and at least 6 inches into preceding layer. Do not insert vibrators into lower layers of concrete that have begun to lose plasticity. At each insertion, limit duration of vibration to time necessary to consolidate concrete and complete embedment of reinforcement and other embedded items without causing mixture constituents to segregate.
- D. Discharge concrete from mixer within 1 1/2 hours of batching.

### 3.8 CONCRETE PROTECTING AND CURING

- A. General: Protect freshly placed concrete from premature drying and excessive cold or hot temperatures.
- B. Formed Surfaces: Cure formed concrete surfaces, including foundation walls and footings and other similar surfaces. If forms remain during curing period, moist cure after loosening forms. If removing forms before end of curing period, continue curing for the remainder of the curing period.
- C. Cure concrete according to ACI 308.R-16, by one of the following methods contractor shall be responsible for utilizing an appropriate curing method to achieve the required strength, moisture levels and other parameters.
  - 1. After placing and finishing, use one or more of the following methods to preserve moisture in the concrete:
    - a. Ponding, continuous fogging, or continuous sprinkling;
    - b. Application of mats or fabric kept continuously wet;
    - c. Continuous application of steam (under 150°F);
    - d. Application of sheet materials conforming to ASTM C171;
    - e. Curing and Sealing Compound

### 3.9 COLD AND HOT WEATHER CONCRETE:

- A. Cold-Weather Placement: Comply with ACI 306.1 and as follows. Protect concrete work from physical damage or reduced strength that could be caused by frost, freezing actions, or low temperatures.
  - 1. When average high and low temperature is expected to fall below 40°F for three successive days, maintain delivered concrete mixture temperature within the temperature range required by ACI 301.
  - 2. Do not use frozen materials or materials containing ice or snow. Do not place concrete on frozen subgrade or on subgrade containing frozen materials.
  - 3. Do not use calcium chloride, salt or other materials containing antifreeze agents or chemical accelerators unless otherwise specified and approved in mixture designs.
- B. Hot Weather Placement: Comply with ACI 301 and as follows:
  - 1. Maintain concrete temperature below 90°F at time of placement. Chilled mixing water or chopped ice may be used to control temperature, provided water equivalent of ice is calculated to total amount of mixing water. Using liquid nitrogen to cool concrete is Contractor's option.
  - 2. Fog spray forms, steel reinforcement, and subgrade just before placing concrete. Keep subgrade uniformly moist without standing water, soft spots, or dry areas.
  - 3. Loss of slump, flash set, or cold joints due to temperature of concrete as placed will not be acceptable. When temperature of concrete exceeds 90°F, obtain acceptance by the RDP of proposed precautionary measures to be undertaken. When temperature of steel reinforcement, embedments, or forms is greater than 120°F, fog steel reinforcement, embedments, and forms with water immediately before placing concrete. Remove standing water before placing concrete.

### 3.10 EMBEDDED ITEM INSTALLATION

- A. Place and secure anchorage devices and other embedded items required for adjoining work that is attached to or supported by cast-in-place concrete. Use setting drawings, templates, diagrams, instructions, and directions furnished with items to be embedded.
  - 1. Install anchor rods, accurately located, to elevations required and complying with tolerances in Section 7.5 of AISC 303.
  - 2. Install reglets to receive waterproofing and to receive through-wall flashings in outer face of concrete frame at exterior walls, where flashing is shown at lintels, shelf angles, and other conditions.

### 3.11 FINISHING FORMED SURFACES

- A. Rough-Formed Finish: As-cast concrete texture imparted by form-facing material with tie holes and defects repaired and patched. Remove fins and other projections that exceed specified limits on formed-surface irregularities.
  - 1. Apply to concrete surfaces not exposed to public view.
- B. Smooth-Formed Finish: As-cast concrete texture imparted by form-facing material, arranged in an orderly and symmetrical manner with a minimum of seams. Repair and patch tie holes and defects. Remove fins and other projections that exceed specified limits on formed-surface irregularities.
  - 1. Apply to concrete surfaces exposed to public view.
- C. Rubbed Finish: Apply the following to smooth-formed finished as-cast concrete where indicated:
  - 1. Smooth-Rubbed Finish: Not later than one day after form removal, moisten concrete surfaces and rub with carborundum brick or another abrasive until producing a uniform color and texture. Do not apply cement grout other than that created by the rubbing process.
- D. Related Unformed Surfaces: At tops of walls, horizontal offsets, and similar unformed surfaces adjacent to formed surfaces, strike off smooth and finish with a texture matching adjacent formed surfaces. Continue final surface treatment of formed surfaces uniformly across adjacent unformed surfaces, unless otherwise indicated.

### 3.12 MISCELLANEOUS CONCRETE ITEMS

- A. Grout beam bearing plates and column leveling plates after they are set to true levels.
- B. Install Sika Latex acrylic bonding agent in strict accordance with manufacturer's recommendations, including but not limited to the removal of all foreign materials by mechanical means such as chipping or sandblasting, and dampening the surface with clean water before installation.
- C. Filling In: Fill in holes and openings left in concrete structures, unless otherwise indicated, after work of other trades is in place. Mix, place, and cure concrete, as specified, to blend with in-place construction. Provide other miscellaneous concrete filling indicated or required to complete the Work.

3.13 JOINT FILLING

- A. Prepare, clean, and install joint filler according to manufacturer's written instructions.
  - 1. Defer joint filling until concrete has aged at least one month(s). Do not fill joints until construction traffic has permanently ceased.
- B. Remove dirt, debris, saw cuttings, curing compounds, and sealers from joints; leave contact faces of joint clean and dry.
- C. Install semi-rigid joint filler full depth in saw-cut joints and at least 2 inches deep in formed joints. Overfill joint and trim joint filler flush with top of joint after hardening.

3.14 CONCRETE SURFACE REPAIRS

- A. Defective Concrete: Repair and patch defective areas when approved by Architect. Remove and replace concrete that cannot be repaired and patched to Architect's approval.
- B. Patching Mortar: Mix dry-pack patching mortar, consisting of one part portland cement to two and one-half parts fine aggregate passing a No. 16 sieve, using only enough water for handling and placing.
- C. Repairing Formed Surfaces: Surface defects include color and texture irregularities, cracks, spalls, air bubbles, honeycombs, rock pockets, fins and other projections on the surface, and stains and other discolorations that cannot be removed by cleaning.
  - 1. Immediately after form removal, cut out honeycombs, rock pockets, and voids more than 1/2 inch in any dimension in solid concrete, but not less than 1 inch in depth. Make edges of cuts perpendicular to concrete surface. Clean, dampen with water, and brushcoat holes and voids with bonding agent. Fill and compact with patching mortar before bonding agent has dried. Fill form-tie voids with patching mortar or cone plugs secured in place with bonding agent.
  - 2. Repair defects on surfaces exposed to view by blending white portland cement and standard portland cement so that, when dry, patching mortar will match surrounding color. Patch a test area at inconspicuous locations to verify mixture and color match before proceeding with patching. Compact mortar in place and strike off slightly higher than surrounding surface.
  - 3. Repair defects on concealed formed surfaces that affect concrete's durability and structural performance as determined by Architect.
- D. Perform structural repairs of concrete, subject to Architect's approval, using epoxy adhesive and patching mortar.
- E. Repair materials and installation not specified above may be used, subject to Architect's approval.

3.15 FIELD QUALITY CONTROL

- A. Testing and Inspecting: **Contractor shall** engage a qualified testing agency to perform tests and to submit reports and the **Contractor shall** will engage a qualified firm to perform Special Inspections (if required) per the Statement of Special Inspections. The Statement of Special Inspections document will be implemented by the RDP.

- B Inspections:
1. Steel reinforcement placement.
  2. Headed bolts and studs.
  3. Verification of use of required design mixture.
  4. Concrete placement, including conveying and depositing.
  5. Curing procedures and maintenance of curing temperature.
- C. Concrete Tests: Testing of composite samples of fresh concrete obtained according to ASTM C 172 will be performed according to the following requirements:
1. Testing Frequency: Obtain at least one composite sample for each 60 cu. yd. or fraction thereof of each concrete mixture placed each day.
    - a. When frequency of testing will provide fewer than five compressive-strength tests for each concrete mixture, testing will be conducted from at least five randomly selected batches or from each batch if fewer than five are used.
  2. Slump: ASTM C 143; one test at point of placement for each composite sample, but not less than one test for each day's pour of each concrete mixture. Perform additional tests when concrete consistency appears to change.
  3. Air Content: ASTM C 231, pressure method, for normal-weight concrete; ASTM C 173, volumetric method, for structural lightweight concrete; one test for each composite sample, but not less than one test for each day's pour of each concrete mixture.
  4. Concrete Temperature: ASTM C 1064 one test hourly when air temperature is 40°F and below and when 80°F and above, and one test for each composite sample.
  5. Unit Weight: ASTM C 567, fresh unit weight of structural lightweight concrete; one test for each composite sample, but not less than one test for each day's pour of each concrete mixture.
  6. Compression Test Specimens: ASTM C 31.
    - a. Cast and laboratory cure two sets of two standard cylinder specimens for each composite sample.
    - b. Compressive-Strength Tests: ASTM C 39/C 39M; test one set of two laboratory-cured specimens at 7 days and one set of two specimens at 28 days.
    - c. A compressive-strength test will be the average compressive strength from a set of two specimens obtained from same composite sample and tested at age indicated.
  7. Strength of each concrete mixture will be satisfactory if every average of any three consecutive compressive-strength tests equals or exceeds specified compressive strength and no compressive-strength test value falls below specified compressive strength by more than 500 psi.
  8. Test results will be reported in writing to RDP, concrete manufacturer, and Contractor within 48 hours of testing. Reports of compressive-strength tests will contain Project identification name and number, date of concrete placement, name of concrete testing and inspecting agency, location of concrete batch in Work, design compressive strength at 28 days, concrete mixture proportions and materials, compressive breaking strength, and type of break for both 7- and 28-day tests.

9. Additional Tests: Testing and inspecting agency will make additional tests of concrete when test results indicate that slump, air entrainment, compressive strengths, or other requirements have not been met. Testing and inspecting agency may conduct tests to determine adequacy of concrete by cored cylinders complying with ASTM C 42/C 42M or by other methods.
10. Additional testing and inspecting, at Contractor's expense, will be performed to determine compliance of replaced or additional work with specified requirements.
11. Correct deficiencies in the Work that test reports and inspections indicate does not comply with the Contract Documents.

**END OF SECTION 03 30 00**



## **SECTION 11 68 43 - SCOREBOARDS**

### **PART 1 GENERAL**

#### **1.1 RELATED DOCUMENTS**

- A. The Contractor, Subcontractors, and/or suppliers providing goods and services referenced in or related to this Section shall also be bound by the Related Documents identified in Division 01 Section "Summary."

#### **1.2 SUMMARY**

- A. Section includes: Exterior, electronic scoreboard for the track and field complex including control center and other accessories for complete functional installation.
- B. The work covered in this section is affected by Alternates.
- C. Contractor shall coordinate work between all Contractors, sections, and trades required for the proper completion of the work.
- D. Contractor is responsible for all health and safety.
- E. Related Sections include the following:
  - 1. Division 01 Section "Alternates."

#### **1.3 REFERENCES**

- A. Reference herein to any technical society, organization, group or regulation are made in accordance with the following abbreviations and, unless otherwise noted or specified, all work under this Section shall conform to the latest edition as applicable.
- B. Code of Federal Regulations (CFR).
  - 1. 29 CFR 1926, Safety and Health Regulations for Construction.
- C. American Society for Testing and Materials (ASTM):
  - 1. ASTM B221 - Aluminum Alloy Extruded Bar, Rod, Wire, Shape, and Tube.
  - 2. ASTM A6 – Steel Shapes
- D. State of Connecticut
  - 1. State Building Code, including all Amendments, Supplements, and Errata.
- E. National Electrical Code (NEC).
- F. Federal Communications Commission, Part 15 Rules & Regulations, EN60950-1, EN55022 & EN55024.
- G. UL AND C-UL Standard for Electric Signs

#### 1.4 SUBMITTALS

- A. Product data for scoreboards, controls, and accessories shall include descriptions of control functions etc. for review and approval by the Landscape Architect and Owner.
- B. Installation drawings, face layout, dimensions, construction, electrical wiring diagrams, and method of anchorage for review and approval by the Landscape Architect and Owner.
- C. Footing/ foundation drawings shall be signed and sealed by a structural engineer licensed to practice in the State of Connecticut.
- D. Copies of all Warranties for review and approval by the Landscape Architect and Owner.
- E. Manufacturer's installation instructions for review and approval by the Landscape Architect and Owner.
- F. Finish Samples for review and approval by the Landscape Architect and Owner.

#### 1.5 PRODUCT DELIVERY AND STORAGE

- A. Materials delivered to the site shall be examined for damage or defects in shipping. Any defects shall be noted and reported to the Owners representative. Replacements, if necessary, shall be immediately re-ordered, so as to minimize any conflict with the construction schedule. Sound materials shall be stored above ground under protective cover or indoors so as to provide proper protection.

#### 1.6 QUALITY ASSURANCE

- A. Source limitation: All components including scoreboard, control center, control cable, and other accessories and installation hardware shall be products of a single manufacturer.
- B. Manufacturer qualifications: Company specializing in manufacturing electronic scoreboards with 10 years' minimum experience.
- C. Scoreboards shall be designed for exterior installation with weatherproof housing and optical isolation interface to reduce potential damage from electrical storms.
- D. Should service be necessary, specialized personnel shall not be required. Modular "plug and play" components will be housed in an internal protective enclosure.
- E. Scoreboards and other electrical components shall be certified for use in United States and Canada by Underwriter Laboratories, (UL) Inc. and shall bear either UL or C-UL label only.
- F. Scoreboards and other electrical components shall be electrically grounded in accordance with National Electrical Code (NEC), Article 600.
- G. Scoreboard footings, uprights, cabinetry and attachment shall meet or exceed the Current Connecticut Building Code standard of wind loading for the municipality in which the project is located.

## 1.7 WARRANTY

### A. Provide warranty to cover defects in materials and workmanship.

1. 5 years' parts and labor warranty for scoreboards, wired controls, and accessories from substantial completion date.
2. 5 years' part and labor guarantee for wireless controls and receivers from substantial completion date.
3. Lifetime telephone support.

## PART 2 PART 2 - PRODUCTS

### 2.1 SCOREBOARD (ADD ALTERNATE)

#### A. Provide one (1) outdoor scoreboard adapted for football, lacrosse, track, and soccer. Size: 12 feet long x 5 feet high x 6 inches deep.

1. Model 8012A as manufactured and supplied by OES Scoreboard, Northeast Scoreboards, PO Box 85, Hadlyme, CT 06469, Brian Barzee, (860) 790-0282, [northeastscoreboards@gmail.com](mailto:northeastscoreboards@gmail.com)
2. Or approved equal.

### 2.2 MATERIALS – GENERAL

#### A. Board: Aluminum enclosure with shatter resistant Lexan digit covers

1. Finish: Acrylic polyurethane paint. Color (RED) with white perimeter striping as selected by the Architect from manufacturer's standard range.
2. Entire board, including but not limited to, front sides, back, top, and bottom, shall be painted to match face of board color.
  - a. Columns and all attached conduit and accessories shall be painted satin black.
3. Provide white striping to separate scoreboard features.

#### B. Mounting Hardware: Corrosion resistant, properly sized for scoreboard weight and windloading.

#### C. Brackets: Integrated universal bracket system.

#### D. Fasteners, anchors, and other exposed hardware: Corrosion resistant.

#### E. Digits: High intensity LED (light emitting diode) units: modular, dimmable, Seven-bar, segmented digits with protective aluminum cover, rated typical life 100,000 hours and be designed to provide excellent visibility from all angles and sides.

1. Color: **White**

#### F. Junction boxes where required: Sheet metal box and cover, 4-1/2 x 2-1/8 x 2-1/8 inches min. complying with NEMA standards.

#### G. Control cable: UL listed, 2-wire, RG-58/U, coaxial cable, 1/4 inch diameter.

- H. Uprights shall be steel i-beams of sufficient size and length per manufacturer, based on scoreboard and accessories specified. Bottom of scoreboards shall be mounted 10'-0" above grade.
- I. Scoreboard uprights, exposed conduit and fasteners shall all be primed and painted to match scoreboard.
- J. Provide each scoreboard with all electrical junction boxes, conduits, mounting hardware, and other accessories as required for proper operation are to be included. All exposed conduit and accessories are to be painted to match scoreboard.
- K. Concrete: See Division 3 Section – "Poured in Place Concrete"
- L. Power requirement:
  - 1. Provide solar power battery system
- M. Features:
  - 1. Scoreboards shall have segment timer mode & horn.
  - 2. All scoreboards shall have wireless controls.
- N. Provide each scoreboard or accessory with electrical junction boxes, conduits, mounting hardware, and other accessories as required for installation and full operation are to be included.
- O. WIRELESS CONTROLS: Provide wireless controller and receiver for each scoreboard. Scoreboard shall be able to be operated wirelessly, or with hard wired connection. Provide Wireless, handheld controller & Receiver and Corresponding receiver specific to the submitted model of scoreboard.
  - 1. Handheld wireless, Controller, AA battery operated, sport specific, control center with receiver unit mounted at scoreboard; High impact, break-resistant black ABS plastic
  - 2. Handheld Unit and receiver shall comply with Part 15 of FCC Rules and Regulations. And shall be 2.4 Ghz and have a minimum of 64 channel operation compatible with receiver to be able to avoid local interference.
  - 3. Handheld control features:
    - a. Multi channel, automatic, Wireless operation within 500 feet.
    - b. High visibility LCD display with a sealed keyboard and adjustable contrast.
    - c. Battery life indicator; low battery indicator, include two AA batteries. 10 hour minimum battery life.
    - d. Scoreboard light level dimming controls.
    - e. Single hand operation with a no slip grip.
    - f. Built-in belt clip, carrying case and neck strap.
    - g. Wireless signal strength meter and internal antenna.
  - 1. Wireless Receiver: Internally scoreboard mounted, Modular Plug & Play operation receiver compatible with controller with a minimum of 15 channel operation. Injection molded case, mounted at scoreboard in accordance with instructions.
    - a. Minimum range: 500 feet from control center to receiver.

- b. Provide suitable, RF transparent, NEMA 4 enclosure for receiver, to be located upon scoreboard supporting structure per installation diagrams.

### PART 3 EXECUTION

#### 3.1 PREPARATION

- A. Verify exact scoreboard and control center quantities and junction box locations with The Architect.
- B. Coordinate requirements for electrical power, concrete, steel erection, auxiliary framing and supports, suspension cables, and other components to be provided under other Specification Sections to ensure adequate provisions are made for complete, functional installation of scoreboards.
- C. Coordinate scoreboard electrical requirements to ensure proper power source, conduit, wiring, and boxes are provided. Prior to installation, verify type and location of power supply.

#### 3.2 INSTALLATION

- A. Install scoreboards, footings, uprights and accessories in accordance with manufacturer's instructions and approved installation drawings.
- B. Before installation, field test scoreboards and accessories for operating functions. Ensure that scoreboards accurately perform all operations. Correct deficiencies.
- C. Rigidly mount scoreboards and accessories level and plumb with brackets and fasteners.
- D. Clean exposed surfaces.
- E. Protect scoreboards and finishes from other construction operations.

#### 3.3 DEMONSTRATING AND TRAINING

- A. Test remote operation of all features of scoreboard for each control. Adjust channel and antennas as required to optimize performance, minimize interference and optimize ease of operation.
- B. Provide demonstration and training session for Owner's representative covering operation and maintenance of electronic scoreboards.

**END OF SECTION 11 68 43**

## **SECTION 311000 - SITE CLEARING**

### **PART 1 - GENERAL**

#### **1.1 RELATED DOCUMENTS**

- A. The Contractor, Subcontractors, and/or suppliers providing goods and services referenced in or related to this Section shall also be bound by the Related Documents identified in Division 01 Section "Summary."

#### **1.2 SUMMARY**

- A. This Section includes the following:
  - 1. Protecting existing trees and vegetation to remain including installation of staging fencing and temporary safety barricade.
  - 2. Removing trees and other vegetation.
  - 3. Clearing and grubbing.
  - 4. Topsoil and subsoil stripping and stockpiling.
  - 5. Removing above-grade site improvements and off-site disposal.
  - 6. Removal and/or on-site pulverizing of designated pavements.
  - 7. Salvaged Items to be reinstalled
- B. Related Sections include the following:
  - 1. Division 01 Section "Execution Requirements".
  - 2. Division 01 Section "Temporary Facilities and Controls".
  - 3. Division 31 Section "Earth Moving".
  - 4. Division 32 Section "Topsoil".
  - 5. Division 32 Section "Turf and Grasses".

#### **1.3 DEFINITIONS**

- A. Topsoil: Natural or cultivated surface-soil layer (typically the A horizon) containing organic matter and sand, silt, and clay particles; friable, pervious, and black or a darker shade of brown, gray, or red than underlying subsoil; free of subsoil, clay lumps, gravel, and other objects more than [2 inches] in diameter; and free of weeds, roots, and other deleterious materials.
- B. Subsoil: Naturally occurring weathered moraine material, located immediately under the topsoil and atop the residual moraine material.
- C. SSRBC: "Standard Specifications for Road and Bridge Construction", State of Rhode Island, Department of Transportation, 2004 edition as amended.
- D. Remove: Detach items from existing construction and legally dispose of them off-site, unless indicated to be removed and salvaged or removed and reinstalled.
- E. Remove and Salvage: Detach items from existing construction and deliver them to Owner.

- F. Remove and Reinstall: Detach items from existing construction, prepare them for reuse, and reinstall them where indicated.
- G. 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.

#### 1.4 MATERIALS OWNERSHIP

- A. **Except for materials indicated to be stockpiled or to remain Owner's property, cleared and demolished materials shall become Contractor's property and shall be removed from the site.**
- B. **Excess aggregate and soil materials shall become property of the Contractor and shall be promptly removed from the site. Contractor shall make every effort to avoid contaminating topsoil with subsoil or other debris or contaminants.**
- C. **Excess topsoil shall become property of Owner. Contractor to deliver excess topsoil from project to Town site across the street.**

#### 1.5 SUBMITTALS

- A. Photographs sufficiently detailed, of existing conditions of trees and plantings, adjoining construction, and site improvements that might be misconstrued as damage caused by site clearing.
- B. Record drawings according to Division 1, Section "Project Closeout."
  - 1. Identify and accurately locate capped utilities and other subsurface structural, electrical, and mechanical conditions.

#### 1.6 QUALITY ASSURANCE

- A. Preconstruction Conference: Conduct conference at Project site to comply with requirements in Division 1, Section "Project Coordination". Coordinate meeting with project sediment and erosion control requirements.
- B. All work shall comply with all codes, rules, regulations, laws and ordinances for the Town of Berlin, the State of Connecticut, and all other authorities having jurisdiction.

#### 1.7 PROJECT CONDITIONS

- A. Traffic: Minimize interference with adjoining roads, streets, walks, and other adjacent occupied or used facilities during site-clearing operations.
  - 1. Do not close or obstruct streets, walks, or other adjacent occupied or used facilities without permission from Owner and authorities having jurisdiction.
  - 2. Provide alternate routes around closed or obstructed traffic ways if required by authorities having jurisdiction.
- B. Improvements on Adjoining Property: Authority for performing indicated removal and alteration work on property adjoining Owner's property will be obtained by Owner before award of Contract.

1. Peripheral areas outside the Contract limit line shall not be disturbed or used for storing materials.
- C. Salvable Improvements: Carefully remove items indicated to be salvaged and store on Owner's premises where indicated.
- D. Notify utility locator service for area where Project is located before site clearing.
- E. Review and verify all limits or improvements to be removed prior to commencing demolition operations.
- F. Inspection: Verify existing condition of all items scheduled for demolition or removal. The Owner assumes no responsibility for the actual condition of structures or utilities to be demolished. Do not proceed with any work that will result with unsafe conditions causing a continuing or permanent hazard. Ascertain that all work scheduled for demolition can be safely accomplished in a proper time period.
- G. Benchmarks: Protect all survey monuments, benchmarks, and property boundary pins. Replace if destroyed by Contractor's operations. Coordinate and schedule work with Owner.
- H. Permits/Fees: Coordinate with appropriate utility companies and pay any disconnect fees and obtain permits as necessary.
- I. Provide 48 hours notice prior to conducting any site demolition operation.

## PART 2 - PRODUCTS

### 2.1 SOIL MATERIALS

- A. Satisfactory Soil Materials: Requirements for satisfactory soil materials are specified in Division 31, Section "Earth Moving."
  1. Obtain approved borrow soil materials off-site when satisfactory soil materials are not available on-site.

### 2.2 SAFETY BARRICADE

- A. The Safety Barricade shall be a temporary, polypropylene construction fence, fully stabilized for UV resistance, with 2 inch by 4.5 inch apertures.
  1. Color: Orange, height 4'0".
  2. Top tension rope – 3/8" braided nylon/polypropylene rope.
- B. POSTS: Heavy gauge channel steel posts 6'0" long.

## PART 3 - EXECUTION

### 3.1 PREPARATION

- A. Protect and maintain benchmarks and survey control points from disturbance during construction.
- B. Provide erosion-control measures to prevent soil erosion and discharge of soil-bearing water runoff or airborne dust to adjacent properties and walkways. [Refer to Division 31, Section "Erosion and Sediment Control.] Notify the City/Town to review all erosion control measures



prior to commencing work. Wetlands Enforcement Officer, Engineer, or other approved City/Town official shall be notified to review.

- C. Locate and clearly flag all limits of clearing, including trees and vegetation to remain or to be relocated. Place flagging every 25' oc. Review with Landscape Architect, City Planning Staff, and Owner.
- D. Protect existing site improvements to remain from damage during construction.
  - 1. Restore damaged improvements to their original condition, as acceptable to the Owner.
- E. Obtain all necessary City permits prior to commencing work.

### 3.2 TREE PROTECTION

- A. Erect and maintain a safety barricade around drip line of individual trees or around perimeter drip line of groups of trees to remain. Remove fence when construction is complete. Post spacing 6'0". Securely attach fencing to posts, including providing a top tension line, woven through top of fabric.
  - 1. Do not store construction materials, debris, or excavated material within drip line of remaining trees.
  - 2. Do not permit vehicles, equipment, or foot traffic within drip line of remaining trees.
- B. Do not excavate within drip line of trees, unless otherwise indicated.
- C. Where excavation for new construction is required within drip line of trees, hand clear and excavate to minimize damage to root systems. Use narrow-tine spading forks, comb soil to expose roots, and cleanly cut roots as close to excavation as possible.
  - 1. Temporarily support and protect roots from damage until they are permanently relocated and covered with soil.
  - 2. Coat cut faces of roots more than 1-1/2 inches in diameter with emulsified asphalt or other approved coating formulated for use on damaged plant tissues.
  - 3. Cover exposed roots with wet burlap to prevent roots from drying out. Backfill with soil as soon as possible.
- D. Repair or replace trees and vegetation indicated to remain that are damaged by construction operations, in a manner approved by Architect.
  - 1. Employ a qualified arborist, licensed in jurisdiction where Project is located, to submit details of proposed repairs and to repair damage to trees and shrubs.
  - 2. Replace trees that cannot be repaired and restored to full-growth status, as determined by the qualified arborist.

### 3.3 UTILITIES

- A. Contractor to arrange for disconnecting and sealing indicated utilities that serve existing structures before site clearing and demolition.

### 3.4 CLEARING AND GRUBBING

- A. Remove obstructions, trees, shrubs, grass, and other vegetation to permit installation of new construction. Removal includes digging out stumps and obstructions and grubbing roots. Selectively clear trees and prune branches within 20' of clearing limit line or property line. Pruning to conform to Class III Standards.
  - 1. Do not remove trees, shrubs, and other vegetation indicated to remain or to be relocated.
  - 2. Selectively prune and cut minor roots and branches of trees indicated to remain in a clean and careful manner where such roots and branches obstruct installation of new construction.
  - 3. Completely remove stumps, roots, obstructions, and debris.
  - 4. Use only hand methods for grubbing within drip line of remaining trees.
  - 5. Along property lines, notify Architect before beginning clearing operations. Coordinate clearing, grubbing and selective pruning with Architect, to maintain as much existing vegetation as is practical.
- B. Fill depressions caused by clearing and grubbing operations with satisfactory soil material, unless further excavation or earthwork is indicated.
  - 1. Place fill material in horizontal layers not exceeding 8-inch loose depth and compact each layer to a density equal to adjacent original ground.

### 3.5 TOPSOIL STRIPPING

- A. Prepare areas of existing loam so as to provide clump free topsoil. Remove sod and grass before stripping topsoil.
- B. Strip topsoil to whatever depths are encountered in a manner to prevent intermingling with underlying subsoil or other waste materials.
  - 1. Strip surface soil of unsuitable topsoil, including trash, debris, weeds, roots, and other waste materials.
  - 2. Where trees are indicated to remain, hold stripping a sufficient distance away to prevent damage to the root system.
  - 3. No topsoil stripping is required where proposed fills are greater than 12' in height.
- C. Stockpile materials away from edge of excavations without intermixing with other soil materials. Grade and shape stockpiles to drain surface water, in locations approved by the Owner and consistent with sediment and erosion control requirements.
  - 1. Do not stockpile topsoil within drip line of remaining trees.
  - 2. Stockpile surplus topsoil and allow for respreading entire amount of approved-stripped and screened topsoil.

### 3.6 SUBSOIL STRIPPING

- A. After topsoil is fully stripped, strip existing subsoil in all proposed pavement areas, within building footprint, in areas of shallow cuts, and in areas of shallow (less than 6' height) fills.

- B. Strip subsoil to whatever depths are encountered in a manner to prevent intermingling with topsoil and general fill.

### 3.7 SITE IMPROVEMENTS

- A. Remove existing above- and below-grade improvements as indicated and as necessary to facilitate new construction.
- B. Remove all slabs, paving, curbs, gutters, and all base/subbase material as indicated to full depths encountered, unless specifically noted otherwise.
  - 1. Unless existing full-depth joints coincide with line of demolition, neatly saw-cut length of existing pavement to remain before removing existing pavement. Saw-cut faces vertically, perpendicular and parallel to direction of traffic.
  - 2. It is the Contractor's option to pulverize or remove existing pavements from site.
  - 3. Specific pulverizing equipment must be approved. Thoroughly break up bituminous pavement to maximize aggregate size of 2". Pulverize all pavements to their full depth. Stockpile all pulverized material only in permitted areas. Submit mechanical/sieve analysis of pulverized/base material. Final pulverized product may be re-used on-site if capable of specified compaction and meeting the requirements of gradation for SSRBC. If not accepted, remove from site at no additional cost to Owner.
- C. Remove existing site improvements, including pavements fences of various types, and signage.
- D. Reinstall salvaged items as noted on plans, including but not limited to memorial benches, plaques and plantings. If items have been previously salvaged by Owner, the contractor shall coordinate and obtain materials to be reinstalled.

### 3.8 DISPOSAL

- A. Disposal: Remove unsuitable and excess soil material, cleared and grubbed material, obstructions, demolished materials, and waste materials, including trash and debris, and legally dispose of them off Owner's property. No burning or burying on site is permitted.
- B. Accumulation of disposal/waste materials on-site is not permitted.
- C. All pavement demolition material shall become the property of the Contractor except as specifically noted to be retained or permitted to be re-used on-site.

### 3.9 MAINTENANCE OF EXISTING SITE AREAS

- A. The Contractor shall maintain all areas within the project limits, for the duration of the contract. This maintenance will include the continuous mowing of undisturbed lawn areas within project limits, as well as the removal of any debris within fenced off areas.

**END OF SECTION 311000**

## **SECTION 31 20 00 – EARTH MOVING**

### **PART 1 - GENERAL**

#### **1.1 RELATED DOCUMENTS**

- A. The Contractor, Subcontractors, and/or suppliers providing goods and services referenced in or related to this Section shall also be bound by the Related Documents identified in Division 01 Section “Summary.”

#### **1.2 SUMMARY**

- A. This Section includes the following:

1. Site excavating, grading, filling, backfilling, compacting, and preparing sub-grades for the entire project including but not limited to: foundations, footings, retaining walls, slab-on-grade components, site utility lines and structures, walks, pavements, lawns, athletic fields and plantings.
2. Granular fill course for walks, curbs, stairs, and other site improvements.
3. Compacted structural fill where indicated on the Structural Drawings or where required below building areas.
4. Foundation drains where indicated on structural drawings.
5. Processed aggregate for pavements and other improvements.
6. Stone screenings for mow strips, warning tracks, walks softball infields, various athletic surfaces, and other site improvements.
7. Crushed Stone for pavements, under building slabs, footings and around foundation drains, including piping in stone wedges.
8. Sand for jumping pits and athletic field construction.
9. General fill for establishing project sub-grades.
10. Excavation of rock and/or boulders, including replacement with suitable earthwork materials.
11. Removal of encountered unsatisfactory soils, including lawful off-site disposal and replacement with suitable earthwork fill material.
12. Utility bedding material for site utilities.
13. Spreading of stockpiled subsoil at all athletic fields.
14. Construction of pea gravel diaphragm at pavement areas where indicated.
15. Securing trenching permit.

- B. Related Sections include the following:

1. Division 01 Section “Temporary Facilities and Controls.”
2. Division 01 Section “Temporary Tree and Plant Protection.”
3. Division 31 Section “Erosion and Sedimentation Control.”
4. Division 31 Section “Trench Excavation and Backfill”.
5. Division 31 Section “Site Clearing”.
6. Division 31 Section “Dewatering”.
7. Division 32 Section “Turf and Grasses”.
8. Division 33 Section “Field Subdrainage System”.
9. Division 33 Section “Storm Drainage System”.

10. Division 26 and 33 Sections for excavating and backfilling buried mechanical and electrical utilities and utility structures.
- C. This project is Unclassified –
  1. Unclassified excavation shall comprise and include the satisfactory removal and disposal of all materials encountered within the lines and grades shown in the drawings and in the specifications regardless of the nature of the materials, and shall be understood to include but not limited to, earth, topsoil, subsoil, hardpan, fill, foundations, pavements, curbs, piping, footings, bricks, concrete, abandoned drainage and utility structures, debris, and materials classified as unsuitable materials. All excavations and associated backfill within the lines and grades shown in the drawings and in the specifications, except in rock as defined below, shall be included in the base bid.

### 1.3 DEFINITIONS

- A. Backfill: Soil materials 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: Layer placed between the subbase course and proposed improvements.
- C. Bedding Course: Layer placed over the excavated subgrade in a trench before laying pipe.
- D. Borrow: Satisfactory soil or earthwork products imported from off-site for use as fill or backfill.
- E. Excavation: Removal of material encountered above subgrade elevations.
  1. Additional Excavation: Excavation below subgrade elevations as directed by Architect. Additional excavation and replacement material will be paid for according to Contract provisions for changes in the Work.
  2. Mass Excavation: Excavations more than 8 feet in width and pits more than 30 feet in either length or width.
  3. Unauthorized Excavation: Excavation below subgrade elevations or beyond indicated dimensions without direction by Architect. Unauthorized excavation, as well as remedial work directed by Architect, shall be without additional compensation.
- F. Fill: Soil materials used to raise existing grades.
- G. Mass Rock or Earth: Excavated material that is greater than 8' in both length and width.
- H. Rock (Mass & Rock): Excavated rock material in beds, ledges, unstratified masses, and conglomerate deposits that cannot be removed by rock excavating equipment equivalent to the following in size and performance ratings, without systematic drilling, ram hammering, ripping, or blasting, when permitted:
  1. Excavation of Footings, Trenches, and Pits: Late-model, track-mounted hydraulic excavator; Caterpillar 325D or equal, equipped with a 42-inch wide, short-tip-radius rock bucket.

2. Mass Excavation: Late-model, track-mounted loader; Caterpillar 963C or equal; or Late-model, track-mounted hydraulic excavator; Caterpillar 325D or equal, equipped with a 42-inch wide, short-tip-radius rock bucket.
  - I. Boulder: An excavated, individual rock fragment or natural stone with a volume of 1.5 c.y. to 3 c.y. All boulders exceeding 3 c.y. shall be classified as “rock” and shall fall within “mass” or “trench” subcategory based on definitions in this section. Material classified as “Rock” and excavated and paid for shall not be eligible to be classified as “boulder” for additional payment purposes. All excavated boulder material, to be disposed of on-site, or processed for re-use on-site, is not eligible for compensation under allowance and is part of base bid.
  - J. 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.
  - K. Subbase Course: Layer placed between the subgrade and base course for pavement or other site improvements.
  - L. Subgrade: Surface or elevation remaining after completing excavation, or top surface of a fill or backfill immediately below subbase, drainage fill, or topsoil materials.
  - M. Trench Rock or Earth: Excavated material from trench excavations that is less than 8’ (eight feet) in either length or width.
  - N. Utilities include on-site underground pipes, conduits, ducts, and cables, as well as underground services within buildings.
  - O. Form 817: "Standard Specifications for Roads, Bridges, and Incidental Construction", State of Connecticut, Department of Transportation, Form 817”, as revised.
  - P. Unsatisfactory/Unsuitable Soils: Any material generated, excavated and/or collected by earth moving activities or other contract work that does not meet any of the product specifications contained in contract documents.
  - Q. Zone of Influence (ZOI): the planes extending horizontally away from the bottom edges of footings, utilities and other existing and proposed site improvements for a distance of two feet in all directions, then down and away at 1H:1V (horizontal : vertical) slope to the intersection with suitable native soils.
- 1.4 SUBMITTALS
- A. General: Submit the following according to the Conditions of the Contract and Division 1 Specifications Sections.
  - B. Product Data: For the following:
    1. Each type of plastic warning tape.
    2. Drainage fabric.
    3. Separation fabric.
  - C. Samples: For the following:

1. 50-lb samples, sealed in airtight containers, of each proposed soil material from on-site or borrow sources, for Owner's independent laboratory testing agency. Samples shall be delivered to the site seven (7) calendar days in advance or time planned on incorporating them into the work. Owner's testing lab will confirm submitted test results and compaction curve data.
  2. 5-lb sample to Architect's office for visual conformance confirmation.
  3. 12-by-12-inch sample of drainage fabric.
  4. 12-by-12-inch sample of separation fabric.
  5. 4-foot strip of each type of warning tape.
- D. Material Test Reports: From an approved qualified testing agency indicating and interpreting test results for compliance of the following with requirements indicated:
1. Complete mechanical/sieve analysis classification according to Form 817 and ASTM D 2487 for every 400 cubic yards of on-site or borrow soil material proposed for fill and backfill. Washed sieve shall be performed for 200 sieve on all materials.
  2. Laboratory compaction curve according to ASTM D 1557 for each on-site or borrow soil material proposed for fill and backfill.
  3. Report of actual unconfined compressive strength and/or results of bearing tests of each stratum tested.
  4. Test sampling shall conform to the requirements of ASTM D-75, and ASTM D-3665.
- E. Blasting plan approved by authorities having jurisdiction, for record purposes.
- F. Seismic survey agency report, for record purposes.
- G. All installation of materials prior to testing and/or review and response by Architect is at Contractor's risk.
- 1.5 QUALITY ASSURANCE
- A. Comply with applicable requirements of NFPA 495, "Explosive Materials Code" and SSHB, Section 120 and State Fire Codes.
- B. Seismic Survey Agency: An independent testing agency, acceptable to authorities having jurisdiction, experienced in seismic surveys and blasting procedures to perform the following services:
1. Prepare plan report types of explosive and sizes of charge to be used in each area of rock removal, types of blasting mats, sequence of blasting operations, and procedures that will prevent damage to site improvements and structures on Project site and adjacent properties.
  2. Seismographic monitoring services during blasting operations.
  3. Prepare a preblast survey of all adjacent properties, including a structural inspection of the buildings and properties and shall include a written and photographic record of existing conditions.
  4. Blast operations shall not commence until all reports and plans are received and approved by the Owner and the Architect.
- C. Geotechnical Testing Agency Qualifications: An independent testing agency qualified according to ASTM E 329 to conduct soil materials and rock-definition testing, as documented according to ASTM D 3740 and ASTM E 548.



- D. Pre-excavation Conference: Conduct conference at Project site to comply with requirements in Division 1, Section "Project Coordination".
1. Before commencing earthwork, meet with representatives of the governing authorities, Owner, Architect, Engineer, consultants, independent testing agency, and other concerned entities. Review earthwork procedures and responsibilities including testing and inspection procedures and requirements. Notify participants at least 3 working days prior to convening conference. Record discussions and agreements and furnish a copy to each participant.
- E. Testing: Compaction tests will be required by the Owner and will be paid for by the Owner. No specific testing schedule has been established at this time. If tests indicate that density requirements have not been achieved, the Contractor shall continue compacting.
- All retesting in these areas shall be paid for by the Contractor. See Division 1, Section "Quality Control Services". Contractor is required to compensate testing laboratory, directly, for all material test reports.
- F. Density and Compaction Testing: The Contractor is responsible to schedule compaction tests and to allow adequate time for the proper execution of said tests.
- G. Protect all benchmarks, monuments, and property boundary pins. Replace if destroyed by Contractor's operations.

#### 1.6 PROJECT CONDITIONS

- A. Existing Utilities: Do not interrupt utilities serving facilities occupied by Owner or others unless permitted in writing by Architect and then only after arranging to provide temporary utility services according to requirements indicated. Note that school operations must be maintained throughout construction.
1. Notify Architect not less than two days in advance of proposed utility interruptions.
  2. Do not proceed with utility interruptions without Architect'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. Contact **Call Before You Dig (1-800-922-4455)** prior to any earthwork or demolition operations.
- C. Contractor is responsible to properly obtain a trenching permit per 520 CMR 14.00 from appropriate local or state agency.

#### 1.7 UNIT PRICES

- A. Rock Measurement: Volume of rock actually removed, measured in original position, but not to exceed the following:
1. 12 inches outside of concrete forms at footings.
  2. 6 inches outside of minimum required dimensions of concrete cast against grade.
  3. Outside dimensions of concrete walls indicated to be cast against rock without forms or exterior waterproofing treatments.

4. 12 inches outside width and bottom of drainage structures, including catch basins and manholes.
  5. Pavements: bottom elevation of the specified subbase course.
  6. 6 inches beneath pipe in trenches, and 24 inches wider than inside diameter of the pipe.
  7. Planting Areas: 48" below proposed finish elevations area as specified for typical planting installation.
  8. Lawn Areas: 18" below indicated finish grades.
- B. Boulder Measurement: Volume of all boulders excavated and slated for removal from site. Individual boulders to be measured by method mutually agreed upon by the Contractor and Owner.
- C. Limits and measurements do not represent dimensions of excavation requirements mandated by safety and other regulatory agencies. Rock required to be removed to conform to safety regulations will not be measured for payment.

