Project Manual and Specifications

Athletic Facilities Renovation Project
Derby High School

Derby, CT

City Project No. COD 2018-02 (B)

Issued for RE-BID
May 1, 2018

KAESTLE BOOS
associates, inc

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

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PROJECT MANUAL AND SPECIFICATIONS

BIDDING AND CONTRACT REQUIREMENTS

DIVISION 00 – PROCUREMENT AND CONTRACTING REQUIREMENTS

DIVISION 01 - GENERAL REQUIREMENTS

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KAESTLE BOOS
associates, inc

PROJECT TEAM AND LOCAL OFFICIALS LIST

DERBY HIGH SCHOOL ATHLETIC FACILITY IMPROVEMENTS -
TURF, TRACK, AND SOFTBALL FIELD
Derby, CT
KBA #17015.00

CITY OF DERBY
1 Elizabeth Street
Derby, CT 06418
P: (203) 736-1450 F: (203) 736-8880

Mayor
Richard Dziekan
Email: rdziekan@derbyct.gov

Building Committee Chair
Keith A. McLiverty P: (203) 627-3947
Email: kmcliverty@region15.org

DERBY PUBLIC SCHOOLS
35 Fifth Street
Derby, CT 06418
P: (203) 736-5027 | F: (203) 736-5031

Superintendent of Schools
Dr. Matthew Conway
Email: mconway@derbyps.org

DERBY HIGH SCHOOL
75 Chatfield Street
Derby, CT 06418
P: (203) 736-5032 | F: (203) 736-5056

Assistant Principal/Athletic Director
Rachael Caggiano
Email: rcaggiano@derbyps.org

LAND USE/ZONING COMMISSION
CITY OF DERBY

Land Use Administrator/Zoning Commission
Theodore Estwan, Chair

LAND USE OFFICIALS
CITY OF DERBY
1 Elizabeth Street
Derby, CT 06418
P: (203) 736-1481

Building Official/Zoning Enforcement Officer/Inland-Wetlands Enforcement Agent/ADA Coordinator
Carlo Sarmiento
Email: csarmiento@derbyct.gov
Building Department Facility Inspectors
Andy Cota/ Jim Watson
M-W: 8:30-5, T: 8:30-6, F: 8:30-12:30

HEALTH DEPARTMENT
CITY OF DERBY
98 Bank Street
Seymour, CT
P: (203) 881-3255

Naugatuck Valley Health District
Karen N. Spargo, Director of Health
M-F: 8:30-4:00 and by appointment

CONNECTICUT OFFICE
416 Slater Road, P.O. Box 2590, New Britain, CT 06050-2590
V: (860) 229-0361 | F: (860) 229-5303

MASSACHUSETTS OFFICE
325 Foxborough Boulevard, Suite 100, Foxborough, MA 02035
V: (508) 549-9906 | F: (508) 549-9907

KAESTLE BOOS
associates, inc

PROJECT TEAM AND LOCAL OFFICIALS LIST

DERBY HIGH SCHOOL ATHLETIC FACILITY IMPROVEMENTS -
TURF, TRACK, AND SOFTBALL FIELD
Derby, CT
KBA #17015.00

OWNERS PROJECT MANAGER
Arum & Associates, LLC
2291 Torringford West Street
Torrington, CT 06790
P: (860) 482-7087

Owners Project Manager
Ed Arum
Email: edarum@hotmail.com

ARCHITECT, LANDSCAPE, STRUCTURAL
Kaestle Boos Associates, Inc.
416 Slater Road, PO Box 2590
New Britain, CT 06050-2590
P: (860) 229-0361 | F: (860) 229-5303

Principal-In-Charge – Brian Solywoda
Email: bsolywoda@kba-architects.com
Project Manager/Landscape Architect – Luke McCoy
Email: lmccoy@kba-architects.com
Landscape Architect – Eric Roise
Email: eroise@kba-architects.com
Architect – Jennifer L. Mangiagli
Email: jmangiagli@kba-architects.com
Structural Engineer – Richard Lewandowski
Email: rlewandowski@kba-architects.com
Specifications and CA Coordination – Alice Nawrot
Email: anawrot@kba-architects.com

MECH./ELEC./PLUMB.
Consulting Engineering Services, Inc.
811 Middle Street
Middletown, CT 06457
P: (860) 632-1682 | F: 860-632-1768

Project Manager – Jesse VanCamp
Email: jvancamp@cesct.com
Plumbing Engineer – Jesse VanCamp
Email: jvancamp@cesct.com
Electrical Engineer – Rick McCracken
Email: rmccracken@cesct.com

CIVIL ENGINEER
Alfred Benesch & Company
90 National Drive
Glastonbury, CT 06033
P: (860) 633-8341
Direct: (860) 494-4422

Civil Engineer – Robert Newton
Email: RNewton@benesch.com

ASBESTOS ABATEMENT CONSULTANT
Hygenix Inc.
49 Woodside Street
Stamford, CT
P: (203) 324-2222 or (800) 201-1227

Project Manager
James Twitchell
Email: jtwitchell@hygenix.com

CONNECTICUT OFFICE
416 Slater Road, P.O. Box 2590, New Britain, CT 06050-2590
V: (860) 229-0361 | F: (860) 229-5303

MASSACHUSETTS OFFICE
325 Foxborough Boulevard, Suite 100, Foxborough, MA 02035
V: (508) 549-9906 | F: (508) 549-9907

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INVITATION TO BID
RE-BID
ATHLETIC FACILITIES RENOVATION PROJECT
DERBY HIGH SCHOOL -
DERBY, CT
CITY PROJECT NO. COD 2018-02 (B)

Sealed bids for the **Athletic Facilities Renovation Project - at Derby High School, Derby, CT** addressed to **Salvatore Coppola, Finance Director** will be received in the **Finance Office, Derby City Hall, 1 Elizabeth Street, Derby, CT 06418** on or before **10:00 a.m**. local time on **FRIDAY, June 1, 2018**. Bids will be publicly opened and read aloud in the Joan Williamson Aldermanic Chambers, 2nd Floor, Derby City Hall. Late bids will be rejected.

A **Non-Mandatory** Pre-Bid Construction Meeting will be held on **TUESDAY, May 15, 2018**, at **10:00 a.m.** local time at the **Site, 75 Chatfield Road, Derby, CT 06418.**

Drawings and specifications may be downloaded at www.derbyct.gov under the Bids link, on or after **FRIDAY, May 4, 2018**. All addenda will be available for viewing and downloading. Faxes of addenda will not be provided. It is the responsibility of bidders to check and download all addenda, prior to submitting bids.

Bidder Qualifications: All bidders must have prior similar experience consisting of no less than five (5) synthetic turf athletic fields that are 55,000 sf or greater, 3 (three) natural grass baseball/softball fields, and one (1) track in the past 10 years. Synthetic turf field construction shall have consisted of laser graded, concrete anchor curbing and drainage stone with flat panel underdrain system. Natural grass field construction shall have consisted of laser graded, drainage underdrain system, irrigation, and seeding. Track construction experience shall consist of construction of asphalt base, long/triple jump runways and pits, high jump, and concrete edge curbing. Bidders must provide verification of experience with the 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).

The City of Derby also reserves the right to consider as not responsible any Bidder who does not habitually perform with his/her own forces at least fifty-one (51%) percent of the dollar value of the work involved in this Contract.

Security: each Bid must be accompanied by a Certified Check or Cashier's Check drawn upon either a State Bank and Trust Company or a National Banking Association, to the order of the **City of Derby**, or the Bid must be accompanied by a Bid Bond having as surety thereto, such Surety Company or Companies as are authorized to do business in the State of Connecticut of an amount not less than **(5%)** of the Bid. NO BID WILL BE ACCEPTED UNLESS ACCOMPANIED BY THE REQUIRED BID DEPOSIT.

Upon award and prior to any work being performed a 100% Performance, Labor and Material Payment Bond and other Bonds subject to the conditions provided for in the Bid Specifications are required. A Certificate of Insurance will also be required naming the **City of Derby** as an additional insured.

Requests for Information (RFI): are to be in writing and emailed to the attention of Eric Roise at eroise@kba-architects.com. Phone calls will not be returned for RFI questions. RFIs must be received by the Architect by **WEDNESDAY**, **May 23, 2018 BY NOON**– Last day to receive RFIs.

Bidders shall not include Federal Excise Taxes or State of Connecticut Sales Taxes on which Public Projects are exempt.

All Bidders should make an effort to consider the use of local trade contractors.

Bids must be held firm and may not be withdrawn for sixty (60) days after the bid opening.

The **City of Derby** reserves the right to waive any informalities in Bids, to reject any or all Bids, or to accept any proposal that in their judgment will be in the best interest of the Town.

The **City of Derby** does not discriminate on the basis of sex, race, age, physical disability, religion or national origin.

The **City of Derby** is an Affirmative Action/Equal Opportunity Employer. Minority/Women's Business Enterprises are encouraged to apply.

Salvatore Coppola
Finance Director
City of Derby, CT

INSTRUCTION TO BIDDERS

CITY PROJECT NO. COD 2018-02 (B)

PROPOSAL

Proposals are being sought for the Derby High School Athletic Facilities Renovation at Derby High School. All work shall be done in full accordance with the plans and specifications.

KEY EVENT DATES

- Advertisement for Invitation to Bid: Wednesday, May 02, 2018.
- **NON-MANDATORY** Pre-Bid Construction Meeting: Tuesday, May 15. 2018, 10:00 a.m.
- **FINAL QUESTIONS BY CONTRACTORS:** Wednesday, May 23, 2018 by Noon.
- **FINAL ADDENDUM ISSUED**: Friday, May 25, 2018.
- **Bid Opening:** Friday, June 01, 2018, 10:00 a.m. No bids will be accepted after said date and time.

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.

RECEIPT AND OPENING OF BIDS

Separate sealed bids will be received in the Finance Office, Derby City Hall, 1 Elizabeth Street, Derby, CT 06418 until the time and date stated in the Invitation to Bid. Bids shall then be publicly opened and read aloud in the Joan Williamson Aldermanic Chambers, 2nd floor, Derby City Hall.

One (1) Original and two (2) copies of the Bid Documents including the Bid, the Non-Collusion Affidavit, Certification(s) Regarding Equal Employment Opportunity and the Bidder's Qualification Statement 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 **Derby High School Athletic Facilities Renovation Project** so as to guard against opening prior to the time set therefore. Bids may be forwarded by mail. 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. Bids cannot be emailed or faxed.

The City may consider informal any bid not prepared and submitted in accordance with the provisions hereof and may waive any informalities in or reject any and all bids. Any bid may be withdrawn prior to the above scheduled time for the opening thereof.

DETERMINATION OF AWARD

This Contract will be awarded to the lowest, responsible, qualified bidder based upon his/her "Total Base Bid Amount" only. The City shall determine the "lowest, responsible, qualified bidder" on the basis of the bidder submitting the lowest Total Base Bid Amount; responsiveness of his/her proposal; demonstration of a history of the ability and integrity necessary to perform the required work; and certification that he/she can perform the required work in accordance with the Contract Documents.

Bids will be compared on the basis of the Total Base Bid of the items listed in the Bid proposal.

UNIT PRICES

The unit prices for each of the several items in the proposal of each bidder shall include it's prorate 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 units prices for such items.

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.

The bid drawings, bid documents and project manual for 'Synthetic Grass and Running Track Surfacing, Derby High School City project COD2018-02 dated February 28, 2018" as modified by addenda are hereby incorporated into this specification in whole. The contractor shall carry the portion of bid costs that relate to the running track surfacing and interior field synthetic turf from the lowest responsible bidder for this bid (AstroTurf and ATT Sports) and shall carry the contract for the track and turf surfacing subcontractor, including materials, installation and warranties and shall include those costs in his bid price.

Each Bidder shall include in his/her Bid the following information:

Principals:

Names:
Home addresses, including City, State, Zip Code:

Firm:

Name:
Treasury Number:
Address:
City, State, Zip Code:
Phone Number:
Fax Number:
Email Address:

SECURITY FOR PROPOSAL

Each proposal must be accompanied by a bid bond with a surety acceptable to the City in the amount equal to at least ten percent (10%) 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 City, as liquidated damages for such failure or refusal, the security deposit with his Proposal.

COLLUSIVE AGREEMENTS

Each Bidder submitting a Bid to the City of Derby 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 City of Derby 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 City of Derby 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 City of Derby that the Bidder is qualified to carry out properly the terms of the Contract.

All bidders must have prior experience consisting of no less than five (5) synthetic turf athletic fields that are 55,000 sf or greater, 3 (three) natural grass baseball/softball fields, and one (1) track. Synthetic turf field construction shall have consisted of laser graded, concrete anchor curbing and drainage stone with flat panel underdrain system. Natural grass field construction shall have consisted of laser graded, drainage underdrain system, irrigation, and seeding. Track construction experience shall consist of construction of asphalt base, long/triple jump runways and pits, high jump, and concrete edge curbing. 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).

The City of Derby also reserves the right to consider as not responsible any Bidder who does not habitually perform with his/her own forces at least fifty-one (51%) percent of the dollar value of the work involved in this Contract.

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 or on written or telefax request dispatched by the bidder in time for delivery in the normal course of business prior to the time fixed for opening, provided that written confirmation of any telefax withdrawal over the signature of the bidder is placed in the mail and postmarked prior to the time set for bid 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 CONDITIIONS, 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 City 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 City of Derby 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 City of Derby'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 City of Derby shall be effective to modify any of the provisions of the Contract Documents.

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 City 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 City of Derby and that approval of the proposed subcontract award cannot be given by the City unless and until the successful bidder submits all information and evidence requested by the City 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 ninety (90) days, the bidder agrees to execute the contract and all related documents for this work within ten 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 CITY 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 City of Derby 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 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 City of Derby shall immediately serve notice thereof upon the Contractor.

PAYMENTS

Monthly estimates and/or invoices shall be furnished to the City of Derby 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 City of Derby until final completion of the work. Final payment will not be made until final completion and acceptance by the City of all work covered by the contract. The Contractor agrees that he will indemnify and save the City of Derby harmless for all claims growing out of the lawful demands of subcontractors, laborers, suppliers, and assignees.

END OF SECTION

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City of Derby
Finance Department
1 Elizabeth Street
Derby CT 06418
203-736-1450

BID REQUIREMENTS
CITY PROJECT NO. COD 2018-02 (B)

This sheet is designed for your assistance and guidance when submitting your proposal of a bid to the City of Derby. Return all bids to the above address.

Number of Copies:
All submitted bids should have one original and two copies when submitting to the Finance Committee. Since some departments require more, please make sure you follow the department's specifications.

Non-Collusion Affidavit: (submit as page two of submitted bid)

Pricing:
All bids shall be honored for no less than 60 days from bid opening date, bid extension date or clarification of contracts.

Insurances/Bonding:
Each proposal must be accompanied by a bid bond with a surety acceptable to the City in the amount equal to at least ten percent (5%) of the amount of the bid. Upon award and contract issuance, the City will require a payment and performance bond in the amount of the contract, which shall be binding upon the awarding, with a surety or sureties satisfactory to the City, for the protection of persons supplying the labor or materials in the prosecution of the work provided. The successful contractor shall be required to furnish with their bid a Certificate of Insurance acceptable to the City, naming the City as an additional insured. Tax Bonds: All non-resident contractors are required to post a Guaranty Bond (form AU-766 or Cash Bond (AU-72) in the amount required by the state. This bond will secure payment for applicable taxes payable to the State with regard to the project.

Prevailing Wages:
Under the Davis-Bacon Act, all construction projects for public works, prevailing wage schedules must be part of any and all specifications. Construction Projects that are considered are remodeling, refurbishing, rehabilitation, alterations or repair(s) whose value exceeds $100,000 and projects for new construction where values exceed $1,000,000.

For questions on prevailing wage, visit the Department of Labor's web page at www.CTDOL.State.CT.US

Ability and Experience of Bidder

No award will be made to any bidder who cannot satisfy the Owner that he has sufficient ability and experience in this class of work and sufficient capital and plan to enable him to prosecute and complete the work successfully within the time named. The Owner's decision or judgment on these matters will be final, conclusive, and binding.

The Owner may make such investigations as he deems necessary, and the bidder shall furnish to the Owner, under oath if so required, all such information and data for this purpose as the Owner may request.

All bidders must have prior experience consisting of no less than five (5) synthetic turf athletic fields that are 55,000 sf or greater, 3 (three) natural grass baseball/softball fields, and one (1) track. Synthetic turf field construction shall have consisted of laser graded, concrete anchor curbing and drainage stone with flat panel underdrain system. Natural grass field construction shall have consisted of laser graded, drainage underdrain system, irrigation, and seeding. Track construction experience shall consist of construction of asphalt base, long/triple jump runways and pits, high jump, and concrete edge curbing. 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).

Waiver or Rejection of Bids:
The City's Finance Committee reserves the right to reject any and all bids in whole or in part, or to waive any informality or technicalities regarding said proposals; or to accept any proposal or part thereof deemed to be in the best interest of the City of Derby. Please be advised that if you are awarded a project from the City of Derby **do not** start work without a signed Purchase Order or Agreement. Both are legal documents engaging you to carry out the projects specifications. Carrying out a project without one of these documents in place can result in your lost time and revenue.

Please have your insurance carrier reference bid number on all Certificates of Insurance

- **Specifications supersede bid requirements above**

If this project is state funded and is $50,000 or more, state set asides 4a-60, 4a-60a, 4a-60g, 46a-68b-46a-68f will apply.

BID LANGUAGE (for bid documents)

The contractor who is selected to perform this State project must comply with CONN. GEN. STAT. Sec. 4a-60, 4a-60a, 4a-60g and 46a-68b through 46a-68f, inclusive, as

amended by June 2015 Special Session Public Act 15-4. An Affirmative Action Plan must be filed with and approved by the Commission on Human Rights and Opportunities prior to the commencement of construction.

The contractor shall be required to make good faith efforts to place a minimum of twenty-five (25%) percent of the subcontracts awarded by the general contractor/construction manager at risk with eligible contractors holding current certification from the Connecticut Department of Administrative Services ("DAS") under the provisions of CONN. GEN. STAT. Sec. 4a-60g, as amended. (25% of the work with DAS certified Small and Minority owned business(s) and 25% of that work with DAS certified Minority, Women and/or Disabled owned businesses)

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BID BOND

CITY PROJECT NO. COD 2018-02 (B)

KNOW ALL MEN BY THESE PRESENTS, that we, the undersigned,

_____ , as Principal, and
(Name of Principal)

_____ , as Surety,
(Name of Surety)

are held and firmly bound unto the CITY OF DERBY, CONNECTICUT, hereinafter called the "CITY," in the penal sum of _____

_____ DOLLARS, ($_____),

lawful money of the United States, for the payment of which sum well and truly to be made, we bind ourselves, our heirs, executors, administrators, successors, and assigns, jointly and severally, firmly by these presents.

THE CONDITION OF THIS OBLIGATION IS SUCH THAT

WHEREAS, the Principal, has submitted the Accompanying Bid dated _____

20 _____ , for _____

_____

_____

_____

NOW, THEREFORE, if the Principal shall not withdraw said Bid within the period specified, therein after the opening of the same, or, if no period be specified, within thirty days after the said opening, and shall within the period specified therefore, or if no period be specified, within ten days after the prescribed forms are presented to him for signature, enter into a written contract with the City in accordance with the Bid, as accepted, and give bond with good and sufficient surety or sureties, as may be required, for the faithful performance and proper fulfillment of such Contract; or in the event of the withdrawal of said Bid within the period specified, or the failure to enter into such Contract and give such bond within the time specified, if the Principal shall pay the City the difference between the amount specified in said Bid and the Amounts for which the City may procure the required work or supplies or both, if the latter be in excess of the former, then the above obligation shall be void and of no effect, otherwise to remain in full force and virtue.

IN WITNESS THEREOF, the Principal and the Surety have hereunto set their hands and seals, and such of them as are corporations have caused their corporate seals to be hereto affixed and these presents to be signed by their proper officers, the day and year first set forth above.

_____ (L.S.)
(Principal)

_____
(Surety)

BY: _____

CERTIFICATION OF BIDDER REGARDING
EQUAL EMPLOYMENT OPPORTUNITY
CITY PROJECT NO. COD 2018-02 (B)

INSTRUCTIONS

This certification is required pursuant to Executive Order 11246 (30F.R. 12319-25). The implementing rules and regulations provide that any bidder or prospective contractor, or any of their proposed subcontractors, shall state as an initial part of the bid or negotiations of the contract whether it has participated in any previous contract or subcontract subject to the equal opportunity clause; and, if so, whether it has filed all compliance reports due under applicable instructions.

Where the certification indicates that the bidder has not filed a compliance report due under applicable instructions, such bidder shall be required to submit a compliance report within seven calendar days after bid opening. No contract shall be awarded unless such report is submitted.

CERTIFICATION BY BIDDER

Bidder's Name: _____

Address and Zip Code: _____

_____

1. Bidder has participated in a previous contract or subcontract subject to the Equal Opportunity Clause.
   Yes ____ No ____ *(If answer is yes, identify the most recent contract*,)

2. Compliance reports were required to be filed in connection with such contract or subcontract.
   Yes ____ No ____ *(If answer is yes, identify the most recent contract*.)

3. Bidder has filed all compliance reports due under applicable instructions, including SF-100.
   Yes ____ No ____ None Required ____

4. If answer to item 3 is "No," please explain in detail on reverse side of this certification.

   _____

Certification - The information above is true and complete to the best of my knowledge and belief.

_____
Name and Title of Signer (Please Type)

_____ _____
Signature *Date*

CERTIFICATION OF SUBCONTRACTOR REGARDING
EQUAL EMPLOYMENT OPPORTUNITY
CITY PROJECT NO. COD 2018-02 (B)

_____
Name of Prime Contractor

INSTRUCTIONS

This certification is required pursuant to Executive Order 11246 (30F.R. 12319-25). The implementing rules and regulations provide that any bidder or prospective contractor, or any of their proposed subcontractors, shall state as an initial part of the bid or negotiations of the contract whether it has participated in any previous contract or subcontract subject to the equal opportunity clause; and, if so, whether it has filed all compliance reports due under applicable instructions.

Where the certification indicates that the subcontractor has not filed a compliance report due under applicable instructions, such subcontractor shall be required to submit a compliance report before the Owner approves the subcontract or permits work to begin under the subcontract.

_____

SUBCONTRACTOR'S CERTIFICATION

Subcontractor's Name: _____

Address and Zip Code: _____

_____

1. Bidder has participated in a previous contract or subcontract subject to the Equal Opportunity Clause.
   Yes ____ No ____

2. Compliance reports were required to be filed in connection with such contract or subcontract.
   Yes ____ No ____

3. Bidder has filed all compliance reports due under applicable instructions, including SF-100.
   Yes ____ No ____ None Required ____

4. If answer to item 3 is "No," please explain in detail on reverse side of this certification.

_____

Certification - The information above is true and complete to the best of my knowledge and belief.

_____
Name and Title of Signer (Please Type)

_____ _____
Signature *Date*

BIDDER'S QUALIFICATION STATEMENT

CITY PROJECT NO. COD 2018-02 (B)

(To be submitted by the Bidder only upon the specific request of the City.)

All questions must be answered, and the data given must be clear and comprehensive. This statement must be notarized. If necessary, questions may be answered on a separate attached sheet. The Bidder may submit any additional information he desires.

1. Name of Bidder.

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. Contracts on hand: (Schedule these, showing amount of each contract and the appropriate anticipated dates of completion.)

7. General character of work performed by your company.

8. Have you ever failed to complete any work awarded to you?
If so, where and why?

9. Have you ever defaulted on a contract?
If so, where and why?

10. List the more important projects recently completed by your company, stating the approximate cost for each, and the month and year completed.

11. List your major equipment available for this Contract.

12. List your experience in work similar to this project.

13. List the background and experience of the principal members of your organization, including officers.

14. List the work to be performed by subcontractors and summarize the dollar value of each subcontract.

15. Credit available.

16. Give bank reference.

17. Will you, upon request, fill out a detailed financial statement and furnish any information that may be required by the City?

18. The undersigned hereby authorizes and request any person, firm or corporation to furnish any information requested by the City in verification of the recitals comprising this Statement of Bidder's Qualifications.

Date _____ this _____ day of _____ , 20_____ .

_____
(Name of Bidder)

By _____

Title _____

State of _____)
)ss.
County of _____)

_____ being duly sworn deposes

and says that he is _____ of _____

_____ .
(Name of Organization)

and that the answers to the foregoing questions and all statements therein contained are true and correct.

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

_____
(Notary Public)

My commission expires _____ , 20_____ .

FORM OF PROPOSAL

RE-BID
ATHLETIC FACILITIES RENOVATION PROJECT
DERBY HIGH SCHOOL
DERBY, CT
CITY PROJECT NO. COD 2018-02 (B)

TO: Salvatore Coppola, Finance Director
Finance Office
Derby City Hall
1 Elizabeth Street
Derby, CT 06418

Pursuant to and in compliance with your "Invitation to Bid" relating thereto, the undersigned,

_____
(Name of Firm)

having visited the site and carefully examined the Drawings, Bidding Documents and complete Specifications **dated May 1, 2018** together with all Addenda issued and received prior to scheduled closing time for recipient of Bids as prepared by the Architects, KAESTLE BOOS ASSOCIATES, INC., 416 Slater Road, New Britain, Connecticut, hereby offers and agrees as follows:

To provide all labor, materials, and all else whatsoever necessary to erect and properly finish all work in connection with the

RE-BID
ATHLETIC FACILITIES RENOVATION PROJECT
DERBY HIGH SCHOOL
DERBY, CT
CITY PROJECT NO. COD 2018-02 (B)

to the satisfaction of the Architect and Owner for the sum of:

_____ **($)**
written amount *numerals*

to provide all labor, materials, and all else whatsoever necessary to construct all improvements described in the specifications.

Broken-out Costs for Turf and Track materials (for this project)*, included in the number above* from separate bid: *See specification Section 01 10 00 SUMMARY, section 1.4 A 2.*

_____ **($)**
written amount *numerals*

If awarded this Contract, we will execute a Contract with the **City of Derby,** Owner of the property.

QUALIFICATIONS:

By submitting this proposal the bidder certifies that he/she meets or exceeds the required qualifications. Bidders must have prior experience consisting of the successful construction of no less than five (5) synthetic turf athletic fields that are 55,000 sf or greater, 3 (three) natural grass baseball/softball fields, and one (1) track. Synthetic turf field construction shall have consisted of laser graded, concrete anchor curbing, drainage and drainage stone and flat panel underdrain system. Natural grass field construction shall have consisted of laser graded field base, drainage & underdrain system, irrigation, and seeding. Track construction experience shall consist of construction of asphalt base, long/triple jump runways and pits, high jump, and concrete edge curbing. Bidders must provide verification of experience with this Form of Proposal and include a completed Bidders Qualification Statement with this proposal for the proposal to be considered.

All general contractors shall also be prequalified for general site construction by the Connecticut Department of Administrative services (DAS).

UNIT PRICES

Should the amount of improvements required be increased or decreased due to special considerations found at the site or because of a request of the **Derby Public Schools,** the undersigned agrees that the following supplemental UNIT PRICES will be the basic price in place for computing the EXTRA or CREDIT.

Each UNIT PRICE shall include all equipment, tools, labor, permits, fees, etc., incidental to the installation and completion of the work involved.

The amounts shown are net changes to the Contract for additional work and include the Contractor's and any Subcontractor's amounts for overhead and profit. For deleted work, the net credit to the Contract shall be 10% less.

All work is to be accomplished in accordance with applicable Sections of the Specifications.

C.Y. = cubic yard	S.F. = square foot
S.Y. = square yard	V.F. = vertical foot
L.F. = linear foot	EA = Each

ITEMS

1. Mass Earth Work $_____
2. Granular Base Fill $_____
3. Crushed Stone $_____
4. Processed Aggregate $_____
5. Concrete Anchor Curbing $_____
6. Slot Drain in Concrete Anchor Curb $_____
7. Flat Panel Drain $_____

8. Collector Pipe Stone $_____
9. Field Base, Bottom Stone $_____
10. Field Base, Top Stone $_____
11. Geotextile Filter Fabric $_____
12. Natural Turf Field $_____
13. Softball Field Mix $_____
14. 4' High Black Vinyl Coated Chain-Link Fencing $_____
15. 6' High Black Vinyl Coated Chain-Link Fencing $_____
16. 8' High Black Vinyl Coated Chain-Link Fencing $_____
17. Track Pavement Asphalt Base $_____

ALTERNATES

The undersigned Bidder further proposed and agrees that should the following Alternates be accepted and included in the Contract, the amount of the Lump Sum Bid, as heretofore stated, shall be adjusted by the amount of said Alternates. All materials and workmanship shall be in strict accordance with the Drawings and specification and shall be in place prices. Refer to specification section 01 23 00 Alternates and the drawings for a detailed information and narratives for the scope of each Alternate.

Alternate No. 1: ADD: Elevated Accessible Bleacher Seating at bottom of East (home) bleacher

Add $_____

Alternate No. 2: ADD: East (home) bleacher code renovations:

Add $_____

Alternate No. 3 ADD: Prefabricated Press box and Structure (west)

Add $_____

Alternate No. 4 ADD: Multi-Sport Field Lighting Upgrade

Add $_____

Alternate No. 5 ADD: Prefabricated Storage Sheds & Structures

Add $_____

Alternate No. 6 ADD: Sanitary Line Replacement (south)

Add $_____

Alternate No. 7 ADD: Non-Fixed Track and Field Equipment

Add $_____

Alternate No. 8 ADD: Basic Softball Practice Field

Add $_____

Alternate No. 9 ADD: Expanded softball field Scope and Improvements

Add $_____

CONTRACT TIME

The undersigned Bidder hereby certifies that Substantial Completion and Final Completion will be achieved in accordance with the time designated in the General Conditions of the Contract for Construction.

The undersigned hereby certifies that he is able to furnish labor that can work in harmony with all other elements of labor employed or to be employed on the work. The Bid includes Addenda listed below and they are hereby acknowledged:

Addendum No. # _____ Dated _____

Addendum No. # _____ Dated _____

Addendum No. # _____ Dated _____

ATTACHMENTS

Enclosed herewith, is the Bid Security which is in the form of:

Bid Bond ( ) Certified Check ( )

In the Amount of
$_____Dollars

SIGNATURE

_____
Contractor Firm

_____
Authorized Signature

_____
Printed Name and Title

_____
Business Address

_____
City and State

_____
Telephone Number

_____
Telephone Fax Number

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NON-COLLUSION AFFIDAVIT

CITY PROJECT NO. COD 2018-02 (B)

State of _____)
)ss.
County of _____)

_____, being first duly sworn, deposes and says that:

(1) He is (owner, partner, officer, representative or agent) 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, agents, representatives, employees or parties in interest, including this affiant, 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 other Bidder or to secure through any collusion, conspiracy, connivance or unlawful agreement any advantage against the 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_____ .

_____
(Notary Public)

My commission expires _____ , 20_____ .

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CITY OF DERBY

SECURITY SATISFACTION
CITY PROJECT NO. COD 2018-02 (B)

The bidder, by submittal of this Bid, agrees with the City that the amount of the bid security deposited with this Bid fairly and reasonably represents the amount of damages the City will suffer due to the failure of the bidder to fulfill his agreements as above provided.

BY_____
(Signature and Title of Authorized Representative)

Business Name_____

Address_____

Date_____

The Bidder is:

1. Corporation, licensed in the State of _____
2. Partnership
3. Individual

Note: If the Bidder is a corporation, affix corporate seal and give below the names of its president, treasurer, and general manager, if any; if a partnership, give full names and residential addresses of all partners; and if an individual, give residential address if different from business address:

DO NOT REMOVE
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Suspension and Debarment

CITY PROJECT NO. COD 2018-02 (B)

The City will not enter into contracts with parties that have been debarred, suspended or excluded from Federal assistance programs per 2 CFR part 180 and part 1532 and 40 CFR part 31.35

Further, the bidder is required to verify that the bidder, or its principals, as defined at 49 CFR 19.995, or affiliates, as defined at 49 CFR 29.40 and 29.945.

The bidder is required to comply with 49 CFR 29, Subpart C and must include the requirement to comply with 49 CFR 29, Subpart C in any lower tier covered transaction it enters into.

By signing and submitting its bid or proposal, the bidder or proposer certifies as follows:

The certification in this clause is a material representation of fact relied upon by the City if it is later determined that the bidder or proposer knowingly rendered an erroneous certification, in addition to remedies available to the City the Federal Government may pursue available remedies, including but not limited to suspension and/or debarment. The bidder or proposer agrees to comply with the requirements of 49 CFR 29, Subpart C while this offer is valid and throughout the period of any contract that may arise from this offer. The bidder or proposer further agrees to include a provision requiring such compliance in its lower tier covered transactions.

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A G R E E M EN T
CITY PROJECT NO. COD 2018-02 (B)

THIS AGREEMENT, entered into on this _____ day of _____, 20____ by and between the **CITY OF DERBY** (hereinafter referred to as the **"CITY"**) and _____ (hereinafter referred to as the **"CONTRACTOR"**):

WHEREAS, the **CITY** desires to _____
_____

NOW, THEREFORE, **CITY** and the **CONTRACTOR** for the consideration of One ($1.00) Dollar and other valuable consideration and under the terms and conditions hereinafter set forth, hereby agree as follows, to wit:

1. The **CITY** hereby engages the **CONTRACTOR** and the **CONTRACTOR** hereby agrees to _____
_____

2. Additional work shall be performed by the **CONTRACTOR** only with the specific authorization of the **CITY** under a written amendment to this Agreement.

3. The **CONTRACTOR** covenants and agrees that it will perform its services under this Agreement in accordance with the highest standards and best practices of its trade.

4. In performing the services required under this Agreement, the **CONTRACTOR** shall conform to all applicable provisions of Federal, State and local laws and regulations including all environmental matters.

5. The **CONTRACTOR** shall indemnify, defend and save harmless the **CITY** for any damages, claims, actions and losses arising either directly or indirectly from the work performed by the **CONTRACTOR** or his subcontractors. The provisions of this paragraph shall survive the expiration or termination of this Agreement and shall in no way be limited by reason of any insurance coverage.

6. The **CONTRACTOR** shall provide the **CITY** with evidence of insurance coverage of a type and in the amounts required by the Contract Documents and naming the **CITY** as an additional insured if the **CITY** so requires. All insurance shall be taken out and maintained at no cost or expense to the **CITY** and the **CONTRACTOR** shall be responsible for the full amount of any deductible. A Performance Bond and a Payment Bond, each in the amount of 100% of the bid amount shall be presented to the **CITY** prior to commencing the performance of any work under

this agreement. The Performance Bond shall be released upon the City's final acceptance of the Project.

7. In providing the services required under this Agreement, the **CONTRACTOR** shall meet with **CITY** officials/representatives as often as reasonably necessary and shall be available upon request.

8. The City of Derby may terminate any Agent/Purchase Order at any time for any reason. Said termination shall not give rise to any claim against the City for damages or for additional compensation.

9. Nonappropriation: If the **CITY** fails to appropriate the funds required by this Agreement or fails for two consecutive months to make the payments required hereunder, the Agreement shall be deemed terminated and of no further force and effect, and the **CONTRACTOR** shall retain all sums previously deposited as liquidated damages, provided the **CITY** shall pay **CONTRACTOR** any amounts due for services rendered as of the date of termination.

10. The **CITY** shall compensate the **CONTRACTOR** _____
_____

11. The **CONTRACTOR** shall not assert any claim arising out of any act or omission by any agent, officer or employee of the **CITY** in the execution or performance of this Agreement.

12. The **CONTRACTOR** shall commence work on this project within ten (10) calendar days after issuance of a Notice to Proceed by the **CITY** or the **CITY's** designated representative. All work shall be completed by the **CONTRACTOR** in accordance with the schedule detailed _____

13. All work performed by the **CONTRACTOR** shall be subject to inspection and acceptance by the **CITY**.

14. The wages paid on an hourly basis to any mechanic, laborer or workman employed upon the work herein contracted to be done and the amount of payment or contribution paid or payable on behalf of each such employee to any employee welfare fund, as defined in subsection (i) of Section 31-53 of the General Statutes, shall be at a rate equal to the rate customary or prevailing for the same work in the same trade or occupation in the town in which such public work project is being constructed. Any contractor who is not obligated by agreement to make payment or contribution on behalf of such employees to any such employee welfare fund shall pay to each employee as part of his wages the amount of payment or contribution for his classification on each pay day.

15. Pursuant to Connecticut General Statutes Section 49-41a, the **CONTRACTOR**, within thirty (30) days after payment by the **CITY**, shall pay any amounts due any

subcontractor, whether for labor performed or materials furnished, when the labor or materials have been included in a requisition submitted by the **CONTRACTOR** and paid by the **CITY**. In addition, the **CONTRACTOR** shall include in each of its subcontracts a provision requiring each subcontractor to pay any amounts due any of its subcontractors, whether for labor performed or materials furnished, within thirty (30) days after such subcontractor receives a payment from the **CONTRACTOR** which encompasses labor and materials furnished by such subcontractor.

16. Pursuant to Connecticut General Statutes Section 49-41b, the **CITY** shall withhold five (5%) percent from any periodic payment or final payment until the work required herein has been completed and accepted by the **CITY**.

17. The **CONTRACTOR** acknowledges the execution of the Non-Collusion Affidavit which was submitted as part of the bid documents and reaffirms the statements provided for therein.

18. The Contractor agrees that the City of Derby, the State of Connecticut, agencies of the Federal Government, or any other authorized representatives, shall, until the expiration of three (3) years after the final payment under the contract, have access to and the right to examine any directly pertinent books, documents, papers, and records of such contractor, involving transactions related to the contractor.

    The period of access and examination described above, for records which relate to (1) appeals for disputes, (2) litigation of the settlement of claims arising out of the performance of this contract, or (3) costs and expenses in relation to the performance of the contract to which exception has been taken by the City, State or Federal government or any of their duly authorized representatives, shall continue until such appeals, litigation, claims or exceptions have been disposed of.

19. Pursuant to Connecticut General Statutes Section 31-52a, in the employment of mechanics, laborers or workmen to perform the work specified herein, preference shall be given to the residents of the state who are, and continuously for at least six (6) months prior to the date hereof have been, residents of this state, and if no such person is available, then to residents of other states.

CITY OF DERBY **CONTRACTOR**

By _____ By _____

Richard Dziekan _____
Mayor Contractor

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Contractor Agreement – Additional Language

CITY PROJECT NO. COD 2018-02 (B)

The Contractor covenants and agrees that it will perform its services under this Agreement in accordance with the highest standards and best practices of its trade.

In performing the services required under this Agreement, the Contractor shall conform to all applicable provisions of Federal, State and local laws and regulations including all environmental matters.

The Contractor shall indemnify, defend and save harmless the City for any damages, claims, actions and losses arising either directly or indirectly from the work performed by the Contractor or his subcontractors. The provisions of this paragraph shall survive the expiration or termination of this Agreement and shall in no way be limited by reason of any insurance coverage.

A Performance Bond and a Payment Bond, each in the amount of **the contract price** shall be presented to the CITY prior to commencing the performance of any work under this agreement. The Performance Bond shall be released upon the City's final acceptance of the Project.

In providing the services required under this Agreement, the Contractor shall meet with City officials/representatives as often as reasonably necessary and shall be available upon request.

The City may terminate this Agreement at any time for any reason. Said termination shall not five rise to any claim against the City for damages or for additional compensation.

Nonappropriation: If the City fails to appropriate the funds required by this Agreement or fails for two consecutive months to make the payments required hereunder, the Agreement shall be deemed terminated and of no further force and effect, and the Contractor shall retain all sums previously deposited as liquidated damages, provided the City shall pay Contractor any amounts due for services rendered as of the date of termination.

"The wages paid on an hourly basis to any mechanic, laborer or workman employed upon the work herein contracted to be done and the amount of payment or contribution paid or payable on behalf of each such employee to any employee welfare fund, as defined in subsection (h) of Section 31-53 of the General Statutes, shall be at a rate equal to the rate customary or prevailing for the same work in the same

trade or occupation in the town in which such public work project is being constructed. Any contractor who is not obligated by agreement to make payment or contribution on behalf of such employees to any such employee welfare fund shall pay to each employee as part of his wages the amount of payment or contribution for his classification on each pay day."

Pursuant to Connecticut General Statutes Section 49-41a, the Contractor, within thirty (30) days after payment by the City, shall pay any amounts due any subcontractor, whether for labor performed or materials furnished, when the labor or materials have been included in a requisition submitted by the Contractor and paid by the City. In addition, the Contractor shall include in each of its subcontracts a provision requiring each subcontractor to pay any amounts due any of its subcontractors, whether for labor performed or materials furnished, within thirty (30) days after such subcontractor receives a payment from the Contractor, which encompasses labor and materials furnished by such subcontractor.

The Contractor acknowledges the execution of the Non-Collusion Affidavit, which was submitted as part of the bid documents and reaffirms the statements provided for therein.

The Contractor agrees that the City of Derby, the State of Connecticut, agencies of the Federal Government, or any other authorized representatives shall, until the expiration of three (3) years after the final payment under the contract, have access to and the right to examine any directly pertinent books, documents, papers, and records of such contractor, involving transactions related to the contractor.

The period of access and examination described above, for records which relate to (1) appeals for disputes, (2) litigation of the settlement of claims arising out of the performance of this contract, or (3) costs and expenses in relation to the performance of the contract to which exception has been taken by the City, State or Federal government or any of their duly authorized representatives, shall continue until such appeals, litigation, claims or exceptions have been disposed of.

Pursuant to Connecticut General Statutes Section 31-52a, in the employment of mechanics, laborers or workmen to perform the work specified herein, preference shall be given to the residents of the state who are, and continuously for at least six (6) months prior to the date hereof have been, residents of this state, and if no such person is available, then to residents of other states.

PAYMENT BOND

CITY PROJECT NO. COD 2018-02 (B)

KNOW ALL MEN BY THESE PRESENTS:

That we, _____ a _____
(Name of Contractor) (Corporation, Partnership, Individual)

hereinafter called "Principal," and _____, of _____,
State of _____, hereinafter called the "Surety," are held firmly bound unto the City of Derby, Connecticut, 06418, hereinafter called the "City," in the penal sum of _____ DOLLARS ($)
in lawful money of the United States, for the payment of which sum well and truly to be made, we bind ourselves, our heirs, executors, administrators, and successors, jointly and severally, firmly by these presents.

THE CONDITION OF THIS OBLIGATION IS SUCH THAT:

WHEREAS, Principal entered into a certain Contract with the City, dated the _____ day of _____, 20 ____, a copy of which is hereto attached and made a part hereof for the construction of:

_____

_____

_____

_____

NOW, THEREFORE, if the Principal shall promptly make payment to all persons, firms, subcontractors, and corporations furnishing materials for or performing labor in the prosecution of the work provided for in such Contract, and any authorized extension or modification thereof, including all amounts due for materials, lubricants, oil, gasoline, coal and coke, repairs on machinery, construction of such work, and all insurance premiums on said work, or otherwise, then this obligation shall be void; otherwise to remain in full force and effect.

PROVIDED, FURTHER, that the said Surety, for value received hereby stipulates and agrees that no change, extension of time, alteration, or addition to the terms of the Contract or to the work to be performed there under of the Specifications accompanying the same shall in any way affect its obligation on this Bond, and it does hereby waive notice of any such change, extension of time, alteration, or addition to the terms of the Contract or to work of the Specifications.

PROVIDED, FURTHER, that no final settlement between the City and the Contractor shall abridge the right of any beneficiary hereunder, whose claim may be unsatisfied.

IN WITNESS WHEREOF, this instrument is executed in three (3) counterparts, each one of which shall be deemed an original, this the _____ day of _____, 20 _____.

ATTEST:

_____
(Principal)

_____
(Principal) Secretary
(SEAL)

BY: _____ (s)

_____
(Address - Zip Code)

_____
(Witness as to Principal)

_____
(Address - Zip Code)

_____
(Surety)

ATTEST:

_____
(Surety) Secretary
(SEAL)

BY: _____
(Attorney-in-fact)

_____
(Witness as to Surety)

_____
(Address - Zip Code)

_____
(Address - Zip Code)

NOTE: Date of Bond must not be prior to date of Contract. If Contractor is Partnership, all Partners should execute Bond.

PERFORMANCE BOND

CITY PROJECT NO. COD 2018-02 (B)

KNOW ALL MEN BY THESE PRESENTS:

That we, _____ a _____
(Corporation, Partnership, Individual)

hereinafter called "Principal," and _____, of _____,
State of _____, hereinafter called the "Surety,"
are held firmly bound unto the City of Derby, Connecticut 06418, hereinafter called the "City,"
in the penal sum of _____
DOLLARS ($ _____) in lawful money of the United States, for the payment of which sum well and truly to be made, we bind ourselves, our heirs, executors, administrators, and successors, jointly and severally, firmly by these presents.

THE CONDITION OF THIS OBLIGATION IS SUCH THAT:

WHEREAS, Principal entered into a certain Contract with the City, dated the _____ day of _____, 20_____, a copy of which is hereto attached and made a part hereof for the construction of:

_____

_____

_____

_____

NOW, THEREFORE, if the Principal shall well, truly, and faithfully perform its duties, all the undertakings, covenants, terms, conditions, and agreements of said Contract during original term thereof, and any extensions thereof which may be granted by the City, with or without notice to the Surety, and if he shall satisfy all claims and demands incurred under such Contract, and shall fully indemnify and save harmless the City from all costs and damages which it may suffer by reason of failure to do so, and shall reimburse and repay the City all outlay and expense which the City may incur in making good any default, then this obligation shall be void; otherwise to remain in full force and effect.

PROVIDED, FURTHER, that the said Surety, for value received hereby stipulates and agrees that no change, extension of time, alteration, or addition to the terms of the Contract or to the work to be performed hereunder of the Specifications accompanying the same shall in any way affect its obligation on this Bond, and it does hereby waive notice of any such change, extension of time, alteration, or addition to the terms of the Contract or to work of the Specifications.

PROVIDED, FURTHER, that no final settlement between the City and the Contractor shall abridge the right of any beneficiary hereunder, whose claim may be unsatisfied.

IN WITNESS WHEREOF, this instrument is executed in three (3) counterparts, each one of which shall be deemed an original, this the _____ day of _____, 20_____.

ATTEST:

_____
(Principal)

_____
(Principal) Secretary
(SEAL)

BY: _____ (s)

_____
(Address - Zip Code)

_____
(Witness as to Principal)

_____
(Address - Zip Code)

_____
(Surety)

ATTEST:

_____
(Surety) Secretary
(SEAL)

BY: _____
(Attorney-in-fact)

_____
(Witness as to Surety)

_____
(Address - Zip Code)

_____
(Address - Zip Code)

NOTE: Date of Bond must not be prior to date of Contract. If Contractor is Partnership, all Partners should execute Bond.

GENERAL CONDITIONS

CITY PROJECT NO. COD 2018-02 (B)

DEFINITIONS

Wherever used in these General Conditions or in the other contract Documents, the following terms have the meanings indicated, which are applicable to both the singular and plural thereof:

Addenda: Written or graphic instruments issued prior to the opening of Bids, which clarify, correct, or change the bidding documents or the Contract Documents.

Agreement: The written agreement between the City and the Contractor covering the Work to be performed; other contract Documents are attached to the Agreement and made a part thereof as provided therein.

Application for Payment: The form accepted by the City of Derby, which is to be used by the Contractor in requesting progress or final payment and which is to include such supporting documentation as is required.

Bid: The offer or proposal of the Bidder submitted on the prescribed form setting forth the prices for the Work to be performed.

Bonds: Bid Bonds, Payment Bonds, Performance Bonds and other instruments of security.

Change Order: A written order to the Contractor signed by the City of Derby's Authorized Representative authorizing an addition, deletion, or revision in the Work, or an adjustment in the Contract Price or the Contract Time issued after the effective date of the Agreement.

Contract Documents: The Agreement, Addenda (which pertain to the Contract Documents) the Contractor's Bid (when attached as an exhibit to the Agreement), the Bonds, these General Conditions, the Supplemental Conditions, the Specifications, the Special Provisions, the Drawings (as the same are more specifically identified in the Agreement), together with all Modifications issued after the execution of the Agreement.

Contract Price: The monies payable by the City to the Contractor under the Contract Documents as stated in the Agreement.

Contract Time: The number of days or the date stated in the Agreement for the completion of the Work.

Contractor: The person, firm, or corporation with whom the City has entered into the Agreement.

Effective Date of the Agreement: The date indicated in the Agreement on which it becomes effective, but if no such date is indicated it means the date on which the Agreement is signed and delivered by the last of the two parties to sign and deliver.

Field Order: A written order issued by the City of Derby or Authorized Representative, which orders minor changes in the Work.

Notice of Award: The written notice by the City to the apparent successful Bidder stating that upon compliance by the apparent successful Bidder with the conditions precedent enumerated therein, within the time specified, the City will sign and deliver the Agreement.

Notice to Proceed: A written notice given by the City to the Contractor fixing the date on which the Contract Time will commence to run and on which the Contractor shall start to perform his obligation under the Contract Documents.

Specifications: Those portions of the Contract Documents consisting of written technical descriptions of materials, equipment, construction systems, standards, and workmanship as applied to thereto.

Subcontractor: An individual, firm, or corporation having a direct contract with the Contractor of with any other subcontractor for the performance of a part of the work at the site.

Substantial Completion: The work (or a specified part thereof) has progressed to the point where, in the opinion of the City of Derby's Authorized Representative, it is sufficiently complete, in accordance with the Contract Documents, so that the Work (or specified part) can be utilized for the purposes for which it was intended.

Work: The entire completed construction of the various separately identifiable parts thereof required to be furnished under the Contract Documents. Work is the result of performing services, furnishing labor, and furnishing and incorporating materials and equipment into the construction, all as required by the Contract Documents.

GENERAL MATTERS

Delivery of Bonds

When the Contractor delivers the executed Agreements to the City, the Contractor shall also deliver to the City such Payment and Performance Bonds as the Contractor may be required to furnish.

Copies of Documents

The City shall furnish the Contractor with sufficient copies of the Contract Documents as are reasonably necessary for the execution of the Work.

Commencement of Contract Time; Notice to Proceed

The Contract Time will commence to run on the effective date of the Agreement, or, if a Notice to Proceed is given on the day indicated in the Notice to Proceed.

Project Schedule

Bids Due	**Friday, June 1, 2018**
a. Contractor Scope Reviews	June 04-05, 2018
b. Recommendation to Building Committee *Anticipated Building Committee Meeting Date	Wednesday, June 6, 2018
c. City and Contractor Executions	June 7 to June 15, 2018
Construction (June 2108-November 2018)	**COMPLETED BY:**
a. Construction Permit, Submittals, & Mobilizations (2 weeks)	June 18-22, 2018
b. Building Abatement (2 weeks) (by others)	May 2 -June 1, 2018
c. Retaining Walls and Bleacher Modifications	July 23-August 3, 2018
d. Track Base Construction	August 6-17, 2018
e. Synthetic Turf Field Installation (4 weeks)	August 20-September 14, 2018
f. Track Throwing Event Installation (2 weeks)	August 20-September 7, 2018
g. Track Surfacing Installation (2 weeks)	September 17-21, 2018
h. Press Box Installation (2 weeks)	September 24-October 5, 2018
i. Fencing, Netting, and Landscaping (1 weeks)	October 8-12, 2018
j. Field and Track Testing, Punch List (1 week)	October 15-19, 2018
k. Close-Out (2 weeks)	October 22-November 2, 2018
l. Project Complete	**November 2, 2018**

Note: Contractor shall be aware, and plan accordingly, for the construction of the J.R Payden Field House and Baseball Field project concurrently and adjacent to this project. Coordination between the two General Contractors cannot be overemphasized.

Starting the Project

The Contractor shall start to perform the Work on the date when the Contract Time commences to run, but no Work shall be done at the site prior to the date on which the Contract Time commences to run

Before Starting Construction

Before undertaking each part of the Work, the Contractor shall carefully study and compare the Contract Documents and check and verify pertinent figures shown thereon and all applicable field measurements. The Contractor shall promptly report in writing to the City of Derby's Authorized Representative any conflict, error, or discrepancy, which the Contractor may discover.

Within ten days after the effective date of the Agreement, the Contractor shall submit to the City of Derby or Authorized Representative for review and acceptance an estimated progress schedule indicating the starting and completion dates of the various stages of the Work, and a preliminary schedule of values of the Work.

Before any Work at the site is started, the Contractor shall deliver to the City of Derby's Authorized Representative certificates of insurance, which the Contractor is required to purchase and maintain.

Preconstruction Conference

Before the Contractor starts the Work at the site, a conference may be required by the City of Derby's Authorized Representative for review and acceptance of the schedules, to establish procedures for handling submittals, for processing Applications for Payment, and to establish a working understanding among the parties as to the Work.

Suspension and Debarment

The City will not enter into contracts with parties that have been debarred, suspended or excluded from Federal assistance programs per 2 CFR part 180 and part 1532 and 40 CFR part 31.35.

Further the bidder is required to verify that the bidder, or its principals, as defined at 49 CFR 19.995, or affiliates, as defined at 49 CFR 29.905, are excluded or disqualified as defined at 49 CFR 20.40 and 29.945.

The bidder is required to comply with 49 CFR 29, Subpart C and must include the requirement to comply with 49 CFR 29, subpart C in any lower tier covered transaction it enters into.

By signing and submitting its bid or proposal, the bidder or proposer certifies as follows:

The certification in this clause is a material representation of fact relied upon by the City if it is later determined that the bidder or proposer knowingly rendered an erroneous certification, in addition to remedies available to the City, the Federal Government may pursue available remedies, including but not limited to, suspension and/or debarment. The bidder or proposer agrees to comply with the requirements of 49 CFR 20, Subpart C while this offer is valid and throughout the period of any contract that may arise from this offer. The bidder or proposer further agrees to include a provision requiring such compliance in its lower tier covered transactions.

CONTRACT DOCUMENTS; INTENT

Intent

The Contract Documents comprise the entire Agreement between the City and the Contractor concerning the Work.

The Contract Documents are complementary; what is called for by one is as binding as if called for by all. If, during the performance of the work the Contractor finds a conflict, error, or discrepancy in the Contract Documents, he shall report it to the City of Derby's Authorized Representative in writing at once and before proceeding with the Work affected thereby.
It is the intent of the Specifications to describe a complete project to be constructed in accordance with the Contract Documents. Any Work that may reasonably be inferred from the Specifications as being required to produce the intended result shall be supplied whether or not it is specifically called for. When words, which have a well-known technical or trade meaning, are used to describe Work, materials, or equipment, such words shall be interpreted in accordance with such meaning. Reference to standard specifications, manuals, or codes of any technical society, organization, or association, or to the code of any governmental authority, whether such reference be specified or by implication, shall mean the latest standard specification, manual, or code in effect at the time of opening of Bids, except as may be otherwise specifically stated. However, no provision of any referenced standard specification, manual, or code (whether or not specifically incorporated by reference in the Contract Documents) shall change the duties and responsibilities of the City, the Contractor, or the City's Authorized Representative, or any of their agents or employees from those set

forth in the Contract Documents. Clarifications and interpretations of the Contract Documents shall be issued by the City of Derby's Authorized Representative.

The Agreement shall be governed by the laws of the State of Connecticut.

AVAILABILITY OF LANDS, PHYSICAL CONDITIONS, REFERENCE POINTS

Availability of Lands

The City shall furnish, as indicated in the Contract Documents, the lands upon which the Work is to be performed, rights-of-way for access thereto, and such other lands, which are designated for the use of the Contractor. The Contractor shall provide for all additional lands and access thereto that may be required for temporary construction facilities or storage of materials and equipment.

Unforeseen Physical Conditions

The Contractor shall promptly notify the City of Derby's Authorized Representative in writing of any subsurface or latent physical conditions at the site or in an existing structure differing materially from those indicated or referred to in the Contract Documents. The City of Derby's Authorized Representative will promptly review those conditions and determine if further investigation or tests are necessary. If the City of Derby's Authorized Representative finds that the results of such investigations or test indicated that there are subsurface or latent physical conditions which differ materially from those intended in the Contract Documents, and which could not reasonably have been anticipated by the Contractor, a Change Order shall be issued incorporating the necessary revisions.

Reference Points

The City shall provide documentation for construction to establish reference points, which in its judgment are necessary to enable the Contractor to proceed with the Work. The Contractor shall be responsible for laying out the Work, shall protect and preserve the established reference points, and shall make no changes or relocations without prior written approval of the City. The Contractor shall report to the City of Derby's Authorized Representative whenever any reference point is lost or destroyed or requires relocation because of necessary changes in grades or locations, and shall be responsible for replacement or relocation of such reference points by professionally qualified personnel.

INSURANCE

Contractor's Liability Insurance

The Contractor shall purchase and maintain such comprehensive general liability and other insurance in an amount and with a company acceptable to the City as will provide protection from claims set forth below which may arise out of or result from the Contractor's performance of the Work and Contractor's other obligations under the Contract Documents, whether such performance is by the Contractor, by any subcontractor, by anyone directly or indirectly employed by any of them, or by anyone for whose acts any of them may be liable:

- Claims under worker's or workmen's compensation, disability benefits, and other similar employee benefit acts;
- Claims for damages because of bodily injury, sickness or disease, or death of any person other than the Contractor's employees;
- Claims for damages insured by personal injury liability coverage, which are sustained by any person as a result of an offense directly or indirectly related to the employment of such person by the Contractor, or by any other person for any other reason;
- Claims for damages, other than to the Work itself, because of injury to or destruction of tangible property, including loss of use resulting therefrom; and
- Claims for damages because of bodily injury or death of any person or property damage arising out of the ownership, maintenance, or use of any motor vehicle.

The insurance required by this paragraph shall include the specific coverage's and be written for not less than the limits of liability and coverage's provided in the Supplemental Conditions, or required by law, whichever is greater. The comprehensive general liability insurance shall include completed operations insurance. All such insurance shall contain a provision that the coverage afforded will not be canceled, materially changed, or renewal refused until at least thirty days prior written notice has been given to the City and the City of Derby's Authorized Representative. All such insurance shall remain in effect until final payment and at all times thereafter when the Contractor may be correcting, removing or replacing defective Work. General liability insurance shall be endorsed to include the City of Derby as an additional insurance

and that such insurance to be primary and non-contributory and not excess to any liability policy carried by the City of Derby.

Contractual Liability Insurance

The comprehensive general liability insurance required above will include contractual liability insurance applicable to the Contractor's obligations.

City's Liability Insurance

The City shall be responsible for purchasing and maintaining its own liability insurance and at its option may purchase and maintain such insurance as will protect the City against claims which may arise from operations under the Contract Documents.

Property Insurance

The City shall not be responsible for purchasing and maintaining any property insurance to protect the interests of the Contractor or subcontractors in the Work to the extent of any deductible amounts. If the Contractor wishes property insurance coverage within the limits of such amounts, the Contractor may purchase and maintain it at his own expense.

Waiver of Rights

The City and the Contractor waive all rights against each other and the subcontractors and their agents and employees and separate contractors (if any) and their subcontractor's agents and employees, for damages caused by fire or other peril to the extent covered by insurance provided or any other property insurance applicable to the Work, except such rights as they may have to the proceeds of such insurance held by the City as trustee. The Contractor shall require written waivers from each subcontractor; each such waiver will be in favor of all other parties enumerated in this paragraph.

Receipt and Application of Proceeds

Any insured loss under the policies of insurance required shall be adjusted with the City and made payable to the City as trustee for the insured's, as their interests may appear, subject to the requirements of any applicable mortgage clause. The City shall deposit in a separate account any money so received, and it shall distribute it in accordance with such agreement as the parties in interest may reach. If no other special agreement is reached the damaged Work shall be repaired or replaced, the monies so received applied on account thereof and the Work and the cost thereof covered by an appropriate Change Order.

The City as trustee shall have power to adjust and settle any loss with the insurers, unless one of the parties in interest shall object in writing within fifteen days after the

occurrence of loss to the City's exercise of this power. If such objection be made, the City as trustee shall make settlement with the insurers in accordance with such agreement as the parties in interest may reach.

Acceptance of Insurance

If the City has any objection to the covered afforded by or other provisions of the insurance required to be purchased and maintained by the Contractor on the basis of its not complying with the Contract Documents, the City will notify the Contractor in writing thereof within ten days of the date of delivery of such certificates to the City. If the Contractor has any objection to the coverage afforded by or other provisions of the policies of insurance required to be purchased and maintained by the City on the basis of their not complying with the Contract Documents, the Contractor will notify the City in writing thereof within ten days of the date of delivery of such certificates to the Contractor. The City and the Contractor will each provide to the other such additional information in respect to insurance provided by him as the other may reasonably request. Failure by the City or the Contractor to give any such notice of objection within the time provided shall constitute acceptance of such insurance purchased by the other as complying with the Contract Documents.

Partial Utilization – Property Insurance

If the City finds it necessary to occupy or use a portion or portions of the Work prior to Substantial Completion of all the work, such use or occupancy may be accomplished provided that no such use or occupancy shall commence before the insurer's providing the property insurance have acknowledged notice thereof and in writing effected the changes in coverage necessitated thereby. The insurers providing the property insurance shall consent by endorsement on the policy or policies, but the property insurance shall not be canceled or lapse on account of any such partial use or occupancy.

CONTRACTOR'S RESPONSIBILITIES

Supervision and Superintendence

The Contractor shall supervise and direct the Work competently and efficiently, devoting such attention thereto and applying such skills and expertise as may be necessary to perform the Work in accordance with the Contract Documents. The Contractor shall be solely responsible for the means, methods, techniques, sequences, and procedures of construction. The Contractor shall be responsible to see that the finished Work complies accurately with the Contract Documents.

The Contractor shall assign to the project a competent field superintendent. The superintendent shall spend sufficient time at the site as necessary to insure that work is proceeding efficiently and in accordance with the Contract Documents.

The superintendent shall not be replaced, except on a temporary basis because of sickness, vacations, etc… without written notice to the City of Derby's Authorized Representative.

The superintendent shall be the Contractor's representative at the site and shall have authority to act on behalf of the Contractor. All communications given to the superintendent shall be as binding as if given to the Contractor.

Labor, Materials and Equipment

The Contractor shall provide competent, suitably qualified personnel to survey and layout the Work and perform construction as required by the Contract Documents. The contractor shall at all times maintain good discipline and order at the site. Except in connection with the safety or protection of persons or the Work or property at the site or adjacent thereto, and except as otherwise indicated in the Supplemental Conditions, all Work at the site shall be performed during regular working hours, and the Contractor will not permit overtime work or the performance of work on Saturday, Sunday, or any legal holiday without the City of Derby's Authorized Representative's written consent.

The Contractor shall furnish all materials, equipment, labor, transportation, construction, equipment and machinery, tools, appliances, fuel, power, light, heat, telephone, water and sanitary facilities, and all other facilities and incidentals necessary for the execution, testing, initial operation, and completion of the Work.

All materials and equipment shall be of good quality and new, except as otherwise provided in the Contract Documents. If required by the City of Derby's Authorized Representative, the Contractor shall furnish satisfactory evidence (including reports or required tests) as to the kind and quality of materials and equipment.
All materials and equipment shall be applied, installed, connected, erected, used, cleaned, and conditioned in accordance with the instructions of the applicable manufacturer, fabricator, supplier, or distributor, except as otherwise provided in the Contract Documents.

Equivalent Materials and Equipment

Whenever materials or equipment are specified or described in the Specifications by using the name of a proprietary item or the name of a particular manufacturer, fabricator, supplier, or distributor, the naming of the item is intended to establish the

type, function, and quality required. Unless the name is followed by words indicating that no substitution is permitted, materials or equipment of other manufacturers, fabricators, suppliers, or distributors may be accepted by the City of Derby's Authorized Representative if sufficient information is submitted by the Contractor to allow the City of Derby's Authorized Representative to determine that the material or equipment proposed is equivalent to that named. The procedure for review by the City of Derby's Authorized Representative will be as follows:

Requests for review of substitute items of material and equipment will not be accepted by the City of Derby's Authorized Representative from anyone other than the Contractor. If the Contractor wishes to furnish or use a substitute item of material or equipment the Contractor shall make written application to the City of Derby's Authorized Representative for acceptance thereof, certifying that the proposed substitute will perform adequately the functions called for by the general design, be similar and of equal substance to that specified, and be suited to the same use and capable of performing the same function as that specified. The application will state whether or not acceptance of the substitute for use in the Work will require a change in the Specifications to adapt the design to the substitute. All variations of the proposed substitute from that specified shall be identified in the application and available maintenance, repair, and replacement service will be indicated. The application will also contain an itemized estimate of all costs that will result directly or indirectly from acceptance of such substitute, including costs of redesign and claims of other contractors affected by the resulting change, all of which shall be considered by the City of Derby's Authorized Representative in evaluating the proposed substitute. The City of Derby's Authorized Representative may require the Contractor to furnish at the Contractor's expense additional data about the proposed substitute. The City of Derby's Authorized Representative will be the sole judge of acceptability, and no substitute will be ordered or installed without the City of Derby's Authorized Representative's prior written acceptance.

The City of Derby's Authorized Representative will record time required by the City of Derby's Authorized Representative and the City of Derby's Authorized Representative's consultants in evaluating substitutions proposed by the Contractor and in making changes in the Specifications occasioned thereby. Whether or not the City of Derby's Authorized Representative accepts a proposed substitute, the Contractor shall reimburse the City for the charges of the City of Derby's Authorized Representative and the City of Derby's Authorized Representative's consultants for evaluating any proposed substitute.

Concerning Subcontractors

The Contractor shall not employ any subcontractor or other person or organization (including those who are to furnish the principal items of materials or equipment), whether initially or as a substitute, against whom the City may have reasonable objection. A subcontractor or other person or organization identified in writing to the City by the Contractor prior to the Notice of Award will be deemed acceptable to the City. Acceptance of any subcontractor, other person, or organization by the City shall not constitute a waiver of any right of the City to reject defective Work. If the City or City of Derby's Authorized Representative after due investigation has reasonable objection to any subcontractor, other person, or organization proposed by the Contractor after the Notice of Award, the Contractor shall submit an acceptable substitute and the Contract Price shall be increased or decreased by the difference in cost occasioned by such substitution, and an appropriate Change Order shall be issued. The Contractor shall not be required to employ any subcontractor, other person, or organization against whom the Contractor has reasonable objection.

The Contractor shall be fully responsible for all acts and omissions of his subcontractors and of persons and organizations directly or indirectly employed by them and of persons and organizations for whose acts any of them may be liable to the same extent that the Contractor is responsible for the acts and omissions of persons directly employed by the Contractor. Nothing in the Contract Documents shall create any obligation on the part of the City to pay or to see to the payment of any monies due any subcontractor or other person or organization, except as may otherwise be required by law. The City or the City of Derby's Authorized Representative may furnish to any subcontractor or other person or organization, to the extent practicable, evidence of amounts paid to the Contractor on account of specific Work done.

Patent Fees and Royalties

The Contractor shall pay all license fees and royalties and assume all costs incident to the use in the performance of the Work or the incorporation in the Work of any invention, design, process, product, or device, which is the subject of patent rights or copyrights held by others. The Contractor shall indemnify and hold harmless the City and the City of Derby's Authorized Representative and anyone directly or indirectly employed by either of them from and against all claims, damages, losses, and expenses (including attorneys' fees) arising out of any infringement of patent rights or copyrights incident to the use in the performance of the Work, and shall defend all such claims in connection with any alleged infringement of such rights.

Permits

Unless otherwise provided in the Supplemental Conditions, the Contractor shall obtain and pay for all construction permits and licenses. The Contractor shall pay all governmental charges and inspection fees necessary for the prosecution of the Work. The Contractor shall pay all charges of utility service companies for connections to the Work.

Laws and Regulations

The Contractor shall give all notices and comply with all laws, ordinances, rules, and regulations, applicable to the Work. If the Contractor observes that the Specifications are at variance therewith, the Contractor shall give the City of Derby's Authorized Representative prompt written notice thereof, and any necessary changes shall be adjusted by an appropriate Change Order. If the Contractor performs any Work knowing or having reason to know that it is contrary to such laws, ordinances, rules, and regulations, and without such notice to the City of Derby's Authorized Representative, the Contractor shall bear all costs arising therefrom.

Use of Premises

The Contractor shall confine construction equipment, the storage of materials and equipment, and the operations of workmen to areas permitted by law, ordinances, permits, or the requirements of the Contract Documents, and shall not unreasonably encumber the premises with construction equipment or other materials or equipment.

During the progress of the Work, the Contractor shall keep the premises free from accumulation of waste materials, rubbish, and other debris resulting from the Work. At the completion of the Work, the Contractor shall remove all waste materials, rubbish, and debris from and about the premises as well as all tools, appliances, construction equipment and machinery, and surplus materials, and shall leave the site clean and ready for occupancy by the City. The Contractor shall restore to their original condition those portions of the site not designated for alteration by the Contract Documents. The Contractor shall not load nor permit any part of any structure to be loaded in any manner that will endanger the structure, nor shall the Contractor subject any part of the work or adjacent property to stresses or pressures that will endanger it.

Taxes

No amount shall be included in the bid price for Connecticut State Sales Tax or for Federal Excise and Transportation Taxes.

Record Documents

The Contractor shall keep one record copy of all Specifications, Drawings, Addenda, Modifications, Shop Drawings, and samples at the site in good order and annotated to show all changes made during the construction process. These shall be available to the Project Engineer for examination and shall be delivered to the City of Derby's Authorized Representative upon completion of the Work.

Safety Protection

The contractor shall be responsible for initiating, maintaining, and supervising all safety precautions and programs in connection with the Work. The Contractor shall take all necessary precautions for the safety of, and shall provide the necessary protection to prevent damage, injury of loss to:

- All employees on the Work and other persons, who may be affected thereby,
- All the Work and all materials or equipment to be incorporated therein, whether in storage on or off the site, and
- Other property at the site or adjacent thereto, including trees, shrubs, lawns, walks, pavements, roadways, structures, and utilities not designated for removal, relocation, or replacement in the course of construction.

The Contractor shall comply with all applicable laws, ordinances, rules, regulations, and orders of any public body having jurisdiction for the safety of persons or property or to protect them from damage, injury, or loss; and shall erect and maintain all necessary safeguards for such safety and protection. The Contractor shall notify the City of adjacent property and utilities when prosecution of the Work may affect them. All damage, injury, or loss to any property caused directly or indirectly, in whole or in part, by the Contractor, any subcontractor, or anyone directly or indirectly employed by any of them or anyone for whose acts any of them may be liable, shall be remedied by the Contractor. The Contractor's duties and responsibilities for the safety and protection of the Work shall continue until such time as all the Work is completed.

The Contractor shall designate a responsible member of his organization at the site whose duty shall be the prevention of accidents. This person shall be the Contractor's superintendent unless otherwise designated in writing by the Contractor to the City of Derby's Authorized Representative.

Emergencies

In emergencies affecting the safety or protection of persons or the Work or property at the site or adjacent thereto, the Contractor, without special instruction or authorization from the City of Derby's Authorized Representative or the City, is obligated to act to prevent threatened damage, injury, or loss. The Contractor shall give the City of Derby's Authorized Representative prompt written notice of any significant changes in the Work or deviations from the Contract Documents caused thereby.

Continuing the Work

The Contractor shall carry on the Work and maintain the progress schedule during all disputes or disagreements with the City. No Work shall be delayed or postponed pending resolution of any disputes or disagreements, except as the Contractor and the City may otherwise agree in writing.

Indemnification

To the fullest extent permitted by law, the Contractor shall indemnify and hold harmless the City and the City of Derby's Authorized Representative and their agents and employees from and against all claims, damages, losses, and expenses including but not limited to attorney's fees arising out of the performance of the Work, provided that any such claim, damage, loss or expense (a) is attributable to bodily injury, sickness, disease, or death, or to injury to or destruction of tangible property (other than the Work itself) including the loss of use resulting therefrom and (b) is caused in whole or in part by any negligent act or omission of the Contractor, any subcontractor, anyone directly or indirectly employed by any of them or anyone for whose acts any of them may be liable, regardless of whether or not it is caused in part by a party indemnified hereunder.

In any and all claims against the City or the City of Derby's Authorized Representative or any of their agents or employees by any employee of the Contractor, any subcontractor, anyone directly or indirectly employed by any of them, or anyone for whose acts any of them may be liable, the indemnification obligation shall not be limited in any way by any limitation of the amount or type of damages, compensation, or benefits payable by or for the Contractor or any subcontractor under workers' or workmen's' compensation acts, disability benefit acts, or other employee benefit acts.

WORK BY OTHERS

The City may perform additional work related to the Project by itself, or have additional work performed by utility service companies, or let other direct contracts therefore, which shall contain General Conditions similar to these. The Contractor shall afford the

City, utility service companies, and the other contractors who are parties to such direct contract reasonable opportunity for the introduction and storage of materials and equipment and the execution of work, and shall properly connect and coordinate his/her Work with theirs.
If any part of the Contractor's Work depends, for proper execution or results, upon the work of any such other Contractor or utility service company, the Contractor shall inspect and promptly report to the City of Derby's Authorized Representative in writing any patent or apparent defects or deficiencies in such work that render it unsuitable for such proper execution and results. The Contractor's failure to so report shall constitute an acceptance of the other work as fit and proper for integration with the Contractor's Work except for latent or non-apparent defects and deficiencies in the other work.

The Contractor shall do all cutting, fitting, and patching of his Work that may be required to make its several parts come together properly and integrate with such other work. The Contractor shall not endanger any work of others by cutting, excavating, or otherwise altering their work and will only cut or alter their work with the written consent of the City of Derby's Authorized Representative and the others whose work will be affected.

If the performance of additional work by other contractors or utility service companies or the City was not noted in the Contract Documents, written notice thereof shall be given the Contractor prior to starting any such additional work.

Note: Contractor shall be aware, and plan accordingly, for the construction of the J.R Payden Field House and Baseball Field project concurrently and adjacent to this project. Coordination between the two General Contractors cannot be overemphasized.

CITY'S RESPONSIBILITIES

The City shall issue all communications to the Contractor through the City of Derby's Authorized Representative.

The City shall furnish the data required of the City under the Contract Documents promptly and shall make payments to the Contractor promptly after they are approved in accordance with the provisions of the Supplemental Conditions.

CITY OF DERBY'S AUTHORIZED REPRESENTATIVE'S STATUS DURING CONSTRUCTION

City Representative

The City of Derby's Authorized Representative shall be the City's representative during the construction period. The duties and responsibilities and the limitations of authority of the City of Derby's Authorized Representative as the City's representative during construction set forth in the Contract Documents and shall not be extended without written consent of the City and the City of Derby's Authorized Representative.

Visits to the Site

The City of Derby's Authorized Representative or his representative shall make visits to the site at intervals appropriate to the various stages of construction to observe the progress and quality of the extended Work and to determine, in general, if the Work is proceeding in accordance with the Contract Documents.

Clarifications and Interpretations

The City of Derby's Authorized Representative shall issue with reasonable promptness such written clarifications or interpretations of the Contract Documents (in the form of drawings or otherwise) as the City of Derby's Authorized Representative may determine necessary.

Rejecting Defective Work

The City of Derby's Authorized Representative shall have authority to disapprove or reject Work, which is defective, and shall also have authority to require special inspection or testing of the Work whether or not the Work is fabricated, installed, or completed.

Decisions on Disagreements

The Director of Public Works shall be the interpreter of the requirements of the Contract Documents and judge of the acceptability of the Work thereunder. Claims, disputes, and other matters relating to the acceptability of the Work or the interpretation of the requirements of the Contract Documents pertaining to the execution and progress of the Work shall be referred to the City of Derby's Authorized Representative in writing with a request for a formal decision in accordance with this paragraph, which the City of Derby's Authorized Representative shall render in writing within a reasonable time.

Limitations on the City of Derby's Authorized Representative's Responsibilities

Neither the City of Derby's Authorized Representative's authority to act under the Contract Documents nor any decision made by the City of Derby's Authorized Representative in good faith either to exercise or not exercise such authority shall give

rise to any duty of responsibility of the City of Derby's Authorized Representative to the Contractor, any subcontractor, any manufacturer, fabricator, supplier, or distributor, or any of their agents or employees, or any other person performing any of the Work.

Whenever in the Contract Documents the terms "as ordered," "as directed," "as required," "as allowed," or "reasonable," "suitable," "acceptable," "proper," or "satisfactory" or adjectives of like effect or import are used, to describe requirements, direction, review, or judgment will be solely to evaluate the Work for compliance with the Contract Documents. The use of any such term or adjective never indicates that the Engineer shall have authority to supervise or direct performance of the Work or authority to undertake responsibility contrary to the provisions of the following:

The City of Derby's Authorized Representative will not be responsible for the Contractor's means, methods, techniques, sequences, or procedures of construction, or the safety precautions and programs incident thereto.

The City of Derby's Authorized Representative will not be responsible for the acts or omissions of the Contractor or of any subcontractors, or of the agents or employees of any Contractor or subcontractor, or of any other persons at the site or otherwise performing any of the Work.

CHANGES IN THE WORK

Without invalidating the Agreement, the City may at any time or from time to time, order additions, deletions, or revisions in the Work; these will be authorized by Change Orders. Upon receipt of a Change Order, the Contractor shall proceed with the Work involved. All such Work shall be executed under the applicable conditions of the Contract Documents. If any Change Order causes an increase or decrease in the Contract Price or an extension or shortening of the Contract Time, an equitable adjustment will be made.

The City of Derby's Authorized Representative may authorize minor changes in the Work not involving an adjustment in the Contract Price or the Contract Time, which are consistent with the overall intent of the Contract Documents. These may be accomplished by a Field Order and shall be binding on the City and also on the Contractor who shall perform the change promptly. If the Contractor believes that a Field Order justifies an increase in the Contract Price or Contract Time, he shall notify the City of Derby's Authorized Representative in writing.

Additional Work performed without authorization of a Change Order will not entitle the Contractor to an increase in the Contract Price or an extension of the Contract Time, except in the case of an emergency.

If notice of any change affecting the general scope of the Work or change in the Contract Price is required by the provisions of any Bond to be given to the Surety, it will be the Contractor's responsibility to so notify the Surety, and the amount of each applicable Bond shall be adjusted accordingly. The Contractor shall furnish proof of such adjustment to the City.

CHANGE OF THE CONTRACT TIME

The Contract Time may only be changed by a Change Order. Any claim for an extension in the Contract Time shall be based on written notice delivered to the Engineer within fifteen days of the occurrence of the event giving rise to the claim. Notice of the extent of the claim with supporting data shall be delivered within forty-five days of such occurrence, unless the City of Derby's Authorized Representative allows an additional period of time to ascertain more accurate data. All claims for adjustment in the Contract Time shall be reviewed by the City of Derby's Authorized Representative and after reviewing the City of Derby's Authorized Representative's recommendation and any other related information the City shall determine and approve any appropriate change in the Contract Time. Any change in the Contract Time resulting from any such claim shall be incorporated in a Change Order.

The Contract Time may be extended in an amount equal to time lost due to delays beyond the control of the Contractor if a claim is made therefore. Such delays may include, but not be limited to, acts or neglect by the City or to fires, floods, labor disputes, epidemics, abnormal weather conditions, or acts of God.

All time limits stated in the Contract Documents are of the essence of the Agreement.

WARRANTY AND GUARANTEE; TESTS AND INSPECTION; CORRECTION, REMOVAL, OR ACCEPTANCE OF DEFECTIVE WORK

Warranty and Guarantee

The Contractor warrants and guarantees to the City and the City of Derby's Authorized Representative that all Work will be in accordance with the Contract Documents and will not be defective. Prompt notice of all defects shall be given to the Contractor. All defective Work, whether or not in place, may be rejected, corrected, or accepted.

Access to Work

The City of Derby's Authorized Representative and the City of Derby's Authorized Representative's representatives, other representatives of the City, testing agencies, and governmental agencies with jurisdictional interests will have access to the Work at reasonable times for their observation, inspection, and testing. The Contractor shall provide proper and safe conditions for such access.

Test and Inspections

The Contractor shall give the City of Derby's Authorized Representative timely notice of readiness of the Work for all required inspections, tests, or approvals.

If any law, ordinance, rule, regulation, code, drawing, specification, or order of any public body having jurisdiction requires any Work (or part thereof) to specifically be inspected, tested, or approved, the Contractor shall assume full responsibility therefore, pay all costs in connection therewith and furnish the City of Derby's Authorized Representative the required certificates of inspection, testing, or approval. The Contractor shall also be responsible for and shall pay all costs in connection with any inspection or testing required in connection with the City's or the Engineer's acceptance of a manufacturer, fabricator, supplier, or distributor of materials or equipment proposed to be incorporated in the Work, or of materials or equipment submitted for approval prior to the Contractor's purchase thereof for incorporation in the Work.

All inspections, tests, or approvals other than those required by law, ordinance, rule, regulation, code or order of any public body having jurisdiction shall be performed by organizations acceptable to the Engineer and the Contractor.
If any Work that is to be inspected, tested, or approved is covered without written concurrence of the City of Derby's Authorized Representative, it must, if requested by the City of Derby's Authorized Representative, be uncovered for observation. Such uncovering shall be at the Contractor's expense unless the contractor has given the City of Derby's Authorized Representative timely notice of the Contractor's intention to cover such Work and the City of Derby's Authorized Representative has not acted with reasonable promptness in response to such notice.

Neither observations by the City of Derby's Authorized Representative nor inspections, tests, or approvals by others shall relieve the Contractor from his/her obligations to perform the Work in accordance with the Contract Documents.

Uncovering Work

If any Work is covered contrary to the request of the City of Derby's Authorized Representative, it must, if requested by the City of Derby's Authorized Representative, be uncovered for the City of Derby's Authorized Representative's observation and replaced at the Contractor's expense.

If the City of Derby's Authorized Representative considers it necessary or advisable that covered Work be observed by the City of Derby's Authorized Representative or inspected or tested by others, the Contractor, at the City of Derby's Authorized Representative's request, shall uncover, expose, or otherwise make available for observation, inspection, or testing as the City of Derby's Authorized Representative may require, that portion of the Work in question, furnishing all necessary labor, material, and equipment. If it is found that such Work is defective, the Contractor shall bear all the expenses of such uncovering, exposure, observation, inspection, and testing and of satisfactory reconstruction, including compensation for additional professional services.

City May Stop the Work

If the Work is defective, or the Contractor fails to supply sufficient skilled workmen or suitable materials or equipment, the Engineer may order the Contractor to Stop the Work, or any portion thereof, until the cause for such order has been eliminated; however, this right of the City to Stop the Work shall not give rise to any duty on the part of the City to exercise this right for the benefit of the Contractor or any other party.

Correction or Removal of Defective Work

If required by the City of Derby's Authorized Representative, the Contractor shall promptly, without cost to the City and as specified by the City of Derby's Authorized Representative, either correct any defective Work, whether or not fabricated, installed or completed, or, if the Work has been rejected by the City of Derby's Authorized Representative, remove it from the site and replace it with non-defective Work.

One-year Correction Period

If within one year after the date of Substantial Completion or such longer period of time as may be prescribed by law or by the terms of any applicable special guarantee required by the Contract Documents or by any specific provision of the contract Documents, any Work is found to be defective, the Contractor shall promptly, without cost to the City and in accordance with the City's written instructions, either correct such defective Work, or if it has been rejected by the City, remove it from the site and replace it with non-defective Work. Where it is required for the contractor to repair, replace, resurface, reseed, replant or to modify, alter, add, or remove hardware, parts, components, or related accessories for the purpose of ensuring proper appearance,

performance, or operation, such operations shall be done as required by the Contractor until such time as acceptable performance has been established. Problems which occur shall be corrected in an appropriate fashion under guarantee. The Contractor shall be responsible to attend to and remedy such items within a reasonable amount of time. Appropriate logs, schedules, and reports shall be maintained to reflect these items and their redress. If the Contractor does not promptly comply with the terms of such instruction, or in an emergency where delay would cause serious risk of loss or damage, the City may have the defective Work corrected or the rejected Work removed and replaced, and all direct and indirect costs of such removal and replacement, including compensation for additional professional services, shall be paid by the Contractor.

Acceptance of Defective Work

If, instead of requiring correction or removal and replacement of defective Work, the City prefers to accept it, the City may do so. In such case, if acceptance occurs prior to final payment, a Change Order shall be issued incorporating the necessary revisions in the Contract Documents, including appropriate reduction in the Contract Price; if the acceptance occurs after such final payment, an appropriate amount shall be paid by the Contractor to the City.

City May Correct Defective Work

If the Contractor fails within a reasonable time after written notice of the Engineer to proceed to correct defective Work or to remove and replace rejected Work as required by the Engineer, or if the Contractor fails to perform the Work in accordance with the Contract Documents (including any requirements of the progress schedule), the City may, after seven days written notice to the Contractor, correct and remedy any such deficiency. In exercising its rights under this paragraph the City shall proceed expeditiously to the extent necessary to complete corrective and remedial action, the City may exclude the Contractor from all or part of the site, take possession of all or part of the Work, and suspend the Contractor's services related thereto, and incorporate in the Work all materials and equipment stored at the site or for which the City has paid the Contractor but which are stored elsewhere. The Contractor shall allow the City, the City's representatives, agents and employees such access to the site as may be necessary to enable the City to exercise its rights under this paragraph. All direct and indirect costs of the City in exercising such rights shall be charged against the Contractor in an amount verified by the City of Derby's Authorized Representative and a Change Order shall be issued incorporating the necessary revisions in the Contract documents and a reduction in the Contract Price. Such direct and indirect costs shall include, in particular but without limitation, compensation for additional professional services required and all costs of repair and replacement of work of others destroyed or

damaged by correction, removal or replacement of the Contractor's defective Work. The Contractor shall not be allowed an extension of the Contract Time because of any delay in performance of the work attributable to the exercise by the City of the City rights hereunder.

PAYMENTS TO CONTRACTOR AND COMPLETION

Schedules

At least ten days prior to submitting the first Application for a progress payment, the Contractor shall submit to the City of Derby's Authorized Representative (Kaestle Boos Associates, Inc.) a progress schedule and a schedule of values of the Work. These schedules shall be satisfactorily in form and substance to the City of Derby's Authorized Representative. The schedule of values shall include quantities and unit prices aggregating the Contract Price and shall subdivide the Work into component parts in sufficient detail to serve as the basis for progress payment during construction. Upon acceptance of the schedule of values by the City of Derby's Authorized Representative, it shall be incorporated into a form of Application for Payment acceptable to the City of Derby's Authorized Representative.

Application for Progress Payment

At least ten days before each progress payment falls due (but not more often than once a month), the Contractor shall submit to the City of Derby's Authorized Representative for review an draft Application for Payment filled out by the Contractor covering the Work completed as of the date of the Application and accompanied by such supporting documentation as is required by the Contract Documents and also as the City of Derby's Authorized Representative may reasonably require. Upon review and approval by the City of Derby's Authorized Representative, the Contractor shall submit three (3) final Application for Payments filled out, notarized, and signed by the Contractor. Each subsequent Application for Payment shall include an affidavit of the Contractor stating that all previous progress payment received on account of the Work have been applied to discharge in full all of the Contractor's obligations reflected in prior Applications for Payment. The amount of retainage with respect to progress payments will be as stipulated in the Contract Documents.
Contractor's Warranty of Title

Contractor's Warranty of Title

The Contractor warrants and guarantees that title to all Work, materials, and equipment covered by any Application for payment, whether incorporated in the project or not, will pass to the City at the time of payment free and clear of all liens, claims, security interests, and encumbrances.

Review of Applications for Progress Payment

The City of Derby's Authorized Representative will, within ten (10) days after receipt of each Application for Payment either indicated in writing a recommendation of payment and present the application to the City, or return the application to the Contractor indicating in writing the City of Derby's Authorized Representative's reasons for refusing the recommended payment. In the latter case, the Contractor may make the necessary corrections and resubmit the Application. The Application for Payment must be presented the first week of each month for review and recommendation for payment. Only after the City of Derby's Authorized Representative's recommendation for payment is received it will then be sent to the Road Bond Committee for approval. If approved the recommendation will be forwarded to the full Board of Aldermen for review and possible action at their regular monthly meeting, which is held the fourth Thursday of each month (date subject to change due to holiday.)

The City of Derby's Authorized Representative may refuse to recommend the whole or any part of any payment if, in his opinion, it would be incorrect to make such representations. He may also refuse to recommend any such payment or, because of subsequently discovered evidence or the results of subsequent inspections or tests, nullify any such payment previously recommended to such extent as may be necessary in the City of Derby's Authorized Representative's opinion to protect the City from loss because:

- The Work is defective, or completed Work has been damaged requiring correction or replacement;
- Written claims have been made against the City in connection with the Work;
- The Contract Price has been reduced;
- The City has been required to correct defective Work or complete the Work, of the Contractor's unsatisfactory prosecution of the Work in accordance with the Contract Documents; and/or
- The Contractor's failure to make payment to subcontractors, or to make payment for labor, materials, or equipment.

Substantial Completion

When the Contractor considers the entire Work ready for its intended use the Contractor shall, in writing to the City of Derby's Authorized Representative, certify that the entire Work is substantially complete and request that the City of Derby's Authorized Representative issue a certificate of Substantial Completion. Within a reasonable time thereafter, the Contractor and City of Derby's Authorized Representative shall make an inspection of the Work to determine the status of completion. If the City of Derby's

Authorized Representative does not consider the Work substantially complete, the City of Derby's Authorized Representative will notify the Contractor in writing giving his reasons therefore. If the City of Derby's Authorized Representative considers the Work substantially complete, the City of Derby's Authorized Representative will prepare certificate of Substantial Completion, which shall fix the date of Substantial Completion. There shall be attached to the certificate a list of items to be completed or corrected before final payment.

The City shall have the right to exclude the Contractor from the Work after the date of Substantial Completion, but the City shall allow the Contractor reasonable access to complete or correct items on the list.

Partial Utilization

Use by the City of completed portions of the Work may be accomplished prior to Substantial Completion of all Work subject to the following:

The City at any time may request The Contractor in writing to permit the City to use any part of the Work, which the City believes to be substantially complete, and which may be so used without significant interference with construction of the other parts of the Work. If the Contractor agrees, the Contractor will certify to the City and the City of Derby's Authorized Representative that said part of the Work is substantially complete and request the Engineer to issue a certificate of Substantial Completion for that part of the Work. Within a reasonable time thereafter, the Contractor and City of Derby's Authorized Representative shall make an inspection of that part of the Work to determine its status of completion. If the City of Derby's Authorized Representative does not consider that part of the Work to be substantially complete, the City of Derby's Authorized Representative will notify the Contractor in writing giving his reasons therefore. If the City of Derby's Authorized Representative considers that part of the Work to be substantially complete, the City of Derby's Authorized Representative will execute and deliver to the Contractor a certificate to that effect, fixing the date of Substantial Completion as to that part of the Work, attaching thereto a list of items to be completed or corrected before final payment.

In lieu of the issuance of a certificate of Substantial Completion as to part of the Work, the City may take over operation of a facility constituting part of the Work whether or not it is substantially complete if such facility is functionally and separately useable provided that prior to any such takeover the City and Contractor have agreed as to the division of responsibilities between the City and Contractor for security, operation, safety, maintenance, correction period, heat, utilities, and insurance with respect to such facility.

Final Inspection

Upon written notice from the Contractor that the Work is complete, the City of Derby's Authorized Representative will make a final inspection with the Contractor and will notify the Contractor in writing of all particulars in which this inspection reveals that the Work is incomplete or defective. The Contractor shall immediately take such measures as are necessary to remedy such deficiencies.

Final Application for Payment

After the Contractor has completed all such corrections to the satisfaction of the City of Derby's Authorized Representative and delivered all maintenance and operating instructions, schedules, guarantees, Bonds, certificates of inspection, marked-up record documents and other documents – all as required by the Contract Documents, and after the Engineer has indicated that the work is acceptable, the Contractor may make application for final payment following the procedure for progress payments. The final Application for Payment shall be accompanied by all documentation called for in the Contract Documents and such other data and schedules as the City of Derby's Authorized Representative may reasonably require, together with complete and legally effective releases or waivers (satisfactory to the City) of all claims arising out of or filed in connection with the Work. In lieu thereof and as approved by the City, the Contractor may furnish receipts or releases in full; an affidavit of the Contract that the releases and receipts include all labor, services, material, and equipment for which a claim could be filed, and that all payrolls, material and equipment bills, and other indebtedness connected with the Work for which the City or its property might in any way be responsible, have been paid or otherwise satisfied; and consent of the Surety, if any, to final payment.

Final Payment and Acceptance

If on the basis of the City of Derby's Authorized Representative's observation of the Work during construction and final inspection, and the Engineer's review of the final Application for Payment and accompanying documentation – all as required by the Contract Documents, the City of Derby's Authorized Representative is satisfied that the Work has been completed and the Contractor has fulfilled all of his obligations under the Contract Documents, the City of Derby's Authorized Representative will, within ten days after receipt of the final Application for Payment, process the Application for payment. Otherwise, the City of Derby's Authorized Representative will return the Application to the Contractor, indicating in writing the reasons for refusing to process final payment, in which case the Contractor shall make the necessary corrections and resubmit the Application.

Contractor's Continuing Obligation

The Contractor's obligation to perform and complete the Work in accordance with the Contract Documents shall be absolute. Neither recommendation of any progress or final payment by the Engineer, nor the issuance of a certificate of Substantial Completion, nor any payment by the City to the Contractor under the Contract Documents, nor any use or occupancy of the Work or any part thereof by the City, nor any act of acceptance by the City nor any failure to do so, nor the issuance of a notice of acceptability by the City of Derby's Authorized Representative, nor any correction of defective Work by the City shall constitute an acceptance of Work not in accordance with the Contract Documents or a release of the Contractor's obligation to perform the Work in accordance with the Contract Documents.

Waiver of Claims

The making and acceptance of final payment shall constitute:

A waiver of claims by the City against the Contractor except for claims arising from unsettled debs, from defective Work appearing after final inspection or from failure to comply with the Contract Documents or the terms of any special guarantees specified therein and it shall not constitute a waiver by the City of any rights in respect of the Contractor's continuing obligations under the Contract Documents and a waiver of all claims by the Contractor against the City other than those previously made in writing and still unsettled.

SUSPENSION OF WORK AND TERMINATION

The City May Terminate:

Upon the occurrence of any one or more of the following events:

- If the Contractor is adjudged a bankrupt or insolvent;
- If the Contractor makes a general assignment of the benefit of creditors;
- If a trustee or receiver is appointed for the Contractor or for any of the Contractor's property;
- If the Contractor files a petition to take advantage of any debtor's act, or to reorganize under the bankruptcy or similar laws;

- If the Contractor repeatedly fails to supply sufficient skilled workmen or suitable materials or equipment;

- If the Contractor repeatedly fails to make prompt payments to the subcontractors or for labor, materials, or equipment;

- If the Contractor disregards laws, ordinances, rules, regulations, or orders of any public body having jurisdiction;

- If the Contractor disregards the authority of the Engineer, or

- If the Contractor otherwise violates in any substantial way any provisions of the Contract Documents;

- At the convenience of the City

The City may, after giving the Contractor and his surety seven days written notice, terminate the services of the Contractor, exclude the Contractor from the site and take possession of the Work, incorporate in the Work all materials and equipment stored at the site or for which the City has paid the Contractor but which are stored elsewhere and finish the Work as the City may deem expedient. In such case the Contractor shall not be entitled to receive any further payment until the Work is finished. If the unpaid balance of the Contract Price exceeds the direct and indirect costs of completing the Work, including compensation for additional professional services, such excess shall be paid to the Contractor. If such costs exceed such unpaid balance, the Contractor shall pay the difference to the City. Such costs incurred by the City shall be incorporated in a Change Order, but in finishing the Work the City shall not be required to obtain the lowest figure for the Work performed. Notwithstanding the foregoing, if the City terminates this Agreement for its convenience, the City shall only be required to pay the Contractor for services to the date of termination.

Where the Contractor's services have been so terminated by the City, the termination shall not affect any rights of the City against the Contractor then existing or which may thereafter accrue. Any retention or payment of monies due the Contractor by the City will not release the Contractor from liability.

Upon seven days written notice to the Contractor, the City may, without cause and without prejudice to any other right or remedy, elect to abandon the Work and terminate the Agreement. In such case, the Contractor shall be paid for all Work executed and any expense sustained plus reasonable expenses.

Contractor May Stop Work or Terminate

If, through no act or fault of the Contractor, the Work is suspended for a period of more than ninety days by the City or under an order of court or other public authority, or the Engineer fails to act on an Application for Payment within thirty days after it is submitted, or the City fails for sixty days to pay the Contractor any sum finally determined to be due, then the Contractor may, upon fourteen days written notice to the City and the Engineer, terminate the Agreement and recover from the City payment for all Work executed and any expense sustained. In addition and in lieu of terminating the Agreement, if the Engineer has failed to act on an Application for Payment or the City has failed to make any payment as aforesaid, the Contractor may upon seven days notice to the City and the Engineer Stop the Work until payment of all amounts then due. The provisions of this paragraph shall not relieve the Contractor of his obligations to carry on the Work in accordance with progress schedule and without delay during disputes and disagreements with the City.

MISCELLANEOUS

Giving Notice

Whenever any provision of the Contract Documents requires the giving of written notice it shall be deemed to have been validly given if delivered in person to the individual or to a member of the firm or to an officer of the corporation for whom it is intended, or if delivered at or sent by registered or certified mail, postage prepaid, to the last business address known to the giver of the notice.

Computation of Time

When any period of time is referred to in the Contract Documents by days, it shall be computed to exclude the first and include the last day of such period. If the last day of any such period falls on a Saturday or Sunday or on a day made a legal holiday by the law of the applicable jurisdiction, such day shall be omitted from the computation.

General

Should the City or the Contractor suffer injury or damage to his/her person or property because of any error, omission, or act of the other party or of any of the other party's employees or agents or others for whose acts the other party is legally liable, claim shall be made in writing to the other party within a reasonable time of the first observance of such injury or damage. The duties and obligations imposed by these General Conditions and the rights and remedies available hereunder to the parties hereto, and, in particular but without limitation, the warranties, guarantees, and obligations imposed upon the Contractor and all of the rights and remedies available to the City and the

Engineer thereunder, shall be in addition to, and shall not be construed in any way as a limitation of any rights and remedies available to any or all of them which are otherwise imposed or available by law or contract, by special warranty or guarantee or by other provisions of the Contract Documents, and the provisions of this paragraph shall be as effective as if repeated specifically in the Contract Documents in connection with each particular duty, obligation, right and remedy to which they apply. All representations, warranties, and guarantees made in the Contract Documents shall survive final payment and termination or completion of this Agreement.

Non-Discrimination

The Contractor shall agree and warrant that in the performance of the contract, he will not discriminate or permit discrimination against any person or group of persons on the ground of race, color, religious creed, age, marital status, national origin, sex, or physical disability, including but not limited to, blindness, unless it is shown by the Contractor that such disability prevents performance of the work involved in any manner prohibited by the laws of the United States or of the State of Connecticut. The Contractor shall further agree to provide the Commission on Human Rights and Opportunities with such information requested by the Commission concerning the employment practices and procedures of the Contractor as they relate to the provisions of Section 4-11a of the Connecticut General Statutes as amended.

Affirmative Action

If requested by the City, the Contractor shall submit details of his Affirmative Action Program. Such Program shall be modified as and where necessary to meet the requirements of the City and shall remain in force throughout the contract period.

SUPPLEMENTAL CONDITIONS

CITY PROJECT NO. COD 2018-02 (B)

These Supplemental Conditions amend or supplement the General Conditions of the Construction Contract and other provisions of the Contract Documents as indicated below. All provisions which are not so amended or supplemented remain in full force and effect.

DEFINITIONS

The Terms used in these Supplemental Conditions, which are defined in the General Conditions of the Construction Contract, have the meanings assigned to them in the General Conditions.

Wherever used in the Contract Documents, the following words have the meanings indicated, which are applied to both the singular and the plural thereof:

"Project Manual" – shall mean the bound volume containing the following Contract Documents:

- Invitation to Bid
- Instruction to Bidders
- Contract Forms
- General Conditions
- Supplemental Conditions
- Wage Rates
- Addenda (if issued)
- Technical Specifications and Construction Drawings

The word "Remove" where it applies to existing materials shall mean remove entirely from the site unless material is approved by the City of Derby's Authorized Representative for re-use. In addition, the word "remove" shall imply the patching of all remaining work affected by removal. All existing materials, which have been removed, shall become the Contractor's property unless otherwise specified.

"As Necessary" or "As Required" – Work referred to as "As Necessary" shall be that work which is required for completed construction, but is not necessarily shown or described in the Contract Documents.

The word "Furnish" or the word "Supply" – shall mean purchase, delivery, and off-loading at the job site including all documentation, storage, and protection.

The word "Install" or the word "Apply" – shall mean set in place complete for normal use or service, all in accordance with the Contract Documents.

The word "Provide" – shall mean furnish (or supply) and install (or apply.)

The words "Approved Equal" – shall mean any product, which in the opinion of the City of Derby's Authorized Representative is comparable in quality, durability, appearance, strength, performance, design, physical dimension, and arrangement to the product specified, and will function properly in accordance with the design intent.

The word "Product" – shall mean any item of equipment or material provided under the Contract Documents.

THE CONTRACTOR'S INSURANCE

The Contractor shall maintain insurance of the kinds and in at least the amounts in a form satisfactory to the City; such certificates shall contain a provision that the City shall be given thirty days advance written notice by registered mail of change in, or cancellation of, coverage.

TIME FOR COMPLETION

It shall be understood and mutually agreed that the time for Substantial Completion is an essential condition of this Contract.

It is expressly understood and agreed by the Contractor and the City that the time for Substantial Completion is reasonable, taking into consideration average climatic range, City restrictions, and other conditions prevailing.

The Contractor agrees that the Work shall be performed diligently and uninterrupted at such rate as will insure Substantial Completion of all Work on or before the date stated in the Contract. If it appears that some of the work cannot be completed by the scheduled date, the Contractor shall increase the work force or increase the hours of work, including evenings and weekends if necessary, at no additional cost to the City.

If the work is complete but the area is not cleaned and debris or equipment is not removed, the City shall have the right to have the area prepared for occupancy with its own or other forces and deduct the costs from the contract amount.

The Construction Schedule is critical to the Project. It is specifically understood that all work is required to be Substantially Complete, and ready for full occupancy and use by

the City, on or before the date agreed upon in the Contract and that the time of completion is of the essence and of great importance to the City.

PAYMENTS AND RETAINAGE

Applications for payment shall be submitted to the City's Authorized Representative for consideration by the **first Thursday of each month.** Payment shall be made within forty-five days after approval of the application for payment by the City.

An amount of 95 percent (95%) of the estimated amount due, less any payments previously made and/or any monies to be held will be paid to the Contractor monthly. The balance will be retained by the City until final completion of the work. Final payment will not be made until final completion and acceptance by the City of all work covered by the Contract. The Contractor agrees that he/she will indemnify and save the City harmless for all claims growing out of the lawful demands of subcontractors, laborers, suppliers, and assignees.

SCOPE OF WORK

The City reserves the right to decrease the Scope of Work to be done under this Contract, select bid or alternate items in its best interest, or to omit any work in order to bring the cost within available funds. Exercise by the City of the above rights shall not constitute any grounds or basis of claim for damages or for anticipated profits on work omitted.

ALTERNATES

Additive Alternates Definitions: An Additive Alternate is defined as a specific scope of work, products, materials, equipment or systems for the work not included in the Base Bid work and which may, at the City's option and under terms established herein, be selected and recorded in the Contract to either supplement or displace basic requirements of contract documents. Alternates may or may not substantially change scope and general character of the work; and must not be confused with "allowances," "unit prices," "change orders," "substitutions," and other similar provisions. The bid price for the Additive Alternate is not included in the Base Bid price.

Additive Alternate Pricing: The bid price for the additive alternate shall include all cost associated with the changes, omissions, additions or other adjustments to the Work in this Bid Package described in the Alternate or reasonably inferred therefrom. The additive alternate bid price shall include the cost of all labor, materials, equipment, time extension or deletion, general conditions, general requirements, overhead, profit, insurance, for the work. Claims for extras resulting from the acceptance or rejection of any Additive Alternate will not be allowed.

Bidding must provide a bid for each Additive Alternate. If no bid is provided for any of the Additive Alternates contained in the bid proposal or if any bid for such an Alternate is obviously unbalanced either in excess of, or below reasonable fair market values, then the entire bid will be considered nonresponsive, and the bid will be rejected.

Award of Contract: The Award of Contract will be made to lowest responsible bidder for the "Base Bid" work – which does not include the bid price for any Additive Alternate.

The Owner shall have the right to accept or omit any Additive Alternate.

The Contract Documents shall be considered appropriately modified by either the acceptance or omission of any Additive Alternates. Bid Bonds: Bid Bond amounts shall be at least ten percent (10%) of the sum of the Base Bid plus all Additive Alternates. The Contract completion date (calendar days) will be adjusted if any of the additive alternates is added. All costs associated with a time extension are to be included in the Additive Alternate Price.

Notification: After award of the Contract, one or more additive alternates for which funds are available may be added to the Contract in the discretion of the City. The adjustment of the Contract price shall be solely based on the bid price for the alternate(s) added. The Contractor will be notified as to which alternates will be included in the Contract within fourteen (14) calendar days of the Award of Contract.

SCHEDULE AND TIME OF COMPLETION

Attention of the Bidder is directed to the time provision for completion of work under the Contract, which requires that all work be completed within the schedule provided under the General Conditions. The calendar days shall be consecutive. Prior to the start of construction, the Contractor shall prepare and submit a schedule for the sequence of construction for approval by the Street Commissioner.

LIQUIDATED DAMAGES

The Contractor will proceed with the work at such rate of progress to ensure full completion within the time requirements stated above. It is expressly understood and agreed by and between the Contractor and the City that the contract items for the completion of the work described herein shall be reasonable, taking into consideration the climatic and economic conditions and other factors prevailing in the locality of the work.

If the Contractor shall fail to complete the work within the contract times, or extension of time granted by the City, then the Contractor and his sureties shall be liable for and shall pay to the City for each and every calendar day that he shall be in default in completing any given assignment in the time stipulated above, the sum of One Thousand Dollars ($1,000.00.) Liquidated damages shall apply to each milestone activity date, as well as the project completion date, indicated under the project schedule outlined in the General Conditions and Project Summary. This sum is hereby agreed upon, not as a penalty, but as fixed liquidated damages which the City will suffer by reason of such default, time being of the essence of the Contract and a material consideration thereof.

The City shall have the right to deduct the amount of any such damages from any monies due the Contractor under this Contract.

PAYMENT OF WAGES

Attached is a copy of the minimum federal and state wage rate schedule issued by the U.S. and State of Connecticut Labor Departments. Said wage rate schedules shall, at all times, be posted at a conspicuous location on the project site.

The Contractor is cautioned that wage rates are continually changing and he shall ensure himself that the enclosed schedules contained herein or otherwise posted are the latest issue, this being his responsibility.

FAIR EMPLOYMENT PRACTICES

The successful Contractor shall agree that neither he nor his subcontractors will refuse to hire or employ or to bar or to discharge from employment an individual, or to discriminate against him in compensation or ill terms, conditions, or privileges of employment because of race, color, religious creed, age, sex, national origin, or ancestry, except in the case of a bona fide occupational qualification or need.

The terms stated above are taken from Section 31-126 of the Connecticut General Statutes "Unfair Employment Practices."

SAFETY

The Contractor shall perform all work in accordance with the latest governmental safety regulations including, but not limited to, the Department of Labor and Office of Safety and Health Administration regulations and suggested practices.

MEASUREMENTS

The Contractor shall make all measurements and check all dimensions necessary for the proper construction of the work as directed or as called for in the Specifications. During the performance of the work, the Contractor shall make all necessary measurements to prevent misfitting in said work and be responsible therefore for the accurate construction of the entire work.

PUBLIC ACCESS

Roads, including driveways, sidewalks, and crossings shall remain passable while work is in progress.

UTILITIES

Utilities may be located within the area and may be adjacent to the construction work.

The Contractor shall make all the necessary arrangements with any utility that must be protected or relocated in order to accomplish the work. The Contractor shall be solely responsible for the protection of the operating condition of all active utilities within the areas of construction and he shall take all necessary precautions to avoid damage to existing utilities. Any cost of temporary relocations for the Contractor's convenience shall be paid for by the Contractor.

The Contractor shall avail himself of the Connecticut Underground Protection Plan ("Call Before You Dig") Box 1562, New Haven, CT (Telephone Toll Free: 1-800-922-4455) for notifications to utility companies prior to excavating.

OFF-SITE DISPOSAL

The Contractor shall load and haul any surplus or unsuitable material for disposal at a disposal site provided by the Contractor at his cost.

PERFORMANCE OF WORK

The Contractor will be responsible for providing all the necessary services necessary to perform the work described in the specifications.

HOURS OF OPERATION

The Contractor shall limit his operations from Monday-Friday between 7:00 a.m. – 6:00 p.m. No work will be permitted on Sundays or legal holidays. Permission from the City

of Derby's Authorize Representative would be required for work to be performed on Saturday.

MAINTENANCE AND PROTECTION OF TRAFFIC

The Contractor will be responsible for the scheduling of Derby Police Officers at least one working day in advance of plans to work in the roadway. The cost for Police will be included in the bid price for the job.

The Contractor may schedule Police Officers by contacting the Derby Police Department, 125 Water Street, Derby, CT 06418 - telephone 203-734-1651.

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AIA® Document G702™ – 1992

CITY PROJECT NO. COD 2018-02 (B)

Application and Certificate for Payment

TO OWNER:	City of Derby 1 Elizabeth Street Derby, CT 06418	**PROJECT:**	Derby High School - Athletic Facilities Renovation Project 75 Chatfield Street, Derby, CT 06418	**APPLICATION NO:** 001 **PERIOD TO:** **CONTRACT FOR:** General Construction **CONTRACT DATE:** **PROJECT NOS:** 17022.00 / /	**Distribution to:** OWNER: ☐ ARCHITECT: ☐ CONTRACTOR: ☐ FIELD: ☐ OTHER: ☐
FROM CONTRACTOR:		**VIA ARCHITECT:**	Kastle Boos Associates, Inc. 416 Slater Road, P.O. Box 2590 New Britain, CT 06050-2590		

CONTRACTOR'S APPLICATION FOR PAYMENT

Application is made for payment, as shown below, in connection with the Contract.
Continuation Sheet, AIA Document G703, is attached.

1. ORIGINAL CONTRACT SUM		$0.00
2. NET CHANGE BY CHANGE ORDERS		$0.00
3. CONTRACT SUM TO DATE (Line 1 ± 2)		$0.00
4. TOTAL COMPLETED & STORED TO DATE (Column G on G703)		$0.00
5. RETAINAGE:		
a. 0 % of Completed Work (Column D + E on G703)	$0.00	
b. 0 % of Stored Material (Column F on G703)	$0.00	
Total Retainage (Lines 5a + 5b or Total in Column I of G703)		$0.00
6. TOTAL EARNED LESS RETAINAGE (Line 4 Less Line 5 Total)		$0.00
7. LESS PREVIOUS CERTIFICATES FOR PAYMENT (Line 6 from prior Certificate)		$0.00
8. CURRENT PAYMENT DUE		$0.00
9. BALANCE TO FINISH, INCLUDING RETAINAGE (Line 3 less Line 6)	$0.00	

CHANGE ORDER SUMMARY	ADDITIONS	DEDUCTIONS
Total changes approved in previous months by Owner	$0.00	$0.00
Total approved this Month	$0.00	$0.00
TOTALS	$0.00	$0.00
NET CHANGES by Change Order		$0.00

The undersigned Contractor certifies that to the best of the Contractor's knowledge, information and belief the Work covered by this Application for Payment has been completed in accordance with the Contract Documents, that all amounts have been paid by the Contractor for Work for which previous Certificates for Payment were issued and payments received from the Owner, and that current payment shown herein is now due.

CONTRACTOR:

By: _____ Date: _____

State of:

County of:

Subscribed and sworn to before me this day of

Notary Public:

My Commission expires:

ARCHITECT'S CERTIFICATE FOR PAYMENT

In accordance with the Contract Documents, based on on-site observations and the data comprising this application, the Architect certifies to the Owner that to the best of the Architect's knowledge, information and belief the Work has progressed as indicated, the quality of the Work is in accordance with the Contract Documents, and the Contractor is entitled to payment of the AMOUNT CERTIFIED.

AMOUNT CERTIFIED $0.00

(Attach explanation if amount certified differs from the amount applied. Initial all figures on this Application and on the Continuation Sheet that are changed to conform with the amount certified.)

ARCHITECT:

By: _____ Date: _____

This Certificate is not negotiable. The AMOUNT CERTIFIED is payable only to the Contractor named herein. Issuance, payment and acceptance of payment are without prejudice to any rights of the Owner or Contractor under this Contract.

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AIA® Document G703™ – 1992

CITY PROJECT NO. COD 2018-02 (B)

Continuation Sheet

AIA Document, G702™–1992, Application and Certification for Payment, or G736™–2009, Project Application and Project Certificate for Payment, Construction Manager as Adviser Edition, containing Contractor's signed certification is attached.
In tabulations below, amounts are in US dollars.
Use Column I on Contracts where variable retainage for line items may apply.

APPLICATION NO:	001
APPLICATION DATE:	
PERIOD TO:	
ARCHITECT'S PROJECT NO:	17022.00

A	B	C	D	E	F	G		H	I
			WORK COMPLETED						
ITEM NO.	DESCRIPTION OF WORK	SCHEDULED VALUE	FROM PREVIOUS APPLICATION (D + E)	THIS PERIOD	MATERIALS PRESENTLY STORED (NOT IN D OR E)	TOTAL COMPLETED AND STORED TO DATE (D + E + F)	% (G ÷C)	BALANCE TO FINISH (C - G)	RETAINAGE (IF VARIABLE RATE)
		0.00	0.00	0.00	0.00	0.00	0.00%	0.00	0.00
		0.00	0.00	0.00	0.00	0.00	0.00%	0.00	0.00
		0.00	0.00	0.00	0.00	0.00	0.00%	0.00	0.00
		0.00	0.00	0.00	0.00	0.00	0.00%	0.00	0.00
		0.00	0.00	0.00	0.00	0.00	0.00%	0.00	0.00
		0.00	0.00	0.00	0.00	0.00	0.00%	0.00	0.00
		0.00	0.00	0.00	0.00	0.00	0.00%	0.00	0.00
		0.00	0.00	0.00	0.00	0.00	0.00%	0.00	0.00
		0.00	0.00	0.00	0.00	0.00	0.00%	0.00	0.00
		0.00	0.00	0.00	0.00	0.00	0.00%	0.00	0.00
		0.00	0.00	0.00	0.00	0.00	0.00%	0.00	0.00
		0.00	0.00	0.00	0.00	0.00	0.00%	0.00	0.00
		0.00	0.00	0.00	0.00	0.00	0.00%	0.00	0.00
		0.00	0.00	0.00	0.00	0.00	0.00%	0.00	0.00
		0.00	0.00	0.00	0.00	0.00	0.00%	0.00	0.00
		0.00	0.00	0.00	0.00	0.00	0.00%	0.00	0.00
		0.00	0.00	0.00	0.00	0.00	0.00%	0.00	0.00
		0.00	0.00	0.00	0.00	0.00	0.00%	0.00	0.00
		0.00	0.00	0.00	0.00	0.00	0.00%	0.00	0.00
	GRAND TOTAL	**$0.00**	**$0.00**	**$0.00**	**$0.00**	**$0.00**	**0.00%**	**$0.00**	**$0.00**

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Minimum Rates and Classifications for Building Construction

ID# : B 24760

Connecticut Department of Labor
Wage and Workplace Standards Division

By virtue of the authority vested in the Labor Commissioner under provisions of Section 31-53 of the General Statutes of Connecticut, as amended, the following are declared to be the prevailing rates and welfare payments and will apply only where the contract is advertised for bid within 20 days of the date on which the rates are established. Any contractor or subcontractor not obligated by agreement to pay to the welfare and pension fund shall pay this amount to each employee as part of his/her hourly wages.

Project Number: 17015.00
Project Town: Derby
State#:
FAP#:

Project: Athletic Facilities Renovation At Derby High School

CLASSIFICATION	Hourly Rate	Benefits
1a) Asbestos Worker/Insulator (Includes application of insulating materials, protective coverings, coatings, & finishes to all types of mechanical systems; application of firestopping material for wall openings & penetrations in walls, floors, ceilings	38.25	27.96
1b) Asbestos/Toxic Waste Removal Laborers: Asbestos removal and encapsulation (except its removal from mechanical systems which are not to be scrapped), toxic waste removers, blasters.**See Laborers Group 7**		
1c) Asbestos Worker/Heat and Frost Insulator	39.00	28.76

As of: **Wednesday, May 02, 2018**

2) Boilermaker	38.34	26.01
3a) Bricklayer, Cement Mason, Concrete Finisher (including caulking), Stone Masons	33.48	32.06 + a
3b) Tile Setter	34.90	25.87
3c) Terrazzo Mechanics and Marble Setters	31.69	22.35
3d) Tile, Marble & Terrazzo Finishers	26.70	21.75
3e) Plasterer	33.48	32.06

As of: **Wednesday, May 02, 2018**

Project: Athletic Facilities Renovation At Derby High School

------LABORERS------

4) Group 1: Laborers (common or general), acetylene burners, carpenter tenders, concrete specialists, wrecking laborers, fire watchers.	30.05	20.10
4a) Group 2: Mortar mixers, plaster tender, power buggy operators, powdermen, fireproofer/mixer/nozzleman (Person running mixer and spraying fireproof only).	30.30	20.10
4b) Group 3: Jackhammer operators/pavement breaker, mason tender (brick), mason tender (cement/concrete), forklift operators and forklift operators (masonry).	30.55	20.10
4c) **Group 4: Pipelayers (Installation of water, storm drainage or sewage lines outside of the building line with P6, P7 license) (the pipelayer rate shall apply only to one or two employees of the total crew who primary task is to actually perform the mating of pipe sections) P6 and P7 rate is $26.80.	30.55	20.10
4d) Group 5: Air track operator, sand blaster and hydraulic drills.	30.55	20.10

4e) Group 6: Blasters, nuclear and toxic waste removal.	31.80	20.10
4f) Group 7: Asbestos/lead removal and encapsulation (except it's removal from mechanical systems which are not to be scrapped).	31.05	20.10
4g) Group 8: Bottom men on open air caisson, cylindrical work and boring crew.	28.38	20.10
4h) Group 9: Top men on open air caisson, cylindrical work and boring crew.	27.86	20.10
4i) Group 10: Traffic Control Signalman	16.00	20.10
5) Carpenter, Acoustical Ceiling Installation, Soft Floor/Carpet Laying, Metal Stud Installation, Form Work and Scaffold Building, Drywall Hanging, Modular-Furniture Systems Installers, Lathers, Piledrivers, Resilient Floor Layers.	32.60	25.34

As of: **Wednesday, May 02, 2018**

5a) Millwrights	33.14	25.74
6) Electrical Worker (including low voltage wiring) (Trade License required: E1,2 L-5,6 C-5,6 T-1,2 L-1,2 V-1,2,7,8,9)	37.50	26.31+3% of gross wage
7a) Elevator Mechanic (Trade License required: R-1,2,5,6)	51.71	32.645+a+b
-----LINE CONSTRUCTION----		
Groundman	26.50	6.5% + 9.00
Linemen/Cable Splicer	48.19	6.5% + 22.00

As of: **Wednesday, May 02, 2018**

8) Glazier (Trade License required: FG-1,2)	36.28	20.45 + a
9) Ironworker, Ornamental, Reinforcing, Structural, and Precast Concrete Erection	35.47	33.39 + a
----OPERATORS----		
Group 1: Crane handling or erecting structural steel or stone, hoisting engineer 2 drums or over, front end loader (7 cubic yards or over), work boat 26 ft. and over and Tunnel Boring Machines. (Trade License Required)	39.30	24.05 + a
Group 2: Cranes (100 ton rate capacity and over); Excavator over 2 cubic yards; Piledriver ($3.00 premium when operator controls hammer); Bauer Drill/Caisson. (Trade License Required)	38.98	24.05 + a
Group 3: Excavator; Backhoe/Excavator under 2 cubic yards; Cranes (under 100 ton rated capacity), Grader/Blade; Master Mechanic; Hoisting Engineer (all types of equipment where a drum and cable are used to hoist or drag material regardless of motive power of operation), Rubber Tire Excavator (Drott-1085 or similar);Grader Operator; Bulldozer Fine Grade. (slopes, shaping, laser or GPS, etc.). (Trade License Required)	38.24	24.05 + a

As of: **Wednesday, May 02, 2018**

Group 4: Trenching Machines; Lighter Derrick; Concrete Finishing Machine; CMI Machine or Similar; Koehring Loader (Skooper).	37.85	24.05 + a
Group 5: Specialty Railroad Equipment; Asphalt Paver; Asphalt Reclaiming Machine; Line Grinder; Concrete Pumps; Drills with Self Contained Power Units; Boring Machine; Post Hole Digger; Auger; Pounder; Well Digger; Milling Machine (over 24" Mandrell)	37.26	24.05 + a
Group 5 continued: Side Boom; Combination Hoe and Loader; Directional Driller; Pile Testing Machine.	37.26	24.05 + a
Group 6: Front End Loader (3 up to 7 cubic yards); Bulldozer (rough grade dozer).	36.95	24.05 + a
Group 7: Asphalt roller, concrete saws and cutters (ride on types), vermeer concrete cutter, Stump Grinder; Scraper; Snooper; Skidder; Milling Machine (24" and under Mandrell).	36.61	24.05 + a
Group 8: Mechanic, grease truck operator, hydroblaster; barrier mover; power stone spreader; welding; work boat under 26 ft.; transfer machine.	36.21	24.05 + a

As of: **Wednesday, May 02, 2018**

Group 9: Front end loader (under 3 cubic yards), skid steer loader regardless of attachments, (Bobcat or Similar): forklift, power chipper; landscape equipment (including Hydroseeder).	35.78	24.05 + a
Group 10: Vibratory hammer; ice machine; diesel and air, hammer, etc.	33.74	24.05 + a
Group 11: Conveyor, earth roller, power pavement breaker (whiphammer), robot demolition equipment.	33.74	24.05 + a
Group 12: Wellpoint operator.	33.68	24.05 + a
Group 13: Compressor battery operator.	33.10	24.05 + a
Group 14: Elevator operator; tow motor operator (solid tire no rough terrain).	31.96	24.05 + a

As of: **Wednesday, May 02, 2018**

Group 15: Generator Operator; Compressor Operator; Pump Operator; Welding Machine Operator; Heater Operator.	31.55	24.05 + a
Group 16: Maintenance Engineer/Oiler.	30.90	24.05 + a
Group 17: Portable asphalt plant operator; portable crusher plant operator; portable concrete plant operator.	35.21	24.05 + a
Group 18: Power safety boat; vacuum truck; zim mixer; sweeper; (Minimum for any job requiring a CDL license).	32.79	24.05 + a
------PAINTERS (Including Drywall Finishing)------		
10a) Brush and Roller	32.72	20.45

As of: **Wednesday, May 02, 2018**

10b) Taping Only/Drywall Finishing	33.47	20.45
10c) Paperhanger and Red Label	33.22	20.45
10e) Blast and Spray	35.72	20.45
11) Plumber (excluding HVAC pipe installation) (Trade License required: P-1,2,6,7,8,9 J-1,2,3,4 SP-1,2)	41.62	30.36
12) Well Digger, Pile Testing Machine	37.26	24.05 + a
Roofer: Cole Tar Pitch	41.00	16.50 + a

As of: **Wednesday, May 02, 2018**

Roofer: Slate, Tile, Composition, Shingles, Singly Ply and Damp/Waterproofing	39.50	16.50 + a
15) Sheetmetal Worker (Trade License required for HVAC and Ductwork: SM-1,SM-2,SM-3,SM-4,SM-5,SM-6)	37.18	35.29
16) Pipefitter (Including HVAC work) (Trade License required: S-1,2,3,4,5,6,7,8 B-1,2,3,4 D-1,2,3,4, G-1, G-2, G-8 & G-9)	41.62	30.36
------TRUCK DRIVERS------		
17a) 2 Axle	29.13	22.32 + a
17b) 3 Axle, 2 Axle Ready Mix	29.23	22.32 + a

As of: **Wednesday, May 02, 2018**

17c) 3 Axle Ready Mix	29.28	22.32 + a
17d) 4 Axle, Heavy Duty Trailer up to 40 tons	29.33	22.32 + a
17e) 4 Axle Ready Mix	29.38	22.32 + a
17f) Heavy Duty Trailer (40 Tons and Over)	29.58	22.32 + a
17g) Specialized Earth Moving Equipment (Other Than Conventional Type on-the-Road Trucks and Semi-Trailers, Including Euclids)	29.38	22.32 + a
18) Sprinkler Fitter (Trade License required: F-1,2,3,4)	43.92	15.84 + a

19) Theatrical Stage Journeyman	25.76	7.34

Welders: Rate for craft to which welding is incidental.

**Note: Hazardous waste removal work receives additional $1.25 per hour for truck drivers.*

***Note: Hazardous waste premium $3.00 per hour over classified rate*

ALL Cranes: When crane operator is operating equipment that requires a fully licensed crane operator to operate he receives an extra $4.00 premium in addition to the hourly wage rate and benefit contributions:

1) Crane handling or erecting structural steel or stone; hoisting engineer (2 drums or over)

2) Cranes (100 ton rate capacity and over) Bauer Drill/Caisson

3) Cranes (under 100 ton rated capacity)

Crane with 150 ft. boom (including jib) - $1.50 extra
Crane with 200 ft. boom (including jib) - $2.50 extra
Crane with 250 ft. boom (including jib) - $5.00 extra
Crane with 300 ft. boom (including jib) - $7.00 extra
Crane with 400 ft. boom (including jib) - $10.00 extra

All classifications that indicate a percentage of the fringe benefits must be calculated at the percentage rate times the "base hourly rate".

Apprentices duly registered under the Commissioner of Labor's regulations on "Work Training Standards for Apprenticeship and Training Programs" Section 31-51-d-1 to 12, are allowed to be paid the appropriate percentage of the prevailing journeymen hourly base and the full fringe benefit rate, providing the work site ratio shall not be less than one full-time journeyperson instructing and supervising the work of each apprentice in a specific trade.

The Prevailing wage rates applicable to this project are subject to annual adjustments each July 1st for the duration of the project.

Each contractor shall pay the annual adjusted prevailing wage rate that is in effect each July 1st, as posted by the Department of Labor.

It is the contractor's responsibility to obtain the annual adjusted prevailing wage rate increases directly from the Department of Labor's website.

The annual adjustments will be posted on the Department of Labor's Web page: www.ct.gov/dol. For those without internet access, please contact the division listed below.

The Department of Labor will continue to issue the initial prevailing wage rate schedule to the Contracting Agency for the project.

All subsequent annual adjustments will be posted on our Web Site for contractor access.

Contracting Agencies are under no obligation pursuant to State labor law to pay any increase due to the annual adjustment provision.

As of: **Wednesday, May 02, 2018**

Project: Athletic Facilities Renovation At Derby High School

Effective October 1, 2005 - Public Act 05-50: any person performing the work of any mechanic, laborer, or worker shall be paid prevailing wage

All Person who perform work ON SITE must be paid prevailing wage for the appropriate mechanic, laborer, or worker classification.

All certified payrolls must list the hours worked and wages paid to All Persons who perform work ON SITE regardless of their ownership i.e.: (Owners, Corporate Officers, LLC Members, Independent Contractors, et. al)

Reporting and payment of wages is required regardless of any contractual relationship alleged to exist between the contractor and such person.

~~Unlisted classifications needed for work not included within the scope of the classifications listed may be added after award only as provided in the labor standards contract clause (29 CFR 5.5 (a) (1) (ii)).

Please direct any questions which you may have pertaining to classification of work and payment of prevailing wages to the Wage and Workplace Standards Division, telephone (860)263-6790.

As of: **Wednesday, May 02, 2018**

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THIS IS A PUBLIC WORKS PROJECT

Covered by the

PREVAILING WAGE LAW

CT General Statutes Section 31-53

If you have QUESTIONS regarding your wages
CALL (860) 263-6790

Section 31-55 of the CT State Statutes requires every contractor or subcontractor performing work for the state to post in a prominent place the prevailing wages as determined by the Labor Commissioner.

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Sec. 31-53b. Construction safety and health course. New miner training program. Proof of completion required for mechanics, laborers and workers on public works projects. Enforcement. Regulations. Exceptions. (a) Each contract for a public works project entered into on or after July 1, 2009, by the state or any of its agents, or by any political subdivision of the state or any of its agents, described in subsection (g) of section 31-53, shall contain a provision requiring that each contractor furnish proof with the weekly certified payroll form for the first week each employee begins work on such project that any person performing the work of a mechanic, laborer or worker pursuant to the classifications of labor under section 31-53 on such public works project, pursuant to such contract, has completed a course of at least ten hours in duration in construction safety and health approved by the federal Occupational Safety and Health Administration or, has completed a new miner training program approved by the Federal Mine Safety and Health Administration in accordance with 30 CFR 48 or, in the case of telecommunications employees, has completed at least ten hours of training in accordance with 29 CFR 1910.268.

(b) Any person required to complete a course or program under subsection (a) of this section who has not completed the course or program shall be subject to removal from the worksite if the person does not provide documentation of having completed such course or program by the fifteenth day after the date the person is found to be in noncompliance. The Labor Commissioner or said commissioner's designee shall enforce this section.

(c) Not later than January 1, 2009, the Labor Commissioner shall adopt regulations, in accordance with the provisions of chapter 54, to implement the provisions of subsections (a) and (b) of this section. Such regulations shall require that the ten-hour construction safety and health courses required under subsection (a) of this section be conducted in accordance with federal Occupational Safety and Health Administration Training Institute standards, or in accordance with Federal Mine Safety and Health Administration Standards or in accordance with 29 CFR 1910.268, as appropriate. The Labor Commissioner shall accept as sufficient proof of compliance with the provisions of subsection (a) or (b) of this section a student course completion card issued by the federal Occupational Safety and Health Administration Training Institute, or such other proof of compliance said commissioner deems appropriate, dated no earlier than five years before the commencement date of such public works project.

(d) This section shall not apply to employees of public service companies, as defined in section 16-1, or drivers of commercial motor vehicles driving the vehicle on the public works project and delivering or picking up cargo from public works projects provided they perform no labor relating to the project other than the loading and unloading of their cargo.

(P.A. 06-175, S. 1; P.A. 08-83, S. 1.)

History: P.A. 08-83 amended Subsec. (a) by making provisions applicable to public works project contracts entered into on or after July 1, 2009, replacing provision re total cost of work with reference to Sec. 31-53(g), requiring proof in certified payroll form that new mechanic, laborer or worker has completed a 10-hour or more construction safety course and adding provision re new miner training program, amended Subsec. (b) by substituting "person" for "employee" and adding "or program", amended Subsec. (c) by adding "or in accordance with Federal Mine
Safety and Health Administration Standards" and setting new deadline of January 1, 2009, deleted former Subsec. (d) re "public building", added new Subsec. (d) re exemptions for public service company employees and delivery drivers who perform no labor other than delivery and made conforming and technical changes, effective January 1, 2009.

Informational Bulletin

THE 10-HOUR OSHA CONSTRUCTION SAFETY AND HEALTH COURSE

(applicable to public building contracts entered into *on or after July 1, 2007,* where the total cost of all work to be performed is at least $100,000)

(1) This requirement was created by Public Act No. 06-175, which is codified in Section 31-53b of the Connecticut General Statutes (pertaining to the prevailing wage statutes);

(2) The course is required for public building construction contracts (projects funded in whole or in part by the state or any political subdivision of the state) entered into on or after July 1, 2007;

(3) It is required of private employees (not state or municipal employees) and apprentices who perform manual labor for a general contractor or subcontractor on a public building project where the total cost of all work to be performed is at least $100,000;

(4) The ten-hour construction course pertains to the ten-hour Outreach Course conducted in accordance with federal OSHA Training Institute standards, and, for telecommunications workers, a ten-hour training course conducted in accordance with federal OSHA standard, 29 CFR 1910.268;

(5) The internet website for the federal OSHA Training Institute is http://www.osha.gov/fso/ote/training/edcenters/fact_sheet.html;

(6) The statutory language leaves it to the contractor and its employees to determine who pays for the cost of the ten-hour Outreach Course;

(7) Within 30 days of receiving a contract award, a general contractor must furnish proof to the Labor Commissioner that all employees and apprentices performing manual labor on the project will have completed such a course;

(8) Proof of completion may be demonstrated through either: (a) the presentation of a *bona fide* student course completion card issued by the federal OSHA Training Institute; *or* (2) the presentation of documentation provided to an employee by a trainer certified by the Institute pending the actual issuance of the completion card;

(9) Any card with an issuance date more than 5 years prior to the commencement date of the construction project shall not constitute proof of compliance;

(10) Each employer shall affix a copy of the construction safety course completion card to the certified payroll submitted to the contracting agency in accordance with Conn. Gen. Stat. § 31-53(f) on which such employee's name first appears;

(11) Any employee found to be in non-compliance shall be subject to removal from the worksite if such employee does not provide satisfactory proof of course completion to the Labor Commissioner by the fifteenth day after the date the employee is determined to be in noncompliance;

(12) Any such employee who is determined to be in noncompliance may continue to work on a public building construction project for a maximum of fourteen consecutive calendar days while bringing his or her status into compliance;

(13) The Labor Commissioner may make complaint to the prosecuting authorities regarding any employer or agent of the employer, or officer or agent of the corporation who files a false certified payroll with respect to the status of an employee who is performing manual labor on a public building construction project;

(14) The statute provides the minimum standards required for the completion of a safety course by manual laborers on public construction contracts; any contractor can exceed these minimum requirements; and

(15) Regulations clarifying the statute are currently in the regulatory process, and shall be posted on the CTDOL website as soon as they are adopted in final form.

(16) Any questions regarding this statute may be directed to the Wage and Workplace Standards Division of the Connecticut Labor Department via the internet website of http://www.ctdol.state.ct.us/wgwkstnd/wgemenu.htm; or by telephone at (860)263-6790.

THE ABOVE INFORMATION IS PROVIDED EXCLUSIVELY AS AN EDUCATIONAL RESOURCE, AND IS NOT INTENDED AS A SUBSTITUTE FOR LEGAL INTERPRETATIONS WHICH MAY ULTMATELY ARISE CONCERNIG THE CONSTRUCTION OF THE STATUTE OR THE REGULATIONS.

November 29, 2006

Notice

To All Mason Contractors and Interested Parties Regarding Construction Pursuant to Section 31-53 of the Connecticut General Statutes (Prevailing Wage)

The Connecticut Labor Department Wage and Workplace Standards Division is empowered to enforce the prevailing wage rates on projects covered by the above referenced statute.

Over the past few years the Division has withheld enforcement of the rate in effect for workers who operate a forklift on a prevailing wage rate project due to a potential jurisdictional dispute.

The rate listed in the schedules and in our Occupational Bulletin (see enclosed) has been as follows:

Forklift Operator:

- **Laborers (Group 4) Mason Tenders** - operates forklift solely to assist a mason to a maximum height of nine feet only.

- **Power Equipment Operator (Group 9)** - operates forklift to assist any trade and to assist a mason to a height over nine feet.

The U.S. Labor Department conducted a survey of rates in Connecticut but it has not been published and the rate in effect remains as outlined in the above Occupational Bulletin.

Since this is a classification matter and not one of jurisdiction, effective January 1, 2007 the Connecticut Labor Department will enforce the rate on each schedule in accordance with our statutory authority.

Your cooperation in filing appropriate and accurate certified payrolls is appreciated.

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STATUTE 31-55a

- SPECIAL NOTICE -

To: All State and Political Subdivisions,Their Agents, and Contractors

Connecticut General Statute 31-55a - Annual adjustments to wage rates by contractors doing state work.

Each contractor that is awarded a contract on or after October 1, 2002, for (1) the construction of a state highway or bridge that falls under the provisions of section 31-54 of the general statutes, or (2) the construction, remodeling, refinishing, refurbishing, rehabilitation, alteration or repair of any public works project that falls under the provisions of section 31-53 of the general statutes shall contact the Labor Commissioner on or before July first of each year, for the duration of such contract, to ascertain the prevailing rate of wages on an hourly basis and the amount of payment or contributions paid or payable on behalf of each mechanic, laborer or worker employed upon the work contracted to be done, and shall make any necessary adjustments to such prevailing rate of wages and such payment or contributions paid or payable on behalf of each such employee, effective each July first.

- The prevailing wage rates applicable to any contract or subcontract awarded on or after October 1, 2002 are subject to annual adjustments each July 1st for the duration of any project which was originally advertised for bids on or after October 1, 2002.
- Each contractor affected by the above requirement shall pay the annual adjusted prevailing wage rate that is in effect each July 1st, as posted by the Department of Labor.
- It is the ***contractor's*** responsibility to obtain the annual adjusted prevailing wage rate increases directly from the Department of Labor's Web Site. The annual adjustments will be posted on the Department of Labor Web page: www.ctdol.state.ct.us. For those without internet access, please contact the division listed below.

- The Department of Labor will continue to issue the initial prevailing wage rate schedule to the Contracting Agency for the project. All subsequent annual adjustments will be posted on our Web Site for contractor access.

Any questions should be directed to the Contract Compliance Unit, Wage and Workplace Standards Division, Connecticut Department of Labor, 200 Folly Brook Blvd., Wethersfield, CT 06109 at (860)263-6790.

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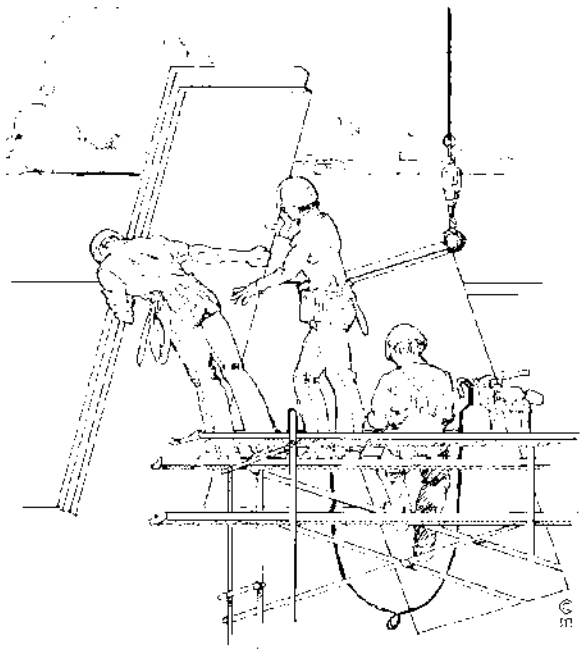
~NOTICE~

TO ALL CONTRACTING AGENCIES

Please be advised that Connecticut General Statutes Section 31-53, requires the contracting agency to certify to the Department of Labor, the total dollar amount of work to be done in connection with such public works project, regardless of whether such project consists of one or more contracts.

Please find the attached "Contracting Agency Certification Form" to be completed and returned to the Department of Labor, Wage and Workplace Standards Division, Public Contract Compliance Unit.

✎ Inquiries can be directed to (860)263-6543.



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CONNECTICUT DEPARTMENT OF LABOR
WAGE AND WORKPLACE STANDARDS DIVISION
CONTRACT COMPLIANCE UNIT

CONTRACTING AGENCY CERTIFICATION FORM

I, _____, acting in my official capacity as _____,
authorized representative title

for _____, located at _____,
contracting agency address

do hereby certify that the total dollar amount of work to be done in connection with

_____, located at _____,
project name and number address

shall be $_____, which includes all work, regardless of whether such project

consists of one or more contracts.

CONTRACTOR INFORMATION

Name:_____

Address:_____
Authorized Representative:_____
Approximate Starting Date: _____

Approximate Completion Date:_____

_____ _____
Signature Date

Return To: Connecticut Department of Labor
Wage & Workplace Standards Division
Contract Compliance Unit
200 Folly Brook Blvd.
Wethersfield, CT 06109

Date Issued: _____

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CONNECTICUT DEPARTMENT OF LABOR
WAGE AND WORKPLACE STANDARDS DIVISION

CONTRACTORS WAGE CERTIFICATION FORM

Construction Manager at Risk/General Contractor/Prime Contractor

I,_____ of _____
Officer, Owner, Authorized Rep. Company Name

do hereby certify that the _____
Company Name

_____
Street

_____
City

and all of its subcontractors will pay all workers on the

_____
Project Name and Number

_____
Street and City

the wages as listed in the schedule of prevailing rates required for such project (a copy of which is attached hereto).

_____
Signed

Subscribed and sworn to before me this _____ day of _____,_____.

_____
Notary Public

Return to:

Connecticut Department of Labor
Wage & Workplace Standards Division
200 Folly Brook Blvd.
Wethersfield, CT 06109

Rate Schedule Issued (Date): _____

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[New] In accordance with Section 31-53b(a) of the C.G.S. each contractor shall provide a copy of the OSHA 10 Hour Construction Safety and Health Card for each employee, to be attached to the first certified payroll on the project.

In accordance with Connecticut General Statutes, 31-53
Certified Payrolls with a statement of compliance
shall be submitted monthly to the contracting agency.

PAYROLL CERTIFICATION FOR PUBLIC WORKS PROJECTS

WEEKLY PAYROLL

Connecticut Department of Labor
Wage and Workplace Standards Division
200 Folly Brook Blvd.
Wethersfield, CT 06109

CONTRACTOR NAME AND ADDRESS:

SUBCONTRACTOR NAME & ADDRESS

WORKER'S COMPENSATION INSURANCE CARRIER

POLICY #

EFFECTIVE DATE:

EXPIRATION DATE:

PAYROLL NUMBER

Week-Ending Date

PROJECT NAME & ADDRESS

PERSON/WORKER, ADDRESS and SECTION	APPR RATE %	MALE/ FEMALE AND RACE*	WORK CLASSIFICATION	DAY AND DATE							Total ST Hours	BASE HOURLY RATE	TYPE OF FRINGE BENEFITS Per Hour 1 through 6 (see back)	GROSS PAY FOR ALL WORK PERFORMED THIS WEEK	TOTAL DEDUCTIONS				GROSS PAY FOR THIS PREVAILING RATE JOB	CHECK # AND NET PAY
				S	M	T	W	TH	F	S					FICA	FEDERAL WITH-HOLDING	STATE WITH-HOLDING	LIST OTHER		
			Trade License Type & Number - OSHA 10 Certification Number	HOURS WORKED EACH DAY							Total O/T Hours	TOTAL FRINGE BENEFIT PLAN CASH								
													1. $							
												$	2. $							
												Base Rate	3. $							
													4. $							
												$	5. $							
												Cash Fringe	6. $							
													1. $							
												$	2. $							
												Base Rate	3. $							
													4. $							
												$	5. $							
												Cash Fringe	6. $							
													1. $							
												$	2. $							
												Base Rate	3. $							
													4. $							
												$	5. $							
												Cash Fringe	6. $							
													1. $							
												$	2. $							
												Base Rate	3. $							
													4. $							
												$	5. $							
												Cash Fringe	6. $							

12/9/2013 *IF REQUIRED

WWS-CP1

*SEE REVERSE SIDE

PAGE NUMBER ______OF

OSHA 10 ~ATTACH CARD TO 1ST CERTIFIED PAYROLL

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***FRINGE BENEFITS EXPLANATION (P):**

Bona fide benefits paid to approved plans, funds or programs, except those required by Federal or State Law (unemployment tax, worker's compensation, income taxes, etc.).

Please specify the type of benefits provided:

1) Medical or hospital care _____ 4) Disability_____

2) Pension or retirement _____ 5) Vacation, holiday_____

3) Life Insurance _____ 6) Other (please specify) _____

CERTIFIED STATEMENT OF COMPLIANCE

For the week ending date of _____,

I, _____of _____, (hereafter known as

Employer) in my capacity as _____ (title) do hereby certify and state:

Section A:

1. All persons employed on said project have been paid the full weekly wages earned by them during the week in accordance with Connecticut General Statutes, section 31-53, as amended. Further, I hereby certify and state the following:

a) The records submitted are true and accurate;

b) The rate of wages paid to each mechanic, laborer or workman and the amount of payment or contributions paid or payable on behalf of each such person to any employee welfare fund, as defined in Connecticut General Statutes, section 31-53 (h), are not less than the prevailing rate of wages and the amount of payment or contributions paid or payable on behalf of each such person to any employee welfare fund, as determined by the Labor Commissioner pursuant to subsection Connecticut General Statutes, section 31-53 (d), and said wages and benefits are not less than those which may also be required by contract;

c) The Employer has complied with all of the provisions in Connecticut General Statutes, section 31-53 (and Section 31-54 if applicable for state highway construction);

d) Each such person is covered by a worker's compensation insurance policy for the duration of his employment which proof of coverage has been provided to the contracting agency;

e) The Employer does not receive kickbacks, which means any money, fee, commission, credit, gift, gratuity, thing of value, or compensation of any kind which is provided directly or indirectly, to any prime contractor, prime contractor employee, subcontractor, or subcontractor employee for the purpose of improperly obtaining or rewarding favorable treatment in connection with a prime contract or in connection with a prime contractor in connection with a subcontractor relating to a prime contractor; and

f) The Employer is aware that filing a certified payroll which he knows to be false is a class D felony for which the employer may be fined up to five thousand dollars, imprisoned for up to five years or both.

2. OSHA~The employer shall affix a copy of the construction safety course, program or training completion document to the certified payroll required to be submitted to the contracting agency for this project on which such persons name first appears.

_____ _____ _____

(Signature) (Title) Submitted on (Date)

*****THIS IS A PUBLIC DOCUMENT*****
*****DO NOT INCLUDE SOCIAL SECURITY NUMBERS*****

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Weekly Payroll Certification For
Public Works Projects (Continued)

PAYROLL CERTIFICATION FOR PUBLIC WORKS PROJECTS

WEEKLY PAYROLL

Week-Ending Date:
Contractor or Subcontractor Business Name:

PERSON/WORKER, ADDRESS and SECTION	APPR RATE %	MALE/ FEMALE AND RACE*	WORK CLASSIFICATION Trade License Type & Number - OSHA 10 Certification Number	DAY AND DATE							Total ST Hours Total O/T Hours	BASE HOURLY RATE TOTAL FRINGE BENEFIT PLAN CASH	TYPE OF FRINGE BENEFITS Per Hour 1 through 6 (see back)	GROSS PAY FOR ALL WORK PERFORMED THIS WEEK	TOTAL DEDUCTIONS				GROSS PAY FOR THIS PREVAILING RATE JOB	CHECK # AND NET PAY
				S	M	T	W	TH	F	S					FICA	FEDERAL WITH-HOLDING	STATE WITH-HOLDING	LIST OTHER		
				HOURS WORKED EACH DAY																
												$ Base Rate $ Cash Fringe	1. $ 2. $ 3. $ 4. $ 5. $ 6. $							
												$ Base Rate $ Cash Fringe	1. $ 2. $ 3. $ 4. $ 5. $ 6. $							
												$ Base Rate $ Cash Fringe	1. $ 2. $ 3. $ 4. $ 5. $ 6. $							
												$ Base Rate $ Cash Fringe	1. $ 2. $ 3. $ 4. $ 5. $ 6. $							
												$ Base Rate $ Cash Fringe	1. $ 2. $ 3. $ 4. $ 5. $ 6. $							

*IF REQUIRED

12/9/2013
WWS-CP2

NOTICE: THIS PAGE MUST BE ACCOMPANIED BY A COVER PAGE (FORM # WWS-CP1)

PAGE NUMBER ______OF

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[New] In accordance with Section 31-53b(a) of the C.G.S. each contractor shall provide a copy of the OSHA 10 Hour Construction Safety and Health Card for each employee, to be attached to the first certified payroll on the project.