## 1.8 SUBSURFACE SOIL DATA

- A. No subsurface testing was performed as part of the project pre-design. All base materials and thicknesses shall be assumed to be as specified in previous construction projects.
- B. Contractor may, at his own expense, conduct additional subsurface testing as required for his own information after approval by the Owner.

## PART 2 - PRODUCTS

### 2.1 SOIL MATERIALS

- A. General: Provide borrow soil materials when sufficient satisfactory soil materials are not available from excavations.
- B. Suitable Soils: ASTM D 2487 soil classification groups GW, GP, GM, SW, SP, and SM, or a combination of these group symbols; free of rock or gravel larger than 3 inches in any dimension, debris, waste, frozen materials, vegetation, reclaimed or recycled materials (i.e., asphalt, concrete, glass, etc.), and other deleterious matter. CL, SC, and GC can be used if approved by the Owner's Geotechnical Engineer. (use of recycled asphalt may be permitted for specific soil products as specified and shall be approved for use by Architect)
- C. Unsuitable Soils: ASTM D 2487 soil classification groups GC, SC, MH, CH, OL, OH, and PT, or a combination of these group symbols, and any materials that contain reclaimed or recycled materials (i.e., asphalt, concrete, glass, etc.) unless otherwise specified.
- D. Unsuitable soils also include suitable soils not maintained by the General Contractor within 2 percent of optimum moisture content at time of compaction.
- E. Granular Fill: Form 817 Article M.02.06, Type 'B' is to be used for filling under footings, pavements, and improvements, and subbase under pavements that is required to achieve the rough grades indicated.
1. Provide borrow material as required to meet project specifications.

F. Structural Fill

1. Structural Fill for fill and backfill below building areas and adjacent to foundation walls except where other materials are specified or detailed. Materials shall be clean bank-run or processed gravel free from recycled material, foreign substances (bricks, concrete, asphalt, etc), frozen material, lumps of clay, loam or vegetable matter, be obtained from a single source and shall meet the following grain size gradation:

2. Sieve Size	Percentage Passing by Weight
3 inches	100
1 ½"	80-100
½"	50-100
No. 4	30-85
No. 20	15-60
No. 60	5-35
No. 200*	0-10
* 0-5 under sidewalks	

Structural fill shall have a plasticity index of less than 6 and shall be compacted in maximum 9' loose lifts to at least 95 percent of the Modified Proctor maximum dry density (ASTM D1557), with moisture contents within  $\pm 2$  percentage points of optimum moisture content.

Fill placed within buildings and within an area extending 5 feet beyond the limits of buildings, including within utility trenches inside buildings, shall consist of Structural Fill.

- G. Crushed Stone: Clean, sound material free of debris, waste, frozen materials and organic material conforming to Form 817, Article M.01.01, No. 6 size as indicated on Drawings.
- H. Porous fill: 3/8" crushed stone, Clean, sound material free of debris, waste, frozen materials and organic material conforming to, Form 817, Article M.01.01 No. 67.
- I. Processed Aggregate: Artificially graded mixture of sound coarse and fine aggregates, containing no more than 15 percent by weight of recycled bituminous concrete. Mixture to be free of debris, waste, frozen materials and organic materials and conform to Form 817, Article M.05.01. . Maximum size of aggregate shall not exceed 2/3 of lift thickness. Broken stone is required; rounded gravel will not be permitted.
- J. Processed Gravel for Subbase, Form 817 Article M.02.06, Type 'B' shall be used as a subbase material for paved areas, including but not limited to roadways, parking lots, asphalt berms, reinforced concrete pads, unit pavers, asphalt walks, concrete walks, and curbs.
- K. Utility Bedding Material: Sand or sandy soil free of debris, waste, frozen materials and organics with 100 percent passing a 3/8-inch sieve and not more than 10 percent passing a No. 200 sieve or as specifically required by applicable utility authority.
- L. Field Stone: Naturally weathered rock between 6" – 18" in width and depth used for the construction of stone walls.
- M. General Fill: Material used to establish subgrade elevations may be either:
  1. Approved soil material available from excavation on site provided material meets specification for general fill as described below, or approved by Architect prior to placement. Maximum size 6".

2. Approved material, obtained from off-site, certified to conform to the following grain-size gradation:

SQUARE MESH SIEVES	PERCENT PASSING WEIGHT
6"	100
1"	50-100
# 4	20-100
# 20	10-70
# 60	5-45
#200	0-20

3. All material used for general filling shall be clean, free of clay and organic material and capable of satisfactory compaction.
4. If sufficient approved on-site material is not available to meet site elevations indicated, Contractor shall provide additional approved off-site material at no extra cost to Owner.

N. Modified Rock Fill: M2.02.4

O. Stone Screenings: , Form 817, Article M.01.01 'Screenings'.

P. Sand for trenching, bedding, concrete and masonry: ASTM C33-03 'Fine Aggregate' type 2NS.

Q. Sand for Long/tiple jump pits shall be rounded, washed river or bank sand conforming to form 817 Article M.05.02-2.0 Sand Cover except material shall 100% pass a number 8 sieve and 0-2% passing the #100 Sieve

R. Subsoil: shall be the existing on site weathered moraine material; typically 12"-24" depth located immediately under the existing topsoil and atop the residual moraine material.

S. Stone: An individual rock fragment or natural stone, with a volume of 0.5 cubic yards to 1.5 cubic yards, obtained from on-site excavation, on-site processing of rock or boulders, or an off-site source. All stone obtained from on-site excavation shall be considered Mass Earth or Trench Earth. All excess stone shall be considered "Unsatisfactory Soils" and shall be legally disposed of off-site.

T. Washed Stone: Crushed stone not to exceed 3".

## 2.2 ACCESSORIES

A. Detectable Warning Tape: Acid- and alkali-resistant polyethylene film warning tape manufactured for marking and identifying underground utilities, minimum 6 inches wide and 4 mils thick, continuously inscribed with a description of 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.

- B. Drainage Fabric: Non-woven geotextile, specifically manufactured as a drainage geotextile; made from polyolefins, polyesters, or polyamides; and with the following minimum properties determined according to ASTM D 4759 and referenced standard test methods:
  - 1. Grab Tensile Strength: 110 lb/f; ASTM D 4632.
  - 2. Tear Strength: 40 lb/f; ASTM D 4533.
  - 3. Puncture Resistance: 50 lb/f; ASTM D 4833.
  - 4. Water Flow Rate: 150 gpm per sq. ft.; ASTM D 4491.
  - 5. Apparent Opening Size: No. 50; ASTM D 4751.
- C. Separation Fabric: Woven geotextile, specifically manufactured for use as a separation geotextile; made from polyolefins, polyesters, or polyamides; and with the following minimum properties determined according to ASTM D 4759 and referenced standard test methods:
  - 1. Grab Tensile Strength: 200 lbf; ASTM D 4632.
  - 2. Tear Strength: 75 lbf; ASTM D 4533.
  - 3. Puncture Resistance: 90 lbf; ASTM D 4833.
  - 4. Water Flow Rate: 4 gpm per sq. ft.; ASTM D 4491.
  - 5. Apparent Opening Size: No. 30; ASTM D 4751.
- D. Foundation Drains: Foundation drainage pipe and fittings shall be 6" inside diameter, 0.254" minimum wall thickness, PVC Perforated Pipe in accordance with ASTM D2729.

### 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. Protect subgrades and foundation soils against freezing temperatures or frost. Provide protective insulating materials as necessary.
- C. Provide erosion-control measures to prevent erosion or displacement of soils and discharge of soil-bearing water runoff or airborne dust to adjacent properties and walkways. Refer to Division 31, Section "Sedimentation and Erosion Control".
- D. Provide protective safety barrier around all trees in the work area that are to remain.

#### 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. Coordinate with project sediment and erosion control requirements.
- 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: Obtain written permission from authorities having jurisdiction before bringing explosives to Project site or using explosives on Project site. Secure and pay for all permits as required.
- B. Comply with procedures outlined in paragraph "Quality Assurance", sub-paragraph "Seismic Survey Agency", above and Form 817, Section 1.07.08.. No overnight on-site storage of explosives is permitted.
  1. Do not damage adjacent structures, property, or site improvements or weaken the bearing capacity of rock subgrade when using explosives.
- C. Provide minimum 48-hours notice to Owner, Architect, abutting properties, and all affected utilities. No blasting is permitted prior to 8:00 a.m. or after 4:00 p.m. or on Holidays, Saturdays or Sundays without written permission of the Owner. Blasting is NOT permitted while school is in session unless otherwise noted.

### 3.4 EXCAVATION, GENERAL

- A. Unclassified Excavation: Excavation to subgrade elevations regardless of the character of the surface and subsurface conditions encountered, including rock, soil materials, and obstructions. No changes in the Contract Time or contract price will be authorized for rock excavation or removal of obstructions.
  1. If excavated materials intended for fill and backfill include unsatisfactory materials and rock, replace with satisfactory soil materials.
  2. Contractor will not be entitled to additional time to complete the project or additional compensation, when rock removal is required.
- B. Rock or Unsuitable materials Excavation Procedures:
  1. When, during the process of excavation, rock or unsuitable materials are encountered as specified herein, the Contractor shall strictly adhere to the following procedures.
  2. Such material shall be uncovered and exposed.
  3. The Architect and the Owner shall be notified by the Contractor before proceeding further.
  4. The Contractor shall not proceed with the excavation of any material claimed as rock or unsuitables until the material has been classified by the Owner's Representative and cross sectioned as specified below.
  5. The Contractor shall retain a land surveyor acceptable to both the Owner and the Contractor, to take cross sections of rock before removal of same, and to provide computations of cross sections within payline limits.
  6. For unsuitable materials, the Contractor shall excavate down to the limits defined by the Geo-technical engineer, owner or architect and then engage a surveyor to provide the measurement necessary to bring the excavation back up to contract payline limits.

7. All quantities and classifications shall be measured as compacted in-place material and not as trucked or stockpiled material and must be verified and documented with Owner's Representative or Architect.
  8. Should the Contractor proceed with the excavation without surveyed quantification and classification of the rock, the Contractor shall forfeit the right to payment as rock for the subject material.
  9. Rock excavation materials may be used for fill, only as specifically allowed and approved by the Architect, in accordance with the following paragraph "D".
- C. All areas where rock is removed must be marked on the as-built Drawings. Obtain approval of the Architect before starting work.
- D. If the Contractor intends to utilize excavated rock for site earthwork operations, the Contractor must modify any such material to comply with the specification for the designated specific material, at no cost to the Owner. Boulders may also be modified for use. No material may be used, unless approved by the Architect, prior to placement.
- E. Boulder disposal:
1. Limited on-site, above grade use of boulders is required for site improvements. See plans, specifications and details for specific locations, quantities and installation procedures. Contractor shall coordinate with Architect for boulder selection and final placement and facing.
  2. On-site, below grade boulder disposal is permitted in locations below meadows and large lawn areas. See plans and coordinate with landscape architect for locations. Contractor shall not deviate from following procedure for on-site, below grade disposal.
    - a. Boulders to be buried in areas of fill under lawn and landscape areas only. Contractor to ensure that there are no conflicts with proposed or existing utilities.
    - b. Top of Boulders shall have a minimum 4'-0" cover to finish grade
    - c. There shall be a minimum distance of 4'-0" between boulders.
    - d. Approved fill materials shall be placed between boulders and installed and compacted in compliance with project specifications. Approved fill materials shall be placed above buried boulders in compliance with project specifications.
- F. Rock and boulder disposal:
1. All excess rock and boulders remain the property of the Contractor and must be removed from project site and disposed in a legal manner.

### 3.5 STABILITY OF EXCAVATIONS

- A. Comply with local codes, ordinances and requirements of authorities having jurisdiction to maintain stable excavations.

### 3.6 SUBGRADE PREPARATION FOR BUILDING FOOTINGS

- A. Contractor shall remove all unsuitable soils, including buried peat, topsoil, subsoil, boulders and existing fill under all building footings. Rock shall be cut at a minimum to 12" beneath the bottom of footings to allow for the placement of Structural fill. The contractor shall place a minimum of 6" (12" where rock is found) of structural fill under all footings and piers.

### 3.7 SUBGRADE PREPARATION FOR BUILDING SLABS

- A. Contractor shall remove all unsuitable soils, including buried peat, topsoil, subsoil, boulders and existing fill under all building slabs. Rock shall be cut at a minimum to 24" beneath the bottom of slabs to allow for the placement of Structural fill. Exposed boulders shall be removed from the subgrade and the resulting excavation filled with structural fill. The contractor shall place a minimum of 12" of porous or structural fill under all building slabs.

### 3.8 EXCAVATION FOR STRUCTURES

- A. Excavate to indicated elevations and dimensions within a tolerance of plus or minus [1 inch]. 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 for bearing surface.

### 3.9 EXCAVATION FOR WALKS AND PAVEMENTS AND SLABS ON GRADE

- A. Excavate surfaces under walks and pavements to indicated cross sections, elevations, and grades. In locations where existing fill and organics are located below pavements, the existing fill below pavements should be improved before placing the proposed fill by compacting the exposed subgrade in the existing fill using vibratory compactor imparting a dynamic effort of at least 40 kips. Where soft zones are revealed by the compaction effort and where organic soil is exposed, the soft materials or organic soil shall be removed and replaced with general fill placed to the bottom of the subbase layer.

### 3.10 APPROVAL OF SUBGRADE

- A. Notify Architect and Owner's Representative when excavations have reached required subgrade.
- B. If unsatisfactory soil is present at sub-grade elevation, continue excavation and replace with compacted backfill or fill material as directed.
  - 1. Additional excavation and replacement material will be paid for according to Contract provisions for changes in the work.
- C. Proof roll subgrade with heavy pneumatic-tired equipment to identify soft pockets and areas of excess yielding. Do not proof roll wet or saturated subgrades. Conform to Section 170. Subgrade must be approved prior to application of any borrow or fill materials.
- D. If it is determined that unsatisfactory soil or excess moisture content is present, continue excavation and replace with compacted free draining backfill or fill material as directed.
- E. Reconstruct subgrades damaged by freezing temperatures, frost, rain, accumulated water, or construction activities, as directed by Architect.
- F. Proof roll all areas under running track with minimum six (6) passes by vibratory roller with minimum 20 tons of dynamic force.



3.11 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. Lean concrete fill may be used when approved by Architect.
  - 1. Fill unauthorized excavations under other construction or utility pipe as directed by Architect.

3.12 STORAGE OF SOIL MATERIALS

- A. Stockpile borrow materials and satisfactory excavated/manufactured soil materials. Stockpile soil materials without intermixing. Place, grade, and shape stockpiles to drain surface water. Cover with tarps to prevent windblown dust or temporarily seed as per Division 31 Section "Erosion and Sedimentation Controls".
  - 1. Stockpile soil materials away from edge of excavations. Do not store within drip line of remaining trees.
  - 2. Contamination/intermixing of soil materials is just cause for rejection of material.

3.13 BACKFILL

- A. Place and compact backfill in excavations promptly, but not before completing the following:
  - 1. Acceptance of construction below finish grade including, where applicable, dampproofing, waterproofing, and perimeter insulation and drainage.
  - 2. Surveying locations of underground utilities for record documents.
  - 3. Inspecting, testing, and approving of underground utilities.
  - 4. Removing concrete formwork.
  - 5. Removing trash and debris from excavation.
  - 6. Removing temporary shoring and bracing, and sheeting.
  - 7. Installing permanent or temporary horizontal bracing on horizontally supported walls.

3.14 PLACEMENT OF FILL

- A. Preparation: Remove vegetation, topsoil, debris, unsatisfactory soil materials, obstructions, and deleterious materials from ground surface before placing fills.
- B. Plow, scarify, bench, or break up sloped surfaces steeper than 1 vertical to 4 horizontal so fill material will bond with existing material.
- C. When subgrade or existing ground surface to receive fill has a density less than that required for fill, break up ground surface to depth required, pulverize, moisture-condition or aerate soil and recompact to required density.
- D. Place and compact fill material in maximum 8" lifts. After placement, thoroughly knead all general fill with sheep's foot rollers to break down any remaining chunks of soil prior to vibratory compaction.
- E. Do not deposit fill in areas of standing water. Any pockets of sediment and foreign material are to be removed before filling continues.

- F. Compaction: Each lift shall be compacted. Maintain optimum and proper moisture content to achieve required compaction. Coordinate with Owner on testing schedule throughout earthwork operations.
- G. Fill under lawn areas shall be compacted between 92% and 96% modified AASHTO laboratory density (ASTM D-1557, Method C).
- H. Fill under structures, pavements, and site improvements within 5' of grade shall be compacted to minimum 95% OF MODIFIED AASHTO laboratory density (ASTM D-1557, Method C). Fill under pavement 5 or more feet below grade shall be compacted minimum 92% of modified AASHTO laboratory density (ASTM D-1557, Method C). Under bituminous pavements, compact processed aggregate materials to minimum 98% modified AASHTO laboratory density. All layers of structural fill shall be compacted to a minimum of 95% OF MODIFIED AASHTO laboratory density (ASTM D-1557, Method C).
- I. Special Requirements
  - 1. Remove all accumulated silts and organic material from temporary sedimentation, siltation, and detention basins prior to proceeding with earthwork.
  - 2. Phase all earthwork operations in all key identified slopes so that each slope and bench/terrace is completed, including compaction and stabilization prior to proceeding with next higher slope/bench. Notify Architect, Engineer, and Geotechnical Consultant for inspection of each slope/bench as it is formed and stabilized. Do not proceed with additional embankment/earthwork operation until approved by Owner's Representative and Engineer.
  - 3. Structural fill will be subject to excavation for underfloor utilities prior to the concreting of the floor slab on grade. The excavation, and the subsequent re-filling with structural fill, including compaction, is included in this Contract.

### 3.15 LOCATION OF STRUCTURAL FILL

- A. Compacted Structural Fill shall occur beneath interior slabs on prepared subgrade as noted above and as indicated on the Structural Drawings unless otherwise noted.
  - 1. Fill beneath the slabs on prepared subgrade shall be a minimum thickness of 12" and of the thickness necessary to bring the grade elevation up to 6" below the underside of the slab on ground from the excavation elevation determined above and indicated on the Contract Documents.
- B. Structural fill shall occur adjacent to new footings as indicated above and as indicated on the Structural Drawings and noted below.
  - 1. Outside of the foundation walls of the building, this fill shall occur above the footing bottom, a minimum of 3 feet horizontally beyond the edge of the footing, to a height of 8" below finished exterior grade.
  - 2. Where structural fill occurs beneath exterior wall or column footings along the exterior wall it shall extend beyond the edge of footings a minimum horizontal distance equal to the depth of the fill below the footing plus three feet.
  - 3. For footings lying wholly outside of the building, (isolated from the main structure), this fill shall occur above the footing bottom, a minimum of 3 feet horizontally beyond the edge of the footings all around, and to a height of 8" below finished exterior grade.

- C. All new utility trenches excavated in existing soils shall be backfilled with structural fill and compacted according to specified requirements. The excavated material must be removed from the building footprint.

3.16 MOISTURE CONTROL (All Soils)

- A. Uniformly moisten or aerate subgrade and each subsequent fill or backfill layer before compaction to within 2 percent of optimum moisture content.
- B. Do not place backfill or fill material on surfaces that are muddy, frozen, or contain frost or ice.
- C. Remove and replace, or scarify and air-dry, all soil material that exceeds optimum moisture content by 2 percent and is too wet to compact to specified dry unit weight.
1. Stockpile or spread and dry removed wet satisfactory soil material.
- D. The Contractor is alerted that the nature of native materials at this site is such that they are sensitive to moisture. On-site materials are difficult to handle and compact and are easily disturbed when wet. The Contractor shall plan and conduct his excavation and filling operations considering the nature of the on-site materials.

3.17 FILL AND COMPACTION OF MATERIALS

- A. Place materials in layers not more than 8 inches in loose depth for material compacted by heavy compaction equipment (minimum 10 tons static weight, 20 tons dynamic force) and not more than 4 inches in loose depth for material compacted by hand-operated tampers. Otherwise, conform to requirements of paragraph 3.12.
- B. Place backfill and fill materials evenly on all sides of structures to required elevations, and uniformly along the full length of each structure.
- C. Compaction of Crushed Stone which is not suited for field density testing shall be accomplished with two to three passes of a vibratory compactor.
- D. Compaction equipment shall not be of the nature as to cause unstable conditions in the underlying natural soil. Compacting equipment shall be approved for use by the inspector of the Owner's testing laboratory.
- E. Placement of structural fill shall be in layers exceeding thicknesses as noted below before compaction. In addition to the stated degree of compaction, all fill and backfill shall receive at least the compactive effort given in the following table. Application of the minimum compactive effort does not relieve the Contractor from his requirement to achieve the specified degree of compaction.

<u>Compaction Method</u>	<u>Maximum Loose Lift Thickness</u>	<u>Minimum No.Of Passes</u>
Hand operated vibratory plate or light roller in confined areas	6"	4"
Hand operated Vibratory drum rollers wighing at least 1000# in confined areas	8"	4"

Light Vibratory Drum Roller min 3000# dynamic force per foot of drum width	12"	4"
Medium Vibratory Drum Roller min 5000# dynamic force per foot of drum width	12"	4"

- F. Each layer shall be compacted to 95% of maximum dry density as determined by AASHTO Method T 180. Structural fill will be subject to excavation for underfloor utilities prior to the concreting of the floor slab on grade. The excavation, and the subsequent re-filling with structural fill, including compaction, is included in this Contract.

### 3.18 GRADING

- A. General: Uniformly grade areas to a smooth surface, free from irregular surface changes. Comply with compaction requirements and grade to cross sections, lines, and elevations indicated. Shape pavement base course with required cross sections and elevations.
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.
  3. In all cases, maintain positive drainage.
- 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 inch.
  3. Pavements: Plus or minus 1/2 inch.
- C. Grading inside Building Lines: Finish subgrade to a tolerance of 1/2 inch when tested with a 10 foot straightedge.
- D. Pavement Shoulders: Place shoulders along edges of subbase and base course to prevent lateral movement. Construct shoulders, at least 12 inches wide, of acceptable soil materials and compact simultaneously with each subbase and base layer.
- E. Grade final surface of porous fill below building slabs on grade smooth and even, free of voids, depressions or mounds and compact to required elevation. Final grades within tolerance of 1/2" (1/4" above and 1/4" below required elevation), when tested with a 10 foot straight edge.

### 3.19 STONE SCREENINGS

- A. Install stone screenings at mow strips, backstops, dugouts, shot put, discus areas, warning tracks, site walks and all other athletic areas detailed on the Drawings.
- B. Mix salvaged and screened stone screenings from Site Clearing operations, with new stone screenings to achieve a homogeneous mixture.

- C. Install stone screenings surface over prepared base, rake smooth and compact.

### 3.20 SAND JUMPING PITS

- A. Install sand in jumping pits, over geotextile separation fabric. Rake smooth and compact to an even grade, flush with adjacent curbing.
- B. Provide Owner with one half (1/2) cubic yard of additional sand for every jumping pit constructed. Deliver to location, on site, designated by Owner.

### 3.21 ATHLETIC FIELD CONSTRUCTION

- A. Construct athletic fields where and as detailed, including installation of subsoil as transition between sand drainage layer and topsoil.
- B. Limits of athletic field construction are defined as a minimum of 15' beyond any playing line.

### 3.22 DRAINAGE FABRIC

- A. Install drainage fabric as shown on Structural, civil and landscape drawings and details. Fabric shall be placed all around the crushed stone that surrounds the foundation drains. The crushed stone surrounding the perforated drain pipe shall be completely wrapped in geotextile drainage fabric. The fabric shall be lapped at all ends, edges, and joints with adjacent sections of fabric. Care shall be exercised to avoid puncturing or tearing the fabric. Any fabric punctured or torn shall be patched with another piece of fabric extending at least two feet beyond the puncture or tear.
- B. Fabric shall be installed vertically between the crushed stone and the structural fill as detailed on the structural drawings.

### 3.23 FOUNDATION DRAINS

- A. Install pipe to elevations as indicated. Proper fittings shall be provided as required by the configuration. Perforated pipe sections must be installed such that the perforated holes in the pipes are positioned downward to allow water to enter the pipes.
- B. Verify proper pitch and flow, if specified, prior to backfilling.

### 3.24 FIELD QUALITY CONTROL

- A. Testing Agency: Allow the Owner's testing agency to inspect and test each subgrade and each fill or backfill layer. Do not proceed until test results for previously completed work verify compliance with requirements.
  - 1. Perform field in-place density tests according to ASTM D 1556 (sand cone method), ASTM D 2167 (rubber balloon method), or ASTM D 2937 (drive cylinder method), as applicable.
    - a. Field in-place density tests may also be performed by the nuclear method according to ASTM D 2922, provided that calibration curves are periodically checked and

- adjusted to correlate to tests performed using ASTM C 1556. With each density calibration check, check the calibration curves furnished with the moisture gages according to ASTM D 3017.
- b. When field in-place density tests are performed using nuclear methods, make calibration checks of both density and moisture gages at beginning of work, on each different type of material encountered, and at intervals as directed by the Engineer.
- 2. Trench Backfill: In each compacted initial and final backfill layer, perform at least one field in-place density test for each 150 feet or less of trench, but no fewer than two tests.
  - 3. Field testing of structural fill will consist of grain size analysis of gravel fill, Modified Optimum Density (AASHTO T-180) and field density tests at the rate of one (1) per 200 cubic yards of fill or at the discretion of the inspector.
- B. When testing agency reports that subgrades, fills, or backfills are below specified density, scarify and moisten or aerate, or allow to dry, or remove and replace soil to the depth required, re-compact and retest until required density is obtained. All retesting costs are the responsibility of the Contractor.
  - C. Testing Laboratory's presence does not include supervision or direction of the actual work by the Contractor, his employees, subcontractors or agents. Neither the presence of the Testing Laboratory, nor any observations and testing performed by him shall excuse the Contractor from defects discovered in his work.
  - D. Testing equipment will be provided by and testing performed by the Testing Laboratory, except as otherwise provided by Contract. Upon request by Architect, the Contractor shall provide such auxiliary personnel and services as needed to accomplish testing work and to repair damage caused thereby to permanent work.

### 3.25 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 the Architect; reshape and re-compact at optimum moisture content to the required density.
- C. Settling: Where settling occurs during the Project correction period, remove finished surfacing, backfill with additional approved material, compact, and reconstruct surfacing.
  - 1. Restore appearance, quality, and condition of finished surfacing to match adjacent work, and eliminate evidence of restoration to the greatest extent possible.

### 3.26 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 Owner's property.

- B. Refer to Division 32 Section "Topsoil" for disposal of topsoil.

END OF SECTION 31 20 00

## **SECTION 31 25 01 – ENVIRONMENTAL CONTROLS**

### **PART 1 - GENERAL**

#### **1.1 RELATED DOCUMENTS**

- A. The Contractor, Subcontractors, and/or suppliers providing goods and services referenced in or related to this Section shall also be bound by the Related Documents identified in Division 01 Section “Summary.”

#### **1.2 SUMMARY**

- A. Environmental controls shall include all labor, materials, equipment and performance of all operations in connection with environmental protection.

#### **1.3 DEFINITIONS**

- A. Resource Areas: Those areas, conditions or features which, when disturbed by construction activities, create an adverse environmental impact. Such areas include, but are not necessarily limited to densely wooded areas, wetland areas, streams, brooks, rivers, and other water crossings and steep slopes.
- B. Form 817 refers to State of Connecticut, Department of Transportation, “Standard Specifications for Roads, Bridges and Incidental Construction, Form 817”, as revised.

#### **1.4 SUBMITTALS**

- A. Submit under provisions of Division 01.

### **PART 2 - PRODUCTS (Not Applicable)**

### **PART 3 - EXECUTION**

#### **3.1 SEDIMENTATION AND EROSION CONTROL**

- A. The Contractor shall follow the requirements of Section, “Sedimentation and Erosion Control” and the “Connecticut Guidelines for Soil Erosion and Sedimentation Control”, as amended.

#### **3.2 PROTECTION OF AIR AND WATER RESOURCES**

- A. During the progress of the work, the Contractor shall conduct his operations and maintain the area of his activities, including sweeping and sprinkling of water as necessary, so as to minimize the creation and dispersion of dust. If the Engineer decides that it is necessary to use calcium chloride for more effective dust control, then the Contractor shall furnish and apply the material as directed.



- B. Fuels, lubricants or other hazardous materials shall not be stored in any resource areas.
- C. Fuel, lubricants and other hazardous material shall be stockpiled within an area of positive containment. The area shall have no open communication with surface water bodies or other resource areas, shall have a base of relatively impermeable material and shall have an adequate supply of materials required for spill clean up.

In the event that any such waste is spilled onto the ground, the Contractor shall immediately notify the Engineer, promptly clean up the spillage and all contaminated soil, and dispose of the cleanings as hazardous waste material. If a spill occurs, the clean-up activities shall take precedence over normal construction activities in order that damage to the environment is minimized.

- D. All hazardous materials containers shall be properly marked, and their contents identified. All fuel oil, lubricant, gasoline, and hydraulic fluid containers shall be fixed in place on the transport vehicle when the vehicle is in motion.
- E. The construction project shall be in compliance with all Federal, State, and local laws with respect to hazardous materials.
- F. All clean up and disposal operations shall comply with all applicable Federal, State, and local statutes, regulations and ordinances and anti-pollution laws.

### 3.3 NOISE ABATEMENT

- A. Construction equipment including generator and compressors shall be enclosed or equipped with mufflers, silencers or miscellaneous to minimize noise.
- B. The Contractor shall limit construction noise in accordance with EPA latest standard criteria.
- C. The Contractor shall comply with all applicable Federal, State and Local regulations.

### 3.4 UTILITIES

- A. The Contractor shall comply with all requirements of all applicable Federal, State, and local regulations and all permits issued for the Contract.

END OF SECTION 31 25 01

## **SECTION 32 00 00 – EXTERIOR IMPROVEMENTS**

### **PART 1 - GENERAL**

#### **1.1 RELATED DOCUMENTS**

- A. The Contractor, Subcontractors, and/or suppliers providing goods and services referenced in or related to this Section shall also be bound by the Related Documents identified in Division 01 Section “Summary.”

#### **1.2 SUMMARY**

- A. This Section includes the following:
  - 1. Signage and Posts
  - 2. Metal Bollards
  - 3. Flagpole
- B. Related Sections: The following Sections contain requirements that relate to this Section:
  - 1. Division 32 Section “Concrete Paving”.
  - 2. Division 32 Section “Turf and Grasses”.

#### **1.3 DEFINITIONS**

- A. Form 816: “Standard Specifications for Roads, Bridges and Incidental Construction”, State of Connecticut, Department of Transportation, Form 816, 2004 edition, with 2005 supplement.

#### **1.4 SUBMITTALS**

- A. Shop Drawings: Contractor shall provide fully dimensioned shop drawings and manufacturer’s technical literature for all improvements and confirm fabrication, reinforcing, and anchoring systems for approval.

### **PART 2 - PRODUCTS**

#### **2.1 FLAGPOLE**

- A. Flagpole shall be 6063-T6 aluminum, tapered seamless tubing, with an exposed height of 40 feet. The pole shall be ground-set in a 16 gauge, corrugated galvanized steel foundation sleeve. Finish shall be satin brush.
- B. Pole shall contain an internal halyard system, with cast aluminum hood and internal revolving truck, 7x19 construction stainless steel aircraft cable, neoprene ball (block), stainless steel snap hooks, solid neoprene ball retaining loop with aircraft cable core, internal winch and removable handle.

- C. Flagpole shall be similar to Model #PT408C as manufactured by Pole-Tech Co., East Setauket, NY, or approved equal.
- D. Flag shall be United States national flag, size 8 feet by 12 feet for 50' pole. It shall be made of 100% nylon, color fast, with strong ultra-white heavy duck heading, and stars that are dense-filled embroidered. The flag shall have hand-fitted, double needle seams with back-stitch reinforcement. There shall be two rows of stitching on top and bottom hems and four rows of locking stitching with back-stitch reinforcements on the fly end. The flag shall be specifically manufactured for outdoor use. The flag shall have integral, brass grommets on the mounting end.

## 2.2 HANDRAILS

- A. Provide & install new steel railings on both sides of stairs and ramps, or as shown on plan.
  - 1. Railings shall be fabricated from (nominal 1-1/4 inch) 1.6-inch outside diameter, standard weight pipe. All pipe railing and accessories shall be hot dipped galvanized.
  - 2. Rolled Steel Structural Sections ASTM A36-84a.
  - 3. Other Steel Sections and Plate: Commercial Quality Low carbon steel.
  - 4. Threaded Fasteners: ASTM A307-86, galvanized.
  - 5. Provide railing, plates, anchors, wall brackets and other accessories and appurtenances required for a complete installation.
  - 6. Tee and cross connections shall be mitered and/or coped and joined by continuous fillet welds ground flush and smooth.
  - 7. Make splices in concealed locations where possible, with splice pieces of bar stock secured inside the section with flat head countersunk screws through the bottom of the railing.
  - 8. Joints shall be flush and tight between sections. Bend units carefully to required shapes without crimping or otherwise damaging sections. Wall rails shall be returned to wall and capped. Ease and round all exposed sharp edges.
- B. Finishes:
  - 1. Galvanized Steel: DeVoe Mirrolac galvanized metal primer #13201.
  - 2. Field touch up of galvanized materials: Z.R.C. gold galvanizing materials.
- C. FABRICATION
  - 1. Welding shall conform to the requirements of the AWS. Grind exposed welds smooth.
  - 2. After Work is fabricated, peen or upset bolt threads to prevent loosening.
  - 3. Grind rough edges smooth.
  - 4. Hot dip galvanize all products for exterior locations. after fabrication. Conform to the requirements of ASTM A386, 2.0 oz. per square foot.

## PART 3 - EXECUTION

### 3.1 JOB CONDITIONS

- A. Confirm completion of pavements and other improvements are properly sequenced prior to installation of specified improvements.

3.2 FLAGPOLE

- A. Install flagpole where indicated on Drawings. Foundation to be minimum 5'-0' below finish grade. Conform to manufacturer recommendations.
- B. Clean entire flagpole per manufacturer recommendations at completion of installation.
- C. Deliver flag in original container, to Owner.

3.3 HANDRAILS

- A. Steel Pipe Railings: Construct steel sections as shown. Set railings plumb and true to line and slope. Grind all sharp edges or drips smooth. Prime paint touch-up all damaged galvanized assemblies.
- B. Posts shall be spaced 6' on center maximum
- C. Core and grout railings in place. Posts embedment shall be as shown on plan or 12" minimum. Installed rails shall be able to maintain 300 # of lateral pressure at top of rail without damage or movement.

3.4 PROTECTION/CLEAN UP

- A. Protect all newly installed equipment until acceptance of the project.
- B. Replace or refinish the surfaces if damaged prior to acceptance.
- C. Clean up all debris from installation procedures.

END OF SECTION 32 00 00

## SECTION 32 12 16 — ASPHALT PAVING

### PART 1 - GENERAL

#### 1.1 RELATED DOCUMENTS

- A. The Contractor, Subcontractors, and/or suppliers providing goods and services referenced in or related to this Section shall also be bound by the Related Documents identified in Division 01 Section “Summary.”

#### 1.2 DESCRIPTION

- A. Work Included: Bituminous concrete drives, parking, and patching, complete in place, as shown on the Drawings and as specified herein including:
  - 1. Saw cut existing pavement as required.
  - 2. Maintenance and protection of pedestrian traffic as required.
- B. Related Sections:
  - 1. Section 01 23 00 - Alternates
  - 2. Section 31 20 00 – Earth Moving;
  - 3. Section 32 12 16.01 – Asphalt Paving – Running Track
  - 4. Section 32 31 13– Chain link Fences and Gates

#### 1.3 QUALITY ASSURANCE

- A. Qualifications of Workmen
  - 1. Provide at least one person who shall be thoroughly trained and experienced in the skills required, who shall be completely familiar with the design and application of work described for this Section, and who shall be present at all times during progress of the work of this Section and shall direct all work performed under this Section.
  - 2. For actual finishing of bituminous concrete surfaces and operation of the required equipment, use only personnel who are thoroughly trained and experienced in the skills required.

#### 1.4 REFERENCES

- A. Wherever reference is made to the DOT Specifications, it shall mean the SSRBC: “Standard Specifications for Road and Bridge Construction”, State of Rhode Island, Department of Transportation, 2006 edition and amendments.

### PART 2 - PRODUCTS

#### 2.1 MATERIALS

- A. Subbase: Granular Fill, per section 31 20 00 Earth Moving
- B. Base: Dense Graded Aggregate (aka Processed Sand/Gravel) per section 31 20 00 Earth Moving.

- C. Asphalt Materials
  - 1. Binder Course: SSRBC, Section M.03, Binder Course
  - 2. Surface Course: SSRBC, Section M.03, Class I-1.
  - 3. Tack Coat: ASTM D 977, emulsified asphalt or ASTM D 2397, cationic emulsified asphalt, slow setting, factory-diluted in water, of suitable grade and consistency for application.
- D. Auxiliary Materials
  - 1. Paving Geotextiles: Nonwoven polypropylene, specifically designed for paving application, resistant to chemical attack, rot and mildew.
  - 2. Pavement Markings:
    - a. Parking lines, stop bars, Handicap Symbols and aisles: Epoxy Resin Pavement Markings, per SSRBC M.17.42.
    - b. Crosswalks: retro reflective thermoplastic preformed material, 90 mils thick, consisting of a homogeneous mixture of high quality polymeric thermoplastic binders, pigments, fillers and glass beads. Materials shall conform to AASHTO, M249-79 (86) except for material being pre-formed. Color shall be white.
    - c. Driveway center lines (two-way traffic) and Bus Stop Bars: Epoxy Resin Pavement Marking, Yellow, as per SSRBC M.17.04.
- E. For Running track asphalt additional requirements refer to Section 32 12 16.01 Asphalt Paving – Running Track.

## PART 3 - EXECUTION

### 3.1 PROJECT CONDITIONS

- A. Environmental Limitations: Do not apply asphalt materials if substrate is wet or excessively damp or the following conditions are not met:
  - 1. Prime and Tack Coats: Minimum surface temperature of 60 deg F.
  - 2. Slurry Coat: Comply with weather limitations of ASTM D 3910.
  - 3. Bituminous Concrete Base Course: Minimum surface temperature of 40 deg F and rising at time of placement, or conform to State Highway Specifications.
  - 4. Bituminous Concrete Surface course: Minimum surface temperature of 60 deg F at time of placement, or conform to State Highway Specifications.
- B. Pavement-Markings: Proceed with pavement marking only on clean, dry surfaces and at a minimum ambient or surface temperature of 40 deg F for oil based materials, 50 deg F for water based materials, and not exceeding 95 deg F.
- C. Grade Control: Establish and maintain the required lines and grades, including crown, inverted crown, and cross-slopes, for each course during paving operations.

### 3.2 EXAMINATION

- A. Verify that base is dry and in suitable condition to support paving and imposed loads. Ensure proper drainage at all times.
- B. Proof-roll base using heavy, pneumatic-tire rollers to locate areas that are unstable or that require further compaction. Subbase surface to be smooth, free of irregularities, depressions, or unsuitable materials.

- C. Notify Architect in writing of any unsatisfactory conditions. Do not begin paving installation until these conditions have been satisfactorily corrected.
- D. Frame Adjustments:
  - 1. Verify frames for manholes, catch basins, and other such improvements, within areas to be paved, are at their proper elevation.
  - 2. Adjust frames if required. Provide temporary closures over openings until completion of rolling operations. Remove closures at completion of the work. Set covers to grade, flush with the surface of adjoining pavement surface.

### 3.3 PATCHING AND REPAIRS

- A. Patching: Saw cut perimeter of patch and excavate existing pavement section to sound base. Re-compact new subgrade. Excavate rectangular patches, parallel and perpendicular to the direction of traffic, extending 12 inches into adjacent sound pavement, unless otherwise indicated. Cut excavation faces vertically. Laminate courses. Feathering of edges and transitions between new and existing pavements is not acceptable.
  - 1. Apply tack coat to faces of excavation and allow to cure before paving.
  - 2. Fill excavation with dense-graded, hot mix asphalt base mix and, while still hot, compact flush with adjacent surface.
  - 3. Partially fill excavation with dense-graded, hot-mix asphalt base mix and compact while still hot. Cover asphalt base course with compacted, hot-mix surface layer finished flush with adjacent surfaces.
- B. Crack and Joint Filling: Remove existing filler material from cracks or joints to a depth of ¼ inch. Refill with asphalt joint-filling material to restore watertight condition. Remove excess filler that has accumulated near cracks or joints. Crack and joint fill prior to any sealcoating. All vegetation shall be removed from cracks in pavements and along curb lines by heat lance (2,800 degree equipment) prior to crack and joint filling.
- C. Tack Coat: Apply uniformly with a powered pressure system to existing surfaces of previously constructed asphalt or Portland cement concrete paving and to surfaces abutting or projecting into new, bituminous concrete pavement. Apply at a uniform rate of 0.05 to 0.15 gal./sq. yd. of surface. Excessive application of tack coat is not permissible and shall be removed.
  - 1. Surface to receive tack coat shall be clean, free from silt, dust, soil, pavement grindings and other foreign matter and dry.
  - 2. Tack coat shall be a constant uniform sprayed application covering a minimum of 98% of the surface to be paved. Swirls or ribbon strips of tack coat are not acceptable. Contractor is responsible for correctly setting pressure, nozzle size and angle, spray bar height and emulsion temperature from applicator.
  - 3. Allow tack coat to cure (a minimum of 24 hours) undisturbed before paving. No one shall drive or walk across the surface while it is curing.
  - 4. Tack coat shall be applied to all asphalt surfaces whose application are five days or older or that have had excessive construction traffic that requires dust and debris removal.
  - 5. Avoid smearing or staining adjoining surfaces, appurtenances, and surroundings. Remove spillages and clean affected surfaces.

### 3.4 SURFACE PREPARATION

- A. General: Immediately before placing asphalt materials, remove loose and deleterious material from substrate surfaces. Ensure that prepared subgrade is ready to receive paving.
  - 1. Sweep loose granular particles from surface of unbound-aggregate base course. Do not dislodge or disturb aggregate embedded in compacted surface of base course.

### 3.5 GEOTEXTILE INSTALLATION

- A. Apply bond coat, consisting of asphalt cement, uniformly to existing surfaces at a rate of 0.20 to 0.30 gal./sq. yd.
- B. Place paving geotextile promptly according to manufacturer's written instruction. Broom or roll geotextile smooth and free of wrinkles and folds. Overlap longitudinal joints 4 inches and transverse joints 6 inches.
  - 1. Protect paving geotextile from traffic and other damage and place overlay paving the same day.