In accordance with Connecticut General Statutes, 31-53
Certified Payrolls with a statement of compliance
shall be submitted monthly to the contracting agency.

PAYROLL CERTIFICATION FOR PUBLIC WORKS PROJECTS

WEEKLY PAYROLL

Connecticut Department of Labor
Wage and Workplace Standards Division
200 Folly Brook Blvd.
Wethersfield, CT 06109

CONTRACTOR NAME AND ADDRESS:
Landon Corporation, 15 Connecticut Avenue, Northford, CT 06472

SUBCONTRACTOR NAME & ADDRESS
XYZ Corporation
2 Main Street
Yantic, CT 06389

WORKER'S COMPENSATION INSURANCE CARRIER
Travelers Insurance Company
POLICY # #BAC8888928
EFFECTIVE DATE: 1/1/09
EXPIRATION DATE: 12/31/09

PAYROLL NUMBER: 1
Week-Ending Date: 9/26/09
PROJECT NAME & ADDRESS: DOT 105-296, Route 82

PERSON/WORKER, ADDRESS and SECTION	APPR RATE %	MALE/ FEMALE AND RACE*	WORK CLASSIFICATION / Trade License Type & Number - OSHA 10 Certification Number	DAY AND DATE: S 20	M 21	T 22	W 23	TH 24	F 25	S 26	Total ST Hours / Total O/T Hours	BASE HOURLY RATE / TOTAL FRINGE BENEFIT PLAN CASH	TYPE OF FRINGE BENEFITS Per Hour 1 through 6 (see back)	GROSS PAY FOR ALL WORK PERFORMED THIS WEEK	TOTAL DEDUCTIONS: FICA	FEDERAL WITH-HOLDING	STATE WITH-HOLDING	LIST OTHER	GROSS PAY FOR THIS PREVAILING RATE JOB	CHECK # AND NET PAY
				HOURS WORKED EACH DAY																
Robert Craft 81 Maple Street Willimantic, CT 06226		M/C	Electrical Lineman E-1 1234567 Owner OSHA 123456		8	8	8	8	8		S-TIME 40 O-TIME	$ 30.75 Base Rate $ 8.82 Cash Fringe	1. $ 5.80 2. $ 3. $ 2.01 4. $ 5. $ 6. $	$1,582.80				P-xxxx	$1,582.80	#123 $ xxx.xx
Ronald Jones 212 Elm Street Norwich, CT 06360	65%	M/B	Electrical Apprentice OSHA 234567		8	8	8	8	8		S-TIME 40 O-TIME	$ 19.99 Base Rate $ 16.63 Cash Fringe	1. $ 2. $ 3. $ 4. $ 5. $ 6. $	$1,464.80	xx.xx	xxx.xx	xx.xx	G-xxx	$1,464.80	#124 $xxx.xx
Franklin T. Smith 234 Washington Rd. New London, CT 06320 SECTION B		M/H	Project Manager			8					S-TIME 8 O-TIME	$ Base Rate $ Cash Fringe	1. $ 2. $ 3. $ 4. $ 5. $ 6. $	$1,500.00	xx.xx	xx.xx	xx.xx	M-xx.x		#125 xxx.xx
											S-TIME O-TIME	$ Base Rate $ Cash Fringe	1. $ 2. $ 3. $ 4. $ 5. $ 6. $							

7/13/2009
WWS-CP1

*IF REQUIRED

*SEE REVERSE SIDE

PAGE NUMBER 1 OF 2

OSHA 10 ~ATTACH CARD TO 1ST CERTIFIED PAYROLL

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***FRINGE BENEFITS EXPLANATION (P):**

Bona fide benefits paid to approved plans, funds or programs, except those required by Federal or State Law (unemployment tax, worker's compensation, income taxes, etc.).

Please specify the type of benefits provided:

1) Medical or hospital care Blue Cross 4) Disability _____

2) Pension or retirement _____ 5) Vacation, holiday _____

3) Life Insurance Utopia 6) Other (please specify) _____

CERTIFIED STATEMENT OF COMPLIANCE

For the week ending date of 9/26/09,

I, Robert Craft of XYZ Corporation, (hereafter known as

Employer) in my capacity as Owner (title) do hereby certify and state:

Section A:

1. All persons employed on said project have been paid the full weekly wages earned by them during the week in accordance with Connecticut General Statutes, section 31-53, as amended. Further, I hereby certify and state the following:

a) The records submitted are true and accurate;

b) The rate of wages paid to each mechanic, laborer or workman and the amount of payment or contributions paid or payable on behalf of each such employee to any employee welfare fund, as defined in Connecticut General Statutes, section 31-53 (h), are not less than the prevailing rate of wages and the amount of payment or contributions paid or payable on behalf of each such employee to any employee welfare fund, as determined by the Labor Commissioner pursuant to subsection Connecticut General Statutes, section 31-53 (d), and said wages and benefits are not less than those which may also be required by contract;

c) The Employer has complied with all of the provisions in Connecticut General Statutes, section 31-53 (and Section 31-54 if applicable for state highway construction);

d) Each such employee of the Employer is covered by a worker's compensation insurance policy for the duration of his employment which proof of coverage has been provided to the contracting agency;

e) The Employer does not receive kickbacks, which means any money, fee, commission, credit, gift, gratuity, thing of value, or compensation of any kind which is provided directly or indirectly, to any prime contractor, prime contractor employee, subcontractor, or subcontractor employee for the purpose of improperly obtaining or rewarding favorable treatment in connection with a prime contract or in connection with a prime contractor in connection with a subcontractor relating to a prime contractor; and

f) The Employer is aware that filing a certified payroll which he knows to be false is a class D felony for which the employer may be fined up to five thousand dollars, imprisoned for up to five years or both.

2. OSHA~The employer shall affix a copy of the construction safety course, program or training completion document to the certified payroll required to be submitted to the contracting agency for this project on which such employee's name first appears.

Robert Craft (Signature) owner (Title) 10/2/09 Submitted on (Date)

Section B: Applies to CONNDOT Projects ONLY

That pursuant to CONNDOT contract requirements for reporting purposes only, all employees listed under Section B who performed work on this project are not covered under the prevailing wage requirements defined in Connecticut General Statutes Section 31-53.

Robert Craft (Signature) owner (Title) 10/2/09 Submitted on (Date)

Note: CTDOL will assume all hours worked were performed under Section A unless clearly delineated as Section B WWS-CP1 as such. Should an employee perform work under both Section A and Section B, the hours worked and wages paid must be segregated for reporting purposes.

*****THIS IS A PUBLIC DOCUMENT*****
*****DO NOT INCLUDE SOCIAL SECURITY NUMBERS*****

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Information Bulletin
Occupational Classifications

The Connecticut Department of Labor has the responsibility to properly determine *"job classification"* on prevailing wage projects covered under C.G.S. Section 31-53(d).

Note: This information is intended to provide a sample of some occupational classifications for guidance purposes only. It is not an all-inclusive list of each occupation's duties. This list is being provided only to highlight some areas where a contractor may be unclear regarding the proper classification. If unsure, the employer should seek guidelines for CTDOL.

Below are additional clarifications of specific job duties performed for certain classifications:

- ***ASBESTOS WORKERS***

Applies all insulating materials, protective coverings, coatings and finishes to all types of mechanical systems.

- ***ASBESTOS INSULATOR***

Handle, install apply, fabricate, distribute, prepare, alter, repair, dismantle, heat and frost insulation, including penetration and fire stopping work on all penetration fire stop systems.

- ***BOILERMAKERS***

Erects hydro plants, incomplete vessels, steel stacks, storage tanks for water, fuel, etc. Builds incomplete boilers, repairs heat exchanges and steam generators.

- ***BRICKLAYERS, CEMENT MASONS, CEMENT FINISHERS, MARBLE MASONS, PLASTERERS, STONE MASONS, PLASTERERS. STONE MASONS, TERRAZZO WORKERS, TILE SETTERS***

Lays building materials such as brick, structural tile and concrete cinder, glass, gypsum, terra cotta block. Cuts, tools and sets marble, sets stone, finishes concrete, applies decorative steel, aluminum and plastic tile, applies cements, sand, pigment and marble chips to floors, stairways, etc.

- ***CARPENTERS, MILLWRIGHTS. PILEDRIVERMEN. LATHERS. RESILEINT FLOOR LAYERS, DOCK BUILDERS, DIKERS, DIVER TENDERS***

Constructs, erects, installs and repairs structures and fixtures of wood, plywood and wallboard. Installs, assembles, dismantles, moves industrial machinery. Drives piling into ground to provide foundations for structures such as buildings and bridges, retaining walls for earth embankments, such as cofferdams. Fastens wooden, metal or rockboard lath to walls, ceilings and partitions of buildings, acoustical tile layer, concrete form builder. Applies firestopping materials on fire resistive joint systems only. Installation of curtain/window walls only where attached to wood or metal studs. Installation of insulated material of all types whether blown, nailed or attached in other ways to walls, ceilings and floors of buildings. Assembly and installation of modular furniture/furniture systems. Free-standing furniture is not covered. This includes free standing: student chairs, study top desks, book box desks, computer furniture, dictionary stand, atlas stand, wood shelving, two-position information access station, file cabinets, storage cabinets, tables, etc.

- **LABORER, CLEANING**

• The clean up of any construction debris and the general (heavy/light) cleaning, including sweeping, wash down, mopping, wiping of the construction facility and its furniture, washing, polishing, and dusting.

- **DELIVERY PERSONNEL**

• If delivery of supplies/building materials is to one common point and stockpiled there, prevailing wages are not required. If the delivery personnel are involved in the distribution of the material to multiple locations within the construction site then they would have to be paid prevailing wages for the type of work performed: laborer, equipment operator, electrician, ironworker, plumber, etc.

• An example of this would be where delivery of drywall is made to a building and the delivery personnel distribute the drywall from one "stockpile" location to further sub-locations on each floor. Distribution of material around a construction site is the job of a laborer or tradesman, and not a delivery personnel.

- ***ELECTRICIANS***

Install, erect, maintenance, alteration or repair of any wire, cable, conduit, etc., which generates, transforms, transmits or uses electrical energy for light, heat, power or other purposes, including the Installation or maintenance of telecommunication, LAN wiring or computer equipment, and low voltage wiring. ****License required per Connecticut General Statutes: E-1,2 L-5,6 C-5,6 T-1,2 L-1,2 V-1,2,7,8,9.***

- ***ELEVATOR CONSTRUCTORS***

Install, erect, maintenance and repair of all types of elevators, escalators, dumb waiters and moving walks. ****License required by Connecticut General Statutes: R-1,2,5,6.***

- ***FORK LIFT OPERATOR***

Laborers Group 4) Mason Tenders - operates forklift solely to assist a mason to a maximum height of nine (9) feet only.

Power Equipment Operator Group 9 - operates forklift to assist any trade, and to assist a mason to a height over nine (9) feet.

- ***GLAZIERS***

Glazing wood and metal sash, doors, partitions, and 2 story aluminum storefronts. Installs glass windows, skylights, store fronts and display cases or surfaces such as building fronts, interior walls, ceilings and table tops and metal store fronts. Installation of aluminum window walls and curtain walls is the "joint" work of glaziers and ironworkers, which require equal composite workforce.

- ***IRONWORKERS***

Erection, installation and placement of structural steel, precast concrete, miscellaneous iron, ornamental iron, metal curtain wall, rigging and reinforcing steel. Handling, sorting, and installation of reinforcing steel (rebar). Metal bridge rail (traffic), metal bridge handrail, and decorative security fence installation. Installation of aluminum window walls and curtain walls is the "joint" work of glaziers and ironworkers which require equal composite workforce.

- ***INSULATOR***

• Installing fire stopping systems/materials for "Penetration Firestop Systems": transit to cables, electrical conduits, insulated pipes, sprinkler pipe penetrations, ductwork behind radiation, electrical cable trays, fire rated pipe penetrations, natural polypropylene, HVAC ducts, plumbing bare metal, telephone and communication wires, and boiler room ceilings.

- ***LABORERS***

Acetylene burners, asphalt rakers, chain saw operators, concrete and power buggy operator, concrete saw operator, fence and guard rail erector (except metal bridge rail (traffic), decorative security fence (non-metal).

installation.), hand operated concrete vibrator operator, mason tenders, pipelayers (installation of storm drainage or sewage lines on the street only), pneumatic drill operator, pneumatic gas and electric drill operator, powermen and wagon drill operator, air track operator, block paver, curb setters, blasters, concrete spreaders.

- ***PAINTERS***

Maintenance, preparation, cleaning, blasting (water and sand, etc.), painting or application of any protective coatings of every description on all bridges and appurtenances of highways, roadways, and railroads. Painting, decorating, hardwood finishing, paper hanging, sign writing, scenic art work and drywall hhg for any and all types of building and residential work.

- ***LEAD PAINT REMOVAL***

• Painter's Rate

1. Removal of lead paint from bridges.
2. Removal of lead paint as preparation of any surface to be repainted.
3. Where removal is on a Demolition project prior to reconstruction.

• Laborer's Rate

1. Removal of lead paint from any surface NOT to be repainted.
2. Where removal is on a *TOTAL* Demolition project only.

- ***PLUMBERS AND PIPEFITTERS***

Installation, repair, replacement, alteration or maintenance of all plumbing, heating, cooling and piping. ****License required per Connecticut General Statutes: P-1,2,6,7,8,9 J-1,2,3,4 SP-1,2 S-1,2,3,4,5,6,7,8 B-1,2,3,4 D-1,2,3,4.***

- ***POWER EQUIPMENT OPERATORS***

Operates several types of power construction equipment such as compressors, pumps, hoists, derricks, cranes, shovels, tractors, scrapers or motor graders, etc. Repairs and maintains equipment. ****License required, crane operators only, per Connecticut General Statutes.***

- ***ROOFERS***

Covers roofs with composition shingles or sheets, wood shingles, slate or asphalt and gravel to waterproof roofs, including preparation of surface. (demolition or removal of any type of roofing and or clean-up of any and all areas where a roof is to be relaid.)

- ***SHEETMETAL WORKERS***

Fabricate, assembles, installs and repairs sheetmetal products and equipment in such areas as ventilation, air-conditioning, warm air heating, restaurant equipment, architectural sheet metal work, sheetmetal roofing, and aluminum gutters. Fabrication, handling, assembling, erecting, altering, repairing, etc. of coated metal material panels and composite metal material panels when used on building exteriors and interiors as soffits, facia, louvers, partitions, canopies, cornice, column covers, awnings, beam covers, cladding, sun shades, lighting troughs, spires, ornamental roofing, metal ceilings, mansards, copings, ornamental and ventilation hoods, vertical and horizontal siding panels, trim, etc. The sheet metal classification also applies to the vast variety of coated metal material panels and composite metal material panels that have evolved over the years as an alternative to conventional ferrous and non-ferrous metals like steel, iron, tin, copper, brass, bronze, aluminum, etc. Fabrication, handling, assembling, erecting, altering, repairing, etc. of architectural metal roof, standing seam roof, composite metal roof, metal and composite bathroom/toilet partitions, aluminum gutters, metal and composite lockers and shelving, kitchen equipment, and walk-in coolers. To include testing and air –balancing ancillary to installation and construction.

- ***SPRINKLER FITTERS***

Installation, alteration, maintenance and repair of fire protection sprinkler systems. ****License required per Connecticut General Statutes: F-1,2,3,4.***

- ***TILE MARBLE AND TERRAZZO FINISHERS***

Assists and tends the tile setter, marble mason and terrazzo worker in the performance of their duties.

- **TRUCK DRIVERS**

~How to pay truck drivers delivering asphalt is under REVISION~

Truck Drivers are requires to be paid prevailing wage for time spent "working" directly on the site. These drivers remain covered by the prevailing wage for any time spent transporting between the actual construction location and facilities (such as fabrication, plants, mobile factories, batch plant, borrow pits, job headquarters, tool yards, etc.) dedicated exclusively, or nearly so, to performance of the contract or project, which are so located in proximity to the actual construction location that it is reasonable to include them. ****License required, drivers only, per Connecticut General Statutes.***

For example:

• Material men and deliverymen are not covered under prevailing wage as long as they are not directly involved in the construction process. If, they unload the material, they would then be covered by prevailing wage for the classification they are performing work in: laborer, equipment operator, etc.
• Hauling material off site is not covered provided they are not dumping it at a location outlined above.
• Driving a truck on site and moving equipment or materials on site would be considered covered work, as this is part of the construction process.

➢ *Any questions regarding the proper classification should be directed to:*
Public Contract Compliance Unit
Wage and Workplace Standards Division
Connecticut Department of Labor
200 Folly Brook Blvd, Wethersfield, CT 06109
(860) 263-6543.

Connecticut Department of Labor
Wage and Workplace Standards Division
FOOTNOTES

⇨ Please Note: If the "Benefits" listed on the schedule for the following occupations includes a letter(s) (+ a or + a+b for instance), refer to the information below.

Benefits to be paid at the appropriate prevailing wage rate for the listed occupation.

If the "Benefits" section for the occupation lists only a dollar amount, disregard the information below.

Bricklayers, Cement Masons, Cement Finishers, Concrete Finishers, Stone Masons
(Building Construction) and
(Residential- Hartford, Middlesex, New Haven, New London and Tolland Counties)

a. Paid Holiday: Employees shall receive 4 hours for Christmas Eve holiday provided the employee works the regularly scheduled day before and after the holiday. Employers may schedule work on Christmas Eve and employees shall receive pay for actual hours worked in addition to holiday pay.

Elevator Constructors: Mechanics

a. Paid Holidays: New Year's Day, Memorial Day, Independence Day, Labor Day, Veterans' Day, Thanksgiving Day, Christmas Day, plus the Friday after Thanksgiving.

b. Vacation: Employer contributes 8% of basic hourly rate for 5 years or more of service or 6% of basic hourly rate for 6 months to 5 years of service as vacation pay credit.

Glaziers

a. Paid Holidays: Labor Day and Christmas Day.

Power Equipment Operators
(Heavy and Highway Construction & Building Construction)

a. Paid Holidays: New Year's Day, Good Friday, Memorial day, Independence Day, Labor Day, Thanksgiving Day and Christmas Day, provided the employee works 3 days during the week in which the holiday falls, if scheduled, and if scheduled, the working day before and the working day after the holiday. Holidays falling on Saturday may be observed on Saturday, or if the employer so elects, on the preceding Friday.

Ironworkers

a. Paid Holiday: Labor Day provided employee has been on the payroll for the 5 consecutive work days prior to Labor Day.

Laborers (Tunnel Construction)

a. Paid Holidays: New Year's Day, Memorial Day, Independence Day, Labor Day, Thanksgiving Day and Christmas Day. No employee shall be eligible for holiday pay when he fails, without cause, to work the regular work day preceding the holiday or the regular work day following the holiday.

Roofers

a. Paid Holidays: July 4th, Labor Day, and Christmas Day provided the employee is employed 15 days prior to the holiday.

Sprinkler Fitters

a. Paid Holidays: Memorial Day, July 4th, Labor Day, Thanksgiving Day and Christmas Day, provided the employee has been in the employment of a contractor 20 working days prior to any such paid holiday.

Truck Drivers

(Heavy and Highway Construction & Building Construction)

a. Paid Holidays: New Year's Day, Memorial Day, Independence Day, Labor Day, Thanksgiving Day, Christmas day, and Good Friday, provided the employee has at least 31 calendar days of service and works the last scheduled day before and the first scheduled day after the holiday, unless excused.

SECTION 00 31 32 – GEOTECHNICAL DATA

PART 1 - GENERAL

1.1 SUMMARY

A. This Document with its referenced attachments is part of the Procurement and Contracting Requirements for Project. They provide Owner's information for Bidders' convenience and are intended to supplement rather than serve in lieu of Bidders' own investigations. They are made available for Bidders' convenience and information, but are not a warranty of existing conditions. This Document and its attachments are not part of the Contract Documents.

1.2 SUBSURFACE EXPLORATIONS

A. Subsurface conditions at the site have been explored by the performance of test borings, test pits, and laboratory testing.

B. Boring and test pit logs and laboratory test reports are attached at the end of this Section. The logs describe subsurface conditions encountered at the exploration locations at the time explorations were made.

C. No warranty is made of the continuity of strata or material between the exploration locations. The stratification lines on the logs represent approximate boundaries between soil types. The actual transitions may be gradual.

D. Water level readings may have been observed in the drill holes at times and under conditions as stated on the boring logs. Fluctuations in the level of the groundwater may occur due to variations in rainfall, temperature and other factors not evident at the time measurements were made.

E. Subsurface exploration locations shown on the Drawings are approximate only and the Owner, Architect, Project Manager and/or design consultants make no representations regarding correctness of such information.

1.3 PROJECT CONDITIONS

A. Existing Conditions: Data and information furnished or referenced in the Geotechnical Engineering Report is for the Contractors' information. The Owner, Architect, or Project Manager shall not be responsible for any interpretation of, or conclusion drawn from the data or information, by the Contractor.

B. Bidders shall make their own interpretations and conclusions of subsurface conditions that may affect methods or cost of construction. Bidders may conduct additional on-site subsurface investigations, at their own expense, in order to ascertain existing site conditions. Any such explorations must be coordinated and scheduled with the Owner. All disturbed areas must be restored to pre-investigative conditions.

1.4 GEOTECHNICAL DATA

A. Geotechnical Report: The following Geotechnical Report is attached at the end of this Section.

1. Geotechnical Report – Geotechnical Study for Proposed Athletic Field Improvements Project at Derby High School, 75 Chatfield Street, Derby, CT; prepared by Welti Geotechnical, P.C., dated November 30, 2017.

B. Soil Boring Data: Boring Location Plan, Test Boring Logs, and Test Pit Logs are attached at the end of this Section.

PART 2 - PRODUCTS (Not Used)

PART 3 - EXECUTION (Not Used)

END OF SECTION 00 31 32

WELTI GEOTECHNICAL, P.C.
Formerly Dr. Clarence Welti, PE.,PC.

227 Williams Street · P.O. Box 397
Glastonbury, CT 06033-0397

(860) 633-4623 / FAX (860) 657-2514

November 30, 2017

Mr. Luke J. McCoy, PLA
Kaestle Boos Associates, Inc
416 Slater Road
New Britain, CT 060503

Re: Geotechnical Study for Proposed Athletic Field Improvements Project at Derby High School, 75 Chatfield Street, Derby, CT

Dear Luke:

1.0 Herewith are the data from the test borings taken at the subject site. Twenty one borings were drilled at (1) the football and track area and (2) at the soft ball field area. Borings SB-1 thru SB-14 (excluding SB-5, which was not accessible) were drilled in the area of the football field and track. The remainder of the borings (SB-15 thru SB-22) were drilled in the soft ball field area. The boring layout was by others and is shown on the attached plan. *The borings were drilled by Clarence Welti Associates, Inc. and sampling was conducted by this firm solely to obtain indications of subsurface conditions as part of a geotechnical exploration program. No services were performed to evaluate subsurface environmental conditions.*

2.0 The **Subject Project** in the **Football Field Area** will include the following: (1) Replace gravel track with new paved track at altered location; (2) Construct new synthetic turf football field over existing field and (3) Construct new bleachers. It is presumed that future grades will be within a foot of the present grades. The proposed construction at the **Soft Ball Field Area** would include the construction of a new field within the existing athletic field on Nutmeg Avenue. It is presumed that the field will have natural turf apart from the infield area.

3.0 The **Soils Cross Section** from the borings was generally as follows:

Football Field and Track (see borings SB-1 thru SB-14)

Topsoil to 6" to 16"; or Bituminous Concrete to 4"

Locally FILL; fine to medium to fine to coarse SAND, little to some Silt, Gravel and Rock Fragments, trace Bricks to 1.2 to 8+ feet, medium compact to dense

Locally (see SB-1&SB-4); fine SAND and SILT (6" to 12" layer) below Topsoil or existing Fill

Locally (see boring SB-13) FILL ; fine to coarse SAND , little Silt and Gravel to 8" over 5" of Bituminous Millings

Fine to medium SAND, some Silt, little Gravel and Rock Fragments to top of bedrock at 3 to 8+ feet, medium compact to dense

Weathered/Decomposed Rock to auger refusal on harder bedrock at 2.5 to 8+ feet, very dense

Soft Ball Field (see Borings SB-15 thru SB-22)

Topsoil to 2.5" to 3"

Locally; fine SAND and SILT to 12" to 18", loose

FILL; fine to coarse SAND, little to some Silt, Gravel and Rock Fragments to 1 to 6+ feet, loose to medium compact

Fine to coarse SAND, little to some Silt, Gravel and Rock Fragment to the top of bedrock at 1 to 6+ feet below grade, medium compact to dense

Weathered/Decomposed Rock to auger refusal on harder bedrock at 2 to 6+ feet, very dense

Ground Water was not evident on boring completion.

4.0 Proposed Replacement of existing grass football field with a synthetic turf surface: The general criteria for the layers directly under synthetic fields are usually part of a design build section. Apart from this section the sub grades must be capable of supporting the construction equipment without rutting. A second requirement would be a total section of least 18" of non-frost susceptible soils. The three borings taken in the field area (see borings SB-4, SB-7 and SB-10) encountered topsoil as deep as 16" with soil below the topsoil, which would be considered frost susceptible. After stripping of the topsoil, its recommended that the stripped subgrade be proof rolled with a vibratory roller with a static weight of at least 5 Tons and a dynamic force of at least 10 Tons. If there is evident instability, the subgrade should be excavated to at least 10" and be replaced with gravel fill. If the subgrade is stable, any fill to the under side of the synthetic field section should be with gravel fill conforming to CTDOT Specification Section M.02.06 grading C. The prepared subgrade must be sufficiently stable for large construction equipment.

4.1 Running Track: The required depth of free drainage material (frost free) beneath the track pavement should be at least 24" (processed base + subbase/free draining soils). This section is

necessary to provide drainage and to minimize the potential for frost heave. The recommended section would include 8" of CTDOT processed stone base (section M.05.01) on 16" of subbase. The 16" of subbase should conform to section 6.0 above or CTDOT Subbase (section M.02.06). The processed stone base should be compacted to at least 98% of modified optimum density. The bituminous layer should be at least 3.5" thick and placed and compacted in two lifts with compaction to at least 98% of the Marshal value.

4.1.1 Subsurface drains are recommended around at the interior of track. The drains can be 4" diameter perforated ADS piping about 6" below the subbase layer wrapped in a geotextile and encapsulated in 3/8" crushed stone. Surface runoff collected at the catch basins should be carried separate from the subsurface drains.

5.0 Proposed Construction of New Soft Ball Field: As noted in section 2.0, it is assumed that the turfed part of the field would be with natural turf. The proposed grades appear to be generally within a foot of the existing grade. As noted in the borings, there is minimal existing topsoil on the proposed turf areas. It is possible that the stripped topsoil at the football field could be used in this area to provide sufficient depth of topsoil for an acceptable turf surface. The infield area, which would presumably have a special soil surface should be placed atop 12" of free draining material to assure a stable surface after heavy rains. A perimeter under drain (about 2 feet below grade) should be placed around the infield area. It is recommended that the topsoil for the natural turf be placed on 6" of sand. Under drains (about 2 feet below grade) should be placed at 40 feet centers, if there is a requirement for using the field within a day after heavy rains.

6.0 The soils at the subject site are generally in OSHA Class C which would require excavations that are in excess of 5 feet to have slopes which are less than 34^{o} i.e. 1.5H to1.0V.

7.0 This report has been prepared for specific application to the subject project in accordance with generally accepted soil and foundation engineering practices. No other warranty, express or implied, is made. In the event that any changes in the nature, design and location of structures are planned, the conclusions and recommendations contained in this report should not be considered valid unless the changes are reviewed and conclusions of this report modified or verified in writing.

The analyses and recommendations submitted in this report are based in part upon data obtained from referenced explorations. The extent of variations between explorations may not become evident until construction. If variations then appear evident, it will be necessary to re-evaluate the recommendations of this report.

Welti Geotechnical, P.C., should perform a general review of the final design and specifications in order that geotechnical design recommendations may be properly interpreted and implemented as they were intended.

If you have any questions please call me.

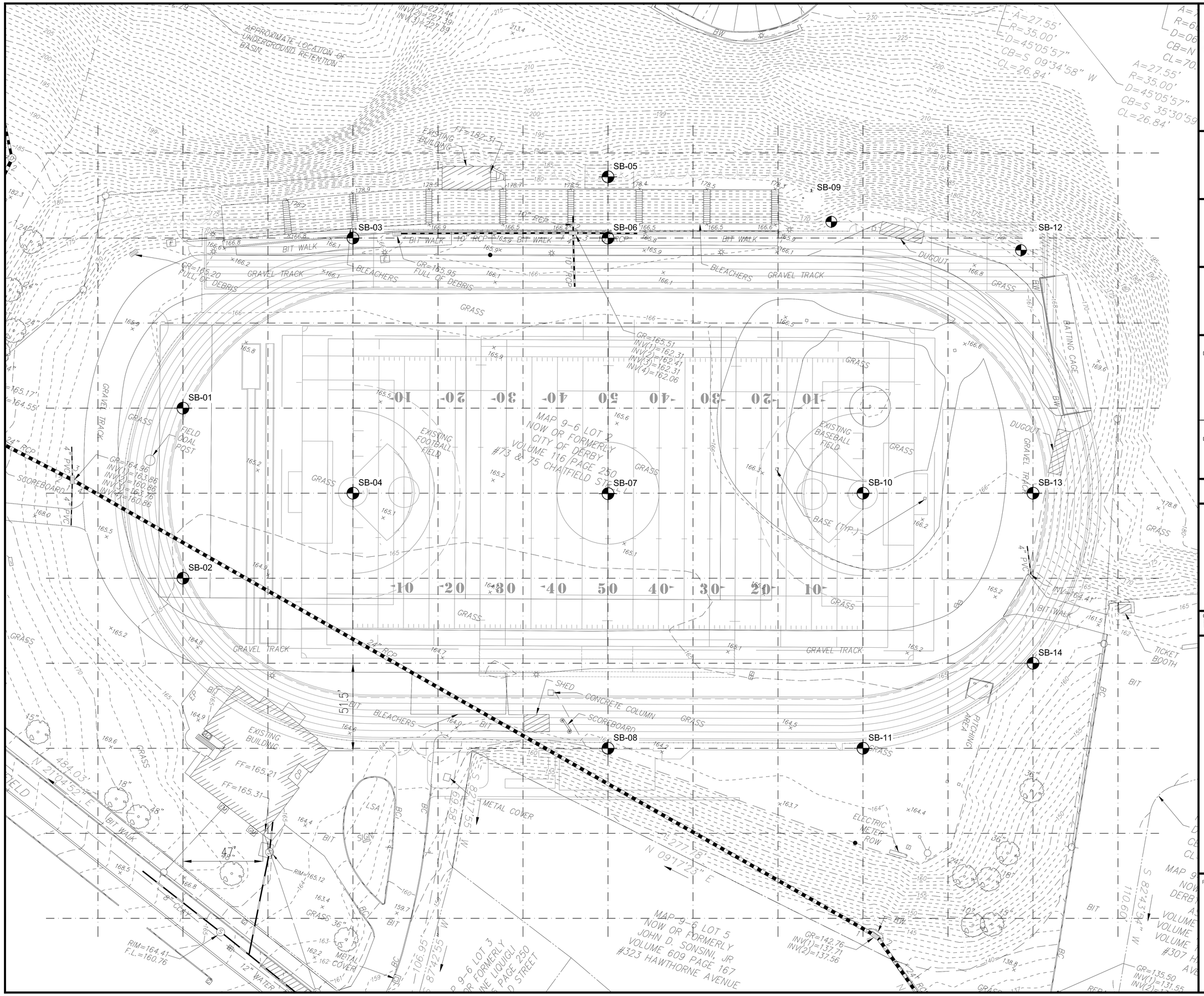
Very truly yours,

Max Welti, P.E.
President, Welti Geotechnical, P.C.

Clarence Welti Ph.D., P. E.

APPENDIX

TEST BORING LOCATION PLAN
+
TEST BORING DATA



KAESTLE BOOS associates, inc

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

325 Foxborough Boulevard, Suite 100, Foxborough, MA 02035
Phone: 508-549-9906 ▲ Fax: 508-549-9907

Email: kba@kba-architects.com ▲ Web: www.kba-architects.com

PROGRESS PRINT
DATE: August 22, 2017
NOT FOR CONSTRUCTION

ISSUE DATE

DATE	DESCRIPTION

REVISIONS

DATE	REFERENCE

FOR ALL ABBREVIATIONS, SYMBOL LEGENDS, AND GENERAL NOTES SEE SHEET R0.01

KEY PLAN

SCALE: 1" = 20'-0" (0, 10', 20', 40') PROJECT TRUE

CITY OF DERBY CONNECTICUT ESTABLISHED MAY 19, 1675

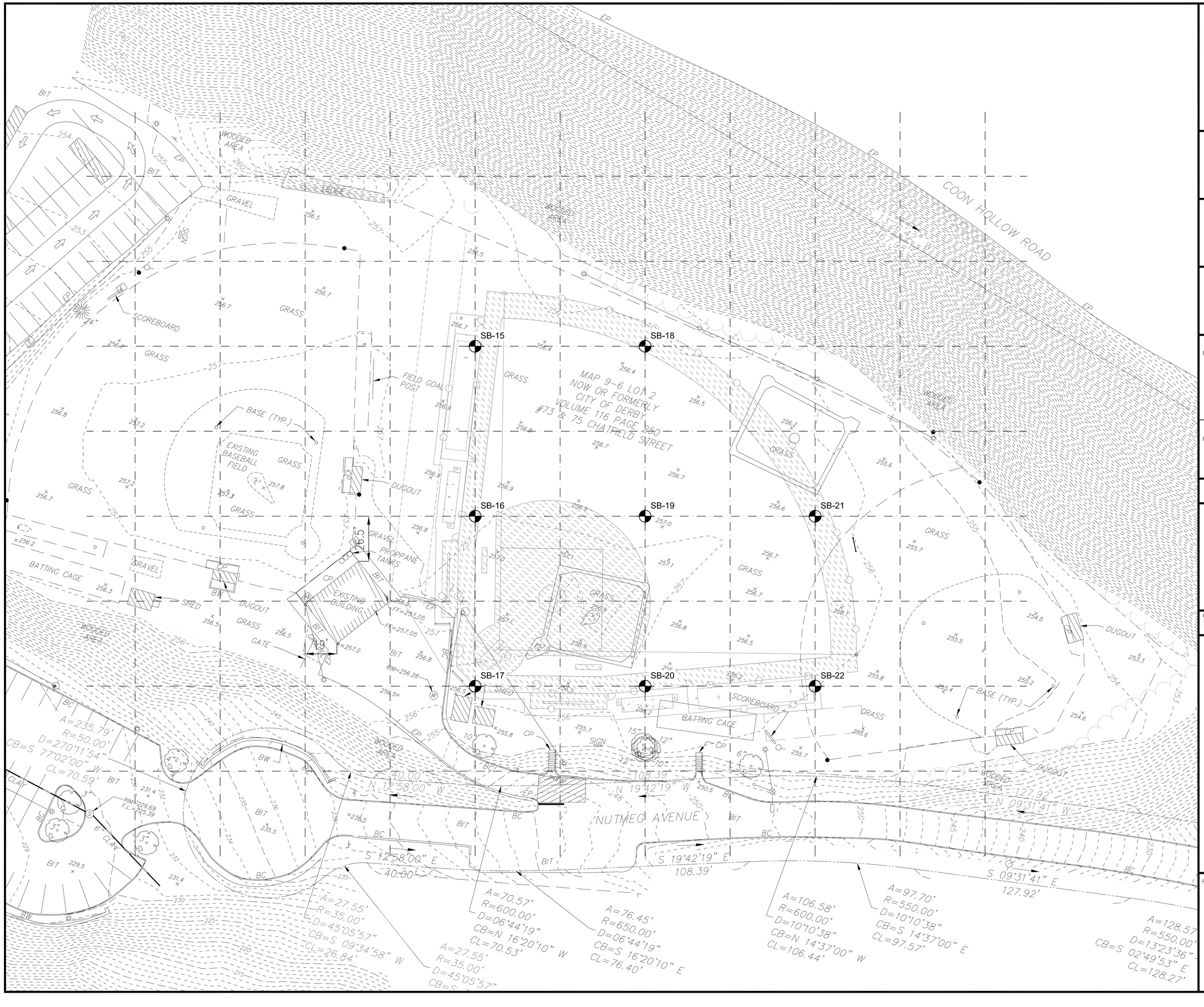
DERBY HIGH SCHOOL ATHLETIC FIELD IMPROVEMENTS

75 CHATFIELD ST
DERBY, CT 06418

PROJECT NO.: 17015.00 DRAWN BY: SD

BORING PLAN

DRAWING NO.:
BP.1.01



KAESTLE BOOS associates, inc

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

325 Foxborough Boulevard, Suite 100, Foxborough, MA 02035
Phone: 508-549-9906 ▲ Fax: 508-549-9907

Email: kba@kba-architects.com ▲ Web: www.kba-architects.com

PROGRESS PRINT
DATE: August 22, 2017
NOT FOR CONSTRUCTION

ISSUE DATE

DATE	DESCRIPTION

REVISIONS

DATE	REFERENCE

FOR ALL ABBREVIATIONS, SYMBOL LEGENDS, AND GENERAL NOTES SEE SHEET R0.01

KEY PLAN

SCALE: 1" = 20'-0" (0, 10', 20', 40')
PROJECT TRUE

DERBY HIGH SCHOOL ATHLETIC FIELD IMPROVEMENTS

75 CHATFIELD ST
DERBY, CT 06418

PROJECT NO.: 17015.00 DRAWN BY: SD

BORING PLAN

DRAWING NO.:
BP.1.02

CLARENCE WELTI ASSOC., INC.
P.O. BOX 397
GLASTONBURY, CONN 06033

CLIENT
KBA

PROJECT NAME
NEW TRACK AND ATHLETIC FIELD IMPROVEMENTS AT DERBY HIGH SCHOOL

LOCATION
75 CHATFIELD STREET, DERBY, CT

	AUGER	CASING	SAMPLER	CORE BAR.
TYPE	HSA		SS	
SIZE I.D.	3.75"		1.375"	
HAMMER WT.			140lbs	
HAMMER FALL			30"	

OFFSET
LINE & STA.
N. COORDINATE
E. COORDINATE

SURFACE ELEV.

HOLE NO. SB-1

GROUND WATER OBSERVATIONS
AT none FT. AFTER 0 HOURS
AT FT. AFTER HOURS

START DATE 11/6/17
FINISH DATE 11/6/17

DEPTH	SAMPLE NO.	BLOWS/6"	DEPTH	A	STRATUM DESCRIPTION + REMARKS	ELEV.
0	1	3-4-6-8	0.0'-2.0'		TOPSOIL — 0.66	
					LIGHT GREY FINE SAND AND SILT — 1.0	
	2	12-26-19-17	2.0'-4.0'		GREY/BR.FINE-MED.SAND, SOME SILT, LITTLE GRAVEL	
	3	12-60	4.0'-4.9'		— 4.5	
5					WEATHERED ROCK — 4.9	
					BOTTOM OF BORING @ 4.9' (AUGER REFUSAL)	
10						
15						
20						
25						
30						
35						

LEGEND: COL. A:

SAMPLE TYPE: D=DRY A=AUGER C=CORE U=UNDISTURBED PISTON S=SPLIT SPOON

PROPORTIONS USED: TRACE=0-10% LITTLE=10-20% SOME=20-35% AND=35-50%

DRILLER: T. CZMYR
INSPECTOR:

SHEET 1 OF 1

HOLE NO. **SB-1**

CLARENCE WELTI ASSOC., INC.
P.O. BOX 397
GLASTONBURY, CONN 06033

CLIENT
KBA

PROJECT NAME
NEW TRACK AND ATHLETIC FIELD IMPROVEMENTS AT DERBY HIGH SCHOOL

LOCATION
75 CHATFIELD STREET, DERBY, CT

	AUGER	CASING	SAMPLER	CORE BAR.
TYPE	HSA		SS	
SIZE I.D.	3.75"		1.375"	
HAMMER WT.			140lbs	
HAMMER FALL			30"	

OFFSET
LINE & STA.
N. COORDINATE
E. COORDINATE

SURFACE ELEV.

HOLE NO. SB-2

GROUND WATER OBSERVATIONS
AT none FT. AFTER 0 HOURS
AT FT. AFTER HOURS

START DATE 11/6/17
FINISH DATE 11/6/17

DEPTH	SAMPLE NO.	BLOWS/6"	DEPTH	A	STRATUM DESCRIPTION + REMARKS	ELEV.
0	1	6-9-11-10	0.0'-2.0'		TOPSOIL 0.50	
					BR.FINE-MED.SAND, SOME SILT, LITTLE GRAVEL	
	2	10-7-8-10	2.0'-4.0'			
	3	6-6-11-60	4.0'-5.9'			
5					5.5	
					WEATHERED ROCK	
					5.9	
					BOTTOM OF BORING @ 5.9' (AUGER REFUSAL)	
10						
15						
20						
25						
30						
35						

LEGEND: COL. A:
SAMPLE TYPE: D=DRY A=AUGER C=CORE U=UNDISTURBED PISTON S=SPLIT SPOON
PROPORTIONS USED: TRACE=0-10% LITTLE=10-20% SOME=20-35% AND=35-50%

DRILLER: T. CZMYR
INSPECTOR:

SHEET 1 OF 1

HOLE NO. **SB-2**

CLARENCE WELTI ASSOC., INC.
P.O. BOX 397
GLASTONBURY, CONN 06033

CLIENT
KBA

PROJECT NAME
NEW TRACK AND ATHLETIC FIELD IMPROVEMENTS AT DERBY HIGH SCHOOL

LOCATION
75 CHATFIELD STREET, DERBY, CT

	AUGER	CASING	SAMPLER	CORE BAR.
TYPE	HSA		SS	
SIZE I.D.	3.75"		1.375"	
HAMMER WT.			140lbs	
HAMMER FALL			30"	

OFFSET
LINE & STA.
N. COORDINATE
E. COORDINATE

SURFACE ELEV.

HOLE NO. SB-3

GROUND WATER OBSERVATIONS
AT none FT. AFTER 0 HOURS
AT FT. AFTER HOURS

START DATE 11/6/17
FINISH DATE 11/6/17

DEPTH	SAMPLE NO.	SAMPLE BLOWS/6"	SAMPLE DEPTH	A	STRATUM DESCRIPTION + REMARKS	ELEV.
0					BITUMINOUS CONCRETE 0.33	
	1	18-19-7-18	1.0'-3.0'		GREY/BR.FINE-CRS.SAND, SOME GRAVEL & ROCK FRAGMENTS, LITTLE SILT - FILL	
	2	45-43-60	3.0'-4.3'			
5	3	60	5.0'-5.1'		5.0 WEATHERED ROCK 5.1	
					BOTTOM OF BORING @ 5.1' (AUGER REFUSAL)	
10						
15						
20						
25						
30						
35						

LEGEND: COL. A:
SAMPLE TYPE: D=DRY A=AUGER C=CORE U=UNDISTURBED PISTON S=SPLIT SPOON
PROPORTIONS USED: TRACE=0-10% LITTLE=10-20% SOME=20-35% AND=35-50%

DRILLER: T. CZMYR
INSPECTOR:

SHEET 1 OF 1 HOLE NO. **SB-3**

CLARENCE WELTI ASSOC., INC.
P.O. BOX 397
GLASTONBURY, CONN 06033

CLIENT
KBA

PROJECT NAME
NEW TRACK AND ATHLETIC FIELD IMPROVEMENTS AT DERBY HIGH SCHOOL

LOCATION
75 CHATFIELD STREET, DERBY, CT

	AUGER	CASING	SAMPLER	CORE BAR.
TYPE	HSA		SS	
SIZE I.D.	3.75"		1.375"	
HAMMER WT.			140lbs	
HAMMER FALL			30"	

OFFSET
LINE & STA.
N. COORDINATE
E. COORDINATE

SURFACE ELEV.

HOLE NO. SB-4

GROUND WATER OBSERVATIONS
AT none FT. AFTER 0 HOURS
AT FT. AFTER HOURS

START DATE 11/6/17
FINISH DATE 11/6/17

DEPTH	SAMPLE NO.	SAMPLE BLOWS/6"	SAMPLE DEPTH	A	STRATUM DESCRIPTION + REMARKS	ELEV.
0	1	3-5-8-11	0.0'-2.0'		TOPSOIL 0.56	
					DARK BR.FINE-MED.SAND, SOME SILT, TRACE GRAVEL - FILL	
	2	6-8-15-5	2.0'-4.0'			
					3.5	
	3	8-18-29-56	4.0'-6.0'		BR.FINE SAND AND SILT - FILL 4.5	
5					BR.FINE-MED.SAND, SOME SILT, LITTLE ROCK FRAGMNETS	
					6.0	
					BOTTOM OF BORING @ 6.0'	
10						
15						
20						
25						
30						
35						

LEGEND: COL. A:
SAMPLE TYPE: D=DRY A=AUGER C=CORE U=UNDISTURBED PISTON S=SPLIT SPOON
PROPORTIONS USED: TRACE=0-10% LITTLE=10-20% SOME=20-35% AND=35-50%

DRILLER: T. CZMYR
INSPECTOR:

SHEET 1 OF 1

HOLE NO. **SB-4**

CLARENCE WELTI ASSOC., INC.
P.O. BOX 397
GLASTONBURY, CONN 06033

CLIENT
KBA

PROJECT NAME
NEW TRACK AND ATHLETIC FIELD IMPROVEMENTS AT DERBY HIGH SCHOOL

LOCATION
75 CHATFIELD STREET, DERBY, CT

	AUGER	CASING	SAMPLER	CORE BAR.
TYPE	HSA		SS	
SIZE I.D.	3.75"		1.375"	
HAMMER WT.			140lbs	
HAMMER FALL			30"	

OFFSET
LINE & STA.
N. COORDINATE
E. COORDINATE

SURFACE ELEV.

HOLE NO. SB-6

GROUND WATER OBSERVATIONS
AT none FT. AFTER 0 HOURS
AT FT. AFTER HOURS

START DATE 11/7/17
FINISH DATE 11/6/17

DEPTH	SAMPLE NO.	SAMPLE BLOWS/6"	SAMPLE DEPTH	A	STRATUM DESCRIPTION + REMARKS	ELEV.
0	1	4-6-10-11	0.0'-2.0'		TOPSOIL 0.33	
					BR.FINE-CRS.SAND, SOME ROCK FRAGMENTS, LITTLE SILT - FILL	
	2	19-60	2.0'-2.8'		WEATHERED ROCK 2.5	
					BOTTOM OF BORING @ 3.0' (AUGER REFUSAL) 3.0	
5						
10						
15						
20						
25						
30						
35						

LEGEND: COL. A:
SAMPLE TYPE: D=DRY A=AUGER C=CORE U=UNDISTURBED PISTON S=SPLIT SPOON
PROPORTIONS USED: TRACE=0-10% LITTLE=10-20% SOME=20-35% AND=35-50%

DRILLER: T. CZMYR
INSPECTOR:

SHEET 1 OF 1 HOLE NO. **SB-6**

CLARENCE WELTI ASSOC., INC.
P.O. BOX 397
GLASTONBURY, CONN 06033

CLIENT
KBA

PROJECT NAME
NEW TRACK AND ATHLETIC FIELD IMPROVEMENTS AT DERBY HIGH SCHOOL

LOCATION
75 CHATFIELD STREET, DERBY, CT

	AUGER	CASING	SAMPLER	CORE BAR.
TYPE	HSA		SS	
SIZE I.D.	3.75"		1.375"	
HAMMER WT.			140lbs	
HAMMER FALL			30"	

OFFSET
LINE & STA.
N. COORDINATE
E. COORDINATE

SURFACE ELEV.

HOLE NO. SB-7

GROUND WATER OBSERVATIONS
AT none FT. AFTER 0 HOURS
AT FT. AFTER HOURS

START DATE 11/6/17
FINISH DATE 11/6/17

DEPTH	SAMPLE NO.	BLOWS/6"	DEPTH	A	STRATUM DESCRIPTION + REMARKS	ELEV.
0	1	3-5-9-9	0.0'-2.0'		TOPSOIL 0.66	
					BR.FINE-CRS.SAND, LITTLE SILT & GRAVEL, TRACE BRICK - FILL 2.0	
	2	3-4-7-20	2.0'-4.0'		DARK BR.SILT AND FINE-MED.SAND - FILL 3.5	
	3	8-7-6-13	4.0'-6.0'		WEATHERED/DECOMPOSED ROCK 6.0	
5					BOTTOM OF BORING @ 6.0'	
10						
15						
20						
25						
30						
35						

LEGEND: COL. A:
SAMPLE TYPE: D=DRY A=AUGER C=CORE U=UNDISTURBED PISTON S=SPLIT SPOON
PROPORTIONS USED: TRACE=0-10% LITTLE=10-20% SOME=20-35% AND=35-50%

DRILLER: T. CZMYR
INSPECTOR:

SHEET 1 OF 1 HOLE NO. **SB-7**

CLARENCE WELTI ASSOC., INC.
P.O. BOX 397
GLASTONBURY, CONN 06033

CLIENT
KBA

PROJECT NAME
NEW TRACK AND ATHLETIC FIELD IMPROVEMENTS AT DERBY HIGH SCHOOL

LOCATION
75 CHATFIELD STREET, DERBY, CT

	AUGER	CASING	SAMPLER	CORE BAR.
TYPE	HSA		SS	
SIZE I.D.	3.75"		1.375"	
HAMMER WT.			140lbs	
HAMMER FALL			30"	

OFFSET
LINE & STA.
N. COORDINATE
E. COORDINATE

SURFACE ELEV.

HOLE NO. SB-8

GROUND WATER OBSERVATIONS
AT none FT. AFTER 0 HOURS
AT FT. AFTER HOURS

START DATE 11/6/17
FINISH DATE 11/6/17

DEPTH	SAMPLE NO.	SAMPLE BLOWS/6"	SAMPLE DEPTH	A	STRATUM DESCRIPTION + REMARKS	ELEV.
0	1	3-4-8-16	0.0'-2.0'		TOPSOIL	
					1.0	
					GREY/BR.FINE-MED.SAND, SOME GRAVEL & ROCK FRAGEMENTS, LITTLE SILT - FILL	
	2	11-11-8-15	2.0'-4.0'			
	3	17-49-60	4.0'-5.4'		4.5	
5					WEATHERED ROCK	
					5.5	
					BOTTOM OF BORING @ 5.5' (AUGER REFUSAL)	
10						
15						
20						
25						
30						
35						

LEGEND: COL. A:
SAMPLE TYPE: D=DRY A=AUGER C=CORE U=UNDISTURBED PISTON S=SPLIT SPOON
PROPORTIONS USED: TRACE=0-10% LITTLE=10-20% SOME=20-35% AND=35-50%

DRILLER: T. CZMYR
INSPECTOR:

SHEET 1 OF 1 HOLE NO. **SB-8**

CLARENCE WELTI ASSOC., INC.
P.O. BOX 397
GLASTONBURY, CONN 06033

CLIENT
KBA

PROJECT NAME
NEW TRACK AND ATHLETIC FIELD IMPROVEMENTS AT DERBY HIGH SCHOOL

LOCATION
75 CHATFIELD STREET, DERBY, CT

	AUGER	CASING	SAMPLER	CORE BAR.
TYPE	HSA		SS	
SIZE I.D.	3.75"		1.375"	
HAMMER WT.			140lbs	
HAMMER FALL			30"	

OFFSET
LINE & STA.
N. COORDINATE
E. COORDINATE

SURFACE ELEV.

HOLE NO. SB-9

GROUND WATER OBSERVATIONS
AT none FT. AFTER 0 HOURS
AT FT. AFTER HOURS

START DATE 11/7/17
FINISH DATE 11/717

DEPTH	SAMPLE NO.	SAMPLE BLOWS/6"	SAMPLE DEPTH	A	STRATUM DESCRIPTION + REMARKS	ELEV.
0	1	4-60	0.0'-1.0'		TOPSOIL 0.17	
					WEATHERED ROCK	
					2.5	
					BOTTOM OF BORING @ 2.5' (AUGER REFUSAL)	
5						
10						
15						
20						
25						
30						
35						

LEGEND: COL. A:
SAMPLE TYPE: D=DRY A=AUGER C=CORE U=UNDISTURBED PISTON S=SPLIT SPOON
PROPORTIONS USED: TRACE=0-10% LITTLE=10-20% SOME=20-35% AND=35-50%

DRILLER: T. CZMYR
INSPECTOR:

SHEET 1 OF 1

HOLE NO. **SB-9**

CLARENCE WELTI ASSOC., INC.
P.O. BOX 397
GLASTONBURY, CONN 06033

CLIENT
KBA

PROJECT NAME
NEW TRACK AND ATHLETIC FIELD IMPROVEMENTS AT DERBY HIGH SCHOOL

LOCATION
75 CHATFIELD STREET, DERBY, CT

	AUGER	CASING	SAMPLER	CORE BAR.
TYPE	HSA		SS	
SIZE I.D.	3.75"		1.375"	
HAMMER WT.			140lbs	
HAMMER FALL			30"	

OFFSET
LINE & STA.
N. COORDINATE
E. COORDINATE

SURFACE ELEV.

HOLE NO. SB-10

GROUND WATER OBSERVATIONS
AT none FT. AFTER 0 HOURS
AT FT. AFTER HOURS

START DATE 11/6/17
FINISH DATE 11/6/17

DEPTH	SAMPLE NO.	SAMPLE BLOWS/6"	SAMPLE DEPTH	A	STRATUM DESCRIPTION + REMARKS	ELEV.
0	1	1-3-2-11	0.0'-2.0'		TOPSOIL	
					1.4	
	2	17-60	2.0'-3.0'		BR.FINE-MED.SAND, SOME SILT, LITTLE GRAVEL	
5	3	9-14-30-18	5.0'-7.0'			
					7.0	
					BOTTOM OF BORING @ 7.0'	
10						
15						
20						
25						
30						
35						

LEGEND: COL. A:
SAMPLE TYPE: D=DRY A=AUGER C=CORE U=UNDISTURBED PISTON S=SPLIT SPOON
PROPORTIONS USED: TRACE=0-10% LITTLE=10-20% SOME=20-35% AND=35-50%

DRILLER: T. CZMYR
INSPECTOR:

SHEET 1 OF 1

HOLE NO. **SB-10**

CLARENCE WELTI ASSOC., INC.
P.O. BOX 397
GLASTONBURY, CONN 06033

CLIENT
KBA

PROJECT NAME
NEW TRACK AND ATHLETIC FIELD IMPROVEMENTS AT DERBY HIGH SCHOOL

LOCATION
75 CHATFIELD STREET, DERBY, CT

	AUGER	CASING	SAMPLER	CORE BAR.
TYPE	HSA		SS	
SIZE I.D.	3.75"		1.375"	
HAMMER WT.			140lbs	
HAMMER FALL			30"	

OFFSET
LINE & STA.
N. COORDINATE
E. COORDINATE

SURFACE ELEV.

HOLE NO. SB-11

GROUND WATER OBSERVATIONS
AT none FT. AFTER 0 HOURS
AT FT. AFTER HOURS

START DATE 11/7/17
FINISH DATE 11/7/17

DEPTH	SAMPLE NO.	SAMPLE BLOWS/6"	SAMPLE DEPTH	A	STRATUM DESCRIPTION + REMARKS	ELEV.
0	1	2-4-7-14	0.0'-2.0'		TOPSOIL	
					GREY/BR.FINE-CRS.SAND, LITTLE SILT & GRAVEL - FILL	
					0.80	
	2	9-16-6-6	2.0'-4.0'		GREY/BR.FINE-MED.SAND, SOME SILT, LITTLE GRAVEL	
					2.0	
	3	9-14-15-16	4.0'-6.0'			
5						
					6.0	
					BOTTOM OF BORING @ 6.0'	
10						
15						
20						
25						
30						
35						

LEGEND: COL. A:
SAMPLE TYPE: D=DRY A=AUGER C=CORE U=UNDISTURBED PISTON S=SPLIT SPOON
PROPORTIONS USED: TRACE=0-10% LITTLE=10-20% SOME=20-35% AND=35-50%

DRILLER: T. CZMYR
INSPECTOR:

SHEET 1 OF 1

HOLE NO. **SB-11**

CLARENCE WELTI ASSOC., INC.
P.O. BOX 397
GLASTONBURY, CONN 06033

CLIENT
KBA

PROJECT NAME
NEW TRACK AND ATHLETIC FIELD IMPROVEMENTS AT DERBY HIGH SCHOOL

LOCATION
75 CHATFIELD STREET, DERBY, CT

	AUGER	CASING	SAMPLER	CORE BAR.
TYPE	HSA		SS	
SIZE I.D.	3.75"		1.375"	
HAMMER WT.			140lbs	
HAMMER FALL			30"	

OFFSET
LINE & STA.
N. COORDINATE
E. COORDINATE

SURFACE ELEV.

HOLE NO. SB-12

GROUND WATER OBSERVATIONS
AT none FT. AFTER 0 HOURS
AT FT. AFTER HOURS

START DATE 11/7/17
FINISH DATE 11/717

DEPTH	SAMPLE NO.	SAMPLE BLOWS/6"	SAMPLE DEPTH	A	STRATUM DESCRIPTION + REMARKS	ELEV.
0	1	4-10-12-14	0.0'-2.0'		TOPSOIL 0.33	
					BR.FINE-MED.SAND, SOME SILT, LITTLE GRAVEL & ROCK FRAGMENTS	
	2	30-19-16-60	2.0'-3.9'			
					3.9	
					BOTTOM OF BORING @ 3.9' (AUGER REFUSAL)	
5						
10						
15						
20						
25						
30						
35						

LEGEND: COL. A:
SAMPLE TYPE: D=DRY A=AUGER C=CORE U=UNDISTURBED PISTON S=SPLIT SPOON
PROPORTIONS USED: TRACE=0-10% LITTLE=10-20% SOME=20-35% AND=35-50%

DRILLER: T. CZMYR
INSPECTOR:

SHEET 1 OF 1

HOLE NO. **SB-12**

CLARENCE WELTI ASSOC., INC.
P.O. BOX 397
GLASTONBURY, CONN 06033

CLIENT
KBA

PROJECT NAME
NEW TRACK AND ATHLETIC FIELD IMPROVEMENTS AT DERBY HIGH SCHOOL

LOCATION
75 CHATFIELD STREET, DERBY, CT

	AUGER	CASING	SAMPLER	CORE BAR.
TYPE	HSA		SS	
SIZE I.D.	3.75"		1.375"	
HAMMER WT.			140lbs	
HAMMER FALL			30"	

OFFSET
LINE & STA.
N. COORDINATE
E. COORDINATE

SURFACE ELEV.

HOLE NO. SB-13

GROUND WATER OBSERVATIONS
AT none FT. AFTER 0 HOURS
AT FT. AFTER HOURS

START DATE 11/6/17
FINISH DATE 11/6/17

DEPTH	SAMPLE NO.	SAMPLE BLOWS/6"	SAMPLE DEPTH	A	STRATUM DESCRIPTION + REMARKS	ELEV.
0	1	9-10-15-25	0.0'-2.0'		FINE GRAVEL — 0.10	
					BR.FINE-CRS.SAND, LITTLE SILT & GRAVEL - FILL — 0.66	
					BITUMINOUS CONCRETE MILLINGS - FILL — 1.2	
	2	26-60	2.0'-2.9'		BR.FINE-CRS.SAND, LITTLE SILT & GRAVEL	
5	3	29-60	5.0'-5.9'		WEATHERED ROCK — 4.5	
					BOTTOM OF BORING @ 5.9' (AUGER REFUSAL) — 5.9	
10						
15						
20						
25						
30						
35						

LEGEND: COL. A:

SAMPLE TYPE: D=DRY A=AUGER C=CORE U=UNDISTURBED PISTON S=SPLIT SPOON

PROPORTIONS USED: TRACE=0-10% LITTLE=10-20% SOME=20-35% AND=35-50%

DRILLER: T. CZMYR
INSPECTOR:

SHEET 1 OF 1

HOLE NO. **SB-13**

CLARENCE WELTI ASSOC., INC.
P.O. BOX 397
GLASTONBURY, CONN 06033

CLIENT
KBA

PROJECT NAME
NEW TRACK AND ATHLETIC FIELD IMPROVEMENTS AT DERBY HIGH SCHOOL

LOCATION
75 CHATFIELD STREET, DERBY, CT

	AUGER	CASING	SAMPLER	CORE BAR.
TYPE	HSA		SS	
SIZE I.D.	3.75"		1.375"	
HAMMER WT.			140lbs	
HAMMER FALL			30"	

OFFSET
LINE & STA.
N. COORDINATE
E. COORDINATE

SURFACE ELEV.

HOLE NO. SB-14

GROUND WATER OBSERVATIONS
AT none FT. AFTER 0 HOURS
AT FT. AFTER HOURS

START DATE 11/7/17
FINISH DATE 11/7/17

DEPTH	SAMPLE NO.	SAMPLE BLOWS/6"	SAMPLE DEPTH	A	STRATUM DESCRIPTION + REMARKS	ELEV.
0	1	2-5-10-14	0.0'-2.0'		TOPSOIL 0.50	
					GREY/BR.FINE-CRS.SAND AND ROCK FRAGMENTS, LITTLE SILT - FILL	
	2	16-21-10-9	2.0'-4.0'			
	3	16-21-10-4	4.0'-6.0'			
5						
	4	18-11-14-11	6.0'-8.0'			
					8.0	
					BOTTOM OF BORING @ 8.0'	
10						
15						
20						
25						
30						
35						

LEGEND: COL. A:
SAMPLE TYPE: D=DRY A=AUGER C=CORE U=UNDISTURBED PISTON S=SPLIT SPOON
PROPORTIONS USED: TRACE=0-10% LITTLE=10-20% SOME=20-35% AND=35-50%

DRILLER: T. CZMYR
INSPECTOR:

SHEET 1 OF 1

HOLE NO. **SB-14**

CLARENCE WELTI ASSOC., INC.
P.O. BOX 397
GLASTONBURY, CONN 06033

CLIENT
KBA

PROJECT NAME
NEW TRACK AND ATHLETIC FIELD IMPROVEMENTS AT DERBY HIGH SCHOOL

LOCATION
75 CHATFIELD STREET, DERBY, CT

	AUGER	CASING	SAMPLER	CORE BAR.
TYPE	HSA		SS	
SIZE I.D.	3.75"		1.375"	
HAMMER WT.			140lbs	
HAMMER FALL			30"	

OFFSET
LINE & STA.
N. COORDINATE
E. COORDINATE

SURFACE ELEV.

HOLE NO. SB-15

GROUND WATER OBSERVATIONS
AT none FT. AFTER 0 HOURS
AT FT. AFTER HOURS

START DATE 11/3/17
FINISH DATE 11/3/17

DEPTH	SAMPLE NO.	SAMPLE BLOWS/6"	SAMPLE DEPTH	A	STRATUM DESCRIPTION + REMARKS	ELEV.
0	1	3-6-6-14	0.0'-2.0'		TOPSOIL 0.20	
					BR.FINE-CRS.SAND, LITTLE SILT & GRAVEL - FILL	
					1.5	
	2	8-8-6-4	2.0'-4.0'		BR.FINE-CRS.SAND, LITTLE SILT, GRAVEL & ROCK FRAGMENTS - FILL	
					4.0	
	3	60	4.5'-5.0'		WEATHERED ROCK 4.5	
5					BOTTOM OF BORING @ 4.5' (AUGER REFUSAL)	
10						
15						
20						
25						
30						
35						

LEGEND: COL. A:
SAMPLE TYPE: D=DRY A=AUGER C=CORE U=UNDISTURBED PISTON S=SPLIT SPOON
PROPORTIONS USED: TRACE=0-10% LITTLE=10-20% SOME=20-35% AND=35-50%

DRILLER: J. BREWER
INSPECTOR:

SHEET 1 OF 1 HOLE NO. **SB-15**

CLARENCE WELTI ASSOC., INC.
P.O. BOX 397
GLASTONBURY, CONN 06033

CLIENT
KBA

PROJECT NAME
NEW TRACK AND ATHLETIC FIELD IMPROVEMENTS AT DERBY HIGH SCHOOL

LOCATION
75 CHATFIELD STREET, DERBY, CT

	AUGER	CASING	SAMPLER	CORE BAR.
TYPE	HSA		SS	
SIZE I.D.	3.75"		1.375"	
HAMMER WT.			140lbs	
HAMMER FALL			30"	

OFFSET
LINE & STA.
N. COORDINATE
E. COORDINATE

SURFACE ELEV.

HOLE NO. SB-16

GROUND WATER OBSERVATIONS
AT none FT. AFTER 0 HOURS
AT FT. AFTER HOURS

START DATE 11/3/17
FINISH DATE 11/3/17

DEPTH	SAMPLE NO.	SAMPLE BLOWS/6"	SAMPLE DEPTH	A	STRATUM DESCRIPTION + REMARKS	ELEV.
0	1	2-6-4-8-60	0.0'-2.0'		TOPSOIL 0.25	
					BR.FINE-MED.SAND, SOME SILT, TRACE ROOTS 1.0	
					WEATHERED ROCK 2.0	
					BOTTOM OF BORING @ 2.0' (AUGER REFUSAL)	
5						
10						
15						
20						
25						
30						
35						

LEGEND: COL. A:
SAMPLE TYPE: D=DRY A=AUGER C=CORE U=UNDISTURBED PISTON S=SPLIT SPOON
PROPORTIONS USED: TRACE=0-10% LITTLE=10-20% SOME=20-35% AND=35-50%

DRILLER: J. BREWER
INSPECTOR:

SHEET 1 OF 1

HOLE NO. **SB-16**

CLARENCE WELTI ASSOC., INC.
P.O. BOX 397
GLASTONBURY, CONN 06033

CLIENT
KBA

PROJECT NAME
NEW TRACK AND ATHLETIC FIELD IMPROVEMENTS AT DERBY HIGH SCHOOL

LOCATION
75 CHATFIELD STREET, DERBY, CT

	AUGER	CASING	SAMPLER	CORE BAR.
TYPE	HSA		SS	
SIZE I.D.	3.75"		1.375"	
HAMMER WT.			140lbs	
HAMMER FALL			30"	

OFFSET
LINE & STA.
N. COORDINATE
E. COORDINATE

SURFACE ELEV.

HOLE NO. SB-17

GROUND WATER OBSERVATIONS
AT none FT. AFTER 0 HOURS
AT FT. AFTER HOURS

START DATE 11/3/17
FINISH DATE 11/3/17

DEPTH	SAMPLE NO.	SAMPLE BLOWS/6"	SAMPLE DEPTH	A	STRATUM DESCRIPTION + REMARKS	ELEV.
0	1	4-3-5-22	0.0'-2.0'		TOPSOIL 0.25	
					BR.FINE SAND AND SILT	
					BR.FINE-CRS.SAND, SOME GRAVEL, LITTLE SILT 1.5	
	2	10-25-26-60	2.0'-3.8'			
					WEATHERED ROCK 3.0	
					BOTTOM OF BORING @ 3.9' (AUGER REFUSAL) 3.9	
5						
10						
15						
20						
25						
30						
35						

LEGEND: COL. A:
SAMPLE TYPE: D=DRY A=AUGER C=CORE U=UNDISTURBED PISTON S=SPLIT SPOON
PROPORTIONS USED: TRACE=0-10% LITTLE=10-20% SOME=20-35% AND=35-50%

DRILLER: J. BREWER
INSPECTOR:

SHEET 1 OF 1

HOLE NO. **SB-17**

CLARENCE WELTI ASSOC., INC.
P.O. BOX 397
GLASTONBURY, CONN 06033

CLIENT
KBA

PROJECT NAME
NEW TRACK AND ATHLETIC FIELD IMPROVEMENTS AT DERBY HIGH SCHOOL

LOCATION
75 CHATFIELD STREET, DERBY, CT

	AUGER	CASING	SAMPLER	CORE BAR.
TYPE	HSA		SS	
SIZE I.D.	3.75"		1.375"	
HAMMER WT.			140lbs	
HAMMER FALL			30"	

OFFSET
LINE & STA.
N. COORDINATE
E. COORDINATE

SURFACE ELEV.

HOLE NO. SB-18

GROUND WATER OBSERVATIONS
AT none FT. AFTER 0 HOURS
AT FT. AFTER HOURS

START DATE 11/3/17
FINISH DATE 11/3/17

DEPTH	SAMPLE NO.	SAMPLE BLOWS/6"	SAMPLE DEPTH	A	STRATUM DESCRIPTION + REMARKS	ELEV.
0	1	4-24-40-60	0.0'-2.0'		TOPSOIL 0.25	
					BR.FINE-MED.SAND, SOME SILT, LITTLE GRAVEL, TRACE ROOTS - FILL 1.0	
					WEATHERED ROCK 2.0	
					BOTTOM OF BORING @ 2.0' (AUGER REFUSAL)	
5						
10						
15						
20						
25						
30						
35						

LEGEND: COL. A:
SAMPLE TYPE: D=DRY A=AUGER C=CORE U=UNDISTURBED PISTON S=SPLIT SPOON
PROPORTIONS USED: TRACE=0-10% LITTLE=10-20% SOME=20-35% AND=35-50%

DRILLER: J. BREWER
INSPECTOR:

SHEET 1 OF 1

HOLE NO. **SB-18**

CLARENCE WELTI ASSOC., INC.
P.O. BOX 397
GLASTONBURY, CONN 06033

CLIENT
KBA

PROJECT NAME
NEW TRACK AND ATHLETIC FIELD IMPROVEMENTS AT DERBY HIGH SCHOOL

LOCATION
75 CHATFIELD STREET, DERBY, CT

	AUGER	CASING	SAMPLER	CORE BAR.
TYPE	HSA		SS	
SIZE I.D.	3.75"		1.375"	
HAMMER WT.			140lbs	
HAMMER FALL			30"	

OFFSET
LINE & STA.
N. COORDINATE
E. COORDINATE

SURFACE ELEV.

HOLE NO. SB-19

GROUND WATER OBSERVATIONS
AT none FT. AFTER 0 HOURS
AT FT. AFTER HOURS

START DATE 11/3/17
FINISH DATE 11/3/17

DEPTH	SAMPLE NO.	SAMPLE BLOWS/6"	SAMPLE DEPTH	A	STRATUM DESCRIPTION + REMARKS	ELEV.
0	1	3-9-28-60	0.0'-2.0'		TOPSOIL 0.25	
					BR.FINE SAND AND SILT, LITTLE GRAVEL, TRACE ROOTS - FILL 1.0	
					WEATHERED ROCK 2.0	
					BOTTOM OF BORING @ 2.0' (AUGER REFUSAL)	
5						
10						
15						
20						
25						
30						
35						

LEGEND: COL. A:
SAMPLE TYPE: D=DRY A=AUGER C=CORE U=UNDISTURBED PISTON S=SPLIT SPOON
PROPORTIONS USED: TRACE=0-10% LITTLE=10-20% SOME=20-35% AND=35-50%

DRILLER: J. BREWER
INSPECTOR:

SHEET 1 OF 1

HOLE NO. **SB-19**

CLARENCE WELTI ASSOC., INC.
P.O. BOX 397
GLASTONBURY, CONN 06033

CLIENT
KBA

PROJECT NAME
NEW TRACK AND ATHLETIC FIELD IMPROVEMENTS AT DERBY HIGH SCHOOL

LOCATION
75 CHATFIELD STREET, DERBY, CT

	AUGER	CASING	SAMPLER	CORE BAR.
TYPE	HSA		SS	
SIZE I.D.	3.75"		1.375"	
HAMMER WT.			140lbs	
HAMMER FALL			30"	

OFFSET
LINE & STA.
N. COORDINATE
E. COORDINATE

SURFACE ELEV.

HOLE NO. SB-20

GROUND WATER OBSERVATIONS
AT none FT. AFTER 0 HOURS
AT FT. AFTER HOURS

START DATE 11/3/17
FINISH DATE 11/3/17

DEPTH	SAMPLE NO.	BLOWS/6"	DEPTH	A	STRATUM DESCRIPTION + REMARKS	ELEV.
0	1	3-3-6-8	0.0'-2.0'		TOPSOIL 0.20	
					BR.FINE-CRS.SAND, LITTLE TO SOME SILT, LITTLE GRAVEL - FILL	
	2	5-4-3-4	2.0'-4.0'			
	3	7-4-3-4	4.0'-6.0'			
5					BR.FINE SAND AND SILT 5.0	
					BOTTOM OF BORING @ 6.0' 6.0	
10						
15						
20						
25						
30						
35						

LEGEND: COL. A:
SAMPLE TYPE: D=DRY A=AUGER C=CORE U=UNDISTURBED PISTON S=SPLIT SPOON
PROPORTIONS USED: TRACE=0-10% LITTLE=10-20% SOME=20-35% AND=35-50%

DRILLER: J. BREWER
INSPECTOR:

SHEET 1 OF 1 HOLE NO. **SB-20**

CLARENCE WELTI ASSOC., INC.
P.O. BOX 397
GLASTONBURY, CONN 06033

CLIENT
KBA

PROJECT NAME
NEW TRACK AND ATHLETIC FIELD IMPROVEMENTS AT DERBY HIGH SCHOOL

LOCATION
75 CHATFIELD STREET, DERBY, CT

	AUGER	CASING	SAMPLER	CORE BAR.
TYPE	HSA		SS	
SIZE I.D.	3.75"		1.375"	
HAMMER WT.			140lbs	
HAMMER FALL			30"	

OFFSET
LINE & STA.
N. COORDINATE
E. COORDINATE

SURFACE ELEV.

HOLE NO. SB-21

GROUND WATER OBSERVATIONS
AT none FT. AFTER 0 HOURS
AT FT. AFTER HOURS

START DATE 11/3/17
FINISH DATE 11/3/17

DEPTH	SAMPLE NO.	SAMPLE BLOWS/6"	SAMPLE DEPTH	A	STRATUM DESCRIPTION + REMARKS	ELEV.
0	1	3-6-60	0.0'-1.4'		TOPSOIL 0.20	
					BR.FINE-CRS.SAND, SOME SILT, LITTLE GRAVEL, TRACE ROOTS - FILL 1.3	
					WEATHERED ROCK	
					BOTTOM OF BORING @ 3.0' (AUGER REFUSAL) 3.0	
5						
10						
15						
20						
25						
30						
35						

LEGEND: COL. A:
SAMPLE TYPE: D=DRY A=AUGER C=CORE U=UNDISTURBED PISTON S=SPLIT SPOON
PROPORTIONS USED: TRACE=0-10% LITTLE=10-20% SOME=20-35% AND=35-50%

DRILLER: J. BREWER
INSPECTOR:

SHEET 1 OF 1 HOLE NO. **SB-21**

CLARENCE WELTI ASSOC., INC.
P.O. BOX 397
GLASTONBURY, CONN 06033

CLIENT
KBA

PROJECT NAME
NEW TRACK AND ATHLETIC FIELD IMPROVEMENTS AT DERBY HIGH SCHOOL

LOCATION
75 CHATFIELD STREET, DERBY, CT

	AUGER	CASING	SAMPLER	CORE BAR.
TYPE	HSA		SS	
SIZE I.D.	3.75"		1.375"	
HAMMER WT.			140lbs	
HAMMER FALL			30"	

OFFSET
LINE & STA.
N. COORDINATE
E. COORDINATE

SURFACE ELEV.

HOLE NO. SB-22

GROUND WATER OBSERVATIONS
AT none FT. AFTER 0 HOURS
AT FT. AFTER HOURS

START DATE 11/3/17
FINISH DATE 11/3/17

DEPTH	SAMPLE NO.	BLOWS/6"	DEPTH	A	STRATUM DESCRIPTION + REMARKS	ELEV.
0	1	1-5-3-4	0.0'-2.0'		TOPSOIL 0.20	
					DARK BR.FINE-MED.SAND, SOME SILT, TRACE GRAVEL - FILL	
	2	20-15-12-4	2.0'-4.0'		2.0 GREY/BR.FINE-CRS.SAND AND GRAVEL, LITTLE SILT - FILL	
	3	3-4-3-3	4.0'-6.0'		4.0 BR.FINE-MED.SAND, SOME SILT, LITTLE GRAVEL - FILL	
5					5.5 BR.FINE SAND AND SILT, TRACE ROOTS & GRAVEL - FILL 6.0	
					BOTTOM OF BORING @ 6.0'	
10						
15						
20						
25						
30						
35						

LEGEND: COL. A:
SAMPLE TYPE: D=DRY A=AUGER C=CORE U=UNDISTURBED PISTON S=SPLIT SPOON
PROPORTIONS USED: TRACE=0-10% LITTLE=10-20% SOME=20-35% AND=35-50%

DRILLER: J. BREWER
INSPECTOR:

SHEET 1 OF 1 HOLE NO. **SB-22**

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

A. Project Identification: The Project consists of
ATHLETIC FACILITIES RENOVATION PROJECT - DERBY HIGH SCHOOL
1. Project Location: **Derby High School, 75 Chatfield Road, Derby, CT 06418**

B. Owner: NAME OF OWNER

2. Owner's Representative:
Patty Finn, Director of Economic & Community Development

C. Architect Identification:
Kaestle Boos Associates, Inc., New Britain, CT

1.4 WORK COVERED BY THE CONTRACT DOCUMENTS

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

1. The Work includes selective demolition, including removal of the existing natural grass athletic field and cinder track, athletic facility building, press box building, natural grass baseball field, and bleachers. Construction includes installation of a new synthetic turf

athletic field, a natural grass softball field, netting, fencing, new rubberized running track, press box, bleacher modifications, lighting relocation, and miscellaneous site improvements.

2. The bid drawings, bid documents and project manual for 'Synthetic Grass and Running Track Surfacing, Derby High School City project COD2018-02 dated February 28, 2018" as modified by addenda are hereby incorporated into this specification in whole. The contractor shall carry the portion of bid costs that relate to the running track surfacing and interior field synthetic turf from the lowest responsible bidder for this bid (AstroTurf and ATT Sports) and shall carry the contract for the track and turf surfacing subcontractor, including materials, installation and warranties and shall include those costs in his bid price.

1.5 WORK SEQUENCE

A. General: The Contractor shall utilize the proposed Schedule as the basis for a detailed construction schedule, to be submitted to the Owner, Architect, and Owner's Representative 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.

B. The Sequence of work is to be completed per the following schedule:

Bids Due	**Friday, June 1, 2018**
a. Contractor Scope Reviews	June 04-05, 2018
b. Recommendation to Building Committee	Wednesday, June 6, 2018
*Anticipated Building Committee Meeting Date	
c. City and Contractor Executions	June 7 to June 15, 2018
Construction (June 2108-November 2018)	**COMPLETED BY:**
a. Construction Permit, Submittals, & Mobilizations (2 weeks)	June 18-22, 2018
b. Building Abatement (2 weeks) (by others)	May 2 -June 1, 2018
c. Retaining Walls and Bleacher Modifications	July 23-August 3, 2018
d. Track Base Construction	August 6-17, 2018
e. Synthetic Turf Field Installation (4 weeks)	August 20-September 14, 2018
f. Track Throwing Event Installation (2 weeks)	August 20-September 7, 2018
g. Track Surfacing Installation (2 weeks)	September 17-21, 2018
h. Press Box Installation (2 weeks)	September 24-October 5, 2018
i. Fencing, Netting, and Landscaping (1 weeks)	October 8-12, 2018
j. Field and Track Testing, Punch List (1 week)	October 15-19, 2018
k. Close-Out (2 weeks)	October 22-November 2, 2018
l. Project Complete	**November 2, 2018**

Note: Contractor shall be aware, and plan accordingly, for the construction of the J.R Payden Field House and Baseball Field project concurrently and adjacent to this project. Coordination between the two General Contractors cannot be overemphasized.

1.6 CONTRACTOR USE OF PREMISES

A. General: Each 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 school 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, bleachers, 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.

C. Adjacent Project Work: J.R Payden Field House and Baseball Field Project General Contractor will also occupy the premises during entire construction period. Cooperate with Owner, CM, and GC during construction operations to minimize conflict. Perform the Work so as not to interfere with Projects operations. Maintain existing exits, unless otherwise directed by authorities having jurisdiction. Adjacent work shall not be a reason for delay of work or failure to meet project milestones.

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 **5:00** 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.

A. Upon receipt of the permit, promptly distribute copies thereof to Owner and Architect.

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 **ATHLETIC FACILITIES RENOVATION PROJECT - DERBY HIGH SCHOOL and those portions of the bid entitled 'Synthetic Grass and Running Track Surfacing, Derby High School City project COD2018-02 dated February 28, 2018" that pertain to this project.**

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

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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. Crushed Stone:

   a. Description: ¾” crushed stone in place, according to Division 31 Section “Earthwork.”
   b. Unit of Measurement: C.Y.

4. Processed Aggregate:
   a. Description: Processed Aggregate (in place) including compaction according to Division 31 Section “Earth Moving.”
   b. Unit of Measurement: C.Y.

5. 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 Drawing L4.03 Detail "5 Main Field Perimeter Collector Drain"
   b. Unit of Measurement: L.F.

6. Slot Drain in Concrete Anchor Curb:

    a. Description: Track system slot drain in concrete anchor curb including forming, concrete, slot drain, labor, and finishing according to Drawing L4.03 Detail "6 Slot Drain in Concrete Anchor Curb."
    b. Unit of Measurement: L.F.

7. 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.

8. Collector Pipe Stone:

    a. Description: Collector pipe stone, including shipping and installation according to Division 33 Section "Field Subdrainage System."
    b. Unit of Measurement: C.Y.

9. Field Base, Bottom Stone:

    a. Description: Field base stone, including shipping and installation according to Division 33 Section "Field Subdrainage System."
    b. Unit of Measurement: C.Y.

10. Field Base, Top Stone:

    a. Description: Field base stone, including shipping and installation according to Division 33 Section "Field Subdrainage System."
    b. Unit of Measurement: C.Y.

11. Geotextile Filter Fabric:

    a. Description: geotextile filter fabric, including shipping, anchoring, and installation according to Division 33 Section "Field Subdrainage System."
    b. Unit of Measurement: S.F.

12. Natural Turf Field
    a. Description: Natural turf field construction including, subgrade preparation, topsoil/loam, seeding, labor, and finishing according to Drawing L4.03 Detail "10 Softball Turf Construction."
    b. Unit of Measurement: S.F.

13. Softball Infield Mix:

    a. Description: Baseball/softball infield mix, including delivery, and installation according to Division 32 Section "Baseball/Softball Infield Mix."
    b. Unit of Measurement: C.Y.

14. 4’ High Black Vinyl Coated Chain-Link Fencing with Black-Coated Mesh:

    a. Description: Contractor shall provide the additional cost for the materials, labor, and other items necessary for the installation of a complete fencing system including, but not limited to excavation, footings, posts, caps, fabric, top and bottom rails, tension rods, ties and repair of disturbed areas, according to Division 32 sections.
    b. Unit of Measurement: L.F.

15. 6’ High Black Vinyl Coated Chain-Link Fencing with Black-Coated Mesh:

    a. Description: Contractor shall provide the additional cost for the materials, labor, and other items necessary for the installation of a complete fencing system including, but not limited to excavation, footings, posts, caps, fabric, top and bottom rails, tension rods, ties and repair of disturbed areas, according to Division 32 sections.
    b. Unit of Measurement: L.F.

16. 8’ High Black Vinyl Coated Chain-Link Fencing with Black-Coated Mesh:

    a. Description: Contractor shall provide the additional cost for the materials, labor, and other items necessary for the installation of a complete fencing system including, but not limited to excavation, footings, posts, caps, fabric, top and bottom rails, tension rods, ties and repair of disturbed areas, according to Division 32 sections.
    b. Unit of Measurement: L.F.

17. Track Pavement Asphalt Base
    a. Description: track pavement asphalt construction including, subgrade preparation, granular fill, processed aggregate, asphalt bottom course, asphalt top course, labor, and finishing according to Drawing L4.03 Detail "9 Track Pavement Asphalt."
    b. Unit of Measurement: S.F.

END OF SECTION 01 22 00

SECTION 01 23 00 - ALTERNATES

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 alternates.

1.3 DEFINITIONS

A. Alternate: An amount proposed by bidders and stated on the Bid Form for certain work defined in the Bidding Requirements that may be added to or deducted from the Base Bid amount if Owner decides to accept a corresponding change either in the amount of construction to be completed or in the products, materials, equipment, systems, or installation methods described in the Contract Documents.

1. The cost or credit for each alternate is the net addition to or deduction from the Contract Sum to incorporate alternate into the Work. No other adjustments are made to the Contract Sum.

1.4 PROCEDURES

A. Coordination: Modify or adjust affected adjacent work as necessary to completely integrate work of the alternate into Project.

1. Include as part of each alternate, miscellaneous devices, accessory objects, and similar items incidental to or required for a complete installation whether or not indicated as part of alternate.

B. Notification: Immediately following award of the Contract, notify each party involved, in writing, of the status of each alternate. Indicate if alternates have been accepted, rejected, or deferred for later consideration. Include a complete description of negotiated modifications to alternates.

C. Execute accepted alternates under the same conditions as other work of the Contract.

D. Schedule: A Schedule of Alternates is included at the end of this Section. Specification Sections referenced in schedule contain requirements for materials necessary to achieve the work described under each alternate.

PART 2 - PRODUCTS (Not Used)

PART 3 - EXECUTION

3.1 SCHEDULE OF ALTERNATES

A. Alternate No. 1: ADD: Elevated Accessible Bleacher Seating, at bottom of East (home) bleacher

Contractor shall provide the addition cost for the materials, labor, and other items necessary for constructing a segmental wall, concrete ramps, hand rails, companion seating and related demolition, paving, drainage and other work per the Specifications and as located on Drawings L2.04 , C3.04, and Sheet A1.01.

B. Alternate No. 2 ADD: East (Home) bleacher code renovations:

Contractor shall provide the addition cost for the materials, labor, and other items necessary for replacing wood bleacher planking with salvaged aluminum seating removed during demolition operations, repair existing concrete access stairs, and replace existing handrails per the Specifications and as located on drawings L2.04 , C3.04, and Sheet A1.01.

C. Alternate No. 3 ADD: Prefabricated Press box and structure (West).

Contractor shall provide the addition cost for the materials, labor, and other items necessary for a complete and fully functional prefabricated pressbox and access platforms, including concrete footings, steel understructure, electrical utilities and modifications to existing visitor bleacher to allow access to pressbox per the Specifications and as located on drawings Drawings L2.04 , C3.04, and Sheet A1.02.

D. Alternate No. 4 ADD: Multi-Sport Field Lighting Upgrade

Contractor shall provide the additional cost for the materials, wiring, 'control link' hardware, labor, and other items necessary for upgrading the existing lighting system to a fully functional, remotely controlled, 60 f.c. sports lighting system per the Specifications and Drawings. (Refer to drawings SU.02)

E. Alternate No. 5 ADD: Prefabricated Storage Sheds and Structures

Contractor shall provide the additional cost for the materials, labor, and other items necessary for the installation of two (2) new 12' x 16' prefabricated wood frame storage sheds per Specifications Section 13 1251 "Prefabricated Structures" and two (2) new 40 'x 8' metal storage containers per Specifications Section 32 0000 "Exterior Improvements' and as located on the Drawings

F. Alternate No. 6: ADD: Sanitary Line Replacement

Contractor shall provide the addition cost for the materials, labor, and other items necessary for a fully functional sanitary line per the Specifications and as located on Drawing C3.03.

G. Alternate No. 7 ADD: Non-Fixed Track and Field Equipment

Contractor shall provide the additional cost for the materials, labor, assembly and other items necessary to provide, fully functional non-fixed track and field equipment per Specification section 32 86 10 Track and Field Equipment Section 2.4.

H. Alternate No. 8 ADD: Basic Softball Practice field scope & improvements

Contractor shall provide the additional cost for the materials, labor, and other items necessary for the installation of a basic softball infield, backstop, accessible parking spaces, wood guard rail grading, layout and amenities, including additional demolition, grading, per the Specifications and as located on the Drawings (esp. sheets L2.02 and Sheet C2.01). (Base Bid: No work in upper fields area)

I. Alternate No. 9 ADD: Expanded softball field scope & improvements

Contractor shall provide the additional cost for the materials, labor, and other items necessary for the installation of additional softball grading, layout and amenities, including additional demolition, grading, drainage, irrigation, electrical improvements including additional fencing, paving, bullpens, batting cage and scoreboard per the Specifications and as located on the Drawings (esp. sheets L1.04, C3.03, IR1.01).

END OF SECTION 01 23 00

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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.
3. Within **21 days** after receipt of Proposal Request, submit a quotation estimating cost adjustments to the Contract Sum and the Contract Time necessary to execute the change.

a. 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.
b. Indicate applicable taxes, delivery charges, equipment rental, and amounts of trade discounts.
c. 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.

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 Changer 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 page.
4. RCOP – Response to Change Order Proposal, 1 page.

END OF SECTION 01 26 00

KAESTLE BOOS
associates, inc

ASI - ARCHITECT'S SUPPLEMENTAL INSTRUCTIONS

PROJECT
City, State

KBA #
Page: 1 of 1

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

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.

Description: ASI Title

Description of work……

Attachments: Sketches, Bulletins, etc.

CONNECTICUT OFFICE
416 Slater Road, P.O. Box 2590, New Britain, CT 06050-2590
V: (860) 229-0361 | F: (860) 229-5303

MASSACHUSETTS OFFICE
325 Foxborough Boulevard, Suite 100, Foxborough, MA 02035
V: (508) 549-9906 | F: (508) 549-9907

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KAESTLE BOOS
associates, inc

RRFI – RESPONSE TO REQUEST FOR INFORMATION

PROJECT
City, State

KBA #
Page: 1 of 1

CONTRACTOR: (or CM) **GENERAL CONTRACTOR OR CM**
Address
City, State, Zip
Attn: M.

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

COPIES TO:
- ☐ KBA – CT/MA
- ☐ Owner
- ☐ Official
- ☐ Consultant

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

DATE: (Month, Day, Year)

☐ 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.

☐ 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.

☐ The Work shall be carried out in accordance with the following supplemental instructions issued in accordance with the Contract Documents.
A Construction Change Directive to follow.

Description: RRFI Title

Response……

Attachments: RFI #

CONNECTICUT OFFICE
416 Slater Road, P.O. Box 2590, New Britain, CT 06050-2590
V: (860) 229-0361 | F: (860) 229-5303

MASSACHUSETTS OFFICE
325 Foxborough Boulevard, Suite 100, Foxborough, MA 02035
V: (508) 549-9906 | F: (508) 549-9907

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P R – P R O P O S A L R E Q U E S T

PROJECT
City, State

KBA #
Page: 1 of 1

CONTRACTOR: (or CM)	**GENERAL CONTRACTOR OR CM** Address City, State, Zip Attn: M.	**PR NO. (3 digit)-(2 digit)**
ISSUED BY:	(Name and Credentials) (Project Architect, Landscape Architect, etc.)	**COPIES TO:** ☐ KBA – CT/MA ☐ Owner ☐ Official
DATE:	(Month, Day, Year)	☐ Consultant

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.

Description: PR Title

Response …….

Attachments:

CONNECTICUT OFFICE
416 Slater Road, P.O. Box 2590, New Britain, CT 06050-2590
V: (860) 229-0361 | F: (860) 229-5303

MASSACHUSETTS OFFICE
325 Foxborough Boulevard, Suite 100, Foxborough, MA 02035
V: (508) 549-9906 | F: (508) 549-9907

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KAESTLE BOOS
associates, inc

RCOP – RESPONSE TO CHANGE ORDER PROPOSAL

PROJECT
City, State

KBA #
Page: 1 of 1

CONTRACTOR: (or CM)	**GENERAL CONTRACTOR OR CM** Address City, State, Zip Attn: M.	**RCOP NO. (3 digit)-(2 digit)**
ISSUED BY:	(Name and Credentials) (Project Architect, Landscape Architect, etc.)	**COPIES TO:** ☐ KBA – CT/MA/NH ☐ Owner ☐ Official
DATE:	(Month, Day, Year)	☐ 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.

CONNECTICUT OFFICE
416 Slater Road, P.O. Box 2590, New Britain, CT 06050-2590
V: (860) 229-0361 | F: (860) 229-5303

MASSACHUSETTS OFFICE
325 Foxborough Boulevard, Suite 100, Foxborough, MA 02035
V: (508) 549-9906 | F: (508) 549-9907

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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.
4. Division 01 Section "Construction Progress Documentation" for administrative requirements governing preparation and submittal of Contractor's Construction Schedule and Submittals Schedule.

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 $25000, provide separate line items for identifiable units of work within such trade with a value not exceeding $25000. 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. Coordination Drawings
   f. Scheduling
   g. Construction Photographic Documentation
   h. Field Engineering
   i. Daily Building Cleanup
   j. Daily Site Cleanup
   k. Safety Program
   l. Full-Time Project Manager
   m. Full-Time Project Superintendent

n. Field Offices
o. Dumpsters
p. Cold Weather Protection
q. Temporary Heat

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

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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 by 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 CRIMINAL OFFENDER RECORD INFORMATION

A. CORI Reports: Each and every person in attendance at Project site must complete the CORI Request Form attached at the end of this Section.

1.7 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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CAD FILES AGREEMENT

Date

(address)

Dear (Contractor's Name):

At your request, Kaestle Boos Associates, Inc. ("KBA") will provide electronic files for your convenience and use in the preparation of shop drawings related to the construction of the **Athletic Facilities Renovation Project, Derby High School, Derby, CT**

KBA's electronic files are compatible with AutoCAD Autodesk Architectural Desktop 2013. 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 is part of KBA's instruments of service and shall not be used by you or anyone else receiving this data through or from you for any purpose other than as a convenience in the preparation of shop drawings for the referenced project; however, they are not to be used in place of Contractor's shop drawings. Any other use or reuse by you or by others, will be at your sole risk and without liability or legal exposure to KBA. You agree 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 you receive. In the event that a conflict arises between the signed contract documents prepared by KBA and electronic files, the signed contract documents shall govern. You are responsible for determining if any conflict exists. By your use of these electronic files, you are not relieved of your duty 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 your work with that of other contractors for the project.

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

KBA will furnish you electronic files of the following drawing sheets:
(Insert list of drawings)

A lump sum fee of $500.00 will be charged for this service. Payment must be remitted to KBA prior to delivery of the electronic files. The lump sum fee will be charged for each occurrence.

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.

_____	_____	_____
CONTRACTOR – (PRINTED NAME)	**CONTRACTOR – (SIGNATURE)**	**DATE**

SECTION 01 32 00 - CONSTRUCTION PROGRESS DOCUMENTATION

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

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 documenting the progress of construction during performance of the Work, including the following:

1. Contractor's Construction Schedule.
2. Submittals Schedule.
3. Daily construction reports.
4. Material location reports.
5. Field condition reports.
6. Special reports.
7. Certified payroll records.

B. Related Sections include the following:

1. Division 01 Section "Payment Procedures" for submitting the Schedule of Values.
2. Division 01 Section "Project Management and Coordination" for submitting and distributing meeting and conference minutes.
3. Division 01 Section "Submittal Procedures" for submitting schedules and reports.
4. Division 01 Section "Quality Requirements" for submitting a schedule of tests and inspections.

1.3 DEFINITIONS

A. Activity: A discrete part of a project that can be identified for planning, scheduling, monitoring, and controlling the construction project. Activities included in a construction schedule consume time and resources.

1. Critical activities are activities on the critical path. They must start and finish on the planned early start and finish times.
2. Predecessor Activity: An activity that precedes another activity in the network.
3. Successor Activity: An activity that follows another activity in the network.

B. Cost Loading: The allocation of the Schedule of Values for the completion of an activity as scheduled. The sum of costs for all activities must equal the total Contract Sum, unless otherwise approved by Architect.

C. CPM: Critical path method, which is a method of planning and scheduling a construction project where activities are arranged based on activity relationships. Network calculations determine when activities can be performed and the critical path of Project.

D. Critical Path: The longest connected chain of interdependent activities through the network schedule that establishes the minimum overall Project duration and contains no float.

E. Event: The starting or ending point of an activity.

F. Float: The measure of leeway in starting and completing an activity.

1. Float time belongs to Owner.
2. Free float is the amount of time an activity can be delayed without adversely affecting the early start of the successor activity.
3. Total float is the measure of leeway in starting or completing an activity without adversely affecting the planned Project completion date.

G. Fragnet: A partial or fragmentary network that breaks down activities into smaller activities for greater detail.

H. Major Area: A story of construction, a separate building, or a similar significant construction element.

I. Milestone: A key or critical point in time for reference or measurement.

J. Network Diagram: A graphic diagram of a network schedule, showing activities and activity relationships.

K. Resource Loading: The allocation of manpower and equipment necessary for the completion of an activity as scheduled.

1.4 SUBMITTALS

A. Qualification Data: For scheduling consultant.

B. Submittals Schedule: Submit three copies of schedule within 10 days of Notice to Proceed, prior to commencement of work other than preparation of temporary facilities. Arrange the following information in a tabular format:

1. Scheduled date for first submittal.
2. Specification Section number and title.
3. Submittal category (action or informational).
4. Name of subcontractor.
5. Description of the Work covered.
6. Scheduled date for Architect's final release or approval.

C. Contractor's Construction Schedule: Submit two opaque copies of initial schedule, large enough to show entire schedule for entire construction period.

1. Submit an electronic copy of schedule, using software indicated, on CD-R, and labeled to comply with requirements for submittals. Include type of schedule (Initial or Updated) and date on label.

D. Daily Construction Reports: Submit three copies at weekly intervals, to the Architect.

E. Material Location Reports: Submit three copies at monthly intervals, to the Architect.

F. Field Condition Reports: Submit three copies at time of discovery of differing conditions, to the Architect.

G. Special Reports: Submit three copies at time of unusual event to the Architect.

1.5 QUALITY ASSURANCE

A. Prescheduling Conference: Within 10 days following Notice to Proceed, conduct conference with Architect and Owner's Representative at Project site to comply with requirements in Division 01 Section "Project Management and Coordination." Review methods and procedures related to the Contractor's Construction Schedule, including, but not limited to, the following:

1. Review format for reports.
2. Discuss constraints, including phasing, work stages, area separations, and partial Owner occupancy.
3. Review delivery dates for Owner-furnished products.
4. Review schedule for work of Owner's separate contracts.
5. Review time required for review of submittals and resubmittals.
6. Review requirements for tests and inspections by independent testing and inspecting agencies.
7. Review time required for completion and startup procedures.
8. Review and finalize list of construction activities to be included in schedule.
9. Review submittal requirements and procedures.
10. Review procedures for updating schedule.
11. Establish mandatory milestone dates and finish dates within each phase.
12. Review installation dates for furniture, furnishings and equipment reinstalled by Owner.

B. Approval of Contractor's Construction Schedule is advisory only and does not relieve the Contractor of the responsibility for completing the work within the Contract Time. Approval by the Owner is not an endorsement of the success of the construction schedule, nor shall it make the Owner liable for time or cost overruns as a result of potential shortcomings.

1.6 COORDINATION

A. Coordinate preparation and processing of schedules and reports with performance of construction activities and with scheduling and reporting of separate contractors.

1. In the case of interference between the operations of different Contractors, the Owner's Representative will determine the work priority of each Contractor and the sequence of work necessary to expedite completion of Project.

B. Coordinate Contractor's Construction Schedule with the Schedule of Values, list of subcontracts, Submittals Schedule, progress reports, payment requests, and other required schedules and reports.

1. Secure time commitments for performing critical elements of the Work from all subcontractors.
2. Coordinate each construction activity in the network with other activities and schedule them in proper sequence.

C. Calendar: Compile a project calendar for use in scheduling. Incorporate all limitations on working days and working hours, including the following:

1. Legal Holidays.
2. Other Holidays observed by the Owner.
3. Non-working day and periods designated by the Owner for special activities.
4. Other non-working days determined by the Contractor.
5. Optional working days determined by the Contractor.

PART 2 - PRODUCTS

2.1 SUBMITTALS SCHEDULE

A. Preparation: Submit a schedule of submittals, arranged in chronological order by dates required by construction schedule. Include time required for review, resubmittal, ordering, manufacturing, fabrication, and delivery when establishing dates.

1. Coordinate Submittals Schedule with list of subcontracts, the Schedule of Values, and Contractor's Construction Schedule.

2.2 CONTRACTOR'S CONSTRUCTION SCHEDULE, GENERAL

A. Procedures: Comply with procedures contained in AGC's "Construction Planning & Scheduling."

B. Time Frame: Extend schedule from date established for commencement of the Work to date of Substantial Completion.

1. Contract completion date shall not be changed by submission of a schedule that shows an early completion date, unless specifically authorized by Change Order.

C. Activities: Treat each phase or separate area as a separate numbered activity for each principal element of the Work. Comply with the following:

1. Activity Duration: Define activities so no activity is longer than 10 days, unless specifically allowed by Architect.
2. Submittal Review Time: Include review and resubmittal times indicated in Division 01 Section "Submittal Procedures" in schedule. Coordinate submittal review times in Contractor's Construction Schedule with Submittals Schedule.
3. Startup and Testing Time: Include not less than 1 day for startup and testing.

4. Substantial Completion: Indicate completion in advance of date established for Substantial Completion, and allow time for Architect's administrative procedures necessary for certification of Substantial Completion.

D. Constraints: Include constraints and work restrictions indicated in the Contract Documents and as follows in schedule, and show how the sequence of the Work is affected.

1. Phasing: Arrange list of activities on schedule by phase.
2. Work under More Than One Contract: Include a separate activity for each contract.
3. Work by Owner: Include a separate activity for each portion of the Work performed by Owner.
4. Work Restrictions: Show the effect of the following items on the schedule:

   a. Coordination with existing construction.
   b. Limitations of continued occupancies.
   c. Uninterruptible services.
   d. Partial occupancy before Substantial Completion.
   e. Use of premises restrictions.
   f. Provisions for future construction.
   g. Seasonal variations.
   h. Environmental control.

5. Work Stages: Indicate important stages of construction for each major portion of the Work, including, but not limited to, the following:

   a. Subcontract awards.
   b. Submittals.
   c. Purchases.
   d. Mockups.
   e. Fabrication.
   f. Sample testing.
   g. Deliveries.
   h. Installation.
   i. Tests and inspections.
   j. Adjusting.
   k. Curing.
   l. Startup and placement into final use and operation.

E. Milestones: Include milestones indicated in the Contract Documents in schedule, including, but not limited to, the Notice to Proceed, Substantial Completion, and Final Completion.

F. Computer Software: Prepare schedules using a program that has been developed specifically to manage construction schedules.

2.3 CONTRACTOR'S CONSTRUCTION SCHEDULE

A. Schedule Preparation: Prepare a list of all activities required to complete the Work.

1. Activities: Indicate the estimated time duration, sequence requirements, and relationship of each activity in relation to other activities. Include estimated time frames for the following activities:

    a. Preparation and processing of submittals.
    b. Mobilization and demobilization.
    c. Purchase of materials.
    d. Delivery.
    e. Fabrication.
    f. Utility interruptions.
    g. Installation.
    h. Work by Owner that may affect or be affected by Contractor's activities.
    i. Testing and commissioning.

2. Critical Path Activities: Identify critical path activities, including those for interim completion dates. Scheduled start and completion dates shall be consistent with Contract milestone dates.

    a. Except where earlier completion are specified, CPM schedules which show completion of the Work prior to the Contract completion date may be approved by the Owner, but will not be allowed as a basis of a claim for delay against the Owner.

3. Format: Mark the critical path. Locate the critical path near center of network; locate paths with most float near the edges.

    a. Subnetworks on separate sheets are permissible for activities clearly off the critical path.

2.4 REPORTS

A. Daily Construction Reports: Prepare a daily construction report recording the following information concerning events at Project site:

1. List of subcontractors at Project site.
2. Approximate count of personnel at Project site.
3. Equipment at Project site.
4. Material deliveries.
5. High and low temperatures and general weather conditions.
6. Accidents.
7. Meetings and significant decisions.
8. Unusual events (refer to special reports).
9. Stoppages, delays, shortages, and losses.
10. Emergency procedures.
11. Orders and requests of authorities having jurisdiction.
12. Change Orders received and implemented.
13. Construction Change Directives received and implemented.
14. Services connected and disconnected.
15. Equipment or system tests and startups.
16. Partial Completions and occupancies.

17. Substantial Completions authorized.

B. Material Location Reports: At bi-weekly intervals, prepare and submit a comprehensive list of materials delivered to and stored at Project site. List shall be cumulative, showing materials previously reported plus items recently delivered. Include with list a statement of progress on and delivery dates for materials or items of equipment fabricated or stored away from Project site.

C. Field Condition Reports: Immediately on discovery of a difference between field conditions and the Contract Documents, prepare and submit a detailed report. Submit with a request for interpretation. Include a detailed description of the differing conditions, together with recommendations for changing the Contract Documents.

D. Deficiency Report: Prepare a detailed deficiency report weekly. The status of the correction of deficient items will be discussed at every progress meeting. The report shall be in "Excel" or similar spreadsheet format. The report shall include the following information:

1. Date that the deficiency was identified.
2. Specific instrument by which the deficiency was identified such as Field Report, Field Notes, Job Meeting.
3. Date by which a remedial plan of action is anticipated to be submitted.
4. Date by which remedial plan of action was submitted.
5. Date by which remedial work is anticipated to be started.
6. Date by which remedial work was started.
7. Date by which remedial work is anticipated to be completed.
8. Date by which remedial work was completed.
9. Date that person authorized by the Owner to inspect the remedial work accepted the work.
10. Name of person authorized by the Owner that inspected and accepted the remedial work.

2.5 SPECIAL REPORTS

A. General: Submit special reports directly to Owner within one day of an occurrence. Distribute copies of report to parties affected by the occurrence.

B. Reporting Unusual Events: When an event of an unusual and significant nature occurs at Project site, whether or not related directly to the Work, prepare and submit a special report. List chain of events, persons participating, response by Contractor's personnel, evaluation of results or effects, and similar pertinent information. Advise Owner in advance when these events are known or predictable.

PART 3 - EXECUTION

3.1 CONTRACTOR'S CONSTRUCTION SCHEDULE

A. Contractor's Construction Schedule Updating: At bi-weekly intervals, update schedule to reflect actual construction progress and activities. Issue schedule one week before submission of Application for Payment.

1. Revise schedule immediately after each meeting or other activity where revisions have been recognized or made. Issue updated schedule concurrently with the report of each such meeting.
2. As the Work progresses, indicate Actual Completion percentage for each activity.
3. Evaluate progress of the work jointly with the Owner's Representative at the end of each week to show progress and identify conflicts.

B. Distribution: Distribute two copies each of approved schedule to Architect, Owner's Representative, Owner, separate contractors, testing and inspecting agencies, and other parties identified by Contractor with a need-to-know schedule responsibility.

1. Post copies in temporary field office.
2. When revisions are made, distribute updated schedules to the same parties and post in the same locations. Delete parties from distribution when they have completed their assigned portion of the Work and are no longer involved in performance of construction activities.

3.2 SCHEDULE COMPLIANCE

A. Whenever it becomes apparent from the current schedule that delays to the critical path have resulted and Contract completion date will not be met, or when so directed by the Owner's Representative, take some or all of the following actions at no additional cost to the Owner:

1. Submit to the Owner's Representative, a written recovery statement of proposed methods to remove or arrest delay to critical path in approved schedule, and a proposed schedule with the corresponding revisions in activities and logic ties.
2. Increase construction manpower as necessary to substantially eliminate backlog of work.
3. Increase the number of working hours per shift, shifts per day, working days per week, amount of construction equipment, or any combination therefore, sufficiently to substantially eliminate backlog of work.
4. Reschedule activities to achieve maximum practical concurrency of accomplishment of activities, and comply with revised schedule.

B. If Contractor fails to submit a written statement of proposed methods or fail to take such steps as requested and approved by the Owner's Representative, the Owner may direct the Contractor to increase the level of effort in manpower (trades), equipment and work schedule including overtime, weekend and holiday work, to be employed by Contractor in order to remove or arrest delay to the critical path in approved schedule.

1. The Contractor shall promptly provide such level of effort at no additional cost to the Owner.

C. Contractor's failure, refusal or neglect to promptly comply with these schedule recovery requirements shall be reasonable evidence that Contractor is not prosecuting the Work with due diligence. Any such failure, refusal or neglect shall give sufficient basis to the Owner to elect any of the following:

1. Demand adequate written assurance of due performance, as provided in the General Conditions;
2. Withhold liquidated damages, and;
3. In the Owner's sole discretion, direct alternate schedule recovery actions.

3.3 ADJUSTMENT OF CONTRACT SCHEDULE AND COMPLETION TIME

A. If Contractor desires to make changes in his method of operating which affect the approved schedule, notify the Owner's Representative in writing, stating the nature of and reason for the proposed changes. Revise and resubmit the schedule only after proposed changes are approved by the Owner's Representative. Adjustment may consist of changing portions of the activity sequence, activity durations, division of approved activities, or other adjustments as may be approved by the Owner's Representative.

1. Addition of extraneous, nonworking activities, or activities which add unapproved constraints to the schedule will not be approved.
2. Make all revisions to the schedule without any additional cost to the Owner.

B. If completion of any activity, whether or not critical, falls more than 100 percent behind its approved duration, submit a schedule adjustment to the Owner's Representative for approval, showing each activity divided into two activities reflecting completed and uncompleted work.

C. Immediately reschedule with added activities shown on the schedule, Shop Drawings which are not approved on the first submittal or within schedule time, and equipment which does not pass specified tests.

D. Subject to the provisions of the General Conditions of the Contract and other Division 01 Sections, submit each request for change in Contract completion date to the Owner's Representative within 20 calendar days after beginning of delay for which a time extension is requested but before date of final payment under this Contract. No extension will be granted for requests which are not submitted within the aftermentioned time limit.

1. In the case of Contractor claims for delays in the work due to causes beyond the Contractor's control, demonstrate by recalculating the progress schedule to indicate the actual effect on related activities. Only interferences with specific work activities that, through correct network analysis, result in a net increase in the critical path will be allowed. Extension of time shall be determined through analysis of the progress schedule.
2. From time to time it may be necessary for the project schedule or completion time to be adjusted, as directed by the Owner, to reflect affects of job conditions, weather, technical difficulties, strikes, unavoidable delays on part of the Owner or its representatives, and other unforeseeable conditions which may indicate schedule adjustments or completion time extensions. Under such conditions, Project Manager will direct the Contractor to reschedule the work or Contract completion time to reflect changed conditions.

    a. Revise and recalculate the schedule accordingly to indicate the actual effect on related activities.

END OF SECTION 01 32 00

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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. This Section includes 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 "Construction Progress Documentation" for submitting schedules and reports, including Contractor's Construction Schedule and the Submittals Schedule.
4. Division 01 Section "Photographic Documentation" for submitting construction photographs.
5. Division 01 Section "Quality Requirements" for submitting test and inspection reports and for mockup requirements.
6. Division 01 Section "Closeout Procedures" for submitting warranties.
7. Division 01 Section "Project Record Documents" for submitting Record Drawings, Record Specifications, and Record Product Data.
8. Division 01 Section "Operation and Maintenance Data" for submitting operation and maintenance manuals.
9. Division 01 Section "Demonstration and Training" for submitting video recordings of demonstration of equipment and training of Owner's personnel.
10. Divisions 02 through 48 Sections for specific requirements for submittals in those Sections.

1.3 DEFINITIONS

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

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

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

    a. Submit revised submittal schedule to reflect changes in current status and timing for submittals.

4. Format: Arrange the following information in a tabular format:

    a. Scheduled date for first submittal.
    b. Specification Section number and title.
    c. Submittal category: Action; informational.
    d. Name of subcontractor.
    e. Description of the Work covered.
    f. Scheduled date for Architect's final release or approval.
    g. Scheduled date of fabrication.
    h. Scheduled dates for purchasing.
    i. Scheduled dates for installation.
    j. Activity or event number.

1.5 SUBMITTAL ADMINISTRATIVE REQUIREMENTS

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

1. Refer to Division 01 Section “Project Management and Coordination” for submitting Coordination Drawings and Contractor’s use of Architect’s digital data files.

B. Coordination: Coordinate preparation and processing of submittals with performance of construction activities.

1. Coordinate each submittal with fabrication, purchasing, testing, delivery, other submittals, and related activities that require sequential activity.
2. Submit all submittal items required for each Specification Section concurrently unless partial submittals for portions of the Work are indicated on approved submittal schedule.
3. Submit action submittals and informational submittals required by the same Specification Section as separate packages under separate transmittals.
4. Coordinate transmittal of different types of submittals for related parts of the Work so processing will not be delayed because of need to review submittals concurrently for coordination.

    a. Architect reserves the right to withhold action on a submittal requiring coordination with other submittals until related submittals are received.

C. Processing Time: Allow 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 (2) weeks for initial review of each submittal. Allow two (2) additional weeks for review of architectural submittals that require plumbing, HVAC, or electrical work to complete the installation, with the exception of Food Service Equipment if specified for this Project. Allow four (4) additional weeks for the review of Food Service Equipment. 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 (2) weeks for review of each resubmittal. Allow two (2) additional weeks for review of architectural submittals that require plumbing, HVAC, or electrical work to complete the installation, with the exception of Food Service Equipment if specified for this Project. Allow four (4) additional weeks for the review of Food Service Equipment.

    a. Resubmittals will be reviewed no more than 2 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.

4. Direct transmission of submittals to Consultants: Submittals may be transmitted directly to the Architect's consultants, with the approval of the Architect. Allow 2 weeks for review of each submittal. Submittal will be returned to Architect before being returned to Contractor.

    a. The Contractor shall request approval from the Architect prior to transmitting submittals to the Architect’s consultants for each Specification Section that the Contractor intends to submit directly to a consultant.

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 stamp approximately 4 by 4 inches on label or beside title block to record Contractor's review and approval markings and action taken by Architect.

    a. The stamp must contain information as indicated on the "Combined Contractor and KBA Inc. Shop Drawing Review Stamp" attached to this section following Part 3.

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 subcontractor.
    f. Name and address of supplier.
    g. Name of manufacturer.
    h. Submittal number or other unique identifier, including revision identifier.

        1) Submittal number shall include the Specification Section number followed by a hyphen and the sequence number for that Specification Section, followed by a hyphen and the review number (i.e. the fourth item submitted under Section 06 10 53 which is being resubmitted after an initial review by the Architect would be numbered as 06 10 53 – 004 - Rev 02).
        2) Submittals that are required by Specification Sections included in Division 01 shall include the Division 01 Section number, followed by a hyphen and the construction Specification Section number, followed by a hyphen and the sequence number for that Specification Section, followed by a hyphen and the review number. (i.e. If the Maintenance Manual for the Hydraulic Elevator were the first item being submitted as a closeout document in Section 14 24 00, it would be numbered as 01 78 23 - 14 24 00 – 01 - Rev 01).

    i. Paragraph number from Part 2 of the appropriate Specification Section.
    j. Drawing number and detail references, as appropriate.
    k. Location(s) where product is to be installed, and/or proposed use of the product, as appropriate.
    l. Other necessary identification.

E. Deviations: Highlight, encircle, or otherwise specifically identify deviations from the Contract Documents on submittals. Differentiate in writing the identified deviations from the products and options which are not in compliance with the Contract Documents.

F. Additional 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.

1. If the Architect approves direct transmission of a submittal to a consultant, the Contractor shall simultaneously transmit one (1) copy of the submittal to the Architect in addition to the required number of submittals. This additional copy will be used as a reference by the Architect during the review and will not be returned to the Contractor. This submittal shall

be accompanied by a copy of the transmittal that was sent to the consultant and shall note that it has been transmitted directly to the Architect's consultant for review.

2. Additional copies submitted for maintenance manuals will not be marked with action taken and will be returned.

G. 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.

1. Transmittal Form: Provide locations on form for the following information:

a. Project name.
b. Date.
c. Destination (To:).
d. Source (From:).
e. Names of subcontractor, manufacturer, and supplier.
f. Category and type of submittal.
g. Submittal purpose and description.
h. Specification Section number and title.
i. Drawing number and detail references, as appropriate.
j. Transmittal number numbered consecutively.
k. Submittal and transmittal distribution record.
l. Remarks.
m. Signature of transmitter.

2. 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 label information as related submittal.
3. Prepare each transmittal separately for the work of a single specification section.

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."
4. The Contractor shall resubmit submittals that are returned from the Architect as "Revise and Resubmit" or "Not Approved" using the same submittal number as the original submittal. The Contractor shall revise the Review number, as appropriate.

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 "Approved" or "Approved as Corrected" 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.

B. Product Schedule: Submit a list, in tabular from, showing specified products. Include generic names of products required. Include manufacturer's name and proprietary product names for each product.

1. Coordinate product list with Contractor's Construction Schedule and the Submittals Schedule.
2. Form: Tabulate information for each product under the following column headings:

    a. Specification Section number and title.
    b. Generic name used in the Contract Documents.
    c. Proprietary name, model number, and similar designations.
    d. Manufacturer's name and address.
    e. Supplier's name and address.
    f. Installer's name and address.
    g. Projected delivery date or time span of delivery period.
    h. Identification of items that require early submittal approval for scheduled delivery date.

3. Initial Submittal: Within 30 days after date of commencement of the Work, submit 3 copies of initial product list. Include a written explanation for omissions of data and for variations from Contract requirements.
4. Completed List: Within 90 days after date of commencement of the Work, submit 3 copies of completed product list. Include a written explanation for omissions of data and for variations from Contract requirements.
5. Architect's Action: Architect will respond in writing to Contractor within 15 days of receipt of completed product list. Architect's response will include a list of unacceptable product selections and a brief explanation of reasons for this action. Architect's response, or lack of response, does not constitute a waiver of requirement to comply with the Contract Documents.

C. 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 written recommendations.
    b. Manufacturer's product specifications.
    c. Manufacturer's installation instructions.

d. Standard color charts.
e. Manufacturer's catalog cuts.
f. Wiring diagrams showing factory-installed wiring.
g. Printed performance curves.
h. Operational range diagrams.
i. Mill reports.
j. Standard product operation and maintenance manuals.
k. Compliance with specified referenced standards.
l. Testing by recognized testing agency.
m. Application of testing agency labels and seals.
n. Notation of coordination requirements.

4. Submit Product Data before or concurrent with Samples.

5. Number of Copies: Submit three copies of Product Data, unless otherwise indicated. Architect will return two copies. Mark up and retain one returned copy as a Project Record Document, the other copy shall be given to the Owner.

D. 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. Wiring diagrams showing field-installed wiring, including power, signal, and control wiring.
f. Shopwork manufacturing instructions.
g. Templates and patterns.
h. Schedules.
i. Design calculations.
j. Compliance with specified standards.
k. Notation of coordination requirements.
l. Notation of dimensions established by field measurement.
m. Relationship to adjoining construction clearly indicated.
n. Seal and signature of professional engineer if specified.
o. Wiring Diagrams: Differentiate between manufacturer-installed and field-installed wiring.

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 40 inches.
3. Number of Copies: Submit **three** opaque copies of each submittal, unless copies are required for operation and maintenance manuals. Submit **three** copies where copies are required for operation and maintenance manuals. Architect will retain one copy; remainder will be returned. Mark up and retain one returned copy as a Project Record Drawing.

E. 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.

    a. Samples that may be incorporated into the Work are indicated in individual Specification Sections. Such Samples must be in an undamaged condition at time of use.
    b. Samples not incorporated into the Work, or otherwise designated as Owner's property, are the property of Contractor.

4. Samples for Initial Selection: Submit manufacturer's color charts consisting of units or sections of units showing the full range of colors, textures, and patterns available.

    a. Number of Samples: Submit three full set(s) of available choices where color, pattern, texture, or similar characteristics are required to be selected from manufacturer's product line. Architect will return submittal with options selected.
    b. Color charts for HVAC equipment, electrical accessories, and light fixtures shall be submitted separately from the product data. Each color chart shall reference the Product Data submittal number, be submitted under a separate transmittal and have its own submittal number.

5. Samples for Verification: Submit full-size units or Samples of size indicated, prepared from same material to be used for the Work, cured and finished in manner specified, and physically identical with material or product proposed for use, and that show full range of color and texture variations expected. Samples include, but are not limited to, the following: partial sections of manufactured or fabricated components; small cuts or containers of materials; complete units of repetitively used materials; swatches showing color, texture, and pattern; color range sets; and components used for independent testing and inspection.

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

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

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

F. Coordination Drawing Submittals: Comply with requirements specified in Division 01 Section "Project Management and Coordination."

G. Contractor's Construction Schedule: Comply with requirements specified in Division 01 Section "Construction Progress Documentation" for Project Manager's action.

H. Application for Payment and Schedule of Values: Comply with requirements specified in Division 01 Section "Payment Procedures."

I. Test and Inspection Reports and Schedule of Tests and Inspections Submittals: Comply with requirements specified in Division 01 Section "Quality Requirements."

J. Closeout Submittals and Maintenance Material Submittals: Comply with requirements specified in Division 01 Section "Closeout Procedures."

K. Maintenance Data: Comply with requirements specified in Division 01 Section "Operation and Maintenance Data."

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

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

N. Manufacturer Certificates: Submit written statements on manufacturer's letterhead certifying that manufacturer complies with requirements in the Contract Documents. Include evidence of manufacturing experience where required.

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

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

Q. Material Test Reports: Submit reports written by a qualified testing agency, on testing agency's standard form, indicating and interpreting test results of material for compliance with requirements in the Contract Documents.

R. Product Test Reports: Submit written reports indicating that current product produced by manufacturer complies with requirements in the Contract Documents. Base reports on evaluation of tests performed by manufacturer and witnessed by a qualified testing agency, or on comprehensive tests performed by a qualified testing agency.

S. Preconstruction Test Reports: Submit reports written by a qualified testing agency, on testing agency's standard form, indicating and interpreting results of tests performed before installation of product, for compliance with performance requirements in the Contract Documents.

T. Compatibility Test Reports: Submit reports written by a qualified testing agency, on testing agency's standard form, indicating and interpreting results of compatibility tests performed before installation of product. Include written recommendations for primers and substrate preparation needed for adhesion.

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

V. Design Data: Prepare and submit written and graphic information, including, but not limited to, performance and design criteria, list of applicable codes and regulations, and calculations. Include list of assumptions and other performance and design criteria and a summary of loads. Include load diagrams if applicable. Provide name and version of software, if any, used for calculations. Include page numbers.

W. 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.

X. Manufacturer's Field Reports: Prepare written information documenting factory-authorized service representative's tests and inspections. Include the following, as applicable:

1. Name, address, and telephone number of factory-authorized service representative making report.
2. Statement on condition of substrates and their acceptability for installation of product.
3. Statement that products at Project site comply with requirements.
4. Summary of installation procedures being followed, whether they comply with requirements and, if not, what corrective action was taken.
5. Results of operational and other tests and a statement of whether observed performance complies with requirements.
6. Statement whether conditions, products, and installation will affect warranty.
7. Other required items indicated in individual Specification Sections.

Y. 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.

Z. Construction Photographs: Comply with requirements specified in Division 01 Section "Photographic Documentation."

AA. Material Safety Data Sheets (MSDSs): Submit information directly to Owner; do not submit to Architect except as required in "Action Submittals" Article.

2.2 DELEGATED DESIGN

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

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

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. Shop Drawing 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: Where a submittal is for information, record purposes or special processing or other activity, the Architect will review each submittal, and mark it "Reviewed" or will return it if it does not comply with requirements. Architect will forward each submittal to appropriate party.

D. Partial submittals are not acceptable, will be considered nonresponsive, and will be returned without review.

E. Unsolicited Submittals: Submittals not required by the Contract Documents may not be reviewed and may be discarded.

F. Return of Submittals: Architect will return submittals to Contractor via standard USPS mail or standard rate for private delivery where PDF by email is not available. If the Contractor requires expedited delivery, the Contractor must provide the Architect with an active shipping account number and forms in order to pay for expedited delivery.

3.3 FORMS

A. The following form referenced in this Section is attached:

1. Combined Contractor and KBA Inc. Shop Drawing 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: _____

TO BE FILLED IN BY THE CONTRACTOR

KAESTLE BOOS ASSOC. PROJECT NO.: 17015.00

TO BE FILLED IN BY KAESTLE BOOS ASSOC., INC.

ARCHITECTS/ENGINEERS
DATE RECEIVED STAMP:

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:

DO NOT REMOVE
THIS PAGE INTENTIONALLY LEFT BLANK

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 "Allowances" for testing and inspecting allowances.
2. Division 01 Section "Construction Progress Documentation" for developing a schedule of required tests and inspections.
3. 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.

J. Experienced: When used with an entity, "experienced" means having successfully completed a minimum of five previous projects similar in size and scope to this Project; being familiar with special requirements indicated; and having complied with requirements of authorities having jurisdiction.

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.

J. Mockups: Before installing portions of the Work requiring mockups, build mockups for each form of construction and finish required to comply with the following requirements, using materials indicated for the completed Work:

1. Build mockups in location and of size indicated or, if not indicated, as directed by Architect.
2. Notify Architect seven days in advance of dates and times when mockups will be constructed.
3. Demonstrate the proposed range of aesthetic effects and workmanship.
4. Obtain Architect's approval of mockups before starting work, fabrication, or construction.

a. Allow seven days for initial review and each re-review of each mockup.

5. Maintain mockups during construction in an undisturbed condition as a standard for judging the completed Work.
6. Demolish and remove mockups when directed, unless otherwise indicated.

K. Laboratory Mockups: Comply with requirements of preconstruction testing and those specified in individual Sections in Divisions 02 through 48.

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 not explicitly assigned to Owner are 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. Where services are indicated as Contractor's responsibility, engage a qualified testing agency to perform these quality-control services.

a. Contractor shall not employ same entity engaged by Owner, unless agreed to in writing by Owner.

2. Notify testing agencies at least 24 hours in advance of time when Work that requires testing or inspecting will be performed.
3. Where quality-control services are indicated as Contractor's responsibility, 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, 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.

H. Schedule of Tests and Inspections: Prepare a schedule of tests, inspections, and similar quality-control services required by the Contract Documents. Submit schedule within 30 days of date established for the Notice to Proceed.

1. Distribution: Distribute schedule to Owner, Project Manager, Architect, testing agencies, and each party involved in performance of portions of the Work where tests and inspections are required.

1.8 SPECIAL TESTS AND INSPECTIONS

A. Special Tests and Inspections: Owner will engage a qualified special inspector to conduct special tests and inspections as set forth in the Engineer of Record's statement of Special Inspections, in accordance with the requirements of the Massachusetts State Building Code, as the responsibility of Owner, and as follows:

1. Verifying that manufacturer maintains detailed fabrication and quality-control procedures and reviewing the completeness and adequacy of those procedures to perform the Work.
2. Notifying Architect and Contractor promptly of irregularities and deficiencies observed in the Work during performance of its services.
3. Submitting a certified written report of each test, inspection, and similar quality-control service to Architect with copy to Contractor and to authorities having jurisdiction.
4. Submitting a final report of special tests and inspections at Substantial Completion, which includes a list of unresolved deficiencies.
5. Interpreting tests and inspections and stating in each report whether tested and inspected work complies with or deviates from the Contract Documents.
6. Retesting and reinspecting corrected work.

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.

C. Copies of Standards: Each entity engaged in construction on Project should be familiar with industry standards applicable to its construction activity. Copies of applicable standards are not bound with the Contract Documents.

1. Where copies of standards are needed to perform a required construction activity, obtain copies directly from publication source.

D. Abbreviations and Acronyms for Standards and Regulations: Where abbreviations and acronyms are used in Specifications or other Contract Documents, they shall mean the recognized name of the trade association, standards-generating organization, authority having jurisdiction, or other entity applicable to the context of the text provision.

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. Telephone service.
   d. Storm and sanitary sewer.

2. Temporary support facilities required include but are not limited to:

   a. Temporary heat.
   b. Field offices and storage containers.
   c. Sanitary facilities, including drinking water.
   d. Dewatering facilities and drains.
   e. Temporary enclosures.
   f. Hoists and manlifts.
   g. Temporary Project identification signs.
   h. Waste disposal services.
   i. Rodent and pest control.
   j. Construction aids and miscellaneous services and facilities.
   k. Scaffolding.
   l. Temporary roads and walks.
   m. Tire cleaning surface.

3. Security and protection facilities required include but are not limited to:

   a. Temporary fire protection.
   b. Barricades, warning signs, lights.
   c. Enclosure fence for the construction area.
   d. Environmental protection.
   e. Traffic control as required at public streets.

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: Water from Owner's existing water system is available for use without metering and without payment of use charges. Provide connections and extensions of services as required for construction operations.

C. Electric Power Service: Electric power from Owner's existing system is available for use without metering and without payment of use charges. Provide connections and extensions of services as required for construction operations.

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.
2. Electrical Service: Comply with NEMA, NECA and UL standards and regulations for temporary electric service. Install service in compliance with National Electric Code (NFPA 70).

C. Inspections: Arrange for authorities having jurisdiction to inspect and test each temporary utility before use. Obtain required certifications and permits. All associated costs are the responsibility of the Contractor.

1.6 PROJECT CONDITIONS

A. Temporary Utilities: 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. Pavement: Comply with Division 32 Section "Asphalt Paving".

C. 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.

D. Gypsum Board: Provide minimum ½ inch thick by 48 inches wide by maximum available lengths; regular-type panels with tapered edges. Comply with requirements of ASTM C 36 on interior walls of temporary partitions.

E. 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.

F. 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.

G. Water: Provide potable water approved by local health authorities.

H. 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.

I. Insulation: Unfaced mineral-fiber blanket, manufactured from glass, slag wool, or rock wool; with maximum flame-spread and smoke-developed indexes of 25 and 50, respectively.

2.2 TEMPORARY FACILITIES

A. Sanitary Facilities: Provide self-contained, single-occupant toilet units of the chemical type, properly ventilated and fully enclosed with a glass-fiber reinforced polyester shell, or equivalent.

2.3 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. Electrical Feeders: The Contractor shall provide feeders of sufficient size from the utility company's power lines for the electric light and power requirements for the building while under construction and until the permanent feeders and related equipment have been installed and are in operation. Temporary lighting shall be based on a minimum of one watt per square foot covering each and every square foot of floor area in the building. Sufficient wiring, lamps, and outlets shall be provided to ensure proper lighting in all rooms, space, stairwells, and corridors. Minimum size lamp used shall be 100 watt. Where higher lighting intensities are required by federal or state standards or laws or are otherwise specified, the above specified wattage shall be increased to provide these increased intensities.

1. The Contractor shall provide and maintain on each floor of the building, a feeder or feeders of sufficient capacity for the requirements of the entire floor and shall provide a sufficient number of outlets, located at convenient points, so that extension cords of not over 50 ft. in length will reach all work requiring temporary light or power.

D. Electrical Outlets: The Contractor shall provide properly configured NEMA polarized outlets to prevent insertion of 110-120 volt plugs into higher voltage outlets. Provide receptacle outlets equipped with ground-fault circuit interrupters, reset button and pilot light, for connection of power tools and equipment.

E. Electrical Power Cords: Provide grounded extension cords; use "hard-service" cords where exposed to abrasion and traffic. Provide waterproof connectors to connect separate lengths of electric cords if single lengths will not reach areas where construction activities are in progress outside of the building, or lengths of electric cords less than 50 ft. are used within the building.

F. Lamps and Light Fixtures: The Contractor shall provide general service incandescent lamps of wattage required for adequate illumination. Provide guard cages or tempered glass enclosures, where exposed to breakage. Provide exterior fixtures where exposed to moisture.

G. Heating Equipment: Unless Owner authorizes use of permanent heating system, the Contractor shall provide vented, self-contained, liquid-propane-gas or fuel-oil heaters with individual space thermostatic control.

1. Use of gasoline-burning space heaters, open-flame heaters, or salamander-type heating units is prohibited.
2. Heating Units: Listed and labeled for type of fuel being consumed, by a testing agency acceptable to authorities having jurisdiction, and marked for intended use.

H. 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. Temporary Lifts and Hoists: The Contractor shall provide, operate and maintain in safe operating order facilities for hoisting materials, rubbish, employees and to otherwise carry out the Work. The Contractor shall only provide temporary hoists and lifts where the capacity of truck cranes and similar devices cannot be used due to height, weight, and/or lateral distance limitations of truck cranes and similar devices. Temporary hoists and lifts shall be limited to stationary tower cranes, stationary hoists, and steel track crawler cranes. Truck cranes, fork lifts, man lifts and similar devices used for hoisting materials are considered "tools and equipment" and not temporary facilities.

1. Provide temporary lifts and hoists that comply in all respects with the most stringent of all applicable Federal (including OSHA), state and local laws, rules, regulations, codes and ordinances, and provisions of Division 01 of this Specification.

D. 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.

E. 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.

1) .
2) The Contractor shall reinstall windows in the same manner as the original installation, properly shimmed and blocked at all anchorage locations, in conformance with the requirements of applicable Division 08 Sections.

F. Temporary Use of Elevator: Comply with the following requirements for elevator used for construction purposes:

1. Provide car with temporary enclosure, either within finished car or in place of finished car, to protect finishes from damage.
2. Provide strippable protective film on entrance and car doors and frames.
3. Provide padded wood bumpers on entrance door frames covering jambs and frame faces.
4. Provide other protective coverings, barriers, devices, signs, and procedures as needed to protect elevator and elevator equipment.
5. Do not load elevators beyond their rated weight capacity.
6. Engage elevator Installer to provide full maintenance service. Include preventive maintenance, repair or replacement of worn or defective components, lubrication, cleaning, and adjusting as necessary for proper elevator operation at rated speed and capacity.

Provide parts and supplies same as those used in the manufacture and installation of original equipment.

7. Engage elevator Installer to restore damaged work, if any, so no evidence remains of correction. Return items that cannot be refinished in the field to the shop, make required repairs and refinish entire unit, or provide new units as required.

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. Remove 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. Where heat is needed and the permanent building enclosure is not complete, provide temporary enclosures where there is no other provision for containment of heat. Provide enclosures as required on the exterior or interior side of the building, whether the roof has been installed or not, and whether windows or doors have been installed or not, in order to protect the Work and allow Work to continue in accordance with the requirements of the Specifications. Coordinate enclosure with ventilating and material drying or curing requirements to avoid dangerous conditions and effects.

    a. Erect and maintain temporary enclosures and temporary heat during the months of November through March.

2. 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.
3. Close openings through floor or roof decks and horizontal surfaces with load-bearing wood-framed construction.
4. Where temporary wood or plywood enclosure exceeds 100 square feet in area, use UL-labeled fire-retardant treated material for framing and main sheathing.
5. Do not use new permanent doors and frames for temporary enclosures until finishing work is begun, and then only if carefully protected from damage. Prior to installation of permanent doors and frames, provide temporary wood or plywood doors with wood frames and proper hardware to make the doors self-closing.

    a. Close and lock all openings accessible from ground level at end of each day's work to prevent entry of unauthorized persons.

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. Do not load, or allow any part of the structure to be loaded, with a weight that will endanger its safety or the safety of personnel operating in or around the premises.

E. 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. Do not permit storage of paint rags to remain in the building unless stored in a container immersed in water.
6. 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.
7. No gasoline may be stored in or close to the building at any time.
8. 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.

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 building, 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. Temporary Facility Changeover: Do not change over from using temporary security and protection facilities to permanent facilities until Substantial Completion.

D. 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.

E. 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

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SECTION 01 60 00 - PRODUCT 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 selection of products for use in Project; product delivery, storage, and handling; manufacturers' standard warranties on products; special warranties; product substitutions; and comparable products.

B. Related Sections include the following:

1. Division 01 Section "Allowances" for products selected under an allowance.
2. Division 01 Section "Alternates" for products selected under an alternate.
3. Division 01 Section "References" for applicable industry standards for products specified.
4. Division 01 Section "Closeout Procedures" for submitting warranties for Contract closeout.
5. Divisions 02 through 48 Sections for specific requirements for warranties on products and installations specified to be warranted.

1.3 DEFINITIONS

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

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

2. New Products: Items that have not previously been incorporated into another project or facility, except that products consisting of recycled-content materials are allowed, unless explicitly stated otherwise. Products salvaged or recycled from other projects are not considered new products.

3. Comparable Product: Product that is demonstrated and approved through submittal process to have the indicated qualities related to type, function, dimension, in-service performance, physical properties, appearance, and other characteristics that equal or exceed those of specified product.

4. Unspecified Products: If an indicated product or item is not specified, the Contractor shall provide the quantity indicated in the Contract Documents. The product or item must be new, of average quality, and fit for the use for which it was intended. If a commercially available manufactured product is not available to fulfill these requirements, the Contractor shall provide a custom fabricated product or item at no additional cost to the Owner. Submit shop drawings in accordance with Division 01 Section “Submittal Procedures.”

    a. This does not apply to unspecified products or items that must be provided in accordance with the manufacturer’s recommendation for a complete installation of a specified product or item. Such products or items shall be provided in accordance with the manufacturer’s recommendation.

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

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

1. Substitutions for Cause: Changes proposed by Contractor that are required due to changed Project conditions, such as unavailability of product, regulatory changes, or unavailability of required warranty terms.
2. Substitutions for Convenience: Changes proposed by Contractor or Owner that are not required in order to meet other Project requirements but may offer advantage to Contractor or Owner.

1.4 ACTION SUBMITTALS

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

1. Include data to indicate compliance with the requirements specified in Part 2 "Comparable Products" Article.
2. Architect's Action: If necessary, Architect will request additional information or documentation for evaluation within one week of receipt of a comparable product request. Architect will notify Contractor of approval or rejection of proposed comparable product request within 15 days of receipt of request, or seven days of receipt of additional information or documentation, whichever is later.

    a. Form of Approval: As specified in Division 01 Section "Submittal Procedures."

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

1. Equal Product Request Form: Use facsimile of form for Substitution requests provided at end of Section.
2. Comply with requirements in “Substitution Requests” article.

C. Basis-of-Design Product Specification Submittal: Comply with requirements in Division 01 Section "Submittal Procedures." Show compliance with requirements.

1.5 SUBSTITUTION REQUESTS

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

1. Substitution Request Form: Use facsimile of form provided at end of Section.
2. Documentation: Show compliance with requirements for substitutions and the following, as applicable:

a. Statement indicating why specified material or product cannot be provided.
b. Coordination information, including a list of changes or modifications needed to other parts of the Work and to construction performed by Owner and separate contractors, that will be necessary to accommodate proposed substitution.
c. Detailed comparison of significant qualities of proposed substitution with those of the Work specified. Significant qualities may include attributes such as performance, weight, size, durability, visual effect, and specific features and requirements indicated.

1) Format detailed comparison on letter-size paper with a two-column comparison; the specified product on the left side, the proposed substitution on the right. Include all performance criteria of the specified product regardless if no corresponding data is available for the proposed substitution.

d. Product Data, including drawings and descriptions of products and fabrication and installation procedures.
e. Samples, where applicable or requested.
f. List of similar installations for completed projects with project names and addresses and names and addresses of architects and owners.
g. Material test reports from a qualified testing agency indicating and interpreting test results for compliance with requirements indicated.
h. Research/evaluation reports evidencing compliance with building code in effect for Project, from a model code organization acceptable to authorities having jurisdiction.
i. Detailed comparison of Contractor's Construction Schedule using proposed substitution with products specified for the Work, including effect on the overall Contract Time. If specified product or method of construction cannot be provided within the Contract Time, include letter from manufacturer, on manufacturer's letterhead, stating lack of availability or delays in delivery.
j. Cost information, including a proposal of change, if any, in the Contract Sum.

k. Contractor's certification that proposed substitution complies with requirements in the Contract Documents and is appropriate for applications indicated.
l. Contractor's waiver of rights to additional payment or time that may subsequently become necessary because of failure of proposed substitution to produce indicated results.

3. Architect's Action: If necessary, Architect will request additional information or documentation for evaluation within 7 days of receipt of a request for substitution. Architect will notify Contractor of acceptance or rejection of proposed substitution within 15 days of receipt of request, or 7 days of receipt of additional information or documentation, whichever is later.

a. Form of Acceptance: As specified in Division 01 Section "Submittal Procedures".

1.6 QUALITY ASSURANCE

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

1. The Contractor is responsible for providing compatible products and construction methods.
2. If a dispute arises over concurrently selectable but incompatible products, Architect will determine which products shall be used.

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

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

1.7 PRODUCT DELIVERY, STORAGE, AND HANDLING

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

B. Delivery and Handling:

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

C. Storage:

1. Store products to allow for inspection and measurement of quantity or counting of units.
2. Store materials in a manner that will not endanger Project structure.
3. Store products that are subject to damage by the elements, under cover in a weathertight enclosure above ground, with ventilation adequate to prevent condensation.
4. Store cementitious products and materials on elevated platforms.
5. Store foam plastic from exposure to sunlight, except to extent necessary for period of installation and concealment.
6. Comply with product manufacturer's written instructions for temperature, humidity, ventilation, and weather-protection requirements for storage.
7. Protect stored products from damage and liquids from freezing.
8. Protect construction materials from contamination and pollution from contact with construction dust, debris, fumes, solvents, and other environmentally polluting materials.
9. Provide a secure location and enclosure at Project site for storage of materials and equipment by Owner's construction forces. Coordinate location with Owner.

1.8 PRODUCT WARRANTIES

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

1. Manufacturer's Warranty: Preprinted written warranty published by individual manufacturer for a particular product and specifically endorsed by manufacturer to Owner.
2. Special Warranty: Written warranty required by or incorporated into the Contract Documents, either to extend time limit provided by manufacturer's warranty or to provide more rights for Owner.
3. Warranty Period: All warranty periods are required to commence on the date of Substantial Completion regardless of manufacturer’s limitations. The Contractor is responsible to purchase an extended warranty as required.

B. Special Warranties: Prepare a written document that contains appropriate terms and identification, ready for execution. Submit a draft, for approval by the Architect, before final execution.

1. Manufacturer's Standard Form: Modified to include Project-specific information and properly executed.
2. Specified Form: When specified forms are included with the Specifications, prepare a written document using appropriate form properly executed.
3. Refer to Divisions 02 through 48 Sections for specific content requirements and particular requirements for submitting special warranties.

C. Warranty Requirements: When work covered by a warranty has failed and has been corrected by replacement or rebuilding, reinstate the warranty by written endorsement. The reinstated warranty shall be equal to the original warranty with an equitable adjustment for depreciation.

1. Upon determination by Architect that work covered by a warranty has failed, replace or rebuild the work to an acceptable condition, in compliance with the Contract Documents.
2. Remove and replace construction that has been damaged as a result of failed or damaged warranted construction, or must be removed and replaced to provide access for correction of warranted construction.

D. List of Warranties: Provide warranties for products and installations as specified, including but not limited to the following:
1. Running Track Surfacing: Division 32 Section “Running Track Surfacing.”

E. Submittal Time: Comply with requirements in Division 01 Section "Closeout Procedures."

PART 2 - PRODUCTS

2.1 PRODUCT SELECTION PROCEDURES

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

1. Provide products complete with accessories, trim, finish, fasteners, and other items needed for a complete installation and indicated use and effect.
2. Standard Products: If available, and unless custom products or nonstandard options are specified, provide standard products of types that have been produced and used successfully in similar situations on other projects.
3. Owner reserves the right to limit selection to products with warranties not in conflict with requirements of the Contract Documents.
4. Where products are accompanied by the term "as selected," Architect will make selection.
5. Where products are accompanied by the term "match sample," sample to be matched is Architect's.
6. Descriptive, performance, and reference standard requirements in the Specifications establish "salient characteristics" of products.
7. Or Equal: For products specified by name and accompanied by the term "or equal," or "or approved equal," or "or approved," comply with requirements in "Comparable Products" Article to obtain approval for use of an unnamed product.

B. Product Selection Procedures:

1. Product: Where Specifications name a single product and manufacturer, provide the named product that complies with requirements.
2. Manufacturer/Source: Where Specifications name a single manufacturer or source, provide a product by the named manufacturer or source that complies with requirements.
3. Products: Where Specifications include a list of names of both products and manufacturers, provide one of the products listed that complies with requirements.

a. Nonrestricted List: Where Specifications include a list of names of both available manufacturers and products, provide one of the products listed, or an unnamed product, that complies with requirements. Comply with requirements in "Comparable Products" Article for consideration of an unnamed product.

4. Manufacturers: Where Specifications include a list of manufacturers' names, provide a product by one of the manufacturers listed that complies with requirements.

    a. Nonrestricted List: Where Specifications include a list of available manufacturers, provide a product by one of the manufacturers listed, or a product by an unnamed manufacturer, that complies with requirements. Comply with requirements in "Comparable Products" Article for consideration of an unnamed manufacturer's product.

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

C. Visual Matching Specification: Where Specifications require matching an established Sample, select a product that complies with requirements and matches Architect's sample. Architect's decision will be final on whether a proposed product matches.

1. If no product available within specified category matches and complies with other specified requirements, comply with provisions in Part 2 "Product Substitutions" Article for proposal of product.

D. Visual Selection Specification: Where Specifications include the phrase "as selected from manufacturer's colors, patterns, textures" or a similar phrase, select a product that complies with other specified requirements.

1. Standard Range: Where Specifications include the phrase "standard range of colors, patterns, textures" or similar phrase, Architect will select color, pattern, density, or texture from manufacturer's product line that does not include premium items.
2. Full Range: Where Specifications include the phrase "full range of colors, patterns, textures" or similar phrase, Architect will select color, pattern, density, or texture from manufacturer's product line that includes both standard and premium items.

2.2 SUBSTITUTIONS

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

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

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

b. Requested substitution provides sustainable design characteristics that specified product provided.
c. Substitution request is fully documented and properly submitted.
d. Requested substitution will not adversely affect Contractor's construction schedule.
e. Requested substitution has received necessary approvals of authorities having jurisdiction.
f. Requested substitution is compatible with other portions of the Work.
g. Requested substitution has been coordinated with other portions of the Work.
h. Requested substitution provides specified warranty.
i. If requested substitution involves more than one contractor, requested substitution has been coordinated with other portions of the Work, is uniform and consistent, is compatible with other products, and is acceptable to all contractors involved.

B. Substitutions for Convenience: Architect will consider requests for substitution if received within 60 days after the Notice to Proceed.