### 3.6 HOT-MIX ASPHALT PLACING

- A. Hot-mix Asphalt: Provide dense, hot-laid asphalt plant mixes approved by authorities having jurisdiction; designed according to the procedures in AI's "Mix Design Methods for Asphalt Concrete and Other Hot-Mix Types"; and complying with the requirements of SSRBC Sections 401-403.
- B. Machine place hot-mix asphalt mix on prepared surface, spread uniformly, and strike off. Place asphalt mix by hand to areas inaccessible to equipment in a manner that prevents segregation of mix. Place each course to required grade, cross section, and thickness, when compacted. Conform to Conform to SSRBC Section 401-403 including transport of material.
  - 1. Spread mix at minimum temperature of 250 deg F.
  - 2. Begin applying mix along centerline of crown for crowned sections and on high side of one-way slopes, unless otherwise indicated.
  - 3. Regulate paver machine speed to obtain smooth, continuous surface free of pulls and tears in asphalt-paving mat.
- C. Place paving in consecutive strips not less than 10 feet wide, except where infill edge strips of a lesser width are required.
  - 1. After first strip has been placed and rolled, place succeeding strips and extend rolling to overlap previous strips. Complete asphalt base course for a section before placing asphalt surface course.
- D. Promptly correct surface irregularities in paving course behind paver. Use suitable hand tools to remove excess material forming high spots. Fill depressions with hot-mix asphalt to prevent segregation of mix; use suitable hand tools to smooth surface.
- E. Protect installed curb, walls, and other improvements, during paving operations. Repair/replace/reset any item/ curb damaged during paving operation. Joint between bituminous pavement shall be of equal density to other areas of pavement.



- F. If the asphalt surface course is not installed immediately after the binder course is installed and stabilized, the Contractor assumes all responsibility for any damage, from whatever source, which may affect the binder course. All damage to this binder course will be removed and replaced by the Contractor, at no additional cost to the Owner. The Architect shall be the sole judge of the limits and extents of pavement and subgrade to be replaced.

### 3.7 JOINTS

- A. Construct joints to ensure continuous bond between adjoining paving sections. Construct joints free of depressions with same texture, density and smoothness as other sections of hot-mix asphalt course.
  - 1. Clean contact surfaces and apply tack coat.
  - 2. Offset longitudinal joints in successive courses a minimum of 12 inches.
  - 3. Offset transverse joints in successive courses a minimum of 24 inches.
  - 4. Construct transverse joints by bulkhead method or sawed vertical face method as described in AI's "The Asphalt Handbook".
  - 5. Compact joints as soon as hot-mix asphalt will bear roller weight without excessive displacement.
  - 6. Compact asphalt at joints to a density within 2 percent of specified course density.

### 3.8 COMPACTION

- A. General: Begin compaction as soon as place hot-mix paving will bear roller weight without excessive displacement. Compact hot-mix paving with hot, hand tampers or vibratory-plate compactors in area inaccessible to rollers.
  - 1. Complete compaction before mix temperature cools to 185 deg F.
- B. Breakdown Rolling: Accomplish breakdown or initial rolling immediately after rolling joints and outside edge. Examine surface immediately after breakdown rolling for indicated crown, grade, and smoothness. Repair surfaces by loosening displaced material, filling with hot-mix asphalt, and re-rolling to required elevations.
- C. Intermediate Rolling: Begin intermediate rolling immediately after breakdown rolling, while hot-mix is still hot enough to achieve specified density. Continue rolling until hot-mix asphalt course has been uniformly compacted to the following density:
  - 1. Average Density: 96 percent of reference laboratory density according to AASHTO T245 but not less than 94 percent nor greater than 100 percent.
  - 2. Average Density: 92 percent of reference maximum theoretical density according to ASTM D 2041, but not less than 90 percent nor greater than 96 percent.
- D. Finish Rolling: finish roll paved surfaces to remove roller marks while hot-mix asphalt is still warm.
- E. Edge Shaping: While surface is being compacted and finished, trim edges of pavement to proper alignment. Bevel edges while still hot, with back of rake or smooth iron. Compact thoroughly using tamper or other satisfactory method. Raveled or untamped edges will not be accepted.
- F. Repairs: Remove paved areas that are defective or contaminated with foreign materials. Remove paving course over area affected and replace with fresh, hot-mix asphalt. Compact by rolling to specified density and surface smoothness.

- G. Protection: After final rolling, do not permit vehicular traffic on pavement until it has cooled and hardened, and in no case sooner than 8 hours.
- H. Erect barricades to protect paving from traffic until mixture has cooled enough not to become marked.

### 3.9 INSTALLATION TOLERANCES

- A. Thickness: Compact each course to produce a surface smoothness within the following tolerances:
  - 1. Base Course: Plus  $\frac{1}{2}$  inch, no minus.
  - 2. Surface Course:  $\frac{1}{4}$  inch, no minus.
- B. Surface Smoothness: Compact each course to produce a surface smoothness within the following tolerances as determined by using a 10-foot straightedge applied transversely or longitudinally to paved areas:
  - 1. Base Course:  $\frac{1}{4}$  inch.
  - 2. Surface Source:  $\frac{1}{8}$  inch
  - 3. Crowned Surfaces: Test with crowned template centered and at right angle to crown. Maximum allowable variance from template is  $\frac{1}{4}$  inch. In no case will water be allowed to puddle or stand on any finished pavement.

### 3.10 SEALCOATING

- A. See Patching and Repairs for surface preparation. Seal coat all areas called out on plans. Apply two coats perpendicular to each other. If any area is transparent and old striping can be discerned, reapply.

### 3.11 PAVEMENT MARKINGS

- A. Do not apply pavement markings until layout, colors, and placement and pavement conditions have been approved by the Architect. Conform to SSRBC, Section M.17 and the manufacturer's recommendations and instructions for application. Remove existing lines from remaining pavements as required and approved by Owner. Painting out lines is not acceptable.
- B. Allow paving to cure for a minimum of 14 days or per manufacturer's requirements before starting pavement marking.
- C. Thoroughly sweep and clean surface to eliminate loose material and dust.
- D. Apply paint with mechanical equipment to produce pavement markings of dimensions indicated with uniform, straight edges. Avoid fogging and overspray. Note specific dimensions and layout requirements for markings:
  - 1. Parking Spaces – 4" wide.
  - 2. Handicap Seating – 2" wide.
  - 3. Diagonal Aisle Stripping – 4" wide, 3' on center.
- E. Apply preformed thermoplastic crosswalks and stop bars, through the use of heat, in accordance with manufacturer's instructions.

- F. After applying paint, erect suitable barriers to prevent tracking of paint before drying. Retouch and paint all marking which become smeared, discolored, worn, or otherwise marred before final acceptance of the project. Remove any evidence of smearing of paint.

### 3.12 FIELD QUALITY CONTROL

- A. Testing Agency: Contractor will engage a qualified independent testing agency to perform field inspections and tests and to prepare test reports.
  - 1. Testing agency will conduct and interpret tests and state in each report whether tested Work complies with or deviates from specified requirements.
- B. Additional testing, at Contractor's expense, will be performed to determine compliance of corrected Work with specified requirements.
- C. Thickness: In-place compacted thickness of hot-mix asphalt course will be tested for compliance with smoothness tolerances.
- D. Surface Smoothness: Finished surface of each hot-mix asphalt course will be tested for compliance with smoothness tolerances.
- E. In-Place Density: Samples of un-compacted paving mixtures and compacted pavement and will be secured by testing agency according to ASTM D 979.
  - 1. Reference laboratory density will be determined by averaging results from 4 samples of hot-mix asphalt-paving mixture delivered daily to site, prepared according to ASTM D 1559, and compacted according to job-mix specifications.
  - 2. In-place density of compacted pavement will be determined by testing core samples according to ASTM D 1188 or ASTM D 2726.
- F. Remove and replace or install additional hot-mix asphalt where test results or measurements indicate that it does not comply with specified requirements.

**END OF SECTION 32 12 16**

## **SECTION 32 12 16.01 – ASPHALT PAVING - RUNNING TRACK**

### **PART 1 - GENERAL**

#### **1.1 RELATED DOCUMENTS**

- A. The Contractor, Subcontractors, and/or suppliers providing goods and services referenced in or related to this Section shall also be bound by the Related Documents identified in Division 01 Section “Summary.”

#### **1.2 SUMMARY**

- A. This Section includes the following:
  - 1. Asphalt paving for running track and field events, including patching and overlays.
- B. Related Sections include the following:
  - 1. Division 31 Section “Earth Moving”.
  - 2. Division 32 Section “Asphalt Paving”.
  - 3. Division 32 Section “Polyurethane Running Track Surfacing – Structural Spray”
  - 4. Division 33 Section “Field Subdrainage System”.

#### **1.3 DEFINITIONS**

- A. Form 817: "Standard Specifications for Roads, Bridges, and Incidental Construction", State of Connecticut, Department of Transportation, Form 817, 2016 edition, as supplemented.

#### **1.4 SUBMITTALS**

- A. Product Data for each product specified. Include technical data and tested physical and performance properties.
- B. Job-Mix Designs for each job mix proposed for the Work.
- C. Shop Drawings: Indicate pavement markings, lane separations, and defined parking spaces. Indicate dedicated handicapped spaces with international graphics symbol.
- D. Qualification data: For firms and persons specified in the “Quality Assurance” Article to demonstrate their capabilities and experience. Include lists of completed projects with project names and addresses, names and addresses of architects and owner, and other information specified.
- E. Material Certificates: Certificates signed by manufacturers certifying that each material complies with requirements.
- F. Two (2) as-built surveys of track and field pavements. Refer to Paragraph "Field Quality Control", below.

#### **1.5 QUALITY ASSURANCE**

- A. Installer Qualifications: Engage an experienced installer who has completed asphalt paving for a minimum of three (3) running tracks in the last five (5) years similar in material, design, and extent to that indicated for this Project and with a record of successful in-service performance.

- B. Manufacturer Qualifications: Engage a firm experienced in manufacturing asphalt paving similar to that indicated for this Project and with a record of successful in-service performance.
  - 1. Firm shall be a registered and approved paving mix manufacturer with authorities having jurisdiction or with the DOT of the state in which Project is located.
- C. For general walks, pads and driveways refer to the requirements of Section 32 12 16 – Asphalt Paving.
- D. Asphalt-Paving Publications Requirements: Comply with AI's "The Asphalt Handbook", and ASTM and AASHTO requirements except where more stringent requirements are indicated herein.
- E. Pre-installation Conference: Conduct conference at Project site to comply with requirements of Division 1, Section "Project Coordination" Review methods and procedures related to asphalt paving including, but not limited to the following:
  - 1. Review proposed sources of paving materials, including capabilities and location of manufacturing plant.
  - 2. Review condition of substrate and preparatory work performed by other trades.
  - 3. Review requirements for protecting paving work, including restriction of traffic during installation period and for remainder of construction period.
  - 4. Review and finalize construction schedule for paving and related work. Verify availability for materials, paving Installer's personnel, and equipment required to execute the Work without delays.
  - 5. Review inspection and testing requirements, governing regulations, and proposed installation procedures.
  - 6. Review forecasted weather conditions and procedures for coping with unfavorable conditions.
  - 7. Track surfacing contractor representative shall be present at pre-installation conference.

#### 1.6 DELIVERY, STORAGE, AND HANDLING

- A. Refer to Connecticut DOT form 817 Section 4.06 requirements for Hot Mix Asphalt.

### PART 2 - PRODUCTS

#### 2.1 ASPHALT MATERIALS

- A. Asphalt Binder Course (aka Class 1): Hot Mix Asphalt binder course shall be CT DOT Form 817, Article M.04.02, HMA S0.5 Design Level 2 as modified below.
  - 1. Shall not contain Recycled Asphalt Pavement (RAP) (0% RAP).
  - 2. Shall have a minimum PG binder content ranging between a minimum of 5% and 6.5% with zero negative tolerance.

- B. Asphalt Surface Course (aka Class II): Hot Mix Asphalt surface course shall be CT DOT Form 817, Article M.04.02, HMA S0.375 Design Level 2 as modified below.
  - 1. Shall not contain Recycled Asphalt Pavement (RAP) (0% RAP)
  - 2. Shall have a minimum PG binder content ranging between a minimum of 6% and maximum of 7% with zero negative tolerance.

## 2.2 AUXILIARY MATERIALS

- A. Tack Coat: Conforming to Section M.04 of CT DOT specifications.
- B. Joint Sealers: Use of joint sealers is not allowed unless specifically approved in writing by the landscape architect.
- C. Paving Geotextiles (if required): Nonwoven polypropylene, specifically designed for paving application, resistant to chemical attack, rot and mildew.

## PART 3 - EXECUTION

### 3.1 GENERAL

- A. Contractor shall install all pavements as specified in the location and to the grades as shown on the drawings and/or approved by the Landscape Architect. Materials, methods of construction, type and thickness of pavement courses shall be as shown as detailed and specified herein.

### 3.2 PREPARATION AND CLEANING

- A. Paving contractor shall coordinate with the track surfacing contractor. Paving contractor is responsible for supplying an asphalt surface that meets the requirements of this specification, project schedule and the track surfacing installer. Paving contractor shall make any corrections required to meet the requirements of this specification.
- B. Remove loose material from compacted base material immediately before proof rolling.
- C. Ensure compaction and planarity testing for aggregate base material has been performed and is approved, in writing by the Landscape Architect. Notify Architect in writing of any unsatisfactory conditions. Do not begin paving installation until these conditions have been satisfactorily corrected.
- D. Proof-roll base using heavy, pneumatic-tire rollers to locate areas that are unstable or that require further compaction. Subbase surface to be smooth, free of irregularities, depressions, or unsuitable materials.
- E. Verify that the frames of all structures, improvements and perimeter curbs are installed at the correct elevation in relation to proposed paving. Adjust frames if required. Provide temporary closures over openings until completion of rolling operations. Remove closures at completion of the work. Set covers to grade, flush with the surface of adjoining pavement surface.

### 3.3 PROJECT CONDITIONS

- A. Environmental Limitations: Do not apply asphalt materials if it is raining, substrate is wet or excessively damp or the following conditions are not met:
  - 1. Prime and Tack Coats: Minimum surface temperature of 60 deg F.

2. Bituminous Concrete Base Course: Minimum surface (earth) temperature of 40 deg F and rising at time of placement.
  3. Bituminous Concrete Surface course: Minimum surface (earth/binder) temperature of 60 deg F at time of placement.
- B. Grade Control: Establish and maintain the required lines and grades, including crown, inverted crown, and cross-slopes, for each course during paving operations. Inclination control of pavements at track and field events is extremely critical. Conform to tolerances listed in this specification.
- C. The paving sub-contractor MUST have a supervisor from the Track Surfacing Sub-contractor (separate contract), present during the installation of the surface course of asphalt paving, at the running track. Inspection and written acceptance of the surface course, by the Track Surfacing Sub-contractor is required before installation of the track surface may proceed.
- 3.4 HOT-MIX ASPHALT PLACING
- A. Hot-mix Asphalt placement shall conform to Connecticut Form 817, Section M.04 unless specifically revised below.
- B. Whenever possible, all pavement shall be spread by a self-propelled finishing machine. At inaccessible or irregular areas, pavement may be placed by hand methods. The hot mixture shall be spread uniformly to the required depth with hot shovels and rakes. After spreading, the hot mixture shall be carefully smoothed to remove all segregated course aggregate and rake marks. Rakes and lutes used for hand spreading shall be of the type designed for use on asphalt mixtures. Loads shall not be dumped faster than they can be properly spread. Workers shall not stand on the loose mixture while spreading.
- C. Paving Machine Placement: Apply successive lifts of bituminous concrete in transverse directions with the surface course placed in the direction of surface-water flow. Place in typical strips not less than 10'-0" wide.
- D. Joints: Make joints between old and new pavements, or between successive days' work, to ensure continuous bond between adjoining work. Construction joints shall have the same texture, density, and smoothness as other sections of bituminous concrete courses. Clean contact surfaces and apply tack coat.
- E. The mixtures shall be placed and compacted to provide a smooth and dense surface with a uniform texture. When overtaken by sudden storms, the Engineer may permit placement of the bituminous concrete to continue up to the quantity of material that is in transit from the plant.
- F. The mixture shall be placed at a temperature that is within 25°F of the approved job mix formula.
- G. Before rolling is started, the mat shall be checked for defects in material or placement. Such defects shall be corrected to the satisfaction of the Engineer. Where it is impracticable due to physical limitations to operate the paving equipment, the Engineer may permit the use of other methods or equipment. Where hand spreading is permitted, the mixture shall be placed by means of suitable shovels and other tools, and in a uniformly loose layer at a depth that will result in a completed pavement having the designed depth. Any deviation from standard crown

or section shall be immediately remedied by placing additional material or removing surplus as directed by the Engineer. The Engineer may direct that other means of spreading be used to ensure a better control of the depths of material and the finished surface.

- H. A thin uniform coating of tack coat shall be applied to the pavement immediately before overlaying and be allowed sufficient time to break (set). All surfaces that have been in place longer than five calendar days shall have an application of tack coat. A tack coat shall be applied to all contact surfaces such as gutters, manholes and concrete barriers. The tack coat shall be applied by a non-gravity pressurized spray system that results in uniform overlapping coverage at an application rate of 0.05 to 0.15 gallons per square yard. Gravity-fed systems are not acceptable for tack coat application. The Engineer must approve the equipment and the method of measurement prior to use. The material for tack coat shall not be heated in excess of 160°F and shall not be further diluted.
- I. Refueling of equipment is prohibited in any location on the paving project where fuel might come in contact with bituminous concrete mixtures already placed or to be placed. Solvents for use in cleaning mechanical equipment or hand tools shall be stored clear of areas paved or to be paved. Before any such equipment and tools are cleaned, they shall be moved off the paved or to-be-paved area; and they shall not be returned for use until after they have been allowed to dry.
- J. Immediately before placing bituminous concrete on a waterproofing membrane, the membrane shall be swept clean. If the membrane is damaged it shall be repaired by patching as directed by the Engineer.
- K. Temporary and permanent transverse joints shall be formed by saw-cutting a sufficient distance back from the previous run, existing bituminous concrete pavement, or bituminous concrete driveways to expose the full depth of the course. On any cold joint, immediately prior to additional bituminous concrete materials being placed, a brush of tack coat shall be used on all contact surfaces.
- L. The longitudinal joint shall be offset at least six inches from the joint in the course immediately below. The joint in the final surface shall be at the centerline or at lane lines.

### 3.5 ROLLING AND COMPACTION

- A. General: Begin compaction as soon as place hot-mix paving will bear roller weight without excessive displacement. Compact hot-mix paving with hot, hand tampers or vibratory-plate compactors in area inaccessible to rollers.
  - 1. Complete compaction before mix temperature cools to 185 deg F.
- B. Finished surface of track pavement must have one consistent cross-pitch from side to side.
- C. Breakdown Rolling: Accomplish breakdown or initial rolling immediately after rolling joints and outside edge. Examine surface immediately after breakdown rolling for indicated crown, grade, and smoothness. Repair surfaces by loosening displaced material, filling with hot-mix asphalt, and re-rolling to required elevations.



- D. Intermediate Rolling: Begin intermediate rolling immediately after breakdown rolling, while hot-mix is still hot enough to achieve specified density. Continue rolling until hot-mix asphalt course has been uniformly compacted to the following density:
  - 1. Average Density: 96 percent of reference laboratory density according to AASHTO T245 but not less than 94 percent nor greater than 100 percent.
  - 2. Average Density: 92 percent of reference maximum theoretical density according to ASTM D 2041, but not less than 90 percent nor greater than 96 percent.
- E. Finish Rolling: finish roll paved surfaces to remove roller marks while hot-mix asphalt is still warm.
- F. Edge Shaping: While surface is being compacted and finished, trim edges of pavement to proper alignment. Bevel edges while still hot, with back of rake or smooth iron. Compact thoroughly using tamper or other satisfactory method. Raveled or untamped edges will not be accepted.
- G. Repairs: Remove paved areas that are defective or contaminated with foreign materials. Remove paving course over area affected and replace with fresh, hot-mix asphalt. Compact by rolling to specified density and surface smoothness.
- H. Protection: After final rolling, do not permit vehicular traffic on pavement until it has cooled and hardened, and in no case sooner than 8 hours.
- I. Erect barricades to protect paving from traffic until mixture has cooled enough not to become marked.

### 3.6 INSTALLATION TOLERANCES

- A. Thickness: Compact each course to produce a surface smoothness within the following tolerances:
  - 1. Base Course: Plus  $\frac{1}{2}$  inch, no minus.
  - 2. Surface Course:  $\frac{1}{4}$  inch, no minus.
- B. Surface Smoothness: Compact each course to produce a surface smoothness within the following tolerances as determined by using a 10-foot straightedge applied transversely or longitudinally to paved areas:
  - 1. Base Course:  $\frac{1}{4}$  inch.
  - 2. Surface Source:  $\frac{1}{8}$  inch
  - 3. Test with straight edge centered and at right angle to slope. In no case will water be allowed to puddle or stand on any finished pavement.
  - 4. Ribbons/waves in longitudinal runways will not be accepted. Replace as directed.
  - 5. Running track shall have a maximum lateral inclination of 1:100 (1.0% Slope);

### 3.7 FIELD QUALITY CONTROL

- A. Testing Agency: Contractor will engage a qualified independent testing agency to perform field inspections and tests and to prepare test reports.

1. Owner/Architect has the option to approve or reject the Contractor's choice of testing agency.
2. Testing agency will conduct and interpret tests and state in each report whether tested Work complies with or deviates from specified requirements.
- B. Additional testing, at Contractor's expense, will be performed to determine compliance of corrected Work with specified requirements.
- C. Thickness: In-place compacted thickness of hot-mix asphalt course will be tested for compliance with thickness tolerances.
- D. Surface Smoothness: Finished surface of each hot-mix asphalt course will be tested for compliance with smoothness tolerances.
- E. In-Place Density: Samples of uncompacted paving mixtures and compacted pavement will be secured by testing agency according to ASTM D 979.
  1. Reference laboratory density will be determined by averaging results from 4 samples of hot-mix asphalt-paving mixture delivered daily to site, prepared according to ASTM D 1559, and compacted according to job-mix specifications.
  2. In-place density of compacted pavement will be determined by testing core samples according to ASTM D 1188 or ASTM D 2726.
- F. Remove and replace or install additional hot-mix asphalt where test results or measurements indicate that it does not comply with specified requirements.
- G. Track Confirmation Topographic Surveys: Two complete, separate planimetric and topographic surveys must be prepared, sealed and signed by a licensed land surveyor and provided to the Architect in CAD form for review. The first survey shall be performed at completion of the installation of the aggregate base course for asphalt paving, and installation of the perimeter trench drain, if any. (Refer to Section "Perimeter Trench Drain" of this specification). A complete, second survey shall be performed at completion of the installation of the Surface Course of asphalt paving. Both surveys must include the following information:
  1. Horizontal limits of pavement, (and trench drain location, if any).
  2. Survey shall provide spot grade Elevations and locations at both sides and center of track pavement, Trench drainage or perimeter curb elevations and location of track radius points. Track elevations at 20 feet on center, maximum.
  3. Horizontal and vertical confirmation of long jump/triple jump and pole vault runways. Record elevations at 6 foot on center intervals, maximum, along both sides of runway. No deviation greater than ½ inch in 10 feet will be permitted. Paving which exceeds this limit will be removed and replaced in its entirety.
  4. Certify general track layout and grading to be in conformance with specification and NCAA standards unless noted otherwise. Track survey shall become the basis for track striping submittal and as-built certification per Division 2, Section "Track Surfacing".
  5. No deviations greater than those listed in "Installation Tolerances" paragraph, above, will be permitted. Paving which exceeds these limits shall be removed and replaced.

- H. Planarity: The contractor is to perform a flood test and straight bar test of the bituminous pavement top course prior to application of the synthetic track surface.
1. The bituminous pavement shall be sufficiently cured and cleaned prior to Work of this section to be performed. The governing guidelines of track construction allow for a maximum longitudinal slope of on tenth of one percent (0.10%) in the running direction. The maximum lateral slope shall not exceed one (1) percent (1.00%).
  2. The entire asphalt base surface shall be checked for planarity, surface tolerance, and flooded and checked for depressions or irregularities in the asphalt. Any puddle area covering a nickel shall or vary +/- ¼ inch when measured with a 10-foot straightedge in any direction shall be marked and repaired with Patch Binder, according to manufacturer's specifications and approved by the Architect.
    - a. Grade conformance tests shall to be performed by a third party approved testing agency (Sports Labs USA, Labosport, or approved equal) on the top course of the bituminous pavement. The entire surface shall provide positive drainage to the inside edge of the track. The maximum allowable planarity deviation within a pass should be 1/4 inch in 10 feet when measured in any direction utilizing a straight bar. Deficient areas in the leveling course should be corrected as approved by the Architect.
    - b. After patching, the asphalt surface shall not vary allow water to stand greater than 1/16 inch, 40 minutes after a flood test has been performed. Slopes shall meet the guidelines of the ASBA and NFHS.
  3. General Contractor, Asphalt Contractor, Architect, and Track Surfacing Contractor shall be present for testing. Notification shall be sent at least five (5) days prior
- I. Protection of the Work: All sections of the newly finished pavement shall be protected by the Contractor from damage by the Contractor's equipment and traffic.
- J. Corrective Work Procedures: Any portion of the completed pavement determined by the Engineer to be defective in surface texture, density or composition, or that does not comply with the requirements of the specifications shall be corrected at the expense of the Contractor.
- K. Any corrective courses placed as the final wearing surface shall not be less than one and one-half inches in depth after compaction.

### 3.8 DEFICIENT PAVEMENT

- A. If pavement placed by the Contractor does not meet these specifications, and the Landscape Architect requires its replacement or correction, the Contractor shall:
- B. Propose a corrective procedure to the Engineer for review and approval prior to any corrective work commencing. The proposal shall include:
1. Limits of pavement to be replaced or corrected, indicating stationing or other landmarks that are readily distinguishable.
  2. Schedule.
  3. Construction method and sequence of operations.

4. Methods of maintenance and protection of traffic.
  5. Material sources.
  6. Names and telephone numbers of supervising personnel.
- C. Perform all corrective work in accordance with the Contract and the approved corrective procedure.
- 3.9 PATCHING AND REPAIRS:
- A. Patching: Saw cut perimeter of patch and excavate existing pavement section to sound base. Re-compact new subgrade. Excavate rectangular patches, parallel and perpendicular to the direction of traffic, extending 12 inches into adjacent sound pavement, unless otherwise indicated. Cut excavation faces vertically. Laminate courses. Feathering of edges and transitions between new and existing pavements is not acceptable.
1. Apply tack coat to faces of excavation and allow to cure before paving.
  2. Fill excavation with dense-graded, hot mix asphalt base mix and, while still hot, compact flush with adjacent surface.
  3. Partially fill excavation with dense-graded, hot-mix asphalt base mix and compact while still hot. Cover asphalt base course with compacted, hot-mix surface layer finished flush with adjacent surfaces.
- B. Crack and Joint Filling: Remove existing filler material from cracks or joints to a depth of 1/4 inch. Refill with asphalt joint-filling material to restore watertight condition. Remove excess filler that has accumulated near cracks or joints. Crack and joint fill prior to any sealcoating. All vegetation shall be removed from cracks in pavements and along curb lines by heat lance (2,800 degree equipment) prior to crack and joint filling.
- C. Tack Coat: Apply uniformly with a powered pressure system to existing surfaces of previously constructed asphalt or Portland cement concrete paving and to surfaces abutting or projecting into new, bituminous concrete pavement. Apply at a uniform rate of 0.05 to 0.15 gal./sq. yd. of surface. Excessive application of tack coat is not permissible and shall be removed.
1. Surface to receive tack coat shall be clean, free from silt, dust, soil, pavement grindings and other foreign matter and dry.
  2. Tack coat shall be a constant uniform sprayed application covering a minimum of 98% of the surface to be paved. Swirls or ribbon strips of tack coat are not acceptable. Contractor is responsible for correctly setting pressure, nozzle size and angle, spray bar height and emulsion temperature from applicator.
  3. Allow tack coat to cure (a minimum of 24 hours) undisturbed before paving. No one shall drive or walk across the surface while it is curing.
  4. Tack coat shall be applied to all asphalt surfaces whose application are five days or older or that have had excessive construction traffic that requires dust and debris removal.
  5. Avoid smearing or staining adjoining surfaces, appurtenances, and surroundings. Remove spillages and clean affected surfaces.

3.10 CLEAN UP

- A. Remove all containers, surplus and debris and dispose of in accordance with local, state and Federal regulation.
- B. Remove all spills and overruns.
- C. Leave site in a clean and orderly condition on a daily basis.
- D. Upon completion of all work, remove all containers, surplus materials, and installation debris. Leave area of work in clean orderly condition.

**END OF SECTION 32 12 16**

## **SECTION 32 18 13 – SYNTHETIC GRASS SURFACING**

### **PART 1 - GENERAL**

#### **1.1 RELATED DOCUMENTS**

- A. The Contractor, Subcontractors, and/or suppliers providing goods and services referenced in or related to this Section shall also be bound by the Related Documents identified in Division 01 Section “Summary.”
- B. Specification Section 32 18 13.10 Synthetic Grass Surfacing Warranty
- C. Specification Section 33 46 16 Field Subdrainage System

#### **1.2 SUMMARY**

- A. This Section includes synthetic turf grass system assemblies consisting of the following:
  - 1. Synthetic grass yarn.
  - 2. Primary and secondary backing materials.
  - 3. Performance infill and sand materials.
  - 4. Seam tape and glue materials.
  - 5. Shock pad.
  - 6. Procurement and installation of the synthetic grass surfacing system.
  - 7. Pre and post installation testing of synthetic grass surfacing system.
  - 8. Warranty and maintenance requirements for the synthetic grass surfacing system.
  - 9. All incidental work items required to complete the work as shown on the Drawings and as called-for in the Specifications.
- B. Contractor shall coordinate work between all Contractors, sections, and trades required for the proper completion of the work. Carefully examine all of the Contract Documents for requirements which affect the work of this Section. The exact scope of work of this section cannot be determined without a thorough review of all Specification Sections and other Contract Documents.
- C. In all cases when conflicts exist between information contained in this Section and in other parts of the Contract Documents, Contractor shall assume that the more stringent and highest-performing solution is required.
- D. Contractor is responsible for all health and safety.

#### **1.3 REFERENCES**

- A. A.Reference herein to any technical society, organization, group or regulation are made in accordance with the following abbreviations and, unless otherwise noted or specified, all work under this Section shall conform to the latest edition as applicable.
- B. American Society for Testing and Materials (ASTM)
- C. European Standard (EN)
- D. National Federation of State High Schools (NFHS)
- E. Synthetic Turf Council Guidelines (STC)

- F. Connecticut Interscholastic Athletic Conference (CIAC)
- G. American Sports Builders Association (ASBA)

#### 1.4 DEFINITIONS

- A. A. Most terms used within the documents are industry standard. Certain words or phrases shall be understood to have specific meanings as follows:
  - 1. Provide: Furnish and install completely connect and in operable condition.
  - 2. Furnish: Purchase and deliver to a specific location within the building or site.
  - 3. Install: With respect to equipment furnished by others, install means to receive, unpack, move into position, mount and connect, including removal of packaging materials.
- B. Synthetic Turf Testing Agency (Testing Agency): Agency to perform testing on the synthetic turf system. All testing shall be done by a 3rd party testing agency. Performance testing and on-site testing shall be performed by an Agency currently holding certification by FIFA, World Rugby, and FIH.

#### 1.5 SUBMITTALS

- A. Pre-Manufacturing Submittals
  - 1. Non-compliance with the submittal requirements as specified herein may result in rejection of any product arriving on-site.
  - 2. The following letters, on the synthetic grass surfacing manufacturer/vendor's letterhead and signed by an officer of the company, shall be submitted with the bid.
    - a. A letter shall confirm their intent to conform to all requirements set forth in the Bid Documents for the Synthetic Grass Surfacing System and qualified installation crew. Including, but not limited to, the Bid Drawings, Specifications, Addendum, and RFI Clarifications.
    - b. Manufacturer's Review of Synthetic Grass Surfacing: A letter confirming that the Bid Documents for the Synthetic Grass Surfacing System have been completely reviewed by qualified representatives of the materials manufacturer and that they are in agreement that the materials and system to be used for the synthetic grass field surfacing are proper and adequate for the applications shown and in no way impact the system warranty.
  - 3. The following letters, on the Drainage Pad manufacturer/vendor's letterhead and signed by an officer of the company, shall be submitted with the bid.
    - a. A letter shall confirm their intent to conform to all requirements set forth in the Bid Documents for Drainage Pad and qualified installation crew. Including, but not limited to, the Bid Drawings, Specifications, Addendum, and RFI Clarifications.
    - b. Manufacturer's Review of Synthetic Grass Surfacing: A letter confirming that the Bid Documents for the Drainage Pad have been completely reviewed by qualified representatives of the materials manufacturer and that they are in agreement that the materials and system to be used for the Drainage Pad are proper and adequate for the applications shown and in no way impact the system warranty.

4. Sample manufacturer's warranty and maintenance requirements for the Drainage Pad proposed for this project.
5. Product Data: Submit manufacturer's general specifications and installation instructions for all products in the Synthetic Grass Surfacing System, including certifications and other data as may be required, to show compliance with the Contract Documents.
  - a. Synthetic Turf Grass Surfacing System
  - b. Yarn Fiber
  - c. Backing Materials
  - d. Seaming Materials
  - e. Performance Infill
  - f. Sand Infill
  - g. Synthetic Grass Surface Carpet
  - h. Shock Pad
6. Material Safety Data Sheets (MSDS) sheets for all products and product components to be utilized on site, as necessary. This shall include solvents and other products required as part of clean-up.
7. Certified Statement: Statement of the presences of toxic and or hazardous materials. Any toxic and/or hazardous material exceeding 100 parts per million (ppm) shall be identified in list form. The list shall reference the standard in name and threshold if applicable, and the test results. This requirement is above and beyond the requirements for MSDS.
8. Material and Performance Testing Agency: Submit for approval all material and performance testing agencies to be utilized for this project. (By Owner)
9. In-house Material Testing Qualifications: Submit for approval all required certifications and third-party calibration testing if an in-house laboratory is to be utilized for the post-manufacturing testing on this project.
10. Material Testing: Submit for approval test results for all material testing performed under "Quality Control Testing, Pre-Manufacturing" herein. Provide copies of all Testing Agency reports. Testing shall be no more than 36 months old from date of submittal.
  - a. Intent:
    - 1) The intent of the pre-manufacturing submittal is for the synthetic turf manufacturer to provide the required documentation listed below for the **manufacturers standard system that most closely resembles the system specified.**
    - 2) The intent of this section is for manufactures to provide a **standard system that has been previously been tested** for conformance to the requirements below.
    - 3) The intent is not to require a manufacture to conduct the required pre-manufacturing submittal testing on a non-standard system.
    - 4) Systems that meet the requirements of this system and have been approved by FIFA should meet the requirements of this specification, apart from the infill material.



11. Material Samples: Submit three (3) samples for approval for all materials under 2.1 Materials including, but not limited to, the following:
  - a. Synthetic Grass Surfacing Yarn Fiber: Provide samples for each color used for the field, markings, and logos.
  - b. Synthetic Grass Samples: Twelve-inch (12") square samples of un-filled synthetic grass surface carpet for each color used for the field.
    - 1) The samples shall be the manufacturers standard product that most closely resembles the specified system and is to be reviewed as the general product intended for use on the field.
    - 2) Manufacturer shall note any discrepancies between the standard product sample submitted and the product to be manufactured for this project.
  - c. Seaming Materials: Twelve-inch (12") long samples of all materials to be used for seaming of the synthetic grass turf system.
  - d. Synthetic Grass Surfacing Infill: One-pound samples of performance infill and infill sand (in separate bags).
12. Shop Drawings: Submit for approval the following:
  - a. Seaming plan; Seams of the field shall not coincide with the subsurface drain system nor seams of pad (if applicable).
  - b. Field Markings and Logos Inlays.
    - 1) Layouts for all sports shown on the Drawings showing any field lines, markings, boundaries on the appropriate field(s) and all specified colors. All markings shall be tufted in the factory or inlaid. Provide certification that field layouts meet all NFHS and CIAC/MIAA sport marking requirements as installed in the field.
    - 2) Details on field construction, making special note of any details that may deviate from the Drawings or Specifications. Include: edge detail, goal post detail, covers for access to subsurface structures, other inserts, etc.
13. Warranties: Submit a draft copy of the warranties in Owner's name for all products furnished under this section for review and approval.
14. Synthetic grass surfacing manufacturer/vendor and installer qualifications:
  - a. Installer Qualifications: Synthetic Grass Installation Sub-Contractor shall certify in writing the designated supervisory personnel on the project are competent in the installation of the all-weather grass material, including gluing or sewing seams and proper installation of the infill mixture. The synthetic grass surfacing installer shall have a representative on-site to certify the installation and warranty compliance. Provide experience to show that installation crew is competent to complete the level of work outlined in this project. Synthetic Grass Installation Sub-Contractor's superintendent shall demonstrate experience that the superintendent is competent to oversee and complete the level of work outlined in this project.
  - b. At a minimum, provide the following documentation: Fifteen (15) reference projects consisting of Synthetic Grass Multi-Sport Grass Fields of 75,000 square-feet or larger within the past five (5) years completed by the proposed on-site full-time installation superintendent.

- c. Project Information: At a minimum, provide the following information for each reference project:
      - 1) Project Name
      - 2) Project Location
      - 3) Project scope
      - 4) Construction timeline
      - 5) Construction cost
      - 6) Reference name, title, affiliation, and contact information.
  - 15. Field Maintenance Equipment:
    - a. 2.1 Materials, H. Field Maintenance Equipment
  - 16. Field Attic Stock
    - a. 2.1 Materials, G. Attic Stock
  - 17. Surveyor: Submit name and qualifications of Professional Land Surveyor who will be responsible for layout and verification of the work of this Section. (As-Built Survey By Owner).
  - B. Post Manufacturing/Pre-Installation Submittals (By Manufacturers in-house testing facility)
    - 1. Material Testing: Submit for approval test results for all material testing performed under “1.8 Quality Control Testing, Post-Manufacturing/Pre-Installation” herein. Provide copies of all testing agency reports.
    - 2. Material Samples: Submit two (2) samples, with required testing data, for approval for all materials under 2.1 Materials including, but not limited to, the following:
      - a. Synthetic Grass Carpet Sample: Twelve-inch (12") square samples of un-filled synthetic grass surfacing carpet for each color manufactured for the project. Samples shall be the same as samples send to the testing agency for conformance of the product declaration.
      - b. Synthetic Grass System Sample: Sample box of synthetic grass system, including infill material.
    - 3. Acceptance of Prior Work: Refer to section 3.2 Examination.
  - C. Post-Installation Submittals
    - 1. Material Testing: Submit for approval test results for all material testing performed under “1.8 Quality Control Testing, Post-Installation” herein. Provide copies of all testing agency reports.
  - D. Warranty Quality Control Submittals
    - 1. Material Testing: Submit for approval test results for all material testing performed under “Quality Control Testing, Warranty” herein. Provide copies of all testing agency reports to the Owner and Landscape Architect for review and approval for the entire warranty period.
- 1.6 QUALITY ASSURANCE
- A. Use adequate numbers of skilled workmen who are thoroughly trained and experienced in the necessary crafts and who are completely familiar with the specified requirements and the methods needed for proper performance of the work of this Section.

- B. The Owner, or Landscape Architect on the Owners behalf, reserves the right to submit any material, either before or after installation, for testing it deems necessary to satisfy the conditions of this contract.
  - 1. Any material tested and found not in compliance with the contract will be rejected and replaced with material conforming to the specifications. This will be done at the sole expense of the Contractor.
  - 2. Any testing performed by the Owner will be at the Owner's expense. The Contractor is responsible for reimbursing the cost of all Owner paid testing that fails. Contractor will bear the cost of all retesting as required by the Owner.

1.7 DELIVERY, STORAGE, AND HANDLING

- A. Schedule delivery to minimize on-site storage. Segregate differing materials and prevent from contamination with other materials.
- B. Packing and Shipping: Deliver products in original unopened packaging with legible manufacturers' identification. All materials shall be stored in a dry place out of the direct sunlight.
- C. Prior to the installation of any materials and immediately upon delivery of the synthetic grass system and components to the project site, the Contractor shall inspect materials as follows:
  - 1. For damaged or defective items.
  - 2. Measure synthetic grass roll lengths, perforations, and uniformity.
  - 3. Adhesives and seaming tap shall arrive in sealed dry containers and be kept in adequate temperature per manufactures requirements.
  - 4. Performance in-fill
    - a. Shall arrive in large sacks or bags without tears and loose material.
    - b. Shall arrive dry and loose. No infill shall be accepted that is bulked or solid.
    - c. Shall be free of exposed metal particles.
  - 5. Sand in-fill
    - a. Shall be free from contamination of site materials.
    - b. Shall arrive in large sacks or bags without tears and loose material or
    - c. Shall be delivered and stored on a solid, level, and clean surface.
      - 1) It is the Contractors responsibility to coordinate the delivery and storage of the infill materials with the OPM and Architect. Loose materials may need to be delivered in super sacs due to site limitations.
      - 2) It shall be assumed the school parking lot is NOT to be used as a storage or material lay down area during this project. Contractor is responsible for coordination stockpile and storage areas with the Owner and Architect.
  - 6. Bulk Materials:
    - a. Deliver materials in clean, washed, and covered trucks to eliminate contamination during transportation.
    - b. Contractor is responsible for the preparation of all stockpile areas for bulk materials. Stockpile areas shall be level, solid surfaces free from debris and prepared to minimize the ability for material migration.
    - c. On site stockpiling locations to be coordinated with the Owner. Stockpile only in areas free of debris and away from drainage routes. Cover all materials with plastic or geotextile.