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

a. Requested substitution offers Owner a substantial advantage in cost, time, energy conservation, or other considerations, after deducting additional responsibilities Owner must assume. Owner's additional responsibilities may include compensation to Architect for redesign and evaluation services, increased cost of other construction by Owner, and similar considerations.
b. Requested substitution does not require extensive revisions to the Contract Documents.
c. Requested substitution is consistent with the Contract Documents and will produce indicated results.
d. Requested substitution provides sustainable design characteristics that specified product provided.
e. Substitution request is fully documented and properly submitted.
f. Requested substitution will not adversely affect Contractor's construction schedule.
g. Requested substitution has received necessary approvals of authorities having jurisdiction.
h. Requested substitution is compatible with other portions of the Work.
i. Requested substitution has been coordinated with other portions of the Work.
j. Requested substitution provides specified warranty.
k. If requested substitution involves more than one contractor, requested substitution has been coordinated with other portions of the Work, is uniform and consistent, is compatible with other products, and is acceptable to all contractors involved.

2. If requested substitution involves the Contractor and one or more Subcontractors, the Contractor shall verify that the requested substitution has been coordinated with other portions of the Work, is uniform and consistent, is compatible with other products, and is acceptable to all Subcontractors involved.

2.3 COMPARABLE PRODUCTS

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

1. Evidence that the proposed product does not require extensive revisions to the Contract Documents, that it is consistent with the Contract Documents and will produce the indicated results, and that it is compatible with other portions of the Work.
2. Detailed comparison of significant qualities of proposed product with those named in the Specifications. Significant qualities include attributes such as performance, weight, size, durability, visual effect, and specific features and requirements indicated.
3. Evidence that proposed product provides specified warranty.
4. List of similar installations for completed projects with project names and addresses and names and addresses of architects and owners, if requested.
5. Samples, if requested.

PART 3 - EXECUTION

3.1 FORMS

A. The following form referenced in this Section is attached:

1. Substitution Request Form, 2 pages.

END OF SECTION 01 60 00

DO NOT REMOVE
THIS PAGE INTENTIONALLY LEFT BLANK

SUBSTITUTION REQUEST
(After the Bidding Phase)

DATE: _____

Project: _____
_____
To: _____
_____
Re: _____

Substitution Request Number: _____
From: _____
Date: _____
KBA Project Number:_____
Contract For: _____

Specification Title: _____ Description: _____
Section: _____ Page: _____ Article/Paragraph: _____

Proposed Substitution: _____
Manufacturer: _____ Address: _____ Phone: _____
Trade Name: _____ Model No. _____
Installer: _____ Address: _____ Phone: _____
History: [ ] New Product [ ] 2-5 years old [ ] 5-10 years old [ ] More than 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: _____
_____
Similar Installation:
Project: _____ Architect: _____
Address: _____ Owner: _____
_____ Date Installed: _____
Proposed substitution affects other parts of Work: [ ] No [ ] Yes; Explain: _____
_____

Savings to Owner for accepting substitution: _____ ($ _____)
Proposed substitution changes Contract Time: [ ] No [ ] Yes [Add] [Deduct] _____ days.

Supporting Data Attached: [ ] Drawings [ ] Product Data [ ] Samples [ ] Tests [ ] Reports [ ] _____

SUBSTITUTION REQUEST DATE: _____

(After the Bidding Phase)

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.

Submitted by: _____

Signed by: _____

Firm: _____

Address: _____

_____

Telephone: _____

Attachments: _____

_____

_____

_____

ARCHITECTS'S REVIEW AND ACTION

[ ] Substitution approved - Make submittals in accordance with Specification Section 013300.
[ ] Substitution approved ad noted - Make submittals in accordance with Specification Section 013300.
[ ] Substitution rejected – Use specified materials.
[ ] Substitution Request received too late – Use specified materials.

Signed by: _____ Date:_____

Additional Comments: [ ] Contractor [ ] Subcontractor [ ] Supplier [ ] Manufacturer [ ] Architect [ ] _____

_____

_____

_____

_____

_____

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. Coordination of Owner-installed products.
5. Progress cleaning.
6. Starting and adjusting.
7. Protection of installed construction.
8. Correction of the Work.

B. Related Sections include the following:

1. Division 01 Section "Project Management and Coordination" for procedures for coordinating field engineering with other construction activities.
2. Division 01 Section "Submittal Procedures" for submitting surveys.
3. Division 01 Section "Cutting and Patching" for procedural requirements for cutting and patching necessary for the installation or performance of other components of the Work.
4. 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. Progress Project Surveys: Submit one hard copy signed by land surveyor and one AutoCAD (2013 or newer) copy as required by Drawings and Specifications at times during construction.

D. Certified Surveys: Submit two hard copies signed by land surveyor and one AutoCAD (2013 or newer) copy.

E. 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.

PART 2 - PRODUCTS (Not Used)

PART 3 - EXECUTION

3.1 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-in for mechanical and electrical systems to verify actual locations of connections before equipment and fixture installation.
4. Examine walls, floors, and roofs for suitable conditions where products and systems are to be installed.
5. Proceed with installation only after unsatisfactory conditions have been corrected. Proceeding with the Work indicates acceptance of surfaces and conditions.

3.2 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.

3.3 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. Building Lines and Levels: Locate and lay out control lines and levels for structures, building foundations, anchor bolt locations, column grids, and floor levels, including those required for mechanical and electrical work. Transfer survey markings and elevations for use with control lines and levels. Level foundations and piers from two or more locations.

E. 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.

3.4 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.

D. Certified Survey: On completion of foundation walls, major site improvements, and other work requiring field-engineering services, prepare a certified survey showing dimensions, locations, angles, and elevations of construction and sitework.

E. Final As-Built Survey: Prepare a final as-built survey, defined by the State of Connecticut, showing significant features (real property) for Project. Include on the survey a certification, signed by land surveyor, that principal metes, bounds, lines, and levels of Project are accurately positioned as shown on the survey.

1. Show boundary lines, monuments, streets, existing improvements (buildings, roads, walks, fences, curbs, etc.) and significant vegetation, adjoining properties, acreage, grade contours, and the distance and bearing from a site corner to a legal point.

2. In addition to all physical features, show all utilities. Survey shall include, but not limited to, markings on field surfaces, lane markings, track surfacing, and other features under this project.
3. Recording: At Substantial Completion, have the final as-built survey recorded by or with authorities having jurisdiction as the official "property survey" and with Architect of record. Survey shall be submitted as .pdf and in AutoCAD format to Architect and Owner.

    a. Submit final property survey in electronic format compatible with AutoCAD.

3.5 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).

3.6 OWNER-INSTALLED PRODUCTS

A. Site Access: Provide access to Project site for Owner's construction forces.

B. Coordination: Coordinate construction and operations of the Work with work performed by Owner's construction forces.

1. Construction Schedule: Inform Owner of Contractor's preferred construction schedule for Owner's portion of the Work. Adjust construction schedule based on a mutually agreeable timetable. Notify Owner if changes to schedule are required due to differences in actual construction progress.
2. Preinstallation Conferences: Include Owner's construction forces at preinstallation conferences covering portions of the Work that are to receive Owner's work. Attend preinstallation conferences conducted by Owner's construction forces if portions of the Work depend on Owner's construction.

3.7 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.

3.8 STARTING AND ADJUSTING

A. Start equipment and operating components to confirm proper operation. Remove malfunctioning units, replace with new units, and retest.

B. Adjust operating components for proper operation without binding. Adjust equipment for proper operation.

C. Test each piece of equipment to verify proper operation. Test and adjust controls and safeties. Replace damaged and malfunctioning controls and equipment.

D. 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."

3.9 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.

3.10 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.

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.

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 "Photographic Documentation" for submitting Final Completion construction photographs and negatives.
6. Division 01 Section "Project Record Documents" for submitting Record Drawings, Record Specifications, and Record Product Data.
7. 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.
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. Deliver tools, spare parts, extra materials, and similar items to location designated by Owner. Label with manufacturer's name and model number where applicable.
7. Make final changeover of permanent locks and deliver keys to Owner. Advise Owner's personnel of changeover in security provisions.
8. Complete startup testing of systems.
9. Submit test/adjust/balance records.
10. Terminate and remove temporary facilities from Project site, along with mockups, construction tools, and similar elements.
11. Advise Owner of changeover in heat and other utilities.
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 60 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 evidence of final, continuing insurance coverage complying with insurance requirements.
4. Submit pest-control final inspection report and warranty.
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

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SECTION 01 78 23 - OPERATION AND MAINTENANCE DATA

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 preparing operation and maintenance manuals, including the following:

1. Operation and maintenance documentation directory.
2. Emergency manuals.
3. Operation manuals for systems, subsystems, and equipment.
4. Maintenance manuals for the care and maintenance of products, materials, and finishes, systems and equipment.

B. Related Sections include the following:

1. Division 01 Section "Submittal Procedures" for submitting copies of submittals for operation and maintenance manuals.
2. Division 01 Section "Closeout Procedures" for submitting operation and maintenance manuals.
3. Division 01 Section "Project Record Documents" for preparing Record Drawings for operation and maintenance manuals.
4. Divisions 02 through 48 Sections for specific operation and maintenance manual requirements for the Work in those Sections.

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. Initial Submittal: Submit 2 draft copies of each manual at least 15 days before requesting inspection for Substantial Completion. Include a complete operation and maintenance directory. Architect will return one copy of draft and mark whether general scope and content of manual are acceptable.

B. Final Submittal: Submit one copy of each manual in final form at least 15 days before final inspection. Architect will return copy with comments within 15 days after final inspection.

1. Correct or modify each manual to comply with Architect's comments. Submit 3 copies of each corrected manual within 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.

E. Identification: In the documentation directory and in each operation and maintenance manual, identify each system, subsystem, and piece of equipment with same designation used in the Contract Documents. If no designation exists, assign a designation according to ASHRAE Guideline 4, "Preparation of Operating and Maintenance Documentation for Building Systems."

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.

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.

2.3 EMERGENCY MANUALS

A. Content: Organize manual into a separate section for each of the following:

1. Type of emergency.
2. Emergency instructions.
3. Emergency procedures.

B. Type of Emergency: Where applicable for each type of emergency indicated below, include instructions and procedures for each system, subsystem, piece of equipment, and component:

1. Fire.
2. Flood.
3. Gas leak.
4. Water leak.
5. Power failure.
6. Water outage.
7. System, subsystem, or equipment failure.
8. Chemical release or spill.

C. Emergency Instructions: Describe and explain warnings, trouble indications, error messages, and similar codes and signals. Include responsibilities of Owner's operating personnel for notification of Installer, supplier, and manufacturer to maintain warranties.

D. Emergency Procedures: Include the following, as applicable:

1. Instructions on stopping.
2. Shutdown instructions for each type of emergency.
3. Operating instructions for conditions outside normal operating limits.
4. Required sequences for electric or electronic systems.
5. Special operating instructions and procedures.

2.4 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. Control diagrams.
8. Piped system diagrams.
9. Precautions against improper use.
10. 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. Performance curves.
8. Engineering data and tests.
9. Complete nomenclature and number of replacement parts.

C. Operating Procedures: Include the following, as applicable:

1. Startup procedures.
2. Equipment or system break-in procedures.
3. Routine and normal operating instructions.
4. Regulation and control procedures.
5. Instructions on stopping.
6. Normal shutdown instructions.
7. Seasonal and weekend operating instructions.
8. Required sequences for electric or electronic systems.
9. Special operating instructions and procedures.

D. Systems and Equipment Controls: Describe the sequence of operation, and diagram controls as installed.

E. Piped Systems: Diagram piping as installed, and identify color-coding where required for identification.

2.5 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.

2.6 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. Emergency Manual: Assemble a complete set of emergency information indicating procedures for use by emergency personnel and by Owner's operating personnel for types of emergencies indicated.

C. Product Maintenance Manual: Assemble a complete set of maintenance data indicating care and maintenance of each product, material, and finish incorporated into the Work.

D. 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.

E. 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.

F. 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.

1. Do not use original Project Record Documents as part of operation and maintenance manuals.

G. Comply with Division 01 Section "Closeout Procedures" for schedule for submitting operation and maintenance documentation.

END OF SECTION 01 78 23

SECTION 01 78 39 - PROJECT RECORD DOCUMENTS

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 Project Record Documents, including the following:

1. Record Drawings.
2. Record Specifications.
3. Record Product Data.

B. Related Sections include the following:

1. Division 01 Section "Closeout Procedures" for general closeout procedures.
2. Division 01 Section "Operation and Maintenance Data" for operation and maintenance manual requirements.
3. Divisions 02 through 48 Sections for specific requirements for Project Record Documents of the Work in those Sections.

1.3 SUBMITTALS

A. Record Drawings: Comply with the following:

1. Number of Copies: Submit one hard copy set(s) of marked-up Record Prints.

a. Provide one set of electronically scanned, marked-up Record Prints in Portable Document Format (.PDF) on a digital video disk (DVD).

B. Record Specifications: Submit one copy of Project's Specifications, including addenda and contract modifications.

C. Record Product Data: Submit one copy of each Product Data submittal.

1. Where Record Product Data is required as part of operation and maintenance manuals, submit marked-up Product Data as an insert in manual instead of submittal as Record Product Data.

PART 2 - PRODUCTS

2.1 RECORD DRAWINGS

A. Record Prints: Maintain one set of blue- or black-line white prints of the Contract Drawings and Shop Drawings.

1. Preparation: Mark Record Prints to show the actual installation where installation varies from that shown originally. Require individual or entity who obtained record data, whether individual or entity is Installer, subcontractor, or similar entity, to prepare the marked-up Record Prints.

a. Give particular attention to information on concealed elements that would be difficult to identify or measure and record later.
b. Accurately record information in an understandable drawing technique.
c. Record data as soon as possible after obtaining it. Record and check the markup before enclosing concealed installations.

2. Content: Types of items requiring marking include, but are not limited to, the following:

a. Dimensional changes to Drawings.
b. Revisions to details shown on Drawings.
c. Depths of foundations below first floor.
d. Locations and depths of underground utilities.
e. Revisions to routing of piping and conduits.
f. Revisions to electrical circuitry.
g. Actual equipment locations.
h. Duct size and routing.
i. Locations of concealed internal utilities.
j. Changes made by Change Order or Construction Change Directive.
k. Changes made following Architect's written orders.
l. Details not on the original Contract Drawings.
m. Field records for variable and concealed conditions.
n. Record information on the Work that is shown only schematically.

3. Mark the Contract Drawings or Shop Drawings, whichever is most capable of showing actual physical conditions, completely and accurately. If Shop Drawings are marked, show cross-reference on the Contract Drawings.
4. Mark record sets with erasable, red-colored pencil. Use other colors to distinguish between changes for different categories of the Work at same location.
5. Mark important additional information that was either shown schematically or omitted from original Drawings.
6. Note Construction Change Directive numbers, alternate numbers, Change Order numbers, and similar identification, where applicable.

B. Format: Identify and date each Record Drawing; include the designation "PROJECT RECORD DRAWING" in a prominent location.

1. Record Prints: Organize Record Prints into manageable sets. Bind each set with durable paper cover sheets. Include identification on cover sheets.

2. Identification: As follows:

a. Project name.
b. Date.
c. Designation "PROJECT RECORD DRAWINGS."
d. Name of Architect.

2.2 RECORD SPECIFICATIONS

A. Preparation: Mark Specifications to indicate the actual product installation where installation varies from that indicated in Specifications, addenda, and contract modifications.

1. Give particular attention to information on concealed products and installations that cannot be readily identified and recorded later.
2. Mark copy with the proprietary name and model number of products, materials, and equipment furnished, including substitutions and product options selected.
3. Record the name of manufacturer, supplier, Installer, and other information necessary to provide a record of selections made.
4. For each principal product, indicate whether Record Product Data has been submitted in operation and maintenance manuals instead of submitted as Record Product Data.
5. Note related Change Orders, Record Product Data, and Record Drawings where applicable.

2.3 RECORD PRODUCT DATA

A. Preparation: Mark Product Data to indicate the actual product installation where installation varies substantially from that indicated in Product Data submittal.

1. Give particular attention to information on concealed products and installations that cannot be readily identified and recorded later.
2. Include significant changes in the product delivered to Project site and changes in manufacturer's written instructions for installation.
3. Note related Change Orders, Record Specifications, and Record Drawings where applicable.

2.4 MISCELLANEOUS RECORD SUBMITTALS

A. Assemble miscellaneous records required by other Specification Sections for miscellaneous record keeping and submittal in connection with actual performance of the Work. Bind or file miscellaneous records and identify each, ready for continued use and reference.

PART 3 - EXECUTION

3.1 RECORDING AND MAINTENANCE

A. Recording: Maintain one copy of each submittal during the construction period for Project Record Document purposes. Post changes and modifications to Project Record Documents as they occur; do not wait until the end of Project.

B. Maintenance of Record Documents and Samples: Store Record Documents and Samples in the field office apart from the Contract Documents used for construction. Do not use Project Record Documents for construction purposes. Maintain Record Documents in good order and in a clean, dry, legible condition, protected from deterioration and loss. Provide access to Project Record Documents for Architect's reference during normal working hours.

END OF SECTION 01 78 39

SECTION 01 79 00 - DEMONSTRATION AND TRAINING

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 instructing Owner's personnel, including the following:

1. Demonstration of operation of systems, subsystems, and equipment.
2. Training in operation and maintenance of systems, subsystems, and equipment.
3. Demonstration and training video recordings.

B. Related Sections include the following:

1. Division 01 Section "Project Management and Coordination" for requirements for preinstruction conferences.
2. Divisions 02 through 48 Sections for specific requirements for demonstration and training for products in those Sections.

1.3 SUBMITTALS

A. Instruction Program: Submit two copies of outline of instructional program for demonstration and training, including a schedule of proposed dates, times, length of instruction time, and instructors' names for each training module. Include learning objective and outline for each training module.

1. Indicate proposed training modules using manufacturer-produced demonstration and training video recordings for systems, equipment, and products in lieu of video recording of live instructional module.
2. At completion of training, submit one complete training manual for Owner's use.

B. Qualification Data: For facilitator and/or instructor, and videographer.

C. Attendance Record: For each training module, submit list of participants and length of instruction time.

D. Evaluations: For each participant and for each training module, submit results and documentation of performance-based test.

E. Demonstration and Training Videotapes: Submit two copies within seven days of end of each training module.

1. Identification: On each copy, provide an applied label with the following information:

    a. Name of Project.
    b. Name and address of videographer.
    c. Name of Architect.
    d. Name of Contractor.
    e. Date videotape was recorded.
    f. Description of vantage point, indicating location, direction (by compass point), and elevation or story of construction.

2. Transcript: Prepared and bound in format matching operation and maintenance manuals. Mark appropriate identification on front and spine of each binder. Include a cover sheet with same label information as the corresponding video recording. Include name of Project and date of video recording on each page.

1.4 QUALITY ASSURANCE

A. Facilitator Qualifications: A firm or individual experienced in training or educating maintenance personnel in a training program similar in content and extent to that indicated for this Project, and whose work has resulted in training or education with a record of successful learning performance.

B. Instructor Qualifications: A factory-authorized service representative, complying with requirements in Division 01 Section "Quality Requirements," experienced in operation and maintenance procedures and training.

C. Videographer Qualifications: A professional videographer who is experienced photographing construction projects.

D. Preinstruction Conference: Conduct conference at Project site to comply with requirements in Division 01 Section "Project Management and Coordination." Review methods and procedures related to demonstration and training including, but not limited to, the following:

1. Inspect and discuss locations and other facilities required for instruction.
2. Review and finalize instruction schedule and verify availability of educational materials, instructors' personnel, audiovisual equipment, and facilities needed to avoid delays.
3. Review required content of instruction.
4. For instruction that must occur outside, review weather and forecasted weather conditions and procedures to follow if conditions are unfavorable.

1.5 COORDINATION

A. Coordinate instruction schedule with Owner's operations. Adjust schedule as required to minimize disrupting Owner's operations.

B. Coordinate instructors, including providing notification of dates, times, length of instruction time, and course content.

C. Coordinate content of training modules with content of approved emergency, operation, and maintenance manuals. Do not submit instruction program until operation and maintenance data has been reviewed and approved by Architect.

PART 2 - PRODUCTS

2.1 INSTRUCTION PROGRAM

A. Program Structure: Develop an instruction program that includes individual training modules for each system and equipment not part of a system, as required by individual Specification Sections, and as follows:

1. Running Track Maintenance.

B. Training Modules: Develop a learning objective and teaching outline for each module. Include a description of specific skills and knowledge that participant is expected to master. For each module, include instruction for the following:

1. Documentation: Review the following items in detail:

a. Emergency manuals.
b. Operations manuals.
c. Maintenance manuals.
d. Project Record Documents.
e. Identification systems.
f. Warranties and bonds.
g. Maintenance service agreements and similar continuing commitments.

2. Adjustments: Include the following:

a. Alignments.
b. Checking adjustments.
c. Noise and vibration adjustments.
d. Economy and efficiency adjustments.

3. Troubleshooting: Include the following:

a. Diagnostic instructions.
b. Test and inspection procedures.

4. Maintenance: Include the following:

a. Inspection procedures.
b. Types of cleaning agents to be used and methods of cleaning.
c. List of cleaning agents and methods of cleaning detrimental to product.
d. Procedures for routine cleaning
e. Procedures for preventive maintenance.
f. Procedures for routine maintenance.
g. Instruction on use of special tools.

5. Repairs: Include the following:

    a. Diagnosis instructions.
    b. Repair instructions.
    c. Disassembly; component removal, repair, and replacement; and reassembly instructions.
    d. Instructions for identifying parts and components.
    e. Review of spare parts needed for operation and maintenance.

PART 3 - EXECUTION

3.1 PREPARATION

A. Assemble educational materials necessary for instruction, including documentation and training module. Assemble training modules into a combined training manual.

B. Set up instructional equipment at instruction location.

3.2 INSTRUCTION

A. Facilitator: Engage a qualified facilitator to prepare instruction program and training modules, to coordinate instructors, and to coordinate between Contractor and Owner for number of participants, instruction times, and location.

B. Engage qualified instructors to instruct Owner's personnel to adjust, operate, and maintain systems, subsystems, and equipment not part of a system.

1. Owner will furnish Contractor with names and positions of participants.

C. Scheduling: Provide instruction at mutually agreed on times. For equipment that requires seasonal operation, provide similar instruction at start of each season.

1. Schedule training with Owner with at least seven days' advance notice.

D. Evaluation: At conclusion of each training module, assess and document each participant's mastery of module by use of a demonstration performance-based test.

E. Cleanup: Collect used and leftover educational materials and give to Owner. Remove instructional equipment. Restore systems and equipment to condition existing before initial training use.

3.3 DEMONSTRATION AND TRAINING VIDEO RECORDINGS

A. General: The Contractor shall engage a qualified commercial videographer to record demonstration and training video recordings where training or demonstration is to be provided by the Contractor. Record each training module separately. Include classroom instructions and demonstrations, board diagrams, and other visual aids, but not student practice.

1. At beginning of each training module, record each chart containing learning objective and lesson outline.

B. Video: Provide minimum 640 x 480 video resolution converted to format file type acceptable to Owner, on electronic media.

1. Electronic Media: Read-only format compact disc acceptable to Owner, with commercial-grade graphic label.
2. File Hierarchy: Organize folder structure and file locations according to project manual table of contents. Provide complete screen-based menu.
3. File Names: Utilize file names based upon name of equipment generally described in video segment, as identified in Project specifications.
4. Contractor and Installer Contact File: Using appropriate software, create a file for inclusion on the Equipment Demonstration and Training DVD that describes the following for each Contractor involved on the Project, arranged according to Project table of contents:

a. Name of Contractor/Installer.
b. Business address.
c. Business phone number.
d. Point of contact.
e. E-mail address.

C. Recording: Mount camera on tripod before starting recording, unless otherwise necessary to adequately cover area of demonstration and training. Display continuous running time.

1. Film training session(s) in segments not to exceed 15 minutes.

a. Produce segments to present a single significant piece of equipment per segment.
b. Organize segments with multiple pieces of equipment to follow order of Project Manual table of contents.
c. Where a training session on a particular piece of equipment exceeds 15 minutes, stop filming and pause training session. Begin training session again upon commencement of new filming segment.

D. Light Levels: Verify light levels are adequate to properly light equipment. Verify equipment markings are clearly visible prior to recording.

1. Furnish additional portable lighting as required.

E. Narration: Describe scenes on video recording by audio narration by microphone while or dubbing audio narration off-site after video recording is recorded. Include description of items being viewed.

F. Transcript: Provide a transcript of the narration. Display images and running time captured from videotape opposite the corresponding narration segment.

G. Preproduced Video Recordings: Provide video recordings used as a component of training modules in same format as recordings of live training.

H. DVD Format: Provide high quality DVD+/-R format Digital Video Disc (DVD) capable of play on DVD player suitable for home use.

I. Recording: Mount camera on tripod before starting recording, unless otherwise necessary to show area of demonstration and training. Display continuous running time.

J. Narration: Describe scenes on videotape by audio narration by microphone while videotape is recorded. Include description of items being viewed. Describe vantage point, indicating location, direction (by compass point), and elevation or story of construction.

K. Transcript: Provide a typewritten transcript of the narration. Display images and running time captured from videotape opposite the corresponding narration segment.

END OF SECTION 01 79 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. Foundation walls.

B. Related Sections include the following:

1. Division 31, Section “Structural Fill”
2. Division 31, Section “Earthwork”

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 shall 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 shall be ACI-certified Concrete Strength Testing Technician and Concrete Laboratory Testing Technician - Grade I. Testing Agency laboratory supervisor shall 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: Owner engages 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 shall 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 shall 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. Owner’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 shall comply with ACI 315 "Manual of Standard Practice for Detailing Reinforced Concrete Structures". All walls shall 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 shall be drawn to a minimum of ¼" =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 shall be dated and numbered and shall have all revision clearly noted with clouding of each revision.

4. All reinforcing shall 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

ACI Publications: Comply with the following unless modified by requirements in the Contract Documents:

ACI 301-16
ACI 117

2.2 CONCRETE

A. Concrete compressive strength for foundation walls and footings shall 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: ¾” 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 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 shall 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, etc., 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, as required, 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 or as approved by Architect.

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: Owner will engage a qualified testing agency to perform tests and to submit reports and the Owner will engage a qualified firm to perform Special Inspections 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 shall 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 shall 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 shall 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 shall be reported in writing to RDP, concrete manufacturer, and Contractor within 48 hours of testing. Reports of compressive-strength tests shall 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 shall make additional tests of concrete when test results indicate that slump, air entrainment, compressive strengths, or other requirements have not been met, as directed by Architect. 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 as directed by Architect.
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

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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 scoreboards for softball and 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.

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 120 mph wind loading.

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 MANUFACTURERS

A. Nevco, Inc., 301 East Harris Avenue, Greenville, Illinois 62246; Dan Scheider, (618) 664-0360, dschneider@nevco.com, www.nevco.com

B. OES Scoreboard, Northeast Scoreboards, PO Box 85, Hadlyme, CT 06469, Brian Barzee, (860) 790-0282, northeastscoreboards@gmail.com

C. Daktronics, Scoreboard Enterprises, Mansfield, MA. Mark Hurley, 508-339-8113, scoreboard enterprises.com, info@scoreboardenterprises.com

D. Or approved equal.

2.2 MATERIALS - GENERAL

A. Aluminum faces and perimeter frame: Fabricated from .050 minimum thickness, ASTM B221 aluminum sheet with reinforcement and slotted mounting brackets top and bottom.

B. Finish: Acrylic polyurethane paint. Color as selected by the Landscape Architect from manufacturer's standard range.

1. Entire board, including but not limited to, front sides, back, top, bottom, and support columns shall be painted to match face of board color.

2. Provide white striping to separate scoreboard features.

C. Brackets: Integrated universal bracket system.

D. Fasteners, anchors, and other exposed hardware: Corrosion resistant.

E. Electronics: Low voltage, solid state, 2-wire cable, multiplex system, quartz crystal controlled. Electrical components shall be modular in nature. Electric accessories, LED digits and lights shall be modular in nature and able to be easily replaced by the use of weather proof plugs and connections.

F. Provide gold plated electrical contacts on interconnecting wiring to reduce corrosion and improve reliability.

G. Provide optical communication interface to reduce threat of damage from electrical storms and ESD.

H. 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**

I. 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.

J. Control cable: UL listed, 2-wire, RG-58/U, coaxial cable, 1/4 inch diameter.

K. 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.

L. Scoreboard uprights, exposed conduit and fasteners shall all be primed and painted to match scoreboard.

M. 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.

N. Concrete: See Division 3 Section – "Poured in Place Concrete"

2.3 SOFTBALL SCOREBOARD (ALTERNATE)

A. Provide one (1) of the following:

B. Type: Exterior, electronic baseball scoreboard with LED displays for balls, strikes, outs, scores by inning, and totals for runs; Model 1609 as manufactured by Nevco or approved equal.

1. Size: 16 feet long x 6 feet high x 8 inches deep.

2. Finish: Acrylic Polyurethane paint – Cardinal Red with white trim/striping

3. Approximate weight: 345 pounds.

4. Mounting Hardware: Corrosion resistant, properly sized for scoreboard weight and windloading.

5. White on black captions:

a. 15 inches high: "BALL", "STRIKE", "OUT".

b. 8 inches high: Inning numbers "1" through "7", "TOTAL".

6. High Intensity White LED displays:

a. 18 inches high digits: Player balls, strikes, outs, hits, errors, home, and guest.

b. 14 inches high digits: “HOME” & “GUEST’ electronic displays, scores by inning and totals for runs.

7. No single section of scoreboard will be larger than 5 x 12 ft to ease burden of installation.

8. Power requirement:

a. POWER with ETNs Translucent White): 120 VAC, 6.2 Amps, 50/60 Hz. / 240 VAC, 3.1 Amps, 50/60 Hz. Requires earth ground.

C. 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.

D. Electronic Team Names and Intelligent Captions: "HOME" and "GUEST" caption plates shall be replaced with programmable Electronic Team Names.

1. Color: White.

2. Changeable team names as ETN. Shall not require controller upgrade, use of additional accessories or computer.

E. Nevco, Inc. Model ‘A 16-2’ signage board: 16 feet long x 2 feet high x 8 inches deep Header Sign including Artwork for Model 1609 Scoreboard or approved equal on each scoreboard.

1. Anticipate 3 color text and logos. Vector Text and logo images to be provided by Landscape Architect prior to manufacturing.

F. WIRELESS CONTROLS: Scoreboard shall be able to be operated wirelessly, or with hard wired connection. Provide Wireless, handheld controller & Receiver Model MPCX2 and Corresponding receiver as manufactured by NEVCO or approved equal.

1. Handheld wireless, Controller, AA battery operated, sport specific, control center with receiver unit mounted at scoreboard; High impact, break-resistant black ABS plastic Size: 3-1/4” x 5-1/2” x 7/8” [80 x 140 x 20 mm].

2. Handheld Unit and receiver shall comply with Part 15 of FCC Rules and Regulations. And shall have a minimum of 15 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] [150 m].

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.

h. Shall be capable of programming Electronic Team names without the need to change controller overlays.

1. Wireless Receiver: Internally scoreboard mounted, Modular Plug & Play operation reciever compatible with controller with a minimum of 15 channel operation. Injection molded case, [5-1/2 by 3-3/4 by 2 inches] [140 by 95 by 51 mm] mounted at scoreboard in accordance with instructions.

a. Maximum range: [500 feet] [150 m] from control center to receiver.

b. Power adapters: Provide for each scoreboard receiver.

1) Input: 120 volts, 0.4 amps, 50/60 Hz.

2) Output: 9 volts, 1.67 amps, 15 watts.

c. Provide suitable, RF transparent, NEMA 4 enclosure for receiver, to be located upon scoreboard supporting structure per installation diagrams.

2.4 MULTI-SPORT SCOREBOARD AT TRACK

A. Provide one (1) of the following:

B. Type: Exterior, electronic Multi-Sport scoreboard with LED intelligent displays/captions and clock, Model 3680 for Football/Soccer/Lacrosse as manufactured by Nevco or approved equal.

1. Size: 18 feet long x 8 feet high x 8 inches deep.

2. Finish: Acrylic Polyurethane paint – Cardinal Red with white trim/striping

3. Approximate weight: 590 pounds.

4. Mounting Hardware: Corrosion resistant, properly sized for scoreboard weight and wind loading.

5. No single section of scoreboard will be larger than 5 x 12 ft to ease burden of installation.

6. Include horn, wireless reciever.

C. All electronic Caption Plates: two ea. 8x48, four ea. 8x32, and two ea. 8x16 – 16mm matrix red or amber LED displays.

1. Displaying per sport: "HOME", "GUESTS", “BALL ON” “DOWN” “YTG” “QTR” "SAVES", "SHOTS", "CK", "H/G”, “PEN”,

2. High intensity translucent white LED displays:

3. 24 inches high digits: All digits except “tol”

4. 18 inches high digits: “tol”

5. Changeable team names as ETN. Shall not require controller upgrade, use of additional accessories or computer.

D. Power requirement: (Translucent White): 120 VAC, 8.3 Amps, 50/60 Hz. / 240 VAC, 4.2 Amps, 50/60 Hz. Requires earth ground.

E. Provide each scoreboard or accessory with electrical junction boxes, conduits, mounting hardware, and other accessories as required for full operation are to be included.

F. Nevco, Inc. Model ‘ADO 18-2’ signage board: 18 feet long x 2 feet high x 8 inches deep Header Sign including Artwork for Model 3680 Scoreboard or approved equal on each scoreboard.

1. 3 color text and logo. “Lou DeFlippo Field” with Red/White/Black derby arrowhead/’D’ logo. Vector Text and logo images to be provided by Landscape Architect prior to manufacturing.

G. CONTROLS: Scoreboard shall be able to be operated wirelessly, or with hard wired connection. Provide multi-channel, wireless control console Model MPC and handheld controller Model MPCX2 and Corresponding multi channel receiver as manufactured by NEVCO or approved equal.

1. Controllers shall be Microprocessor based operator's control center designed to operate different models of scoreboard by interchange of keyboard overlay; Wireless controllers shall have minimum 15 channel operation to avoid interference.

2. Wireless Receiver: Internally scoreboard mounted, Modular Plug & Play operation reciever compatible with controller with a minimum of 15 channel operation. Injection molded case, [5-1/2 by 3-3/4 by 2 inches] [140 by 95 by 51 mm] mounted at scoreboard in accordance with instructions.

a. Maximum range: [500 feet] [150 m] from control center to receiver.

b. Power adapters: Provide for each scoreboard receiver.

1) Input: 120 volts, 0.4 amps, 50/60 Hz.

2) Output: 9 volts, 1.67 amps, 15 watts.

c. Provide suitable, RF transparent, NEMA 4 enclosure for receiver, to be located upon scoreboard supporting structure per installation diagrams.

2. Pressbox Console: High impact, break-resistant black plastic with improved UV resistance. 11 x 9-1/2 x 4-1/8 inches.

a. Provide with LED displays, lithium cell battery backup to maintain scoreboard memory and time of day, self test mode, power on-off switch, alternate time control, and multiple scoreboard operation.

b. Split and raised 40 key soft touch keyboard. Keyboard shall be spill resistant.

c. Internal beeper acknowledging each entry

d. System Profiles feature set all parameters of operation including choice of controlled accessories and scoreboards.

e. Colorful graphic rich keyboard overlays for scoreboard or accessory.

f. Remote hand-held main time switch with programmable integral horn button.

g. 25 feet control cable with connectors.

h. Timer features: Time of day display, multiple time out timers with warning, interval horn, up-count auto stop with horn, 1/10th second display during last minute, changeable horn tone on scoreboards with the feature.

i. Segment timing for practice and workout.

j. Dimmer control for scoreboard.

k. MPC features shall be accessed through yes/no abbreviated questions in a drop down menu format.

l. Multiple receiver management shall be accomplished through direct keyboard input.

m. Electronic Team Names and automatic Electronic Caption Plates shall be controlled from MPC control without need to change overlays.

n. Power requirements: 120 volts, 12 watts, 50/60 Hz.

o. Provide option of battery supply for control operation if utility power not available.

p. Provide carrying case for control center, cable, and hand-held switch; Model CC-3 as manufactured by Nevco Inc.

1) Size: 18-1/2 x 14-1/2 x 6 inches.

2) Construction: Double wall, high density black polyethylene with padded interior, mechanical latches, and hinges.

3. Hand Held Controller: Handheld wireless, Controller, AA battery operated, sport specific, control center with receiver unit mounted at scoreboard; High impact, break-resistant black ABS plastic Size: 3-1/4” x 5-1/2” x 7/8” [80 x 140 x 20 mm].

a. Handheld Unit and receiver shall comply with Part 15 of FCC Rules and Regulations. And shall have a minimum of 15 channel operation compatible with receiver to be able to avoid local interference.

b. Handheld control features:

c. Wireless operation within [500 feet] [150 m].

d. High visibility LCD display with a sealed keyboard and adjustable contrast.

e. Battery life indicator; low battery indicator, include two AA batteries. 10 hour minimum battery life.

f. Scoreboard light level dimming controls.

g. Single hand operation with a no slip grip.

h. Built-in belt clip, carrying case and neck strap.

i. Wireless signal strength meter and internal antenna.

j. Shall be capable of programming Electronic Team names without the need to change controller overlays.

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 and operation.

B. Provide demonstration and training session for Owner's representative covering operation and maintenance of electronic scoreboard.

END OF SECTION 11 68 43

SECTION 13 12 50 – PERMANENT GRANDSTAND SEATING AND PRESS BOX

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 modifications to existing exterior, permanent home team grandstand seating and a new press box.

B. Providing all Engineering Design, materials, fabrication, freight, installation, supervision, and other miscellaneous items required for grandstand seating and press box in accordance with these Specifications and Contract Drawings.

C. Related Sections: The following Sections contain requirements that relate to this Section:

1. Division 02 Section "Earthwork".
2. Division 03 Section "Cast-In-Place Concrete".
3. Division 26 Section "Electrical".

1.3 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 all press box components, including paint products, railings, and chainlink fence products.

C. Shop Drawings detailing fabrication and erection of replacement seating system and press box. Include seating plan indicating aisles, walkways, seating sections, and relationship to existing construction. Show anchorage and accessory items for seating and press box. Show front, rear and end elevations and sections through press box. Provide details and schedules for the fabrication and of all structural components. Include details of all cuts, connections, chamber, welds and other pertinent data. Provide templates for anchors and bolts specified for installation under other Sections. All drawings must be prepared by and bear the stamp of a professional engineer licensed in the State of Connecticut.

1. All structural detailing shall follow the standard practice as set forth in AISC "Detailing for Steel Construction."
2. Seating plan indicating aisles, walkways, seating sections, and relationship to existing construction.
3. End elevations/sections indicating deck configuration, method of attachment, railing, and size of framing members.
4. Seatboard/footboard configuration and method of attachment.

5. Calculations by a Registered Professional Engineer with State Licensure.
6. Schedule of work experience, including names and telephone numbers of contacts; 10 projects minimum of equal value.
7. Schedule of work experience, including names and phone numbers of contacts, 10 projects minimum of equal value.
8. Project schedule, including phasing with other trades and designation for all tasks, milestone dates for drawing submittal, fabrication time, key material delivery dates and designated dates of installation.

D. Samples

1. Color samples for siding and roofing
2. 12” x 12” chain link
3. Seat mounting brackets if new are required

E. Qualification data for firms and persons specified in the "Quality Assurance" Article to demonstrate their capabilities and experience. Include a list of completed projects with project name, addresses, names of architects and owners, and other information specified.

1.4 DESIGN CRITERIA

A. All material and workmanship shall comply with the following requirements:

1. The 2016 Connecticut State Building Code (CSBC) and 2016 Connecticut Fire Safety Code (CSFSC) including:

a. 2012 International Building Code (IBC)
b. 2012 International Mechanical Code (IMC)
c. 2012 International Energy Conservation Code (IECC_
d. 2014 NFPA 70 National Electrical Code (NEC)
e. 2009 ICC/ANSI A117.1 Accessible and Usable Buildings and Facilities
f. 2012 International Fire Code (IFC), including all referenced standards.
g. Current OSHA
h. Connecticut General Statutes
i. Title II of the Americans with Disabilities Act (ADA) including the 2010 ADA Standards for Accessible Design
j. 2012 ICC 300 Standards For Bleachers, Folding and Telescoping Seating and Grandstands

2. AISC Manual of Steel Construction, Load & Resistance factor Design, 13th Edition
3. Aluminum Association of America

B. Structural Performance: Engineer, fabricate, and install modifications to grandstand seating systems to withstand the following structural loads without exceeding the allowable design working stress of the materials involved, including anchors and connections. Apply each load to produce the maximum stress in each of the respective components of each metal fabrication.

1. Top Rail of Guardrail Systems: Capable of withstanding the following loads applied as indicated:

a. Concentrated load of 200 lbf applied at any point and in any direction.
b. Uniform load of 50 lbf per linear foot applied horizontally and concurrently with uniform load of 100 lbf per linear foot applied non-concurrently or vertically downward.
c. Concentrated and uniform loads above need not be assumed to act concurrently.

C. Federal Specification LP-390C, Type 1, Class M, Grade 2, Category

D. Design Loads:

Dead Load:	10 psf	seat and footboards, risers, etc.
Live Load:	100 psf	To structural members. All stringers and girders shall be limited to L/200 for maximum vertical live load deflection.
Live Load:	120 plf	Seatboards/Footboards
Wind Load:	Local Wind Speed	On projected vertical surface. Uplift per current State Building Code

E. General: The structure shall be properly braced for wind and construction loads until all structural elements are secured. Lateral and longitudinal bays shall be cross-braced as required. Guardrails shall be of adequate size, location, and height to meet specified codes and designed to carry required loads.

F. Code Compliance: Submittals shall be based upon specifications contained in the bid documents. Interpretation of code compliance for life safety issues is provided in design documents. Any change to design must have approval prior to bid. Design changes to reduce aisles or exits is not allowed. Bidder is responsible to meet the code interpretation provided in bid drawings and specifications.

G. Deflection: Structural elements shall be sized to limit the live load deflections to 1/360 of the span.

H. Foundations: Foundations have been sized by an engineer and are based on soil bearing capacity per the provided geotechnical report. Soil bearing capacity to be verified by the Owner prior to placement of footings. Foundation sizes on drawings will not be reduced under any circumstance. Downsizing or redesigned foundations are not allowed.

1.5 QUALITY ASSURANCE

A. Fabricator Qualifications: Firm experienced in producing permanent grandstand seating systems and press boxes similar to those indicated for this project with a record of successful in-service performance, and with sufficient production capacity to produce required units without delaying the Work. Review of the manufacturer's qualifications shall be based upon the following criteria:

1. 10 Years minimum experience in the design, fabrication and erection of permanent grandstand seating systems and press boxes.

2. A list of similar projects completed within the last three (3) years. Provide references and telephone numbers for each. The Owner shall have the right to visit any one of the listed projects. Out of state travel costs shall be borne by the bidder.
3. Compatibility and equality of any proposed alternate manufacturer's system with the Construction Drawings and this Specification.

B. Evaluation of compatibility and equivalence shall be at the sole discretion of the Owner.

C. Engineer Qualifications: Professional engineer legally authorized to practice in the State of Connecticut and experienced in providing engineering services of the kind indicated for permanent grandstand seating systems and new press box similar to this Project in material, design, and extent, and that have a record of successful in-service performance.

D. Coating System Applicator Qualifications: Company specializing in coating system application with a minimum of 10-years' experience.

E. Installer Qualifications: Arrange for modifications to existing grandstand seating systems and new press box by a firm that can demonstrate successful experience in installing permanent grandstand seating items similar in type and quality to those required for this Project.

F. Installer Certification: Obtain written certification from manufacturer of permanent grandstand seating systems and press box certifying that Installer is approved by manufacturer to install specified grandstand system and new press box and supervised by personnel trained by the Manufacturer in proper application of the product. Provide copy of certification for Architect prior to awarding this work. Such certification shall have been issued by the manufacturer no less than 5 years prior to the date of the Contractor's Bid Proposal.

G. Welding Standards: Comply with applicable provisions of AWS D1.1 "Structural Welding Code—Steel", AWS D1.2 "Structural Welding Code—Aluminum", and AWS D1.3 "Structural Welding Code—Sheet Steel".

1. Certify that each welder has satisfactorily passed AWS qualification tests for welding processes involved and, if pertinent, has undergone recertification.

H. Submit evidence of product liability Certificate of Insurance for life of the product.

I. Warranty: The Press Box shall be under warranty for a period of one year beginning at date of Substantial Completion. The Press Box is warranted to be free from defect in materials and workmanship in the course of manufacture. This warranty excludes any other defects resulting from abnormal use in service, accidental or intentional damage or any occurrences beyond manufacturer's control.

J. Product shall be guaranteed for five (5) years on the structure and three (3) years on the finish together with labor. Damage resulting from abnormal use, vandalism, or incorrect installation (if done by other than authorized installer of the manufacturer) is not applicable. The coating system shall be guaranteed for a ten (10) year period against defective materials and workmanship.

K. Project schedule, including phasing with other trades and designation for all tasks, milestone dates for drawing submittal, fabrication time, key material delivery dates and designated dates of installation.

L. Detailed Certificate of Insurance, including products/completed operations liability insurance, shall be provided.

1.6 DELIVERY, STORAGE, AND HANDLING

A. Delivery and Storage: Keep materials under cover and dry. Protect against exposure to weather and contact with damp or wet surfaces. Stack materials, provide for air circulation within and around stacks and under temporary coverings including polyethylene and similar materials.

1.7 PROJECT CONDITIONS

A. A visitation to the site prior to bid by a qualified representative of the grandstand and press box manufacturer is recommended. No allowance will be made after the award of contract for any problems encountered which would have been discovered during the pre-bid visitation. In addition, the representative of the manufacturer will revisit the site within six (6) months after completion of the project for reinspection with the Owner.

B. Field Measurements: Check actual locations of other construction to which grandstand seating system and press box must fit by accurate field measurements before fabrication. Show recorded measurements on final shop drawings to avoid delaying the Work.

1. Where field measurements cannot be made without delaying the Work, guarantee dimensions and proceed with fabricating products without field measurement. Coordinate construction to ensure that actual dimensions correspond to guaranteed dimensions. Allow for trimming and fitting at no additional cost to the Owner.

C. Code compliance: Approval Drawings shall be based upon the criteria indicated herein. Achieving compliance to the Codes indicated is mandatory and is the manufacturer's responsibility.

PART 2 - PRODUCTS

2.1 MANUFACTURERS

A. Basis of Design Product: Subject to compliance with the Plans and Specifications herein provide grandstand seating components by:
1. GT Grandstands. Plant City, FLA 33566 Jack Terry 978-770-7036
2. Dant-Clayton Corporation, Louisville, KY 40210 502-634-3626
3. Southern Bleacher Co. Graham, TX 76450 940-549-0733
4. Or approved equal.

2.2 STRUCTURAL STEEL

A. All detailing, fabrication, and erection shall be in accordance with AISC Specifications, Load & Resistance Factor Design. All fabrication shall be completed in an AISC certified facility.

B. Structural steel shall be ASTM A572 multi-certified grad 50, Miscellaneous steel shall be ASTM A36.

C. All bolts 5/8" diameter and larger shall be ASTM A325. All bolts ½" and smaller shall be ASTM A307. Threaded rod shall be ASTM A36.

D. All welds shall conform to ANSI/AWS D.1, latest edition. Electrodes shall be E70XX.

2.3 Materials

A. Extrusions

1. Footboards and toeboards shall be 6063-T6 extruded aluminum with a fluted surface and a wall thickness of .078". The minimum acceptable vertical height is 1.750". Footboards and toeboards shall be slip and stain resistant finish. Finish shall be produced in addition to the mill finish and shall prevent oxidation staining. Slip resistance shall improve co-efficient of friction in all directions. This is not an untreated mill finish.
2. Seats shall be 6063-T6 extruded aluminum with a fluted surface and a minimum of 4 vertical legs. The exact size of seatboard is 2" x 10" x .080" wall thickened at the joints and weighing 1.9 lbs. per foot with 1" radius comfort curve front edge. Seat Brackets shall bolt directly to the steel understructure. Supporting seat brackets in the aluminum channels of the deck will not be permitted. Mounting brackets: 3/16" thick A36 steel plate, plasma cut, bent and galvanized. Seat board ends shall be closed with cast aluminum, friction fit end caps and secured with rivets.
3. Footboards shall be 6063-T6 extruded aluminum with a fluted surface and a wall thickness of .078". The minimum acceptable vertical height is 1.750". Footboards shall be slip and stain resistant finish. Finish shall be produced in addition to the mill finish and shall prevent oxidation staining. Slip resistance shall improve co-efficient of friction in all directions. This is not an untreated mill finish.
4. Adapter plates shall be 6061-T6 extruded aluminum and shall be mill finish.

B. Hardware:

1. Bolts used for field installation shall be hot dipped galvanized after fabrication.
2. End Caps.
   a. Seatboard, walkway, footboard and aisle board end caps shall be cast aluminum, friction fit.

C. Closure

1. Vertical closure shall be provided at the locations shown on the drawings and shall enclose the area from 1.5" below walking surface to 4" above grade:
   a. Vertical closure material shall be a minimum ½" thick
   b. Vertical closure material shall be 100% recycled post-consumer products
   c. Vertical closure material shall be non-metallic, non-corrosive, wear and abrasion resistant, stress-crack resistant, waterproof, impervious to most chemicals, and impact resistant
   d. Panels shall be provided in color selected by the architect

e. Panel color must be impregnated through the material, and no panels shall be painted
f. Panels shall have no water absorption
g. Vertical closure material shall be provided in panels and framed on all sides with heavy duty aluminum shapes integrated with the grandstand steel and /or aluminum framing

2.4 PRESS BOX

A. DESIGN CRITERIA

1. Press box shall be independently supported 8 feet wide x 30 feet 6 inches long.
2. Press box dimensions: 8 feet wide x 30 feet 6 inches long with 3 interior compartments.
3. Press box to be of open construction, allowing inspection of electrical wiring, switches and other components without destructive disassembly.
4. All material and workmanship shall be in accordance with the applicable state building codes indicated.
5. All electric components shall be UL listed.
6. Design Loads:

    a. Live Load 100 psf floor
    b. 50 psf roof (w/ filming platform)
    c. Wind Per Local Regulations on vertical surfaces

7. Design Classification
    a. Use Group: A-5, Construction Type: IIB

B. Support Structure

1. Galvanized
2. Structural shapes meet one of the following ASTM specifications: A36, A36/A572 grade 50, A572 grade 50, A529-50, or A500 grade B.
3. Shop connections are seal welds or bolted.
4. After fabrication, all steel is hot-dipped galvanized to ASTM-A-123 specifications.
5. All materials shall be new and shall comply with ASTM specifications.

C. Floor Construction

1. Main support to be galvanized steel floor frame sized to support structure and 26 gauge "U" panel underbelly with galvalume finish for support of insulation.
2. Floor to be mill finished interlocking Aluminum Decking System, extruded aluminum alloy 6063 T6, mill finish. Attach Decking System to steel floor frame with mechanical fasteners at end of plank and at intermediate supports.
3. Insulation: R-13 Fiberglasss, BATT insulation with vapor barrier.

D. Wall Structure

1. 4 inch x 4 inch x 11 gauge square tubing with maximum span of 14 feet on front wall and maximum span of 6 feet on back wall and 4 inch x 18 gauge steel studs with maximum

spacing of 5 feet for all walls with siding. Spans greater than these require engineered calculations for design. All steel studs treated with metal primer after welding.

2. Insulation: R-13 Fiberglass BATT insulation with vapor barrier

E. Interior Finish

1. 5/8" vinyl coated gypsum panels, Class A rated.
2. Cove Base: Vinyl 4 inches.

F. Exterior Finish

1. 26ga "U" panel pre-finished ribbed steel exterior siding with Kynar 500 finish (color as selected from standard color list)

G. Roof Structure

1. 4 inch x 4 inch x 3/16" square tubing with maximum spacing of 6 feet on center and 4" x 18ga gauge steel studs with maximum spacing of 2 feet on center. All treated with metal primer after welding.
2. Roof: 1/8 inch steel plate roof, continuous welded seams coated with metal primer and 36 mils of white elastomeric roof coating.
3. Insulation: R 19 Batt insulation with vapor barrier.
4. Fascia: 26 gauge steel prefinished trim with Kynar 500 finish (color as selected) to match metal siding.
5. Ceiling: 24 inch x 24 inch gypsum suspended ceiling system, class A rated.

H. Exterior Doors

1. 18 gauge insulated galvanized hollow metal door with 16 gauge steel wrap around frames (paint to match siding), hydraulic closer, weatherstrip, aluminum threshold and exterior commercial lever handled lockset, interior panic bar exit device.

I. Interior Door

1. Interior Birch Unit. Dimensions: 3 feet 0 inches x 6 feet 8 inches.
2. Hardware: Handles shall be lever type that allow operation without tight grasping or twisting of the wrist.

J. Interior Walls

1. Framing to be steel galvanized studs (25 gauge) 1 1/4 inch x 3 5/8 inch at maximum 2 feet on center.
2. Finishes to be consistent with all other interior finishes.

K. Windows

1. Frame: Extruded aluminum single hung, vertical sliding unit, thermal break.
2. Sash: Tilt toward inside for easy cleaning.
3. 7/8" insulated tempered safety glass.

4. Dimensions of each unit: Dependent on compartment size. At interior wall locations or structural support locations the dimension between windows shall be no greater than 6 inches.
5. Frame color white.

L. Work Bench

1. 18 inch wide work bench of plastic laminate.

M. Electrical

1. Submittal drawing shall indicate devices and circuitry.
2. Fixtures: 2 lamp, 40 watt fluorescent, white strip design as manufactured by Lithonia Lighting, or equal. Fixtures shall be located above countertop and be maximized to full length of compartment space.
3. All wiring to be encased in thin all EMT conduit min. 12thhn copper wire. N.E.C. breaker box to be 100 amp surface mounted on wall with 1.5 inch rigid conduit to be stubbed out at back wall of press box ready for service line to be connected. (Service line to Press Box is responsibility of Owner).
4. Electrical outlet(s) installed per NEC shall be standard duty. All outlets shall be surface mounted and grounding type on wall
5. Sound, Telephone, Clock, Field Communication: Empty double outlet boxes per N.E.C. with 3/4 inch conduit stubbed out bottom of Press Box for use of Owner. Outlet boxes to be flush mounted into wall. Any wiring completed on site will be responsibility of such contractor for inspections. Quantity. Two will be provided. Owner shall indicate additional boxes needed.
6. Provide a minimum of 2 GFCI outlet receptacles on filming platform.

N. Filming Area/Observation Deck

1. Bilco #S-50 roof hatch with Alaco #460 aluminum ladder. Include guardrail on sides with gate to provide fall protection at open sides of roof hatch.
2. Weathertight outlet box for cameras. Quantity: as indicated on plans.
   a. Access: Roof hatch with OSHA-rated aluminum ladder mounted to an interior back wall.
   b. Roof guardrailing to be 48” above walking surface around perimeter of deck attached to 5/8 inch galvanized studs to be welded to roof support structure. The guardrailing to include anodized aluminum with 9 gauge galvanized chain link fencing fastened in place with galvanized fasteners and aluminum ties.

PART 3 - EXECUTION

3.1 PREPARATION

A. Coordinate and furnish anchorages, drawings, diagrams, templates, instruction, and directions for assembling and installing seating systems. Coordinate delivery of such items to Project site.

3.2 INSTALLATION, GENERAL

A. Perform cutting, drilling, and fitting required for modifications to existing grandstand seating and new press box system. Set grandstand seating components and press box accurately in location, alignment, and elevation; with edges and surfaces level, plumb, true, and free of rack; and measured from established lines and levels.

B. Fit exposed connections accurately together to form hairline joints. Do not weld, cut, or abrade the surfaces of exterior units that have been hot-dip galvanized after fabrication and are intended for bolted or screwed field connections.

3.3 INSTALLATION

A. General: Comply with plans, approved shop drawings; manufacturer's written instructions and recommendations for installation, as applicable to project conditions and supporting substrates. Erect grandstand seating components and press box securely, with provisions for thermal and structural movement.

B. Installation shall be performed directly by the Manufacturer or by a factory certified Installer.

3.4 ADJUSTING AND CLEANING

A. Touch-up Painting: Cleaning and touch-up painting of field welds, bolted connections, and abraded areas of the shop paint on miscellaneous metal.

B. For galvanized surfaces, clean bolted connections, and abraded areas, and apply galvanizing repair paint to comply with ASTM A 780.

C. Clean all surfaces after erection in accordance with manufacturer's recommendations.

D. Remove and properly dispose of all packaging and construction debris.

END OF SECTION 13 12 50

SECTION 13 12 51 – PREFABRICATED STRUCTURES (ALTERNATE)

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 prefabricated wood storage sheds.

B. Providing all Engineering Design, materials, fabrication, freight, installation, supervision, and other miscellaneous items required for storage shed structures in accordance with these Specifications and Contract Drawings.

C. Related Sections: The following Sections contain requirements that relate to this Section:

1. Division 03 Section "Cast in Place Concrete".

1.3 SUBMITTALS

A. Shop Drawings: Contractor shall provide fully dimensioned shop drawings and manufacturer's technical literature for all improvements and confirm colors, fabrication, reinforcing, and anchoring systems for approval.

B. Samples

1. Color samples for siding and roofing for selection by Owner

C. Design Loads:

D. General: The structure shall be properly braced for wind and construction loads until all structural elements are secured. Lateral and longitudinal bays shall be cross-braced as required.

E. Deflection: Structural elements shall be sized to limit the live load deflections to 1/200 of the span.

1.4 QUALITY ASSURANCE

A. Engineer Qualifications: Professional engineer legally authorized to practice in the State of Connecticut and experienced in providing engineering services of the kind indicated for prefabricated wood structures similar to this Project in material, design, and extent, and that have a record of successful in-service performance.

B. Submit evidence of product liability Certificate of Insurance for life of the product.

C. Warranty:

D. Product shall be guaranteed for five (5) years on the structure and three (3) years on the finish together with labor. Damage resulting from abnormal use, vandalism, or incorrect installation (if done by other than authorized installer of the manufacturer) is not applicable. The coating system shall be guaranteed for a ten (10) year period against defective materials and workmanship.

E. Project schedule, including phasing with other trades and designation for all tasks, milestone dates for drawing submittal, fabrication time, key material delivery dates and designated dates of installation.

F. Detailed Certificate of Insurance, including products/completed operations liability insurance, shall be provided.

1.5 PROJECT CONDITIONS

A. A visitation to the site prior to bid by a qualified representative of the prefabricated wood-framed structure manufacturer is recommended. No allowance will be made after the award of contract for any problems encountered which would have been discovered during the pre-bid visitation. In addition, the representative of the manufacturer will revisit the site within six (6) months after completion of the project for reinspection with the Owner.

B. Field Measurements: Check actual locations of other construction to which prefabricated wood-framed structure must fit by accurate field measurements before fabrication. Show recorded measurements on final shop drawings to avoid delaying the Work.

1. Where field measurements cannot be made without delaying the Work, guarantee dimensions and proceed with fabricating products without field measurement. Coordinate construction to ensure that actual dimensions correspond to guaranteed dimensions. Allow for trimming and fitting at no additional cost to the Owner.

C. Code compliance: Approval Drawings shall be based upon the criteria indicated herein. Achieving compliance to the Codes indicated is mandatory and is the manufacturer's responsibility.

PART 2 - PRODUCTS

2.1 MANUFACTURERS

A. Basis of Design Product: Subject to compliance with the Plans and Specifications herein provide Carefree Building Storage Master Cottage or comparable product.

2.2 STORAGE SHED

A. Wood storage sheds shall be 12'X16' overall. Two sheds are required.

B. Sheds shall be weatherproof.

C. Foundation lumber shall be pressure treated 4 x 4 timbers.

D. Framing lumber shall be manufactured to conform to PS 20, "American Softwood Lumber Standard" and with applicable grading rules of inspection agencies certified by American Lumber Standards Committee's (ALSC) Board of Review. Species shall be one of the following: Southern Yellow Pine; Douglas Fir; Hem-Fir.

E. Exterior: Vinyl clapboard siding shall be applied over 1/2-inch plywood sheathing. Provide solid vinyl trim.

F. Roof sheathing shall be 1/2" CDX plywood.

G. Flooring shall be pressure treated 2 x 6 floor joists at 12 inches on center, covered with 3/4-inch UL exterior grade plywood.

H. Roofing shall include aluminum drip edges and 30-year architectural roof shingles.

I. Roof structure shall be engineered roof trusses 16 inches on center utilizing metal barbed structural connectors pressed into the wood with up to 20 tons of force.

J. Shed shall have reinforced double leaf door, with adjoining pressure treated ramp from floor to grade.

K. Entire structure shall be painted in latex/acrylic exterior paint. Color to be selected by Architect.

L. Shed shall not have windows.

M. Access ramp shall be provided at all doors.

N. Screened wall louvers shall be provided on both gable ends.

O. Exterior door shall be 18 gauge galvanized hollow metal with 16-gauge steel wrap around frames (paint to match siding), hydraulic closer, weatherstrip, aluminum threshold and exterior commercial lever handled, keyed lockset.

P. Provide galvanized steel floor guards.

Q. Provide overhead storage loft.

R. Provide large trim and overhangs.

S. Stud walls shall be 16 inches on center approximately 8 feet high. Headers shall be provided over doors and studs provided in corners.

T. Provide garage package including passage door, garage door with ramp and heavy-duty pressure treated floor.

U. Provide and install solar panel and LED interior shed light assembly for each shed. Shed light assembly shall be Microsolar 1 watt, 3 volt, 120 lumen 20 LED light, pull strung light switch,

3.7 volt, 2000mAH Lithium battery, solar panel, battery, mounting hardware and switch assembly, color black or approved equal

2.3 STORAGE CONTAINERS (CONNEX BOXES) (ALTERNATE)

A. Shall be a new, 100% solid steel, secure, weathertight, general purpose steel shipping container with exterior dimension of 40’ long x 8’ w x 8”-6 h with a rear, double, lock-able swing door manufactured to ISO668 specifications for general purpose, dry, shipping containers.

B. Container shall have corrugated steel walls with minimum 1” thick wood interior floor. All exterior welds shall be continuous and weather-tight. All containers shall have plastic insect proof ventilators on the top of each side wall.

C. Finish: Sides end and top: Standard, grey, corrosion resistant paint. Bottom: standard bituminous coating

D. Warranty: free from defects in materials, workmanship and structure for a period of 1 year from date of substantial completion.

PART 3 - EXECUTION

3.1 PREPARATION

A. Confirm completion of pavements and other improvements are properly sequenced prior to installation of storage sheds.

B. Coordinate and furnish anchorages, drawings, instructions, and directions for installing wood sheds.

C. Coordinate delivery to Project site.

3.2 INSTALLATION

A. Sheds shall be fabricated on site.

B. Fabricate wood storage sheds on site on concrete slab where indicated on Drawings. Anchor shed to slab in conformance with manufacturer’s recommendations and in accordance with Connecticut State Building Codes.

3.3 PROTECTIONS/CLEAN UP

A. Clean all surfaces after erection in accordance with manufacturer’s recommendations.

B. Remove and properly dispose of all packaging and construction debris.

END OF SECTION 13 12 50

SECTION 22 04 00 - GENERAL CONDITIONS FOR PLUMBING TRADES

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 RELATED REQUIREMENTS

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

B. This section applies to certain sections of Division 26, "Electrical," and this section applies to all sections of Division 23, "Mechanical" of this project specification unless specified otherwise in the individual sections.

1.3 DESCRIPTION

A. The General Conditions and Supplementary General Conditions are a part of this Division and are to be considered a part of this Contract.

B. Where items of the General Conditions and Supplementary General Conditions are repeated in other Sections of the Specifications, it is merely intended to qualify or to call particular attention to them. It is not intended that any other parts of the General Conditions and Supplementary General Conditions shall be assumed to be omitted if not repeated therein. This Section applies equally and specifically to all Contractors supplying labor and/or equipment and/or materials as required under each Section of this Division. Where conflicts exist between the drawings and the specifications or between this section of the specifications and other sections, the more stringent or higher cost option shall apply.

1.4 INTENT

A. It is the intent of the Specifications and Drawings to call for finished work, tested and ready for operation.

B. Any apparatus, appliance, material or work not shown on drawings but mentioned in the specifications, or vice versa, or any incidental accessories necessary to make the work complete and perfect in all respects and ready for operation as determined by good trade practice even if not particularly specified, shall be furnished, delivered and installed under their respective Divisions without any additional expense to the Owner.

C. Minor details not usually shown or specified but necessary for proper installation and operation shall be included in the work as though they were hereinafter shown or specified.

D. Work under each Section shall include giving written notice to the Owner and Engineer of any materials or apparatus believed inadequate or unsuitable; in violation of laws, ordinances, rules or regulations of authorities having jurisdiction; and any necessary items of work omitted. In the absence of such written notice, it is mutually agreed that work under each Section includes the cost of all required items for the accepted, satisfactory functioning of the entire system without extra compensation.

1.5 DEFINITIONS

A. Approve: The term "approved," where used in conjunction with the Engineer's action on the Contractor's submittals, applications, and requests, is limited to the Engineer's duties and responsibilities as stated in General and Supplementary Conditions.

B. “Approved equal” mean any product which in the opinion of the Engineer is equal in quality, arrangement, appearance, and performance to the product specified.

C. Directed: Terms such as "directed," "requested," "authorized," "selected," "approved," "required," and "permitted" mean "directed by the Engineer," "requested by the Engineer," and similar phrases.

D. “Finished” refers to all rooms and areas to be specified to receive architectural treatment as indicated on the drawings. All rooms and areas not covered, including underground tunnels and areas above ceilings shall be considered not finished, unless otherwise noted.

E. “Furnish” or “supply” shall mean purchase, deliver to, and off-load at the job site, ready to be installed including where appropriate all necessary interim storage and protection.

F. Indicated: The term "indicated" refers to graphic representations, notes, or schedules on the Drawings, other paragraphs or schedules in the Specifications, and similar requirements in the Contract Documents. Where terms such as "shown," "noted," "scheduled," and "specified" are used, it is to help the reader locate the reference; no limitation on location is intended.

G. “Install” shall mean set in place complete with all mounting facilities and connections as necessary ready for normal use or service.

H. "Lead Free" shall mean not more than .25% in the wetted surface area.

I. “Product” shall mean any item of equipment, material, fixture, apparatus, appliance or accessory installed under this Division.

J. “Provide” shall mean furnish (or supply) and install as necessary.

K. Regulation: The term "Regulations" includes laws, ordinances, statutes, and lawful orders issued by authorities having jurisdiction, as well as rules, conventions, and agreements within the construction industry that control performance of the Work.

L. Remove: The term “remove” means “ to disconnect from its present position, remove from the premises and to dispose of in a legal manner.”

M. Special Warranties: The term “Special Warranties” are written warranties required by or incorporated in the Contract Documents, either to extend time limits provided by standard warranties or to provide greater rights for the Owner.

N. Standard Product Warranties: The term “Standard Product Warranties” are preprinted written warranties published by individual manufacturers for particular products and are specifically endorsed by the manufacturer to the Owner.

O. “Subcontractor” means specifically the subcontractor working under this Division. Other Contractors are specifically designated “Plumbing Subcontractor”, “General Contractor” and so on. Note: Take care to ascertain limits of responsibility for connecting equipment which requires connections by two or more trades.

P. Substitutions: Requests for changes in products, materials, equipment, and methods of construction proposed by the Contractor are considered requests for "substitutions."

Q. “Wiring” shall mean cable assembly, raceway, conductors, fittings and any other necessary accessories to make a complete wiring system.

1.6 DRAWINGS

A. Drawings are diagrammatic and indicate the general arrangement of systems and work included in the Contract. Consult the Architectural Drawings and Details for exact location of fixtures and equipment; where same are not definitely located, obtain this information from the Architect. (Do not scale the drawings)

B. Work under each Section shall closely follow Drawings in layout of work; check Drawings of other Divisions to verify spaces in which work will be installed. Maintain maximum headroom; where space conditions appear inadequate, Owner and Engineer shall be notified before proceeding with installations.

C. The Owner may, without extra charge, make reasonable modifications in the layout as needed to prevent conflict with work of other trades and/or for proper execution of the work.

D. Where variances occur between the Drawings and Specifications or within either of the Documents, the item or arrangement of better quality, shall be included in the Contract price. The Owner and Engineer shall decide on the item and the manner in which the work shall be installed.

1.7 SURVEYS AND MEASUREMENTS

A. Before submitting his Bid, the Contractors shall visit the site and become thoroughly familiar with all existing conditions under which work will be installed. This Contract includes all modifications of existing systems required for the installation of new equipment. This Contract includes all necessary offsets, transitions and modifications required to install all new equipment in existing spaces. All new and existing equipment and systems shall be fully operational under this Contract before the job is considered complete. The Contractors shall be held responsible for any assumptions he makes, any omissions or errors he makes as a result of his failure to become fully familiar with the existing conditions at the site and the Contract Documents.

B. The Contractor shall base all measurements, both horizontal and vertical, from established bench marks. All work shall agree with these established lines and levels. Verify all measurements at the site and check the correctness of same as related to the work.

C. Should the Contractor discover any discrepancies between actual measurements and those indicated which prevent following good practice or which interfere with the intent of the Drawings and Specifications, the Engineer will be notified and work will not proceed until instructions from the Engineer are received.

1.8 CODES AND STANDARDS

A. Reference Standard Compliance
1. Where equipment or materials are specified to conform to industry and technical society reference standards of the organizations such as American National Standards Institute (ANSI), American Society for Testing and Materials (ASTM), National Electrical Manufacturers Association (NEMA), and Underwriters Laboratories Inc. (UL), submit proof of such compliance. The label or listing by the specified organization will be acceptable evidence of compliance.
2. Independent Testing Organization Certificate: In lieu of the label or listing indicated above, submit a certificate from an independent testing organization, competent to perform testing, and approved by the Engineer. The certificate shall state that the item has been tested in accordance with the specified organization's test methods and that the item complies with the specified organization's reference standard.

B. The Following Codes and Standards listed below apply to all plumbing work. Wherever Codes and/or Standards are mentioned in these Specifications, the latest applicable edition or revision shall be followed:
Connecticut State Building Code - Connecticut Supplement
The International Building Code
The International Mechanical Code
The International Plumbing Code
The International Energy Conservation Code
The National Electrical Code
NFPA 101 Life Safety
ASHRAE 90.1 and International Energy Conservation Code

C. The following Standards shall be used where referenced by the following abbreviations:

ACGIH	American Conference of Governmental Industrial Hygienists
AGA	American Gas Association
AIA	American Institute of Architects
ANSI	American National Standards Institute
API	American Petroleum Institute
ASHRAE	American Society of Heating, Refrigerating and Air Conditioning Engineers
ASME	American Society of Mechanical Engineers
ASPE	American Society of Plumbing Engineers
ASSE	American Society of Sanitary Engineers
ASTM	American Society of Testing and Materials
AWS	American Welding Society
AWWA	American Water Works Association
CGA	Compressed Gas Association
CSA	Canadian Standards Association
CISPI	Cast Iron Soil Pipe Institute
EJMA	Expansion Joint Manufacturing Association
EPA	Environmental Protection Agency
FM	Factory Mutual
FSSC	Federal Specification
HIS	Hydraulic Institute Standards
IEEE	Institute of Electrical and Electronics Engineers
IRI	Industrial Risk Insurers
ISO	Insurance Services Office
MCAA	Mechanical Contractors Association of America
NBS	National Bureau of Standards
NEBB	National Environmental Balancing Bureau
NEMA	National Electrical Manufacturers Association
NFPA	National Fire Protection Association
NOFI	National Oil Fuel Institute
NSC	National Safety Council
NSF	National Sanitation Foundation
OSHA	Occupational Safety and Health Administration
PDI	Plumbing and Drainage Institute
SBI	Steel Boiler Industry (Division of Hydronics Institute)

SDWA	Safe Drinking Water Act
SMACNA	Sheet Metal and Air Conditioning Contractors National Association
STI	Steel Tank Institute
UL	Underwriters' Laboratories

D. All materials furnished and all work installed shall comply with the rules and recommendations of the NFPA, the requirements of the local utility companies, the recommendations of the fire insurance rating organization having jurisdiction and the requirements of all Governmental departments having jurisdiction.

E. The Contractor shall include in the work, without extra cost to the Owner, any labor, materials, services, apparatus and Drawings in order to comply with all applicable laws, ordinances, rules and regulations, whether shown on Drawings and/or specified or not.

1.9 PERMITS AND FEES

A. The Contractor shall give all necessary notices, obtain all permits; and pay all Government and State sales taxes and fees where applicable, and other costs, including utility connections or extensions in connection with the work, file all necessary Drawings, prepare all documents and obtain all necessary approvals of all Governmental and State departments having jurisdiction, obtain all required certificates of inspection for his work, and deliver a copy to the Owner and Engineer before request for acceptance and final payment for the work.

1.10 EQUIPMENT SUBSTITUTIONS

A. In these Contract Documents, one or more makes of materials, apparatus or appliances may have been specified for use in this installation. These describe the basis of design and approved equivalents. This has been done for convenience in fixing the standard of workmanship, finish and design required for installation without consideration of any or all costs associated but not limited to (structural, mechanical, or electrical feeder, breaker, or transformer requirements). The Contractor acknowledges that not all requirements are shown for either alternate acceptable manufacturers listed or those alternates requiring a request for substitution and it is their responsibility to coordinate all requirements necessary to accommodate any change from the basis of design listed or scheduled. The contractor is required to submit any and all costs (including costs associated or required by all trades) along with performance differences as part of their request for substitution. The details of workmanship, finish and design, and the guaranteed performance of any material, apparatus or appliance which the Contractor desires to deviate for those mentioned herein shall also conform to these standards.

B. Where no specific make of material, apparatus or appliance is mentioned, any first-class product made by a reputable manufacturer may be submitted for the Engineers review.

C. Where two or more names are given as approved manufacturers of equivalents, the Contractor must use the specified item or one of the named equivalents which still must meet all of the performance characteristics of the basis of design make and model. Where one name only is used and is followed by the words “or approved equal”, the Contractor must use the item named or he is required to apply for a substitution. Where one name only is used, the Contractor must use that item named.

D. Where the Contractor proposes to deviate (provide an equivalent or request for substitution) from the equipment or materials as hereinafter specified, they are required to submit a requested for substitution in writing. The Contractor shall state in their request whether it is a substitution or a non approved equivalent to that specified and the amount of credit or extra cost involved. A copy of said request shall be included in the Base Bid with manufacturer’s equipment cuts. The Base Bid shall be based on using the materials and equipment as specified with no exceptions.

E. Where the Contractor proposes to use an item of equipment other than specified or detailed on the Drawings which requires any redesign of the structure, partitions, foundations, piping, wiring or any other part of the mechanical, electrical or architectural layout, all such redesign and all new drawings and detailing required therefore shall be prepared by the Engineers/Architects of Record at the expense of the Contractor and at no additional cost to the Owner.

F. Where such accepted deviation resulting from using an approved equivalent or substitution requires a different quantity and arrangement of piping, ductwork, valves, pumps, insulation, wiring, conduit and equipment from that specified or indicated on the Drawings, the Contractor shall, after acceptance by the Engineer, furnish and install any such additional equipment required by the system at no additional cost to the Owner, including any costs added to other trades due to the deviation.

G. Equipment, material or devices submitted for review as an “equivalent” shall meet the following requirements:
   1. The equivalent shall have the same construction features such as, but not limited to:
      a. Material thickness, gauge, weight, density, etc.
      b. Welded, riveted, bolted, etc., construction
      c. Finish, undercoating, corrosion protection
   2. The equivalent shall perform with the same or better operating efficiency.
   3. The equivalent shall be locally represented by the manufacturer for service, parts and technical information.
   4. The equivalent shall bear the same labels of performance certification as is applicable to the specified item, such as UL or NEMA labels.

H. Equipment, material or devices submitted for review as a "substitution" shall meet the following requirements:

1. Substitution Request Submittal: Requests for substitution will be considered if received in writing 14 days before the bid date. Requests received later than 14 days before the bid date may be considered or rejected at the discretion of the Engineer/Owner. Once the Contractor submits a complete request for substitution as determined by the engineer, the engineer reserves the right to request the time necessary to evaluate the request for substitution and review it with the Owner.
2. Submit three (3) copies of each request for substitution for consideration.
3. Identify the product, or the fabrication or installation method to be replaced in each request. Include related Specification Section and Drawing numbers. Provide complete documentation showing compliance with the requirements for substitutions, and the following information, as appropriate:
    a. Product Data, including Drawings and descriptions of products, fabrication and installation procedures.
    b. Samples, where applicable or requested.
    c. A detailed comparison of significant qualities of the proposed substitution with those of the Work specified. Significant qualities may include elements such as size, weight, durability, performance and visual effect.
    d. Coordination information, including a list of changes or modifications needed to other parts of the Work and to construction performed by the Owner and separate Contractors, that will become necessary to accommodate the proposed substitution.
    e. A statement indicating the substitution's effect on the Contractor's Construction Schedule compared to the schedule without approval of the substitution. Indicate the effect of the proposed substitution on overall Contract Time.
    f. Cost information, including a proposal of the net change, if any in the Contract Sum.
    g. Certification by the Contractor that the substitution proposed is equal-to or better in every significant respect to that required by the Contract Documents, and that it will perform adequately in the application indicated. Include the Contractor's waiver of rights to additional payment or time, that may subsequently become necessary because of the failure of the substitution to perform adequately.
    h. Engineer's Action: Within one week of receipt of the request for substitution, the Engineer will notify the Contractor of acceptance or rejection of the proposed substitution. If a decision on use of a proposed substitute cannot be made or obtained within the time allocated, use the product specified by name. Acceptance of a product substitution will be in the form of an Addendum.

i. Other Conditions: The Contractor's substitution request will be received and considered by the Engineer when one or more of the following conditions are satisfied, as determined by the Engineer; otherwise requests will be returned without action except to record noncompliance with these requirements.
   1) The request is directly related to an "or equal" clause or similar language in the Contract Documents.
   2) The specified product or method of construction cannot be provided within the Contract Time. The request will not be considered if the product or method cannot be provided as a result of failure to pursue the Work promptly or coordinate activities properly.
   3) A substantial advantage is offered the Owner, in terms of cost, time, energy conservation or other considerations of merit, after deducting offsetting responsibilities the Owner may be required to bear. Additional responsibilities for the Owner may include additional compensation to the Engineer for redesign and evaluation services, increased cost of other construction by the Owner or separate Contractors, and similar considerations.

1.11 SUBMITTAL PROCEDURES

A. Provide Submittals in accordance with the requirements of Division 1 and as indicated in the following.

B. Coordination: Coordinate preparation and processing of submittals with performance of construction activities. Transmit each submittal sufficiently in advance of performance of related construction activities to avoid delay.
   1. Coordinate each submittal with fabrication, purchasing, testing, delivery, other submittals and related activities that require sequential activity.
   2. Coordinate transmittal of different types of submittals for related elements of the Work so processing will not be delayed by the need to review submittals concurrently for coordination. The Engineer reserves the right to withhold action on a submittal requiring coordination with other submittals until related submittals are received.

C. Processing: Allow sufficient review time so that installation will not be delayed as a result of the time required to process submittals, including time for resubmittals.
   1. Allow two weeks for initial review. Allow additional time if processing must be delayed to permit coordination with subsequent submittals. The Engineer will promptly advise the Contractor when a submittal being processed must be delayed for coordination.
   2. If an intermediate submittal is necessary, process the same as the initial submittal.
   3. Allow two weeks for reprocessing each submittal.
   4. No extension of Contract Time will be authorized because of failure to transmit submittals to the Engineer sufficiently in advance of the Work to permit processing.

D. Submittal Preparation: Place a permanent label or title block on each submittal for identification. Indicate the name of the entity that prepared each submittal on the label or title block. Submittals shall be arranged in order of specification sections.

1. Include the following information on the label for processing and recording action taken.
   a. Project name.
   b. Date.
   c. Name and address of Engineer.
   d. Name and address of Contractor.
   e. Name and address of subcontractor.
   f. Name and address of supplier.
   g. Name of manufacturer.
   h. Number, title and paragraph of appropriate Specification Section.
   i. Drawing number and detail references, as appropriate.

E. Submittal Transmittal: Package each submittal appropriately for transmittal and handling. Transmit each submittal from Contractor to Engineer using a transmittal form. Submittals received from sources other than the Contractor will be returned without action. On the transmittal, record relevant information and requests for data. On the form, or separate sheet, record deviations from Contract Document requirements, including minor variations and limitations. Include Contractor's certification that information complies with Contract Document requirements.

F. Except for submittals for record, information or similar purposes, the Engineer will review each submittal, mark to indicate action taken, and return promptly. Compliance with specified characteristics is the Contractor's responsibility.

G. Action Stamp: The Engineer will stamp each submittal with a uniform, self-explanatory action stamp. The stamp will be appropriately marked, to indicate the action taken.

1.12 SHOP DRAWINGS

A. Submit neatly prepared information, drawn to accurate scale. Highlight, encircle, or otherwise indicate deviations from the Contract Documents. Do not reproduce Contract Documents or copy standard information as the basis of Shop Drawings. Standard information prepared without specific reference to the Project is not considered Shop Drawings.

B. The Contractor shall submit for review detailed shop drawings of all equipment and material specified in each section and coordinated ductwork layouts. No material or equipment may be delivered to the job site or installed until the Contractor has received shop drawings for the particular material or equipment which have been properly reviewed. Shop drawings shall be submitted within 60 days after award of Contract before any material or equipment is purchased. The Contractor shall submit for review copies of all shop drawings to be incorporated in the Mechanical Contract. Refer to Division 1 for the quantity of copies required for submission. Where quantities are not specified, provide seven (7) copies for review.

C. Provide shop drawings for all devices specified under equipment specifications for all systems. Shop drawings shall include manufacturers' names, catalog numbers, cuts, diagrams, dimensions, identification of products and materials included, compliance with specified standards, notation of coordination requirements, notation of dimensions established by field measurement and other such descriptive data as may be required to identify and accept the equipment. A complete list in each category (example: all fixtures), of all shop drawings, catalog cuts, material lists, etc., shall be submitted to the Engineer at one time. No consideration will be given to a partial shop drawing submittal.

D. When a submittal could involve more than one trade, e.g., valves, piping, etc., the submitted shall be separated by traded involved, ie. HVAC, plumbing, fire protection, etc.

E. Where multiple quantities or types of equipment are being submitted, provide a cover sheet (with a list of contents) on the submittal identifying the equipment or material being submitted.

F. The Contractor shall furnish all necessary templates, patterns, etc., for installation work and for the purpose of making adjoining work conform; furnish setting plans and shop details to other trades as required.

G. "No Exception Taken" rendered on shop drawings shall not be considered as a guarantee of measurements or building conditions. Where drawings are reviewed, review does not mean that drawings have been checked in detail; said approval does not in any way relieve the Contractor from his responsibility or necessity of furnishing material or performing work as required by the Contract Drawings and Specifications. Verify available space prior to submitting shop drawings. Review of shop drawings shall not apply to quantity of material.

H. After shop drawings have been reviewed, with no exceptions taken, no further changes will be allowed without the written consent of the Engineer.

I. Shop drawing submittal sheets which may show items that are not being furnished shall have those items crossed off to clearly indicate which items will be furnished.

J. Bidders shall not rely on any verbal clarification of the Drawings and/or Specifications. Any questions shall be referred to the Engineer in writing at least five (5) working days prior to Bidding to allow for issuance of an Addendum.

K. Do not use Shop Drawings without an appropriate final stamp indicating action taken in connection with construction.

1.13 COORDINATION DRAWINGS

A. Prepare coordination drawings drawn in the latest AutoCAD version in accordance with Division 1 to a minimum scale of 1/4"=1'-0" detailing major elements, components, and systems of mechanical equipment and materials in relationship with other systems, installations, and building components. Indicate locations where space is limited for installation and access and where sequencing and coordination of installations are of importance to the efficient flow of the Work, including (but not necessarily limited to) the following:

1. The Contractor shall indicate the proposed locations of piping, conduit, ductwork, equipment, and materials. Include the following:
    a. Clearances for servicing and maintaining equipment, including tube removal, filter removal, and space for equipment disassembly required for periodic maintenance.
    b. Equipment connections and support details.
    c. Exterior wall and foundation penetrations.
    d. Fire-rated wall and floor penetrations.
    e. Sizes and locations of required concrete pads and bases.

B. Indicate scheduling, sequencing, movement, and positioning of large equipment into the building during construction.

C. Prepare floor plans, elevations, and details to indicate penetrations in floors, walls, and ceilings and their relationship to other penetrations and installations.

D. Prepare reflected ceiling plans to coordinate and integrate installations, air outlets and inlets, light fixtures, communication systems components, sprinklers, and other ceiling-mounted items.

E. The Contractor and each subcontractor shall sign and date each coordination drawing prior to submission.

F. Work shall not be performed until coordination drawings have been approved by the architect and engineer.

G. Electronic copies of the MEP floor plans are available to use as a basis for preparing coordination drawings and can be provided by the Engineer. The cost for these floor plans is a lump sum fee of $ 500.00. If the Contractor elects to obtain the Engineers electronic files a Electronic Drawing File Release Form must be submitted with payment. This form must be signed by the Contractor, Owner, and Architect. Upon receipt of a signed copy of the Electronic Drawing File Release Form, and payment, the Engineer will provide copies of the electronic files for the Contractor’s use. A copy of the Electronic Drawing File Release Form is appended to the end of this specification section

1.14 COORDINATION WITH OTHER DIVISIONS

A. All work shall be carried out in conjunction with other trades and full cooperation shall be given in order that all work may proceed with a minimum of delay and interference. Particular emphasis is placed on timely installation of major apparatus and furnishing other Contractors, especially the Contractor or Construction Manager, with information as to openings, chases, sleeves, bases, inserts, equipment locations, panels, etc., required by other trades.

B. The Contractors are required to examine all of the Project Drawings and mutually arrange work so as to avoid interference with the work of other trades. In general, ductwork, HVAC piping, sprinkler piping and drainage lines take precedence over water, gas and electrical conduits. The Engineer shall make final decisions regarding the arrangement of work which cannot be agreed upon by the Contractors.

C. Where the work of the Contractor will be installed in close proximity to or will interfere with work of other trades, the Contractors will cooperate in working out space conditions to make a satisfactory adjustment.

D. If the work under a Section is installed before coordinating with other Divisions or Sections or so as to cause interference with work of other Sections, the necessary changes to correct the condition shall be made by the Contractor causing the interference without extra charge to the Owner.

1.15 WORKMANSHIP

A. Service Support: The equipment items shall be supported by service organizations which are reasonably convenient to the equipment installation in order to render satisfactory service to the equipment on a regular and emergency basis during the warranty period of the contract.

B. Modification of References: In each of the publications referred to herein, consider the advisory provisions to be mandatory, as though the word, "shall" had been substituted for "should" wherever it appears.

C. The Contractor shall furnish the services of an experienced superintendent who shall be constantly in charge of the installation of the work together with all skilled workmen, fitters, metal workers, welders, helpers and laborers required to unload, transfer, erect, connect, adjust, start, operate and test each system.

D. Unless otherwise specifically indicated on the Drawings or Specifications, all equipment and materials shall be installed with the acceptance of the Engineer and in accordance with the recommendations of the manufacturer. This includes the performance of such tests as the manufacturer recommends.

E. All labor for installation of plumbing systems shall be performed by experienced, skilled tradesmen under the supervision of a licensed journeyman foreman. All work shall be of a quality consistent with good trade practice and shall be installed in a neat, workmanlike manner. The Engineer reserves the right to reject any work which, in his opinion, has been installed in a substandard, dangerous or unserviceable manner. The Contractor shall replace said work in a satisfactory manner at no extra cost to the Owner.

1.16 SHUTDOWNS

A. When installation of a new system requires the temporary shutdown of an existing operating system, the connection of the new system shall be performed at such time as designated by the Owner.

B. The Engineer and the Owner shall be notified in writing of the estimated duration of the shutdown period at least ten (10) days in advance of the date the work is to be performed.

C. Work shall be arranged for continuous performance whenever possible. The Contractor shall provide all necessary labor, including overtime if required, to assure that existing operating services will be shut down only during the time actually required to make necessary connections.

1.17 TEMPORARY UTILITIES

A. General: Provide new materials and equipment; if acceptable to the Engineer, undamaged previously used materials in serviceable condition may be used. Provide materials suitable for the use intended.

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. First Aid Supplies: Comply with governing regulations.

D. 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.

E. Utilities: Engage the appropriate local utility company to install temporary service or connect to existing service. Where the company provides only part of the service, provide the remainder with matching, compatible materials and equipment; comply with the company's recommendations.

1. Use Charges: Cost or use charges for temporary facilities are not chargeable to the Owner or Engineer, and will not be accepted as a basis of claims for a Change Order.

F. Water Service: Install water service and distribution piping of sizes and pressures adequate for construction until permanent water service is in use.

G. Temporary Heat-Cool-Dehumidification: Provide temporary services required by construction activities, for curing or drying of completed installations or protection of installed construction from adverse effects of low temperatures or high humidity. Select safe equipment that will not have a harmful effect on completed installations or elements being installed. Coordinate temporary services to produce the ambient condition required and minimize consumption of energy. The building's permanent HVAC systems shall not be used for these purposes.

H. Environmental Protection: Provide protection, operate temporary facilities and conduct construction in ways and by methods that comply with environmental regulations, and minimize the possibility that air, waterways and subsoil might be contaminated or polluted, or that other undesirable effects might result. Avoid use of tools and equipment which produce harmful noise. Restrict use of noise making tools and equipment to hours that will minimize complaints from persons or firms near the site.

I. Termination and Removal: Unless the Engineer requires 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. Materials and facilities that constitute temporary facilities are property of the Contractor. The Owner reserves the right to take possession of Project identification signs.

1.18 PROJECT PHASING

A. Work under each Section shall include all necessary temporary connections, equipment, piping, heating, temperature control work, fire stopping, water heaters, labor, and material as necessary to accommodate the phasing of Construction as developed by the General Contractor or Construction Manager and approved by the Owner. All existing systems that pass-thru an area of the building shall remain operational during all phases of construction. No extra compensation shall be granted the Contractor for work required to maintain existing systems operational or to accommodate the construction phasing of the project.

1.19 PROTECTION OF MATERIALS AND EQUIPMENT

A. Work under each Section shall include protecting the work and material of all other Sections from damage by work or workmen and shall include making good all damage thus caused.

B. The Contractor shall be responsible for work and equipment until the facility has been accepted by the Owner. Protect work against theft, injury or damage and carefully store material and equipment received on site which is not immediately installed. Close open ends of work with temporary covers or plugs during construction to prevent entry of foreign material.

C. Work under each Section includes receiving, unloading, uncrating, storing, protecting, setting in place and completely connecting equipment supplied under each Section. Work under each Section shall also include exercising special care in handling and protecting equipment and fixtures, and shall include the cost of replacing any of the equipment and fixtures which are missing or damaged.

D. Equipment and material stored on the job site shall be protected from the weather, vehicles, dirt and/or damage by workmen or machinery. Insure that all electrical or absorbent equipment or material is protected from moisture during storage.

1.20 ADJUSTING AND TESTING

A. After all the equipment and accessories to be furnished are in place, they shall be put in final adjustment and subjected to such operating tests so as to assure the Engineer that they are in proper adjustment and in satisfactory, permanent operating condition.

B. Where requested by the Engineer, a factory-trained service representative shall inspect the installation and assist in the initial startup and adjustment to the equipment. The period of these services shall be for such time as necessary to secure proper installation and adjustments. After the equipment is placed in permanent operation, the service representative shall supervise the initial operation of the equipment and instruct personnel responsible for operation and maintenance of the equipment. The service representative shall notify the Contractor in writing, that the equipment was installed according to manufacturers recommendations and is operating as intended by the manufacturer.

1.21 CLEANING

A. The Contractor shall thoroughly clean and flush all piping and equipment of all foreign substances, oils, burrs, solder, flux, etc., inside and out before being placed in operation.

B. If any part of a system should be stopped or damaged by any foreign matter after being placed in operation, the system shall be disconnected, cleaned and reconnected wherever necessary to locate and/or remove obstructions. Any work damaged in the course of removing obstructions shall be repaired or replaced when the system is reconnected at no additional cost to the Owner.

C. During the course of construction, all ducts and pipes shall be capped in an acceptable manner to insure adequate protection against the entrance of foreign matter.

D. Upon completion of all work under the Contract, the Contractor shall remove from the premises all rubbish, debris and excess materials left over from his work. Any oil or grease stains on floor areas caused by the Contractor shall be removed and floor areas left clean.

E. Complete the following cleaning operations before requesting inspection for Certification of Substantial Completion.
1. Remove labels that are not permanent labels.

2. Clean transparent materials, including mirrors and glass in doors and windows. Remove glazing compound and other substances that are noticeable vision-obscuring materials. Replace chipped or broken glass and other damaged transparent materials.
3. Clean exposed exterior and interior hard-surfaced finishes to a dust-free condition, free of stains, films and similar foreign substances. Restore reflective surfaces to their original reflective condition. Leave concrete floors broom clean. Vacuum carpeted surfaces.
4. Wipe surfaces of mechanical and electrical equipment. Remove excess lubrication and other substances. Clean plumbing fixtures to a sanitary condition. Clean light fixtures and lamps.

F. Comply with regulations of authorities having jurisdiction and safety standards for cleaning. Do not burn waste materials. Do not bury debris or excess materials on the Owner's property. Do not discharge volatile, harmful or dangerous materials into drainage systems. Remove and dispose of ALL waste materials, packaging material, skids etc. from the site and dispose of in a lawful manner in accordance with municipal, state and federal regulations.

G. Where extra materials of value remaining after completion of associated Work have become the Owner's property, arrange for disposition of these materials as directed.

1.22 OPERATING AND MAINTENANCE

A. Upon completion of all work and tests, the Contractor shall furnish the necessary skilled labor and helpers for operating his system and equipment for a period specified under each applicable Section of this Division. During this period, he shall fully instruct the Owner or the Owner’s representative in the operation, adjustment and maintenance of all equipment furnished. The Contractor shall give at least seven (7) days notice to the Owner and the Engineer in advance of this period.

B. The Contractor shall include the maintenance schedule for the principal items of equipment furnished under this Division.

C. The Contractor shall physically demonstrate procedures for all routine maintenance of all equipment furnished under each respective Section to assure accessibility to all devices.

D. An authorized manufacturer’s representative shall attest in writing that the equipment has been properly installed prior to startup of any major equipment. The following equipment will require this inspection: pumps; controls, water heaters, compressors, boilers etc. These letters shall be bound into the operating and maintenance books.

E. Refer to individual trade Sections for any other particular requirements related to operating instructions.

F. Demonstration shall be recorded on VHS audio/video tape with two (2) tapes turned over to the Owner.

1.23 OPERATING AND MAINTENANCE MANUALS

A. Prepare operating and maintenance manuals in accordance with the requirements of Division 1 and as follows. The Contractor shall prepare six (6) copies of a complete maintenance and operating instructions manual, bound in booklet form. Organize operating and maintenance data into suitable sets of manageable size. Bind properly indexed data in individual heavy-duty 3-ring vinyl-covered binders, with pocket folders for folded sheet information and designation partitions with identification tabs. Mark appropriate identification on front and spine of each binder.

B. Manual shall include the following:
1. Description of function, normal operating characteristics and limitations, performance curves, engineering data and tests, and complete nomenclature and commercial numbers of replacement parts.
2. Manufacturer's printed operating procedures to include start-up, break-in, and routine and normal operating instructions; regulation, control, stopping, shutdown, and emergency instructions; and summer and winter operating instructions.
3. Maintenance procedures for routine preventative maintenance and troubleshooting; disassembly, repair, and reassembly; aligning and adjusting instructions.
4. Servicing and operating instructions including lubrication charts and schedules.
5. Emergency and safety instructions.
6. Spare parts list.
7. Copies of warranties.
8. Wiring diagrams.
9. Recommended "turn around" cycles.
10. Inspection procedures.
11. Approved Shop Drawings and Product Data.
12. Equipment Start-up Reports.
13. Temperature control diagrams and written sequences of operations.
14. Balance reports.

C. Include in the manual, a tabulated equipment schedule for all equipment. Schedule shall include pertinent data such as: make, model number, serial number, voltage, normal operating current, belt size, filter quantities and sizes, bearing number, etc. Schedule shall include maintenance to be done and frequency.

D. Maintenance and instruction manuals shall be submitted to the Owner at the same time as the seven (7) day notice is given prior to the instruction period.

1.24 ACCEPTANCES

A. The equipment, materials, workmanship, design and arrangement of all work installed under the Plumbing Sections shall be subject to the review of the Engineer.

B. Within 30 days after the awarding of a Contract, the Plumbing Contractor shall submit to the Engineer, for review, a list of manufacturers of equipment proposed for the work under the Plumbing Sections. The intent to use the exact manufacturers and models specified does not relieve the Contractor of the responsibility of submitting such a list.

C. If extensive or unacceptable delivery time is expected on a particular item of equipment specified, the Contractor shall notify the Owner and Engineer, in writing, within 30 days of award of the Contract. In such instances, equipment substitutions may be made pending acceptance by the Engineer or the Owner's representative.

D. Where any specific material, process or method of construction or manufactured article is specified by reference to the catalog number of a manufacturer, the Specifications are to be used as a guide and are not intended to take precedence over the basic duty and performance specified or noted on the Drawings. In all cases, the Plumbing Contractor shall verify the duty specified with the specific characteristics of the equipment offered for review. Equipment characteristics are to be used as mandatory requirements where the Contractor proposes to use an acceptable equivalent.

E. If material or equipment is installed before it is reviewed and/or approved, the Contractor shall be liable for its removal and replacement at no extra charge to the Owner if, in the opinion of the Engineer, the material or equipment does not meet the intent of, or standard of quality implied by, the Drawings and Specifications.

F. Failure on the part of the Engineer to reject shop drawings or to reject work in progress shall not be interpreted as acceptance of work not in conformance with the Drawings and/or Specifications. Work not in conformance with the Drawings and/or Specifications shall be corrected whenever it is discovered.

1.25 RECORD DRAWINGS

A. General: Do not use record documents for construction purposes; protect from deterioration and loss in a secure, fire-resistive location; provide access to record documents for the Engineer's reference during normal working hours.

B. Maintain a clean, undamaged set of blue or black line white-prints of Contract Drawings and Shop Drawings. Mark the set to show the actual installation where the installation varies substantially from the Work as originally shown. Mark whichever drawing is most capable of showing conditions fully and accurately. Give particular attention to concealed elements that would be difficult to measure and record at a later date. Items to be indicated include but are not limited to:

1. Dimensional change
2. Revision to drawing detail
3. Location and depth of underground utility
4. Revision to pipe routing
5. Revision to electrical circuitry
6. Actual equipment location
7. Pipe size and routing
8. Location of concealed internal utility

9. Changes made by Change Order
10. Details not on original Contract Drawing
11. Information on concealed elements which would be difficult to identify or measure later

C. Mark record sets with red erasable pencil; use other colors to distinguish between variations in separate categories of the Work.

D. Mark new information that is important to the Owner, but was not shown on Contract Drawings or Shop Drawings.

E. Note related Change Order numbers where applicable.

F. Organize record drawing sheets into manageable sets, bind with durable paper cover sheets, and print suitable titles, dates and other identification on the cover of each set.

G. These shall be clearly marked for Record Drawings on a clean set of reproducible mylar sepias at the completion of the work and turned over to the Owner.

H. Final record documents shall be prepared in the latest AutoCad version and CD Rom of all drawings and a clean set of reproducible mylar sepias shall be turned over to the Owner at the completion of the work.

1.26 WARRANTIES AND BONDS

A. The following general administrative and procedural requirements for warranties and bonds required by the Contract Documents, including manufacturers standard warranties on products and special warranties are to be included:
1. General close-out requirements included in Division 1.
2. Specific requirements for warranties for the Work and products and installation that are specified to be warranted, are included in the individual Sections of Divisions-2 through -50.
3. Certifications and other commitments and agreements for continuing services to Owner are specified elsewhere in the Contract Documents.

B. Disclaimers and Limitations: Manufacturer's disclaimers and limitations on product warranties do not relieve the Contractor of the warranty on the Work that incorporates the products, nor does it relieve suppliers, manufacturers, and subcontractors required to countersign special warranties with the Contractor.

C. Separate Prime Contracts: Each prime Contractor is responsible for warranties related to its own Contract.

1.27 WARRANTY REQUIREMENTS

A. Related Damages and Losses: When correcting warranted Work that has failed, remove and replace other Work that has been damaged as a result of such failure or that must be removed and replaced to provide access for correction of warranted Work.

B. Reinstatement of Warranty: When Work covered by a warranty has failed and been corrected by replacement or rebuilding, reinstate the warranty by written endorsement. The reinstated warranty shall be equal to the original warranty with an equitable adjustment for depreciation.

C. Replacement Cost: Upon determination that Work covered by a warranty has failed, replace or rebuild the Work to an acceptable condition complying with requirements of Contract Documents. The Contractor is responsible for the cost of replacing or rebuilding defective Work regardless of whether the Owner has benefited from use of the Work through a portion of its anticipated useful service life.

D. Owner's Recourse: Written warranties made to the Owner are in addition to implied warranties, and shall not limit the duties, obligations, right and remedies otherwise available under the law, nor shall warranty periods be interpreted as limitations on time in which the Owner can enforce such other duties, obligations, rights, or remedies.

E. Rejection of Warranties: The Owner reserves the right to reject warranties and to limit selections to products with warranties not in conflict with requirements of the Contract Documents.

F. The Owner reserves the right to refuse to accept Work for the Project where a special warranty, certification, or similar commitment is required on such Work or part of the Work, until evidence is presented that entities required to countersign such commitments are willing to do so.

G. Submit written warranties to the Engineer prior to the date certified for Substantial Completion. If the Engineer's Certificate of Substantial Completion designates a commencement date for warranties other than the date of Substantial Completion for the Work, or a designated portion of the Work, submit written warranties upon request of the Engineer.

H. When a designated portion of the Work is completed and occupied or used by the Owner, by separate agreement with the Contractor during the construction period, submit properly executed warranties to the Engineer within fifteen days of completion of that designated portion of the Work.

I. When a special warranty is required to be executed by the Contractor, or the Contractor and a subcontractor, supplier or manufacturer, prepare a written document that contains appropriate terms and identification, ready for execution by the required parties. Submit a draft to the Owner through the Engineer for approval prior to final execution.
   1. Refer to individual Sections of Divisions-2 through -16 for specific content requirements, and particular requirements for submittal of special warranties.

J. Form of Submittal: At Final Completion compile two copies of each required warranty and bond properly executed by the Contractor, or by the Contractor, subcontractor, supplier, or manufacturer. Organize the warranty documents into an orderly sequence based on the table of contents of the Project Manual.

K. Bind warranties and bonds in heavy-duty, commercial quality, durable 3-ring vinyl covered loose-leaf binders, thickness as necessary to accommodate contents, and sized to receive 8-1/2" by 11" paper.
   1. Provide heavy paper dividers with celluloid covered tabs for each separate warranty. Mark the 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 the installer.
   2. Identify each binder on the front and the spine with the typed or printed title "WARRANTIES AND BONDS," the Project title or name, and the name of the Contractor.
   3. When operating and maintenance manuals are required for warranted construction, provide additional copies of each required warranty, as necessary, for inclusion in each required manual.

1.28 GUARANTEES

A. The Contractor shall guarantee all material and workmanship under these Specifications and the Contract for a period of one (1) year from the date of final acceptance by Owner. During this guarantee period, all defects developing through faulty equipment, materials or workmanship shall be corrected or replaced immediately by this Contractor without expense to the Owner. Such repairs or replacements shall be made to the Engineer's satisfaction.

B. Contractor shall provide name, address, and phone number of all contractors and subcontractors and associated equipment they provided.

1.29 PROJECT CLOSE-OUT

A. Submit specific warranties, workmanship bonds, maintenance agreements, final certifications and similar documents in accordance with Division 1.

B. Deliver tools, spare parts, extra stock, and similar items.

C. Complete start-up testing of systems, including measuring and documenting all required startup checklist requirements documented in installation and maintenance instructions by the equipment manufacturer, and instruction of the Owner's operating and maintenance personnel. Discontinue or change over and remove temporary facilities from the site, along with construction tools, mock-ups, and similar elements.

D. Complete final clean up requirements, including touch-up painting. Touch-up and otherwise repair and restore marred exposed finishes.

E. Field Observation Procedures: On receipt of a request for an Engineers Field Observation, the Engineer will advise the Contractor of unfulfilled requirements. The Engineer will advise the Contractor of construction that must be completed or corrected before the certificate will be issued.

1. The Engineer will repeat the Field Observation when requested and assured that the Work has been substantially completed.
2. Results of the completed list of unfulfilled items will form the basis of requirements for final acceptance.

END OF SECTION 22 04 00

Electronic Drawing File Release Form

DELIVERY OF ELECTRONIC FILES FOR: _____
Project Name

In accepting and utilizing any drawings or other data on any form of electronic media generated and provided by the Design Professional, the Client covenants and agrees that all such drawings and data are instruments of service of the Design Professional, who shall be deemed the author of the drawings and data, and shall retain all common law, statutory law and other rights, including copyrights.

The Client further agrees not to use these drawings and data, in whole or in part, for any purpose or project other than the project which is the subject of this Agreement. The Client agrees to waive all claims against the Design Professional resulting in any way from any unauthorized changes or reuse of the drawings and data for any other project by anyone other than the Design Professional.

In addition, the Client agrees, to the fullest extent permitted by law, to indemnify and hold the Design Professional harmless from any damage, liability or cost, including reasonable attorneys' fees and costs of defense, arising from any changes made by anyone other than the Design Professional or from any reuse of the drawings and data without the prior written consent of the Design Professional.

Under no circumstances shall transfer of the drawings and other instruments of service on electronic media for use by the Client be deemed a sale by the Design Professional, and the Design Professional makes no warranties, either express or implied, of merchantability and fitness for any particular purpose.

_____ _____
Client's Signature Date

_____
Company - Title

_____ _____
Architects' Signature Date

_____
Firm - Title

_____ _____
Owner's Signature Date

_____
Company - Title

SECTION 22 05 00 - COMMON WORK RESULTS FOR PLUMBING

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. Identification for Plumbing Piping and Equipment.
2. Sleeves.
3. Mechanical sleeve seals.
4. Formed steel channel.

1.3 SUBMITTALS

A. Shop Drawings: Submit for piping and equipment identification list of wording, symbols, letter size, and color coding for pipe identification and valve chart and schedule, including valve tag number, location, function, and valve manufacturer's name and model number.

B. Product Data for Pipe and Equipment Identification: Submit for mechanical identification manufacturers catalog literature for each product required.

1.4 QUALITY ASSURANCE

A. Maintain one copy of each document on site.

PART 2 PRODUCTS

2.1 IDENTIFICATION FOR PLUMBING PIPING AND EQUIPMENT

A. Plastic Nameplates: Laminated three-layer plastic with engraved black letters on light background color.

B. Plastic Tags: Laminated three-layer plastic with engraved black letters on light background color, minimum 1-1/2 inches diameter.

C. Plastic Pipe Markers: Factory fabricated, flexible, semi-rigid plastic, preformed to fit around pipe or pipe covering. Larger sizes may have maximum sheet size with spring fastener. Color and Lettering: Conform to ASME A13.1.

D. Plastic Tape Pipe Markers: Flexible, vinyl film tape with pressure sensitive adhesive backing and printed markings. Color and Lettering: Conform to ASME A13.1.

E. Plastic Underground Pipe Markers: Bright colored continuously printed plastic ribbon tape, minimum 6 inches wide by 4 mil thick, manufactured for direct burial service.

2.2 SLEEVES

A. Sleeves for Pipes Through Non-fire Rated Floors: 18 gage thick galvanized steel.

B. Sleeves for Pipes Through Non-fire Rated Beams, Walls, Footings, and Potentially Wet Floors: Steel pipe or 18 gage thick galvanized steel.

C. Sealant: Acrylic

2.3 MECHANICAL SLEEVE SEALS

A. Manufacturers:
1. Thunderline Link-Seal, Inc.

B. Product Description: Modular mechanical type, consisting of interlocking synthetic rubber links shaped to continuously fill annular space between object and sleeve, connected with bolts and pressure plates causing rubber sealing elements to expand when tightened, providing watertight seal and electrical insulation.

2.4 FORMED STEEL CHANNEL

A. Manufacturers:
1. Allied Tube & Conduit Corp.
2. B-Line Systems
3. Unistrut Corp.

B. Product Description: Galvanized 12 gage) thick steel. With holes 1-1/2 inches on center.

PART 3 EXECUTION

3.1 EXAMINATION

A. Verify openings are ready to receive sleeves.

3.2 INSTALLATION - PIPING AND EQUIPMENT IDENTIFICATION

A. Install plastic nameplates with adhesive.

B. Install plastic tags with corrosion resistant metal chain.

3.3 INSTALLATION - SLEEVES

A. Exterior watertight entries: Seal with mechanical sleeve seals.

B. Set sleeves in position in forms. Provide reinforcing around sleeves.

C. Size sleeves large enough to allow for movement due to expansion and contraction. Provide for continuous insulation wrapping.

D. Extend sleeves through floors 1 inch above finished floor level. Caulk sleeves.

E. Where piping or ductwork penetrates floor, ceiling, or wall, close off space between pipe or duct and adjacent work with firestopping insulation and caulk airtight. Provide close fitting metal collar or escutcheon covers at both sides of penetration.

F. Install chrome plated steel escutcheons at finished surfaces.

END OF SECTION 22 05 00

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SECTION 22 05 03 - PIPES AND TUBES FOR PLUMBING PIPING AND 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: Pipe and pipe fittings for the following systems:
1. Domestic water piping, within 5 feet of building.
2. Equipment drains and over flows.
3. Unions and flanges.
4. Underground pipe markers.
5. Bedding and cover materials.

B. Related Sections:
1. Section 22 04 00 – General Conditions for Plumbing Trades
2. Section 22 05 00 – Common Work Results for Plumbing.
3. Section 22 05 23 - General-Duty Valves for Plumbing Piping: Product requirements for valves for placement by this section.

1.3 REFERENCES

A. American Society of Mechanical Engineers:
1. ASME B16.1 - Cast Iron Pipe Flanges and Flanged Fittings.
2. ASME B16.3 - Malleable Iron Threaded Fittings.
3. ASME B16.4 - Gray Iron Threaded Fittings.
4. ASME B16.18 - Cast Copper Alloy Solder Joint Pressure Fittings.
5. ASME B16.22 - Wrought Copper and Copper Alloy Solder Joint Pressure Fittings.
6. ASME B16.26 - Cast Copper Alloy Fittings for Flared Copper Tubes.

B. ASTM International:
1. ASTM B32 - Standard Specification for Solder Metal.
2. ASTM B42 - Standard Specification for Seamless Copper Pipe, Standard Sizes.
3. ASTM B43 - Standard Specification for Seamless Red Brass Pipe, Standard Sizes.
4. ASTM B75 - Standard Specification for Seamless Copper Tube.
5. ASTM B88 - Standard Specification for Seamless Copper Water Tube.
6. ASTM B251 - Standard Specification for General Requirements for Wrought Seamless Copper and Copper-Alloy Tube.
7. ASTM B280 - Standard Specification for Seamless Copper Tube for Air Conditioning and Refrigeration Field Service.

8. ASTM B302 - Standard Specification for Threadless Copper Pipe, Standard Sizes.
9. ASTM B584 - Standard Specification for Copper Alloy Sand Castings for General Applications.

C. American Welding Society:
1. AWS A5.8 - Specification for Filler Metals for Brazing and Braze Welding.
2. AWS D1.1 - Structural Welding Code - Steel.

D. American Water Works Association:
1. AWWA C151 - American National Standard for Ductile-Iron Pipe, Centrifugally Cast, for Water.
2. AWWA C900 - Polyvinyl Chloride (PVC) Pressure Pipe, 4 in. through 12 in., for Water Distribution.

E. NSF International:
1. NSF 61 - Standard for Drinking Water System Components - Health Effects.

F. Safe Drinking Water Act.
1. SDWA 1417 - Standard for Lead Free Drinking Water.

1.4 SUBMITTALS

A. Section 01 33 00 - Submittal Procedures: Submittal procedures.

B. Shop Drawings: Indicate layout of piping systems, including equipment, critical dimensions, and sizes. Submit shop drawings sealed by registered professional engineer.

C. Product Data: Submit data on pipe materials and fittings. Submit manufacturers catalog information. Clearly indicate on submittal "Lead Free" where required.

1.5 QUALITY ASSURANCE

A. Perform Work in accordance with ASME B31.9 code for installation of piping systems and ASME Section IX for welding materials and procedures.

B. All components of the potable domestic water system shall meet the requirements of SDWA-1417.

C. To assure uniformity and compatibility of piping components in grooved end piping systems, all grooved products utilized shall be supplied by Victaulic or an Engineer Approved Equal. Grooving tools shall be supplied by the same manufacturer as the grooved components

D. Maintain one copy of each document on site.

1.6 QUALIFICATIONS

A. Manufacturer: Company specializing in manufacturing Products specified in this section with minimum three years documented experience.

B. Installer: Company specializing in performing work of this section with minimum three years documented experience.

C. Design piping systems pipe hangers and supports under direct supervision of Professional Engineer experienced in design of this Work and licensed at Project location.

1.7 PRE-INSTALLATION MEETINGS

A. Section 01 30 00 - Administrative Requirements: Pre-installation meeting.

B. Convene minimum one week prior to commencing work of this section.

1.8 DELIVERY, STORAGE, AND HANDLING

A. Section 01 60 00 - Product Requirements: Requirements for transporting, handling, storing, and protecting products.

B. Furnish temporary end caps and closures on piping and fittings. Maintain in place until installation.

C. Protect piping from entry of foreign materials by temporary covers, completing sections of the Work, and isolating parts of completed system.

1.9 ENVIRONMENTAL REQUIREMENTS

A. Section 01 60 00 - Product Requirements: Environmental conditions affecting products on site.

B. Do not install underground piping when bedding is wet or frozen.

1.10 FIELD MEASUREMENTS

A. Verify field measurements prior to fabrication.

1.11 COORDINATION

A. Section 01 30 00 - Administrative Requirements: Requirements for coordination.

B. Coordinate installation of buried piping with trenching.

PART 2 PRODUCTS

2.1 DOMESTIC WATER PIPING, BURIED WITHIN 5 FEET OF BUILDING

A. Copper Tubing: ASTM B88, Type K, L, annealed.
1. Fittings: ASME B16.18, cast copper, or ASME B16.22, wrought copper.
2. Joints: Compression connection or Brazed, AWS A5.8 BCuP silver/phosphorus/copper alloy with melting range 1190 to 1480 degrees F.

2.2 DOMESTIC WATER PIPING, ABOVE GRADE

A. Copper Tubing: ASTM B88, Type L, drawn.
1. Fittings: ASME B16.18, cast bronze, or ASME B16.22, wrought copper and bronze or extruded tee connections conforming to ASTM F2014-00.
2. Joints: ASTM B32, solder, Grade 95TA or extruded tee connections brazed in compliance with the manufacturer's written instructions.
3. Other Acceptable Joining Methods:
a. Victaulic Copper Connection System sizes 2" to 8" with Victaulic style 607 coupling for copper tubing.
1) Grooved Fittings: ASME B16.18, cast bronze, or ASME B16.22, wrought copper, with copper-tubing sized grooved ends. (Flaring of tube or fittings ends to IPS sizes is not permitted.
2) Style 607 coupling with offsetting, angle-pattern bolt pads for direct metal-to-metal bolt pad contact with no torque requirement.
3) Gaskets shall be grade 'EHP' EPDM, UL classified in accordance with ANSI/NSF-61 for potable water service.
b. Press Fitting: Copper and copper alloy press fittings conforming to ASME B16.18 or ASME B16.22. Sealing elements for press fittings shall be EPDM and factory installed. Press ends shall have SC feature design (leakage path) to assure detection and easy identification of leakage of liquids from inside the system past the sealing element of an unpressed connection.

2.3 UNIONS AND FLANGES

A. Unions for Pipe 2 inches and Smaller:
1. Copper Piping: Class 150, bronze unions with soldered.
2. Dielectric Connections: Union or waterways with galvanized or plated steel or copper-silicon casting with threaded end, copper solder end, grooved end, lead free, water impervious isolation barrier.

2.4 UNDERGROUND PIPE MARKERS

A. Manufacturers:
1. Seton
2. Northtown
3. Kolbi
4. Substitutions: Section 01 60 00 - Product Requirements.

B. Plastic Ribbon Tape: Bright colored, continuously printed, minimum 6 inches wide by 4 mil thick, manufactured for direct burial service.

C. Trace Wire: Magnetic detectable conductor, brightly colored plastic covering, imprinted with "Domestic Water" in large letters.

2.5 BEDDING AND COVER MATERIALS

A. Bedding: Fill Type as specified by Division 31.

B. Cover: Fill Type as specified by Division 31.

PART 3 EXECUTION

3.1 EXAMINATION

A. Section 01 30 00 - Administrative Requirements: Verification of existing conditions before starting work.

B. Verify excavations are to required grade, dry, and not over-excavated.

C. Verify trenches are ready to receive piping.

3.2 PREPARATION

A. Ream pipe and tube ends. Remove burrs. Bevel or groove plain end ferrous pipe.

B. Remove scale and dirt on inside and outside before assembly.

C. Prepare piping connections to equipment with flanges or unions.

D. Keep open ends of pipe free from scale and dirt. Protect open ends with temporary plugs or caps.

3.3 INSTALLATION - BURIED PIPING SYSTEMS

A. Establish elevations of buried piping with not less than four ft of cover.

B. Excavate pipe trench in accordance with Division 31.

C. Place bedding material at trench bottom to provide uniform bedding for piping, level bedding materials in one continuous layer not exceeding 4 inches compacted loose depth; compact to 95 percent maximum density.

D. Install pipe on prepared bedding.

E. Route pipe in straight line.

F. Install pipe to allow for expansion and contraction without stressing pipe or joints.

G. Install shutoff and drain valves at locations indicated on Drawings in accordance with Section 22 05 23

H. Install plastic ribbon tape continuous buried 6 inches below finish grade, above pipe line; coordinate with Division 31.

I. Install trace wire continuous buried 6 inches below finish grade, above pipe line; coordinate with Division 31.

J. Pipe Cover and Backfilling:
1. Backfill trench in accordance with Division 31.
2. Maintain optimum moisture content of fill material to attain required compaction density.
3. After hydrostatic test, evenly backfill entire trench width by hand placing backfill material and hand tamping in 6 inches compacted layers to 12 inches minimum cover over top of jacket. Compact to 95 percent maximum density.
4. Evenly and continuously backfill remaining trench depth in uniform layers with backfill material.
5. Do not use wheeled or tracked vehicles for tamping.

3.4 INSTALLATION - ABOVE GROUND PIPING

A. Route piping in orderly manner and maintain gradient. Route parallel and perpendicular to walls.

B. Install piping to maintain headroom without interfering with use of space or taking more space than necessary.

C. Group piping whenever practical at common elevations.

D. Sleeve pipe passing through partitions, walls and floors.

E. Install piping to allow for expansion and contraction without stressing pipe, joints, or connected equipment.

F. Provide clearance in hangers and from structure and other equipment for installation of insulation and access to valves and fittings.

G. Provide access where valves and fittings are not accessible.

H. Install non-conducting dielectric connections wherever jointing dissimilar metals.

I. Slope piping and arrange systems to drain at low points.

J. Protect piping systems from entry of foreign materials by temporary covers, completing sections of the Work, and isolating parts of completed system.

K. Install valves in accordance with Section 22 05 23.

L. Insulate piping.

M. Install pipe identification in accordance with Section 22 05 53.

3.5 INSTALLATION - DOMESTIC WATER PIPING SYSTEMS

A. Install domestic water piping system in accordance with SDWA - 1417.

B. Install domestic water piping system in accordance with ASME B31.9.

3.6 INSTALLATION – PRESS STYLE FITTINGS

A. Press connections: Copper and copper alloy press connections shall be made in accordance with the manufacturer's installation instructions. The tubing shall be fully inserted into the fitting and the tubing marked at the shoulder of the fitting. The fitting alignment shall be checked against the mark on the tubing to assure the tubing is fully engaged (inserted) in the fitting. The joints shall be pressed using the tool(s) recommended by the manufacturer. Contractor shall be trained on the use and installation of the system by manufacturer's representative.

3.7 FIELD QUALITY CONTROL

A. Section 01 40 00 - Quality Requirements 01 70 00 - Execution and Closeout Requirements: Field inspecting, testing, adjusting, and balancing.

B. Test domestic water piping system in accordance with applicable code and local authority having jurisdiction

C. Pressure test to identify un-pressed fittings: Utilizing air or water, the system shall be pressurized, not to exceed 85 psi. If there is a significant drop in pressure, the system shall be walked to check for un-pressed fittings. Should an un-pressed fitting be located, the pressure should be released from the system and the un-pressed fitting shall be pressed. If no un-pressed fitting is identified the system shall be pressurized to test pressures required by code, not to exceed 600 psi.

3.8 CLEANING

A. Section 01 70 00 - Execution and Closeout Requirements: Requirements for cleaning.

B. Clean and disinfect domestic water distribution system in accordance with Division 31.

END OF SECTION 22 05 03

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SECTION 22 05 23 - GENERAL-DUTY VALVES FOR PLUMBING PIPING

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. Ball valves.
2. Butterfly valves.
3. Check valves.
4. Globe.
5. Pressure reducing.
6. Pressure relief.
7. Strainers.

B. Related Sections:
1. Section 22 04 00 – General Conditions for Plumbing Trades
2. Section 22 05 00 – Common Work Results for Plumbing.
3. Section 22 05 03 - Pipes and Tubes for Plumbing Piping and Equipment: Product and installation requirements for piping materials applying to various system types.

1.3 REFERENCES

A. ASTM International:
1. ASTM D1785 - Standard Specification for Rigid Poly (Vinyl Chloride) (PVC) Compounds and Chlorinated Poly (Vinyl Chloride) (CPVC) Compounds.
2. ASTM D4101 - Standard Specification for Propylene Injection and Extrusion Materials.

B. Manufacturers Standardization Society of the Valve and Fittings Industry:
1. MSS SP 67 - Butterfly Valves.
2. MSS SP 70 - Cast Iron Gate Valves, Flanged and Threaded Ends.
3. MSS SP 71 - Cast Iron Swing Check Valves, Flanged and Threaded Ends.
4. MSS SP 78 - Cast Iron Plug Valves, Flanged and Threaded Ends.
5. MSS SP 80 - Bronze Gate, Globe, Angle and Check Valves.
6. MSS SP 110 - Ball Valves Threaded, Socket-Welding, Solder Joint, Grooved and Flared Ends.

C. Safe Drinking Water Act:
1. SDWA 1417 - Reduction of Lead in Drinking Water.

1.4 SUBMITTALS

A. Section 01 33 00 - Submittal Procedures: Requirements for submittals.

B. Product Data: Submit manufacturers catalog information with valve data and ratings for each service.

C. Manufacturer's Installation Instructions: Submit hanging and support methods, joining procedures.

D. Manufacturer's Certificate: Certify products meet or exceed specified requirements.

1.5 CLOSEOUT SUBMITTALS

A. Section 01 70 00 - Execution and Closeout Requirements: Requirements for submittals.

B. Project Record Documents: Record actual locations of valves

C. Operation and Maintenance Data: Submit installation instructions, spare parts lists, exploded assembly views.

1.6 QUALITY ASSURANCE

A. For drinking water service, provide valves complying with NSF 61.

B. All valves installed on the domestic water distribution system shall comply with SDWA 1417. Exception shall be main shut-off valve at domestic water service entrance that is 2-inches or larger.

C. All valve manufacturers shall demonstrate that valve products have been certified per NSF/ANSI Standard 372.

D. All valves installed on the domestic water system shall have labeling of lead content engraved on the valve body.

E. Maintain one copy of each document on site.

F. To assure uniformity and compatibility of piping components in grooved end piping systems, all grooved products utilized shall be supplied by Victaulic or an Engineer Approved Equal

1.7 QUALIFICATIONS

A. Manufacturer: Company specializing in manufacturing Products specified in this section with minimum three years documented experience.

B. Installer: Company specializing in performing work of this section with minimum years documented experience.

1.8 PRE-INSTALLATION MEETINGS

A. Section 01 30 00 - Administrative Requirements: Pre-installation meeting.

B. Convene minimum one week prior to commencing work of this section.

1.9 DELIVERY, STORAGE, AND HANDLING

A. Section 01 60 00 - Product Requirements: Requirements for transporting, handling, storing, and protecting products.

B. Accept valves on site in shipping containers with labeling in place. Inspect for damage.

C. Provide temporary protective coating on cast iron and steel valves.

1.10 ENVIRONMENTAL REQUIREMENTS

A. Section 01 60 00 - Product Requirements: Environmental conditions affecting products on site.

B. Do not install valves underground when bedding is wet or frozen.

1.11 WARRANTY

A. Section 01 70 00 - Execution and Closeout Requirements: Requirements for warranties.

B. Furnish five year manufacturer warranty for valves excluding packing.

1.12 EXTRA MATERIALS

A. Section 01 70 00 - Execution and Closeout Requirements: Requirements for extra materials.

B. Furnish two packing kits for each size valve.

PART 2 PRODUCTS

2.1 BALL VALVES

A. Manufacturers:
   1. Apollo
   2. Milwaukee Valve Co.
   3. NIBCO, Inc.
   4. American Valve Co.
   5. Watts
   6. Substitutions: Section 01 60 00 - Product Requirements

B. 2 inches and Smaller: MSS SP 110, Class 250, bronze, two piece body, lead free, type 316 stainless steel ball, full port, teflon seats, blow-out proof stem, press ends, lever handle, Nibco Model # PC585-66-LF.

2.2 BUTTERFLY VALVES

A. Manufacturers:
1. Victaulic
2. Milwaukee Valve Company
3. NIBCO, Inc.
4. American Valve Co.
5. Watts
6. Substitutions: Section 01 60 00 - Product Requirements.

B. 2-inches and Larger: MSS SP 67, Class 200.
1. Body: Cast bronze, lug ends, stainless steel stem, extended neck.
2. Disc: Aluminum bronze.
3. Seat: Resilient replaceable EPDM or Fluoroelastomer.
4. Handle and Operator: 10 position lever handle. Furnish gear operators for valves 8 inches and larger, and chain-wheel operators for valves mounted over 8 feet above floor.
5. Milwaukee Valve Company Model # ML 233E.

2.3 CHECK VALVES

A. Horizontal Swing Check Valves:
1. Manufacturers:
a. Apollo
b. Milwaukee Valve Co.
c. NIBCO, Inc.
d. American Valve Co.
e. Watts
f. Substitutions: Section 01 60 00 - Product Requirements.

2. 2 inches and Smaller: MSS SP 80, Class 300, bronze body and cap, bronze seat, brass disc, solder ends, Milwaukee Valve Co. Model # 1509.

2.4 GLOBE VALVES

A. Up to and including 2-inch:
1. Bronze body, bronze trim, screwed bonnet, non-asbestos packing, rising stem, handwheel, inside screw, renewable composition disc and bronze seat, Class 125,

2.5 WATER PRESSURE REDUCING VALVES

A. Watts Model 223:
1. Up to 2 Inches (50 mm): Bronze body, stainless steel and thermoplastic internal parts, fabric reinforced diaphragm, threaded ends, with strainer.

2.6 STRAINERS

A. Watts series 77:
1. Size 2 inch (50 mm) and Under: Screwed brass or iron body for 175 psig (1200 kPa) working pressure, Y pattern with 1/32 inch (0.8 mm) stainless steel perforated screen.

PART 3 EXECUTION

3.1 EXAMINATION

A. Section 01 30 00 - Administrative Requirements: Verification of existing conditions before starting work.

B. Verify piping system is ready for valve installation.

3.2 INSTALLATION

A. Install valves with stems upright or horizontal, not inverted.

B. Install brass male adapters each side of valves in copper piped system. Solder adapters to pipe.

C. Install 3/4 inch ball valves with cap for drains at main shut-off valves, low points of piping, bases of vertical risers, and at equipment.

D. Install valves with clearance for installation of insulation and allowing access.

E. Provide access where valves and fittings are not accessible.

END OF SECTION 22 05 23

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SECTION 26 04 00 - GENERAL CONDITIONS FOR ELECTRICAL TRADES

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 RELATED REQUIREMENTS

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

B. This section applies to certain sections of Division 33 “Utilities” and this section applies to all sections of Division 26, "Electrical" of this project specification unless specified otherwise in the individual sections.

C. The Drawings of other trades (Architectural, Structural, Civil, Plumbing, Mechanical, Food Service, Fire Protection, Communications, and Electronic Safety and Security) shall be examined for coordination and familiarity of work with other Contractors. Any duplication or omission of provisions in this project should be brought to the attention of the Owners prior to Bidding.

D. The Drawings of equipment suppliers shall be examined for coordination and familiarity of work with Owner’s equipment suppliers.

1.3 DESCRIPTION

A. The General Conditions and Supplementary General Conditions are a part of this Division and are to be considered a part of this Contract.

B. Where items of the General Conditions and Supplementary General Conditions are repeated in other Sections of the Specifications, it is merely intended to qualify or to call particular attention to them. It is not intended that any other parts of the General Conditions and Supplementary General Conditions shall be assumed to be omitted if not repeated therein. This Section applies equally and specifically to all Contractors supplying labor and/or equipment and/or materials as required under each Section of this Division. Where conflicts exist between the drawings and the specifications or between this section of the specifications and other sections, the more stringent or higher cost option shall apply.

C. It is the intent of this Section of the Specifications to establish a standard of quality and performance characteristics for basic materials and installation methods used in building electrical, communications and electronic safety and security systems.

1.4 INTENT

A. This contract is for all labor, materials and equipment required for installation. The system shall be complete and finished in all respects, tested and ready for operation. Work shall include calibration of equipment with factory settings. All materials, equipment and apparatus shall be new and of first class quality.

B. Any apparatus, appliance, material or work not shown on drawings but mentioned in the specifications, or vice versa, or any incidental accessories necessary to make the work complete and perfect in all respects and ready for operation as determined by good trade practice even if not particularly specified, shall be furnished, delivered and installed under their respective Divisions without any additional expense to the Owner.

C. Minor details not usually shown or specified but necessary for proper installation and operation shall be included in the work as though they were hereinafter shown or specified.

D. Work under each Section shall include giving written notice to the Owner and Engineer of any materials or apparatus believed inadequate or unsuitable; in violation of laws, ordinances, rules or regulations of authorities having jurisdiction; and any necessary items of work omitted. In the absence of such written notice, it is mutually agreed that work under each Section has included the cost of all required items for the accepted, satisfactory functioning of the entire system without extra compensation.

E. Wherever a particular piece of equipment, device or material is specifically indicated on the Drawings by model number, type, series or other means, that specification shall take precedence over equipment or materials specified herein. For example: If a particular switch is specified on the Drawings, its specification takes precedence over switch specified herein.

F. Removal and installation of field light poles, existing/new, shall be supervised by Musco's representative.

1.5 DEFINITIONS

A. Word "Subcontractor" means specifically the subcontractor working under this Division. Other Contractors are specifically designated "Mechanical Subcontractor", "General Contractor" and so on. Note: Take care to ascertain limits of responsibility for connecting equipment which requires connections by two or more trades.

B. Word "install" shall mean set in place complete with all mounting facilities and connections as necessary ready for normal use or service.

C. Words "furnish" or "supply" shall mean purchase, deliver to, and off-load at the job site, all ready to be installed including where appropriate all necessary interim storage and protection.

D. Word "provide" shall mean furnish (or supply) and install as necessary.

E. Word “finished” refers to all rooms and areas scheduled to be painted in Room Finish Schedule on the drawings. All rooms and areas not covered in Schedule, including underground tunnels and areas above ceilings shall be considered not finished, unless otherwise noted.

F. Words “approved equal” mean any product which in the opinion of the Engineer is equal in quality, arrangement, appearance, and performance to the product specified.

G. Word “wiring” shall mean cable assembly, raceway, conductors, fittings and any other necessary accessories to make a complete wiring system. Word “product” shall mean any item of equipment, material, fixture, apparatus, appliance or accessory installed under this Division.

H. Substitutions: Requests for changes in products, materials, equipment, and methods of construction required by Contract Documents proposed by the Contractor after award of the Contract are considered requests for "substitutions."

I. Indicated: The term "indicated" refers to graphic representations, notes, or schedules on the Drawings, other paragraphs or schedules in the Specifications, and similar requirements in the Contract Documents. Where terms such as "shown," "noted," "scheduled," and "specified" are used, it is to help the reader locate the reference; no limitation on location is intended.

J. Directed: Terms such as "directed," "requested," "authorized," "selected," "approved," "required," and "permitted" mean "directed by the Engineer," "requested by the Engineer," and similar phrases.

K. Approve: The term "approved," where used in conjunction with the Engineer's action on the Contractor's submittals, applications, and requests, is limited to the Engineer's duties and responsibilities as stated in General and Supplementary Conditions.

L. Regulation: The term "Regulations" includes laws, ordinances, statutes, and lawful orders issued by authorities having jurisdiction, as well as rules, conventions, and agreements within the construction industry that control performance of the Work.

M. Remove: The term “remove” means “to disconnect from its present position, remove from the premises and to dispose of in a legal manner.”

N. Standard Product Warranties are preprinted written warranties published by individual manufacturers for particular products and are specifically endorsed by the manufacturer to the Owner.

O. Special Warranties are written warranties required by or incorporated in the Contract Documents, either to extend time limits provided by standard warranties or to provide greater rights for the Owner.

1.6 DRAWINGS

A. Drawings are diagrammatic and indicate the general arrangement of systems and work included in the Contract. Consult the Architectural Drawings and Details for exact location of fixtures and equipment; where same are not definitely located, obtain this information from the Architect. (Do not scale the drawings)

B. Work under each Section shall closely follow Drawings in layout of work; check Drawings of other Divisions to verify spaces in which work will be installed. Maintain maximum headroom; where space conditions appear inadequate, Owner and Engineer shall be notified before proceeding with installations.

C. The Owner may, without extra charge, make reasonable modifications in the layout as needed to prevent conflict with work of other trades and/or for proper execution of the work.

D. Where variances occur between the Drawings and Specifications or within either of the Documents, the item or arrangement of better quality shall be included in the Contract price. The Owner and Engineer shall decide on the item and the manner in which the work shall be installed.

1.7 SURVEYS AND MEASUREMENTS

A. Before submitting his Bid, the Contractors shall visit the site and become thoroughly familiar with all existing conditions under which his work will be installed. All new equipment and systems shall be fully operational under this Contract before the job is considered complete. The Contractors shall be held responsible for any assumptions he makes, any omissions or errors he makes as a result of his failure to become fully familiar with the existing conditions at the site and the Contract Documents.

B. The Contractor shall base all measurements, both horizontal and vertical, from established bench marks. All work shall agree with these established lines and levels. Verify all measurements at the site and check the correctness of same as related to the work.

C. Should the Contractor discover any discrepancies between actual measurements and those indicated which prevent following good practice or which interfere with the intent of the Drawings and Specifications, the Engineer will be notified and work will not proceed until instructions from the Engineer are received.

1.8 CODES AND STANDARDS

A. Reference Standard Compliance
   1. Where equipment or materials are specified to conform to industry and technical society reference standards of the organizations such as American National Standards Institute (ANSI), American Society for Testing and Materials (ASTM), National Electrical Manufacturers Association (NEMA), and Underwriters Laboratories Inc. (UL), submit proof of such compliance. The

label or listing by the specified organization will be acceptable evidence of compliance.

2. Independent Testing Organization Certificate: In lieu of the label or listing, indicated above submit a certificate from an independent testing organization, competent to perform testing, and approved by the engineer. The certificate shall state that the item has been tested in accordance with the specified organization's test methods and that the item complies with the specified organization's reference standard.

B. The Following Codes and Standards listed below apply to all electrical work. Wherever Codes and/or Standards are mentioned in these Specifications, the latest applicable edition or revision shall be followed:
Connecticut State Building Code – and Supplement
Connecticut State Fire Safety Code – and Supplement
The International Building Code
The International Mechanical Code
The International Plumbing Code
The BOCA National Code Supplement
The National Electrical Code
NFPA 101 Life Safety Code
The International Energy Conservation Code
ASHRAE 90.1 and International Energy Conservation Code

C. The following Standards shall be used where referenced by the following abbreviations:

AIA	American Institute of Architects
ANSI	American National Standards Institute
ASME	American Society of Mechanical Engineers
ASTM	American Society of Testing and Materials
EPA	Environmental Protection Agency
FM	Factory Mutual
FSSC	Federal Specification
IEEE	Institute of Electrical and Electronics Engineers
NBS	National Bureau of Standards
NEMA	National Electrical Manufacturers Association
NETA	International Electrical Testing Association
NFPA	National Fire Protection Association
NSC	National Safety Council
OSHA	Occupational Safety and Health Administration
UL	Underwriters' Laboratories

D. All materials furnished and all work installed shall comply with the rules and recommendations of the NFPA, the requirements of the local utility companies, the recommendations of the fire insurance rating organization having jurisdiction and the requirements of all Governmental departments having jurisdiction.

E. The Contractor shall include in the work, without extra cost to the Owner, any labor, materials, services, apparatus and Drawings in order to comply with all applicable laws, ordinances, rules and regulations, whether shown on Drawings and/or specified or not.

1.9 PERMITS AND FEES

A. The Contractor shall give all necessary notices, obtain all permits; and pay all Government and State sales taxes and fees where applicable, and other costs, including utility connections or extensions in connection with the work, file all necessary Drawings, prepare all documents and obtain all necessary approvals of all Governmental and State departments having jurisdiction, obtain all required certificates of inspection for his work, and deliver a copy to the Owner and Engineer before request for acceptance and final payment for the work.

1.10 EQUIPMENT SUBSTITUTIONS

A. In these Contract Documents, one or more makes of materials, apparatus or appliances may have been specified for use in this installation. These describe the basis of design and approved equivalents. This has been done for convenience in fixing the standard of workmanship, finish and design required for installation without consideration of any or all costs associated but not limited to (structural, mechanical, or electrical feeder, breaker, or transformer requirements). The Contractor acknowledges that not all requirements are shown for either alternate acceptable manufacturers listed or those alternates requiring a request for substitution and it is their responsibility to coordinate all requirements necessary to accommodate any change from the basis of design listed or scheduled. The Contractor is required to submit any and all costs (including costs associated or required by all trades) along with performance differences as part of their request for substitution. The details of workmanship, finish and design, and the guaranteed performance of any material, apparatus or appliance which the Contractor desires to deviate for those mentioned herein shall also conform to these standards.

B. Where no specific make of material, apparatus or appliance is mentioned, any first-class product made by a reputable manufacturer may be submitted for the Engineers review.

C. Where two or more names are given as approved manufacturers of equivalents, the Contractor must use the specified item or one of the named equivalents which still must meet all of the performance characteristics of the basis of design make and model. Where one name only is used and is followed by the words “or approved equal”, the Contractor must use the item named or he is required to apply for a substitution. Where one name only is used, the Contractor must use that item named.

D. Where the Contractor proposes to deviate (provide an equivalent or request for substitution) from the equipment or materials as hereinafter specified, they are required to submit a request for substitution in writing. The Contractor shall state in their request whether it is a substitution or a non approved equivalent to that specified and the amount of credit or extra cost involved. A copy of said request shall be included in the Base Bid with manufacturer’s equipment cuts. The Base Bid shall be based on using the materials and equipment as specified with no exceptions.

E. Where the Contractor proposes to use an item of equipment other than specified or detailed on the Drawings which requires any redesign of the structure, partitions, foundations, piping, wiring or any other part of the mechanical, electrical or architectural layout, all such redesign and all new drawings and detailing required therefore shall be prepared by the Engineers/Architects of Record at the expense of the Contractor and at no additional cost to the Owner.

F. Where such accepted deviation resulting from using an approved equivalent or substitution requires a different quantity and arrangement of piping, ductwork, valves, pumps, insulation, wiring, conduit and equipment from that specified or indicated on the Drawings, the Contractor shall, after acceptance by the Engineer, furnish and install any such additional equipment required by the system at no additional cost to the Owner, including any costs added to other trades due to the deviation.

G. Equipment, material or devices submitted for review as an "equivalent" shall meet the following requirements:
   1. The equivalent shall have the same construction features such as, but not limited to:
      a. Material thickness, gauge, weight, density, etc.
      b. Welded, riveted, bolted, etc., construction.
      c. Finish, undercoating, corrosion protection.
      d. In the case of lighting fixtures, equivalent shall also meet the form, shape, and function in the opinion of the Architect and Engineer.
   2. The equivalent shall perform with the same or better operating efficiency.
   3. The equivalent shall be locally represented by the manufacturer for service, parts and technical information.
   4. The equivalent shall bear the same labels of performance certification as is applicable to the specified item, such as UL or NEMA labels.

H. Equipment, material or devices submitted for review as a "substitution" shall meet the following requirements:
   1. Substitution Request Submittal: Requests for substitution will be considered if received in writing 14 days before the bid date. Requests received later than 14 days before the bid date may be considered or rejected at the discretion of the Engineer/Owner. Once the Contractor submits a complete request for substitution as determined by the Engineer, the Engineer reserves the right to request the time necessary to evaluate the request for substitution and review it with the Owner.
   2. Submit three (3) copies of each request for substitution for consideration.
   3. Identify the product, or the fabrication or installation method to be replaced in each request. Include related Specification Section and Drawing numbers. Provide complete documentation showing compliance with the requirements for substitutions, and the following information, as appropriate:
      a. Product Data, including Drawings and descriptions of products, fabrication and installation procedures.
      b. Samples, where applicable or requested.

c. A detailed comparison of significant qualities of the proposed substitution with those of the Work specified. Significant qualities may include elements such as size, weight, durability, performance and visual effect.

d. Coordination information, including a list of changes or modifications needed to other parts of the Work and to construction performed by the Owner and separate Contractors that will become necessary to accommodate the proposed substitution.

e. A statement indicating the substitution's effect on the Contractor's Construction Schedule compared to the schedule without approval of the substitution. Indicate the effect of the proposed substitution on overall Contract Time.

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

g. Certification by the Contractor that the substitution proposed is equal-to or better in every significant respect to that required by the Contract Documents, and that it will perform adequately in the application indicated. Include the Contractor's waiver of rights to additional payment or time that may subsequently become necessary because of the failure of the substitution to perform adequately.

h. Engineer's Action: Within one week of receipt of the request for substitution, the Engineer will notify the Contractor of acceptance or rejection of the proposed substitution. If a decision on use of a proposed substitute cannot be made or obtained within the time allocated, use the product specified by name. Acceptance of a product substitution will be in the form of an Addendum.

i. Other Conditions: The Contractor's substitution request will be received and considered by the Engineer when one or more of the following conditions are satisfied, as determined by the Engineer; otherwise requests will be returned without action except to record noncompliance with these requirements.

    1) The request is directly related to an "or equal" clause or similar language in the Contract Documents.

    2) The specified product or method of construction cannot be provided within the Contract Time. The request will not be considered if the product or method cannot be provided as a result of failure to pursue the Work promptly or coordinate activities properly.

    3) A substantial advantage is offered the Owner, in terms of cost, time, energy conservation or other considerations of merit, after deducting offsetting responsibilities the Owner may be required to bear. Additional responsibilities for the Owner may include additional compensation to the Engineer for redesign and evaluation services, increased cost of other construction by the Owner or separate Contractors, and similar considerations.

1.11 SUBMITTAL PROCEDURES

A. Provide Submittals in accordance with the requirements of Division 1 and as indicated in the following.

B. Coordination: Coordinate preparation and processing of submittals with performance of construction activities. Transmit each submittal sufficiently in advance of performance of related construction activities to avoid delay.
1. Coordinate each submittal with fabrication, purchasing, testing, delivery, other submittals and related activities that require sequential activity.
2. Coordinate transmittal of different types of submittals for related elements of the Work so processing will not be delayed by the need to review submittals concurrently for coordination. The Engineer reserves the right to withhold action on a submittal requiring coordination with other submittals until related submittals are received.

C. Processing: Allow sufficient review time so that installation will not be delayed as a result of the time required to process submittals, including time for resubmittals.
1. Allow two weeks for initial review. Allow additional time if processing must be delayed to permit coordination with subsequent submittals. The Engineer will promptly advise the Contractor when a submittal being processed must be delayed for coordination.
2. If an intermediate submittal is necessary, process the same as the initial submittal.
3. Allow two weeks for reprocessing each submittal.
4. No extension of Contract Time will be authorized because of failure to transmit submittals to the Engineer sufficiently in advance of the Work to permit processing.

D. Submittal Preparation: Place a permanent label or title block on each submittal for identification. Indicate the name of the entity that prepared each submittal on the label or title block.
1. Include the following information on the label for processing and recording action taken.
    a. Project name.
    b. Date.
    c. Name and address of Engineer.
    d. Name and address of Contractor.
    e. Name and address of subcontractor.
    f. Name and address of supplier.
    g. Name of manufacturer.
    h. Number and title of appropriate Specification Section.
    i. Drawing number and detail references, as appropriate.

E. Submittal Transmittal: Package each submittal appropriately for transmittal and handling. Transmit each submittal from Contractor to Engineer using a transmittal form. Submittals received from sources other than the Contractor will be returned without action. On the transmittal, record relevant information and requests for data. On the form, or separate sheet, record deviations from Contract Document requirements, including minor variations and limitations. Include Contractor's certification that information complies with Contract Document requirements.

F. Except for submittals for record, information or similar purposes, where action and return is required or requested, the Engineer will review each submittal, mark to indicate action taken, and return promptly. Compliance with specified characteristics is the Contractor's responsibility.

G. Action Stamp: The Engineer will stamp each submittal with a uniform, self-explanatory action stamp. The stamp will be appropriately marked, to indicate the action taken.

1.12 SHOP DRAWINGS

A. Submit newly prepared information, drawn to accurate scale. Highlight, encircle, or otherwise indicate deviations from the Contract Documents. Do not reproduce Contract Documents or copy standard information as the basis of Shop Drawings. Standard information prepared without specific reference to the Project is not considered Shop Drawings.

B. The Contractor shall submit for review detailed shop drawings of all equipment and material specified in each section and coordinated ductwork layouts. No material or equipment may be delivered to the job site or installed until the Contractor has received shop drawings for the particular material or equipment which have been properly reviewed. Shop drawings shall be submitted within 60 days after award of Contract before any material or equipment is purchased. The Contractor shall submit for review copies of all shop drawings to be incorporated in the Electrical Contract. Refer to the General Conditions and Supplementary General Conditions for the quantity of copies required for submission. Where quantities are not specified, provide seven (7) copies for review.

C. Provide shop drawings for all devices specified under equipment specifications for all systems including fire alarm, switchgear, clock, lighting, etc., or where called for elsewhere in the Specifications. Shop drawings shall include manufacturers’ names, catalog numbers, cuts, diagrams, dimensions, identification of products and materials included, compliance with specified standards, notation of coordination requirements, notation of dimensions established by field measurement and other such descriptive data as may be required to identify and accept the equipment. A complete list in each category (example: all fixtures) of all shop drawings, catalog cuts, material lists, etc., shall be submitted to the Engineer at one time. No consideration will be given to a partial shop drawing submittal.