## 1.8 QUALITY CONTROL TESTING

- A. All sampling/testing shall be the responsibility of Manufacturer/Supplier. The Manufacturer/Supplier shall retain and pay for the services of a third-party Testing Agency to perform all sampling/testing in accordance with applicable standards.
- B. All testing, unless otherwise noted, shall be completed by an independent (third-party) Testing Agency as approved by Architect. Testing must be for current materials with current date from independent testing laboratory as described herein.
- C. Certified copies of laboratory reports shall be submitted for all testing.
- D. Pre-Manufacturing Testing
  1. The intent of the pre-manufacturing testing is for manufacturers to submit the required testing for a previously tested standard system that most closely resembles the specified system. Manufacturer shall note any discrepancies between the standard system previously tested and the system proposed for this project, if any.
    - A. IT IS NOT THE INTENT OF PRE-MANUFACTURING TESTING SECTION TO REQUIRE MANUFACTURERS TO ENGAGE IN TESTING OF SYSTEM NOT PREVIOUSLY TESTED BETWEEN THE TIME OF BID AND MANUFACTURING.
    - B. MANUFACTURERS WITHOUT A PREVIOUSLY TESTED SYSTEM CLOSELY RESEMBLING THE SPECIFICATION SHALL NOT BE CONSIDERED FOR THIS PROJECT.
  2. Timing: Contractor shall submit to Landscape Architect a copy of all test results certified by the independent Testing Agency prior to manufacturing of the Synthetic Grass Surfacing for the Project. Provide testing data for the following:

TESTING METHOD	CHARACTERISTIC	DECLARATION
<b>SYNTHETIC GRASS YARN</b> <b>(INCLUDE RESULTS FOR EACH YARN COLOR SEPARATELY)</b>		
ASTM D1907/ FIFA TEST METHOD 23	<b>LINEAR DENSITY OF YARN</b>	WITHIN 90% COMPARED TO SUPPLIERS DECLARATION
ASTM D3218/ FIFA TEST METHOD 25	<b>YARN THICKNESS</b>	WITHIN 90% COMPARED TO SUPPLIERS DECLARATION
FIFA METHOD 22	<b>PILE YARN CHARACTERISTIC</b>	SAME POLYMER
ASTM D 789	<b>MELTING POINT</b>	> 235 DEGREES F
ASTM D 5034	<b>BREAKING STRENGTH (LENGTH)</b>	> 283 LBS./ FT.
ASTM D 5034	<b>BREAKING STRENGTH (WIDTH)</b>	> 200 LBS./FT
ASTM F 2765-09	<b>LEAD CONTENT</b>	< 50 PPM
<b>ARTIFICIAL WEATHERING (FIFA 10)</b>		
EN ISO 20105-A02	<b>COLOR FASTNESS (CHANGE) - ARTIFICIAL WEATHERING (5000 HOURS)</b>	> GRAY SCALE 3
EN 13864	<b>TENSILE STRENGTH AFTER ARTIFICIAL WEATHERING (5000 HOURS)</b>	<50% REDUCTION

SYNTHETIC GRASS SEAMING		
EN 12228 METHOD 1	SEAM STRENGTH – UNAGED	> 1000N/100MM
EN 13744 & EN 12228 METHOD 1	SEAM STRENGTH – AGED	> 75% OF THE UNAGED VALUE
EN 12228 METHOD 1	BONDED PEAL STRENGTH – UNAGED	> 50N/100MM
EN 13744 & EN 12228 METHOD 1	BONDED PEAL STRENGTH – AGED	> 75% OF THE UNAGED VALUE
SYNTHETIC GRASS INFILL MATERIALS (INCLUDE RESULTS FOR EACH INFILL MATERIAL SEPARATELY)		
EN 71-3	STABILIZING INFILL EXTRACTABLE HAZARDOUS METALS	PASS
ASTM F3188	STABILIZING INFILL SOLUBLE THRESHOLD LIMIT CONCENTRATION	PASS
EN 933/ FIFA TEST METHOD 20	STABILIZING INFILL BULK DENSITY	
EN 14955	STABILIZING INFILL PARTICLE SIZE	< 1 SIEVE SIZE CHANGE COMPARED TO MANUFACTURER'S DECLARATION
EN 1097-3	STABILIZING INFILL PARTICLE SHAPE	SAME SHAPE
	PERFORMANCE INFILL EXTRACTABLE HAZARDOUS METALS	PASS
	PERFORMANCE INFILL SOLUBLE THRESHOLD LIMIT CONCENTRATION	PASS
	PERFORMANCE INFILL BULK DENSITY	
	PERFORMANCE INFILL PARTICLE SIZE	< 1 SIEVE SIZE CHANGE COMPARED TO MANUFACTURER'S DECLARATION
	STABILIZING INFILL PARTICLE SHAPE	SAME SHAPE
EN ISO 20105-A02	PERFORMANCE INFILL ARTIFICIAL COLOR FASTNESS (CHANGE) - ARTIFICIAL WEATHERING	> GREY SCALE 3, NO CHANGE IN SHAPE
SYNTHETIC GRASS SYSTEM (SURFACING (CARPET), INFILL, & SHOCKPAD) (PREVIOUS RESULTS FOR TESTING OF PRODUCT THAT CLOSELY MEETS SPECIFICATION)		
ASTM D5848/ISO 2549	PILE HEIGHT (PILE LENGTH ABOVE BACKING)	<5%
ASTM D5793	STITCH GAUGE	< 3/8"
ISO 1763	TUFTS PER UNIT AREA/KNOTS PER WOVEN AREA	

ASTM D5848/ISO 8543	<b>PILE WEIGHT</b>	< +/- 5% OF PRODUCT DECLARATION
ASTM D5848	<b>TOTAL WEIGHT</b>	
ASTM D1335/ISO 4919	<b>TURF BIND (WITHDRAWAL)</b>	.40N (UNAGED)
EN 13744 & ASTM D1335/ISO 4919	<b>TURF BIND (WITHDRAWAL)</b>	.40N (AFTER IMMERSION IN HOT WATER)
EN 13746	<b>DIMENSIONAL STABILITY</b>	< 0.5% AFTER EACH STAGE
EN 12228 METHOD 1	<b>SEAM STRENGTH - UNAGED</b>	>1000N/100MM
EN 13744 & EN 12228-1	<b>SEAM STRENGTH – AFTER</b>	>75% OF THE UNAGED VALUE
EN 1969/ FIFA TEST METHOD 18	<b>FREE PILE HEIGHT</b>	< ½” FIBER REVEAL
EN 1969/ FIFA TEST METHOD 21	<b>INFILL DEPTH</b>	WITHIN 90% COMPARED TO PROJECT SPECIFICATIONS
	<b>FIBER (PILE YARN) REVEAL/ FREE PILE HEIGHT</b>	< ½” FIBER REVEAL
EN 13672	<b>SIMULATED WEAR (PERCENTAGE OF YARN AFFECTED) (CAN BE EQUIVALENT YARN ON SIMILAR SYSTEM)</b>	> 6,000 PASSES WITHOUT SPLITTING
ASTM F1551/EN 12616 (FIFA METHOD 24)	<b>WATER PERMEABILITY (HEAD PRESSURE)</b>	> 25 INCHES / PER HOUR
<b>PERFORMANCE TESTING</b>		
ASTM F 1936	<b>IMPACT ATTENUATION(G-MAX)</b>	< 100 G’S
EN 1177	<b>IMPACT ATTENUATION, HEAD INJURY CRITERIA (HIC)</b>	<1000 @ 1.0M
EN 14808/ FIFA 04&09	<b>FORCE REDUCTION/ SHOCK ABSORPTION</b>	55% TO 70%
	<b>ENERGY RESTITUTION</b>	45 – 70%
EN 14809/ FIFA 05A&15	<b>VERTICAL DEFORMATION</b>	4.0 - 11.0 MM
EN 15301/ FIFA 06&15	<b>ROTATIONAL RESISTANCE</b>	25 – 50 NM
	<b>WEIGHTED ROTATIONAL RESISTANCE</b>	25NM - 50NM
	<b>VERTICAL BALL REBOUND</b>	0.60 - 1.0 M
	<b>REDUCED BALL ROLL *LABORATORY TEST ONLY</b>	4 – 12 M
	<b>SKIN/ SURFACE FRICTION *LABORATORY TEST ONLY</b>	0.35 – 0.75

RESILIENT PAD		
BS 7044 METHOD 4 OR EN 12616 AS APPLICABLE	<b>DRAINAGE / PERMEABILITY</b>	PERFORATED OR PERMEABLE 50 INCHES PER HOUR MINIMUM
ASTM D2859	<b>GMAX</b>	90 MINIMUM, 120 MAXIMUM
EN 1177	<b>IMPACT ATTENUATION, HEAD INJURY CRITERIA (HIC)</b>	<900 @1.2 M
ASTM D 1056-07	<b>MATERIAL DENSITY</b>	3.6 TO 12.5 LBS/FT3
ASTM D 1056-07	<b>WATER ABSORPTION</b>	<5%
EN 14809	<b>VERTICAL DEFORMATION W/OUT TURF</b>	4MM MAXIMUM
ASTM D696-03	<b>THERMAL EXPANSION (PER 1°C)</b>	0.0000833MM/MM
ASTM D3575	<b>COMPRESSION STRENGTH</b>	@25% 30 PSI @50% 49 PSI @75% 102 PSI
ISO 1856C	<b>COMPRESSION SET – STATIC LOAD (25% STRAIN, 22 HRS, 23°C AFTER 24 HRS)</b>	8.2% (0.089 IN) MAX
SYSTEM TEST	<b>COMPRESSION SET – REPEATED IMPACTS (106 PSI, REPEATED, 10,000 CYCLES)</b>	6.0% MAXIMUM
ISO 8295	<b>FRICTION COEFFICIENT</b>	2.44 LBS MAX 1.35 LBS AVERAGE
ASTM G22-76 ASTM G21-96 ASTM F925	<b>MICROBIOLOGICAL ANALYSIS BACTERIA RESISTANCE, FUNGAL RESISTANCE CHEMICAL RESISTANCE</b>	NO GROWTH OR DETRIMENTAL EFFECTS
	<b>ACCELERATED AGING 20 YR MODEL - % TENSILE STRENGTH LOSS 20 YR MODEL - % ELONGATION LOSS</b>	-<10% AFTER 120 DAYS @ 85C  -<5% AFTER 120 DAYS AT 85C

E. Post Manufacturing/Pre-Installation Material Identification Testing

1. Manufacturers may utilize in-house testing facilities to perform post-manufacturing conformance testing so long as the following requirements are met:
  - a. Facility must hold a current ISO 9000 Certification
  - b. Provide documentation equipment calibration by means of third-party testing result no more than 12 months from date of submittal.
2. The intent of the post manufacturing/pre-installation testing is for manufacturers to submit the required testing for quality control and conformance to the approved pre-manufacturing submittal for the manufactured product.

3. IT IS NOT THE INTENT OF POST-MANUFACTURING TESTING SECTION TO REQUIRE MANUFACTURERS TO ENGAGE IN THIRD-PARTY TESTING OF MANUFACTURED PRODUCT.
  4. THE OWNER AND ENGINEER RESERVE THE RIGHT TO INDEPENDENTLY TEST PRODUCT MANUFACTURED FOR THIS PROJECT. CONTRACTOR SHALL BARE THE COST OF ALL TESTING, MATERIAL REPLACEMENT, AND RE-TESTING FOR MATERIALS THAT FAIL TO MEET THE SPECIFIED REQUIREMENTS.
- F. Timing: Contractor shall submit to Landscape Architect a copy of all test results certified by the in-house testing facility manager prior to shipping of the Synthetic Grass Surfacing to the Project.
- G. Provide testing data for the following:

<b>PRODUCT IDENTIFICATION - SYNTHETIC GRASS SURFACING CARPET</b>		
ASTM D1907/ FIFA TEST METHOD 23	<b>LINEAR DENSITY OF YARN</b>	WITHIN 90% COMPARED TO SUPPLIERS DECLARATION
ASTM D3218/ FIFA TEST METHOD 25	<b>YARN THICKNESS</b>	WITHIN 90% COMPARED TO SUPPLIERS DECLARATION
ASTM D 5034	<b>BREAKING STRENGTH (LENGTH)</b>	> 283 LBS./ FT.
ASTM D 5034	<b>BREAKING STRENGTH (WIDTH)</b>	> 200 LBS./FT
<b>PRODUCT IDENTIFICATION – PILE YARN</b>		
ASTM D 1907/FIFA Test Method 23	<b>DENIER (DTEX)</b>	WITHIN 95% COMPARED TO SUPPLIERS DECLARATION
ASTM D 3218/FIFA Test Method 25	<b>MICRONS</b>	WITHIN 95% COMPARED TO SUPPLIERS DECLARATION
ASTM D 5848	<b>PRIMARY BACKING WEIGHT</b>	WITHIN 95% COMPARED TO SUPPLIERS DECLARATION
ASTM D 5848	<b>SECONDARY BACKING WEIGHT</b>	WITHIN 95% COMPARED TO SUPPLIERS DECLARATION
Visual	<b>PERFORATIONS</b>	>3/16" dia. holes, spaced 4" on center

<b>SYNTHETIC GRASS SURFACING (CARPET)</b>		
ASTM D5848/ISO 2549	<b>PILE HEIGHT (PILE LENGTH ABOVE BACKING)</b>	<5%
ASTM D5793	<b>STITCH GAUGE</b>	< 3/8"
ISO 1763	<b>TUFTS PER UNIT AREA/KNOTS PER WOVEN AREA</b>	WITHIN 95% COMPARED TO SUPPLIERS DECLARATION
ASTM D5848/ISO 8543	<b>PILE WEIGHT</b>	WITHIN 95% COMPARED TO SUPPLIERS DECLARATION
ASTM D5848	<b>TOTAL WEIGHT</b>	WITHIN 95% COMPARED TO SUPPLIERS DECLARATION
ASTM D1335/ISO 4919	<b>TURF BIND (WITHDRAWAL)</b>	WITHIN 95% COMPARED TO SUPPLIERS DECLARATION



H. Field Base Stone Approval

1. Synthetic Grass Surfacing System Installer shall review all testing, the as-built survey, performance string line layout, and confirm dimensional relationship to all existing and installed conditions prior to installation the system. Review shall be documented to Owner and Engineer along with a Letter of Acceptance of the field sub-base.
2. See SPECIFICATION SECTION 33 46 16 'FIELD SUBDRAINAGE SYSTEM' for quality control requirements for the field sub-base.

I. Post-Installation Testing

1. Timing: Submit to Landscape Architect a copy of all test results certified by the approved third-party testing agency prior to issuance of any project Substantial Completion.
  - a. Testing shall be completed on-site and within five (5) days of the completion of installation.
  - b. Testing results shall be submitted for review within three (3) days of the completion of testing.
2. Submit to Landscape Architect a copy of all test results certified by the independent Testing Agency.
3. Provide testing data for the following:

<b>SYNTHETIC GRASS SURFACING SYSTEM (INSTALLED ON-SITE, AFTER INSTALLATION OF SYNTHETIC GRASS SURFACING, INFILL)</b>		
ASTM F1551/EN 12616	<b>WATER INFILTRATION RATE</b>	>16 IN./HR. (1 TEST PER 20,000 S.F.)
EN 1969/ FIFA 21	<b>INFILL DEPTH MEASUREMENT</b>	WITHIN 95% COMPARED TO SUPPLIERS DECLARATION (ANY LOCATION, <b>NOT AVERAGE</b> )
EN 13036/FIFA 12	<b>PLANARITY/SURFACE REGULARITY</b>	<10 MM
ASTM F 1936	<b>IMPACT ATTENUATION(G-MAX) (MINIMUM 10 LOCATIONS)</b>	< 100 G'S (ANY LOCATION - <b>NOT AVERAGE</b> )
EN 1177	<b>IMPACT ATTENUATION, HEAD INJURY CRITERIA (HIC) (MINIMUM 10 LOCATIONS)</b>	<900 @ 1.0M (ANY LOCATION – <b>NOT AVERAGE</b> )
EN 14808/ FIFA 04A	<b>SHOCK ABSORPTION</b>	55% TO 70%
EN 14809/ FIFA 05A	<b>VERTICAL DEFORMATION</b>	4MM TO 11MM
EN 15301/ FIFA 06	<b>ROTATIONAL RESISTANCE</b>	25N TO 50N
EN 12235/ FIFA 01	<b>VERTICAL BALL REBOUND</b>	.6 TO 1M
EN 12234/ FIFA 03	<b>BALL ROLL</b>	4M TO 10M
EN 71-3	<b>STABILIZING INFILL EXTRACTABLE HAZARDOUS METALS</b>	PASS
ASTM F3188	<b>STABILIZING INFILL SOLUBLE THRESHOLD LIMIT CONCENTRATION</b>	PASS

EN 933/ FIFA TEST METHOD 20	<b>STABILIZING INFILL BULK DENSITY</b>	WITHIN 95% COMPARED TO SUPPLIERS DECLARATION
EN 14955	<b>STABILIZING INFILL PARTICLE SIZE</b>	< 1 SIEVE SIZE CHANGE COMPARED TO MANUFACTURER'S DECLARATION
EN 1097-3	<b>STABILIZING INFILL PARTICLE SHAPE</b>	SAME SHAPE

4. Any material tested and found not in compliance with the contract may be rejected and Contractor shall rectify the issue to be acceptable. Any area/item not within conformance shall be retested at the Contractors expense after remedy is implemented until satisfactory results are achieved.
5. The Owner, or Landscape Architect on the Owner behalf, reserves the right to independently test any material. Any testing performed by the Owner will be at the Owner's expense. The Contractor is responsible for reimbursing the cost of all Owner directed testing that fails. Contractor will bear the cost of all retesting as required by the Owner.

J. Warranty Testing

1. Timing: Testing shall be completed on-site and annually for the warranty period (8 years).
2. Contractor shall submit to Architect and Owner a copy of all test results certified by the independent Testing Agency.
3. Provide testing data for the following:

<b>SYNTHETIC GRASS SURFACING SYSTEM (ANNUALLY)</b>		
EN 13036	<b>PLANARITY/SURFACE REGULARITY</b>	<10 MM
EN 1969	<b>INFILL DEPTH MEASUREMENT</b>	WITHIN 95% COMPARED TO SUPPLIERS DECLARATION (1/2" EXPOSED FIBER)
ASTM F 1936	<b>IMPACT ATTENUATION(G-MAX) (MINIMUM 10 LOCATIONS)</b>	< 160 G'S (INDIVIDUAL LOCATIONS, NOT AVERAGE FIELD RESULTS)
EN 1177	<b>IMPACT ATTENUATION, HEAD INJURY CRITERIA (HIC) (MINIMUM 10 LOCATIONS)</b>	<1000 @ 1.0M (INDIVIDUAL LOCATIONS, NOT AVERAGE FIELD RESULTS)
EN 71-3	<b>SAFETY OF TOYS PART 3</b>	PASS (MINIMUM OF 3 SAMPLES)
ASTM F3188	<b>SAFETY OF SYNTHETIC TURF INFILL</b>	PASS (MINIMUM OF 3 SAMPLES)

4. Any materials tested and found not in compliance with the warranty requirements shall be rectified at Contractors expense. Contractor shall rectify the issue to be acceptable and pass all warranty testing requirements. Any area/item not within conformance shall be retested at the Contractors expense after remedy is implemented until satisfactory results are achieved.

#### 1.9 PATENT RIGHTS AND INFRINGEMENT

- A. The Drawings and Specifications are not indented to be proprietary or in violation of any current or pending patents. The Contractor and subcontractors are responsible to provide the Owner and Landscape Architect with any violations contained here in prior to bidding. By bidding on the project, the Contractor and subcontractors shall hold the Owner, Construction Manager, and Design Consultants harmless from infringement of any current or future patent issued for the synthetic grass surfacing system.
- B. Contractor and subcontractors shall hold the Owner, Construction Manager, and Design Consultants harmless from infringement of any current or future patent issued for the synthetic grass surfacing system, fibers, backings, including resilient pad (if required), installation methods and vertical draining characteristics. The successful bidder will be required to submit a letter for consent from their surety. The Surety shall indemnify the requirements.
- C. There are various established performance criteria throughout this request for products and services. There may exist patent coverage for some means and methods of achieving those performance criteria. Bidders are responsible for ascertaining that means and methods of the products and services which they are providing are not being provided in violation of any such patent rights. Bidder's responsibilities are as follows:
  1. To hold harmless, the Owner, Construction Manager, and Design Consultants, as to any violation to include dollar amounts that could be owed as a result of damages for infringement including potential treble damages as provided for under U.S. Patent Law.
  2. Any and all costs that the Owner, Construction Manager, and Design Consultants, would incur in replacing materials and services which are determined to infringe patent rights.
  3. All administrative, legal and other costs that would be incurred as a result of an infringement.

#### 1.10 WARRANTY

- A. Synthetic Grass Surfacing Warranty – Sports Fields: See Specification Section 32 18 13.10 Synthetic Grass Surfacing Warranty.
  1. The Synthetic Grass Manufacture/Supplier shall be required to meeting the requirements, as described under G. Warranty Testing and inspection plan for the lifespan of the warranty as part of this Contract and shall submit a schedule of visits at the time of completion.
    - 1) Contractor shall make corrections as necessary to meet all testing requirements.
- B. Synthetic Grass Infill Warranty
  1. The Contractor shall provide a non-prorated Manufacturer/Installer Warranty/Guarantee (also referred to herein as the Warranty) for the synthetic grass infill materials and installation as specified herein, for a minimum non-pro-rated period of eight (8) years to the Owner from the date of Certificate of Substantial Completion.

2. Infill material shall be warrantied against breakdown of material outside of project specifications, deterioration of infill coatings, and failure to adhere to EN 71-3 and ASTM F3188 testing.
- C. Resilient pad Warranty's
1. The Contractor shall provide a non-prorated Resilient pad Manufacturer/Installer Warranty/Guarantee (also referred to herein as the Warranty) for the Resilient pad materials and installation as specified herein, for a minimum non-pro-rated period of sixteen (16) years to the Owner from the date of Certificate of Substantial Completion.
  2. Warranty shall include coverage for the following:
    - a. Drainage issues, or Failure to drain at rate of 16" per hour or greater.
    - b. Undulations or heaving repair for any undulation caused by the padding material apparent in the turf over 10mm vertical height, whether periodic (due to weather) or persistent.
    - c. Persistent depressions, or deformation of the pad material 10 mm or greater caused by the Resilient pad materials.
    - d. Any failure in the physical properties of the pad that negatively affect the aesthetics, playability, G-Max rating, HIC rating, or longevity of the synthetic turf of the athletic field.
    - e. Costs for repair or replacement of the synthetic turf and infill above Resilient pad in affected areas in the event of product failure.
  3. The Contractor shall inspect and repair any areas of concern caused by the Resilient padding system under warranty including, but not limited to, the following:
    - a. Drainage Issues
    - b. Base Depressions and Undulations Repair
    - c. The Warranty shall cover, in general, the usability of the Synthetic Grass System (and pad); accessories, use, characteristics, and suitability, of the installation to the minimums specified in this Section.
  4. All items covered by the warranty are to be replaced or repaired with new materials, including installation at the sole expense of the warranting manufacturer/surface supplier over the life of the Warranty.
- D. Seaming Materials shall be warrantied against separation, deterioration, and dimensional stability by the material supplier for the entirety of the field warranty period of eight (8) years.
- E. The Warranty shall cover, in general, the usability of the Synthetic Grass System accessories, use, characteristics, and suitability, of the installation to the minimums specified in this Section.
- F. All items covered by the warranty are to be replaced or repaired with new materials, including installation at the sole expense of the warranting manufacturer/surface supplier over the life of the Warranty.
- G. Sports Field Synthetic Grass Use: The materials utilized in the sports field synthetic grass system (carpet, infill, resilient pad, seaming, logo's, inlays, etc.) shall be guaranteed for the designated uses as follows:
1. Football, Rugby, Soccer, Baseball, Softball, Field Hockey, Lacrosse

2. Marching Band
  3. Graduations and Ceremonies
  4. Physical Education and Intramural Sports Programs
  5. Physical Education exercises and activities
  6. Pedestrian traffic and other similar uses
  7. Pneumatic rubber-tired maintenance and service equipment, designed for use on athletic fields and golf courses.
- H. Warranty documents and terms of Warranty shall be in accordance with this Specification.
1. The use of the Manufacturers' standard or modified form of Warranty shall in no circumstance supersede the conditions set forth in this Specification Section, which shall be considered part of the Warranty.
  2. This Warranty shall constitute a contract made in the State of where the project is located and shall be governed by the laws of that State.
- I. Warranty shall include coverage for the following:
1. Drainage issues, or Failure to drain at the specified rate for the Synthetic Grass Surfacing System.
  2. Any failure in the physical properties that negatively affect the aesthetics, playability, G-Max rating, HIC rating, or longevity of the synthetic grass surfacing system.
  3. Test results, field repairs, and field concerns shall be submitted to the Owner and the Landscape Architect in a Field Inspection Report and Testing Results for review.
- 1.11 WARRANTY AND MAINTENANCE OBLIGATIONS
- A. Base Bid: The Synthetic Grass Manufacture/Supplier shall be required to meeting the requirements, as described under G. Warranty Testing and inspection plan for the lifespan of the warranty as part of this Contract and shall submit a schedule of visits at the time of completion. (base bid)
1. The Synthetic Grass Manufacture/Supplier to return to the site once (1) per year for the duration of the warranty, no less than 8 visits.
  2. The Synthetic Grass Manufacture/Supplier shall visit the field and inspect any areas of concern and make repairs as necessary under warranty including, but not limited to, the following:
    - a. Nailer Board/Concrete Anchor Cub Repairs (general contractor)
    - b. Inlays, Numbers, Logo, and Seam Conditions
    - c. Fiber Conditions
    - d. Fiber Height
    - e. Infill Condition
    - f. Test results, field repairs, and field concerns shall be submitted to the Owner and the Landscape Architect in a Field Inspection Report and Testing Results for review.
  3. Contractor shall make corrections as necessary to meet all testing requirements.
    - a. Additional infill may be required by Contractor to maintain the G-Max, HIC levels and required infill depths at the Contractor expense.

4. All items covered by the warranty are to be replaced or repaired with new materials, including installation at the sole expense of the warranting manufacturer/surface supplier over the life of the Warranty.

## PART 2 - PRODUCTS

### 2.1 MATERIALS

#### A. Synthetic Grass Surfacing System

1. All components and their installation method shall be designed and manufactured for use on outdoor athletic fields. The finished surface shall resist abrasion and cutting from normal use.
2. The materials as hereinafter specified should be able to withstand full climatic exposure in all climates, be resistant to insect infestation, rot, fungus, mildew, ultraviolet light, heat degradation, and be non-allergenic and non-toxic. The entire system shall be constructed to maximize dimensional stability, to resist damage and normal wear and tear from its designated uses and to minimize the ultra-violet degradation.
3. The system shall have the basic characteristics of flow-through drainage, allowing free movement of surface runoff through the synthetic grass system where such water may flow to the existing base and into the field drainage system.
4. Pile fibers shall resemble freshly grown natural grass in appearance, texture and color (except as noted for markings and graphics). Streaks, discoloration, or different dye lots shall not be accepted.
5. Manufacturer is to guarantee that the synthetic grass fiber (yarn) is adaptable to painted lines.
6. The synthetic grass surfacing system shall be a proven athletic caliber yarn designed specifically for outdoor use and stabilized to resist the effect of ultraviolet degradation, heat, foot traffic, water, and airborne pollutants.
7. All adhesives used in bonding the system together shall be resistant to moisture, bacterial and fungus attacks, and resistant to ultra-violet rays at any location upon installation.
8. Fabric surface shall be constructed and installed in minimum widths of 15 feet with no longitudinal or transverse seams, except for inlaid lines with a finished roll assembly.
9. The Synthetic Grass System shall remain free draining at all times before, during, and after the infill materials are installed.
10. The synthetic grass surfacing shall be made up of the following systems:
  - a. Multi-Sport Field – Tufted combination of Diamond Shaped Monofilament and Slit-Film, and thatch fibers.
  - b. The intent of the system is for manufacturers to utilize a standard system that most closely resembles the specified system. Refer to Section 1.8 Quality Control for system performance and safety requirements.
  - c. It is not the intent of the pre-manufacturing testing section to require manufacturers to engage in testing of system not previously tested between the time of bid and manufacturing.
    - 1) Manufacturers without a previously tested system closely resembling the specification shall not be considered for this project.

11. Synthetic Turf Carpet Properties:

Denier	9,000 (mono & slit-film) 5,000 (thatch/rootzone/spikezone)
Microns	310 microns (mono) 120 microns (slit-film)
Pile Height	2 inches
Pile Weight	60 oz.
Stitch Gauge	< 3/8"
Primary Backing Weight	>7 oz.
Secondary Backing Weight	>20 oz.

B. Perforations

1. Synthetic grass carpeting shall be perforated to provide vertical drainage as specified herein.
2. Size and spacing of perforations shall be as specified herein. Spacing of perforations shall be uniform in both directions.
3. Perforations shall be complete and full diameter for a minimum of 95% of each roll.

C. Markings and Logos

1. All field lining, marking, field boundary system with team area limits, logos, etc. shall be same material (yarn, infill, and backing) as playing field system.
2. Lines, logos, and graphics to be installed on the synthetic grass surface as per documents are to be tufted in the factory to the maximum extent practical. Those not tufted in the factory shall be inlaid in the field (**shaving is not permitted**).
3. A complete field lining, marking, and field boundary system with team area limits, etc. shall be provided with the initial installation. Layouts shall be accurately surveyed and marked prior to installation. Layouts shall include all incidental markings required by the NFHS or state athletic organization, whichever is applicable.
4. All markings shall be uniform in color, providing a sharp contrast with the synthetic grass field color and shall have sharp and distinct edging.
5. Logos and lines shall be true and shall not vary more than 1/2" from specified width and location.
6. Tick marks for field markings shown on Plans shall be 4" x 4" in size. At a minimum, ticks shall be installed at the following locations:
  - a. Corners of field
  - b. Corners of boxes, goal areas, and goal locations
  - c. At radii for creases and arches
  - d. Corners of player, coaches, and substitution areas
7. Turf Graphics (other than field lining)
  - a. Field Graphics: (See drawings for detail and location)
    - 1) Centerfield Logo (Add Alternate)
      - a) Three color 'B'
    - 2) Football Yardline Numbers and Arrows (Add Alternate)

D. Adhesive Materials and Seaming Tape

1. Adhesive material to fix the synthetic grass carpet to the seaming tape shall be a polyurethane adhesive:
  - a. Mapei Ultrabond Turf PU 2K - Two-Part Component Adhesive or approved equal
2. Bonding surfaces shall be clean, dry, and free from grease, oil, wax, weak oxide films, mold release agents, and other surface contaminants.
3. The adhesive shall be applied at the rate not to exceed 60 square feet per gallon.
4. The adhesive shall have the same warranty period as the synthetic grass system.
5. Seaming tape shall be a 12" wide polypropylene or polyethylene fabric acceptable for use with the synthetic turf carpet system and the adhesive material.
6. Seaming tape shall meet FIFA Joint Strength >50N/100mm

E. Infill

1. Infill Materials shall be uniformly filled to a depth which leaves no more than 1/2" of exposed pile after settlement.
  - a. Infill materials shall consist of a homogeneous non-compacting mixture of silica sand and CRM ChillFill meeting the following criteria:
    - 1) CRM ChillFill content shall be between approximately 30-40% by weight.
    - 2) Sand shall be between 60-70% by weight.
    - 3) Manufacturer to provide infill ration based on pre-installation testing.
  - b. Performance Infill
    - 1) Chill Fill as manufactured by CRM
      - a) Shall be free of all metal and foreign materials
      - b) The material shall be UV stabile and resistant to heat degradation to the best of its ability.
  - c. Stabilizing Infill
    - 1) Sand

F. Additional Field Materials (Attic Stock)

1. New and Used Carpet
  - a. The Contractor shall manufacture and supply to the Owner the following materials. Materials shall be manufactured and delivered to the project at the same time as the installation of the field.
    - 1) 15' wide by 50' long single carpet roll of field material
    - 2) Three (3) sets of 4" wide by 15' long carpet pieces for each line and logo color.
    - 3) Adequate full-size material for two (2) additional (including material necessary for all inlays):
      - a) Full pitcher's mound circle
      - b) Batters area circles
  - b. Materials shall be supplied on rolls, with original wrapping, and clearly labeled.



2. Carpet Remnants from Installation
  - a. All remnants smaller than 4'x5' shall be removed and disposed of properly by the Contractor.
  - b. Remnants larger than 4'x5', field cuts outs for the center logo, field lettering, pitcher's mound circle, and batters area circle shall protected and supplied to the Owner as additional attic stock.
  - c. All remnants shall be rolled and wrapped or neatly folded, placed on a pallet and wrapped for storage by the Owner.
3. Infill Materials
  - a. The Contractor shall supply and deliver an additional 2,000 lbs of ChillFill material as specified for the sports field synthetic grass surfacing system.
  - b. *The infill shall be placed in RubberMaid 50 gallon containers with covers and wheels and clearly labeled "FIELD INFILL".*

G. Drainage Pad

1. SP-17 as manufactured by Brock USA or approved equal
2. Load Capacity: No permanent deformation under periodic loading (e.g. grooming equipment, or ambulance).
3. Connectors, couplers, and other fittings: As required to complete the system and prevent heaving buckling or movement of the mat. Material of construction and configuration shall be in accordance with the Drainage Pad manufacture's requirements or recommendations, whichever is more stringent.
4. Warranty: Minimum 16-year manufacturer's warranty.
5. Drainage pad performance requirements:

<b><u>Drainage Pad</u></b>		
<b>Characteristic</b>	<b>Testing Method</b>	<b>Requirements</b>
Material	PVC/Nitrile Rubber Or Expanded Polypropylene	
Material Thickness	>17 mm (0.67 inch) +/-0.18"	
Format / Type	Sheet - or interlocking panels	
Drainage / Permeability	BS 7044 Method 4 or EN 12616 as applicable	Perforated or Permeable 50 inches per hour minimum
GMAX, With Turf and infill	ASTM D2859	90 minimum, 120 maximum. (throughout warranty period)
Impact Attenuation, Head Injury Criteria (HIC) (with pad)	EN 1177	<900 @1.4m (throughout warranty period)
Material Density	ASTM D 1056-07	3.6 to 12.5 lbs/ft3
Water Absorption	ASTM D 1056-07	<5%
Vertical Deformation w/out turf	EN 14809	4mm maximum

Thermal Expansion (per 1°C)	ASTM D696-03	0.0000833mm/mm
Compression Strength	ASTM D3575	@25% 30 psi @50% 49 psi @75% 102 psi
Compression Set – Static Load (25% strain, 22 hrs, 23°C after 24 hrs)	ISO 1856C	8.2% (0.089 in) max
Compression Set – Repeated impacts (106 psi, repeated, 10,000 cycles)	System Test	6.0% maximum
Friction Coefficient	ISO 8295	2.44 lbs Max 1.35 lbs average
Microbiological Analysis Bacteria Resistance, Fungal Resistance Chemical resistance	ASTM G22-76 ASTM G21-96 ASTM F925	No growth or detrimental effects
Accelerated Aging 20 yr model - % tensile strength loss 20 yr model - % elongation loss		-<10% after 120 days @ 85C -<5% after 120 days at 85C

6. Manufacturer shall provide documentations that the Drainage Pad meets the following:
  - a. Product meets human health and total threshold limit concentrations using EPA method 3052
  - b. Product meets human health and total threshold limit concentrations for Title 22 (CAM 17) metals using EPA 6020/7471A and hexavalent chromium using EPA method 7196A.

H. Additional Field Materials (Attic Stock)

1. Sports Fields:
  - a. The Contractor shall supply and deliver an additional 50 lineal feet of full width material, plus 5 linear feet of full width of each color used. Scraps left from the installation process are not acceptable.
  - b. The Contractor shall supply and deliver an additional 2,000 lbs crumb rubber material as specified for the sports field synthetic grass surfacing system. The rubber infill shall be placed in RubberMaid 50 gallon containers with lockable covers and wheels and clearly labeled "FIELD INFILL".
2. Seaming Tape and Adhesive: Provide 100' linear feet of seaming tape and sufficient gluing materials necessary for seaming repair. Materials shall be easily used by the Owner. 5 Gallon pails of glue material is not acceptable.

2.2 10 YEAR - TWICE ANNUAL MAINTENANCE CONTRACT (ADD ALTERNATE)

- A. For this item the contractor shall provide a price to provide a 10 year, bi-annual maintenance Contract for maintaining the turf and infill:
1. Contractor shall provide the additional cost for the materials, labor, and other items necessary to restore the field to the conditions (infill and turf) outlined in the post installation warranty testing.
  2. Field shall be maintained in the spring prior to spring sports and late summer prior to fall sports, annually for a period of 10 years from substantial completion of the project.
  3. Maintenance shall include redistribution of infill, providing additional infill as required, fixing all warranty issues such as torn seams, delaminating edges, Including typical drag brush and deep tine raking of entire field, dragging field with litter cat to remove debris and dragging field with magnet bar to remove all metallic debris from infill.
    - a. Field shall be groomed in two directions with brush during each visit.
    - b. Motorized brushing shall be provided if required to release trapped fibers
    - c. Payment for maintenance contract provider shall be bi-annually after services have been provided contingent on town receipt of acceptable required annual field testing and inspections.
  4. Maintenance shall not substitute for or affect the scope of require warranty maintenance or repairs as listed in this section.

PART 3 - EXECUTION

3.1 GENERAL

- A. Verify site conditions before proceeding with installation work. Field check the accuracy of the Drawings and inspect structures, utilities, and other site features prior to start of work and notify Architect in writing, of any hazardous conditions and/or discrepancies.
- B. Weather Permitted Conditions: The Contractor shall not perform any work if the conditions for working are:
1. Ambient air temperatures are below 45 degrees F.
  2. Material temperature falls below 45 degrees F.
  3. Rain is forecast or falling
  4. Conditions exist or are pending that will be unsuitable to the installation of the system.
- C. Drawings / Specifications: The Contractor shall perform all work in strict accordance to the Contract Drawings / Plans, Shop Drawings and manufacturer's specifications and instructions.
- D. Verification: The Contractor shall be responsible for the inspecting, verifying, and completing all installed work of this section.
1. The Owner, or Architect on the Owner behalf, reserves the right to independently test any material. Any testing performed by the Owner will be at the Owner's expense. The Contractor is responsible for reimbursing the cost of all Owner directed testing that fails. Contractor will bear the cost of all retesting as required by the Owner.

### 3.2 EXAMINATION

- A. Acceptance of Prior Work-Field Base Stone: Upon completion of the base and drainage work, the Site General Contractor shall submit a letter, addressed to the Owner, signed by the Site General Contractor and the Synthetic Grass Surfacing Installer. The letter shall confirm Field Base Stone has been reviewed, including all testing data, and is acceptable for installation of the synthetic grass surfacing system. Any discrepancies, problems, and/or conflicts shall be addressed prior to issuance of the letter.
  - 1. Continuing with the installation of the synthetic turf over the field base stone without issuance of such letter shall be considered as an approval of the base by the Synthetic Grass Surfacing Installer.

### 3.3 PREPARATION

- A. The Contractor shall take special care to protect all field structures and utilities. Any damage shall be repair or replaced at the cost of the Contractor.
- B. Layout: The Contractor shall be responsible for furnishing, setting and marking all lines, seams and markings for the field. The Contractor shall at all times maintain all necessary benchmarks and control points to locate all events and markings.
- C. Stone Base: The Contractor/Installer is responsible for maintaining the condition of the approved base stone. All area disturbed during the staging of materials or other activities during the installation of the synthetic turf system shall be rectified prior to installation of materials.
  - 1. The Owner and/or Architect reserve the right to test the base stone planarity at any time during or after installation.
  - 2. Any deformations in the stone base after acceptance shall be the installers responsibility to rectify.

### 3.4 INSTALLATION

- A. Synthetic Grass Surfacing System Installation
  - 1. The synthetic grass carpet and pad shall be staged as necessary to minimize disturbance of the approved stone base.
  - 2. The resilient pad shall be covered and protect from UV exposure at all times.
  - 3. Carpet shall be unrolled and installed as necessary over the resilient pad so as not to allow resilient pad to be exposed to UV conditions for longer than 4 hours.
  - 4. Carpet shall be unrolled and laid out to acclimate for an adequate time prior to seaming.
  - 5. All panel seams spacing is to be held to a minimum of 15 feet with no longitudinal or transverse seams, except for inlaid lines with a finished roll assembly unless prior approval of seaming diagram indicates a lesser panel.
  - 6. No fitted pieces shall be allowed to true alignment.
  - 7. All panel seams shall be securely glued and lay flat. Minimum of 5" of seaming tape and glue shall be on either side of the seam.
    - a. Ridges or tenting of seams is not acceptable.
    - b. Gaps greater than 1/8" are not acceptable.

8. All seams shall be brushed thoroughly during installation and before infill materials are installed to release fibers trapped in seaming glue.
9. All seams shall have full fastenings and no loose areas. At no time can pulling on the section separate the material.
10. The Synthetic Grass System shall remain free draining at all times before, during, and after the infill materials are installed.

B. Synthetic Grass System Edges and Termination

1. Field edges shall remain loose and unattached during infill material installation. Minimum of 50% of infill shall be installed prior to edge attachment being made.
2. All edges and ends of the synthetic grass system shall be secured to the anchor curb by 100% glue. Glue shall be installed per manufactures recommendations over full width of anchor curb shelf. Glue beading or failure to follow manufacturers recommendation is unacceptable.
3. Installer shall account for weather conditions and changes in climate conditions when determining the best time of day to make the edge attachment.
4. Final infill level shall be flush with adjacent anchor curb or track surfacing unless noted otherwise on plan.

C. Lines, Markings, Logos, and In-Lays

1. Lines and markings shall be tufted in the factory to the greatest extent possible during manufacturing.
2. All lines, numbers, and field markings are to be tufted or in-laid, shaving shall not be permitted, with the specific colored synthetic grass. All lines and markings shall be accurately set and surveyed to within 1/2" tolerance.
3. All lines and markings shall be installed and verified prior to any installation of in-fill material.
4. All glued inlays shall have a 12" wide seaming tape, fully coated with adhesive. All inlays shall not have any adhesive applied to any exposed fibers.
5. All inlays shall be tuft-in or cut-in (shaving is not permitted).
6. All inlays shall be brushed thoroughly before infill materials are installed.
7. All inlays shall have full fastenings and no loose areas. At no time can pulling on the section separate the material.
8. Installer shall exercise caution to prevent gluing or adhesion of turf to resilient pad. Glue shall not be applied directly to pad in any instance.

D. Synthetic Grass Surfacing Infill

1. No in-fill materials shall be installed until the synthetic grass surfacing is fully seamed and all inlays are installed.
2. Edges shall remain unattached until at least 75% of infill is installed.
3. The synthetic grass surfacing shall be thoroughly brushed prior to any in-fill materials to remove any wrinkles and defibrillate the slit film.
4. Acceptable Infill shall not leave less than 1/2" of exposed fiber on sports fields.

5. The in-fill materials shall be installed in layers not to exceed 0.30 lbs per sq ft per layer.
6. Infill material shall be 'worked into' the turf fibers. Contractor shall allow time and proper machinery to do so.

### 3.5 PROTECTION

- A. The Contractor shall take special care to protect all field and building structures and utilities. Any damage shall be repair or replaced at the cost of the Contractor.

### 3.6 TRAINING INSTRUCTION AND OWNERS MANUALS

- A. Provide a 4 hour, at a minimum, on-site training instructional program for the Owner. Prior to conducting training the contractor shall put together and test all maintenance equipment. Equipment shall be fully functional and ready to use at the time of the training. The training shall include review and demonstration generally of the following, but not be limited to:
  1. Daily/Weekly fiber, infill, and seam inspections.
  2. Low infill hand grooming and infill placement.
  3. Seam repair.
  4. Field sweeping, grooming, and decompaction (with tines groomer if applicable). Including demonstration of hock-up, detachment, and use of all equipment with the Owner's equipment.
  5. Field plowing (if applicable).
  6. Protection for events.
  7. Procedure for Warranty claims.
- B. The training instruction will be summarized on a DVD included in the Owner's Manual and close-out documents.
- C. Training shall take place no later than fourteen (14) days after article "Quality Control Testing, Post-Construction Testing" is completed.

### 3.7 AS-BUILT FIELD LAYOUT DRAWING (By-Owner)

- A. Provide As-Built Field Layout Drawing including verification of field layout dimensions, by licensed surveyor, to the Architect for review and approval.
  1. Provide as-built survey in AutoCAD and .pdf format for review.

### 3.8 CLEAN UP

- A. The site shall be kept clean and free of debris throughout the installation. Empty barrels, sacks, bags, and remnant materials shall be stored or disposed daily in a proper container or legal manner.
- B. After completion of the entire Project, the site shall have a general cleanup removing all debris remaining on the site that is not a part of the final Project.
- C. The equipment supply requirements for this Project shall be part of the total price and shall be the sole expense of the Contractor.
- D. All natural grass areas disturbed during this construction shall be restored to the satisfaction of the Owner at no additional cost to the Owner.
- E. All attic stock materials shall be placed in its appropriate location as determined by the Owner.

3.9 ACCEPTANCE

- A. Should any imperfections develop in the surface areas prior to the final acceptance of the work, they shall be removed and replaced with new materials. All such repair work shall be done at no additional cost to the Owner.
- B. Acceptance will be issued to the Contractor as described under “Substantial Completion” when all work under this section is found to be completed. The Owner or Landscape Architect will not be responsible for any additional acceptance requirements by the Contractor or subcontractor.

**END OF SECTION 32 18 13**

## SECTION 32 18 13.10 – SYNTHETIC GRASS SURFACING WARRANTY

### PART 1 - GENERAL

#### 1.1 RELATED DOCUMENTS

- A. The Contractor, Subcontractors, and/or suppliers providing goods and services referenced in or related to this Section shall also be bound by the Related Documents identified in Division 01 Section “Summary.”

#### 1.2 SUMMARY

- A. Section Includes:
  - 1. Synthetic Grass Sports Surfacing Warranty and Guarantee.

#### 1.3 SIGNATORIES TO THE WARRANTY

- A. The Synthetic Grass System Warranty shall be signed by:
  - 1. An officer of the applicable party or agency duly authorized to sign contracts. The term “Contractor” specified herein shall refer to the party or agency that is furnishing the warranty.
  - 2. If the grass Manufacturer and/or Installation Contractor of the Synthetic Grass System (referred to herein as the Sub-contractor) is not the same entity as the Contractor, the warranty shall be co-signed by the Manufacturer and the Sub-contractor.
  - 3. The “Owner” is **TOWN OF BERLIN, CT**.

#### 1.4 GENERAL WARRANTY CONDITIONS

- A. Warranty Period: The Contractor shall provide a **non-prorated** Synthetic Grass Surfacing Manufacturer/Installer Warranty/Guarantee (also referred to herein as the Warranty) for the synthetic grass as specified herein, for a minimum period of eight (8) years to the Owner from the date of Certificate of Substantial Completion.
  - 1. The Warranty shall cover, in general, the usability of the Synthetic Grass System (and pad); accessories, use, characteristics, and suitability, of the installation.
  - 2. All items covered by the warranty are to be replaced or repaired with new materials, including installation at the sole expense of the warranting manufacturer/surface supplier over the life of the Warranty.



3. Field Use: The materials shall be guaranteed for the designated uses as follows:
  - a. Football / Rugby / Soccer
  - b. Baseball / Softball (including metal cleats)
  - c. Field Hockey
  - d. Lacrosse
  - e. Marching Band
  - f. Graduations and Ceremonies
  - g. Physical Education exercises and activities
  - h. Pedestrian traffic and other similar uses
  - i. Plowing of snow
  - j. Pneumatic rubber tired maintenance and service equipment, designed for use on athletic fields and golf courses.

B. Warranty documents and terms of Warranty shall be in accordance with this Specification Section.

1. The use of the Manufacturers' standard or modified form of Warranty shall in no circumstance supersede the conditions set forth in this Specification Section, which shall be considered part of the Warranty.
2. This Warranty shall constitute a contract made in the state of Connecticut and shall be governed by the laws of that State.

1.5 BID SUBMITTALS

- A. Contractor shall submit a draft of the standard warranty of the proposed Synthetic Turf System, as required by this specification with the bid.

1.6 *PRE-COMPLETION SUBMITTALS*

- A. *Provide prior to Substantial Completion, the following documents:*
1. *Manufacturer's Sample Warranty: shall be a minimum eight (8) year non-prorated Synthetic Turf Warranty, as specified herein, for the specific type of synthetic grass that the Contractor intends to install on this Project.*
  2. *Manufacturer's Warranty Certificate, noting compliance with all the conditions of this Specification.*

1.7 CONTRACTOR'S LIABILITY

- A. General: Failure to service the requirements of the Warranty will be charged to the Contractor.
- B. Repair and Replacement: Any defects caused by delaminating, peeling, normal abrasion or raveling that is not in original conformance with the testing specifications shall be repaired or replaced at no cost to the Owner during this Warranty period.

- C. The Contractor will be responsible for all remedies, including replacement if required, required for failed testing, as specified herein, that fail the requirements of the Synthetic Grass System Warranty/Guarantee. All re-testing shall be paid for by the Contractor until such time as the system passes the requirements.
- D. Limited Liability: This warranty does not cover excessive wear of the surface caused by misuse. The Owner will be given instructions and care-taking procedures before final acceptance. The Owner is to follow the maintenance guidelines as specified by the surfacing manufacturer.

#### 1.8 GENERAL FORM OF WARRANTY OF THE SYNTHETIC GRASS SYSTEM

- A. Warranty form: Sample form of warranty herein set forth is a suggested for use for the work under this section. Manufacturers' standard form of warranty may be used or modified provided conditions specified herein are incorporated.
- B. Contractor hereby warrants to the Owner, subject to the limitations and conditions set forth below, that its synthetic grass system consisting of the synthetic grass described as \_\_\_\_\_, the resilient shock-absorbing under-pad described as \_\_\_\_\_, and the adhesives used in the installation, are free from defects in material and workmanship and shall, for a minimum period of eight (8) years from the date of Substantial Completion, remain serviceable for the activities as listed above.
- C. Contractor warrants to the Owner that its synthetic grass materials shall not fade, fail, shrink, wrinkle or reflect excessive wear. Contractor shall, at their sole expense and cost, replace such areas of the synthetic grass system not performing to these standards for the life of the warranty.
  - 1. The term "not fade" in the context of this warranty shall mean that the synthetic grass material remain a uniform shade of green or the other colors installed with no significant loss of color as defined by not greater than 20% loss or shade reduction.
  - 2. The term "not fail" or "excessive wear" as used in the context of this warranty shall mean that the length and weight of the face yarn or pile material in the synthetic grass surface shall not have been decreased by more than 6% per year according to ASTM D418, nor exceed 20% during the warranty period.
- D. In the event that the synthetic grass materials do not retain its fiber height or shock absorbency and is consequently no longer serviceable during the warranty period, the Contractor shall, at their sole expense, replace such portions of the system that are no longer serviceable.
  - 1. The term "serviceable" in the context of this warranty shall mean that the synthetic grass material shall meet the following minimal requirements annually:

<b>SYNTHETIC GRASS SURFACING SYSTEM (annually)</b>		
EN 13036	Planarity/Surface Regularity	<10 mm
EN 1969 (Sports Fields)	Infill Depth Measurement	± 10% of specification (1/2" exposed fiber)
ASTM F 1936	Impact Attenuation(g-max) (minimum 10 locations)	< 120 G's (individual, not average results)
EN 1177	Impact Attenuation, Head Injury Criteria (HIC) (minimum 10 locations)	<900 @ 1.4m (individual, not average results)

2. Prior to any G-Max testing on the field, the testing machine shall be calibrated in the field with a test pad to verify accuracy of the testing unit. Calibration and testing shall be witnessed by the Owner or Owner's representative. The Contractor is required to perform the necessary testing during a scheduled time at least one time per year during the Warranty period. The results of the testing shall be submitted to the Owner within 30 days of each test. Failure to submit the results shall serve as notice to perform such testing by Owner to determine the extent of the needs under this Warranty.
  3. Any material tested and found not in compliance with the contract may be rejected and Contractor shall rectify the issue to be acceptable. Any area/item not within conformance shall be retested at the Contractors expense after remedy is implemented until satisfactory results are achieved.
- E. Where applicable, the fabric shall adhere firmly and completely to the seaming tape and anchor tape over the entire warranty period.
- F. Contractor warrants to the Owner that the permeable synthetic grass system shall drain vertically a minimum of 16 inches precipitation per hour for a maximum of 24 hours continuously, without visible surface ponding.
- G. Contractor shall replace with new materials, at their sole expense, any damage to the synthetic grass system, which extends more than one meter beyond the location of foreign combustibles, which may ignite, and fire-damage the synthetic grass system. These warranties and the Contractor's obligations here-under are expressly conditioned upon;
1. The Owner making all minor repairs to the synthetic grass system upon the discovery of the need for such repairs.
  2. The Owner maintaining and properly caring for the synthetic grass system in accordance with the Contractor's maintenance manual and instructions.
  3. The Owner complying with the dynamic and static load specifications established by the Contractor.
- H. The warranty is not to cover any defect, failure, damage or undue wear in or to the synthetic grass system caused by or connected with abuse, neglect, deliberate acts, acts of God, casualty, static or dynamic loads exceeding Contractor's recommendations.

#### 1.9 WARRANTY INSPECTIONS AND TESTING

- A. Scheduled Inspection and Testing: Contractor shall examine the synthetic grass surfacing system and conduct testing and maintenance on the synthetic grass surface as a part of a warranty maintenance plan, see paragraph 1.10 "Warranty" in Specification Section 32 18 13 – Synthetic Grass Surfacing and paragraph 1.11 "Warranty and Maintenance Obligations" in Specification Section 32 18 13 – Synthetic Grass Surfacing.
1. The Testing Results and Field Inspection Report shall be delivered to the Owner and Engineer within thirty (30) days of the testing.

- B. Other Inspections: Contractor shall examine the synthetic grass system in regards to any claim that the Owner makes to be present at any time, to analyze the results of all tests conducted by the Owner or Owner's Authorized Representative(s), and to conduct such tests of his own on the synthetic grass surface.
  - 1. The Owner reserves the right to submit on the synthetic grass surface to the above tests at any time during the length of the Warranty. Consideration will be given to the age and intensity of use of the surface.
- C. Cost of Inspections: The Contractor shall pay for costs of scheduled inspections, testing, and analysis.

#### 1.10 REMEDIAL WORK

- A. Notice: The Owner will notify the Contractor in writing of any issues that require remedial work on the field area.
  - 1. The Contractor shall respond to the notification within forty-eight (48) hours of receipt and schedule any major defect or repair within seventy-two (72) hours or as weather permits.
  - 2. In the event the Contractor does not respond to the Owner's written notice within ten (10) days of receipt of the notice or does not submit, schedule and execute corrective work within sixty (60) days, weather permitting, the Owner has the option of having the work performed at the expense of the Contractor.
  - 3. The Contractor will be given seven (7) days' notice in the form of a certified letter notifying the Contractor of the end of the sixty (60) day period.
- B. Repairs: The Warranty requires that the Contractor shall be required to perform all required repairs in a permanent and suitable manner as deemed necessary to maintain a safe playing condition at all times.
  - 1. Any replacement or repair area shall match (as close as possible) the appearance and requirements of section 32 18 13 of the existing surface.
- C. Schedule of Repairs: The Warranty requires that in case of any major repair or replacement, the Contractor is to schedule such work as to not interfere with the Owner's primary use or schedule.

#### 1.11 CLAIMS

- A. All claims by the Owner under this Warranty must be made in writing to the Contractor's address, within 30 days after the Owner learns of the defect, giving rise to the claim.

**END OF SECTION 32 18 13.10**

BISCOGLIO FIELD - BERLIN HIGH SCHOOL  
BERLIN, CT

SYNTHETIC TURF FIELD  
KBA #22024.00

**SECTION 32 18 23.31 – POLYURETHANE RUNNING TRACK SURFACING  
(STRUCTURAL SPRAY)**

**PART 1 - GENERAL**

**1.1 SUMMARY**

- A. The work under this section includes the installation of a cast in place, durable, permeable, resilient, all-weather track surface consisting of a polyurethane bound, paved, rubber base mat and structural spray topcoat on top of a prepared asphalt base.
- B. Work of this specification consists of furnishing all the required labor, materials, equipment, parts and supplies necessary for this installation of the synthetic running track surface.
- C. The installer of all installed materials will be authorized to do so by the manufacturer.
- D. The work hereunder will be done and conform to:
  - 1. American Sports Builders Association Track Construction Manual and Track Construction Guidelines

**1.2 REFERENCES**

- A. Specification Section 32 12 16.01 – “Asphalt Paving-Running Track” for all existing and new pavement repair and preparation.
- B. Reference herein to any technical society, organization, group or regulation are made in accordance with the following abbreviations and, unless otherwise noted or specified, all work under this Section will conform to the latest edition as applicable.
  - 1. National Asphalt Pavement Association (NAPA)
  - 2. USA Track & Field (USATF)
  - 3. National Federation of State High School Associations (NFHS)
  - 4. National Interscholastic Athletic Administrators Association (NIAAA)
  - 5. International Association of Athletics Federation (IAAF)
  - 6. American Sports Builders Association (ASBA)

**1.3 JOB CONDITIONS**

- A. Weather Limitations: The urethane mixture shall not be placed whenever the surface is wet, frozen, or when the temperature is outside the limitations stated by the manufacturer's recommendations for installation. Contractor shall be responsible for submitting the procedure at least one week in advance of any surfacing operations that may result in placement of the urethane running track surfacing outside of the temperature limitations.

**1.4 Bid-SUBMITTALS**

- A. Provide the following at the time of bid:
  - 1. A letter on the Contractor / Sub-contractor's letterhead (whomever shall be supplying and installing the polyurethane running track surfacing system) shall be submitted, with the

bid, confirming their intent to conform to all information presented during the bidding process for the Polyurethane Running Track Surfacing System, including, but not limited to, the bid Drawings, Specifications, Addendum, and RFI Clarifications.

- B. Non-compliance with the bid submittal requirements as specified herein will result in rejection of the bid.

## 1.5 SUBMITTALS

- A. Contractor shall submit the following for review and approval by the Architect:
1. Manufacturer's product data sheets including installation guidelines for components and system.
  2. Manufacturer's color options for review and selection by the Architect/Owner.
  3. Three (3) representative samples of the system to be installed with appropriate labeling for identification and color as selected by Architect/ Owner.
  4. Current material safety data sheets (MSDS) for the liquid components.
  5. Test reports that verify the manufacturer's specifications (data) for the product to be installed.
  6. Documentation that verifies that the synthetic surfacing material does not contain any toxic or hazardous substance, which exceeds limits set forth by the EPA.
  7. The synthetic surfacing material manufacturer shall submit a letter stating that the surfacing contractor is qualified to install its surfacing system.
  8. A certificate from the manufacturer of the binders and coatings stating that the materials have been produced specifically for the use in all-weather running track surfacing construction.
  9. A complete list of materials, including quantities, intended to be used in the construction of the running track system. All liquid quantities will be prior to dilution.
  10. Provide a letter stating that the surfacing contractor has reviewed the asphalt specification and accepts the specification as correct.
  11. Provide a letter after checking the prepared asphalt surface in the field & accepting it for running track surfacing system installation. Should areas be found that do not meet specifications, they shall be repaired or replaced by the asphalt contractor prior to the synthetic surfacing contractor issuing its letter of acceptance.
  12. A test report that the ½" (13 mm) system has been tested to IAAF standards for force reduction and modified vertical deformation. Force reduction shall be 35-50%. Modified vertical deformation shall be 0.6-1.8 mm.
  13. Submit evidence that the synthetic surfacing contractor holds the necessary contractor's license to install synthetic surfacing.
  14. Submit evidence that the material manufacturer is ISO 9001 certified.
  15. Contractor shall provide written maintenance information on the installed product to be presented to the owner upon completion of the surface. This shall include repair methods and availability of repair materials including cost. Submit 3 copies of the approved Surfacing Care and Maintenance Guide.

## 1.6 COORDINATION

- A. Contractor shall coordinate with all other trades, especially Site Contractors to ensure approval of asphalt base prior to surfacing application. Any rework shall be done at no cost to the Owner.

#### 1.7 RELATED WORK

- A. When surfacing on new bituminous pavement, the bituminous pavement must meet the specifications and standards set forth by the Architect. The contractor shall be responsible of performing an elevation survey of the bituminous pavement prior to application of the synthetic track surface. The contractor is to perform a flood test of the bituminous pavement top course prior to application of the synthetic track surface.
- B. The bituminous pavement and associated repairs shall be sufficiently cured and cleaned prior to Work of this section to be performed. The governing guidelines of track construction allow for a maximum longitudinal slope of on tenth of one percent (0.10%) in the running direction. The maximum lateral slope shall not exceed one (1) percent (1.00%)
- C. Grade conformance tests may be required to be performed by the Contractor on both the leveling course and the top course of the bituminous pavement at the Architect's discretion. The entire surface shall provide positive drainage to the inside edge of the track. The maximum allowable planarity deviation within a pass should be 1/4 inch in 10 feet when measured in any direction. Deficient areas in the leveling course should be corrected as approved by the Engineer. After any corrections, the surface shall not allow water to stand greater than 1/16 inch deep, one (1) hour after rain has ended.
- D. The Contractor shall be responsible to have adjacent grass edged and removed from all areas receiving the synthetic surface. It may be necessary to apply a liquid herbicide such as Roundup to any adjacent edges of track and event areas.

#### 1.8 MATERIAL HANDLING AND STORAGE

- A. Materials should be delivered in manufacturer's container to maintain clean and dry conditions. See manufacturer's guidelines for temperature requirements for the locale of installation.
- B. Store material in accordance with manufacturer's specifications and MSDS.
- C. The contractor shall provide a secure, clean, dry location for storage of materials at temperature as above. Under no circumstances should materials be stored outside unless fully protected from moisture with 10 mil polyethylene barrier and tarpaulin. All materials stored outside shall be inspected by dealer for moisture contamination before application.
- D. Deliver products to the site in original, unopened containers with labels attached.
- E. All surfacing materials shall be non-flammable.

#### 1.9 Quality assurance

- A. Provide a certificate of accuracy from a registered engineer, land surveyor or certified track builder by ASBA that the track measures 400 meters in all lanes from start to finish.
- B. The contractor shall record the batch number of each product used on the site and maintain it throughout the warranty period.



- C. The contractor shall provide the Architect, an estimate of the volume of each liquid product and the weight of the rubber granule to be used on site.
- D. The manufacturer's representative will be available to help resolve material issues.
- E. Provide, as a part of the Warranty, documents stating that the materials applied conform to the manufacturer's specifications and that the material will not separate from the asphalt or concrete base, blister, bubble, fade, crack or wear excessively during the life of the warranty.
- F. The materials will not foam, thus causing air bubbles and reduce the life expectancy of the surface.
- G. The synthetic surfacing contractor and owner will annually walk and inspect the synthetic surface during the life of the warranty. Issues will be documented in writing to the Owner. The Owner will review items with the Engineer. Warranty issues will be repaired and for non-warranty items a method for correction will be presented.
- H. Track system shall subject to successfully tested independently an accredited IAAF testing house to the requirements of the IAAF Performance Specifications for Synthetic Surface Athletics Tracks (Outdoor) dated January 1990.
- I. The synthetic surfacing contractor shall maintain a clean and orderly job site. All excess materials shall be removed from the construction area and properly disposed of. Scrap shall be removed in the same manner.

#### 1.10 GUARANTEE

- A. The Contractor shall be required to guarantee all labor, materials, workmanship and services for the polyurethane running track surfacing system and markings for a period of not less than FIVE (5) YEARS from the date of Substantial Completion of the work, as issued by the Architect.
- B. Any defects caused by delaminating, peeling, normal abrasion or raveling that is not in original conformance with the testing specifications shall be repaired or replaced at no cost to the Owner during this guarantee period.
- C. This Contractor shall be required to submit the following documents in regard to the guarantee:
  - 1. Letter from the manufacturer(s) of all materials attesting to the guarantee length and limits. This must be signed by an officer of the organization.
  - 2. Maintenance Instruction Guide for the Contract Surfaces, signed by an officer of the surface company and notarized.
  - 3. Letter of Guarantee from the Installation Contractor for the above time period, signed by an officer of the Company and notarized.
  - 4. These documents shall be submitted to the Owner prior to final payment. The installer and the materials manufacturer shall supply a warranty covering labor and materials respectively. The warranty period shall be for five (5) years.

#### 1.11 INSTALLER QUALIFICATIONS

- A. Installers shall be regularly engaged in the construction and surfacing of running tracks.
- B. Installer shall be an authorized applicator of the specified system.

- C. Installers of this product are to provide a list of at least five (5) installations that are a maximum of five (5) years old that contain the same products, and use the same method of installation. Include:
  - 1. Project Name
  - 2. Address
  - 3. Owners Representatives Name
  - 4. Owners Representatives Email
  - 5. Owners Representatives Phone
- D. Completed projects are to have been installed under the same company name and ownership that is presently bidding.
- E. Projects shall not have needed repair or maintenance work during the warranty period.
- F. The installer's installing foreman must have at least eight (8) years' experience installing the specified type of synthetic track surface system.

#### 1.12 MANUFACTURER QUALIFICATION

- A. System manufacturer shall certify that the materials provided are manufactured specifically for construction and surfacing of running tracks.
- B. System manufacturer shall be continuously engaged in the business of track surfacing materials for at least ten (10) years.
- C. System manufacturer of this product are to provide a list of at least twenty (20) installations that are minimum of five (5) years old that contain the same products, and use the same method of installation.
  - 1. Project Name
  - 2. Address
  - 3. Owners Representatives Name
  - 4. Owners Representatives Email
  - 5. Owners Representatives Phone
- D. Completed projects are to have been installed under the same company name and ownership that is presently bidding.
- E. Projects shall not have needed repair or maintenance work during the warranty period.
- F. System manufacturer shall have a designated representative available for site inspection.

## PART 2 - PRODUCTS

### 2.1 General

- A. The synthetic surfacing shall be a 13 mm thick, permeable, structural spray system, with a paved in place rubber granule and polyurethane binder base layer. Two coats of a mixture of colored polyurethane and EPDM rubber granules are structurally sprayed onto the base to form a textured finish.

- B. The following products and manufacturers have been approved for use for this project:
1. BSS 100 track system as supplied by Beynon Sports (A Tarkett Sports company)
  2. Rekotan BS track system as supplied by AstroTurf (A SportsGroup company)
  3. Spurtan BS track system as supplied by Advanced Polymer Technology
- C. The synthetic track surface system shall have a smooth finish and may be applied for outdoor use.
- D. The structural spray applied polyurethane and rubber blended coating shall be resilient and allow moisture to pass through the surface. It shall have a textured finish for outdoor applications.
- E. The product shall meet the following minimum physical properties:
1. Top Color: Red (Final color to be approved by Architects based on manufacture's standard palette)
- F. Performance Standards
- | <u>Test Results</u>                  | <u>DIN Standard</u> |
|--------------------------------------|---------------------|
| Thickness (DIN):                     | min. 13 mm          |
| Force Reduction (IAAF):              | 35-50%              |
| Modified Vertical Deformation (IAAF) | 0.6 mm – 2.5 mm     |
| Permeability:                        | min 0.01 cm/s       |
| Friction (wet) (IAAF):               | > 0.5               |
| Friction (dry) (DIN):                | <1.1                |
| Tensile Strength (IAAF):             | ≥ 0.4 MPa           |
| Elongation (IAAF):                   | >40%                |
| Spike Resistance (DIN)               | Class 1             |
- G. Product substitution: If other than the product specified, the contractor shall submit at least seven (7) days prior to the bid date a complete type written list of proposed substitutions with sufficient data, drawings, samples and literature to demonstrate that the proposed substitution is of equal quality and utility to that originally specified. Information must include a QUV test of at least 1,000 hours and IAAF test information for the system to be installed.
- H. Any materials used must be an emulsion/water based product. Any products which require solvents such as MEK, Butyl Cellusolve or Acetone for clean up or mixing are not acceptable.
- I. Materials must have a VOC less than 150g/lit. for binder products. Topcoats shall have a VOC of less than 100g/lit. measured by EPA method 24.
- J. Materials may not have a flash point of less than 200°F.
- K. All Materials shall have documented independent test results by an accredited IAAF testing house to the requirements of the IAAF Performance Specifications for Synthetic Surface Athletics Tracks (Outdoor) dated January 1990.

### PART 3 - MATERIALS

#### 3.1 Rubber – Polyurethane Track Basemat (SBR)

- A. The polyurethane track base mat rubber shall be specifically graded rubber granules with a controlled gradation between 1.0mm to 3.00mm.
- B. Dust and rubber particulate smaller than a No. 200 sieve size shall not exceed 1 percent of the total rubber.
- C. The rubber shall be black SBR

#### 3.2 Rubber – Structural Spray Top Coat (EPDM)

- A. EPDM colored virgin rubber granules that are processed and graded to 0.5 – 1.5 mm in size unless otherwise specified. The rubber shall contain a minimum of 20% EPDM and be approved by the resin manufacturer. The specific density shall be 1.60 +/- 0.08 and Shore A hardness of 60.
  - 1. Color coat shall be RED in color.

#### 3.3 Primer

- A. The synthetic track surface primer shall be polyurethane based and compatible with asphalt and synthetic track surfacing materials.
- B. When installing over a concrete pavement special developed concrete primer, manufactured by the same manufacturer of the other materials, shall be applied.

#### 3.4 Binder

- A. The synthetic track surface binding agent shall be a single component; MDI based moisture cure polyurethane binder. The binder shall not have a free TDI monomer level above 0.2% and must be solvent free.
- B. The polyurethane binder shall be 100 percent solids.
- C. The polyurethane binder shall be compatible with SBR and EPDM rubber granules.
- D. All polyurethane binder shall be manufactured by the installation company and to be delivered in new unopened containers, clearly labeled by the manufacturer.

#### 3.5 Structural Spray Coating

- A. The spray coating shall be a MDI-based single-component, moisture cured, 100% solids, and pigmented polyurethane, specifically formulated for compatibility with EPDM granules.
  - 1. The coating shall be RED.
  - 2. Pigment intergraded in the field shall not be allowed.

## PART 4 - EXECUTION

### 4.1 GENERAL

- A. The bituminous pavement should be sufficiently cured and cleaned in order for work to progress.
- B. The entire surface shall be swept, power blown, or high pressure washed to remove all dirt, oil, grease, or any other foreign matter. The surface shall be free from any loose material.
- C. All work shall be performed by manufacturer's technicians and comply with the manufacturer's guidelines for the complete placement and installation of the base layer, the sealing and surface layers.
- D. During surface installation and striping all sprinkler systems shall be shut off, or controlled so that no water falls on the track or event surfaces.
- E. All materials shall be installed in strict compliance with the manufacturer's specifications and instructions.
- F. The Contractor shall be responsible to have the entire track area, and other pertinent areas such as football field, concessions, closed and secured of all activities 24 hours per day through the curing and completion of the synthetic track surface.

### 4.2 WEATHER LIMITATIONS

- A. Ambient and surface temperatures must be 50°F and rising.
- B. Installation should not be conducted during rainfall or when rainfall is imminent.
- C. Do not apply when surface temperature is in excess of 140°F.
- D. Apply the synthetic surfacing material only during favorable weather conditions. Work is to proceed only when adequate curing can be guaranteed by the manufacturer and installer.

### 4.3 SURFACE PREPARATION

- A. Asphalt shall be cleaned of all oils, spills & staining. Repairs to existing asphalt as asphalt shall be allowed to cure for a minimum of 21 days prior to the application of any surfacing materials.
- B. All concrete work is to cure for a minimum of 45 days. No curing agents are to be used. Any concrete flat work such as run ups will be checked as in 3.3D.
- C. The surface must be thoroughly cleaned of all loose dirt and debris. Any oil spills (hydraulic, diesel, motor oil) must be completely removed, either by chipping out or removing and replacing with new, keyed in asphalt.
- D. The asphalt substrate track surface shall not vary from planned cross slope by more than + .2%, with a maximum lateral slope outside to inside of 0.8% for NCAA or IAAF facilities (1% to 2% for NFHS), and a maximum slope of 0.1% in any running direction. The finished asphalt shall not vary under a 10' straight edge more than 1/8".

- E. Prior to the application of resilient surface materials, the entire asphalt base surface shall be checked for planarity, surface tolerance, and flooded and checked for depressions or irregularities in the asphalt. Any puddle area covering a nickel shall or vary  $\pm \frac{1}{4}$  inch when measured with a 10-foot straightedge in any direction shall be marked and repaired with Patch Binder, according to manufacturer's specifications and approved by the Engineer. After patching, the asphalt surface shall not vary allow water to stand greater than 1/16 inch, one (1) hour after a flood test has been pre-formed. Slopes shall meet the guidelines of the ASBA and NFHS.
- F. It shall be the responsibility of the general contractor to flood the surface.
  - 1. If, after 40 minutes of drying time, there are birdbaths evident, it shall be the responsibility of the landscape architect, in conjunction with the surfacing contractor, to determine the method of correction. No cold tar patching, skin patching or sand mix patching will be acceptable.
  - 2. Any oil spills (hydraulic, diesel, motor oil.) must be completely removed and replaced with either polyurethane or new, keyed in asphalt. The minimum curing time for the asphalt base repair is 21 days. It will be the responsibility of the surfacing contractor to determine if the asphalt substrate has cured sufficiently prior to the application of the polyurethane surfacing system.
  - 3. It will be the responsibility of the general contractor to determine if the asphalt substrate meets all design specifications, i.e. cross slopes, planarity and specific project criteria. After all the above conditions are met, the synthetic surfacing contractor must, in writing, accept the planarity of the asphalt receiving base, before work can commence.
- G. Polyurethane running track surfacing system installer representative will be present for all testing on the asphalt base. Installer will submit, in writing, acceptance of the asphalt base.

#### 4.4 SURFACE INSTALLATION

- A. Primer
  - 1. The entire area to be surfaced shall receive an application of polyurethane primer applied uniformly at a rate between 0.20-0.30 lb. per sq. yd. A minimum cure time of 30 minutes is required before application of the base mat materials.
  - 2. Only the area to be covered within the working day should be primed to ensure a good bond to the base. Concrete base may require additional coating based on absorption rate of applied primer.
- B. Polyurethane Track Basemat
  - 1. The mixing ratio of rubber to binder shall not be less than 100 parts rubber to 20 part binder as determined by the weight of the products. The materials shall be prepared in a mechanical mixer until a homogenous mix is obtained.
  - 2. The mixed materials making up the synthetic track surface shall be applied by a mechanically operated finishing machine, which shall have an electrically heated screed, to an approximate depth of 11 - 12 mm using approximately 17.33 lbs/sy of mixed material.
  - 3. The cured edge of each joint shall be primed with the synthetic track surface binding agent prior to the laying of the adjacent base mat. All joint work shall be troweled flush with the adjacent mat.
  - 4. Trowel work: All seams shall be troweled smooth within the pot life of the material. All edges shall be straight and rounded by turning the trowel. All cold dry seams shall be cut straight at an inward angle and primed prior to commencing with subsequent work.

- C. Structural Spray Top Coat (two applications)
  - 1. The polyurethane track base mat shall be cleaned and prepared prior to the installation of the structural spray top coat in accordance with the manufacturer's specifications and instructions.
  - 2. According to the manufacturer's specifications, the specified quantity of colored EPDM granules shall be mixed thoroughly with the specified quantity of the one component polyurethane of the structural spray material.
  - 3. Structural Spray Coat (two applications) – is spray applied with air and volume-controlled spray equipment. Care is to be taken so as to provide an even surface without streaking.
  - 4. A second coat of material over the first is applied in the opposite direction. The total rate of each coat of spray shall range from 3.5 to 4.0 lbs. per square yard.

#### 4.5 MARKING AND MEASUREMENTS

- A. Wait 48 hours after surface completion before applying line marking.
- B. Experienced personal specializing in polyurethane running track surfacing system striping will accomplish all striping.
- C. See Track Markings Section

#### 4.6 PROTECTION

- A. During construction the installer is responsible for limiting access of non-construction personnel to the site.
- B. The installation contractor will coordinate any irrigation of fields with the owner.
- C. The installer will protect curbs, fences and all other structures from overspray.

#### 4.7 QUALITY ASSURANCE

- A. Track system will be subject to successfully tested independently an accredited IAAF testing house to the requirements of the IAAF Performance Specifications for Synthetic Surface Athletics Tracks (Outdoor) dated January 1990

#### 4.8 CLEAN UP

- A. Remove all containers, surplus and debris and dispose of in accordance with local, state and Federal regulation.
- B. Remove all spills and overruns.
- C. Leave site in a clean and orderly condition on a daily basis.
- D. Upon completion of all work, remove all containers, surplus materials, and installation debris. Leave area of work in clean orderly condition.

#### END OF SECTION 32 18 23.31

**SECTION 32 18 23.33 – POLYURETHANE RUNNING TRACK SURFACING  
–EMBEDDED SANDWICH SYSTEM**

**PART 1 GENERAL**

**1.1 SUMMARY**

- A. Work of this specification includes the installation and application of an IAAF approved, impermeable polyurethane synthetic track system consisting of SBR Rubber and single-component polyurethane binder and a poured-in-place, two-component U.V. stabilized elastomeric polyurethane wearing layer with an embedded textured finish.
- B. Work of this specification consists of furnishing all the required labor, materials, equipment, parts, and supplies necessary for this installation of the synthetic running track surface.
- C. The work hereunder shall be done and conform to:
  - 1. American Sports Builders Association Track Construction Manual and Track Construction Guidelines.
  - 2. Codes and standards follow the current guidelines set forth by the National Federation of State High School Associations (NFHS), Connecticut Interscholastic Athletic Conference (CIAC), the National Collegiate Athletic Association (NCAA), and the International Association of Athletics Federations (IAAF).

**1.2 REFERENCES**

- A. Reference herein to any technical society, organization, group or regulation are made in accordance with the following abbreviations and, unless otherwise noted or specified, all work under this Section shall conform to the latest edition as applicable.
- B. National Asphalt Pavement Association (NAPA).
- C. USA Track & Field (USATF).
- D. Connecticut Interscholastic Athletic Conference (CIAC).
- E. National Federation of State High School Associations (NFHS).
- F. National Collegiate Athletic Association (NCAA).
- G. National Interscholastic Athletic Administrators Association (NIAAA).
- H. International Association of Athletics Federation (IAAF).

**1.3 JOB CONDITIONS**

- A. Weather Limitations
  - 1. The texturizing mixture shall not be placed whenever the surface is wet, frozen or when the temperature is outside the limitations stated by the manufacturer's recommendations for installation. Contractor shall be responsible for submitting the procedure at least one week in advance of any surfacing operations that may result in placement of the all-weather running track texturizing surfacing outside of the temperature limitations.



#### 1.4 BID-SUBMITTALS

- A. Only one each of the following bid submittals are required to the bidding entities at the time of bid:
  - 1. A letter on the Contractor / Sub-contractor's letterhead (whomever shall be supplying and installing the all-weather track surfacing system) shall be submitted, with the bid, confirming their intent to conform to all information presented during the bidding process for the All-Weather Track Surfacing System. Including, but not limited to, the bid Drawings, Specifications, Addendum, and RFI Clarifications.
  - 2. Non-compliance with the bid submittal requirements as specified herein will result in rejection of the bid.

#### 1.5 SUBMITTALS

- A. Manufacturer's product data sheets including installation guidelines for components and system.
- B. Manufacturer's color options for review and selection by the Engineer/Owner.
- C. Three (3) representative samples of the system to be installed with appropriate labeling for identification and color as selected by Engineer/ Owner.
- D. Current material safety data sheets (MSDS) for the liquid components.
- E. Test reports that verify the manufacturer's specifications (data) for the product to be installed.
- F. Documentation that verifies that the synthetic surfacing material does not contain any toxic or hazardous substance, which exceeds limits set forth by the EPA.
- G. The synthetic surfacing material manufacturer shall submit a letter stating that the surfacing contractor is qualified to install its synthetic surface system.
- H. A certificate from the manufacturer of the binders and coatings stating that the materials have been produced specifically for the use in sports surfacing construction.
- I. A complete list of materials intended to be used in the construction of the running track system. All liquid quantities will be prior to dilution.
- J. Provide a letter stating that the surfacing contractor has reviewed the asphalt specification and accepts the specification as correct.
- K. Provide a letter after checking the asphalt accepting it for synthetic surface installation. Should areas be found that do not meet specifications, they shall be repaired or replaced by the asphalt contractor prior to the synthetic surfacing contractor issuing its letter of acceptance.
- L. Submit evidence that the synthetic surfacing contractor holds the necessary contractor's license to install synthetic surfacing.
- M. Submit evidence that the material manufacturer is ISO 9001 certified.

- N. Contractor to shall provide written maintenance information on the installed product to be presented to the owner upon completion of the surface. This shall include repair methods and availability of repair materials including cost. Submit 3 copies of the approved Surfacing Care and Maintenance Guide.

#### 1.6 COORDINATION

- A. Contractor shall coordinate with all other trades, especially Site Contractors to ensure approval of asphalt base prior to surfacing application. Any rework shall be done at no cost to the Owner.

#### 1.7 RELATED WORK

- A. When surfacing on new bituminous pavement, the bituminous pavement must meet the specifications and standards set forth by the Engineer. The contractor shall be responsible of performing an elevation survey of the bituminous pavement prior to application of the synthetic track surface. The contractor is to perform a flood test of the bituminous pavement top course prior to application of the synthetic track surface.
- B. The bituminous pavement shall be sufficiently cured and cleaned prior to Work of this section to be performed. The governing guidelines of track construction allow for a maximum longitudinal slope of on tenth of one percent (0.10%) in the running direction. The maximum lateral slope shall not exceed one (1) percent (1.00%)
- C. Grade conformance tests may be required to be performed by the Contractor on both the leveling course and the top course of the bituminous pavement at the Engineer's discretion. The entire surface shall provide positive drainage to the inside edge of the track. The maximum allowable planarity deviation within a pass should be 1/4 inch in 10 feet when measured in any direction. Deficient areas in the leveling course should be corrected as approved by the Engineer. After any corrections, the surface shall not allow water to stand greater than 1/16 inch deep, one (1) hour after rain has ended.
- D. The Contractor shall be responsible to have adjacent grass edged and removed from all areas receiving the synthetic surface. It may be necessary to apply a liquid herbicide such as Roundup to any adjacent edges of track and event areas.

#### 1.8 MATERIAL HANDLING AND STORAGE

- A. Materials should be delivered in manufacturer's container to maintain clean and dry conditions. See manufacturer's guidelines for temperature requirements for the locale of installation.
- B. Store material in accordance with manufacturer's specifications and MSDS.
- C. The contractor shall provide a secure, clean, dry location for storage of materials at temperature as above. Under no circumstances should materials be stored outside unless fully protected from moisture with 10 mil polyethylene barrier and tarpaulin. All materials stored outside shall be inspected by dealer for moisture contamination before application.
- D. Deliver products to the site in original, unopened containers with labels attached.
- E. All surfacing materials shall be non-flammable.

#### 1.9 QUALITY ASSURANCE

- A. Provide a certificate of accuracy from a registered engineer, land surveyor or certified track builder by ASBA that the track measures 400 meters in all lanes from start to finish.

- B. The contractor shall record the batch number of each product used on the site and maintain it throughout the warranty period.
- C. The contractor shall provide the Engineer, an estimate of the volume of each liquid product and the weight of the rubber granule to be used on site.
- D. The manufacturer's representative will be available to help resolve material issues.
- E. Provide, as a part of the Warranty, documents stating that the materials applied conform to the manufacturer's specifications and that the material will not separate from the asphalt or concrete base, blister, bubble, fade, crack or wear excessively during the life of the warranty.
- F. The materials will not foam, thus causing air bubbles and reduce the life expectancy of the surface.
- G. The synthetic surfacing contractor and owner will annually walk and inspect the synthetic surface during the life of the warranty. Issues will be documented in writing to the Owner. The Owner will review items with the Engineer. Warranty issues will be repaired and for non-warranty items a method for correction will be presented.
- H. Track system shall subject to successfully tested independently an accredited IAAF testing house to the requirements of the IAAF Performance Specifications for Synthetic Surface Athletics Tracks (Outdoor) dated January 1990.
- I. The synthetic surfacing contractor shall maintain a clean and orderly job site. All excess materials shall be removed from the construction area and properly disposed of. Scrap shall be removed in the same manner.

#### 1.10 GUARANTEE

- A. The Contractor shall be required to guarantee all labor, materials, workmanship and services for the Synthetic Surface and Track Markings.
- B. This guarantee shall remain in force for a period of not less than FIVE (5) YEARS from the date of Substantial Completion of the work.
- C. Any defects caused by delaminating, peeling, normal abrasion or raveling that is not in original conformance with the testing specifications shall be repaired or replaced at no cost to the Owner during this guarantee period.
- D. This Contractor shall be required to submit the following documents regarding the guarantee:
  - 1. Letter from the manufacturer(s) of all materials attesting to the guarantee length and limits. This must be signed by an officer of the organization.
  - 2. Maintenance Instruction Guide for the Contract Surfaces, signed by an officer of the surface company and notarized.
  - 3. Letter of Guarantee from the Installation Contractor for the above time period, signed by an officer of the Company and notarized.
  - 4. These documents shall be submitted to the Owner prior to final payment.

#### 1.11 INSTALLER QUALIFICATIONS

- A. Installers shall be regularly engaged in the construction and surfacing of running tracks.
- B. Installer shall be an authorized applicator of the specified system.
  - 1. Installers of this product are to provide a list of at least five (5) installations that are a maximum of five (5) years old that contain the same products and use the same method of installation. Include:
    - a. Project Name
    - b. Address
    - c. Owners Representatives Name
    - d. Owners Representatives Email
    - e. Owners Representatives Phone
  - 2. Completed projects are to have been installed under the same company name and ownership that is presently bidding.
- C. The installer's installing foreman must have at least eight (8) years' experience installing the specified type of synthetic track surface system.