D. Submittals shall be marked with the trade involved, i.e., Electrical, HVAC, Fire Protection, etc. when the submittal could involve more than one trade.

E. Where multiple quantities or types of equipment are being submitted, provide a cover sheet (with a list of contents) on the submittal identifying the equipment or material being submitted.

F. Failure to submit shop drawings in ample time for review shall not entitle the Contractor to an extension of Contract time. No claim for extension by reason of such default will be allowed, nor shall the Contractor be entitled to purchase, furnish and/or install equipment which has not been reviewed by the Engineer.

G. The Contractor shall furnish all necessary templates, patterns, etc., for installation work and for the purpose of making adjoining work conform; furnish setting plans and shop details to other trades as required.

H. Acceptance rendered on shop drawings shall not be considered as a guarantee of measurements or building conditions. Where drawings are reviewed, review does not mean that drawings have been checked in detail; said approval does not in any way relieve the Contractor from his responsibility or necessity of furnishing material or performing work as required by the Contract Drawings and Specifications. Verify available space prior to submitting shop drawings.

I. Acceptance of shop drawings shall not apply to quantity nor relieve Contractor of his responsibility to comply with intent of Drawings and Specifications.

J. Acceptance of shop drawings is final and no further changes will be allowed without the written consent of the Engineer.

K. Shop drawing submittal sheets which may show items that are not being furnished shall have those items crossed off to clearly indicate which items will be furnished.

L. Bidders shall not rely on any verbal clarification of the Drawings and/or Specifications. Any questions shall be referred to the Engineer in writing at least five (5) working days prior to Bidding to allow for issuance of an Addendum.

M. Do not use Shop Drawings without an appropriate final stamp indicating action taken in connection with construction.

1.13 COORDINATION DRAWINGS

A. Prepare coordination drawings in accordance with Division 1 Section "PROJECT COORDINATION," to a scale of 1/4"=1'-0" or larger; detailing major elements, components, and systems of electrical equipment and materials in relationship with other systems, installations, and building components. Indicate locations where space is limited for installation and access and where sequencing and coordination of installations are of importance to the efficient flow of the Work, including (but not necessarily limited to) the following:
   1. Indicate the proposed locations of light fixtures, swichboards, panelboards, lighting inverters, conduits, cabinets, etc. Include the following:
   2. Clearances for installing and maintaining insulation.

3. Clearances for servicing and maintaining equipment, including NEC requirements and space for equipment disassembly required for periodic maintenance.
4. Equipment connections and support details.
5. Exterior wall and foundation penetrations.
6. Fire-rated wall and floor penetrations.
7. Sizes and locations of required concrete pads and bases.

B. Indicate scheduling, sequencing, movement, and positioning of large equipment into the building during construction.

C. Prepare floor plans, elevations, and details to indicate penetrations in floors, walls, and ceilings and their relationship to other penetrations and installations.

D. Prepare reflected ceiling plans to coordinate and integrate installations, air outlets and inlets, light fixtures, communication systems components, sprinklers, and other ceiling-mounted items.

1.14 COORDINATION WITH OTHER TRADES

A. All work shall be carried out in conjunction with other trades and full cooperation shall be given in order that all work may proceed with a minimum of delay and interference. Particular emphasis is placed on timely installation of major apparatus and furnishing other Contractors, especially the Contractor or Construction Manager, with information as to openings, chases, sleeves, bases, inserts, equipment locations, panels, etc., required by other trades.

B. The Contractors are required to examine all of the Project Drawings and mutually arrange work so as to avoid interference with the work of other trades. In general, ductwork, heating, condenser, chilled water piping, sprinkler piping and drainage lines take precedence over water, gas and electrical conduits. The Engineer shall make final decisions regarding the arrangement of work which cannot be agreed upon by the Contractors.

C. Where the work of the Contractor will be installed in close proximity to or will interfere with work of other trades, the Contractors will cooperate in working out space conditions to make a satisfactory adjustment.

D. If the work under a Section is installed before coordinating with other Divisions or Sections or so as to cause interference with work of other Sections, the necessary changes to correct the condition shall be made by the Contractor causing the interference without extra charge to the Owner.

E. If so directed in other Sections, the Contractor indicated shall prepare composite working drawings and sections clearly showing how the work is to be installed in relation to the work of other trades, at no extra charge to the Owner.

F. Musco’s representative shall oversee the removal and installation of existing/new Musco’s poles.

1.15 WORKMANSHIP

A. Service Support: The equipment items shall be supported by service organizations which are reasonably convenient to the equipment installation in order to render satisfactory service to the equipment on a regular and emergency basis during the warranty period of the contract.

B. Modification of References: In each of the publications referred to herein, consider the advisory provisions to be mandatory, as though the word, "shall" had been substituted for "should" wherever it appears.

C. The Contractor shall furnish the services of an experienced superintendent who shall be constantly in charge of the installation of the work together with all skilled workmen, journeymen, electricians, helpers and laborers required to unload, transfer, erect, connect, adjust, start, operate and test each system.

D. Unless otherwise specifically indicated on the Drawings or Specifications, all equipment and materials shall be installed with the acceptance of the Engineer and in accordance with the recommendations of the manufacturer. This includes the performance of such tests as the manufacturer recommends.

E. All labor for installation of electrical systems shall be performed by experienced, skilled tradesmen under the supervision of a licensed journeyman foreman. All work shall be of a quality consistent with good trade practice and shall be installed in a neat, workmanlike manner. The Engineer reserves the right to reject any work which, in his opinion, has been installed in a substandard, dangerous or unserviceable manner. The Contractor shall replace said work in a satisfactory manner at no extra cost to the Owner.

F. Musco’s representative shall supervise the removal and installation of existing and new Musco light poles.

1.16 SHUTDOWNS

A. When installation of a new system requires the temporary shutdown of an operating system, the connection of the new system shall be performed at such time as designated by the Owner.

B. The Engineer and the Owner shall be notified in writing of the estimated duration of the shutdown period at least ten (10) days in advance of the date the work is to be performed.

C. Work shall be arranged for continuous performance whenever possible. The Contractor shall provide all necessary labor, including overtime if required, to assure that existing operating services will be shut down only during the time actually required to make necessary connections.

1.17 TEMPORARY UTILITIES

A. General: Provide new materials and equipment; if acceptable to the Engineer, undamaged previously used materials in serviceable condition may be used. Provide materials suitable for the use intended.

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. First Aid Supplies: Comply with governing regulations.

D. 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.

E. Provide temporary lighting in all areas, throughout construction activities.
   1. Use Charges: Cost or use charges for temporary facilities are not chargeable to the Owner or Engineer, and will not be accepted as a basis of claims for a Change Order.
   2. Temporary Electric Power Service: Provide weatherproof, grounded electric power service and distribution system of sufficient size, capacity, and power characteristics during construction period. Include meters, transformers, overload protected disconnects, automatic ground-fault interrupters, and main distribution switch gear.
      a. Except where overhead service must be used, install electric power service underground.

F. Environmental Protection: Provide protection, operate temporary facilities and conduct construction in ways and by methods that comply with environmental regulations, and minimize the possibility that air, waterways and subsoil might be contaminated or polluted, or that other undesirable effects might result. Avoid use of tools and equipment which produce harmful noise. Restrict use of noise making tools and equipment to hours that will minimize complaints from persons or firms near the site.

G. Termination and Removal: Unless the Engineer requires 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. Materials and facilities that constitute temporary facilities are property of the Contractor. The Owner reserves the right to take possession of Project identification signs.

1.18 PROJECT PHASING

A. Work under each Section shall include all necessary temporary connections, equipment, conduit, wiring, fire alarm equipment and testing, security equipment and testing, communications equipment and testing, lighting and emergency lighting, fire stopping, connection of necessary mechanical equipment, labor, and material as necessary to accommodate the phasing of Construction as developed by the General Contractor or Construction Manager and approved by the Owner. All systems that pass-thru an area of the building shall remain operational during all phases of construction. No extra compensation shall be granted the Contractor for work required to maintain systems operational or to accommodate the construction phasing of the project.

1.19 PROTECTION OF MATERIALS AND EQUIPMENT

A. Work under each Section shall include protecting the work and material of all other Sections from damage by work or workmen and shall include making good all damage thus caused.

B. The Contractor shall be responsible for work and equipment until the facility has been accepted by the Owner. Protect work against theft, injury or damage and carefully store material and equipment received on site which is not immediately installed. Close open ends of work with temporary covers or plugs during construction to prevent entry of foreign material.

C. Work under each Section includes receiving, unloading, uncrating, storing, protecting, setting in place and completely connecting equipment supplied under each Section. Work under each Section shall also include exercising special care in handling and protecting equipment and fixtures, and shall include the cost of replacing any of the equipment and fixtures which are missing or damaged.

D. Equipment and material stored on the job site shall be protected from the weather, vehicles, dirt and/or damage by workmen or machinery. Insure that all electrical or absorbent equipment or material is protected from moisture during storage.

E. Removal and installation of existing poles, Musco pole shall be supervised by Musco representative.

1.20 ADJUSTING AND TESTING

A. After all the equipment and accessories to be furnished are in place, they shall be put in final adjustment and subjected to such operating tests so as to assure the Engineer that they are in proper adjustment and in satisfactory, permanent operating condition.

B. Where requested by the Engineer, a factory-trained service representative shall inspect the installation and assist in the initial startup and adjustment to the equipment. The period of these services shall be for such time as necessary to secure proper installation and adjustments. After the equipment is placed in permanent operation, the service representative shall supervise the initial operation of the equipment and instruct the personnel responsible for operation and maintenance of the equipment. The service representative shall notify the Contractor in writing that the equipment was installed according to manufacturers' recommendations and is operating as intended by the manufacturer.

1.21 CLEANING

A. The Contractor shall thoroughly clean all equipment of all foreign substances, oils, dust, dirt, etc., inside and out before final acceptance by the Engineer.

B. If any part of a system should be stopped or damaged by any foreign matter after being placed in operation, the system shall be disconnected, cleaned and reconnected wherever necessary to locate and/or remove obstructions. Any work damaged in the course of removing obstructions shall be repaired or replaced when the system is reconnected at no additional cost to the Owner.

C. During the course of construction, all conduits shall be capped in an acceptable manner to insure adequate protection against the entrance of foreign matter.

D. Upon completion of all work under the Contract, the Contractor shall remove from the premises all rubbish, debris and excess materials left over from his work.

E. Complete the following cleaning operations before requesting inspection for Certification of Substantial Completion.
   1. Remove labels that are not permanent labels.
   2. Clean transparent materials, including mirrors and glass in doors and windows. Remove glazing compound and other substances that are noticeable vision-obscuring materials. Replace chipped or broken glass and other damaged transparent materials.
   3. Clean exposed exterior and interior hard-surfaced finishes to a dust-free condition, free of stains, films and similar foreign substances. Restore reflective surfaces to their original reflective condition. Leave concrete floors broom clean. Vacuum carpeted surfaces and panelboard interiors.
   4. Wipe surfaces of mechanical and electrical equipment. Remove excess lubrication and other substances. Clean light fixtures and lamps.

F. Comply with regulations of authorities having jurisdiction and safety standards for cleaning. Do not burn waste materials. Do not bury debris or excess materials on the Owner's property. Do not discharge volatile, harmful or dangerous materials into drainage systems. Remove and dispose of ALL waste materials, packaging material, skids etc. from the site and dispose of in a lawful manner in accordance with municipal, state and federal regulations.

G. Where extra materials of value remaining after completion of associated Work have become the Owner's property, arrange for disposition of these materials as directed.

1.22 OPERATING AND MAINTENANCE

A. Upon completion of all work and tests, the Contractor shall furnish the necessary skilled labor and helpers for operating his system and equipment for a period specified under each applicable Section of this Division. During this period, he shall fully instruct the Owner or the Owner’s representative in the operation, adjustment and maintenance of all equipment furnished. The Contractor shall give at least seven (7) days notice to the Owner and the Engineer in advance of this period.

B. The Contractor shall include the maintenance schedule for the principal items of equipment furnished under this Division.

C. The Contractor shall physically demonstrate procedures for all routine maintenance of all equipment furnished under each respective Section to assure accessibility to all devices.

D. An authorized manufacturer’s representative shall attest in writing that the equipment has been properly installed prior to startup of any major equipment. The following equipment will require this inspection: emergency generator, fire alarm system, nurse call system, paging systems, etc. These letters will be bound into the operating and maintenance books.

E. Refer to individual trade Sections for any other particular requirements related to operating instructions.

F. Demonstration shall be recorded on CD/DVD disc with two (2) discs turned over to the Owner.

1.23 OPERATING AND MAINTENANCE MANUALS

A. Prepare operating and maintenance manuals in accordance with the requirements of Division 1 and as follows. The Contractor shall prepare six (6) copies of a complete maintenance and operating instructions manual, bound in booklet form. Organize operating and maintenance data into suitable sets of manageable size. Bind properly indexed data in individual heavy-duty, 3-ring, vinyl-covered binders, with pocket folders for folded sheet information. Mark appropriate identification on front and spine of each binder.

B. Manual shall include the following:
   1. Description of function, normal operating characteristics and limitations, performance curves, engineering data and tests, and complete nomenclature and commercial numbers of replacement parts.
   2. Manufacturer's printed operating procedures to include start-up, break-in, and routine and normal operating instructions; regulation, control, stopping, shutdown, and emergency instructions; and summer and winter operating instructions.
   3. Maintenance procedures for routine preventative maintenance and troubleshooting; disassembly, repair, and reassembly; aligning and adjusting instructions.
   4. Servicing instructions and lubrication charts and schedules.
   5. Emergency instructions.
   6. Spare parts list.
   7. Copies of warranties.
   8. Wiring diagrams.
   9. Recommended "turn around" cycles.
   10. Inspection procedures.
   11. Shop Drawings and Product Data.
   12. Equipment start-up reports.

C. Include in the manual, a tabulated equipment schedule for all equipment. Schedule shall include pertinent data such as: make, model number, serial number, voltage, normal operating current, belt size, filter quantities and sizes, bearing number, etc. Schedule shall include maintenance to be done and frequency.

D. Maintenance and instruction manuals shall be submitted to the Owner at the same time as the seven (7) day notice is given prior to the instruction period.

1.24 ACCEPTANCES

A. The equipment, materials, workmanship, design and arrangement of all work installed under the Electrical Sections shall be subject to the review of the Engineer.

B. Within 30 days after the awarding of a Contract, the Electrical Contractor shall submit to the Engineer, for review, a list of manufacturers of equipment proposed for the work under the Electrical Sections. The intent to use the exact makes specified does not relieve the Contractor of the responsibility of submitting such a list.

C. If extensive or unacceptable delivery time is expected on a particular item of equipment specified, the Contractor shall notify the Owner and Engineer, in writing, within 30 days of the awarding of the Contract. In such instances, deviations may be made pending acceptance by the Engineer or the Owner’s representative.

D. Where any specific material, process or method of construction or manufactured article is specified by reference to the catalog number of a manufacturer, the Specifications are to be used as a guide and are not intended to take precedence over the basic duty and performance specified or noted on the Drawings. In all cases, the Electrical Contractor shall verify the duty specified with the specific characteristics of the equipment offered for review. Equipment characteristics are to be used as mandatory requirements where the Contractor proposes to use an acceptable equivalent.

E. If material or equipment is installed before it is reviewed and/or approved, the Contractor shall be liable for its removal and replacement at no extra charge to the Owner if, in the opinion of the Engineer, the material or equipment does not meet the intent of, or standard of quality implied by, the Drawings and Specifications.

F. Failure on the part of the Engineer to reject shop drawings or to reject work in progress shall not be interpreted as acceptance of work not in conformance with the Drawings and/or Specifications. Work not in conformance with the Drawings and/or Specifications shall be corrected whenever it is discovered.

1.25 RECORD DRAWINGS

A. General: Do not use record documents for construction purposes; protect from deterioration and loss in a secure, fire-resistive location; provide access to record documents for the Engineer's reference during normal working hours.

B. Record Drawings: Maintain a clean, undamaged set of blue or black line white-prints of Contract Drawings and Shop Drawings. Mark the set to show the actual installation where the installation varies substantially from the Work as originally shown. Mark whichever drawing is most capable of showing conditions fully and accurately; where Shop Drawings are used, record a cross-reference at the corresponding location on the Contract Drawings. Give particular attention to concealed elements that would be difficult to measure and record at a later date.
   1. Mark record sets with red erasable pencil; use other colors to distinguish between variations in separate categories of the Work.
   2. Mark new information that is important to the Owner, but was not shown on Contract Drawings or Shop Drawings.
   3. Note related Change Order numbers where applicable.
   4. Organize record drawing sheets into manageable sets, bind with durable paper cover sheets, and print suitable titles, dates and other identification on the cover of each set.
   5. Final record documents shall be prepared in the latest Revit version and floppy disks or CD ROM of all drawings and a clean set of reproducible mylar sepias shall be turned over to the Owner at the completion of the work.

1.26 WARRANTIES AND BONDS

A. The following general administrative and procedural requirements for warranties and bonds required by the Contract Documents, including manufacturers standard warranties on products and special warranties are to be included:
   1. General close-out requirements included in Section "Project Close-out."
   2. Specific requirements for warranties for the Work and products and installation that are specified to be warranted are included in the individual Sections of Divisions 2 through 28.
   3. Certifications and other commitments and agreements for continuing services to Owner are specified elsewhere in the Contract Documents.

B. Disclaimers and Limitations: Manufacturer's disclaimers and limitations on product warranties do not relieve the Contractor of the warranty on the Work that incorporates the products, nor does it relieve suppliers, manufacturers, and subcontractors required to countersign special warranties with the Contractor.

C. Separate Prime Contracts: Each prime Contractor is responsible for warranties related to its own Contract.

1.27 WARRANTY REQUIREMENTS

A. Related Damages and Losses: When correcting warranted Work that has failed, remove and replace other Work that has been damaged as a result of such failure or that must be removed and replaced to provide access for correction of warranted Work.

B. Reinstatement of Warranty: When Work covered by a warranty has failed and been corrected by replacement or rebuilding, reinstate the warranty by written endorsement. The reinstated warranty shall be equal to the original warranty with an equitable adjustment for depreciation.

C. Replacement Cost: Upon determination that Work covered by a warranty has failed, replace or rebuild the Work to an acceptable condition complying with requirements of Contract Documents. The Contractor is responsible for the cost of replacing or rebuilding defective Work regardless of whether the Owner has benefited from use of the Work through a portion of its anticipated useful service life.

D. Owner's Recourse: Written warranties made to the Owner are in addition to implied warranties, and shall not limit the duties, obligations, right and remedies otherwise available under the law, nor shall warranty periods be interpreted as limitations on time in which the Owner can enforce such other duties, obligations, rights, or remedies.

E. Rejection of Warranties: The Owner reserves the right to reject warranties and to limit selections to products with warranties not in conflict with requirements of the Contract Documents.

F. The Owner reserves the right to refuse to accept Work for the Project where a special warranty, certification, or similar commitment is required on such Work or part of the Work, until evidence is presented that entities required to countersign such commitments are willing to do so.

G. Submit written warranties to the Engineer prior to the date certified for Substantial Completion. If the Engineer's Certificate of Substantial Completion designates a commencement date for warranties other than the date of Substantial Completion for the Work, or a designated portion of the Work, submit written warranties upon request of the Engineer.

H. When a designated portion of the Work is completed and occupied or used by the Owner, by separate agreement with the Contractor during the construction period, submit properly executed warranties to the Engineer within fifteen days of completion of that designated portion of the Work.

I. When a special warranty is required to be executed by the Contractor, or the Contractor and a subcontractor, supplier or manufacturer, prepare a written document that contains appropriate terms and identification, ready for execution by the required parties. Submit a draft to the Owner through the Engineer for approval prior to final execution.
   1. Refer to individual Sections of Divisions 2 through 33 for specific content requirements, and particular requirements for submittal of special warranties.

J. Form of Submittal: At Final Completion compile two copies of each required warranty and bond properly executed by the Contractor, or by the Contractor, subcontractor, supplier, or manufacturer. Organize the warranty documents into an orderly sequence based on the table of contents of the Project Manual.

K. Bind warranties and bonds in heavy-duty, commercial quality, durable 3-ring vinyl covered loose-leaf binders, thickness as necessary to accommodate contents, and sized to receive 8-1/2" by 11" paper.
   1. Provide heavy paper dividers with celluloid covered tabs for each separate warranty. Mark the 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 the installer.
   2. Identify each binder on the front and the spine with the typed or printed title "WARRANTIES AND BONDS," the Project title or name, and the name of the Contractor.
   3. When operating and maintenance manuals are required for warranted construction, provide additional copies of each required warranty, as necessary, for inclusion in each required manual.

1.28 GUARANTEES

A. The Contractor shall guarantee all material and workmanship under these Specifications and the Contract for a period of one (1) year from the date of final acceptance by Owner. During this guarantee period, all defects developing through faulty equipment, materials or workmanship shall be corrected or replaced immediately by this Contractor without expense to the Owner. Such repairs or replacements shall be made to the Engineers satisfaction.

B. Contractor shall provide name, address, and phone number of all contractors and subcontractors and associated equipment they provided

1.29 PROJECT CLOSE-OUT

A. Submit specific warranties, workmanship bonds, maintenance agreements, final certifications and similar documents.

B. Deliver tools, spare parts, extra stock, and similar items.

C. Complete start-up testing of systems, and instruction of the Owner's operating and maintenance personnel. Discontinue or change over and remove temporary facilities from the site, along with construction tools, mock-ups, and similar elements.

D. Complete final clean up requirements, including touch-up painting. Touch-up and otherwise repair and restore marred exposed finishes.

E. Inspection Procedures: On receipt of a request for inspection, the Engineer will either proceed with inspection or advise the Contractor of unfilled requirements. The Engineer will prepare the Certificate of Substantial Completion following inspection, or advise the Contractor of construction that must be completed or corrected before the certificate will be issued.
   1. The Engineer will repeat inspection when requested and assured that the Work has been substantially completed.
   2. Results of the completed inspection will form the basis of requirements for final acceptance.

END OF SECTION 26 04 00

CADD File Release Form

DELIVERY OF CADD FILES FOR: _____
Project Name

In accepting and utilizing any drawings or other data on any form of electronic media generated and provided by the Design Professional, the Client covenants and agrees that all such drawings and data are instruments of service of the Design Professional, who shall be deemed the author of the drawings and data, and shall retain all common law, statutory law and other rights, including copyrights.

The Client further agrees not to use these drawings and data, in whole or in part, for any purpose or project other than the project which is the subject of this Agreement. The Client agrees to waive all claims against the Design Professional resulting in any way from any unauthorized changes or reuse of the drawings and data for any other project by anyone other than the Design Professional.

In addition, the Client agrees, to the fullest extent permitted by law, to indemnify and hold the Design Professional harmless from any damage, liability or cost, including reasonable attorneys' fees and costs of defense, arising from any changes made by anyone other than the Design Professional or from any reuse of the drawings and data without the prior written consent of the Design Professional.

Under no circumstances shall transfer of the drawings and other instruments of service on electronic media for use by the Client be deemed a sale by the Design Professional, and the Design Professional makes no warranties, either express or implied, of merchantability and fitness for any particular purpose.

_____ _____
Client's Signature Date

_____
Company - Title

_____ _____
Architects' Signature Date

_____
Firm - Title

_____ _____
Owner's Signature Date

_____
Company - Title

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SECTION 26 05 03 - EQUIPMENT WIRING CONNECTIONS

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 electrical connections to equipment.

B. Related Sections:
1. Section 26 05 19 – Building Wire and Cable.
2. Section 26 05 33 - Raceway and Boxes for Electrical Systems.
3. Section 26 27 26 – Wiring Devices
4. Section 26 29 13 – Enclosed Controllers

C. Related Requirements:
1. The Drawings of other trades (Architectural, Electrical and Plumbing, shall be examined for coordination and familiarity of work with other Contractors. Any duplication or omission of provisions in this project should be brought to the attention of the Owners prior to Bidding.

1.3 REFERENCES

A. National Electrical Manufacturers Association:
1. NEMA WD 1 - General Requirements for Wiring Devices.
2. NEMA WD 6 - Wiring Devices-Dimensional Requirements.

1.4 SUBMITTALS

A. Section 01 33 00 - Submittal Procedures: Submittal procedures.

B. Product Data: Submit wiring device manufacturer’s catalog information showing dimensions, configurations, and construction.

C. Manufacturer's installation instructions.

1.5 CLOSEOUT SUBMITTALS

A. Section 01 70 00 - Execution and Closeout Requirements: Submittal procedures.

B. Project Record Documents: Record actual locations, sizes, and configurations of equipment connections.

1.6 COORDINATION

A. Section 01 30 00 - Administrative Requirements Coordination and project conditions.

B. Obtain and review shop drawings, product data, manufacturer’s wiring diagrams, and manufacturer's instructions for equipment furnished under other sections.

C. Determine connection locations and requirements, including requirements for control stations, safety devices, control wiring, and accessories for equipment furnished under other sections.

D. Sequence rough-in of electrical connections to coordinate with installation of equipment. Do not proceed with rough-in without coordination of requirements for equipment furnished under other sections.

E. Sequence electrical connections to coordinate with start-up of equipment.

PART 2 PRODUCTS

2.1 CORD AND PLUGS

A. Manufacturers:
1. Hubbell.
2. Leviton.
3. Bryant.
4. Substitutions: Section 01 60 00 - Product Requirements

B. Attachment Plug Construction: Conform to NEMA WD 1.

C. Cord Construction: Type SO, SJO multi-conductor flexible cord with identified equipment grounding conductor, suitable for use in damp locations.

D. Size: Suitable for connected load of equipment, length of cord, and rating of branch circuit overcurrent protection.

PART 3 EXECUTION

3.1 EXAMINATION

A. Section 01 30 00 - Administrative Requirements Coordination and project conditions.

B. Verify equipment is ready for electrical connection, for wiring, and to be energized.

3.2 INSTALLATION

A. Make electrical connections.

B. Make conduit connections to equipment using flexible conduit. Use liquidtight flexible conduit with watertight connectors in damp or wet locations.

C. Install receptacle outlet to accommodate connection with attachment plug.

D. Install cord and cap for field-supplied attachment plug.

E. Install suitable strain-relief clamps and fittings for cord connections at outlet boxes and equipment connection boxes.

F. Install disconnect switches, controllers, control stations, and control devices to complete equipment wiring requirements.

G. Install terminal block jumpers to complete equipment wiring requirements.

H. Install interconnecting conduit and wiring between devices and equipment to complete equipment wiring requirements.

I. Install conduit and wiring for interconnection of lighting and switches furnished with equipment.

J. Install conduit and wiring for interconnection of power supplies furnished by other divisions.

3.3 ADJUSTING

A. Section 01 70 00 - Execution and Closeout Requirements Testing, adjusting, and balancing.

B. Cooperate with utilization equipment installers and field service personnel during checkout and starting of equipment to allow testing and balancing and other startup operations. Provide personnel to operate electrical system and checkout wiring connection components and configurations.

END OF SECTION 26 05 03

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SECTION 26 05 19 – ELECTRICAL POWER CONDUCTORS AND CABLES

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 building wire and cable; service entrance cable; metal clad cable; and rated feeder wiring and wiring connectors and connections.

B. Related Sections:
1. Section 26 05 53 - Identification for Electrical Systems: Product requirements for wire identification.
2. Section 26 27 26 – Wiring Devices.

1.3 REFERENCE

A. International Electrical Testing Association:
1. NETA ATS - Acceptance Testing Specifications for Electrical Power Distribution Equipment and Systems.

B. National Fire Protection Association:
1. NFPA 70 - National Electrical Code.

1.4 SYSTEM DESCRIPTION

A. Product Requirements: Provide products as follows:

1. Solid conductor for feeders and branch circuits 10 AWG and smaller.
2. Stranded conductors for control circuits.
3. Conductor not smaller than 12 AWG for power and lighting circuits.
4. Conductor not smaller than 14 AWG for control circuits.
5. Increase wire size in branch circuits to limit voltage drop to a maximum of 3 percent.

B. Wiring Methods: Provide the following wiring methods:
1. Exposed Dry Interior Locations: Use only building wire, Type THHN/THWN insulation, in raceway.
2. Exterior Locations: Use only building wire, Type XHHW-2 insulation, in schedule 40/80 PVC conduit for lighting circuits.
3. Underground Locations: Use only building wire, Type XHHW-2 insulation in conduit.
4. Field light pole shall have RGS riser conduits with Type XHHW-2 insulation in conduit.

1.5 DESIGN REQUIREMENTS

A. Conductor sizes are based on copper.

1.6 SUBMITTALS

A. Section 01 33 00 - Submittal Procedures Requirements for submittals.

B. Product Data: Submit for building wire and each cable assembly type.

1.7 CLOSEOUT SUBMITTALS

A. Section 01 70 00 - Execution and Closeout Requirements: Requirements for submittals.

B. Project Record Documents: Record actual locations of components and circuits.

1.8 QUALITY ASSURANCE

A. Perform Work in accordance with the current issue of the State of Connecticut Building code.

B. Maintain one copy of each document on site.

1.9 QUALIFICATIONS

A. Manufacturer: Company specializing in manufacturing products specified in this section with minimum three years documented experience.

1.10 FIELD MEASUREMENTS

A. Verify field measurements are as indicated on Drawings.

1.11 COORDINATION

A. Section 01 30 00 - Administrative Requirements: Requirements for coordination.

B. Where wire and cable destination is indicated and routing is not shown, determine routing and lengths required.

PART 2 PRODUCTS

2.1 BUILDING WIRE

A. Manufacturers:
1. American Insulated Wire Corporation.
2. General Cable Co.
3. SouthWire.
4. Substitutions: Section 01 60 00 - Product Requirements.

B. Product Description: Single conductor insulated wire.

C. Conductor: Copper.

D. Insulation: Type THHN/THWN for all branch circuits and feeders except rated emergency feeders (or as otherwise described above). Type XHHW-2 for feeders in ductbanks.

2.2 WIRING CONNECTORS

A. Split Bolt Connectors:
1. Ilsco.
2. Thomas Betts.
3. Burndy.
4. Buchanan.
5. Substitutions: Substitutions: Section 01 60 00 - Product Requirements.

B. Solderless Pressure Connectors:
1. Ilsco.
2. Thomas Betts.
3. Burndy.
4. Buchanan.
5. Substitutions: Substitutions: Section 01 60 00 - Product Requirements.

C. Spring Wire Connectors:
1. Ilsco.
2. Thomas Betts.
3. Burndy.
4. Buchanan.
5. Substitutions: Substitutions: Section 01 60 00 - Product Requirements.

D. Compression Connectors:
1. Ilsco.
2. Thomas Betts.
3. Burndy.
4. Buchanan.
5. Substitutions: Substitutions: Section 01 60 00 - Product Requirements.

2.3 TERMINATIONS

A. Terminal lugs for Wires 6 AWG and Smaller: Solderless, compression type copper.

B. Lugs for Wires 4 AWG and Larger: Color keyed, compression type copper, with insulating sealing collars.

C. Termination to ground rods shall be exothermic welds.

PART 3 EXECUTION

3.1 EXAMINATION

A. Section 01 30 00 - Administrative Requirements: Coordination and project conditions.

B. Verify interior of building has been protected from weather.

C. Verify mechanical work likely to damage wire and cable has been completed.

D. Verify raceway installation is complete and supported.

3.2 PREPARATION

A. Completely and thoroughly swab raceway before installing wire.

3.3 INSTALLATION

A. Route wire and cable to meet Project conditions.

B. Neatly train and lace wiring inside boxes, equipment, and panelboards.

C. Identify and color code wire and cable under provisions of this section. Identify each conductor with its circuit number or other designation indicated.

D. Special Techniques--Building Wire in Raceway:
1. Pull conductors into raceway at same time.
2. Install building wire 4 AWG and larger with pulling equipment.
3. Use of pulling compounds not allowed for pulling of wire used for isolated power systems.

E. Special Techniques - Cable:
1. Protect exposed cable from damage.
2. Support cables above accessible ceiling, using spring metal clips or cable ties to support cables from structure. Do not rest cable on ceiling panels.
3. Use suitable cable fittings and connectors.

F. Special Techniques - Wiring Connections:
1. Clean conductor surfaces before installing lugs and connectors.
2. Make splices, taps, and terminations to carry full ampacity of conductors with no perceptible temperature rise.
3. Tape uninsulated conductors and connectors with electrical tape to 150 percent of insulation rating of conductor.
4. Install split bolt connectors for copper conductor splices and taps, 6 AWG and larger.
5. Install solderless pressure connectors with insulating covers for copper conductor splices and taps, 8 AWG and smaller.
6. Install insulated spring wire connectors with plastic caps for copper conductor splices and taps, 10 AWG and smaller.

G. Install stranded conductors for control circuits 14 AWG and smaller. Install crimp on fork terminals for device terminations. Do not place bare stranded conductors directly under screws.

H. Install terminal lugs on ends of 600 volt wires unless terminal lugs are furnished on connected device, such as circuit breakers.

I. Size lugs in accordance with manufacturer's recommendations for terminating wire sizes. Install 2-hole type lugs to connect wires 4 AWG and larger to copper bus bars.

J. For terminal lugs fastened together such as on motors, transformers and other apparatus, or when spaced between studs is small enough that lugs can turn and touch each other, insulate for dielectric strength 2-1/2 times normal potential of circuit.

3.4 WIRE COLOR

A. General:
   1. For wire sizes 10 AWG and smaller, install wire colors in accordance with the following:
      a. Black and red for single phase circuits at 120/240 volts.
      b. Black, red, and blue for circuits at 120/208 volts single or three phase.
      c. Orange, brown, and yellow for circuits at 277/480 volts single or three phase.
   2. For wire sizes 8 AWG and larger, identify wire with colored tape at terminals, splices and boxes.

B. Neutral Conductors: White. When two or more neutrals are located in one conduit, individually identify each with proper circuit number.

C. Branch Circuit Conductors: Install three or four wire home runs with each phase uniquely color coded.

D. Feeder Circuit Conductors: Uniquely color code each phase as indicated above.

E. Ground Conductors:
   1. For 6 AWG and smaller: Green.
   2. For 4 AWG and larger: Identify with green tape at both ends and visible points including junction boxes.

3.5 FIELD QUALITY CONTROL

A. Inspect and test in accordance with NETA ATS, except Section 4.

B. Perform inspections and tests listed in NETA ATS, Section 7.3.1.

END OF SECTION 26 05 19

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SECTION 26 05 33 - RACEWAY AND BOXES FOR ELECTRICAL SYSTEMS

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 conduit and tubing, outlet boxes, pull and junction boxes, and handholes.

B. Related Sections:
1. Section 26 05 03 - Equipment Wiring Connections.
2. Section 26 05 26 - Grounding and Bonding for Electrical Systems.
3. Section 26 05 29 - Hangers and Supports for Electrical Systems.
4. Section 26 05 53 - Identification for Electrical Systems.
5. Section 26 27 26 - Wiring Devices.
6. Section 26 51 00 - Interior Lighting.
7. Section 26 52 00 - Emergency Lighting.
8. Section 26 56 68- Exterior Athletic Lighting

1.3 REFERENCES

A. American National Standards Institute:
1. ANSI C80.1 - Rigid Steel Conduit, Zinc Coated.
2. ANSI C80.3 - Specification for Electrical Metallic Tubing, Zinc Coated.
3. ANSI C80.5 - Aluminum Rigid Conduit - (ARC).

B. National Electrical Manufacturers Association:
1. NEMA 250 - Enclosures for Electrical Equipment (1000 Volts Maximum).
2. Cast concrete underground stackable boxes and Conduit Bodies for Conduit and Cable Assemblies.
3. NEMA OS 1 - Sheet Steel Outlet Boxes, Device Boxes, Covers, and Box Supports.
4. NEMA TC 2 - Electrical Polyvinyl Chloride (PVC) Tubing and Conduit.
5. NEMA TC 3 - PVC Fittings for Use with Rigid PVC Conduit and Tubing.

1.4 SYSTEM DESCRIPTION

A. Raceway and boxes located as indicated on Drawings, and at other locations required for splices, taps, wire pulling, equipment connections, and compliance with regulatory requirements. Raceway and boxes are shown in approximate locations unless dimensioned. Provide raceway to complete wiring system.

B. Before installing underground Utility Primary Conduits and 3 Phase Transformer Pads refer to local utility construction specifications.

C. Underground more than 5 feet outside Foundation Wall: Provide PVC conduit.

D. Underground within 5 feet from Foundation Wall: Provide rigid steel conduit.

E. In or Under Slab on Grade: Provide PVC conduit with rigid steel conduit sweeps.

F. Outdoor Locations, Above Grade: Provide rigid steel conduit. Provide cast metal or nonmetallic outlet, pull, and junction boxes.

G. In Slab above Grade: Provide rigid steel conduit. Provide cast boxes.

H. Wet and Damp Locations: Provide rigid steel conduit. Provide cast metal outlet, junction, and pull boxes. Provide flush mounting outlet box in finished areas.

I. Wet or Damp environments (buried conduits): Use only building wire, Type XHHW-2, / THWN-2 insulation, in Schedule 40 PVC conduit. Provide non-metallic WP boxes. Boxes and conduit connections shall be glued and water tight.

J. Concealed Dry Locations: Provide EMT conduit. Provide sheet-metal boxes. Provide flush mounting outlet box in finished areas. Provide hinged enclosure for large pull boxes.

K. Dry Finished Locations: Provide flush mounting outlet box in finished areas. Provide hinged enclosure for large pull boxes.

1.5 DESIGN REQUIREMENTS

A. Minimum Raceway Size: 3/4 inch unless otherwise specified.

1.6 SUBMITTALS

A. Section 01 33 00 - Submittal Procedures: Submittal procedures.

B. Product Data: Submit for the following:
1. Flexible metal conduit.
2. Liquidtight flexible metal conduit.
3. Nonmetallic conduit.
4. EMT.
5. Raceway fittings.
6. Conduit bodies.
7. Wireway.
8. Pull and junction boxes.
9. “ComBox”

C. Manufacturer's Installation Instructions: Submit application conditions and limitations of use stipulated by Product testing agency specified under Regulatory Requirements. Include instructions for storage, handling, protection, examination, preparation, and installation of Product.

1.7 CLOSEOUT SUBMITTALS

A. Section 01 70 00 - Execution and Closeout Requirements: Closeout procedures.

B. Project Record Documents:
1. Record actual routing of conduits larger than 2 inch.
2. Record actual locations and mounting heights of outlet, pull, and junction boxes.

1.8 DELIVERY, STORAGE, AND HANDLING

A. Section 01 60 00 - Product Requirements: Product storage and handling requirements.

B. Protect conduit from corrosion and entrance of debris by storing above grade. Provide appropriate covering.

C. Protect PVC conduit from sunlight.

1.9 COORDINATION

A. Section 01 30 00 - Administrative Requirements: Coordination and project conditions.

B. Coordinate installation of outlet boxes for equipment connected under Section 26 05 03.

C. Coordinate mounting, orientation and locations of in ground handholes pull boxes outlets and switches.

D. Coordinate with utility company for exact trench path, location of pull boxes and quantity of pullboxes.

PART 2 PRODUCTS

2.1 METAL CONDUIT

A. Manufacturers:
1. Allied Tube and Conduit.
2. Western Tube and Conduit.
3. Wheatland Tube Company.
4. Substitutions: Section 01 60 00 - Product Requirements.

B. Rigid Steel Conduit: ANSI C80.1.

C. Fittings and Conduit Bodies: NEMA FB 1; material to match conduit.

2.2 FLEXIBLE METAL CONDUIT

A. Manufacturers:
1. Allied Tube and Conduit
2. Western Tube and Conduit.
3. Wheatland Tube Company.
4. Substitutions: Section 01 60 00 - Product Requirements.

B. Fittings: NEMA FB 1.

2.3 LIQUIDTIGHT FLEXIBLE METAL CONDUIT

A. Manufacturers:
1. Carlon Electrical Products.
2. Anamet Electrical.
3. Allied Tube and Conduit.
4. Substitutions: Section 01 60 00 - Product Requirements.

B. Fittings: NEMA FB 1.

2.4 ELECTRICAL METALLIC TUBING (EMT)

A. Manufacturers:
1. Allied Tube and Conduit.
2. Western Tube and Conduit.
3. Wheatland Tube Company.
4. Substitutions: Section 01 60 00 - Product Requirements.

B. Product Description: ANSI C80.3; galvanized tubing.

C. Fittings and Conduit Bodies: NEMA FB 1; steel, set screw type.

2.5 NONMETALLIC CONDUIT

A. Manufacturers:
1. Carlon Electrical Products.
2. Thomas & Betts Corp.
3. Allied Tube and Conduit.
4. Substitutions: Section 01 60 00 - Product Requirements.

B. Product Description: NEMA TC 2; Schedule 40/80 PVC.

C. Fittings and Conduit Bodies: NEMA TC 3.

2.6 WIREWAY

A. Manufacturers:
1. Carlon Electrical Products.
2. Thomas & Betts Corp.
3. Hoffman.
4. Substitutions: Section 01 60 00 - Product Requirements.

B. Product Description: General purpose type wireway.

C. Knockouts: Manufacturer's standard.

D. Cover: Screw cover.

E. Finish: Rust inhibiting primer coating with gray enamel finish.

2.7 OUTLET BOXES

A. Manufacturers:
1. Erico Products.
2. Raco.
3. Thomas & Betts Corp.
4. Substitutions: Section 01 60 00 - Product Requirements.

B. Sheet Metal Outlet Boxes: NEMA OS 1, galvanized steel.
1. Luminaire and Equipment Supporting Boxes: Rated for weight of equipment supported; furnish 1/2 inch male fixture studs where required.

C. Nonmetallic Outlet Boxes: NEMA OS 2.

D. Cast Boxes: PG Style Polymer Concrete (stackable) Assembly in ground boxes with covers rated for cover by box manufacturer 15,000 pounds. Covers shall be identified with content (Utility, Data, or Electrical)

E. Wall Plates for Finished Areas: As specified in Section 26 27 26.

F. Wall Plates for Unfinished Areas: Furnish cover with gasket.

G. Provide boxes listed for “EXTRA DUTY” for exterior receptacle locations.

2.8 PULL AND JUNCTION BOXES

A. Manufacturers:
1. Carlon Electrical Products.
2. Hubbell Wiring Devices.
3. Hubbell in ground stackable boxes.
4. Thomas & Betts Corp.
5. Substitutions: Section 01 60 00 - Product Requirements.

B. Sheet Metal Boxes: NEMA OS 1, galvanized steel.

C. Surface Mounted Cast Metal Box: NEMA 250; flat-flanged, surface mounted junction box:
1. Material: Cast aluminum.
2. Cover: Furnish with ground flange, neoprene gasket, and stainless steel cover screws.

D. "ComBox" by Sportsfield Specialties model # CBNGI830 (3551) Provide where required on drawings. Box is made out of 3/16" Aluminum with removable aluminum divider. The enclosure dimensions are 30"L x 18"W x 14"H. "ComBox" has a 1" PVC drain stub for positive drainage connection. "ComBox" cover and hand holes are aluminum construction with following attributes:
1. Pad lockable main cover.
2. Designed to allow synthetic turf to be adhered directly to the aluminum surface with synthetic adhesive or mechanical fasteners.
3. Accessories include
   a. Stainless steel leveling bolts
   b. Stainless steel assembly hardware
   c. Factory provided 3/8" drainage holes in main cover.

PART 3 EXECUTION

3.1 EXAMINATION

A. Section 01 30 00 - Administrative Requirements: Coordination and project conditions.

B. Verify outlet locations and routing and termination locations of raceway prior to rough-in.

3.2 INSTALLATION

A. Ground and bond raceway and boxes in accordance with Section 26 05 26.

B. Fasten raceway and box supports to structure and finishes in accordance with Section 26 05 29.

C. Identify raceway and boxes in accordance with Section 26 05 53.

D. Arrange raceway and boxes to maintain clearances and present neat appearance.

3.3 INSTALLATION - RACEWAY

A. Raceway routing is shown in approximate locations unless dimensioned. Route to complete wiring system.

B. Arrange raceway supports to prevent misalignment during wiring installation.

C. Support raceway using coated steel or malleable iron straps, lay-in adjustable hangers, clevis hangers, and split hangers.

D. Group related raceway; support using conduit rack. Construct rack using steel channel specified in Section 26 05 29.

E. Do not support raceway with wire or perforated pipe straps. Remove wire used for temporary supports

F. Do not attach raceway to ceiling support wires or other piping systems.

G. Construct wireway supports from steel channel specified in Section 26 05 29.

H. Route exposed raceway parallel and perpendicular to walls.

I. Route raceway installed above accessible ceilings parallel and perpendicular to walls.

J. Route conduit in and under slab from point-to-point.

K. Maintain clearance between raceway and piping for maintenance purposes.

L. Maintain 12 inch clearance between raceway and surfaces with temperatures exceeding 104 degrees F.

M. Cut conduit square using saw or pipe cutter; de-burr cut ends.

N. Bring conduit to shoulder of fittings; fasten securely.

O. Join nonmetallic conduit using cement as recommended by manufacturer. Wipe nonmetallic conduit dry and clean before joining. Apply full even coat of cement to entire area inserted in fitting. Allow joint to cure for minimum 20 minutes.

P. Coordinate with AHJ for exact depth to bury conduits.

Q. Install conduit hubs to fasten conduit to sheet metal boxes in damp and wet locations and to cast boxes.

R. Install no more than equivalent of three 90 degree bends between boxes. Install conduit bodies to make sharp changes in direction, as around beams. Install factory elbows for bends in metal conduit larger than 2 inch size.

S. Avoid moisture traps; install junction box with drain fitting at low points in conduit system.

T. Seal all raceway entering a building from the exterior with sealant identified for use with the cable insulation, shield or other cabling components.

U. Install fittings to accommodate expansion and deflection where raceway crosses expansion joints.

V. Install suitable pull string or cord in each empty raceway except sleeves and nipples.

W. Install suitable caps to protect installed conduit against entrance of dirt and moisture.

X. Surface Raceway: Install flat-head screws, clips, and straps to fasten raceway channel to surfaces; mount plumb and level. Install insulating bushings and inserts at connections to outlets and corner fittings.

Y. Close ends and unused openings in wireway.

3.4 INSTALLATION - BOXES

A. Install wall mounted boxes at elevations to accommodate mounting heights as indicated on Drawings.

B. Adjust box location prior to rough-in to accommodate intended purpose.

C. Orient boxes to accommodate wiring devices oriented as specified in Section 26 27 26.

D. Install pull boxes and junction boxes above accessible ceilings and in unfinished areas only.

E. In Accessible Ceiling Areas: Install outlet and junction boxes no more than 6 inches from ceiling access panel or from removable recessed luminaire.

F. Locate flush mounting box in masonry wall to require cutting of masonry unit corner only. Coordinate masonry cutting to achieve neat opening.

G. Do not install flush mounting box back-to-back in walls; install with minimum 6 inches separation. Install with minimum 24 inches separation in acoustic rated walls.

H. Secure flush mounting box to interior wall and partition studs. Accurately position to allow for surface finish thickness.

I. Install stamped steel bridges to fasten flush mounting outlet box between studs.

J. Install flush mounting box without damaging wall insulation or reducing its effectiveness.

K. Install adjustable steel channel fasteners for hung ceiling outlet box.

L. Support boxes independently of conduit.

M. Install gang box where more than one device is mounted together. Do not use sectional box.

N. Install “ComBox” as per manufactures recommendations.

3.5 INTERFACE WITH OTHER PRODUCTS

A. Align adjacent wall mounted outlet boxes for switches and similar devices.

3.6 ADJUSTING

A. Section 01 70 00 - Execution and Closeout Requirements: Testing, adjusting, and balancing.

B. Adjust flush-mounting outlets to make front flush with finished wall material.

C. Install knockout closures in unused openings in boxes.

3.7 CLEANING

A. Section 01 70 00 - Execution and Closeout Requirements: Final cleaning.

B. Clean interior of boxes to remove dust, debris, and other material.

C. Clean exposed surfaces and restore finish.

END OF SECTION 26 05 33

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SECTION 26 05 53 – IDENTIFICATION FOR ELECTRICAL SYSTEMS

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. Nameplates.
2. Labels.
3. Wire markers.
4. Conduit markers.
5. Stencils.
6. Underground Warning Tape.
7. Lockout Devices.

B. Related Sections:
1. Section 09 90 00 - Painting and Coating: Execution requirements for painting specified by this section.

1.3 SUBMITTALS

A. Section 01 33 00 - Submittal Procedures Submittal procedures.

B. Product Data:
1. Submit manufacturer’s catalog literature for each product required.
2. Submit electrical identification schedule including list of wording, symbols, letter size, color coding, tag number, location, and function.

C. Manufacturer's Installation Instructions: Indicate installation instructions, special procedures, and installation.

1.4 CLOSEOUT SUBMITTALS

A. Project Record Documents: Record actual locations of tagged devices; include tag numbers.

1.5 DELIVERY, STORAGE, AND HANDLING

A. Section 01 60 00 - Product Requirements: Requirements for transporting, handling, storing, and protecting products.

B. Accept identification products on site in original containers. Inspect for damage.

C. Accept materials on site in original factory packaging, labeled with manufacturer's identification, including product density and thickness.

D. Protect insulation from weather and construction traffic, dirt, water, chemical, and mechanical damage, by storing in original wrapping.

1.6 ENVIRONMENTAL REQUIREMENTS

A. Section 01 60 00 - Product Requirements: Environmental conditions affecting products on site.

B. Install nameplates only when ambient temperature and humidity conditions for adhesive are within range recommended by manufacturer.

PART 2 PRODUCTS

2.1 NAMEPLATES

A. Manufacturers:
1. Seton.
2. Brady.
3. Ideal Industries
4. Substitutions: Section 01 60 00 - Product Requirements. Product Description: Laminated three-layer plastic with engraved black letters on white contrasting background color. White letters on Red background for emergency equipment.

B. Product Description: Laminated three-layer plastic with engraved white letters on black contrasting background color.

C. Letter Size:
1. 1/8 inch high letters for identifying individual equipment and loads.
2. 1/4 inch high letters for identifying grouped equipment and loads.

D. Minimum nameplate thickness: 1/8 inch.

2.2 LABELS

A. Manufacturers:
1. Seton.
2. Brady.
3. Ideal Industries
4. Substitutions: Section 01 60 00 - Product Requirements. Product Description: Laminated three-layer plastic with engraved black letters on white contrasting background color. White letters on Red background for emergency equipment.

2.3 WIRE MARKERS

A. Manufacturers:
1. Seton.
2. Brady.
3. Ideal Industries

2.4 CONDUIT AND RACEWAY MARKERS

A. Manufacturers:
1. Seton.
2. Brady.
3. Ideal Industries

B. Legend:
1. 240/120 Volt System: 240 VOLTS.
2. 480 Volt System: 480/277 VOLTS
3. Telephone System: Telephone
4. Voice/Data Systems: Voice/Data

2.5 UNDERGROUND WARNING TAPE

A. Manufacturers:
1. Seton.
2. Brady.
3. Ideal Industries
4. Substitutions: Section 01 60 00 - Product Requirements. Description: 4 inch wide plastic tape, detectable type, colored yellow with suitable warning legend describing buried electrical lines.

2.6 DEVICE IDENTIFICATION

A. Service Equipment:
1. Labeling:
a. Indicate the maximum available fault current at the equipment, including the date the fault current calculation was performed. Label shall include warning for “Arc Flash Hazard” and requirement for “PPE protection”.
b. Indicate Equipment designation.

B. Panelboards:
1. Labeling:
a. Indicate power supply origin (panelboard or transformer) of source feeding the panelboard.
b. Indicate Panelboard designation.

C. Receptacles:
1. Labeling:
a. Indicate source panel and circuit number at each cover plate.
b. Cover plates shall be labeled with information indicated above using a permanent label.

PART 3 EXECUTION

3.1 PREPARATION

A. Degrease and clean surfaces to receive adhesive for identification materials.

3.2 INSTALLATION

A. Install identifying devices after completion of painting.

B. Nameplate Installation:
1. Install nameplate parallel to equipment lines.
2. Install nameplate for each interior electrical distribution and control equipment enclosure with corrosive-resistant mechanical fasteners, or adhesive.
3. Install nameplates for each interior control panel and major control components located outside panel with corrosive-resistant mechanical fasteners.
4. Install nameplates for each exterior control panel and equipment enclosure to equipment front using corrosive-resistant fasteners or rivets.
5. Secure nameplate to inside surface of door on recessed panelboard in finished locations.
6. Install nameplates for the following:
a. Panelboards.
b. Transformers.
c. Disconnects.
d. Control Panels.

C. Label Installation:
1. Install label parallel to equipment lines.
2. Install label for identification of individual control device stations.
3. Install labels for permanent adhesion and seal with clear lacquer.

D. Wire Marker Installation:
1. Install wire marker for each conductor at panelboard gutters, pull boxes and junction boxes.
2. Mark data cabling at each end. Install additional marking at accessible locations along the cable run.
3. Install labels at data outlets identifying patch panel and port designation.

E. Underground Warning Tape Installation:
   1. Install underground warning tape along length of each underground conduit, raceway, or cable 12 inches below finished grade, directly above buried conduit, raceway, or cable.

END OF SECTION 26 05 53

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SECTION 26 24 16 - PANELBOARDS

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 distribution and branch circuit panelboards.

B. Selective Coordination:
1. Fusible branch circuit panelboards overcurrent protective devices shall be selectively coordinated with all supply side fed from (both the normal and emergency source) overcurrent protective devices. Provide recommended fuses from a single manufacturer to maintain published minimum ampere coordination ratios. Consult manufacturer for coordination ratios for other types of fuses.

C. Related Sections:
1. Section 26 05 26 - Grounding and Bonding for Electrical Systems.
2. Section 26 05 53 - Identification for Electrical Systems.

1.3 REFERENCES

A. Institute of Electrical and Electronics Engineers:
1. IEEE C62.41 - Recommended Practice on Surge Voltages in Low-Voltage AC Power Circuits.
2. UL 248 – Low-Voltage Fuses.
3. NEMA FU 1 – Low Voltage Cartridge Fuses.

B. National Electrical Manufacturers Association:
1. NEMA AB 1 - Molded Case Circuit Breakers and Molded Case Switches.
2. NEMA FU 1 - Low Voltage Cartridge Fuses.
3. NEMA ICS 2 - Industrial Control and Systems: Controllers, Contactors, and Overload Relays, Rated Not More Than 2000 Volts AC or 750 Volts DC.
4. NEMA ICS 5 - Industrial Control and Systems: Control Circuit and Pilot Devices.
5. NEMA KS 1 - Enclosed and Miscellaneous Distribution Equipment Switches (600 Volts Maximum).
6. NEMA PB 1 - Panelboards.
7. NEMA PB 1.1 - General Instructions for Proper Installation, Operation, and Maintenance of Panelboards Rated 600 Volts or Less.

C. International Electrical Testing Association:
1. NETA ATS - Acceptance Testing Specifications for Electrical *Power* **DISTRIBUTION** Equipment and Systems.

D. National Fire Protection Association:
   1. NFPA 70 - National Electrical Code.

E. Underwriters Laboratories Inc.:
   1. UL 67 - Safety for Panelboards.
   2. UL 1283 - Electromagnetic Interference Filters.
   3. UL 1449 - Transient Voltage Surge Suppressors.

1.4 SUBMITTALS

A. Shop Drawings: Indicate outline and support point dimensions, voltage, main bus ampacity, integrated short circuit ampere rating, circuit breaker and fusible switch arrangement and sizes.

B. Product Data: Submit catalog data showing specified features of standard products.

C. Main disconnect ratings (if applicable):
   1. Voltage and ampacity ratings of disconnect.
   2. Voltage, ampacity, and interrupting ratings of fuses.

D. Branch device ratings including:
   1. Voltage, ampacity, and interrupting ratings of fused branch device.

1.5 CLOSEOUT SUBMITTALS

A. Project Record Documents: Record actual locations of panelboards and record actual circuiting arrangements.

B. Operation and Maintenance Data: Submit spare parts listing; source and current prices of replacement parts and supplies; and recommended maintenance procedures and intervals.

1.6 QUALIFICATIONS

A. Manufacturer: Company specializing in manufacturing products specified in this section with minimum five years documented experience.

B. Fusible branch circuit panelboards shall be listed to UL 67.

1.7 MAINTENANCE MATERIALS

A. Furnish two of each panelboard key. Panelboards keyed alike.

B. Furnish 20% or minimum of three fuses of each rating and type of fuse installed.

C. Furnish a minimum of one spare fuse cabinet or as indicated on the drawings.

PART 2 PRODUCTS

2.1 DISTRIBUTION PANELBOARDS

A. Manufacturers:
1. Square D.
2. Eaton/Cutler Hammer
3. Siemens
4. General Electric.
5. Substitutions: Not permitted.

B. Product Description: NEMA PB 1, circuit breaker type panelboard.

C. Panelboard Bus: Copper current carrying components, ratings as indicated on Drawings. Furnish copper ground bus in each panelboard.

D. Minimum integrated short circuit rating: Calculated based on primary transformer available SCR.

E. Molded Case Circuit Breakers: NEMA AB 1, circuit breakers with integral thermal and instantaneous magnetic trip in each pole. Furnish circuit breakers UL listed as Type HACR for air conditioning equipment branch circuits.

F. Circuit Breaker Accessories: Trip units and auxiliary switches as indicated on Drawings.

G. SPD Devices: Provide integral panel mounted surge protective device modules within all 480/277v distribution panelboards.
1. IEEE C62.41surge protective device.
2. Style B
3. 160 kA per phases and 80kAper mode.

H. Enclosure: NEMA PB 1, Type 1 cabinet box.

I. Cabinet Front: Surface door-in-door type, fastened with concealed trim clamps, hinged door with flush lock, metal directory frame, finished in manufacturer's standard gray enamel.

J. Provide main circuit breakers in Panelboards.

2.2 BRANCH CIRCUIT PANELBOARDS

A. Manufacturers:
1. Square D.
2. Eaton/Cutler Hammer.
3. Siemens.
4. General Electric.
5. Substitutions: Not permitted.

B. Product Description: NEMA PB1, circuit breaker type, lighting and appliance branch circuit panelboard.

C. Panelboard Bus: Copper current carrying components, ratings as indicated on Drawings. Furnish copper ground bus in each panelboard.

D. Minimum Integrated Short Circuit Rating: Calculated based on primary transformer available SCR and as indicated on plans.

E. Molded Case Circuit Breakers: NEMA AB 1, bolt-on type thermal magnetic trip circuit breakers, with common trip handle for all poles, listed as Type SWD for lighting circuits, Type HACR for air conditioning equipment circuits, Class A ground fault interrupter circuit breakers as indicated on Drawings. Do not use tandem circuit breakers.

F. Enclosure: NEMA PB 1, Type 1.

G. Cabinet Box: 6 inches deep, 20 inches wide for 480/277 volt and less panelboards.

H. Cabinet Front: Flush cabinet front with concealed hinge, metal directory frame, and flush lock keyed alike. Finish in manufacturer's standard gray enamel.

PART 3 EXECUTION

3.1 INSTALLATION

A. Install panelboards in accordance with NEMA PB 1.1.

B. Install panelboards plumb.

C. Install recessed panelboards flush with wall finishes.

D. Height: 6 feet to top of panelboard; install panelboards taller than 6 feet with bottom no more than 4 inches above floor.

E. Install filler plates for unused spaces in panelboards.

F. Provide typed circuit directory for each branch circuit panelboard. Revise directory to reflect circuiting changes to balance phase loads.

G. Install engraved plastic nameplates in accordance with Section 26 05 53.

H. Install a permanent label indicating the panelboard or transformer where the power supply to the panel originates.

I. Ground and bond panelboard enclosure according to Section 26 05 26. Connect equipment ground bars of panels in accordance with NFPA 70.

J. Define each lighting control circuit breaker, relay load type and assign to required zone, input and/or schedule.

3.2 FIELD QUALITY CONTROL

A. Section 01 70 00 - Execution and Closeout Requirements: Field inspecting, testing, adjusting, and balancing.

B. Inspect and test in accordance with NETA ATS, except Section 4.

C. Perform circuit breaker inspections and tests listed in NETA ATS, Section 7.6.

D. Perform switch inspections and tests listed in NETA ATS, Section 7.5.

E. Perform controller inspections and tests listed in NETA ATS, Section 7.16.1.

F. Above testing shall be documented in writing and furnished as a part of O&M manuals, and provided to CX agent prior to closeout.

3.3 ADJUSTING

A. Section 01 70 00 - Execution and Closeout Requirements: Requirements for starting and adjusting.

B. Measure steady state load currents at each panelboard feeder; rearrange circuits in panelboard to balance phase loads to within 20 percent of each other. Maintain proper phasing for multi-wire branch circuits.

END OF SECTION 26 24 16

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SECTION 26 27 26 - WIRING DEVICES

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 wall switches; receptacles;; and device plates.
   1. Section 26 05 33 - Raceway and Boxes for Electrical Systems: Outlet boxes for wiring devices.

1.3 REFERENCES

A. National Electrical Manufacturers Association:
   1. NEMA WD 1 - General Requirements for Wiring Devices.
   2. NEMA WD 6 - Wiring Devices-Dimensional Requirements.

1.4 SUBMITTALS

A. Product Data: Submit manufacturer's catalog information showing dimensions, colors, and configurations.

B. Samples: Submit two samples of each wiring device and wall plate illustrating materials, construction, color, and finish.

1.5 QUALIFICATIONS

A. Manufacturer: Company specializing in manufacturing products specified in this section with minimum three years documented experience.

1.6 EXTRA MATERIALS

A. Furnish two of each style, size, and finish wall plate.

PART 2 PRODUCTS

2.1 WALL SWITCHES

A. Manufacturers:
1. Hubbell Wiring Products.
2. Leviton.
3. Bryant.
4. Pass and Seymour.
5. Substitutions: Section 01 60 00 - Product Requirements.

B. Product Description: NEMA WD 1, General-Duty, AC only general-use snap switch.

C. Body and Handle: Color by Architect.

D. Ratings:
1. Voltage: 120 volts, AC.
2. Current: 20 amperes.

E. Ratings: Match branch circuit and load characteristics.

F. Specification grade device.

2.2 RECEPTACLES

A. Manufacturers:
1. Hubbell Wiring Products.
2. Leviton.
3. Bryant.
4. Pass and Seymour.
5. Substitutions: Section 01 60 00 - Product Requirements.

B. Product Description: NEMA WD 1, General-duty general use receptacle.

C. Device Body: Color by Architect

D. Configuration: NEMA WD 6, type as indicated on Drawings.

E. Convenience Receptacle: Type 5-20R.

F. GFCI Receptacle: Convenience receptacle with integral ground fault circuit interrupter to meet regulatory requirements.

G. Specification grade device.

2.3 WALL PLATES

A. Manufacturers:
1. Hubbell Wiring Products.
2. Leviton.
3. Bryant.
4. Pass and Seymour.
5. Substitutions: Section 01 60 00 - Product Requirements.

B. Decorative Cover Plate: Stainless steel plate, natural brushed finish.

PART 3 EXECUTION

3.1 EXAMINATION

A. Verify outlet boxes are installed at proper height.

B. Verify wall openings are neatly cut and completely covered by wall plates.

C. Verify branch circuit wiring installation is completed, tested, and ready for connection to wiring devices.

3.2 PREPARATION

A. Clean debris from outlet boxes.

3.3 INSTALLATION

A. Install devices plumb and level.

B. Install switches with OFF position down.

C. Install receptacles with grounding pole on top.

D. Connect wiring device grounding terminal to outlet box with bonding jumper and branch circuit equipment grounding conductor.

E. Install wall plates on switch, receptacle, and blank outlets in finished areas.

F. Connect wiring devices by wrapping solid conductor around screw terminal. Install stranded conductor for branch circuits 10 AWG and smaller. When stranded conductors are used in lieu of solid, use crimp on fork terminals for device terminations. Do not place bare stranded conductors directly under device screws.

G. Use jumbo size plates for outlets installed in masonry walls.

H. Install galvanized steel plates on outlet boxes and junction boxes in unfinished areas, above accessible ceilings, and on surface mounted outlets.

I. Provide weatherproof GFCI type receptacles for all 20A, 125V receptacles.

3.4 INTERFACE WITH OTHER PRODUCTS

A. Coordinate locations of outlet boxes provided under Section 26 05 33 to obtain mounting heights as specified and as indicated on drawings.

B. Install wall switch 48 inches above finished floor.

C. Install convenience receptacle 18 inches above finished floor.

D. Install convenience receptacle 6 inches above counter or back splash of counter.

E. Coordinate installation of wiring devices with floor box service fittings provided under Section 26 05 34 and Section 26 05 39.

3.5 FIELD QUALITY CONTROL

A. Inspect each wiring device for defects.

B. Operate each wall switch with circuit energized and verify proper operation.

C. Verify each receptacle device is energized.

D. Test each receptacle device for proper polarity.

E. Test each GFCI receptacle device for proper operation.

3.6 ADJUSTING

A. Adjust devices and wall plates to be flush and level.

3.7 CLEANING

A. Clean exposed surfaces to remove splatters and restore finish.

END OF SECTION 26 27 26

SECTION 26 28 13 - FUSES

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 fuses and spare fuse cabinet.

1.3 REFERENCES

A. National Electrical Manufacturers Association:
1. NEMA FU 1 - Low Voltage Cartridge Fuses.

1.4 DESIGN REQUIREMENTS

A. Select fuses to provide appropriate levels of short circuit and overcurrent protection for the following components: wire, cable, bus structures, and other equipment. Design system to maintain component damage within acceptable levels during faults.

B. Select fuses to coordinate with time current characteristics of other overcurrent protective elements, including other fuses, circuit breakers, and protective relays. Design system to maintain operation of device closest to fault operates.

1.5 FUSE PERFORMANCE REQUIREMENTS

A. General Purpose Branch Circuits: Class RK1 (time delay).

B. Motor Branch Circuits: Class RK1 (time delay).

1.6 SUBMITTALS

A. Section 01 33 00 - Submittal Procedures: Submittal procedures.

B. Product Data: Submit data sheets showing electrical characteristics, including time-current curves.

1.7 CLOSEOUT SUBMITTALS

A. Section 01 70 00 - Execution and Closeout Requirements: Closeout procedures.

B. Project Record Documents: Record actual sizes, ratings, and locations of fuses.

1.8 QUALIFICATIONS

A. Manufacturer: Company specializing in manufacturing products specified in this section with minimum three years documented experience.

1.9 MAINTENANCE MATERIALS

A. Section 01 70 00 - Execution and Closeout Requirements: Spare parts and maintenance products.

B. Furnish two fuse pullers.

1.10 EXTRA MATERIALS

A. Section 01 70 00 - Execution and Closeout Requirements: Requirements for extra materials.

B. Furnish three spare fuses of each Class, size, and rating installed.

PART 2 PRODUCTS

2.1 FUSES

A. Manufacturers:
1. Bussman.
2. Gould Shawmut.
3. Little Fuse.
4. Substitutions: Section 01 60 00 - Product Requirements.

B. Dimensions and Performance: NEMA FU 1, Class as specified or as indicated on Drawings.

C. Voltage: Rating suitable for circuit phase-to-phase voltage.

2.2 SPARE FUSE CABINET

A. Manufacturers:
1. Bussman.
2. Gould Shawmut.
3. Little Fuse.
4. Substitutions: Section 01 60 00 - Product Requirements.

B. Product Description: Wall-mounted sheet metal cabinet with shelves, suitably sized to store spare fuses and fuse pullers specified.

C. Doors: Hinged, with hasp for Owner's padlock.

D. Finish: Gray enamel.

PART 3 EXECUTION

3.1 INSTALLATION

A. Install fuse with label oriented so manufacturer, type, and size are easily read.

B. Install spare fuse cabinet as indicated on Drawings or as directed by Owner.

END OF SECTION 26 28 13

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SECTION 26 28 19 - ENCLOSED SWITCHES

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 fusible and nonfusible switches.

B. Related Sections:
1. Section 26 28 13 - Fuses.

1.3 REFERENCES

A. National Electrical Manufacturers Association:
1. NEMA FU 1 - Low Voltage Cartridge Fuses.
2. NEMA KS 1 - Enclosed and Miscellaneous Distribution Equipment Switches (600 Volts Maximum).

B. International Electrical Testing Association:
1. NETA ATS - Acceptance Testing Specifications for Electrical Power Distribution Equipment and Systems.

1.4 SUBMITTALS

A. Section 01 33 00 - Submittal Procedures: Submittal procedures.

B. Product Data: Submit switch ratings and enclosure dimensions.

1.5 CLOSEOUT SUBMITTALS

A. Section 01 70 00 - Execution and Closeout Requirements: Closeout procedures.

B. Project Record Documents: Record actual locations of enclosed switches and ratings of installed fuses.

1.6 QUALIFICATIONS

A. Manufacturer: Company specializing in manufacturing products specified in this section with minimum three years documented experience.

PART 2 PRODUCTS

2.1 FUSIBLE SWITCH ASSEMBLIES

A. Manufacturers:
1. Square D.
2. Eaton/Cutler Hammer.
3. Siemens.
4. General Electric.
5. Substitutions: Section 01 60 00 - Product Requirements.

B. Product Description: NEMA KS 1, Type HD, enclosed load interrupter knife switch. Handle lockable in OFF position.

C. Fuse clips: Designed to accommodate NEMA FU 1, Class R fuses.

D. Enclosure: NEMA KS 1, to meet conditions. Fabricate enclosure from steel finished with manufacturer's standard gray enamel.
1. Interior Dry Locations: Type 1.
2. Exterior Locations: Type 3R.

E. Furnish switches with entirely copper current carrying parts.

2.2 NONFUSIBLE SWITCH ASSEMBLIES

A. Manufacturers:
1. Square D.
2. Eaton/Cutler Hammer.
3. Siemens.
4. General Electric.
5. Substitutions: Section 01 60 00 - Product Requirements.

B. Product Description: NEMA KS 1, Type HD enclosed load interrupter knife switch. Handle lockable in OFF position.

C. Enclosure: NEMA KS 1, to meet conditions. Fabricate enclosure from steel finished with manufacturer's standard gray enamel.
1. Interior Dry Locations: Type 1.
2. Exterior Locations: Type 3R.

D. Furnish switches with entirely copper current carrying parts.

2.3 SWITCH RATINGS

A. Switch Rating: Horsepower rated for AC or DC as indicated on Drawings.

B. Short Circuit Current Rating: UL listed for 200,000 rms symmetrical amperes when used with or protected by Class R or Class J fuses (30-600 ampere switches employing appropriate fuse rejection schemes).

PART 3 EXECUTION

3.1 INSTALLATION

A. Install enclosed switches plumb. Provide supports in accordance with Section 26 05 29.

B. Height: 5 feet to operating handle.

C. Install fuses for fusible disconnect switches. Refer to Section 26 28 13 for product requirements.

D. Install engraved plastic nameplates in accordance with Section 26 05 53.

E. Apply adhesive tag on inside door of each fused switch indicating NEMA fuse class and size installed.

3.2 FIELD QUALITY CONTROL

A. Section 01 70 00 - Execution and Closeout Requirements: Field inspecting, testing, adjusting, and balancing.

B. Inspect and test in accordance with NETA ATS, except Section 4.

C. Perform inspections and tests listed in NETA ATS, Section 7.5.

END OF SECTION 26 28 19

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SECTION 26 33 00 - EMERGENCY POWER INVERTER

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 emergency power supplies and accessories.

1.3 REFERENCES

A. National Fire Protection Association:
1. NFPA 111 - Standard on Stored Electrical Energy Emergency and Standby Power Systems.

1.4 SUBMITTALS

A. Section 01 33 00 - Submittal Procedures: Submittals procedures.

B. Product Data: Submit catalog and data sheets showing electrical characteristics and connection requirements. Include unit ratings, dimensions, and finishes. Include performance data for batteries.

1.5 CLOSEOUT SUBMITTALS

A. Section 01 70 00 - Execution and Closeout Requirements: Closeout procedures.

B. Operation and Maintenance Data: Submit battery maintenance and unit testing procedures.

1.6 QUALITY ASSURANCE

A. Perform Work in accordance with NFPA 111.

B. Maintain three copies of document on site.

1.7 QUALIFICATIONS

A. Manufacturer: Company specializing in manufacturing products specified in this section with minimum 30 years documented experience, and with service facilities within 100 miles of project.

1.8 WARRANTY

A. Section 01 70 00 - Execution and Closeout Requirements: Product warranties and product bonds.

B. Furnish 10 year manufacturer warranty for batteries.

1.9 EXTRA MATERIALS

A. Section 01 70 00 - Execution and Closeout Requirements: Spare parts and maintenance products.

B. Furnish one extra battery.

PART 2 PRODUCTS

2.1 EMERGENCY POWER SUPPLY

A. Manufacturers:
1. Myers Power Products, Illuminator.
2. Exitronix, Sierra 1 series
3. Emergi-Lite, Emerg-Power System
4. Substitutions: Not Permitted.

B. Product Description: NFPA 111 Type B, Class 1.5 stored emergency power supply system designed for Level 1 applications and consisting of rectifier/charger unit, storage battery, and solid state inverter with transfer switch, in one or several enclosures. unit suitable for operating HID lamps without extinguishing lamp on transfer.