#### 1.12 MANUFACTURER QUALIFICATION

- A. System manufacturer shall certify that the materials provided are manufactured specifically for construction and surfacing of running tracks.
- B. System manufacturer shall be operational within the US that has been continuously engaged in the business of track surfacing materials for at least ten (10) years.
- C. System manufacturer of this product are to provide a list of at least twenty (20) installations that are maximum of five (5) years old that contain the same products and use the same method of installation.
  - 1. Include:
    - a. Project Name
    - b. Address
    - c. Owners Representatives Name
    - d. Owners Representatives Email
    - e. Owners Representatives Phone
  - 2. Completed projects are to have been installed under the same company name and ownership that is presently bidding.
- D. System manufacturer shall have a designated representative available for site inspection.

## PART 2 PRODUCTS

### 2.1 GENERAL

- A. The synthetic surfacing shall be a 13 mm thick, impermeable, sandwich system, with a paved in place rubber granule and polyurethane binder base layer sealed to render it impermeable. The surface finish is embedded granular EPDM.
- B. The following products and manufacturers have been approved for use for this project:
  - 1. BSS 300 track system as supplied by Beynon Sports (A Tarkett Sports company)
  - 2. Rekotan M track system as supplied by AstroTurf (A SportsGroup company)
  - 3. Spurtan BV track system as supplied by Advanced Polymer Technology
- C. Materials must have a VOC less than 150g/lt. for binder products. Topcoats shall have a VOC of less than 100g/lt. measured by EPA method 24.
- D. Materials may not have a flash point of less than 200°F.
- E. All Materials shall have documented independent test results by an accredited IAAF testing house to the requirements of the IAAF Performance Specifications for Synthetic Surface Athletics Tracks (Outdoor) dated January 1990.

### 2.2 PROPERTIES

- A. The product shall meet the following minimum physical properties:
  - 1. Top Color: **Red** (Final color to be approved by Architect)

B. Performance Standards	<u>Test Results</u>	<u>DIN Standard</u>
Thickness (DIN):	min. 13 mm	
Force Reduction (IAAF):	35-50%	
Modified Vertical Deformation (IAAF):	0.6 mm – 2.5 mm	
Friction (wet) (IAAF):	> 0.5	
Friction (dry) (DIN):	<1.1	
Tensile Strength (IAAF):	≥ 0.5 MPa	
Elongation (IAAF):	>40%	
Spike Resistance (DIN)	Class 1	

### 2.3 MATERIALS

- A. Rubber – Polyurethane Track Basemat (SBR)
  - 1. The polyurethane track base mat rubber shall be specifically graded rubber granules with a controlled gradation between 1.0mm to 3.00mm.
    - a. Dust and rubber particulate smaller than a No. 200 sieve size shall not exceed 1 percent of the total rubber.
    - b. The rubber shall be black SBR

B. Rubber – Structural Spray Top Coat (EPDM)

1. EPDM colored virgin rubber granules that are processed and graded to 0.5 – 1.5 mm in size unless otherwise specified. The rubber shall contain a minimum of 20% EPDM and be approved by the resin manufacturer. The specific density shall be 1.60 +/- 0.08 and Shore A hardness of 60.

C. Primer

1. The entire area to be surfaced shall receive an application of polyurethane primer applied uniformly at a rate between 0.20-0.30 lb. per sq. yd. A minimum cure time of 30 minutes is required before application of the base mat materials.
2. Only the area to be covered within the working day should be primed to ensure a good bond to the base. Concrete base may require additional coating based on absorption rate of applied primer.

D. Binder

1. The synthetic track surface binding agent shall be a single component; MDI based moisture cure polyurethane binder. The binder shall not have a free TDI monomer level above 0.2% and must be solvent free.
  - a. The polyurethane binder shall be 100 percent solids.
  - b. The polyurethane binder shall be compatible with SBR and EPDM rubber granules.
2. All polyurethane binder shall be manufactured by the installation company and to be delivered in new unopened containers, clearly labeled by the manufacturer.

E. Polyurethane Track Basemat

1. The mixing ratio of rubber to binder shall not be less than 100 parts rubber to 20 part binder as determined by the weight of the products. The materials shall be prepared in a mechanical mixer until a homogenous mix is obtained.
2. The mixed materials making up the synthetic track surface shall be applied by a mechanically operated finishing machine, which shall have an electrically heated screed, to an approximate depth of 11 - 12 mm using approximately 17.33 lbs/sy of mixed material.
3. The cured edge of each joint shall be primed with the synthetic track surface binding agent prior to the laying of the adjacent base mat. All joint work shall be troweled flush with the adjacent mat.
4. Trowel work: All seams shall be troweled smooth within the pot life of the material. All edges shall be straight and rounded by turning the trowel. All cold dry seams shall be cut straight at an inward angle and primed prior to commencing with subsequent work.

F. Seal Coat: This seal coat shall be a two-component polyurethane pore sealer use with paved rubber granule mats. The granular SBR and binder layer shall be sealed with the seal coat. The application of EPDM dust is not allowed.

G. Aliphatic Spray Coat

1. Shall be a two-component varnish with high quality UV resistance.

- H. Line Paint: Shall comply with Specification Section 32 1823.35 Markings
- I. The installer will furnish the Owner/Engineer with a proof of delivery that the correct volume of product has been provided. The installer will also verify that the same manufacturer has supplied all binders and coatings.

## PART 3 EXECUTION

### 3.1 GENERAL

- A. The bituminous pavement should be sufficiently cured and cleaned in order for work to progress
- B. The entire surface shall be swept, power blown, or high pressure washed to remove all dirt, oil, grease, or any other foreign matter. The surface shall be free from any loose material.
- C. All work shall be performed by manufacturer's technicians and comply with the manufacturer's guidelines for the complete placement and installation of the base layer, the sealing and surface layers.
- D. During surface installation and striping all sprinkler systems shall be shut off, or controlled so that no water falls on the track or event surfaces.
- E. All materials shall be installed in strict compliance with the manufacturer's specifications and instructions.
- F. The Contractor shall be responsible to have the entire track area, and other pertinent areas such as football field, concessions, etc., closed and secured of all activities 24 hours per day through the curing and completion of the synthetic track surface.

### 3.2 WEATHER LIMITATIONS

- A. Apply Synthetic Track Surfacing in dry weather when pavement and atmospheric temperatures are fifty (50) degrees Fahrenheit, or above, and are anticipated to remain above fifty (50) degrees Fahrenheit for twenty-four (24) hours after completing application.
- B. Installation should not be conducted during rainfall or when rainfall is imminent. Rain cannot be falling. If there is a threat of rain, work shall cease until dry conditions can be re-established on the track pavement. Work is to proceed only when adequate curing can be guaranteed by the manufacturer.
- C. The maximum temperature cannot exceed 105 degrees at any point during a 24 - hour period.
- D. Do not apply when surface temperature is more than 140°F.
- E. Apply the synthetic surfacing material only during favorable weather conditions. Work is to proceed only when adequate curing can be guaranteed by the manufacturer and installer.

### 3.3 SURFACE PREPARATION

- A. New asphalt shall be allowed to cure for a minimum of 28 days prior to the application of any surfacing materials.
- B. All concrete work is to cure for a minimum of 45 days. No curing agents are to be used. Any concrete flat work such as run ups etc. will be checked as in 3.3D.

- C. The surface must be thoroughly cleaned of all loose dirt and debris. Any oil spills (hydraulic, diesel, motor oil, etc.) must be completely removed, either by chipping out or removing and replacing with new, keyed in asphalt.



- D. The asphalt substrate track surface shall not vary from planned cross slope by more than + .2%, with a maximum lateral slope outside to inside of 1% for NCAA or IAAF facilities (1% to 2% for NFHS), and a maximum slope of 0.1% in any running direction. The finished asphalt shall not vary under a 10' straight edge more than 1/8".
- E. It should be the responsibility of the contractor to flood the surface.
  - 1. If, after 20 minutes of drying time, there are birdbaths evident, it shall be the responsibility of the Contractor, in conjunction with the surfacing contractor, to determine the method of correction and submit to the Engineer. No cold tar patching, skin patching or sand mix patching will be acceptable.
  - 2. Any oil spills (hydraulic, diesel, motor oil, etc.) must be completely removed and replaced with either polyurethane or new, keyed in asphalt. The minimum curing time for the asphalt base repair is 28 days. It shall be the responsibility of the surfacing contractor to determine if the asphalt substrate has cured sufficiently prior to the application of the polyurethane surfacing system.
  - 3. It shall be the responsibility of the general contractor to determine if the asphalt substrate meets all design specifications, i.e. cross slopes, planarity and specific project criteria. After all the above conditions are met, the synthetic surfacing contractor must, in writing, accept the planarity of the asphalt receiving base, before work can commence.

### 3.4 RESILIENT SURFACE INSTALLATION

#### A. Primer

- 1. The entire area to be surfaced shall receive an application of polyurethane primer applied uniformly at a rate between 0.20-0.30 lb. per sq. yd. A minimum cure time of 30 minutes is required before application of the base mat materials.
- 2. Only the area to be covered within the working day should be primed to ensure a good bond to the base. Concrete base may require additional coating based on absorption rate of applied primer.

#### B. Polyurethane Track Basemat

- 1. The mixing ratio of rubber to binder shall not be less than 100-part rubber to 20-part binder as determined by the weight of the products. The materials shall be prepared in a mechanical mixer until a homogenous mix is obtained.
- 2. The mixed materials making up the synthetic track surface shall be applied by a mechanically operated finishing machine, which shall have an electrically heated screed, to an approximate depth of 11 - 12 mm using approximately 17.33 lbs/sy of mixed material.
- 3. The cured edge of each joint shall be primed with the synthetic track surface binding agent prior to the laying of the adjacent base mat. All joint work shall be troweled flush with the adjacent mat.
- 4. Trowel work: All seams shall be troweled smooth within the pot life of the material. All edges shall be straight and rounded by turning the trowel. All cold dry seams shall be cut straight at an inward angle and primed prior to commencing with subsequent work.

C. Seal Coat

1. The two components are mixed at the prescribed ratio homogeneously with a suitable mixing device. The coating is squeegee applied to the base mat, making it impermeable. The sealed surface must be checked for pin holes prior to further application. The seal coat consumption is approximately 2.00-3.00 lbs/sy of seal coating.

D. Top Layer

1. One application of double mixed polyurethane coating at approximately 3.87 lbs/sy is applied on top of the base layer with a notched squeegee. After the material has self-leveled and is still liquid, colored 1.0-3.5 mm EPDM rubber granules are broadcast into the surface to excess. After curing (hardening) the excess colored EPDM granules are removed. Then approximately 4.98 lbs/sy of EPDM will remain in the colored polyurethane. The resilient embedded textured finish shall be a dense matrix of exposed EPDM granules to a depth of 5 mm.

3.5 MARKING AND MEASUREMENTS

- A. Wait 48 hours after surface completion before applying line marking.
- B. Experienced personnel specializing in all-weather running track striping shall accomplish all striping.
- C. See Section 32 1823.35 - Running Track Surfacing - Markings.

3.6 PROTECTION

- A. During construction the installer is responsible for limiting access of non-construction personnel to the site.
- B. The installation contractor shall coordinate any irrigation of fields with the owner.
- C. The installer shall protect curbs, fences and other structures from overspray.

3.7 QUALITY ASSURANCE

- A. Track system shall be subject to successfully tested independently by an accredited IAAF testing house to the requirements of the IAAF Performance Specifications for Synthetic Surface Athletics Tracks (Outdoor) dated January 1990.

3.8 CLEAN UP

- A. Remove all containers, surplus and debris and dispose of in accordance with local, state and Federal regulation.
- B. Remove all spills and overruns.
- C. Leave site in a clean and orderly condition on a daily basis.
- D. Upon completion of all work, remove all containers, surplus materials, and installation debris. Leave area of work in clean orderly condition.

**END OF SECTION 32 18 23.33**

## **SECTION 32 1823.35 RUNNING TRACK SURFACING - MARKINGS**

### **PART 1 GENERAL**

#### **1.1 RELATED DOCUMENTS**

- A. The Contractor, Subcontractors, and/or suppliers providing goods and services referenced in or related to this Section shall also be bound by the Related Documents identified in Division 01 Section "Summary."

#### **1.2 SUMMARY**

- A. Work of this specification consists of furnishing all the required labor, materials, equipment, parts and supplies necessary for this installation of the synthetic running track striping and markings.
- B. The work hereunder shall be done and conform to:
  - 1. American Sports Builders Association Track Construction Manual and Track Construction Guidelines
  - 2. Massachusetts Interscholastic Athletic Association (MIAA) and the National Federation of State High School Associations (NFHS) for track and field event layout.

#### **1.3 REFERENCES**

- A. Reference herein to any technical society, organization, group or regulation are made in accordance with the following abbreviations and, unless otherwise noted or specified, all work under this Section shall conform to the latest edition as applicable.
- B. National Asphalt Pavement Association (NAPA)
- C. USA Track & Field (USATF)
- D. National Federation of State High School Associations (NFHS)
- E. National Interscholastic Athletic Administrators Association (NIAAA)
- F. International Association of Athletics Federation (IAAF)
- G. American Sports Builders Association (ASBA)

#### **1.4 JOB CONDITIONS**

- A. Weather Limitations
  - 1. The striping mixture shall not be placed whenever the surface is wet, frozen or when the temperature is outside the limitations stated by the manufacturer's recommendations for installation. Contractor shall be responsible for submitting the procedure at least one week in advance of any surfacing operations that may result in placement of the all-weather running track striping material outside of the temperature limitations.

## 1.5 SUBMITTALS

- A. Manufacturer's specifications for components and system.
- B. Current material safety data sheets (MSDS) for the liquid components.
- C. Current Authorized Applicator certificate from the surface system manufacturer.
- D. A certificate from the manufacturer of the striping material stating that the materials have been produced specifically for the use in all-weather track surfacing striping.
- E. A complete list of materials intended to be used in the striping of the running track system. All liquid quantities will be prior to dilution.
- F. Contractor to shall provide written maintenance information on the installed product to be presented to the owner upon completion of the surface. This shall include repair methods and availability of repair materials including cost. Submit 3 copies of recommended Surfacing Care and Maintenance Guide.
- G. Upon completion, supply the Owner with all necessary as-built drawings showing markings color coding of each event.
- H. Upon completion, a letter of certification attesting to the accuracy of the markings shall be submitted by the Professional Engineer or Land Surveyor in charge of the layout. The letter shall be signed and sealed by the person or persons in charge of the layout indicating the state of registration, number and name.

## 1.6 COORDINATION

- A. Contractor shall coordinate with all other trades, especially all-weather track surfacing installer to ensure approval of track surfacing prior to striping application. Any rework shall be done at no cost to the Owner.

## 1.7 RELATED WORK

- A. The all-weather track surfacing shall be sufficiently cured and cleaned prior to work of this section to be performed.

## 1.8 MATERIAL HANDLING AND STORAGE

- A. Materials should be delivered in manufacturer's container to maintain clean and dry conditions. See manufacturer's guidelines for temperature requirements for the locale of installation.
- B. Store material in accordance with manufacturer's specifications and MSDS.
- C. The owner shall provide a secure, clean, dry location for storage of materials at temperature as above. Under no circumstances should materials be stored outside unless fully protected from moisture with 10 mil polyethylene barrier and tarpaulin. All materials stored outside shall be inspected by dealer for moisture contamination before application.
- D. Deliver products to the site in original, unopened containers with labels attached.
- E. All surfacing materials shall be non-flammable.

#### 1.9 QUALITY ASSURANCE

- A. Track system shall be subject to testing by an independent accredited IAAF testing house. The track system must adhere to the requirements of the IAAF Performance Specifications for Synthetic Surface Athletics Tracks (Outdoor) dated January 1990.

#### 1.10 GUARANTEE

- A. See the warranty section
- B. The installer and the materials manufacturer shall supply a warranty covering labor and materials respectively. The warranty period shall be for five (5) years.

#### 1.11 INSTALLER QUALIFICATIONS

- A. Installers shall be regularly engaged in the striping of running tracks.
- B. Installer shall be an authorized applicator of the specified system.
  - 1. Installers of this product are to provide a list of at least 10 installations that are a minimum of 5 years old that contain the same products, and use the same method of installation. Include:
    - a. Project Name
    - b. Address
    - c. Owners Representatives Name
    - d. Owners Representatives Email
    - e. Owners Representatives Phone
  - 2. Completed projects are to have been installed under the same company name and ownership that is presently bidding.
- C. Installer may be a builder member of the ASBA.
- D. The installer's installing foreman must have at least eight (8) years' experience installing the specified type of synthetic track surface system.

#### 1.12 MANUFACTURER QUALIFICATION

- A. System manufacturer shall certify that the materials provided are manufactured specifically for construction and surfacing of running tracks.
- B. System manufacturer shall be a US owned company that has been continuously engaged in the business of track surfacing materials for at least ten (10) years.
- C. System manufacturer of this product are to provide a list of at least twenty (20) installations that are minimum of 3 years old that contain the same products, and use the same method of installation.

1. Include:
  - a. Project Name
  - b. Address
  - c. Owners Representatives Name
  - d. Owners Representatives Email
  - e. Owners Representatives Phone
2. Completed projects are to have been installed under the same company name and ownership that is presently bidding.

D. Striping paint manufacturer shall have a designated representative available for site inspection.

## PART 2 PRODUCTS

### 2.1 GENERAL

- A. Paint shall be that material as recommended by the manufacturer of the track surface.
- B. All markings shall receive two (2) coats of paint to achieve the full opaque results.

### 2.2 MATERIALS

- A. Paint shall be polyurethane based for all system except for rubberized asphalt and the latex systems.
- B. No thinners shall be used.
- C. No painting shall be performed when the velocity of the wind exceeds twelve (12) MPH, unless the spray equipment is equipped with the proper air curtains.

## PART 3 EXECUTION

### 3.1 GENERAL

- A. Ambient and surface temperatures must be as recommended by the manufacturer, but not less than 50°F and rising.
- B. Installation should not be conducted during rainfall or when rainfall is imminent.
- C. Do not apply when surface temperature is in excess of 140°F.
- D. The all-weather track surfacing should be sufficiently cured and cleaned in order for work to progress.
- E. The entire surface shall be swept, power blown, or high pressure washed to remove all dirt, oil, grease, or any other foreign matter. The surface shall be free from any loose material.
- F. All work shall be performed by manufacturer's technicians and comply with the manufacturer's guidelines for the complete placement and installation of the base layer, the sealing and surface layers.

### 3.2 WEATHER LIMITATIONS

- A. Ambient and surface temperatures must be 50°F and rising.
- B. Installation should not be conducted during rainfall or when rainfall is imminent.
- C. Do not apply when surface temperature is in excess of 140°F.
- D. Apply the synthetic surfacing material only during favorable weather conditions. Work is to proceed only when adequate curing can be guaranteed by the manufacturer and installer.
- E. During surface installation and striping all sprinkler systems shall be shut off, or controlled so that no water falls on the track or event surfaces.
- F. All materials shall be installed in strict compliance with the manufacturer's specifications and instructions.
- G. The Contractor shall be responsible to have the entire track area, and other pertinent areas such as football field, concessions, etc., closed and secured of all activities 24 hours per day through the curing and completion of the synthetic track surface.

### 3.3 SURFACE PREPARATION

- A. New asphalt shall be allowed to cure for a minimum of 14 days prior to the application of any surfacing materials.
- B. The surface must be thoroughly cleaned of all loose dirt and debris.
- C. Prior to the application of resilient surface materials, the entire asphalt base surface shall be checked for planarity, surface tolerance, and flooded and checked for depressions or irregularities in the asphalt. Any puddle area covering a nickel shall or vary +/- 1/4 inch when measured with a 10-foot straightedge in any direction shall be marked and repaired with Patch Binder, according to manufacturer's specifications and approved by the Landscape Architect. After patching, the asphalt surface shall not vary allow water to stand greater than 1/16 inch, one (1) hour after a flood test has been performed. Slopes shall meet the guidelines of the ASBA and NFHS.

### 3.4 ALL-WEATHER TRACK MARKINGS

- A. Markings
  - 1. Shall be marked for 42" lanes and include all event markings as recommended by NFHS and MIAA events and requirements. Also included shall be those additional events as indicated in the specifications.
- B. Computations
  - 1. Verify the locations of purposed events with the Owner.
  - 2. Calculations shall be made to the nearest 1/10,000th of a foot.
  - 3. Calculations of the angle shall be made to the nearest one second.
  - 4. Calculations shall be submitted to the Landscape Architect prior to the painting.
  - 5. Calculations shall be made by or certified by the engineer or surveyor completing the work.

C. Layout

1. Lines and markings shall be made by a competent, experienced and fully qualified Track Marking Professional.
2. Locate and confirm both new radius points.
3. Establish and set all necessary control points.
4. Measurements shall be made on the track to the nearest 1/100th of a foot.
5. Angles shall be set by using a transit or theodolite capable of reading direct to 20 seconds.
6. The markings on the curve may also be set by using the chord length method.
7. Measurements shall be made with an engineering steel tape in engineering scale.
8. All markings shall be clearly identified and color coded for the painter to identify.

D. Symbols

1. All lanes and lines shall be white 2" wide markings
2. All starts and finishes shall be 2" wide lines
3. mark.
4. Scratch lines for the jumping events shall be 12" wide. Include markings for both men's and women's distances under NFHS regulations.
5. All starts and finishes shall be clearly marked with the start of the said events.
6. All symbols shall have the proper color code for the event.

3.5 PROTECTION

- A. During construction, the installer is responsible for limiting access of non-construction personnel to the site.
- B. The installation contractor shall coordinate any irrigation of fields with the owner.
- C. The installer shall protect curbs, fences and other structures from overspray.

3.6 QUALITY ASSURANCE

- A. Upon completion, a letter of certification attesting to the accuracy of the markings shall be submitted by the Professional Engineer or Land Surveyor in charge of the layout. The letter shall be signed and sealed by the person or persons in charge of the layout indicating the state of registration, number and name.
- B. All measurements and tolerances shall conform to those recommended by the Massachusetts Interscholastic Athletic Association (MIAA) and the National Federation of State High School Associations (NFHS) for track and field event layout.



3.7 CLEAN UP

- A. Remove all containers, surplus and debris and dispose of in accordance with local, state and Federal regulation.
- B. Remove all spills and overruns.
- C. Leave site in a clean and orderly condition on a daily basis.
- D. Upon completion of all work, remove all containers, surplus materials, and installation debris. Leave area of work in clean orderly condition.

**END OF SECTION 32 18 23.35**

## **SECTION 32 31 13 – CHAIN LINK FENCES AND GATES**

### **PART 1 GENERAL**

#### **1.1 SUMMARY**

- A. Section includes:
  - 1. Furnishing and installing woven wire fencing systems of the type and height specified and supported by metal posts erected where indicated on the Drawings and as specified herein, including fence and gates.
- B. Contractor shall coordinate work between all Subcontractors, sections, and trades required for the proper completion of the work.
- C. Contractor is responsible for all health and safety.

#### **1.2 REFERENCES**

- A. Reference herein to any technical society, organization, group or regulation are made in accordance with the following abbreviations and, unless otherwise noted or specified, all work under this Section shall conform to the latest edition as applicable.
- B. Code of Federal Regulations (CFR).
  - 1. 29 CFR 1926, Safety and Health Regulations for Construction.
- C. American Society for Testing and Materials (ASTM).
  - 1. ASTM A53 - Standard Specification for Pipe, Steel, Black and Hot-Dipped, Zinc-Coated, Welded and Seamless.
  - 2. ASTM A90- Standard Test Method for Weight (Mass) of Coating on Iron or Steel Articles with Zinc or Zinc Alloy.
  - 3. ASTM A123- Zinc (Hot Dip Galvanized) Coatings on Iron and Steel Products.
  - 4. ASTM A153- Standard Specification for Zinc Coating (Hot Dip) on Iron and Steel Hardware.
  - 5. ASTM A392- Standard Specification for Zinc-Coated Steel Chain-Link Fence Fabric.
  - 6. ASTM A428- Standard Test Method for Weight (Mass) of Coating on Aluminum-Coated Iron or Steel Articles.
  - 7. ASTM A491- Standard Specification for Aluminum Coated Steel Chain Link Fence Fabric.
  - 8. ASTM A780 – Standard Specification for Repair of Damaged and Uncoated Areas of Hot-Dip Galvanized Coatings.
  - 9. ASTM A817- Standard Specification for Metallic-Coated Steel Wire for Chain Link Fence Fabric and Marcellled Tension Wire.
  - 10. ASTM A824 - Standard Specification Metallic-Coated Steel Marcellled Tension Wire for Use with Chain Link Fence.

11. ASTM B211- Standard Specification for Aluminum and Aluminum-Alloy Bar, Rod and Wire.
12. ASTM C94 - Standard Specification for Ready-Mixed Concrete.
13. ASTM F552 - Standard Terminology Relating to Chain Link Fencing.
14. ASTM F567- Standard Practice for Installation of Chain Link Fence.
15. ASTM F626 - Standard Specification for Fence Fittings.
16. ASTM F668 - Specification for Polymer Coated Chain Link Fence Fabric.
17. ASTM F900 - Standard Specification for Industrial and Commercial Swing Gates.
18. ASTM F934 - Specification for Standard Colors for Polymer-Coated Chain Link.
19. ASTM F1043 - Strength and Protective Coatings on Metal Industrial Chain Link Fence Framework.
20. ASTM F1083 - Standard Specification for Pipe, Steel, Hot-Dipped Zinc-Coated (Galvanized) Welded, for Fence Structures.
21. ASTM F1183 - Standard Specification for Aluminum Alloy Chain Link Fence Fabric.

D. Chain Link Fence Manufacturer's Institute

1. Chain Link Fence Manufacturer's Institute Product Manual, latest revision.

1.3 SYSTEM DESCRIPTION

A. Temporary Construction Fence shall meet the following basic parameters:

1. Fence Height: 8 feet.
2. Mesh Size: 2 inches.
3. Mesh Gage: 12
4. Gates: Height of gates shall match that of fence. Width of gates shall be as shown on the Drawings.
5. Anchored post or driven posts where indicated. No top or bottom rails required.
6. Panelized/modular units where indicated. Two stabilizers per panel.

B. Permanent Fence shall meet the following basic parameters:

1. Fence Height: Varies, refer to the Drawings.
2. Type:
  - a. 9 gauge vinyl coated black mesh and accessories
3. Mesh Size:
  - a. Field and boundary fencing: 2"
  - b. All mesh to have knuckled both selvages.

4. Mesh Gage:
  - a. Field Fencing: Wire with a diameter of 9 gauge galvanized core fused. Measured prior to application of coating.
5. Gates: Height of gates shall match that of fence. Type and size of gates shall be as shown on the Drawings.
6. Anchored post where indicated; top and bottom rails between posts unless otherwise indicated.

#### 1.4 SUBMITTALS

- A. Shop drawings showing the plan layout, spacing of components, post foundation dimensions, hardware anchorage, gates and a schedule of components.
- B. Product Data: For each type of product indicated. Include construction details, material descriptions, dimensions of individual components and profiles, and finishes for chain-link fences and gates.
  1. Fence and gate posts, rails, and fittings.
  2. Chain-link fabric, reinforcements, and attachments.
  3. Accessories: Privacy slats.
  4. Gates, locking mechanisms and hardware.
- C. Shop Drawings: Include plans, elevations, sections, details, and attachments to other work. Show accessories, hardware, gate operation, and operational clearances.
- D. Samples for Initial Selection: For components with factory-applied color finishes.
- E. Samples for Verification: Prepared on Samples of size indicated below:
  1. Polymer-Coated Components: In 6-inch lengths for components and on full-sized units for accessories.
- F. Delegated-Design Submittal: For chain-link fences and gate framework indicated to comply with performance requirements and design criteria, including analysis data signed and sealed by the qualified professional engineer responsible for their preparation.

#### 1.5 INFORMATIONAL SUBMITTALS

- A. Qualification Data: For qualified factory-authorized service representative.
- B. Product Certificates: For each type of chain-link fence, and gate, from manufacturer.
- C. Product Test Reports: For framing strength according to ASTM F 1043.
- D. Field quality-control reports.
- E. Warranty: Sample of special warranty.

## 1.6 CLOSEOUT SUBMITTALS

- A. Operation and Maintenance Data: For the following to include in emergency, operation, and maintenance manuals:
  - 1. Polymer finishes.
  - 2. Gate hardware.

## 1.7 QUALITY ASSURANCE

- A. Use adequate numbers of skilled workmen who are thoroughly trained and experienced in the necessary crafts and who are completely familiar with the specified requirements and the methods needed for proper performance of the work of this Section.
- B. Supply material in accordance with Chain Link Fence Manufacturer's Institute Product Manual and this Specification.
- C. Perform installation in accordance with ASTM F567.
- D. Maintain all facilities installed under this Section in proper and safe condition throughout the progress of the work.
- E. Testing Agency Qualifications: For testing fence grounding. Member company of NETA or an NRTL.
  - 1. Testing Agency's Field Supervisor: Currently certified by NETA to supervise on-site testing.
- F. Electrical Components, Devices, and Accessories: Listed and labeled as defined in NFPA 70, by a qualified testing agency, and marked for intended location and application.
- G. Emergency Access Requirements: Comply with requirements of authorities having jurisdiction for gates with automatic gate operators serving as a required means of access.
- H. Mockups: Build mockups to set quality standards for fabrication and installation.
  - 1. Include 10-foot length of fence and gate.
- I. Preinstallation Conference: Conduct conference at Project site.
  - 1. Inspect and discuss electrical roughing-in, equipment bases, and other preparatory work specified elsewhere.
  - 2. Review sequence of operation for each type of gate operator.
  - 3. Review coordination of interlocked equipment specified in this Section and elsewhere.
  - 4. Review required testing, inspecting, and certifying procedures.

## 1.8 PROJECT CONDITIONS

- A. Field Measurements: Verify layout information for chain-link fences and gates shown on Drawings in relation to property survey and existing structures. Verify dimensions by field measurements.

## 1.9 DELIVERY, STORAGE AND HANDLING

- A. Deliver fence fabric and accessories in packed cartons or firmly tied rolls.
- B. Packages shall be labeled with the manufacturer's name.
- C. Store fence fabric and accessories in a secure and dry place.

## 1.10 WARRANTY

- A. Special Warranty: Manufacturer's standard form in which Installer agrees to repair or replace components of chain-link fences and gates that fail in materials or workmanship within specified warranty period.
  - 1. Failures include, but are not limited to, the following:
    - a. Faulty operation of gate accessories and mechanisms.
    - b. Deterioration of metals, metal finishes, and other materials beyond normal weathering.
- B. Warranty Period: Five years from date of Substantial Completion.

## PART 2 PRODUCTS

### 2.1 GENERAL

- A. Material furnished shall be in good condition and shall not have been painted.
- B. All posts and rails shall be straight, true to section and of sufficient length for proper installation.
- C. Unless otherwise specified, hardware and accessories shall conform to the requirements of ASTM F626 and ASTM A123 or ASTM A153 as applicable for zinc-coating.

### 2.2 LINE POSTS

- A. See Drawings for size and type depending on height of fence.
  - 1. Vinyl Coated Color: Black Class 2b fused and adhered

### 2.3 CORNER, END, AND PULL POSTS

- A. See Drawings for size depending on height of fence.
  - 1. Vinyl Coated Color: Black Class 2b fused and adhered

### 2.4 BRACE ASSEMBLY

- A. Rails
  - 1. 1.25-inch nominal (1.660 O.D.) steel pipe, steel pipe.
    - a. Vinyl Coated Color: Black Class 2b fused and adhered
- B. Truss rod shall be 3/8-inch with adjustable turnbuckles or truss tightener to match fabric type.

## 2.5 CHAIN-LINK FENCE FABRIC

- A. General: Provide fabric in one-piece heights measured between top and bottom of outer edge of selvage knuckle or twist. Comply with CLFMI Product Manual and with requirements indicated below:
1. Fabric Height: As indicated on Drawings.
  2. Steel Wire Fabric:
    - a. Field Fencing: Wire with a diameter of 9 gauge galvanized core fused. Measured prior to application of coating.
    - b. Mesh Size:
      - 1) 2 inches. Measured prior to application of coating.
    - c. Polymer-Coated Fabric: ASTM F 668, Class 2b.
      - 1) Color: Black, ASTM F 934.
    - d. Coat selvage ends of fabric that is metallic coated before the weaving process *with manufacturer's standard clear protective coating.*
  3. Selvage: Knuckled at both selvages.

## 2.6 FENCE FRAMING

- A. Posts and Rails: Comply with ASTM F 1043 for framing, including rails, braces, and line; terminal; and corner posts. Provide members with minimum dimensions and wall thickness according to ASTM F 1043 based on the following:
1. Fence Height: As indicated on Drawings.
  2. Light Industrial Strength: Material Group IC-L, round steel pipe, electric-resistance-welded pipe.
    - a. Line Post: Refer to Drawings for post sizes based on fence height.
    - b. End, Corner and Pull Post: Refer to Drawings for post sizes based on fence height.
  3. Horizontal Framework Members: Intermediate top and bottom rails complying with ASTM F 1043.
    - a. Top, Bottom and Mid Rail for all fencing systems and all heights: Refer to Drawings for post sizes based on fence height.
    - b. Brace Rails: Comply with ASTM F 1043.
- B. Polymer coating over metallic coating.
1. Color: Black, ASTM F 934.

## 2.7 STRETCHER BARS

- A. Bars shall be one piece lengths of zinc-coated steel, not less than 2-inches shorter than the full height of the fencing fabric with a minimum cross section of 3/16-inch by 3/4-inch, ASTM F626.
- B. Polymer coating over metallic coating.
- C. Color: Black, ASTM F 934.

## 2.8 TENSION WIRE

- A. Polymer-Coated Steel Wire: Marcellled (spiraled or crimped) No. 7 gage, (0.177-inches) diameter, ASTM A824, ASTM F 1664,
- B. Polymer coating Class 2b over-coated steel wire. Color Black, ASTM F 934.
- C. Galvanized Type II zinc coated class 5 - 2oz/ft<sup>2</sup>

## 2.9 HARDWARE AND TIES

- A. Hardware & tie finish shall match that of fence fabric used.
- B. Miscellaneous hardware, including but not limited to nuts, bolts, washers, clips, bands, rail ends, brackets, and straps shall be provided as required, hot-dip galvanized steel or aluminum alloy, ASTM F626.
- C. Tension bands shall be formed from flat or beveled steel and shall have a minimum thickness after galvanizing of 0.078-inches and a minimum width of 3/4-inch.
- D. Brace bands shall be formed from flat or beveled steel and shall have a minimum thickness after galvanizing of 0.108-inches and a minimum width of 3/4-inch.
- E. Wire ties shall be minimum 16-gage galvanized steel wire or minimum 9-gage aluminum alloy wire.
- F. All fasteners shall be hot-dip galvanized, ASTM F2329.
- G. Bolts: Steel, ASTM A307.
- H. Washers: Steel, round, ASTM F844.
- I. Bolts: Steel, ASTM A563 Grade A, hex head.

## 2.10 FITTINGS

- A. General: Comply with ASTM F 626.
- B. Post Caps: Provide for each post.
  - 1. Provide line post caps with loop to receive tension wire or top rail.
- C. Rail and Brace Ends: For each gate, corner, pull, and end post.
- D. Rail Fittings: Provide the following:
  - 1. Top Rail Sleeves: Pressed-steel or round-steel tubing not less than 6 inches long.



2. Rail Clamps: Line and corner boulevard clamps for connecting intermediate and bottom rails in the fence line-to-line posts.
- E. Tension and Brace Bands: Pressed steel.
- F. Tension Bars: Steel, length not less than 2 inches (50 mm) shorter than full height of chain-link fabric. Provide one bar for each gate and end post, and two for each corner and pull post, unless fabric is integrally woven into post.
- G. Truss Rod Assemblies: Steel, hot-dip galvanized after threading rod and turnbuckle or other means of adjustment.
- H. Tie Wires, Clips, and Fasteners: ASTM F 626.
  1. Standard Round Wire Ties: For attaching chain-link fabric to posts, rails, and frames, complying with the following:
    - a. Hot-Dip Galvanized Steel: 0.148-inch- (3.76-mm-) diameter wire; galvanized coating thickness matching coating thickness of chain-link fence fabric.
- I. Finish:
  1. Metallic Coating for Pressed Steel or Cast Iron: Not less than 1.2 oz. /sq. ft. (366 g /sq. m) zinc.
    - a. Polymer coating over metallic coating.

## 2.11 GATES

- A. Gate Construction: ASTM F900. Corners welded or assembled with special malleable or pressed-steel fittings and rivets or bolts to provide rigid connections.
- B. Pipe and Tubing:
  1. Zinc-Coated Steel: Comply with ASTM F 1043 and ASTM F 1083; protective coating and finish to match fence framing.
- C. Posts: Round tubular steel.
  1. Size: Refer to Drawings for proper sizes based on fence height.
- D. Gate Frames and Bracing: Round tubular steel.
  1. Framing:
    - a. Size: Refer to Drawings for proper sizes based on fence height.
    - b. Assemble gate frames by welded connections. When width of gate leaf exceeds 10 feet, install mid-distance vertical tubing of the same size and weight as frame members. When either horizontal or vertical bracing is not required, provide truss rods as cross bracing to prevent sag or twist.
    - c. Horizontal bracing shall be used on all gates.
- E. Wire Fencing Fabric: Fabric shall match that of fence, attached securely to frame at intervals not exceeding 15-inches.

F. Hardware:

1. Hinges: 180-degree outward swing only.
  - a. Hinge brackets shall be tack welded after install and coated.
  - b. Gates shall not allow swing over track surfacing or turf.
  - c. Open gate position shall lie parallel to adjacent fenceline
2. Latches permitting operation from both sides of gate with provision for padlocking accessible from both sides of gate.
3. All gates shall be equipped with hot-dipped galvanized steel hinges and latch with provisions for padlocking.
4. Double gates and single gates with leaf width 4 feet and greater shall be equipped with a minimum ½" drop bar and gate hold backs, one each leaf.
5. Hinges shall be cast steel hinges capable of 180 degree opening. Tack weld hinge brackets to the steel post after installation to lock each hinge to the gate post and prevent rotation. No-lift-off type. Box type hinges are not acceptable.
6. Gate Leaves: Configured with intermediate members and diagonal truss rods or tubular members as necessary to provide rigid construction, free from sag or twist.
7. Latches, hinges, stops, keepers and other hardware items shall be furnished as required for proper operation.

2.12 CONCRETE

- A. Concrete shall conform to ASTM C94; or pre-packaged concrete mix, ASTM C387. Minimum 28-day compressive strength of 3,000 psi. No air entrainment.

2.13 GROUT AND ANCHORING CEMENT

- A. Nonshrink, Nonmetallic Grout: Premixed, factory-packaged, non-staining, noncorrosive, nongaseous grout complying with ASTM C 1107. Provide grout, recommended in writing by manufacturer, for exterior applications.
- B. Erosion-Resistant Anchoring Cement: Factory-packaged, non-shrink, non-staining, hydraulic-controlled expansion cement formulation for mixing with potable water at Project site to create pourable anchoring, patching, and grouting compound. Provide formulation that is resistant to erosion from water exposure without needing protection by a sealer or waterproof coating and that is recommended in writing by manufacturer, for exterior applications.

PART 3 EXECUTION

3.1 GENERAL

- A. Install fence with properly trained crew as shown on the drawings in accordance with ASTM F567.
- B. Install all nuts for tension bands and hardware bolts on the side of the fence opposite the fabric.
- C. The temporary chain link fence shall be removed at the conclusion of the work.

### 3.2 EXAMINATION

- A. Examine areas and conditions, with Installer present, for compliance with requirements for a verified survey of property lines and legal boundaries, site clearing, earthwork, pavement work, and other conditions affecting performance of the Work.
  - 1. Do not begin installation before final grading is completed unless otherwise permitted by Architect.
- B. Proceed with installation only after unsatisfactory conditions have been corrected.

### 3.3 PREPARATION

- A. Stake locations of fence lines, gates, and terminal posts. Do not exceed intervals of 500 feet or line of sight between stakes. Indicate locations of utilities, lawn sprinkler system, underground structures, benchmarks, and property monuments.

### 3.4 INSTALLATION, GENERAL

- A. Install chain-link fencing to comply with ASTM F 567 and more stringent requirements indicated.
  - 1. Install fencing on established boundary lines inside property line.

### 3.5 CHAIN-LINK FENCE INSTALLATION

- A. Post Excavation: Drill or hand-excavate holes for posts to diameters and spacings indicated, in firm, undisturbed soil.
- B. Post Setting: Set posts in concrete at indicated spacing into firm, undisturbed soil.
  - 1. Verify that posts are set plumb, aligned, and at correct height and spacing, and hold in position during setting with concrete or mechanical devices.
  - 2. Concrete post footings shall have a plan diameter 12-inches greater than the post diameter. Holes shall be clean and free of loose soil and debris. Concrete shall be placed continuously in one operation and tamped or vibrated for consolidation. Tops of the concrete footings shall be crowned to shed water.
  - 3. Gate post/footings shall be installed a minimum of 42-inches below grade.
  - 4. All corner, end posts, and gate posts shall be braced.
    - a. Brace each gate and corner post to adjacent line post with horizontal center brace rail and diagonal truss rods. Install brace rail one bay from end and gate posts.
    - b. Corner and terminal posts are to be braced horizontally and diagonally. The braces are to extend over one adjacent panel. Changes in line of 30 degrees or more shall be considered as corners.
    - c. Braces and truss rods shall be securely fastened to posts with appropriate hardware.
    - d. Pull posts with two braces shall be provided for all heights where changes in horizontal or vertical alignment of ten (10) degrees or more occur.

5. Concrete Fill: Place concrete around posts to dimensions indicated and vibrate or tamp for consolidation. Protect aboveground portion of posts from concrete splatter.
  - a. Concealed Concrete: Top 3 inches below grade as indicated on Drawings to allow covering with surface material.
  - b. Posts Set into Concrete in Sleeves: Use steel pipe sleeves preset and anchored into concrete for installing posts. After posts have been inserted into sleeves, fill annular space between post and sleeve with non-shrink, nonmetallic grout, mixed and placed to comply with anchoring material manufacturer's written instructions, and finished sloped to drain water away from post.
  - c. Posts Set into Voids in Concrete: Form or core drill holes not less than 5 inches deep and 3/4 inch larger than OD of post. Clean holes of loose material, insert posts, and fill annular space between post and concrete with non-shrink, nonmetallic grout, mixed and placed to comply with anchoring material manufacturer's written instructions, and finished sloped to drain water away from post.
- C. Terminal Posts: Locate terminal end, corner, and gate posts per ASTM F 567 and terminal pull posts at changes in horizontal or vertical alignment of 15 degrees or more.
- D. Line Posts: Space line posts uniformly as indicated on the Drawings. Unless indicated otherwise, spacing shall be 8 feet on-center.
- E. Post Bracing and Intermediate Rails: Install according to ASTM F 567, maintaining plumb position and alignment of fencing. Diagonally brace terminal posts to adjacent line posts with truss rods and turnbuckles. Install braces at end and gate posts and at both sides of corner and pull posts.
  1. horizontal braces at midheight of fabric 72 inches or higher, on fences with top rail and at two-third fabric height on fences without top rail. Install so posts are plumb when diagonal rod is under proper tension.
- F. Tension Wire: Install according to ASTM F567, maintaining plumb position and alignment of fencing. Pull wire taut, without sags. Fasten fabric to tension wire with 0.120-inch-diameter hog rings of same material and finish as fabric wire, spaced a maximum of 24 inches on-center. Install tension wire in locations indicated before stretching fabric. Provide horizontal tension wire at the following locations:
  1. Extended along top and bottom of fence fabric. Install top tension wire through post cap loops. Install bottom tension wire within 6 inches (152 mm) of bottom of fabric and tie to each post with not less than same diameter and type of wire.
- G. Top Rail: Install according to ASTM F567, maintaining plumb position and alignment of fencing. Run rail continuously through line post caps, bending to radius for curved runs and terminating into rail end attached to posts or post caps fabricated to receive rail at terminal posts. Provide expansion couplings as recommended in writing by fencing manufacturer.
- H. Intermediate and Bottom Rails: Install and secure to posts with fittings.

- I. Chain-Link Fabric: **Apply fabric to inside (field side) of enclosing framework.** Leave 1 inch between finish grade or surface and bottom selvage unless otherwise indicated. Pull fabric taut and tie to posts, rails, and tension wires. Anchor to framework so fabric remains under tension after pulling force is released.
- J. Tension or Stretcher Bars: Thread through fabric and secure to end, corner, pull, and gate posts with tension bands spaced not more than 15 inches on-center.
- K. Tie Wires: Use wire of proper length to firmly secure fabric to line posts and rails. Attach wire at one end to chain-link fabric, wrap wire around post a minimum of 180 degrees, and attach other end to chain-link fabric per ASTM F626. Bend ends of wire to minimize hazard to individuals and clothing.
  - 1. Maximum Spacing: Tie fabric to line posts at 12 inches on-center and to braces at 24 inches on-center.
- L. Fasteners: Install nuts for tension bands and carriage bolts on the side of the fence opposite the fabric side.
- M. Fabric:
  - 1. Do not install fabric until concrete post footings have cured seven (7) days. Provide fabric of the height specified. Install fabric on the public side of the fence, with bottom no greater than 1-inches above the ground surface. Fabric shall be pulled taut to prevent sagging and provide a uniform smooth appearance. Fasten fabric to line posts at intervals not exceeding 15-inches with ties as specified.
  - 2. Install tension wire in one continuous length between pull posts, weaved through fence fabric at top. Tension wire shall be applied to provide a wire without visible sag between posts. Fasten fabric to tension wire at intervals not exceeding 24-inches with ties or hog rings as specified.
  - 3. Where it is not practicable to conform the fence to general contour of the ground, as at ditches, channels, etc., the opening beneath the fence shall be enclosed with chain link fabric and sufficiently braced to preclude access, but not to restrict the flow of water.

### 3.6 GATE INSTALLATION

- A. Install gates according to manufacturer's written instructions, level, plumb, and secure for full opening without interference. Attach fabric as for fencing. Attach hardware using tamper-resistant or concealed means. Install ground-set items in concrete for anchorage. Adjust hardware for smooth operation and lubricate where necessary.
- B. Provide swing gates at the locations and dimensions shown on the Drawings. Do not install gates until concrete post footings have cured seven (7) days.
- C. Gates shall be installed plumb, level, and secure, with full opening without interference. Hardware shall be installed and adjusted for smooth operation and lubricated where necessary.
- D. Provide concrete center drop to footing depth and suitable drop rod sleeve at each leaf at center of double gate openings.

- E. **Gates shall not be able to swing over adjacent track surfacing. Gates shall open 180 degrees, fully so that gate leaf lies parallel to adjacent fence.**

### 3.7 GROUNDING AND BONDING

- A. Fence Grounding: Install at maximum intervals of 1,500 feet except as follows:
- B. Fences within 100 feet of buildings, structures, walkways, and roadways: Ground at maximum intervals of 750 feet.
1. Gates and Other Fence Openings: Ground fence on each side of opening.
  2. Bond metal gates to gate posts.
  3. Coordinate subparagraph below with Drawings in projects where intentional discontinuities are provided in metal fencing conductivity to localize lightning effects to the vicinity of strikes. See Evaluations.
  4. Bond across openings, with and without gates, except openings indicated as intentional fence discontinuities. Use No. 2 AWG wire and bury it at least 18 inches below finished grade.
- C. Protection at Crossings of Overhead Electrical Power Lines: Ground fence at location of crossing and at a maximum distance of 150 feet on each side of crossing.
- D. Plans and details on Electrical Drawings and requirements in Division 26 Sections may revise or illustrate application of requirement below or may require grounding that exceeds minimum requirements in IEEE C2. Fences enclosing electrical substations are often bonded to a station grounding mat.
- E. Fences Enclosing Electrical Power Distribution Equipment: Ground as required by IEEE C2 unless otherwise indicated.
- F. Grounding Method: At each grounding location, drive a grounding rod vertically until the top is 6-inches below finished grade. Connect rod to fence with No. 6 AWG conductor. Connect conductor to each fence component at the grounding location, including the following:
1. Make grounding connections to each barbed wire strand with wire-to-wire connectors designed for this purpose.
  2. Make grounding connections to each barbed tape coil with connectors designed for this purpose.
- G. Bonding Method for Gates: Connect bonding jumper between gate post and gate frame.
- H. Connections: Make connections to minimize possibility of galvanic action or electrolysis. Select connectors, connection hardware, conductors, and connection methods so metals in direct contact will be galvanically compatible.
1. Use electroplated or hot-tin-coated materials to ensure high conductivity and to make contact points closer in order of galvanic series.
  2. Make connections with clean, bare metal at points of contact.

3. Make aluminum-to-steel connections with stainless-steel separators and mechanical clamps.
  4. Make aluminum-to-galvanized-steel connections with tin-plated copper jumpers and mechanical clamps.
  5. Coat and seal connections having dissimilar metals with inert material to prevent future penetration of moisture to contact surfaces.
- I. Bonding to Lightning Protection System: If fence terminates at lightning-protected building or structure, ground the fence and bond the fence grounding conductor to lightning protection down conductor or lightning protection grounding conductor complying with NFPA 780.

### 3.8 FIELD QUALITY CONTROL

- A. Grounding-Resistance Testing: Engage a qualified testing agency to perform tests and inspections.
1. Grounding-Resistance Tests: Subject completed grounding system to a megger test at each grounding location. Measure grounding resistance no fewer than two full days after last trace of precipitation, without soil having been moistened by any means other than natural drainage or seepage and without chemical treatment or other artificial means of reducing natural grounding resistance. Perform tests by two-point method according to IEEE 81.
  2. Excessive Grounding Resistance: If resistance to grounding exceeds specified value, notify Architect promptly. Include recommendations for reducing grounding resistance and a proposal to accomplish recommended work.
  3. Report: Prepare test reports certified by a testing agency of grounding resistance at each test location. Include observations of weather and other phenomena that may affect test results.

### 3.9 ADJUSTING

- A. Gates: Adjust gates to operate smoothly, easily, and quietly, free of binding, warp, excessive deflection, distortion, nonalignment, misplacement, disruption, or malfunction, throughout entire operational range. Confirm that latches and locks engage accurately and securely without forcing or binding.
- B. Lubricate hardware and other moving parts.

### 3.10 DEMONSTRATION

- A. Engage a factory-authorized service representative to train Owner's personnel to adjust, operate, and maintain chain-link fences and gates.

**END OF SECTION 32 31 13**

## **SECTION 32 86 00 – ATHLETIC FIELD EQUIPMENT**

### **PART 1 GENERAL**

#### **1.1 RELATED DOCUMENTS**

- A. The Contractor, Subcontractors, and/or suppliers providing goods and services referenced in or related to this Section shall also be bound by the Related Documents identified in Division 01 Section "Summary."

#### **1.2 SUMMARY**

- A. Section includes:
  - 1. Purchase and installation of all fixed play field equipment and components.
  - 2. Purchase and delivery of all non-fixed play field equipment and components.

#### **1.3 RELATED WORK**

- A. Examine contract documents for requirements that affect work of this section. Other specification divisions and sections that directly relate to the work of this section include, but are not limited to:
  - 1. Division 03 - Concrete; Sections: Cast-in-Place Concrete
  - 2. Division 31 - Earthwork; Sections: Excavation and Backfill and Establishment of Sub-Grade Elevations
  - 3. Division 32 - Exterior Improvements; Sections: Athletic and Recreational Surfacing, Concrete and Asphalt

#### **1.4 REFERENCES**

- A. Reference herein to any technical society, organization, group or regulation are made in accordance with the following abbreviations and, unless otherwise noted or specified, all work under this Section shall conform to the latest edition as applicable.
- B. Code of Federal Regulations (CFR).
  - 1. 29 CFR 1926, Safety and Health Regulations for Construction.
- C. American Society of Testing and Material (ASTM).
- D. Connecticut Interscholastic Athletic Conference (CIAC).
- E. National Federation of State High Schools (NFHS)

#### **1.5 SUBMITTALS**

- A. Manufacturers Product Data
  - 1. Provide manufacturers product data prior to actual field installation work, for Engineer's and Owner's representatives review.
  - 2. Product Data: drawings including standard printed specifications and diagrams.
  - 3. Colors: Provide manufacturer's standard colors for selection by the Architect and Owner.



B. Shop Drawings

1. Provide drawings of the manufacturers recommended installation and foundation requirements prior to actual field installation work, for Architect's review.
2. Shop drawings including drawings depicting installation directions and dimensions for all sports equipment.
3. Material safety data sheets on all products, as necessary.

1.6 QUALITY ASSURANCE

- A. The Contractor shall only accept bids from those Vendors that have been pre-approved or identified as approved equal.
- B. Manufacturers warranties shall pass to the Owner and certification made that the product materials meet all applicable grade trademarks or conform to industry standards and inspection requirements.

1.7 PRODUCT DELIVERY AND STORAGE

- A. Materials delivered to the site shall be examined for damage or defects in shipping. Any defects shall be noted and reported to the Owners representative. Replacements, if necessary, shall be immediately re-ordered, so as to minimize any conflict with the construction schedule. Sound materials shall be stored above ground under protective cover or indoors so as to provide proper protection.

PART 2 PRODUCTS

2.1 SPORTS FIELD EQUIPMENT

- A. Furnish all sports field components as specified by these specifications and shown on the project drawings.
- B. Sports field equipment shall be provided with all necessary components and attachments to fully install systems. Attachment systems shall be in a color approved by the Owner and Engineer. The products must meet the NFHS AND CIAC regulations.

2.2 FOOTBALL/ SOCCER GOALS

- A. Provide one (1) complete set of Football Goal Uprights and Soccer Goals as manufactured by Sports Field Specialties, Inc. model GPKS20HSR or approved equal, includes:
  1. GP820COLPL Football Goal Post with 20' uprights and 8' offset single gooseneck
  2. SG2S Lockdown Safety System
  3. SG824R Soccer Goal
  4. SGWKL4 Levered soccer goal wheel kit, 4" round end frames
- B. Components:
  1. Football Goal Post:
    - a. Single Gooseneck Support
      - 1) Fabricated of 6" Schedule 40 Aluminum Pipe (6.625" O.D.), 5' Radius, 8' Offset
      - 2) Base Plate Mounting Kit

- b. Crossbar: Fabricated of 6" Schedule 40 Aluminum Pipe (6.625" O.D.)
    - 1) Width: 23'-4" inside dimension between uprights – High School
    - 2) Allowing for the adjustment of both the gooseneck/crossbar and upright/crossbar connections throughout the life of the football goal post ensuring proper alignment of all components.
    - 3) No exposed hardware on the face of the goal.
    - 4) Anti-vibration enhancements such as serrated washers and nyloc coated bolt ends.
  - c. Uprights: Fabricated of Extruded 6061-T6 Aluminum Tube (4"O.D.) with Rigid Wire Loop Welded to Upper End
    - 1) Length: 20'
    - 2) Powder Coated Finish: Yellow
  - d. Installation Package Consisting of the Following Components:
    - 1) Fixed Base Plate Mounting Kit
    - 2) Access Frame Kit + : 1/8" (0.125") for synthetic turf installation
    - 3) Aluminum Construction with Gasket Seal
    - 4) 1" PVC Drain Stub,
    - 5) Dimensions: 1'-2-1/2" H X 3'-4" Square
    - 6) Two (2) Half Moon Filler Plugs
    - 7) SG2S® Lockdown Safety System
  - e. Provide minimum 6 oz. container of touch up paint to match goal.
  - f. Provide all required mounting and installation hardware.
  - g. Goal posts shall be supplied with wind directional flags.
  - h. Each post shall include a package of ten (10) additional shear-pins and two (2) directional flags.
  - i. Goal post foundations shall be reinforced concrete formed using CMP. 4,000 psi concrete footing sized per manufacturers shop drawings.
  - j. Stamped and Sealed Drawings and Calculations by a Licensed Professional Engineer of Record in the State of Project Location
2. SG824R 8' x 24' Regulation Size Round Faced Soccer Goals:
- a. Top Crossbar Fabricated of 6061-T6 Extruded Aluminum Tube Having the Following Attributes:
    - 1) Length: 24' - Regulation Size
    - 2) 4.375" Square x 4.688" Round Faced Crossbar, 3/16" (.1875") Wall Thickness
    - 3) Enhanced Resistance to UV and Fade
    - 4) 3/16" (0.1875") Thick Formed Aluminum Channel Crossbar Attachment Brackets with Welded Tap Blocks, Mill Finish
  - b. One Piece End Frame Construction Fabricated of 6061-T6 Extruded Aluminum Tube Having the Following Attributes:
    - 1) 4.375" Square x 4.688" Round Faced Corner Post, 8'H, 3/16" (.1875") Wall Thickness
    - 2) Rolled Side Frame, 2" x 3" x 0.125" Thick Wall, TIG Welded to Corner Upright Posts
    - 3) Radius Backside Corners
    - 4) Super Durable Powder Coated White Finish with Enhanced Resistance to UV and Fade

- c. Rear Bottom Ground Bar Fabricated of 6061-T6 Extruded Aluminum Tube Having the Following Attributes:
    - 1) 2" x 2" x 0.25" Thick Wall with Welded ½" Aluminum End Plates
    - 2) Super Durable Powder Coated White Finish with
    - 3) Enhanced Resistance to UV and Fade
  - d. Included Accessories:
    - 1) Welded Aluminum Net Clips with Lifetime Guarantee
    - 2) 5mm Braided, Knotless White High Tenacity Polypropylene Soccer Net with Rope Bound Perimeter and 4" Square Mesh - 8.2'H x 24.4'L x 4.3'B x 8.6'D
    - 3) SG2S® Lockdown Safety System
    - 4) Model Specific Hardware Kit and Installation Instructions
  - e. Meet and Exceed Current ASTM F2950-14 Standard Safety and Performance Specification for Soccer Goals and F1938-98 Standard Guide for Safer Use of Movable Soccer Goals
  - f. Five (5) Year Limited Manufacturer's Product Warranty
3. Levered Soccer Goal External Wheel Kit compatible with soccer goal model SG824R having the following attributes:
- a. Removable lever with ribbed rubber grip to rotate wheel, one (1) per wheel
  - b. Retractable spring plunger to release wheel into playing position and to wheel into portable position
  - c. 8" semi-pneumatic swivel casters, 450 lb. capacity each
  - d. 7 ga. steel mounting brackets, powder coated finish
  - e. Quick release stainless pull pin with 12" lanyard for removal of assembly
  - f. Five (5) Year Limited Manufacturer's Product Warranty

## 2.3 GOAL POST PADDING

- A. Provide one (1) complete set for each football goal.
- B. Goal post pads shall be as manufactured by UCS, Inc., Aluminum Athletic Equipment, Sports Field Specialties, Inc, Gill, Sports Edge, or approved equal. Pads shall be a 6' in height, 6" thick split cylindrical urethane foam core fully encapsulated in a vinyl laminated polyester fabric to repel water, rot, mildew, UV light and shall further resist tears and abrasions that has a minimum weight of 19 oz per square yard. It shall have hook and loop closure strips and top and bottom tie cords to keep pads in place. Cover material shall be flame retardant.
- C. Color Red with black lettering to be selected by Engineer and Owner from manufacturer's standard colors. Provide imprinted logo on pad panels spelling "BERLIN".

## 2.4 INTERNATIONAL CORNER FLAGS

- A. Provide four, 60" tall x 1 1/2" O.D. PVC uprights, Steel spring base with weighted bases for synthetic turf.

- B. KwikGoal Universal Weighted Soccer Corner Flags SCG6B1104 as Manufactured and/or Supplied by: Sportsfield Specialties, Inc., (888) 975-3343, [www.sportsfieldspecialties.com](http://www.sportsfieldspecialties.com) or approved equal.

2.5 BALL SAFETY NETTING SYSTEM – ENDLINE

- A. Provide a complete 20' high ball netting system including, but not limited to, footings, sleeves, sleeve covers, permanent posts, removable netting (Athletic Equipment Alternate), and hardware.
- B. BSS420 StormGuard® Professionally Pre-Engineered 20' Straight Pole Break-Away Ball Safety Netting System and accessories as Manufactured and/or Supplied by: Sportsfield Specialties, Inc., (888) 975-3343, [www.sportsfieldspecialties.com](http://www.sportsfieldspecialties.com) or approved equal.

1. Components for system (Base Bid):

- a. Posts:
- 1) 4" O.D. (3.5" Schedule 40) Aluminum Pipe, 23'-6"L
  - 2) Standard Powder Coated Black Finish
- b. Ground Sleeves with Welded Base Plates:
- 1) 30" Ground Sleeves
  - 2) Aluminum Tube with Alignment Bolt
  - 3) 4,000 psi concrete footing sized per manufacturers shop drawings
- c. Stamped and Sealed Drawings and Calculations by a Licensed Professional Engineer of Record in the State of Project Location

2. Components for system (Athletic Equipment Alternate):

- a. Net with Perimeter Rope Binding:
- 1) Overall Dimensions: Refer to project drawings
  - 2) 1-3/4" Square Mesh
  - 3) #36 Black Nylon
  - 4) Sewn 1/4" Diameter Braided Rope Binding on Perimeter Edges
  - 5) Color: Black
- b. Accessories:
- 1) Stainless Steel and/or Galvanized Steel Assembly Hardware
  - 2) Fixed Welded Upper Tab and Adjustable Lower Bracket with Tensioned Vertical Slide Cable System
  - 3) Secure Snap Clips for Net Attachment
  - 4) 3/16" Diameter Galvanized Wire Rope Black Vinyl Coated to 1/4" Diameter
  - 5) Black Plastic Friction Fit Ground Sleeve Caps
  - 6) Model Specific Hardware Kit and Installation Instructions

## 2.6 BALL SAFETY NETTING SYSTEM – SIDELINES

- A. Provide a complete 10' high semi-permanent ball netting system including, but not limited to, footings, sleeves, sleeve covers, semi-permanent posts (Athletic Equipment Alternate), removable netting (Athletic Equipment Alternate), and hardware (Athletic Equipment Alternate).
- B. BSS210 10' High Ball Safety Netting System sleeves and accessories as Manufactured and/or Supplied by: Sportsfield Specialties, Inc., (888) 975-3343, [www.sportsfieldspecialties.com](http://www.sportsfieldspecialties.com) or approved equal.

### 1. Components for system (Base Bid):

#### a. Ground Sleeves with Welded Base Plates:

- 1) 24" Ground Sleeves, 2.625" O.D. (2.425" I.D.)
- 2) Aluminum Tube with Alignment Bolt
- 3) 4,000 psi concrete footing sized per manufacturers shop drawings

#### b. Stamped and Sealed Drawings and Calculations by a Licensed Professional Engineer of Record in the State of Project Location

### 2. Components for system (Athletic Equipment Alternate):

#### a. 10' High Ball Netting System Posts

- 1) 2.375" O.D. (2" Schedule 80) Aluminum Pipe, 12' L
- 2) Standard Powder Coated Black Finish

#### b. Net with Perimeter Rope Binding:

- 1) Overall Dimensions: Refer to project drawings
- 2) 1-3/4" Square Mesh
- 3) #36 Black Nylon
- 4) Sewn 1/4" Diameter Braided Rope Binding on Perimeter Edges
- 5) Color: Black

#### c. Accessories:

- 1) Stainless Steel and/or Galvanized Steel Assembly Hardware
- 2) Five (5) Fixed Welded 3/16" Aluminum Upper, Lower and Middle Pole Tabs
- 3) Secure Snap Clips for Net Attachment
- 4) 1/8" Diameter Galvanized Wire Rope Black Vinyl Coated to
- 5) 3/16" Diameter for Top and Bottom of Net Runs
- 6) Black Plastic Friction Fit Ground Sleeve Caps
- 7) Model Specific Hardware Kit and Installation Instructions

## 2.7 FACILITY USE SIGNAGE

- A. Facility Use Signage shall be shall be 24" x 36" or larger .063 Aluminum sign. Message shall be applied with durable 7-year vinyl graphics. Sign shall be white with red lettering in color. Sign shall be supplied with radius corners and 4 (3/16") mounting holes, Provide and install FOUR (4) signs and mounting hardware for mounting on existing fence.
- B. Sign shall include the facility name and generally the following:

### **VINCENT BISCOGLIO MEMORIAL FIELD**

#### **FIELD REGULATIONS**

ANY GROUP WISHING TO USE THE FIELD MUST OBTAIN A PERMIT BY  
CONTACTING THE PARKS AND RECREATION OFFICE AT (860) 828-7009

NO ALCOHOL, SMOKING/ TOBACCO PRODUCTS ON PREMISE

NO FOOD OR DRINKS (INCLUDING SPORTS DRINKS)

DRINKING WATER ONLY

NO SUNFLOWER SEEDS, CHEWING GUM

NO PETS

NO GOLF

NO BIKES, ROLLERBLADES, OR STROLLERS

NO MOTORIZED VEHICLES ON THE FIELD OR TRACK

NO FIREWORKS OR FLAMMABLE LIQUIDS

NO METAL CLEATS, SPIKES, OR SHOES WITH CLEATS/SPIKES REMOVED.

NO HIGH HEELS

NO CHAIRS, TENTS, OR STAGES ON TRACK OR FIELD

NO GLASS OR SHARP OBJECTS

ALL MATERIALS ARE TO BE CARRIED (NOT DRAGGED) ACROSS THE FIELD

NO DRIVING OF STAKES OR ANCHORS

NO SPECTATORS ON THE TRACK OR FIELD

PLEASE REMOVE ALL TRASH AND DEBRIS AFTER USE OF THE COMPLEX

PLEASE CONTACT THE BERLIN POLICE AT (860) 828-7080 TO REPORT  
INAPPROPRIATE USE OR VANDALISM

- C. Sign text shall be reviewed by Architect and Owner prior to manufacturing.
- D. Signs shall be mounted with nylon threaded nuts and bolts shall be cut flush to ensure safety of players and spectators.

## 2.8 SINGLE TIER PORTABLE ALUMINUM BENCH WITH BACKREST

- A. Provide four (4) complete 8' long single tier portable benches with backrests (Athletic Equipment Alternate).

- B. ATBBRPT8 8' long single tier portable benches with backrests and accessories as Manufactured and/or Supplied by: Sportsfield Specialties, Inc., (888) 975-3343, [www.sportsfieldspecialties.com](http://www.sportsfieldspecialties.com) or approved equal.
- C. Components:
  - 1. Portable Aluminum Team Bench with Back Rest:
    - a. Length: 8'
    - b. Fully Welded Frame Fabricated with 2" x 2" x 1/8" (0.125") Square Aluminum Tubing
      - 1) Durable Powder Coated Finish
      - 2) Weather Resistant and Unsusceptible to Rust
    - c. 8" and 10" Textured Aluminum Extrusion Seat and Backrest Planking Material
    - d. Weather Resistant and Unsusceptible to Rust
    - e. 100% Preamsembled; On-Site Assembly NOT Required
    - f. 5-Year Manufacturer's Limited Product Warranty

## 2.9 COMM BOX FOR SYNTHETIC TURF OR TRACK

- A. Provide electrical/communication boxes are shown on drawings within synthetic turf or track surfacing as appropriate.
  - 1. For Synthetic Turf Installation: Half ComBox CBIT1815 as Manufactured and/or Supplied by: Sportsfield Specialties, Inc., (888) 975-3343, [www.sportsfieldspecialties.com](http://www.sportsfieldspecialties.com) or approved equal
  - 2. For Asphalt at running track surfacing installation: Half ComBox CBBM1815 as Manufactured and/or Supplied by: Sportsfield Specialties, Inc., (888) 975-3343, [www.sportsfieldspecialties.com](http://www.sportsfieldspecialties.com) or approved equal
- B. Refer to project drawings for locations and base bid versus alternates.

## PART 3 EXECUTION

### 3.1 INSTALLATION OF SPORTS FIELD COMPONENTS

- A. Provide all materials and necessary labor for the complete installation of the equipment and padding.
- B. Install goal posts level, plumb and in proper alignment with the sports field marking.
- C. Install all bases, plates and rubbers as per manufacturer's instructions.
- D. Mount signs at locations determined by Landscape Architect and Owner.
- E. All athletic equipment shall be installed as recommended with manufacturer's written directions, and as indicated on the drawings.
- F. Hold top of concrete footings 6" below finished grade. Slope all tops of footings to drain.

END OF SECTION 32 86 00

## **SECTION 32 91 01 – TOPSOIL**

### **PART 1 - GENERAL**

#### **1.1 RELATED DOCUMENTS**

- A. The Contractor, Subcontractors, and/or suppliers providing goods and services referenced in or related to this Section shall also be bound by the Related Documents identified in Division 01 Section “Summary.”

#### **1.2 SUMMARY**

- A. This Section includes the following:
  - 1. Testing, amending, screening, placing and finish grading all stockpiled and borrow topsoil.
  - 2. Provide all borrow topsoil necessary to properly complete all lawn and planting operations.
- B. Related Sections include the following:
  - 1. Division 31 Section “Site Clearing”.
  - 2. Division 31 Section “Earth Moving”.
  - 3. Division 32 Section “Turf and Grasses”.

#### **1.3 QUALITY ASSURANCE**

- A. All work shall comply with all codes, rules, regulations, laws and ordinances for the Town, State of Connecticut, and all other authorities having jurisdiction.
- B. Topsoil:
  - 1. Testing: Representative samples of all stockpiled and borrow topsoil shall be completely analyzed/tested to determine:
    - a. Nutrient analysis using the Modified Morgan extractant for soil available P, K, Ca, and Mg.
    - b. Soil pH.
    - c. Organic content-determined by loss of weight on ignition.
    - d. Particle size analysis-sand, silt, and clay-analysis shall be determined using the hydrometer method of particle size analysis with size fractions based upon sized limits established by USDA.
    - e. Laboratory recommendations required for topsoil to achieve optimum nutrient levels for the establishment of lawn, trees and shrubs or special plantings (i.e. wetlands replication).
  - 2. Testing shall conform to “Recommended Soil Testing Procedures for the Northeastern United States”, Bulletin #493
  - 3. Before delivery of any borrow topsoil, furnish the Architect with a 5 gallon sample of material.
  - 4. Topsoil testing costs shall be borne by the Contractor.
  - 5. Testing laboratory shall be:  
Soil Nutrient Analysis Laboratory  
Department of Plant Science



University of Connecticut  
2019 Hillside Road, U-102  
Storrs, Ct 06269-1102

6. Contractor may submit a written request to utilize an alternate testing laboratory, to the Owner and Architect for approval. This request must include the qualifications of the proposed alternate laboratory. This laboratory may not be retained by the Contractor until written permission is received from the owner and Architect.

#### 1.4 SUBMITTALS

- A. Submit topsoil test results to the Architect for review. The Architect will be the sole judge of acceptability.
- B. 5-lb sample to the Architect for visual conformance confirmation.

#### 1.5 PRODUCT HANDLING

- A. Coordinate delivery of borrow topsoil such that it is placed as delivered and no stockpiling is required.

### PART 2 - PRODUCTS

#### 2.1 TOPSOIL

- A. Borrow Topsoil and/or Topsoil to be amended on-site
- B. Shall be a sandy loam, or fine loamy sand (per USDA Soil Classification index), with a minimum 50% sand content by weight not to contain materials harmful to plant life, to be clean, fertile, friable, and well draining. All topsoil to be free of any subsoil earth clods, sod, stones over 3/4" in any dimension, sticks, roots, weeds, litter and other deleterious material. Topsoil shall be uniform in quality and texture and contain organic matter and mineral elements necessary for sustaining healthy plant growth.
- C. Topsoil shall have the following optimum ranges unless otherwise approved by the Architect.
  1. Organic Matter Content: 3 – 7%
  2. Acidity range: pH 6.0 to pH 7.4
- D. Nutrient levels shall be achieved by the Contractor's addition of amendments to the topsoil to meet the optimum nutrient levels (or better) specified in the testing laboratory report.

#### 2.2 STOCKPILED TOPSOIL

- A. Stockpiled topsoil shall conform to all requirements of paragraph 2.1. All stockpiled topsoil material must be 1/2" screened to be used for project development.
- B. Provide amendments to stockpiled topsoil (organic material, sand, etc.) to produce topsoil in conformance with the Soil Nutrient Analysis Recommendations and project requirements.
- C. Waste products from screening operations are the property of the Contractor and shall be removed from the site at the Contractor's expense.

### PART 3 - EXECUTION

#### 3.1 SHAPING AT ALL NEW LAWN AREAS

- A. After rough grading has been completed, shape and grade lawn subgrade areas to lines and levels as noted on the drawings and as required based on total amounts of approved topsoil to allow placement of uniform depth of topsoil. Adjustments may be necessary due to field conditions. Provide all shaping adjustments at no additional cost to the Owner.
- B. Cultivate and loosen the subgrade soil to min. 18" depth with a subsoiler or other approved machinery to correct over-compaction.
- C. After shaping of lawn subgrades remove all sticks, stones, or foreign material one (1) inch or greater in dimension. Remove debris and stone off-site.

#### 3.2 TOPSOIL SPREADING

- A. **Do not apply topsoil to the prepared subgrade without approval by the Architect.** Once approved, no vehicular traffic will be allowed on finish subgrade. Topsoil will not be permitted to be spread until topsoil test reports have been submitted and approved. Topsoil shall not be delivered or worked in a frozen or muddy condition.
- B. Uniformly distribute and spread topsoil over all graded lawn areas to conform smoothly to the lines, grades, and elevations shown or otherwise required. If directed conduct field density tests to demonstrate friable subgrade conditions. All general lawn areas to have a minimum of 6" of topsoil after compaction. All approved stockpiled topsoil is to be spread unless otherwise directed by the Owner. Maintain consistent depths of material throughout the project area.
  - 1. Manually supply topsoil around all trees to remain. Avoid damage to root systems.
- C. Topsoil shall be spread in (2) equal lifts. Bottom lift shall be thoroughly mixed with the loosened subgrade by disking, harrowing, or other approved means, to a depth of 4 inches into the subgrade, to create a transition layer.
- D. Place topsoil only when it can be immediately followed by lawn development operations.
- E. Supply and replace topsoil to eroded, settled or damaged areas until all lawn areas are stabilized. Care shall be taken not to damage grass or pavement areas in the replacement to topsoil.

#### 3.3 PROTECTION

- A. Remove weeds prior to lawn development operations. No weeds shall be allowed to go to seed.
- B. Keep heavy equipment, trucks, etc. off areas that have received topsoil, at all times.
- C. If compaction occurs, scarify to the full depth of the topsoil and regrade topsoil.

#### 3.4 EXCESS TOPSOIL

- A. Excess topsoil material shall be transported by the Contractor to the Town owned site across the street.

**END OF SECTION 32 91 01**

## **SECTION 32 92 00 – TURF AND GRASSES**

### **PART 1 - GENERAL**

#### **1.1 RELATED DOCUMENTS**

- A. The Contractor, Subcontractors, and/or suppliers providing goods and services referenced in or related to this Section shall also be bound by the Related Documents identified in Division 01 Section “Summary.”

#### **1.2 SUMMARY**

- A. The work of this Section includes the following:
  - 1. Fine grading and preparing lawn areas.
  - 2. Furnishing and applying soil amendments.
  - 3. Furnishing and applying fertilizers.
  - 4. Seeding new lawns.
  - 5. Sodding new lawns.
  - 6. Furnishing and applying slope seed mixtures.
  - 7. Replanting unsatisfactory or damaged lawns.
  - 8. Maintenance of all lawns until acceptance.
- B. Related Sections include the following:
  - 1. Division 31 Section “Site Clearing”.
  - 2. Division 31 Section “Earth Moving”.
  - 3. Division 32 Section “Topsoil”.
  - 4. Division 32 Section “Plants”.
- C. The intent of this specification is to provide athletic fields that are high-performance, competition grade.

#### **1.3 DEFINITIONS**

- A. Form 817: “Standard Specifications for Roads, Bridges and Incidental Construction”, State of Connecticut, Department of Transportation, Form 817, 2016 edition, as amended.

#### **1.4 SUBMITTALS**

- A. General: Submit each item in this Article according to the Conditions of the Contract and Division 1 Specification Sections.
- B. Product data for the following:
  - 1. Fertilizers.
  - 2. Limestone.
  - 3. Chemical preservatives and controls – also confirm that each of the materials proposed to be applied are permitted for use by the State of Connecticut.

- C. Certification of grass seed from seed vendor for each grass-seed mixture and sod grown stating the botanical and common name and percentage by weight of each species and variety, and percentage of purity, germination, and weed seed. Include the year of production and date of packaging. Submit topsoil test of sod source to determine compatibility of sod material with project topsoil (borrow & stockpiled).
- D. Seed labels from actual bags/containers of the seed mix at the time of seeding.
- E. Qualification data for firms and persons specified in the "Quality Assurance" Article to demonstrate their capabilities and experience. Include lists of completed projects with project names and addresses, names and address of Architects and Owner, and other information specified.
- F. Material test reports from qualified independent testing agency indicating and interpreting test results relative to compliance of the following materials with requirements indicated.
  - 1. Analysis of existing surface soil.
  - 2. Analysis of imported topsoil.
- G. Planting schedule indicating anticipated dates and locations for each type of seeding or sodding.
- H. Maintenance instructions recommending procedures to be established by Owner for maintenance of lawns during an entire year. Submit before expiration of required maintenance periods.
- I. The Contractor must include, in the Schedule of Values, a separate line item for "Maintenance of Lawns". This item will include all costs assigned by the Contractor, for the expenditure of labor and materials anticipated from the time of lawn establishment, until acceptance.

#### 1.5 QUALITY ASSURANCE

- A. Installer Qualifications: Engage an experienced Installer who has completed lawn development work similar in material, design, and extent to that indicated for this Project and with a record of successful grass establishment.
  - 1. Installer's Field Supervision: Require Installer to maintain an experienced full-time supervisor on the Project site during times that grass planting is in progress.
  - 2. Athletic field contractors must have completed 5 athletic fields in the past three (3) years, similar to the design and materials specified herein.
- B. Examine work to receive lawn development and notify the Architect of any defects. Specifically review the topsoil placement (depths, grades, and condition). Commencement of this work implies acceptance by Contractor of preparatory work by others.
- C. Pre-installation Conference: Conduct conference at Project site to comply with requirements of Division 01 Section "Project Meetings".

#### 1.6 DELIVERY, STORAGE, AND HANDLING

- A. Seed, Fertilizer and Lime: Deliver in original sealed, labeled, and undamaged containers, showing weight, analysis, and name of manufacturer.

- B. Sod: Harvest, deliver, store, and handle sod according to the requirements of the American Sod Producers Association's (ASPA) "Specifications for Turfgrass Sod Materials and Transplanting/Installing."
- C. Protect materials from deterioration during delivery and while stored at site.

#### 1.7 GUARANTEE

- A. Duration of guarantee shall be until the completion of the specified maintenance period and until Owner's final acceptance of all lawn areas.

#### 1.8 CHEMICAL CONFORMANCE

- A. All chemical applications shall conform to the State of Connecticut statutes and City Integrated Pest Management (IPM) plans.
- B. Contractor shall provide all necessary data and information to the Owner for amending or filing an IPM plan, including, but not limited to proposed chemicals and EPA number, applicator name and license number, and proposed application dates.
- C. All fertilizer, pesticide and herbicide applications must conform to the City IPM, or in the absence thereof, must conform to the regulations of the State of Connecticut, in addition to any and all conditions listed in Division 1, Section "Project Environmental Permits" of this Specification.

### PART 2 - PRODUCTS

#### 2.1 SEED

- A. Grass Seed: Fresh, clean, dry, new-crop seed complying with the Association of Official Seed Analysts' "Rules for Testing Seeds" for purity and germination tolerances.
  - 1. Seed Mixture: Provide seed of grass species and varieties, proportions by weight, and minimum percentages of purity, germination, and maximum percentage of weed seed as indicated.
- B. Provide fresh, clean, new -crop seed; blue tag certified complying with the tolerance for purity and germination established by the Office of Seed Analysis of North America. Provide seed of the grass species, proportions and maximum percentages of weed seed.
- C. Provide seed in cleaned, sealed, properly labeled containers. Seed that is wet, moldy, or otherwise damaged will not be accepted. Handle seed to manufacturer recommendations for exposure to extremes of heat, cold, or moisture.
- D. Lawn Seed Quality:
  - 1. Weed Seed: maximum of 0.50%, no noxious weed seed.
  - 2. Purity: minimum of 97% pure.
  - 3. Crop: maximum 0.50%
  - 4. Germination Rate: minimum 85%.

E. Mixture for General Lawn Areas:

TYPE OF SEED	PERCENT BY WEIGHT
Perennial Ryegrass	30%
50% Manhattan	
50% Saturn	
Fine leaf or Creeping Fescue	30%
50% Pennlawn	
50% Jamestown II	
Kentucky Bluegrass	40%
50% Glade	
50% Cobart	

2.2 SLOPE SEED MIX

Refer to Form 817, Section M.13.04.

2.3 SOD (if used)

- A. Sod: Certified turfgrass sod minimum two years' old, complying with ASPA specifications for machine-cut thickness, size, strength, moisture content, and mowed height, and free of weeds and undesirable native grasses. Provide viable sod of uniform density, color, and texture of the following turfgrass species, strongly rooted, and capable of vigorous growth and development when planted. Pad thickness 3/4" (+1/4"), excluding thatch and top growth. Minimum size: 9 SF/piece.
1. Species: Provide sod of grass species and varieties, proportions by weight, and minimum percentages of purity, germination, and maximum percentage of weed seed as indicated on Schedules at the end of this Section.
  2. Sod to be harvested from field, which is comprised of a "sandy loam" or "loamy sand" classification of soil.

2.4 LIME

- A. ASTM C 602, class T, agricultural ground limestone containing a minimum 50 percent total oxides (calcium oxide plus magnesium oxide), with a minimum 50 percent passing a 100 mesh sieve, and 98% passing a 20-mesh sieve, for powder form of lime.
1. Provide lime in the form of dolomitic limestone.

2.5 FERTILIZER

- A. Phosphorus: Commercial, soluble; guaranteed analysis of 0-46-0.
- B. Starter Fertilizer: Commercial-grade complete fertilizer of neutral character, consisting of fast release water soluble nitrogen, derived from natural organic sources of urea ammonium phosphate, or similar material.

1. Composition: Nitrogen, phosphorous, and potassium in amounts recommended in soil reports from a qualified soil-testing agency, 14.28.14 guaranteed analysis.
- C. Secondary-Fertilizer: Granular fertilizer consisting of 50 percent water-insoluble nitrogen, phosphorus, and potassium with guaranteed analysis of 15.15.15.
- D. Tertiary Fertilizer: guaranteed analysis of 46-0-0.

## 2.6 MULCHES

- A. Straw Mulch: Provide air-dry, clean, mildew-and seed-free, salt hay or threshed straw of wheat, rye, oats, or barley.
- B. Peat Mulch: Provide peat moss in natural, shredded, or granulated form, of fine texture, with a pH range of 4 to 6 and a water-absorbing capacity of 1100 to 2000 percent.
- C. Fiber Mulch: Biodegradable dyed-wood cellulose-fiber mulch, nontoxic, free of plant growth or germination inhibitors, with maximum moisture content of 15 percent and a pH range of 4.5 to 6.5.
- D. Nonasphaltic Tackifier: Colloidal tackifier recommended by fiber-mulch manufacturer for slurry application, nontoxic and free of plant growth or germination inhibitors.

## 2.7 EROSION CONTROL MATERIALS

- A. Material shall be a lightweight, nonwoven erosion control/revegetation blanket comprised primarily of virgin wood fiber. The blanket shall be manufactured by blending thermal mechanically – defibrated wood fiber with a small percentage of recycled synthetic fibers and forming them into a drapeable blanket. An accelerated photodegradable polypropylene netting shall be laminated to the surfaces of the blanket.
- B. Material shall be similar to “Futerra”, as manufactured by Conwed Fibers of Statesville, North Carolina, or approved equal.

## 2.8 SALT MARSH HAY

- A. Naturally harvested salt marsh hay, certified weed free.

## 2.9 CHEMICAL PREVENTATIVE AND CONTROLS

- A. Commercial materials labeled for turf maintenance, State of Connecticut and EPA registered and approved for turf application.

## 2.10 WATER

- A. Potable: The Contractor is responsible for furnishing all water necessary to complete the establishment and maintenance of lawns until acceptance by Owner. This requirement includes providing all water for irrigated lawn areas, if any, until the irrigation system is activated.

## PART 3 - EXECUTION

### 3.1 EXAMINATION

- A. Examine areas to receive lawns and grass for compliance with requirements and for conditions affecting performance of work of this Section. Do not proceed with installation until unsatisfactory conditions have been corrected.

### 3.2 COORDINATION AND SCHEDULING

- A. Planting Season: Sow lawn seed and install sod during normal planting seasons for type of lawn work required. Correlate planting with specified maintenance periods to provide required maintenance from date of Substantial Completion.
- B. Weather Limitations: Proceed with planting only when existing and forecast weather conditions are suitable for work.
- C. Construct lawns between August 15 and October 1, unless otherwise approved.
- D. Examine areas to receive seeding or sod and notify Architect of any problems prior to commencing work. Specifically review the topsoil placement (depths, grades and conditions). Commencement of this work implies acceptance by Contractor of preparatory work of others.

### 3.3 PREPARATION

- A. Protect structures, utilities, sidewalks, pavement, and other facilities, trees, shrubs, and plantings from damage caused by lawn and athletic field development operations.
  - 1. Protect adjacent and adjoining areas from hydroseed overspraying.
- B. Provide erosion control measures to prevent erosion or displacement of soils and discharge of soil bearing water runoff or airborne dust to adjacent properties and walkways.

### 3.4 TOPSOIL PREPARATION - GENERAL

- A. Apply lime, and phosphorus at the rates recommended by the topsoil tests in all areas where topsoil has been installed. Cultivate topsoil to its full depth by scarifying or other disking methods to thoroughly incorporate amendments into the topsoil. Maintain a loose friable seed bed. At no time will rubber tired loaders or graders having greater compaction than a small farm tractor be allowed on topsoil. Keep all heavy equipment and trucks off prepared topsoil. Do not prepare while ground is wet or frozen.
- B. Provide additional topsoil where and as required to properly meet all proposed finish grades.
- C. Remove any weeds, debris, foreign matter and stones having any dimension greater than 3/4 inch. Remove from property.
- D. Fine grade to a smooth uniform surface. The entire area shall present an even grade with no depressions where water will stand. Any protective fencing around existing trees shall be removed and disposed of by the Contractor at this time. Topsoil shall be smoothly blended to



existing finish grades around erosion control devices and adjacent existing conditions, maintain existing surface drainage patterns. Round-off all top and toe of slopes. Reinstall erosion control devices and protective fencing as required.

- E. **Approval of surface by Architect shall be obtained before seeding or sodding operations begin.** Where directed, perform bulk density and nuclear compaction readings to monitor degree of soil compaction/seed bed friability.

### 3.5 LAWN DEVELOPMENT

- A. General: All disturbed areas not developed otherwise shall be developed as lawn as indicated on the Drawings and as specified.

### 3.6 SEEDING GENERAL LAWN AREAS

- A. Ensure that the soil has been prepared in accordance with Topsoil Paragraph of this Section. All disturbed areas not developed otherwise shall be developed as lawn.
- B. Seeding shall be done when wind does not interfere with uniform distribution of hydroseeding mixture.
- C. Sow seed at following rates:
  - 1. Seeding Rate: 5 lb per 1000 sq. ft.
- D. Hydroseeding of general lawn areas, only, is permitted. Mix specified seed, fertilizer, and maximum 10% of fiber mulch in water, using equipment specifically designed for hydroseed application. Continue mixing until uniformly blended into homogenous slurry suitable for hydraulic application.
  - 1. Mix slurry with non-asphaltic tackifier.
  - 2. Apply slurry uniformly to all areas to be seeded in a 2-step process. Apply first slurry application at the minimum rate required to obtain specified seed-sowing rate.
  - 3. Apply second slurry cover coat of fiber mulch at a rate of 1000 pounds per acre.

### 3.7 SODDING NEW LAWNS

- A. Lay sod within 24 hours of stripping. Do not lay sod if dormant or if ground is frozen. The prepared soil shall be watered within 12-24 hours prior to laying the sod. Sod should not be laid on soil that is dry and powdery.
- B. Lay sod in straight lines to form a solid mass with tight joints. Butt ends and sides of sod; do not stretch or overlap. Stagger sod strips or pads to offset joints in adjacent coursed. Avoid damage to subgrade or sod during installation. Tamp and roll lightly to ensure contact with subgrade, eliminate air pockets, and form a smooth surface. Work sifted soil of fine sand into minor cracks between pieces of sod; remove excess to avoid smothering sod and adjacent grass. Provide full pieces on all perimeter edges.
  - 1. Lay sod across angle of slopes exceeding 1:3.
  - 2. Anchor sod on slopes exceeding 1:5 with wood pegs spaced as recommended by sod manufacturer but not less than 2 anchors per sod strip to prevent slippage.

- C. Saturate sod with fine water spray within 2 hours of planting. During first week, water daily or more frequently as necessary to maintain moist soil to a minimum depth of 1-1/2 inches below the sod.

### 3.8 EROSION PREVENTATIVES

- A. Install erosion control material on all seeded slopes one foot (1') vertical to three (3) feet horizontal or steeper, or any seeded areas which receive concentrated run-off water, and areas as required by the Architect or Owner. Joints in these materials shall overlap no less than one foot (1') and the material shall be secured as recommended by the manufacturer.

### 3.9 WATERING LAWN AREAS

- A. Maintain a moist seed and sod bed at all times. Water seedbed daily with 1/4" water/day using three sets, keeping the surface moist. Apply complete coverage to insure proper germination/root growth conditions. Maintain soil moisture at or near field capacity during the period of germination and seeding development.
- B. Protect all lawn areas with barricades, if necessary, to keep all traffic off the area. Repair all damage to lawn areas including topsoil replacement, at no additional cost to Owner.
- C. Adjust watering requirement as required at request of Owner and after a full ground cover has been achieved.

### 3.10 MAINTENANCE

- A. Begin maintenance of lawns immediately after each area is planted and continue until lawn is accepted, but for not less than the following periods.
  - 1. Seeded Lawns: 60 days after date of first mowing, and after a minimum of 5 mowings;
  - 2. Sodded Lawns: 45 days after date of first mowing, and a minimum of 3 mowings;
  - 3. When full maintenance period has not elapsed before end of growing season, or if lawn is not fully established at that time, continue maintenance during the next growing season.
- B. Maintain and establish all lawns by watering, fertilizing, weeding, mowing, trimming, replanting bare or eroded areas and redress to produce a uniformly smooth lawn.
- C. Replant bare areas with same materials specified for lawns.
- D. Add new mulch in areas where mulch has been disturbed sufficiently to nullify its purpose. Anchor as required to prevent displacement.
- E. Crabgrass and broadleaf weed control.
  - 1. General: Treat all lawn areas with crabgrass or broadleaf weed control in conformance with manufacturer's recommendations as required (after diagnosis of weed/crabgrass presence) and in conformance with all State and Local regulations.
  - 2. Time: Conform to the manufacturer's recommendations.
  - 3. Rate: Conform to the manufacturer's recommendations.

F. Disease Control

1. General: Treat any diseased lawn areas with disease control in conformance with the manufacturer's recommendations as required (after diagnosis of disease organisms) and in conformance with all State and Local regulations.
2. Time: Conform to the manufacturer's recommendations.
3. Rate: Conform to the manufacturer's recommendations.

G. Mow lawns as soon as there is enough top growth to cut with reel mower set at mowing height of 1-1/2" (bench height). Repeat mowing as required to maintain specified height without cutting more than 30 percent of the grass height on maximum 5 day interval. Remove no more than 30 percent of grass-leaf growth in initial or subsequent mowings. Do not mow when grass is wet. Schedule mowing when grass attains a 2" height. Subsequent mowing to maintain following grass height. Subsequent mowings to maintain following grass height.

1. Mow grass from 1-1/2 to 2 inches high.
2. Maintain reel blade and bed knife in sharp condition and evenly matched to provide a clean cut.

H. Secondary Fertilization: Apply secondary fertilization to entire lawn and athletic field areas two (2) weeks after seeding.

I. Tertiary Fertilizations: Apply three (3) tertiary fertilizations at two week intervals (4, 6, and 8 weeks after seeding) to entire lawn and athletic field areas.

3.11 EXISTING LAWN RENOVATION

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

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

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

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

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

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

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

G. Till stripped, bare and compacted areas thoroughly to a soil depth of 12 inches.

H. Apply soil amendments and initial fertilizers required for establishing new lawns and mix thoroughly into top 6 inches of existing soil. Provide new planting soil to fill low spots and meet finish grades.

- I. Apply seed and protect with straw mulch as required for new lawns.
- J. Water newly planted areas and keep moist until new lawn is established.

### 3.12 ACCEPTABLE LAWNS

- A. The Architect shall inspect all work for acceptance of lawns upon written request of the Contractor. The request shall be received at least 10 days before the anticipated date of inspection.
  - 1. Lawn areas will not be accepted in “pieces”, unless specifically agreed to by the Owner.
  - 2. If the lawn is in acceptable condition, the Contractor’s maintenance responsibility will end. If, in the opinion of the Architect, the grass stand is unacceptable, the Contractor’s complete maintenance responsibilities shall continue until an acceptable stand of grass is achieved.
- B. All lawns will be considered eligible for inspection and acceptance provided all requirements, including maintenance, have been met and a healthy, uniform, dense stand of grass is established, free of weeds, bare spots and surface irregularities, with coverage exceeding 90 percent over any 5 square feet selected by the Architect. The Architect will be the sole judge of acceptability. Lawns must be free of weeds, crabgrass, and other undesirable plants, with no disease present. Sodded lawns shall be free of open joints and uneven surfaces. Acceptance will not be made until all damaged areas, including areas outside the property limits, have been restored to original conditions.
- C. Prior to acceptance of athletic fields, the Contractor shall perform a 6 inch deep core aeration. Allow the cores to dry, drag the cores, and topdress with a one-quarter inch depth of sand to all athletic field areas. Contractor must request a meeting with the Architect to establish specific timing of this operation.
- D. In no case will any lawns be accepted prior to Substantial Completion of the overall project.
- E. Replant lawns that do not meet requirements and continue maintenance until lawns are satisfactory. Upon stabilization of lawn areas, remove erosion control devices and protective fencing. Reseed bare areas as required.

### 3.13 WINTERIZATION

- A. At the end of the growing season, prior to the on-set of Winter, all newly-seeded areas, open earthen areas, or stockpiled earth materials, must be protected from erosion. This protection must form a continuous blanket over these areas. Protection may be:
  - 1. a hydro-seed mulch with a non-asphaltic tackifier, or;
  - 2. straw mulch spread uniformly at a rate of 2 tons per acre to form a continuous blanket 1-1/2 inches in loose depth over the areas with a slope not exceeding 1:6.

### 3.14 CLEANUP AND PROTECTION

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

- B. Erect barricades and warning signs as required to protect newly planted areas from traffic, vandalism, and unauthorized use. Maintain barricades throughout maintenance period until lawn is established and accepted by the Owner.

### 3.15 LAWN MATERIAL INSTALLATION

- A. Lawns: Provide materials in not less than the following quantities:
  - 1. Weight of lime per 1000 sq. ft: as per topsoil test report.
  - 2. Weight of phosphorous per 1000 sq. ft.: as per topsoil test report.
  - 3. Weight of commercial fertilizer per 1000 sq. ft.: as per topsoil test report.
  - 4. Cellulose Pulp 'Fiber: 32# /1,000 SF.
  - 5. Grass Seed: 130 lbs/acre.
  - 6. Starter Fertilizer: 310 lbs./acre.
  - 7. Secondary Fertilizer: 300#/acre.
  - 8. Tertiary Fertilizer 50#/acre, providing 22# of nitrogen/acre.

END OF SECTION 32 92 00

## **SECTION 33 46 16 FIELD SUBDRAINAGE SYSTEM**

### **PART 1 GENERAL**

#### **1.1 SUMMARY**

**A. Section includes:**

1. This section outlines steps required for grading, testing of the existing stone field base, and drainage prior to new turf installation.
2. Specification also outlines installation of a full depth multi-component synthetic field aggregate base system on top of a prepared subgrade and perimeter collector drains, if required.
3. Testing, Inspections, monitoring, and reporting.

**B. Contractor shall coordinate work between all Contractors, sections, and trades required for the proper completion of the work.**

**C. Contractor is responsible for all health and safety.**

#### **1.2 REFERENCES**

**A. Reference herein to any technical society, organization, group or regulation are made in accordance with the following abbreviations and, unless otherwise noted or specified, all work under this Section shall conform to the latest edition as applicable.**

**B. Code of Federal Regulations (CFR).**

1. 29 CFR 1926, Safety and Health Regulations for Construction.

**C. Commonwealth of Massachusetts**

1. Standard Specifications for Highways and Bridges, Massachusetts Highway Department

**D. American Association of State High and Transportation Officials (AASHTO).**

1. AASHTO M252 - Standard Specification for Corrugated Polyethylene Drainage Pipe

**E. American Society for Testing and Materials (ASTM)**

1. ASTM C88 - Test Method for Soundness of Aggregates by Use of Sodium Sulfate or Magnesium Sulfate.
2. ASTM C131 - Standard Test Method for Resistance to Degradation of Small-Size Coarse Aggregate by Abrasion and Impact in the Los Angeles Machine.
3. ASTM D422 - Standard Test Method for Particle Analysis of Soils.
4. ASTM D1557 - Standard Test Methods for Laboratory Compaction Characteristics of Soil Using Modified Effort (56,000 ft-lbf/ft<sup>3</sup>(2,700 kN-m/m<sup>3</sup>)).
5. ASTM D2434 - Standard Test Method for Permeability of Granular Soils (Constant Head).
6. ASTM D2922 - Standard Test Methods for Density of Soil and Soil-Aggregate in Place by Nuclear Methods (Shallow Depth).

7. ASTM D3212 - Standard Specification for Joints for Drain and Sewer Plastic Pipes Using Flexible Elastomeric Seals.
  8. ASTM F1551/EN 12616 - Standard Test Method for Comprehensive Characterization of Synthetic Turf Playing Surfaces and Materials
  9. ASTM D3786 - Standard Test Method for Bursting Strength of Textile Fabrics-Diaphragm Bursting Strength Tester Method.
  10. ASTM D4355 - Standard Test Method for Deterioration of Geotextiles by Exposure to Light, Moisture and Heat in a Xenon Arc Type Apparatus.
  11. ASTM D4491 - Standard Test Methods for Water Permeability of Geotextiles by Permittivity.
  12. ASTM D4533 - Standard Test Method for Trapezoid Tearing Strength of Geotextiles.
  13. ASTM D4632 - Standard Test Method for Grab Breaking Load and Elongation of Geotextiles.
  14. ASTM D4833 - Standard Test Method for Index Puncture Resistance of Geotextiles, Geomembranes, and Related Products.
  15. ASTM D4751 - Standard Test Method for Determining Apparent Opening Size of a Geotextile.
  16. ASTM D7001 - Standard Specification for Geocomposites for Pavement Edge Drains and Other High-Flow Applications.
- F. Fédération Internationale de Football Association (FIFA)
1. EN 13036 – Surface Planarity/Surface Regularity

### 1.3 SUBMITTALS

- A. Sampling and Testing Laboratory: Submit name and qualifications of commercial sampling and testing laboratory for Landscape Architect's approval.
- B. Testing Agency: Submit name and qualifications of third-party in-field quality control Testing Agency for Landscape Architect's approval.
- C. Surveyor: Submit name and qualifications of Professional Land Surveyor who will be responsible for layout and verification of the work of this Section.
- D. Product Data: Submit manufacturer's product data demonstrating compliance with this specification. Include manufacturer's written instructions for each product.
  1. Flat Panel Drain
- E. Confirmation of Acceptance, Design: Submit a signed written statement signed by the manufacturer of the synthetic grass surfacing system confirming that:
  1. The field subdrainage system design meets the requirements of the synthetic grass surfacing manufacturer and the that if the system is constructed as designed there will be no conflicts with the conditions of the warranty.

- F. Material Testing Data: Submit for approval test results for all material testing performed under the Article “Testing, Pre-Construction” herein. Failure to submit testing results shall in no way relieve Contractor from his obligation to meet the performance requirements of the field subdrainage system in all regards.
1. Material testing data shall be no older than twelve (12) months from proposed material placement date. Testing data older than twelve (12) months will be rejected.
- G. Pre-Construction drainage testing: Submit for approval test results for all drainage testing performed under the Article “Testing, Pre-Construction” herein. Failure to submit testing results shall in no way relieve Contractor from his obligation to meet the performance requirements of the field subdrainage system in all regards.
- H. Samples
1. Submit for approval samples of proposed materials. Failure to submit samples shall in no way relieve Contractor from his obligation to meet the performance requirements of the field subdrainage system in all regards. Submit the following:
    - a. Flat Panel Drains: Submit 12-inch-long product sample.
    - b. Field Base, Bottom Stone: Deliver to the Project Site one 5-gallon bucket of material in an air-tight container. Provide sample within 10 days of contract award. Sample shall be accompanied by adequate labelling indicating project name, source of supply, and identified as “Field Base, Bottom Stone”.
    - c. Field Base, Top Stone: Deliver to the Project Site one 5-gallon bucket of material in an air-tight container. Provide sample within 10 days of contract award. Sample shall be accompanied by adequate labelling indicating project name, source of supply, and identified as “Field Base, Top Stone”.
    - d. Collector Pipe Stone, Bottom Stone: Deliver to the Project Site one 5-gallon bucket of material in an air-tight container. Provide sample within 10 days of contract award. Sample shall be accompanied by adequate labelling indicating project name, source of supply, and identified as “Collector Pipe Stone, Bottom Stone”.
- I. Material Certificates: Submit certificates for Bottom Stone, Top Stone, and Collector Pipe Stone materials signed by material producer and Contractor, certifying that each material delivered to the project complies with, or exceeds the requirements specified herein.
- J. Quality Control Testing Results
1. Submit results of all test results performed under Article 1.5 and 1.6 “Testing, Quality Control During Construction” herein. Provide copies of all Testing Agency reports.
  2. Failure to submit quality control testing results shall in no way relieve Contractor from his obligation to meet the performance requirements of the field subdrainage system in all regards.



- K. Confirmation of Acceptance, Completed Base: Submit a signed written statement signed by the manufacturer of the all-weather grass surfacing materials and countersigned by the synthetic grass surfacing and resilient pad materials installers (if different), confirming that:
  - 1. Based on the Progress Survey and visual inspections, all applicable areas and surfaces are satisfactory for the installation of the synthetic grass surfacing system
  - 2. No conditions exist that conflict with the synthetic grass surfacing system warranty requirements.

#### 1.4 DELIVERY, STORAGE AND HANDLING

- A. All deliveries are to be scheduled to avoid school drop-off and pick-up activities. No deliveries shall be allowed to enter the site during these times.
- B. Drainage Stone
  - 1. Schedule delivery to minimize on-site storage. Segregate differing stone materials and prevent from contamination with other materials.
  - 2. Coordinate procurement of stone with the sampling and in-field testing required herein.
- C. Geotextiles
  - 1. Follow geotextile manufacturer's recommendations for packaging, transportation, and delivery to ensure materials are not damaged. Furnish the geotextile fabric in a wrapping that protects the fabric from ultraviolet radiation and from abrasion due to shipping and hauling.
  - 2. Geotextile shall be stored on a prepared surface (not wooden pallets) and should not be stacked more than two rolls high. Storage shall be such that the geotextile is protected from puncture, dirt, grease, water, moisture, mud, mechanical abrasions, excessive heat or cold, or other damaging circumstances. Temporary storage at the Project Site shall be away from standing water such that crushing or flattening of roll goods does not occur.
- D. Piping and Drains
  - 1. Manufacturer shall package the pipe and other drainage materials in a manner designed to deliver the pipe to the Project Site neatly, intact, and without physical damage. Transportation carrier shall use an appropriate method to ensure the pipe is properly supported, stacked, and restrained during transport. Inspect materials delivered to site for damage; store with minimum of handling.
  - 2. Unloading of the pipe and other drainage materials should be controlled so as not to collide with the other pipe sections or fittings, and care should be taken to avoid chipping or spalling, especially to the spigots and bells. For manhole sections, cone sections, bases, fittings and other precast appurtenances, utilize lifting holes or lifting eyes provided.
  - 3. In cold weather conditions, use caution to prevent impact damage. Handling methods considered acceptable for warm weather may be unacceptable during cold weather.
  - 4. Storage: Store materials on site in enclosures or under protective coverings. Do not store materials directly on the ground. Keep inside of pipes and fittings free of dirt and debris.

## 1.5 QUALITY ASSURANCE

- A. Use adequate numbers of skilled workmen who are thoroughly trained and experienced in the necessary crafts and who are completely familiar with the specified requirements and the methods needed for proper performance of the work of this Section.
- B. Landscape Architect reserves the right to perform all in-field testing specified in this Section and reserves the right to determine the suitability of all materials to be used for in the work, and to reject any material not meeting these specifications.
- C. Sampling and Testing Laboratory: The Sampling and Testing Laboratory shall be a qualified commercial entity with a documented track-record of conducting sampling and laboratory testing in support of construction projects. Once approved, the Sampling and Testing Laboratory shall not be changed without Landscape Architect's approval.
- D. Testing Agency: The Testing Agency shall be a qualified commercial entity with a documented track-record of performing in-field testing and inspection services. The Sampling and Testing Laboratory may provide the services of the Testing Agency provided it meets the qualifications to do so. Once approved, the Testing Agency shall not be changed without Landscape Architect's approval.
- E. Surveyor: Engage a Land Surveyor licensed as a Professional Land Surveyor (PLS) in the state where the project is located to perform layout and verification of the work of this Section.
- F. Material Certificates: Materials Certificates certify that the materials furnished conform to all applicable requirements of the Contract Documents. Materials Certificates shall be signed by a duly authorized and responsible agent for the organization supplying the material. Contractor shall be responsible for any testing, Materials Certificates, and inspections required. Materials Certificates shall also include the following information:
  - 1. Project for which the material has been consigned.
  - 2. Name of Contractor to which material is supplied.
  - 3. Item number and description of material.
  - 4. Quantity of material represented by the certificate.
  - 5. Means of identifying the consignment, such as label, marking, lot numbers, etc.
  - 6. Date and method of shipment

- 1.6 The field subdrainage system, stone base, anchor curbing, and permanently installed amenities within the field shall be guaranteed by the Contractor for a period of two (2) years from the date of Substantial Completion. The field subdrainage system, stone base, anchor curbing, and permanently installed amenities shall remain free from defects or deterioration, movement or shifting, changes in planarity, and changes in drainage capabilities. Any remediation required to field base items shall be at the Contractors expense, including all work above the base necessary to make such repairs.

## 1.7 TESTING, PRE-CONSTRUCTION

- A. All pre-construction sampling/testing shall be the responsibility of Contractor. Contractor shall retain and pay for the services of a third-party Sampling and Testing Laboratory and/or Testing Agency to perform all sampling/testing services in accordance with applicable standards and these specifications.
- B. Material Testing. (only submit on products proposed to be used)
  - 1. Provide testing data for the following:
    - a. Field Base, Bottom Stone
    - b. Field Base, Top Stone
    - c. Collector Pipe Stone, Bottom Stone
  - 2. Testing parameters:
    - a. Moisture-Dry Density Curve (Proctor Test-Modified): ASTM D1557
    - b. Gradation: ASTM D422
    - c. Resistance to Abrasion: ASTM C131
    - d. Soundness: ASTM C88
    - e. Chemical Testing: Contractor shall conduct chemical testing to demonstrate that such material is free of oils, hazardous materials, or other organic and non-organic constituents which may be considered contaminants. For each type/classification and source of earth material proposed, submit a letter signed by an authorized representative of the material supplier stating that such proposed earth material is free of oils, hazardous materials, or other organic and non-organic constituents which may be considered contaminants.
  - 3. Testing Frequency: One test for each type of material per source of supply.
  - 4. All required testing (sample and analysis) shall be submitted as part of one submittal, or it will be rejected. Failure to include any of the above requirements will result in rejection.

## 1.8 TESTING, QUALITY CONTROL DURING CONSTRUCTION

- A. All quality control sampling/testing during construction shall be the responsibility of Contractor. Contractor shall retain and pay for the services of a third-party Sampling and Testing Laboratory and/or Testing Agency to perform all sampling/testing/inspection services in accordance with applicable standards and these specifications.
- B. Material Testing – New Materials
  - 1. During construction, from the material delivered to the Project Site, provide representative testing for the following materials (only if material proposed to be used on site):
    - a. Field Base, Bottom Stone
    - b. Field Base, Top Stone
    - c. Collector Pipe Stone, Bottom Stone

2. Intent: The purpose of such testing is to monitor consistency in material characteristics during construction to ensure materials delivered to the Project Site demonstrate the same characteristics as those represented by Landscape Architect-approved pre-construction material testing submittals.
  - a. If testing indicates that materials demonstrate differing characteristics as indicated in Landscape Architect-approved pre-construction material testing submittals, materials shall not be employed in the work. Any material represented by such sampling result which has been placed shall be removed from the Project Site and replaced with acceptable material at no expense to Owner.
  - b. Contractor is solely responsible for coordinating the timing of sampling, testing, reporting, and Landscape Architect's review. Allow Landscape Architect 24 hours to review test results.
3. Testing parameters:
  - a. Moisture-Dry Density Curve (Proctor Test-Modified): ASTM D1557
  - b. Gradation: ASTM D422
  - c. Resistance to Abrasion: ASTM C131
  - d. Soundness: ASTM C88
4. Testing Frequency: One test representing 10,000 square feet (1 test/10,000 sf) of in-place material.

C. Compaction Testing

1. Compaction Testing: ASTM D2922.
  - a. Collector Pipe Stone, Bottom Stone: One test per 2,500 square feet of Bottom Stone installed (1 test/2,500 sf).
  - b. Field Base Bottom Stone: One test per 5,000 square feet of Bottom Stone installed (1 test/5,000 sf).
  - c. Prepared Field Base Top Stone: One test per 5,000 square feet of Top Stone installed (1 test/5,000 sf).
2. Additional compaction testing may be required when there is evidence of a change in the quality of moisture control or the effectiveness of compaction.
3. If testing indicates that compacted subgrade, backfill, or fill are below specified density, additional compaction and/or replacement of material shall be provided at no expense to Owner.

D. Drainage Testing – Existing Field Stone Base

1. Contractor shall perform drainage testing on the existing field base stone after removal of the existing synthetic turf system and grading of the field base.

- a. Perform infiltration tests, double-ring infiltrometer, ASTM F1551/EN 12616 - Standard Test Method for Comprehensive Characterization of Synthetic Turf Playing Surfaces and Materials, as the prepared field base Stone layer of the field subdrainage system/base is completed. Alternative infiltration testing will not be considered valid.
- b. Testing Frequency: Perform one test for each 20,000 square feet (20,000 sf) of completed field area.
- c. Testing criteria: Each test will be considered acceptable when an infiltration rate of no less than 20 inches per hour (20 in/hr) is demonstrated. Do not proceed with installation of the synthetic turf system until all tests are considered acceptable.

E. Drainage Testing – New Materials and Construction

1. Collector Pipe, Bottom Stone

- a. Perform infiltration tests, double-ring infiltrometer, ASTM F1551/EN 12616 - Standard Test Method for Comprehensive Characterization of Synthetic Turf Playing Surfaces and Materials, on or over the existing Collector Drain. Alternative infiltration testing will not be considered valid.
- b. Testing Frequency: Perform six tests
- c. Testing criteria: Each test will be considered acceptable when an infiltration rate of no less than 30 inches per hour (30 in/hr) is demonstrated. Do not proceed with turf installation until all tests are considered acceptable.

2. Field Base, Bottom Stone

- a. Perform infiltration tests, double-ring infiltrometer, ASTM F1551/EN 12616 - Standard Test Method for Comprehensive Characterization of Synthetic Turf Playing Surfaces and Materials, of the exposed existing Stone layer of the field subdrainage system/base. Alternative infiltration testing will not be considered valid.
  - 1) Testing Frequency: Perform one test for each 20,000 square feet (20,000 sf) of completed area.
  - 2) Testing criteria: Each test will be considered acceptable when an infiltration rate of no less than 30 inches per hour (30 in/hr) is demonstrated. Do not proceed with installation of subsequent layers until all tests are considered acceptable.

3. Field Base, Top Stone

- a. Perform infiltration tests, double-ring infiltrometer, ASTM F1551/EN 12616 - Standard Test Method for Comprehensive Characterization of Synthetic Turf Playing Surfaces and Materials, as the prepared field base Stone layer of the field subdrainage system/base is completed. Alternative infiltration testing will not be considered valid.

- b. Testing Frequency: Perform one test for each 20,000 square feet (20,000 sf) of completed field area.
- c. Testing criteria: Each test will be considered acceptable when an infiltration rate of no less than 20 inches per hour (20 in/hr) is demonstrated. Do not proceed with turf installation until all tests are considered acceptable.

## 1.9 SURFACE REGULARITY TESTING

### A. Subgrade – New Construction

- 1. The planarity of the finished subgrade of the field shall conform to EN 13036 Surface Planarity as performed by an independent Certified Testing Agency. Planarity shall not be greater than 15 mm.
- 2. Contractor shall also conduct a field survey at 25 feet o.c. grid. Grades shall be checked using a dual plane laser operation survey instrument and shall be within 1/4 inch of required elevation. Correct irregularities in elevation beyond this tolerance.

### B. Field Base, Bottom Stone – New Construction

- 1. The planarity of the finished Field Base, Bottom Stone grade of the field shall conform to EN 13036 Surface Planarity as performed by an independent Certified Testing Agency.
- 2. Contractor shall also conduct a field survey of all renovated athletic areas at 25 feet o.c. grid. Grades shall be checked using a dual plane laser operation survey instrument and shall be within 1/4 inch of required elevation. Correct irregularities in elevation beyond this tolerance.

### C. Prepared Field Base, Top Stone – Existing Field Base and New Construction

- 1. The planarity of the finished, prepared Field Base, Top Stone grade of the field shall conform to EN 13036 Surface Planarity as performed by an independent Certified Testing Agency.
- 2. Contractor shall also conduct a field survey of all renovated athletic areas at 25 feet o.c. grid. Grades shall be checked using a dual plane laser operation survey instrument and shall be within 1/4 inch of required elevation. Correct irregularities in elevation beyond this tolerance.

## PART 2 PRODUCTS

### 2.1 FIELD DRAIN (FLAT PANEL)

- A. Composite, pre-fabricated high density polyethylene (HDPE), 3-dimensional high-flow, drainage core with internal support pillars, wrapped with a filtration geotextile filter fabric, 1.5-inches by 13-inches. HDPE minimum cell classification: 424420C, ASTM D3350.
- B. Couplers, tees, caps, and other fittings: As required to complete the system, as shown on plan & details. Material of construction and configuration shall be in accordance with the drain manufacture's requirements or recommendations, whichever is more stringent. HDPE minimum cell classification: 424420C, ASTM D3350.

C. Geotextile Filter Fabric

1. Grab Tensile Strength (weakest principle direction), ASTM D4632: 120 pounds
2. Grab Elongation (weakest principle direction), ASTM D4633: 60%
3. Trapezoidal Tear (weakest principle direction) ASTM D4533: 40 pounds
4. Puncture, ASTM D3786: 30 pounds
5. Permittivity, ASTM D4491: 0.7
6. AOS (U.S. Sieve Size), ASTM D4751: 60
7. U.V. Resistance, ASTM D4355: 70

2.2 PIPE

- A. Perforated Corrugated Polyethylene Pipe: AASHTO M252 Type SP (Double Wall) as indicated on the Drawings.
1. Perforations: Class 2 slotted perforations per AASHTO M252. Perforations shall be uniformly spaced along the length and circumference of the pipe.
  2. Joints: Joint: Silt-tight, ASTM D3212.

2.3 FIELD BASE, BOTTOM STONE

- A. Product resulting from the artificial crushing of rocks, boulders or large cobblestones, substantially all faces of which have resulted from the crushing operation. Material shall consist of sound, tough, durable, angular stones, free from soft, thin, elongated, laminated, friable, micaceous or disintegrated pieces, feldspar, limestone, marble, mud, dirt, organic matter, or other deleterious material. The presence of soft, thin, elongated, laminated, friable, micaceous or disintegrated pieces, feldspar, limestone, marble, mud, dirt, organic matter, or other deleterious material will be cause for rejection at Landscape Architect's discretion.
1. Testing and evaluation of material by the testing laboratory shall evaluate material composition for the presents of feldspar or micaceous materials and note same on testing report. Material may be rejected due to the presence of feldspar or micaceous materials.
- B. **Test for Resistance to Abrasion, ASTM C131. Materials shall show a loss on abrasion of not more than 25%.**
- C. Soundness, ASTM C88. Coarse aggregate shall not have a loss of more than 15% at the end of five cycles.

D. Gradation:

Gradation of Bottom Stone (#67)

Sieve	Percent Passing by Weight
1"	100
3/4"	90-100
3/8"	20-55
No. 4	0-10
No. 8	0-5

OR APPROVED EQUAL

2.4 FIELD BASE, TOP STONE

- A. Product resulting from the artificial crushing of rocks, boulders or large cobblestones, substantially all faces of which have resulted from the crushing operation. Material shall consist of sound, tough, durable, angular stones, free from soft, thin, elongated, laminated, friable, micaceous or disintegrated pieces, limestone, marble, mud, dirt, organic matter, or other deleterious material. The presence of soft, thin, elongated, laminated, friable, micaceous or disintegrated pieces, feldspar, limestone, marble, mud, dirt, organic matter, or other deleterious material will be cause for rejection at Landscape Architect's discretion.
1. Testing and evaluation of material by the testing laboratory shall evaluate material composition for the presents of feldspar or micaceous materials and note same on testing report. Material may be rejected due to the presence of feldspar or micaceous materials.
- B. **Test for Resistance to Abrasion, ASTM C131. Materials shall show a loss on abrasion of not more than 25%.**
- C. Soundness, ASTM C88. Coarse aggregate shall not have a loss of more than 15% at the end of five cycles.



D. Gradation:

1. Gradation of Top Stone (#8)

Sieve	Percent Passing by Weight
1/2"	100
3/8"	85-100
1/4"	75-90
No. 4	10-40
No. 8	0-10
No. 16	0-5
No. 200	0-2

2.5 COLLECTOR PIPE STONE, BOTTOM STONE

A. Product resulting from the artificial crushing of rocks, boulders or large cobblestones, substantially all faces of which have resulted from the crushing operation. Material shall consist of sound, tough, durable, angular stones, free from soft, thin, elongated, laminated, friable, micaceous or disintegrated pieces, limestone, marble, mud, dirt, organic matter, or other deleterious material.

1. Testing and evaluation of material by the testing laboratory shall evaluate material composition for the presents of feldspar or micaceous materials and note same on testing report. Material maybe rejected due to the presence of feldspar or micaceous materials.

B. **Test for Resistance to Abrasion, ASTM C131. Materials shall show a loss on abrasion of not more than 25%.**

C. Soundness, ASTM C88. Coarse aggregate shall not have a loss of more than 15% at the end of five cycles.

D. Size: 3/4-inch, clean, washed stone.

2.6 GEOTEXTILE

A. Composition: Nonwoven, polypropylene fibers.

B. Physical properties:

Mechanical Properties	Test Method	Unit	Minimum Average Roll Value
Grab Tensile Strength, Ultimate	ASTM D 4632	Pounds	120
Grab Tensile Strength, Elongation at Ultimate	ASTM D 4632	Percent (%)	50
Trapezoid Tear Strength	ASTM D 4533	Pounds	50
Mullen Burst Strength	ASTM D 3786	psi	225
Puncture Strength	ASTM D 4833	Pounds	60
Apparent Opening Size (AOS)	ASTM D 4751	U.S. Sieve	70
Permittivity	ASTM D 4491	sec <sup>-1</sup>	1.8
Flow Rate	ASTM D 4491	gal/min/ft <sup>2</sup>	135
UV Resistance (at 500 hours)	ASTM D 4355	% strength retained	70
Physical Properties	Test Method	Unit	Average Roll Value
Weight	ASTM D 5261	oz/yd <sup>2</sup>	4.5
Thickness	ASTM D 5199	Mils (mm)	44 (1.12)

### PART 3 EXECUTION

#### 3.1 GENERAL

- A. Notify "Dig Safe" to request a utility mark-out for the Project Site prior to any earth disturbance. Provide written confirmation to Landscape Architect that such mark-out has been completed.
- B. Verify site conditions before proceeding with demolition work. Field check the accuracy of the Drawings and inspect structures, utilities, and other site features prior to start of work and notify Landscape Architect in writing, of any discrepancies or hazardous conditions.
- C. Take precautions for preventing injuries to persons or damage to property in or about the work. Protect structures, utilities, adjacent athletic facilities, walks, pavements, and other improvements from damage caused by settlement, lateral movement, undermining, washout and other hazards created by earthwork operations.
- D. Protect sub-grades and foundation soils against freezing temperatures or frost. Provide protective insulating materials as necessary.

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

### 3.2 PROGRESS SURVEY

- A. Retain and pay for the services of a Professional Land Surveyor licensed in the State of Connecticut who will be responsible for the verification of the work of this Section. Complete Progress Surveys for each of the following stages:
  - 1. Completed subgrade elevations (new construction).
  - 2. Completed field base stone elevations (new construction).
  - 3. Completed top stone elevations (existing and new construction).
  - 4. Completed field subdrainage system elevations and drain locations (existing and new construction)
    - a. Include collector pipe and flat panel piping for new construction.
- B. Complete surveys to verify that the specified lines, grades, and cross sections of the project elements and/or systems as indicated on the Drawings have been achieved, or that the lines, grades, and cross sections of the system required to achieve final field elevations indicated on the Drawings have been achieved.
- C. Prepare Progress Survey depicting the area and elevations of each finished system for review by Landscape Architect and turf installer. Drawing shall be prepared based on a 20 foot grid with spot grades to the nearest 0.01 foot. In addition to spot grades and surface regularity testing, Contractor shall pull string lines at each inlaid line location and at 15 foot intervals to identify high and low spots. This includes all lines. Depict locations of string lines on Progress Survey.
- D. Survey shall be provided to Landscape Architect and Owner in.pdf and AutoCAD (2019 or newer) format for review.

### 3.3 DEWATERING

- A. Prevent surface water and ground water from entering excavations, from ponding on prepared subgrade and from flooding Project site and surrounding area.
- B. Protect subgrade from softening, undermining, washout and damage by rain or water accumulation.

### 3.4 SUBGRADE (NEW CONSTRUCTION)

- A. Formation: Form and shape subgrade to the specified lines, grades, and cross-sections indicated on the Drawings, or to the lines, grades, and cross-sections required to achieve final field elevations indicated on the Drawings. Refer to Section 31 2310 - Earthwork.
  - 1. All soft and yielding material and other portions of the subgrade which will not compact readily shall be removed and replaced with suitable material. Utilize Granular Fill, Processed Aggregate, or other Landscape Architect-approved material as required.
  - 2. Reconstruct sub-grades damaged by freezing temperatures, frost, rain, accumulated water or construction activities, as directed by Landscape Architect.

- B. Compaction: The entire area of the subgrade shall be uniformly and thoroughly compacted by use of compaction equipment consisting of rollers, compactors or a combination thereof.
  - 1. Earth-moving and other equipment not specifically manufactured for compaction purposes will not be considered as compaction equipment.
- C. Approval of Subgrade: Examine the subgrade of the field for horizontal and vertical conformance, compaction, and general suitability.
  - 1. Evidence of inadequate subgrade shall be brought to the immediate attention of Landscape Architect.
  - 2. Areas of potential ponding shall be corrected.
  - 3. Confirm planarity requirements of subgrade based on a 20 foot grid. Grid shall be laid-out and a level-set laser system used to determine elevation compliance.
    - a. Construction Tolerance: Re-grade areas that are not within 1/2-inch of required elevations.

### 3.5 FLAT PANEL DRAIN (NEW CONSTRUCTION)

- A. Install flat panel drains as indicated on the Drawings.
- B. Install all drain components in accordance with the manufacturer's instructions.

### 3.6 DRAINAGE STONE, BOTTOM STONE AND TOP STONE (NEW AND EXISTING CONSTRUCTION)

- A. Confirm placement of flat panel drains prior to initiating installation of Bottom Stone.
- B. Conduct and submit material testing in accordance with Article 1.7
- C. Installation
  - 1. Install each layer of stone as indicated on the Drawings.
  - 2. Bottom Stone: Install in two lifts, compacted to required density.
  - 3. Top Stone: Install in a single lift and compact to required density
  - 4. Maintain dozer, grader, or loader push distances below 75 feet to minimize segregation of course-graded fractions from fine-graded fractions, as well as not overwork the material.
  - 5. Installed layers shall be kept clean and uncontaminated. Less select materials shall not be permitted to become mixed with drainage stone. Materials spilled outside specified lines shall be removed and areas repaired.
  - 6. Portions of drainage layer which become contaminated, softened, or dislodged by passing of equipment, or otherwise damaged, shall be cleaned, replaced, and otherwise repaired to conform to the requirements of this specification.
- D. Compaction
  - 1. Compact lifts using a 6-ton steel wheel roller or vibratory roller equivalent to a 6-ton static roller, or approved equivalent.

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. Compaction Density: Compaction density shall be expressed as a percentage of maximum dry density at optimum moisture content according to ASTM D 1557 Method C.
    - a. Bottom Stone: Between 90% and 92%
    - b. Top Stone: Between 90% and 92%
- E. Final Grading (applies to New construction and all existing stone base to remain)
1. Utilize a laser-guided grader to complete fine grading of the finish surface of the field subdrainage system. Laser control system shall control each side of the blade independently. Single post control systems are not acceptable.
  2. Minimize movement of machinery or equipment over completed work. Repair any ruts or other deviations.
  3. Surface Regularity: The planarity of the finished grade of the field subdrainage system shall conform to EN 13036 Surface Planarity as performed by an independent Certified Testing Agency.
    - a. Deviations shall be measures below a straightedge using a graduated wedge (slip gauge). No deviation shall exceed 10mm.
  4. Protection
    - a. Where the activities of Contractor have been determined by the Landscape Architect to have caused damage or contamination of the dynamic stone material the Contractor shall remove and replace all affected areas to the satisfaction of Landscape Architect.
    - b. Where weather conditions have created erosion of topping stone material or migration of fine material such that it concentrates in areas on the drainage stone surface (such as runoff causing migration of fines), these areas shall be cleaned of all fine material and replaced with new material.
- 3.7 PERIMETER COLLECTOR DRAIN (NEW CONSTRUCTION / ALTERNATE)
- A. Install perimeter collector piping and bedding system as indicated on the Drawings.
  - B. Installed perimeter collector piping shall be kept clean and uncontaminated. Foreign materials shall not be permitted to mix with field drainage stone.
- 3.8 DRAINAGE TESTING
- A. Complete post-installation drainage testing of the installed field subdrainage system/base in accordance with Article 1.7.
- 3.9 CLEAN UP
- A. Contractor shall remove all debris, residuals, and materials at the conclusion of the work.

**END OF SECTION 33 46 16**

**K<sup>^</sup>ESTLE BOOS**  
a s s o c i a t e s , i n c

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