C. Input Voltage: 480 volts, 60 Hz, single phase.

D. Output Power: 4000 VA at 0.5 power factor.

E. Output Voltage: 480 volts plus/minus 3% percent, single phase.

F. Inverter Output Frequency: .60 Hz plus .05 percent.

G. Efficiency: 90 percent minimum.

H. Maximum Recharge Time: 24 hours following 1.5 hour discharge.

I. Total Harmonic Distortion: Less than 3 percent at full resistive load.

J. Battery: Lead calcium, sealed type battery.

K. Charger: Dual rate, designed to maintain battery in full-charge condition during normal conditions.

L. Furnish local trouble monitor in flush-mounted enclosed within manufacturer's standard enclosure.

M. Enclosure: Lockable, NEMA 3R, freestanding, two-door enclosure with forced air temperature controlled fans.

N. Accessories: Metering; maintenance bypass switch.

O. Emergency power inverter is self-testing and has self-diagnostics.

P. Operating temperature of emergency inverter shall be between -4°F and 104°F for 90 minutes of operation.

PART 3 EXECUTION

3.1 INSTALLATION

A. Install units plumb and level.

B. Start-up of inverter shall be by manufacturer's personnel.

3.2 FIELD QUALITY CONTROL

A. Section 01 70 00 - Execution and Closeout Requirements: Field inspecting, testing, adjusting, and balancing.

B. Verify operation of each unit by simulating outage.

3.3 DEMONSTRATION AND TRAINING

A. Demonstrate normal operation of unit.

B. 2 hr training/shift.

END OF SECTION 26 33 00

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SECTION 26 56 68 – EXTERIOR ATHLETIC LIGHTING
ALTERNATE BID: Lighting System with HID (Metal Halide) Light Source

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 covered by this section of the specifications shall conform to the contract documents, engineering plans as well as state and local codes.

B. The purpose of these specifications is to define the lighting system performance and design standards for Derby High School Phase 2. For the Alt-bid manufacturer/contractor shall supply a lighting system using an HID (metal halide) light source to meet or exceed the standards set forth in these specifications.

C. Under this alternate (3) existing 80' Musco poles will be re-located and (1) new 80' pole will be installed. The existing poles will require new pre-cast Musco foundations. New pole top fitters will be installed, adding luminaires to each assembly. New electrical enclosures will be provided, along with wire harnesses. Field aiming of existing fixtures will be required, an aiming diagram will be provided by Musco.

D. The sports lighting will be for the following fields:
1. Football Field
2. Soccer Field

E. The primary goals of this sports lighting project are:
1. Guaranteed Light Levels: Selection of appropriate light levels impact the safety of the players and the enjoyment of spectators. Therefore light levels are guaranteed to not drop below specified target values for a period of 25 years.
2. Life-cycle Cost: In order to reduce the operating budget, the preferred lighting system shall be energy efficient and cost effective to operate. All maintenance costs shall be eliminated for the duration of the warranty.
3. Control and Monitoring: To allow for optimized use of labor resources and avoid unneeded operation of the facility, customer requires a remote on/off control system for the lighting system. Fields should be proactively monitored to detect luminaire outages over a 25-year life cycle. All communication and monitoring costs for 25-year period shall be included in the bid.
4. Environmental Light Control: It is the primary goal of this project to minimize spill light to adjoining properties and glare to the players, spectators and neighbors.

1.3 LIGHTING PERFORMANCE

A. Performance Requirements: Playing surfaces shall be lit to an average target illumination level and uniformity as specified in the chart below. Lighting calculations shall be developed and field measurements taken on the grid spacing with the minimum number of grid points specified below. Average illumination level shall be measured in accordance with the IESNA LM-5-04 (IESNA Guide for Photometric Measurements of Area and Sports Lighting Installations). Illumination levels shall not to drop below desired target values in accordance to IES RP-6-15, Page 2, Maintained Average Illuminance and shall be guaranteed for the full warranty period. Hours of usage shall comply with the following:

Area of Lighting	Annual Usage Hours	25 Year Usage Hours
Football Field, Soccer Field, and Track	200	5,000

B. Mounting Heights: To ensure proper aiming angles for reduced glare and to provide better playability, minimum mounting heights shall be as described below. Higher mounting heights may be required based on photometric report and ability to ensure the top of the field angle is a minimum of 10 degrees below horizontal.

# of Poles	Pole Designation	Pole Height
3 existing poles	F1, F2, F3	80’
1 new pole	F4	80’

C. Lighting Methodology: There are two methods that will be considered for calculation of the lighting designs for this project. The approved Lighting Method #1 (Musco), automated timed power adjustments, as described in C.1 utilizes methodology that adjusts light levels through a series of programmed adjustments. The alternate Lighting Method #2 (Non-Musco), continuous depreciating light, as described in C.2 uses continuous lamp lumen depreciation which is recovered by relamping and cleaning lenses of the luminaires. Computer models shall reflect initial design lumens, end of life design lumens, recoverable light loss factor (RLLF of .69), and the Coefficient Utilization (CU) for the design. Both methods must be at or above target illumination levels throughout the 25 years of the contract/warranty provided by the manufacturer. A +/- 10% design/testing allowance is not permitted in the design logic.

1. (Base-Bid) Lighting Method #1: Automated Timed Power Adjustments (Musco):
    a. Approved Musco’s Green Generation Lighting® sports lighting system shall use automated timed power adjustments to achieve a lumen maintenance control strategy as described in the IESNA Lighting Handbook 10th Edition, Lighting Controls Section page 16-8: "Lumen maintenance involves adjusting lamp output over time to maintain constant light output as lamps age and dirt accumulation reduces luminaire output. With lumen maintenance control, either lamps are dimmed when new, or the lamp's current is increased as the system ages."

b. Manufacturers, not pre-approved, bidding an automated timed power adjustment system must provide an independent test report certifying the system meets the lumen maintenance control strategy above and verifying the field performance of the system for the duration of the useful life of the lamp based on lamp replacement hours. Report shall be signed by a licensed professional engineer with outdoor lighting experience. If report is not provided at least 10 days prior to bid opening, the manufacturer shall provide the initial and maintained designs called for in this specification under Lighting Method #2: Alternate Manufacturers, section 1.2.C.2.

c. Project References: Non-approved manufacturers bidding any form of Automated Timed Power Adjustment light system must provide a minimum of ten (10) project references within the state of Connecticut that have been completed within the last 12 months utilizing this exact technology. Manufacturer will include project name, project city, and if requested, contact name and contact phone number for each reference.

Area of Lighting	Average Target Illumination Levels	Maximum to Minimum Uniformity Ratio	Grid Points	Grid Spacing
Football Field	45 FC	2 : 1	72	30’ X 30’
Soccer Field	45 FC	2 : 1	84	30’ X 30’
Track	15 FC	15 : 1	48	30’ X 30’

2. (Base-Bid) Lighting Method #2 – Continuous Depreciating Light (Non-Musco):

a. The manufacturer bidding Lighting Method #2 must provide a complete submittal package for approval as outlined in Submittal Information at the end of this section at least 10 days prior to bid.

b. The lighting system shall use continuous lamp lumen depreciation which is recovered by relamping and cleaning lenses of the luminaires. Manufacturer shall provide computer models for initial illumination level and target illumination levels on the field over 25 years. The specified maximum Recoverable Light Loss Factor (RLLF) .69 and maintenance/group relamping schedule shall be provided in accordance with recommendations in the Leukos Abstract Volume 6, Number 3, January 2010, page 183-201: “Light Loss Factors for Sports Lighting”, and presented at the 2009 IESNA Annual Conference

1500 Watt Metal Halide Luminaire
RLLF Requirements

Lamp Replacement Interval (hours)	Recoverable Light Loss Factor (RLLF)
2,100	.69

c. Independent Test Report: If lamp replacement interval is greater than 3,000 hours for 1500 watt lamps, manufacturer shall supply an independent test report with lumen depreciation over proposed lamp life, initial lumens, and end of life lumens.

d. Based on anticipated hours of usage listed below, Method #2 systems would require the following minimum group lamp replacements over the 25 years.

Area of Lighting	25 Year Usage Hours	25 Year Group Relamps Required
Football/ Soccer	200	5,000

Area of Lighting	Average Initial Illumination Levels	Average Target Illumination Levels	Maximum to Minimum Uniformity Ratio	Grid Points	Grid Spacing
Football	65 FC	45 FC	2 : 1	72	30’ X 30’
Soccer	65 FC	45 FC	2 : 1	84	30’ X 30’

e. Revised Electrical Distribution: Manufacturer shall provide revised electrical distribution plans to include changes to service entrance, panel, and wire sizing if increased power is required which exceeds specified design loads.

1.4 ENVIRONMENTAL LIGHT CONTROL

A. Light Control Luminaires: All luminaires shall utilize spill light and glare control devices including, but not limited to, internal shields, louvers and external shields. No symmetrical beam patterns are accepted.

B. The first page of a photometric report for all luminaire types proposed showing horizontal and vertical axial candle power shall be provided to demonstrate the capability of achieving the specified performance. Reports shall be certified by a qualified independent testing laboratory with a minimum of five years experience or by a manufacturer’s laboratory with a current accreditation under the National Voluntary Laboratory Accreditation Program for Energy Efficient Lighting Products. A summary of the horizontal and vertical aiming angles for each luminaire shall be included with the photometric report.

1.5 LIFE CYCLE COSTS

A. Manufacturer shall submit 25-year life cycle cost calculation as outlined in the required submittal information.

Lamp replacement schedule per charts below:

Lighting Method 1 Lamp Replacement	Lighting Method 2 Lamp Replacement
5,000 hour intervals	2,100 hour intervals

B. Preventative and Spot Maintenance: Manufacturer shall provide all preventative and spot maintenance, including parts and labor for 25 years from the date of equipment shipment. Individual outages shall be repaired when the usage of any field is materially impacted. Owner agrees to check fuses in the event of a luminaire outage.

PART 2 PRODUCT

2.1 SPORTS LIGHTING SYSTEM CONSTRUCTION

A. Manufacturing Requirements: All components shall be designed and manufactured as a system. All luminaires, wire harnesses, ballast and other enclosures shall be factory assembled, aimed, wired and tested.

B. Durability: All exposed components shall be constructed of corrosion resistant material and/or coated to help prevent corrosion. All exposed carbon steel shall be hot dip galvanized per ASTM A123. All exposed aluminum shall be powder coated with high performance polyester or anodized. All exterior reflective inserts shall be anodized, coated, and protected from direct environmental exposure to prevent reflective degradation or corrosion. All exposed hardware and fasteners shall be stainless steel of 18-8 grade or better, passivated and coated with aluminum-based thermosetting epoxy resin for protection against corrosion and stress corrosion cracking. Structural fasteners may be carbon steel and galvanized meeting ASTM A153 and ISO/EN 1461 (for hot dipped galvanizing), or ASTM B695 (for mechanical galvanizing). All wiring shall be enclosed within the cross-arms, pole, or electrical components enclosure.

C. System Description: Lighting system shall consist of the following:
1. Galvanized steel poles and cross-arm assemblies.
2. Non-approved pole technology:
   a. Square static cast concrete poles will not be accepted.
   b. Direct bury steel poles which utilize the extended portion of the steel shaft for their foundation will not be accepted due to potential for internal and external corrosive reaction to the soils and long term performance concerns.
3. Pre-stressed concrete base embedded in concrete backfill allowed to cure for 12-24 hours before pole stress is applied. Alternate may be an anchor bolt foundation designed such that the steel pole and any exposed steel portion of the foundation is located a minimum of 18 inches above final grade. The concrete for anchor bolt foundations shall be allowed to cure for a minimum of 28 days before the pole stress is applied unless shorter cure time approved by structural engineer of record.
4. All luminaires shall be constructed with a die-cast aluminum housing or external hail shroud to protect the luminaire reflector system.
5. Manufacturer will remote all ballasts and supporting electrical equipment in aluminum enclosures mounted approximately 10 feet above grade. The enclosures shall be touch-safe and include ballast, capacitor and fusing with indicator lights on fuses to notify when a fuse is to be replaced for each luminaire. Disconnect per circuit for each pole structure will be located in the enclosure. Integral ballast fixtures will not be accepted.

6. Wire harness complete with an abrasion protection sleeve, strain relief and plug-in connections for fast, trouble-free installation.
7. All luminaires, visors, and cross-arm assemblies shall withstand 150 mph winds and maintain luminaire aiming alignment
8. Control cabinet to provide remote on-off control and monitoring of the lighting system. Cabinet shall be constructed of aluminum and be rated NEMA Type 4. Communication method shall be provided by manufacturer. Cabinet shall contain custom configured contactor modules for 30, 60, and 100 amps, labeled to match field diagrams and electrical design. Manual off-on-auto selector switches shall be provided.
9. Lightning Protection: Manufacturer shall provide integrated lightning grounding via concrete encased electrode grounding system as defined by NFPA 780 and be UL Listed per UL 96 and UL 96A. If grounding is not integrated into the structure, the manufacturer shall supply grounding electrodes, copper down conductors, and exothermic weld kits. Electrodes and conductors shall be sized as required by NFPA 780. The grounding electrode shall be minimum size of 5/8 inch diameter and 8 feet long, with a minimum of 10 feet embedment. Grounding electrode shall be connected to the structure by a grounding electrode conductor with a minimum size of 2 AWG for poles with 75 feet mounting height or less, and 2/0 AWG for poles with more than 75 feet mounting height.

D. Safety: All system components shall be UL listed for the appropriate application.

2.2 ELECTRICAL

A. Electric Power Requirements for the Sports Lighting Equipment:
1. Electric power: 480 Volt, 3 Phase
2. Maximum total voltage drop: Voltage drop to the disconnect switch located on the poles shall not exceed three (3) percent of the rated voltage.

B. Revised Electrical Distribution: Manufacturer shall provide, at their cost, revised electrical distribution plans to include changes to service entrance, panel, and wire sizing if using Lighting Method 2.

2.3 STRUCTURAL PARAMETERS

A. Wind Loads: Wind loads shall be based on the 2012 International Building Code. Wind loads to be calculated using ASCE 7-10, an ultimate design wind speed of 125 and exposure category C.

B. Pole Structural Design: The stress analysis and safety factor of the poles shall conform to 2009 AASHTO Standard Specification for Structural Supports for Highway Signs, Luminaires, and Traffic Signals (LTS-5).

C. Foundation Design: The foundation design shall be based on soil parameters as outlined in the geotechnical report. If a geotechnical report is not available, the foundation design shall be based on soils that meet or exceed those of a Class 5 material as defined by 2012 IBC Table 1806.2.

2.4 CONTROL SYSTEM

A. Remote Lighting Control System: System shall allow owner and users with a security code to schedule on/off system operation via a web site, phone, fax or email up to ten years in advance. Manufacturer shall provide and maintain a two-way TCP/IP communication link. Trained staff shall be available 24/7 to provide scheduling support and assist with reporting needs.

The owner may assign various security levels to schedulers by function and/or fields. This function must be flexible to allow a range of privileges such as full scheduling capabilities for all fields to only having permission to execute “early off” commands by phone. Scheduling tool shall be capable of setting curfew limits.

Controller shall accept and store 7-day schedules, be protected against memory loss during power outages, and shall reboot once power is regained and execute any commands that would have occurred during outage.

B. Remote Monitoring System: System shall monitor lighting performance and notify manufacturer if individual luminaire outage is detected so that appropriate maintenance can be scheduled. The controller shall determine switch position (manual or auto) and contactor status (open or closed).

C. Management Tools: Manufacturer shall provide a web-based database and dashboard tool of actual field usage and provide reports by facility and user group. Dashboard shall also show current status of lamp outages, control operation and service scheduling including relamping operations completed and scheduled. Mobile application will be provided suitable for IOS, Android and Blackberry devices.

Hours of Usage: Manufacturer shall provide a means of tracking actual hours of usage for the field lighting system that is readily accessible to the owner.

1. Cumulative hours: shall be tracked to show the total hours used by the facility
2. Current lamp hours: shall be tracked separately to reflect the amount of hours on the current set of lamps being used, so relamping can be scheduled accurately.
3. Report hours saved by using early off and push buttons by users.

D. Communication Costs: Manufacturer shall include communication costs for operating the controls and monitoring system for a period of 25 years.

PART 3 EXECUTION

3.1 SOIL QUALITY CONTROL

A. It shall be the Contractor’s responsibility to notify the Owner if soil conditions exist other than those on which the foundation design is based, or if the soil cannot be readily excavated. Contractor may issue a change order request / estimate for the Owner’s approval / payment for additional costs associated with:

1. Providing engineered foundation embedment design by a registered engineer in the State of Connecticut for soils other than specified soil conditions.

2. Additional materials required to achieve alternate foundation;
3. Excavation and removal of materials other than normal soils, such as rock, caliche, etc.

3.2 DELIVERY TIMING

A. Delivery Timing Equipment On-Site: The equipment must be on-site 4-6 from receipt of approved submittals and receipt of complete order information.

3.3 FIELD QUALITY CONTROL

A. Illumination Measurements: Upon substantial completion of the project and in the presence of the Contractor, Project Engineer, Owner's Representative, and Manufacturer's Representative, illumination measurements shall be taken and verified. The illumination measurements shall be conducted in accordance with IESNA LM-5-04. For Lighting Method 1, Timed Power Adjustment systems, light levels must be measured and exceed the specified target levels. For Lighting Method 2, light levels must be measured and meet the specified initial light levels.

B. Field Light Level Accountability
1. Light levels are guaranteed not to fall below the target maintained light levels for the entire warranty period of 25 Years.
2. The contractor/manufacturer shall be responsible for an additional inspection one year from the date of commissioning of the lighting system and will utilize the owner’s light meter in the presence of the owner.
3. The contractor/manufacturer will be held responsible for any and all changes needed to bring these fields back to compliance for light levels and uniformities. Contractor/Manufacturer will be held responsible for any damage to the fields during these repairs.

C. Correcting Non-Conformance: If, in the opinion of the Owner or his appointed Representative, the actual performance levels including footcandles and uniformity ratios are not in conformance with the requirements of the performance specifications and submitted information, the Manufacturer shall be required to make adjustments to meet specifications and satisfy Owner.

3.4 25-YEAR WARRANTY

A. Each manufacturer shall supply a signed warranty covering the entire system for 25 years OR for the maximum hours of coverage based on the estimated annual usage, whichever occurs first. Warranty shall guarantee light levels will not fall below target maintained levels. A +/- 10% design/testing allowance will not be allowed. Warranty shall also cover: lamp replacements, system energy consumption, monitoring, maintenance and control services, spill light control, and structural integrity. Manufacturer shall maintain specifically-funded financial reserves to assure fulfillment of the warranty for the full term. Warranty may exclude fuses, storm damage, vandalism, abuse and unauthorized repairs or alterations.

B. Group lamp replacements for Method 1 systems (Time Powered Adjustment) must occur at end of useful life of lamp as stated by manufacturer. Group lamp replacements for Method 2 systems (Continuous Depreciating Light) must relamp every 2,100.

C. Maintenance: Manufacturer shall monitor the performance of the lighting system, including on/off status, hours of usage and lamp outage for 25 years from the date of equipment shipment. Individual lamp outages shall be repaired when the usage of any field is materially impacted. Owner agrees to check fuses in the event of a luminaire outage.

PART 4 DESIGN APPROVAL

4.1 PRE-BID SUBMITTAL REQUIREMENTS (Non-Musco)

A. Design Approval: The owner / engineer will review pre-bid submittals per section 4.0.B from all the manufacturers to ensure compliance to the specification 10 days prior to bid. If the design meets the design requirements of the specifications, a letter and/or addendum will be issued to the manufacturer indicating approval for the specific design submitted.

B. Listed Manufacturers:
1. Method 1: Time Powered Adjustment Technology - Musco's Green Generation Lighting® sports lighting system with a metal halide light source is the listed "Lighting Method 1" product.
2. Method 2: Continuous Depreciating Light – Non Musco is the listed "Lighting Method 2" product.

C. All listed manufacturers not pre-approved shall submit the information at the end of this section at least 10 days prior to bid. An addendum will be issued prior to bid; listing approved lighting manufacturers and the design method to be used.

D. Bidders are required to bid only products that have been approved by this specification or addendum by the owner or owner's representative. Bids received that do not utilize an approved system/design, will be rejected.

REQUIRED SUBMITTAL INFORMATION FOR ALL MANUFACTURERS (NOT PRE-APPROVED)
10 DAYS PRIOR TO BID

All items listed below are mandatory, shall comply with the specification and be submitted according to pre-bid submittal requirements. Complete the Yes/No column to indicate compliance (Y) or noncompliance (N) for each item. Submit checklist below with submittal.

Submitting as: ☐ *HID Lighting Method 1* ☐ *HID Lighting Method 2*

Yes / No	Tab	Item	Description
	A	Letter/ Checklist	Listing of all information being submitted must be included on the table of contents. List the name of the manufacturer's local representative and his/her phone number. Signed submittal checklist to be included.
	B	Equipment Layout	Drawing(s) showing field layouts with pole locations
	C	On Field Lighting Design	Lighting design drawing(s) showing: a. Field Name, date, file number, prepared by b. Outline of field(s) being lighted, as well as pole locations referenced to the center of the field (x & y), Illuminance levels at grid spacing specified c. Pole height, number of fixtures per pole, horizontal and vertical aiming angles, as well as luminaire information including wattage, lumens and optics d. Height of light test meter above field surface. e. Summary table showing the number and spacing of grid points; average, minimum and maximum illuminance levels in foot candles (fc); uniformity including maximum to minimum ratio, coefficient of variance (CV), coefficient of utilization (CU) uniformity gradient; number of luminaries, total kilowatts, average tilt factor; light loss factor. f. Manufacturer's using Lighting Method 2 shall provide both initial and maintained light scans using a maximum recoverable right loss factor (RLLF) as specified in section 1.2.C.2 and shall be shown on lighting design.
	D	Photometric Report	Provide first page of photometric report for all luminaire types being proposed showing candela tabulations as defined by IESNA Publication LM-35-02. Photometric data shall be certified by laboratory with current National Voluntary Laboratory Accreditation Program or an independent testing facility with over 5 years experience.
	E	Performance Guarantee	Provide performance guarantee including a written commitment to undertake all corrections required to meet the performance requirements noted in these specifications at no expense to the owner. Light levels must be guaranteed to not fall below target levels for warranty period.
	F	Structural Calculations	Pole structural calculations and foundation design showing foundation shape, depth backfill requirements, rebar and anchor bolts (if required). Pole base reaction forces shall be shown on the foundation drawing along with soil bearing pressures. Design must be stamped by a structural engineer in the state of Connecticut, if required by owner.
	G	Control & Monitoring System	Manufacturer of the control and monitoring system shall provide written definition and schematics for automated control system to include monitoring. They will also provide ten (10) references currently using proposed system in the state of Connecticut.
	F	Electrical Distribution Plans	Manufacturer using Lighting Method 2 must include a revised electrical distribution plan including changes to service entrance, panels and wire sizing, signed by a licensed Electrical Engineer in the state of Connecticut.

	I	Warranty	Provide written warranty information including all terms and conditions. Provide ten (10) references of customers currently under specified warranty in the state of Connecticut.
	J	Independent Testing Report	a. Lighting Method 1 is to provide an independent test report certifying the system meets the lumen maintenance control strategy defined in Section 1.2.C.1.a, verifying the field performance of the system for the duration of the useful life of the lamp based on lamp replacement hours. Report shall be signed by a licensed professional engineer with outdoor lighting experience. b. If Manufacturer using Lighting Method 2 desires to provide a recoverable light loss factor other than specified in section 1.2.C.2, Independent field test report from licensed professional engineer will be required to substantiate the ability to maintain light levels in accordance with section 1.7-A of the specification. Both initial and maintained light scans must still be provided. Independent Engineer conducting the report must have no affiliation with the manufacturer and report must be based on actual testing data. Testing must be done on the system as a whole, not on individual components.
	K	Project References	Manufacturer to provide a list of ten (10) projects where the technology and specific fixture proposed for this project has been installed in the state of Connecticut. Reference list will include project name, project city, installation date, and if requested, contact name and contact phone number. Manufacturer bidding Lighting Method 2 must supply independent test report if lamp life relamping projection is greater than 3000 hours.
	L	Product Information	Complete bill of material and current brochures/cut sheets for all product being provided.
	M	Delivery	Manufacturer shall supply an expected delivery timeframe from receipt of approved submittals and complete order information.
	N	Non-Compliance	Manufacturer shall list all items that do not comply with the specifications. If in full compliance, tab may be omitted.
	O	Life-cycle Cost Calculation	Document life-cycle cost calculations as defined in the specification. Identify energy costs for operating the luminaires. Maintenance cost for the system including spot lamp replacement and group relamping costs must be included in the warranty. All costs should be based on 25 Years.

The information supplied herein shall be used for the purpose of complying with the specifications for Derby High School Phase 2. By signing below I agree that all requirements of the specifications have been met and that the manufacturer will be responsible for any future costs incurred to bring their equipment into compliance for all items not meeting specifications and not listed in the Non-Compliance section.

Manufacturer: _____ Signature: _____

Contact Name: _____ Date: _____/_____/_____

Contractor: _____ Signature: _____

END OF SECTION 26 56 68

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SECTION 26 56 68 – EXTERIOR ATHLETIC LIGHTING
BASE BID: Lighting System with HID (Metal Halide) Light Source

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 covered by this section of the specifications shall conform to the contract documents, engineering plans as well as state and local codes.

B. The purpose of these specifications is to define the lighting system performance and design standards for Derby High School Phase 2. For the base-bid manufacturer/contractor shall re-locate the lighting system using an HID (metal halide) light source to meet or exceed the standards set forth in these specifications. Contractor will provide new pre-cast foundations, by Musco. Contractor will re-aim existing lights with new aiming diagram, provided by Musco.

C. There is an alternate bid to supply lighting equipment using an HID light source reaching 45 FC. All bidders must provide a base-bid.

D. The sports lighting will be for the following fields:
1. Football Field
2. Soccer Field

E. The primary goals of this sports lighting project are:
1. Guaranteed Light Levels: Selection of appropriate light levels impact the safety of the players and the enjoyment of spectators. Therefore light levels are guaranteed to not drop below specified target values for a period of 25 years.
2. Life-cycle Cost: In order to reduce the operating budget, the preferred lighting system shall be energy efficient and cost effective to operate. All maintenance costs shall be eliminated for the duration of the warranty.
3. Control and Monitoring: To allow for optimized use of labor resources and avoid unneeded operation of the facility, customer requires a remote on/off control system for the lighting system. Fields should be proactively monitored to detect luminaire outages over a 25-year life cycle. All communication and monitoring costs for 25-year period shall be included in the bid.
4. Environmental Light Control: It is the primary goal of this project to minimize spill light to adjoining properties and glare to the players, spectators and neighbors.

1.3 LIGHTING PERFORMANCE

A. Performance Requirements: Playing surfaces shall be lit to an average target illumination level and uniformity as specified in the chart below. Lighting calculations shall be developed and field measurements taken on the grid spacing with the minimum number of grid points specified below. Average illumination level shall be measured in accordance with the IESNA LM-5-04 (IESNA Guide for Photometric Measurements of Area and Sports Lighting Installations). Illumination levels shall not to drop below desired target values in accordance to IES RP-6-15, Page 2, Maintained Average Illuminance and shall be guaranteed for the full warranty period. Hours of usage shall comply with the following:

Area of Lighting	Annual Usage Hours	25 Year Usage Hours
Football / Soccer Field	200	5,000

B. Mounting Heights: To ensure proper aiming angles for reduced glare and to provide better playability, minimum mounting heights shall be as described below. Higher mounting heights may be required based on photometric report and ability to ensure the top of the field angle is a minimum of 10 degrees below horizontal.

# of Poles	Pole Designation	Pole Height
3 existing poles	F1, F2, F3	80’
1 existing pole	F4	70’

C. Lighting Methodology: There are two methods that will be considered for calculation of the lighting designs for this project. The approved Lighting Method #1 (Musco), automated timed power adjustments, as described in C.1 utilizes methodology that adjusts light levels through a series of programmed adjustments. The alternate Lighting Method #2 (Non-Musco), continuous depreciating light, as described in C.2 uses continuous lamp lumen depreciation which is recovered by relamping and cleaning lenses of the luminaires. Computer models shall reflect initial design lumens, end of life design lumens, recoverable light loss factor (RLLF of .69), and the Coefficient Utilization (CU) for the design. Both methods must be at or above target illumination levels throughout the 25 years of the contract/warranty provided by the manufacturer. A +/- 10% design/testing allowance is not permitted in the design logic.

1. (Base-Bid) Lighting Method #1: Automated Timed Power Adjustments (Musco):
    a. Approved Musco’s Green Generation Lighting® sports lighting system shall use automated timed power adjustments to achieve a lumen maintenance control strategy as described in the IESNA Lighting Handbook 10th Edition, Lighting Controls Section page 16-8: "Lumen maintenance involves adjusting lamp output over time to maintain constant light output as lamps age and dirt accumulation reduces luminaire output. With lumen maintenance control, either lamps are dimmed when new, or the lamp's current is increased as the system ages."

b. Manufacturers, not pre-approved, bidding an automated timed power adjustment system must provide an independent test report certifying the system meets the lumen maintenance control strategy above and verifying the field performance of the system for the duration of the useful life of the lamp based on lamp replacement hours. Report shall be signed by a licensed professional engineer with outdoor lighting experience. If report is not provided at least 10 days prior to bid opening, the manufacturer shall provide the initial and maintained designs called for in this specification under Lighting Method #2: Alternate Manufacturers, section 1.2.C.2.

c. Project References: Non-approved manufacturers bidding any form of Automated Timed Power Adjustment light system must provide a minimum of ten (10) project references within the state of Connecticut that have been completed within the last 12 months utilizing this exact technology. Manufacturer will include project name, project city, and if requested, contact name and contact phone number for each reference.

Area of Lighting	Average Target Illumination Levels	Maximum to Minimum Uniformity Ratio	Grid Points	Grid Spacing
Football Field	25 FC	2 : 1	72	30’ X 30’
Soccer Field	25 FC	2 : 1	84	30’ X 30’

2. (Base-Bid) Lighting Method #2 – Continuous Depreciating Light (Non-Musco):

a. The manufacturer bidding Lighting Method #2 must provide a complete submittal package for approval as outlined in Submittal Information at the end of this section at least 10 days prior to bid.

b. The lighting system shall use continuous lamp lumen depreciation which is recovered by relamping and cleaning lenses of the luminaires. Manufacturer shall provide computer models for initial illumination level and target illumination levels on the field over 25 years. The specified maximum Recoverable Light Loss Factor (RLLF) .69 and maintenance/group relamping schedule shall be provided in accordance with recommendations in the Leukos Abstract Volume 6, Number 3, January 2010, page 183-201: “Light Loss Factors for Sports Lighting”, and presented at the 2009 IESNA Annual Conference

1500 Watt Metal Halide Luminaire
RLLF Requirements

Lamp Replacement Interval (hours)	Recoverable Light Loss Factor (RLLF)
2,100	.69

c. Independent Test Report: If lamp replacement interval is greater than 3,000 hours for 1500 watt lamps, manufacturer shall supply an independent test report with lumen depreciation over proposed lamp life, initial lumens, and end of life lumens.

d. Based on anticipated hours of usage listed below, Method #2 systems would require the following minimum group lamp replacements over the 25 years.

Area of Lighting	25 Year Usage Hours	25 Year Group Relamps Required
Football / Soccer Field and Track	200	1

Area of Lighting	Average Initial Illumination Levels	Average Target Illumination Levels	Maximum to Minimum Uniformity Ratio	Grid Points	Grid Spacing
Football Field	37	25 FC	2 : 1	72	30’ X 30’
Soccer Field	37	25 FC	2 : 1	84	30’ X 30’

e. Revised Electrical Distribution: Manufacturer shall provide revised electrical distribution plans to include changes to service entrance, panel, and wire sizing if increased power is required which exceeds specified design loads.

1.4 ENVIRONMENTAL LIGHT CONTROL

A. Light Control Luminaires: All luminaires shall utilize spill light and glare control devices including, but not limited to, internal shields, louvers and external shields. No symmetrical beam patterns are accepted.

B. The first page of a photometric report for all luminaire types proposed showing horizontal and vertical axial candle power shall be provided to demonstrate the capability of achieving the specified performance. Reports shall be certified by a qualified independent testing laboratory with a minimum of five years experience or by a manufacturer’s laboratory with a current accreditation under the National Voluntary Laboratory Accreditation Program for Energy Efficient Lighting Products. A summary of the horizontal and vertical aiming angles for each luminaire shall be included with the photometric report.

1.5 LIFE CYCLE COSTS

A. Manufacturer shall submit 25-year life cycle cost calculation as outlined in the required submittal information.
Lamp replacement schedule per charts below:

Lighting Method 1 Lamp Replacement	Lighting Method 2 Lamp Replacement
5,000 hour intervals	2,100 hour intervals

B. Preventative and Spot Maintenance: Manufacturer shall provide all preventative and spot maintenance, including parts and labor for 25 years from the date of equipment shipment. Individual outages shall be repaired when the usage of any field is materially impacted. Owner agrees to check fuses in the event of a luminaire outage.

PART 2 PRODUCT

2.1 SPORTS LIGHTING SYSTEM CONSTRUCTION

A. Manufacturing Requirements: All components shall be designed and manufactured as a system. All luminaires, wire harnesses, ballast and other enclosures shall be factory assembled, aimed, wired and tested.

B. Durability: All exposed components shall be constructed of corrosion resistant material and/or coated to help prevent corrosion. All exposed carbon steel shall be hot dip galvanized per ASTM A123. All exposed aluminum shall be powder coated with high performance polyester or anodized. All exterior reflective inserts shall be anodized, coated, and protected from direct environmental exposure to prevent reflective degradation or corrosion. All exposed hardware and fasteners shall be stainless steel of 18-8 grade or better, passivated and coated with aluminum-based thermosetting epoxy resin for protection against corrosion and stress corrosion cracking. Structural fasteners may be carbon steel and galvanized meeting ASTM A153 and ISO/EN 1461 (for hot dipped galvanizing), or ASTM B695 (for mechanical galvanizing). All wiring shall be enclosed within the cross-arms, pole, or electrical components enclosure.

C. System Description: Lighting system shall consist of the following:
1. Galvanized steel poles and cross-arm assemblies.
2. Non-approved pole technology:
    a. Square static cast concrete poles will not be accepted.
    b. Direct bury steel poles which utilize the extended portion of the steel shaft for their foundation will not be accepted due to potential for internal and external corrosive reaction to the soils and long term performance concerns.
3. Pre-stressed concrete base embedded in concrete backfill allowed to cure for 12-24 hours before pole stress is applied. Alternate may be an anchor bolt foundation designed such that the steel pole and any exposed steel portion of the foundation is located a minimum of 18 inches above final grade. The concrete for anchor bolt foundations shall be allowed to cure for a minimum of 28 days before the pole stress is applied unless shorter cure time approved by structural engineer of record.
4. All luminaires shall be constructed with a die-cast aluminum housing or external hail shroud to protect the luminaire reflector system.

5. Manufacturer will remote all ballasts and supporting electrical equipment in aluminum enclosures mounted approximately 10 feet above grade. The enclosures shall be touch-safe and include ballast, capacitor and fusing with indicator lights on fuses to notify when a fuse is to be replaced for each luminaire. Disconnect per circuit for each pole structure will be located in the enclosure. Integral ballast fixtures will not be accepted.
6. Wire harness complete with an abrasion protection sleeve, strain relief and plug-in connections for fast, trouble-free installation.
7. All luminaires, visors, and cross-arm assemblies shall withstand 150 mph winds and maintain luminaire aiming alignment
8. Control cabinet to provide remote on-off control and monitoring of the lighting system. Cabinet shall be constructed of aluminum and be rated NEMA Type 4. Communication method shall be provided by manufacturer. Cabinet shall contain custom configured contactor modules for 30, 60, and 100 amps, labeled to match field diagrams and electrical design. Manual off-on-auto selector switches shall be provided.
9. Lightning Protection: Manufacturer shall provide integrated lightning grounding via concrete encased electrode grounding system as defined by NFPA 780 and be UL Listed per UL 96 and UL 96A. If grounding is not integrated into the structure, the manufacturer shall supply grounding electrodes, copper down conductors, and exothermic weld kits. Electrodes and conductors shall be sized as required by NFPA 780. The grounding electrode shall be minimum size of 5/8 inch diameter and 8 feet long, with a minimum of 10 feet embedment. Grounding electrode shall be connected to the structure by a grounding electrode conductor with a minimum size of 2 AWG for poles with 75 feet mounting height or less, and 2/0 AWG for poles with more than 75 feet mounting height.

D. Safety: All system components shall be UL listed for the appropriate application.

2.2 ELECTRICAL

A. Electric Power Requirements for the Sports Lighting Equipment:
   1. See drawings
   2. Maximum total voltage drop: Voltage drop to the disconnect switch located on the poles shall not exceed three (3) percent of the rated voltage.

B. Revised Electrical Distribution: Manufacturer shall provide, at their cost, revised electrical distribution plans to include changes to service entrance, panel, and wire sizing if using Lighting Method 2.

2.3 STRUCTURAL PARAMETERS

A. Wind Loads: Wind loads shall be based on the 2012 International Building Code. Wind loads to be calculated using ASCE 7-10, an ultimate design wind speed of 125 and exposure category C.

B. Pole Structural Design: The stress analysis and safety factor of the poles shall conform to 2009 AASHTO Standard Specification for Structural Supports for Highway Signs, Luminaires, and Traffic Signals (LTS-5).

C. Foundation Design: The foundation design shall be based on soil parameters as outlined in the geotechnical report. If a geotechnical report is not available, the foundation design shall be based on soils that meet or exceed those of a Class 5 material as defined by 2012 IBC Table 1806.2.

2.4 CONTROL SYSTEM

A. Remote Lighting Control System: System shall allow owner and users with a security code to schedule on/off system operation via a web site, phone, fax or email up to ten years in advance. Manufacturer shall provide and maintain a two-way TCP/IP communication link. Trained staff shall be available 24/7 to provide scheduling support and assist with reporting needs.

The owner may assign various security levels to schedulers by function and/or fields. This function must be flexible to allow a range of privileges such as full scheduling capabilities for all fields to only having permission to execute “early off” commands by phone. Scheduling tool shall be capable of setting curfew limits.

Controller shall accept and store 7-day schedules, be protected against memory loss during power outages, and shall reboot once power is regained and execute any commands that would have occurred during outage.

B. Remote Monitoring System: System shall monitor lighting performance and notify manufacturer if individual luminaire outage is detected so that appropriate maintenance can be scheduled. The controller shall determine switch position (manual or auto) and contactor status (open or closed).

C. Management Tools: Manufacturer shall provide a web-based database and dashboard tool of actual field usage and provide reports by facility and user group. Dashboard shall also show current status of lamp outages, control operation and service scheduling including relamping operations completed and scheduled. Mobile application will be provided suitable for IOS, Android and Blackberry devices.

Hours of Usage: Manufacturer shall provide a means of tracking actual hours of usage for the field lighting system that is readily accessible to the owner.

1. Cumulative hours: shall be tracked to show the total hours used by the facility
2. Current lamp hours: shall be tracked separately to reflect the amount of hours on the current set of lamps being used, so relamping can be scheduled accurately.
3. Report hours saved by using early off and push buttons by users.

D. Communication Costs: Manufacturer shall include communication costs for operating the controls and monitoring system for a period of 25 years.

PART 3 EXECUTION

3.1 SOIL QUALITY CONTROL

A. It shall be the Contractor's responsibility to notify the Owner if soil conditions exist other than those on which the foundation design is based, or if the soil cannot be readily excavated. Contractor may issue a change order request / estimate for the Owner's approval / payment for additional costs associated with:
   1. Providing engineered foundation embedment design by a registered engineer in the State of Connecticut for soils other than specified soil conditions.
   2. Additional materials required to achieve alternate foundation;
   3. Excavation and removal of materials other than normal soils, such as rock, caliche, etc.

3.2 FIELD QUALITY CONTROL

A. Illumination Measurements: Upon substantial completion of the project and in the presence of the Contractor, Project Engineer, Owner's Representative, and Manufacturer's Representative, illumination measurements shall be taken and verified. The illumination measurements shall be conducted in accordance with IESNA LM-5-04. For Lighting Method 1, Timed Power Adjustment systems, light levels must be measured and exceed the specified target levels. For Lighting Method 2, light levels must be measured and meet the specified initial light levels.

B. Field Light Level Accountability
   1. Light levels are guaranteed not to fall below the target maintained light levels for the entire warranty period of 25 Years.
   2. The contractor/manufacturer shall be responsible for an additional inspection one year from the date of commissioning of the lighting system and will utilize the owner's light meter in the presence of the owner.
   3. The contractor/manufacturer will be held responsible for any and all changes needed to bring these fields back to compliance for light levels and uniformities. Contractor/Manufacturer will be held responsible for any damage to the fields during these repairs.

C. Correcting Non-Conformance: If, in the opinion of the Owner or his appointed Representative, the actual performance levels including footcandles and uniformity ratios are not in conformance with the requirements of the performance specifications and submitted information, the Manufacturer shall be required to make adjustments to meet specifications and satisfy Owner.

3.3 25-YEAR WARRANTY

A. Each manufacturer shall supply a signed warranty covering the entire system for 25 years OR for the maximum hours of coverage based on the estimated annual usage, whichever occurs first. Warranty shall guarantee light levels will not fall below target maintained levels. A +/- 10% design/testing allowance will not be allowed. Warranty shall also cover: lamp replacements, system energy consumption, monitoring, maintenance and control services, spill light control, and structural integrity. Manufacturer shall maintain specifically-funded financial reserves to assure fulfillment of the warranty for the full term. Warranty may exclude fuses, storm damage, vandalism, abuse and unauthorized repairs or alterations.

B. Group lamp replacements for Method 1 systems (Time Powered Adjustment) must occur at end of useful life of lamp as stated by manufacturer. Group lamp replacements for Method 2 systems (Continuous Depreciating Light) must relamp every 2,100.

C. Maintenance: Manufacturer shall monitor the performance of the lighting system, including on/off status, hours of usage and lamp outage for 25 years from the date of equipment shipment. Individual lamp outages shall be repaired when the usage of any field is materially impacted. Owner agrees to check fuses in the event of a luminaire outage.

PART 4 DESIGN APPROVAL

4.1 PRE-BID SUBMITTAL REQUIREMENTS (Non-Musco)

A. Design Approval: The owner / engineer will review pre-bid submittals per section 4.0.B from all the manufacturers to ensure compliance to the specification 10 days prior to bid. If the design meets the design requirements of the specifications, a letter and/or addendum will be issued to the manufacturer indicating approval for the specific design submitted.

B. Listed Manufacturers:
1. Method 1: Time Powered Adjustment Technology - Musco’s Green Generation Lighting® sports lighting system with a metal halide light source is the listed “Lighting Method 1” product.
2. Method 2: Continuous Depreciating Light – Non Musco is the listed “Lighting Method 2” product.

C. All listed manufacturers not pre-approved shall submit the information at the end of this section at least 10 days prior to bid. An addendum will be issued prior to bid; listing approved lighting manufacturers and the design method to be used.

D. Bidders are required to bid only products that have been approved by this specification or addendum by the owner or owner’s representative. Bids received that do not utilize an approved system/design, will be rejected.

REQUIRED SUBMITTAL INFORMATION FOR ALL MANUFACTURERS (NOT PRE-APPROVED)
10 DAYS PRIOR TO BID

All items listed below are mandatory, shall comply with the specification and be submitted according to pre-bid submittal requirements. Complete the Yes/No column to indicate compliance (Y) or noncompliance (N) for each item. Submit checklist below with submittal.

Submitting as: ☐ *HID Lighting Method 1* ☐ *HID Lighting Method 2*

Yes / No	Tab	Item	Description
	A	Letter/ Checklist	Listing of all information being submitted must be included on the table of contents. List the name of the manufacturer's local representative and his/her phone number. Signed submittal checklist to be included.
	B	Equipment Layout	Drawing(s) showing field layouts with pole locations
	C	On Field Lighting Design	Lighting design drawing(s) showing: a. Field Name, date, file number, prepared by b. Outline of field(s) being lighted, as well as pole locations referenced to the center of the field (x & y), Illuminance levels at grid spacing specified c. Pole height, number of fixtures per pole, horizontal and vertical aiming angles, as well as luminaire information including wattage, lumens and optics d. Height of light test meter above field surface. e. Summary table showing the number and spacing of grid points; average, minimum and maximum illuminance levels in foot candles (fc); uniformity including maximum to minimum ratio, coefficient of variance (CV), coefficient of utilization (CU) uniformity gradient; number of luminaries, total kilowatts, average tilt factor; light loss factor. f. Manufacturer's using Lighting Method 2 shall provide both initial and maintained light scans using a maximum recoverable right loss factor (RLLF) as specified in section 1.2.C.2 and shall be shown on lighting design.
	D	Photometric Report	Provide first page of photometric report for all luminaire types being proposed showing candela tabulations as defined by IESNA Publication LM-35-02. Photometric data shall be certified by laboratory with current National Voluntary Laboratory Accreditation Program or an independent testing facility with over 5 years experience.
	E	Performance Guarantee	Provide performance guarantee including a written commitment to undertake all corrections required to meet the performance requirements noted in these specifications at no expense to the owner. Light levels must be guaranteed to not fall below target levels for warranty period.
	F	Structural Calculations	Pole structural calculations and foundation design showing foundation shape, depth backfill requirements, rebar and anchor bolts (if required). Pole base reaction forces shall be shown on the foundation drawing along with soil bearing pressures. Design must be stamped by a structural engineer in the state of Connecticut, if required by owner.
	G	Control & Monitoring System	Manufacturer of the control and monitoring system shall provide written definition and schematics for automated control system to include monitoring. They will also provide ten (10) references currently using proposed system in the state of Connecticut.
	F	Electrical Distribution	Manufacturer using Lighting Method 2 must include a revised electrical distribution plan including changes to service entrance, panels and wire sizing, signed by a licensed

		Plans	Electrical Engineer in the state of Connecticut.
	I	Warranty	Provide written warranty information including all terms and conditions. Provide ten (10) references of customers currently under specified warranty in the state of Connecticut.
	J	Independent Testing Report	a. Lighting Method 1 is to provide an independent test report certifying the system meets the lumen maintenance control strategy defined in Section 1.2.C.1.a, verifying the field performance of the system for the duration of the useful life of the lamp based on lamp replacement hours. Report shall be signed by a licensed professional engineer with outdoor lighting experience. b. If Manufacturer using Lighting Method 2 desires to provide a recoverable light loss factor other than specified in section 1.2.C.2, Independent field test report from licensed professional engineer will be required to substantiate the ability to maintain light levels in accordance with section 1.7-A of the specification. Both initial and maintained light scans must still be provided. Independent Engineer conducting the report must have no affiliation with the manufacturer and report must be based on actual testing data. Testing must be done on the system as a whole, not on individual components.
	K	Project References	Manufacturer to provide a list of ten (10) projects where the technology and specific fixture proposed for this project has been installed in the state of Connecticut. Reference list will include project name, project city, installation date, and if requested, contact name and contact phone number. Manufacturer bidding Lighting Method 2 must supply independent test report if lamp life relamping projection is greater than 3000 hours.
	L	Product Information	Complete bill of material and current brochures/cut sheets for all product being provided.
	M	Delivery	Manufacturer shall supply an expected delivery timeframe from receipt of approved submittals and complete order information.
	N	Non-Compliance	Manufacturer shall list all items that do not comply with the specifications. If in full compliance, tab may be omitted.
	O	Life-cycle Cost Calculation	Document life-cycle cost calculations as defined in the specification. Identify energy costs for operating the luminaires. Maintenance cost for the system including spot lamp replacement and group relamping costs must be included in the warranty. All costs should be based on 25 Years. (complete table below)

The information supplied herein shall be used for the purpose of complying with the specifications for Derby High School Phase 2. By signing below I agree that all requirements of the specifications have been met and that the manufacturer will be responsible for any future costs incurred to bring their equipment into compliance for all items not meeting specifications and not listed in the Non-Compliance section.

Manufacturer: _____ Signature: _____

Contact Name: _____ Date: _____/_____/_____

Contractor: _____ Signature: _____

END OF SECTION 26 56 68

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SECTION 31 10 00 - 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. Athletic infield surface material stripping and stockpiling.
6. Removing above-grade site improvements and off site disposal.
7. Removal and disposal of designated pavements.

B. Related Sections include the following:

1. Division 01 Section "Execution Requirements".
2. Division 01 Section "Temporary Facilities and Controls".
3. Division 31 Section "Temporary Tree and Plant Protection".
4. Division 31 Section "Earth Moving".
5. Division 32 Section “Topsoil”.
6. 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, typical 12”-24” depth located immediately under the topsoil.

C. Form 817: "Standard Specifications for Roads, Bridges, and Incidental Construction", State of Connecticut, Department of Transportation, Form 817, 2016 edition, as supplemented.

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. Removal includes removal of associated concrete or metal footings and pads.

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, excess cleared and demolished materials shall become Contractor's property and shall be removed from the site unless otherwise noted on plan.

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 condition

C. Product data for safety barricade and root inoculant.

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 municipality in which the project is located, 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.

H. Relocate designated monuments where and as directed by the City, Coordinate and schedule work with Owner.

I. Permits/Fees: Coordinate with appropriate utility companies and pay any disconnect fees and obtain permits as necessary.

J. 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.

2.3 STAGING FENCING

A. Staging Fencing: Chain Link Fence, 6’0” height, 11 gauge with 1-1/2” OD posts at 10’-0” maximum on center spacing. Top tension wire required.

2.4 ROOT INOCULANT

A. Inoculant shall be rooting growth hormone containing mycorrhizae.

2.5 PRESERVING EXISTING MOUNUMENTS & MEMORIALS

A. Where indicated on plan, contractor shall preserve existing memorials to be reinstalled at a later date. Contractor shall record conditions of monument prior to constructions.

B. Items to be removed and reinstalled may be stored on terrace south of existing baseball diamond at south end of track for the period of construction

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.**]**

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, Town Planning Staff, and Owner. Modify limits as required.

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

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

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 with in 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 completely.
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 and athletic infield surfacing materials 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.

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 topsoil or haul excess topsoil off site.

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 remove existing pavements from site.

C. Remove existing site improvements, including pavements fences of various types, and signage.

D. Where indicated on plan, remove, salvage and deliver to Owner, on-site, athletic equipment such as goals, scoreboards, mounting sleeves, etc.

3.8 DISPOSAL

A. Disposal: Remove unsuitable 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 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 31 10 00

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SECTION 31 11 00 — CLEARING AND GRUBBING

PART 1 – GENERAL

1.1 DESCRIPTION

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. Work Included: cutting trees, shrubs, and bushes; removing stumps; removing other materials; disposal of materials; stripping and stockpiling topsoil.

C. Related Work Specified Elsewhere

1. Earth Moving – Section 31 20 00

PART 2 – PRODUCTS

A. None required by this Section.

PART 3 – EXECUTION

3.1 CLEARING AND GRUBBING

A. Remove all rubbish and debris from within the Contract limits.

B. Remove trees, saplings, shrubs, bushes, vines, undergrowth, stumps, and roots from areas to be occupied by buildings, structures, roadways, parking lots, pipelines, and lawns.

C. The Architect will designate trees and other plants to remain. Protect those trees and plants from damage by erecting barricades, fences, or by other acceptable means. Prevent falling trees from damaging trees and plants designated to remain.

D. Protect areas outside the limits of clearing from damage by the clearing and grubbing operations.

3.2 STRIPPING AND STOCKPILING TOPSOIL

A. Strip topsoil from cleared areas. Do not mix topsoil with subsoil. Keep topsoil free of brush, trash, large stones, and other extraneous material.

B. Stockpile topsoil at areas on the site as directed by the Architect. Protect the stockpiles of topsoil until used for lawns and other plantings under other Sections of these Specifications.

C. Any topsoil remaining after all work is in place shall become the property of the Contractor. The Contractor shall dispose of the topsoil off the site.

D. The Contractor shall supply additional topsoil at his expense if there is a shortage from stripping.

3.3 DISPOSAL OF MATERIAL

A. No burning will be allowed.

B. All rubbish, debris, logs, stumps, roots, cuttings, and other materials resulting from the clearing and grubbing operations shall become the property of the Contractor and shall be disposed of by him off the site. The manner of disposal shall comply with all applicable local, state, and federal regulations.

END OF SECTION

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, but is not limited to the following:

1. Site excavating, grading, filling, backfilling, compacting, and preparing sub-grades for the entire project including but not limited to: foundations, footings, drainage structures, and athletic fields.
2. Granular fill course for curbs and other site improvements.
3. Excavating and backfilling for field and structures.
4. Processed aggregate for pavements and other improvements.
5. General fill for establishing project sub-grades.
6. Excavation of rock and/or boulders, including replacement with suitable earthwork materials.
7. Removal of encountered unsatisfactory soils, including lawful off-site disposal and replacement with suitable earthwork fill material.

B. Related Sections include the following:
1. Division 01 Section "Alternates."
2. Division 01 Section "Allowances."
3. Division 01 Section "Unit Prices"
4. Division 31 Section "Dewatering".
5. Division 32 Section "Topsoil"
6. Division 32 Section "Synthetic Grass Surfacing"
7. Division 33 Section "Field Sub Drainage System"

1.3 DEFINITIONS

A. Backfill: Suitable soil materials used to fill an excavation as approved by Architect and Geotechnical Engineer.

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: Suitable soil or earthwork products imported from off-site for use as fill or backfill as approved by Architect and Geotechnical Engineer.

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: Suitable soil materials used to raise existing grades as approved by Architect and Geotechnical Engineer.

G. Mass Rock or Earth: An area of rock or unclassified earth material that is greater than 8’ in both length and width.

H. Rock: Material in beds, ledges, unstratified masses, conglomerate deposits and boulders of rock material that exceed 1 cubic yard in volume for mass excavation, or ¾ CY for trench, footing or pit excavation that cannot be removed by 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. Stone: An individual rock fragment or natural stone, with a volume less than 1cubic yard, 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 of Trench Earth.

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. Subsoil: shall be the existing on site soil material; typically 12”–24” depth located immediately under the existing topsoil.

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

N. Trench Rock or Earth: Excavated material from trench excavations that is less than 8' (eight feet) in either length or width.

O. Utilities include on-site underground pipes, conduits, ducts, and cables, as well as underground services within buildings.

P. Form 817: "Standard Specifications for Roads, Bridges, and Incidental Construction", State of Connecticut, Department of Transportation, Form 817, 2016 edition, as supplemented.

Q. Unsatisfactory 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.

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. Drainage fabric.
2. 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.

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 500 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. Where specified aggregate materials shall be tested for LA abrasion (ASTM c131-03).
5. Test sampling shall conform to the requirements of ASTM D-75, and ASTM D-3665.
6. Documentation for each borrow material proposed for use that demonstrates that the material meets applicable CT DEEP Remediation Standard Regulation criteria for soil, ei-

ther through knowledge of the soil material or analytical testing of known or suspected contaminants.

7. Submittals in paragraphs below are for record purposes only.
8. If rock removal is required, the contractor shall provide the following:
   a. A blasting plan approved by authorities having jurisdiction, for record purposes.
   b. Seismic survey agency report, for record purposes.

E. All installation of materials prior to testing and approval by Architect is at Contractor's risk.

1.5 QUALITY ASSURANCE

A. Comply with applicable requirements of NFPA 495, "Explosive Materials Code" and Form 816, Paragraph 1.07.08.

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: At the Owner's expense, and option, 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.

Testing: Compaction tests will be required by the Owner and will be paid for by the Contractor. 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.

E. Density and Compaction Testing: The Contractor is responsible to schedule compaction tests and to allow adequate time for the proper execution of said tests. Materials placed without specified testing, or failing testing requirements shall be subject to removal and reinstallation meeting specification at no cost to the Owner.

F. 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. Geotechnical Report: A subsurface geotechnical investigation report for the site, prepared by Welti Geotechnical, PC dated November 30, 2017 is included and is available for information only. The report is not part of the Contract Documents. The opinions expressed in this report are those of the geotechnical engineer and represent interpretations of the subsoil conditions, tests, and results of analyses conducted by the geotechnical engineer. Neither the Owner nor the Architect will be responsible for interpretations or conclusions drawn from this data by the Contractor as required for confirming field conditions. The Contractor shall conduct their own investigation of existing subsurface conditions as necessary. Neither the Owner nor Architect will be responsible in any manner for additional compensation for excavation work performed under the Contract due to the Contractor's assumptions based on soil investigation data prepared by the Owner's geotechnical investigation.

D. Rock, if encountered, shall be exposed, measured & documented by the engineer for pricing by the Contractor. Rock removal shall conform to the requirements outlined in this specification. Costs for rock removal shall be negotiated as an add service by the Contractor.

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 dimen-

sion, 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. Backfill and Fill: Suitable soil that meets specification requirements.

F. Common Fill: Suitable soil that can be placed and compacted. On site soils may be used as common fill to establish subgrade beneath walks, pavements and lawn areas provided they conform to soil requirements per project specifications as approved by the project geotechnical engineer.

G. Granular Fill: Form 816 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. Granular Fill may be referred to as base or subbase course in project documents.

1. Provide borrow material as required to meet project specifications.

H. Crushed Stone: Suitable soil consisting of washed, clean, narrowly graded mixture of crushed stone, or crushed gravel, free of all reclaimed aggregate. Sound material free of debris, waste, recycled material, frozen materials and organic material conforming to Form 816, Article M.01.01, No. 6 or size as indicated on Drawings.

I. Porous fill and Filter Media: 3/8" crushed stone, Clean, sound material free of debris, waste, frozen materials and organic material conforming to Form 816, Article M.01.01.

J. 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 816, 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. Processed Aggregate may be referred to as base course in project documents.

K. Bedding: Suitable soil consisting of naturally or artificially graded mixture of natural or crushed gravel, crushed stone, and natural or crushed sand; ASTM D 2940; except with 100 percent passing a 1-inch sieve and not more than 8 percent passing a No. 200 sieve.

L. Synthetic turf field drainage and base aggregates: See Specification Section 33 46 16 "Field Subdrainage System, Stone"

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 8".
2. Approved material, obtained from off-site, certified to conform to the following grain-size gradation:

	SQUARE MESH SIEVES	PERCENT PASSING WEIGHT
3.	Pass 5"	100
4.	Pass 3/4"	75-100
5.	Pass #4	25-80

6. Less than 15% of the material passing the #4 sieve shall pass a #200 sieve.

7. All material used for general filling shall be clean, free of clay and organic material and capable of satisfactory compaction.
8. 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. Impervious Fill: Suitable soils consisting of a mixture of silt, clay and sand capable of being compacting to a relatively impermeable condition.

O. Sand: Form 816, Section M.11.04, Grade "B".

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.

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. The Contractor shall remove and replace or reconstruct subgrade soils and foundation soils that have frozen as necessary at no additional expense to the owner.

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.

E. Soils at the site are sensitive to disturbance and can readily become muddy and unstable when disturbed by traffic from heavy construction equipment or other construction operations, particularly during or following periods of wet weather. The Contractor shall take all measures necessary to maintain stable site conditions.

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 *(if required & approved)*

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 816, 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 stone, soil materials, and obstructions.

1. If excavated materials intended for fill and backfill include unsatisfactory materials or rock, replace with satisfactory soil materials.
2. Rock removal, as defined herein will be negotiated as a additional cost to the contract. Contractor shall assume rock removal is not required for his base cost.

B. Rock Excavation Procedures *(if required)*:

1. When, during the process of excavation, rock is encountered as specified herein, the Contractor shall strictly adhere to the following procedures.
   a. Such material shall be uncovered and exposed.
   b. The Architect and the Owner shall be notified by the Contractor before proceeding further.

2. Rock excavation materials may be used for fill, only as specifically allowed and approved by the Architect, in accordance with the following paragraph "D".
3. All areas where rock is removed must be marked on the as-built Drawings. Obtain approval of the Architect before starting any rock removal work.
4. 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.
5. Rock and boulder disposal:
   a. All excess rock and boulders shall become the property of the Contractor and must be removed from project site and disposed in a legal manner.

C. Boulder & Stone disposal *(if required):*

1. Limited on-site, below grade boulder disposal is permitted. If any boulders are encountered review acceptable below grade placement locations with Architect. 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.

D. Dispose of unsuitable soil, and rock, off site properly and replace with approved fill material as required to bring the site to final elevations. Contractor shall excavate all material deemed "un-suitable" by the Owner's geotechnical engineer. In the case of any question or inconsistencies, the Owner's geotechnical engineer's determination of unsuitable soils shall be final.

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 CURB

A. Do not disturb bottom of excavation. Trim bottoms to required lines and grades to leave solid base to receive other work.

3.7 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 (min. 18" outside of face of footings with no undercutting permitted, Trenches min. 18" wider than outside dimension of structures they are to contain.). Place a minimum 8-inch thick layer of 3/8" Crushed Stone over Separation Fabric over the footing or foundation subgrade. For footings for the proposed bridge structure, compact the subgrade using intensive surface compaction, as indicated in Section 3.9.B, and place a 2-foot thick layer of compacted structural fill.

2. Excavation for Floor Slab: 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. Place a minimum 12-inch thick layer of Structural Fill over Separation Fabric over the floor slab subgrade.

3. 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.

4. Surfaces of excavation shall be suitably dressed to grade noted to receive subsequent construction. Bottoms shall be level with no projections and free of loose material. Material at bottom of excavations shall be undisturbed. The engineer shall be immediately notified if unsatisfactory material for foundation bearing is encountered before proceeding with work.

3.8 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, The Contractor shall notify Architect & Geotechnical Engineer for review, upon further direction the Contractor shall continue excavation and replace with compacted backfill or fill material as directed.

1. Additional excavation and replacement material for existing unsuitable subgrade soils will be paid for according to Contract provisions for changes in the work.

2. Any subgrades that are damaged from construction activity shall be deemed unsuitable material and shall be the responsibility of the contractor. Damaged soils shall be replaced or repaired at no additional cost to the owner.

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 Form 817, Section 2.09. 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. Soil subgrades are susceptible to disturbance and loss of strength due to construction equipment operating over the subgrade or other disturbance when the subgrade is wet or moist. All loose, saturated or disturbed materials that are unsuitable and shall be removed and replaced with compacted structural fill or suitable compacted fill approved by project geotechnical engineer.

F. Reconstruct subgrades damaged by freezing temperatures, frost, rain, accumulated water, or construction activities, as directed by Architect & Geotechnical Engineer.

3.9 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.

3.10 STORAGE OF SOIL MATERIALS

A. Contractor shall 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 and to protect from becoming excessively wet due to rainfall or infiltration from other sources. Temporarily seed soil stockpiles as required to prevent erosion. 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.

3.11 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.

3.12 PLACEMENT OF FILL OR BACKFILLS

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. Provide Steps or benches in the subgrades of existing steep slopes to promote stabilization of fill material. Fills in sloping areas shall be placed and compacted to a minimum of 93 percent modified proctor dry density as determined by ASTM D1557.

C. Place and compact fill material in layers to required elevations as follows:
1. Under curbs and field use Common Fill, base, and subbase.

3.13 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 shall plan and conduct his excavation and filling operations considering the nature of the on-site materials. Refer to geotechnical report

E. Compacted subgrades shall be protected from construction equipment or human traffic that may loosen or disturb the fill. All loose, saturated or disturbed materials shall be removed and replaced with suitable compacted fill

3.14 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 3.16.

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 the Porous Fill or 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. 95% of maximum dry density as determined by AASHTO Method T 180.

3.15 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.
4. Refer to related specifications for additional information.

3.16 SUBBASE AND BASE COURSES

A. Under pavements and walks, place subbase course on prepared subgrade and as follows:

1. Place base course material over subbase.
2. Compact subbase and base courses at optimum moisture content to required grades, lines, cross sections, and thickness to not less than 95 percent of maximum dry unit weight according to ASTM D 1557.

3. Shape subbase and base to required crown elevations and cross-slope grades.
4. When thickness of compacted subbase or base course is 6 inches or less, place materials in a single layer.
5. When thickness of compacted subbase or base course exceeds 6 inches, place materials in equal layers, with no layer more than 6 inches thick or less than 3 inches thick when compacted.

B. Pavement Shoulders: Place shoulders along edges of subbase and base course to prevent lateral movement. Construct shoulders, at least 60 inches wide, of common fill or approved suitable soil material and compact each layer of subbase, and base layer to not less than 93 percent of maximum dry unit weight according to ASTM D 1557.

3.17 FIELD QUALITY CONTROL

A. Testing Agency: Contractor shall coordinate directly with 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.

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.

E. Refer to related sections for additional testing requirements.

3.18 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.

D. Protect areas with slopes of 1 vertical : 2 horizontal with erosion-control fiber mesh and with erosion-control blankets installed and stapled according to manufacturer's written instructions, or as indicated on the civil drainage plans.

E. Protect areas with slopes not exceeding 1 vertical : 2 horizontal by spreading straw mulch. Spread uniformly at a minimum rate of 2 tons/acre to form a continuous blanket 1-1/2 inches in loose depth over seeded areas. Spread by hand, blower, or other suitable equipment.

1. Anchor straw mulch by crimping into topsoil with suitable mechanical equipment.

3.19 DISPOSAL OF SURPLUS AND WASTE MATERIALS

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

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SECTION 31 23 33 — TRENCHING AND BACKFILLING

PART 1 – GENERAL

1.1 DESCRIPTION

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. Work Included: Excavate trenches for utilities; compacted bedding under and compacted fill over utilities to subgrade elevations; backfilling and compaction. Work under this item also include the complete replacement of all items disturbed by trenching activities, including sidewalks, curbs, signs, pavement, etc.

C. Related Sections:

1. Section 31 20 00 – Earth Moving;

2. Section 31 25 00 – Erosion and Sedimentation Controls;

3. Section 33 40 00 – Storm Drainage Utilities;

4. Section 33 30 00 – Sanitary Sewerage Utilities;

5. Section 33 10 00 – Water Utilities.

1.2 REFERENCES

A. American Society for Testing and Materials (ASTM):

1. ASTM C136 - Method for Sieve Analysis of Fine and Coarse Aggregates.

B. Wherever reference is made to the DOT Specifications, it shall mean the Connecticut Department of Transportation Standard Specifications for Roads, Bridges and Incidental Construction, Form 817 (2016), as modified by Supplemental Specifications issued by the Connecticut Department of Transportation.

1.3 REGULATORY REQUIREMENTS

A. Notify utility companies in accordance with Public Act 77-350 'CALL BEFORE YOU DIG", (1-800-922-4455).

B. Comply with United States Department of Labor, Occupational Safety and Health Administration.

C. Construction Standards for Excavations, 29 CFR part 1926, subpart P.

D. Obtain required permits from authorities.

E. Do not close or obstruct roadways, sidewalks, or hydrants without permits.

F. Comply with all applicable requirements of State and local authorities for trenching, backfilling and maintenance and protection of traffic within city streets.

1.4 SUBMITTALS

A. Samples of filter cloth and warning tape shall be submitted for approval. Other samples and certificates of compliance may be requested.

B. Where sheeting and shoring is used, complete sheeting and shoring sketches and calculations shall be prepared by a Connecticut registered Professional Engineer and shall meet OSHA regulations.

PART 2 – PRODUCTS

2.1 CRUSHED STONE

A. Crushed stone of the size specified shall conform to the requirements of Section M.01.01 of the DOT specifications.

2.2 SAND

A. Conform to Section M.03.01-2 of the DOT Specifications.

2.3 GRANULAR FILL

A. Conform to Section M.02.01 of the DOT Specifications.

2.4 BACKFILL MATERIAL

A. Wherever reference is made on the Drawings or in the Specifications to suitable material, suitable backfill material, and suitable fill material, the material shall be mineral soil substantially free from organic materials, topsoil, wood, trash, and other objectionable materials which may be compressible or which cannot be properly compacted. It shall not contain rocks or lumps larger than six (6) inches in largest dimension, and not more than 15 percent of the rocks or lumps shall be larger than 2 1/2 inches in largest dimension. Further, it shall not contain granite blocks, broken concrete, masonry rubble, or other similar materials. It shall have physical properties such that it can be readily spread and compacted during filling. Snow, ice, and frozen soil will not be permitted.

2.5 GEOTEXTILE FILTER CLOTH

A. Geotextile filter cloth shall conform to the requirements of Section M.08.01-26 of the D.O.T. Specifications. Geotextile shall be approved for subsurface drainage use, Class A.

2.6 WARNING TAPE

A. Warning tape shall be 3-inch wide, detectable, color to suit utility being identified.

2.7 SHEETING AND SHORING

A. Lumber used for sheeting, rangers, bracing, and other construction purposed shall be sound, straight grained, free from shakes, loose knots and other defects liable to impair its strength or durability. Lumber and sheeting may be reused if not ordered left in place and if in good condition. Lumber shall be spruce and/or fir.

PART 3 – EXECUTION

3.1 GENERAL

A. Verify that backfill materials to be used are acceptable.

3.2 PREPARATION

A. Identify required lines, grades, levels, contours, and datum.

B. Maintain and protect existing above and below grade utilities to remain. The contractor shall contact “Call Before You Dig” utility locating service at 1-800-922-4455 at least 48 hours prior to the start of any site construction to have existing underground utilities located.

C. Protect trees, plant life, lawns, rock outcropping, and other features remaining as a portion of final landscaping.

D. Protect benchmarks, existing structures, fences, sidewalks, paving, and curbs from excavation equipment and vehicular traffic.

E. Cut out soft areas of subgrade not capable of insitu compaction. Backfill with granular fill and compact to density equal to or greater than requirements for subsequent backfill material.

3.3 EXCAVATION

A. Excavate subsoil required for utility installation.

B. Excavate rock and unsuitable material as specified in Section 31 20 00 – Earth Moving.

C. Make all trenches open vertical construction with sufficient width to provide free working space at both sides of the trench and around the installed item as required for caulking, jointing, backfilling, and compacting.

1. Depth: Excavate to the elevations shown on the Drawings.

2. Excavation shall not interfere with normal 45 degree bearing splay of foundations.

3. Hand trim excavation. Hand trim for bell and spigot pipe joints. Remove loose matter.

4. Remove lumped subsoil and boulders.

D. Correct unauthorized excavation.

E. Correct areas over-excavated by error. Where trench excavation is inadvertently carried below proper elevations, fill with granular fill and compact to provide a firm and unyielding subgrade or foundation at no additional cost to the Owner.

F. Stockpile excavated material in area designated on site and remove excess material not being used, from site.

G. Keep excavations dry; Construction work to be installed "in the dry". Do not use pipe being constructed for trench drainage.

H. Grade top perimeter of excavation to prevent surface water from draining into trench. Do not obstruct surface drainage, but provide means whereby storm water is diverted into existing gutters, other surface drains, or temporary drains.

3.4 SHEETING AND SHORING

A. Trench Bracing:

1. Properly support all trenches in strict accordance with all pertinent rules and regulations.

2. Brace, sheet, and support trench walls in such a manner that they will be safe and that the ground alongside the excavation will not slide or settle, and that all existing improvements of every kind, whether on public or private property, will be fully protected from damage.

3. In the event of damage to such improvements, immediately make all repairs and replacements necessary at no additional cost to the Owner.

B. The Contractor shall leave in place all sheeting and bracing which the Engineer may direct him in writing to leave in place at any time during the progress of the work for the purpose of preventing injury to structures, utilities, or property, whether public or private. All sheeting to be left in place shall be cut off at least 3' below paved surfaces and 2' below non-paved surfaces.

C. All sheeting and bracing not left in place shall be carefully removed in such manner as not to endanger the construction of other structures, utilities, or property. All voids left or caused by withdrawal of sheeting shall be immediately refilled with sand by ramming with tools especially adapted to that purpose.

D. Sheeting and bracing ordered to be left in place shall not be construed as creating any obligation on his part to issue such order, and his failure to exercise his right to do so shall not relieve the Contractor from liability for damages to persons or property occurring from or upon the work occasioned by negligence or otherwise growing out of a failure on the part of the Contractor to install or leave in place sufficient sheeting and bracing to prevent any caving or moving of the ground.

3.5 PIPE AND STRUCTURE BEDDING

A. Grade trench bottoms for pipes, manholes, catch basins, utility services, and other items to provide a smooth, firm, and stable foundation free from rock points.

B. Support pipe conduit during placement and compaction of bedding fill. Provide continuous bedding layer. Use of blocking not acceptable.

C. Pipes and structures shall be bedded and backfilled as detailed in the drawings.

3.6 PIPE BACKFILLING

A. Backfill trenches to contours and elevations with unfrozen materials.

B. Systematically backfill to allow maximum time for natural settlement. Do not backfill over porous, wet, frozen or spongy subgrade surfaces.

C. Backfill in accordance with trench details.

D. Place and compact backfill materials in continuous layers not exceeding 8 inches compacted depth, compacted as shown on the drawings.

E. Employ placement and compaction methods that do not disturb or damage pipes, conduits or structures.

F. Maintain optimum moisture content of backfill materials to attain required compaction density.

G. Remove surplus backfill materials from site.

H. Leave fill material stockpile areas completely free of excess fill materials.

3.7 TOLERANCES

A. Top Surface of Backfilling: Plus or minus one inch from required elevations.

END OF SECTION

SECTION 31 25 00 — EROSION AND SEDIMENTATION CONTROLS

PART 1 – GENERAL

1.1 DESCRIPTION

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. Work Included: Controlling sedimentation and erosion as shown on the Drawings and as specified.

C. Related Sections:

1. Section 31 20 00 – Earth Moving;

2. Section 31 23 33 – Trenching and Backfilling.

1.2 REFERENCES

A. Wherever reference is made to the DOT Specifications, it shall mean the Connecticut Department of Transportation Standard Specifications for Roads, Bridges, and Incidental Construction Form 817 (2016) as modified by Supplemental Specifications issued by the Connecticut Department of Transportation.

PART 2 – PRODUCTS

2.1 HAY BALES AND STAKES

A. Hay Bales: Forty pounds minimum weight and 120 pounds maximum weight.

B. Wood Stakes:

1. Two (2) per bale for securing bales.

2. Sizes: As shown on the Drawings.

2.2 MATERIALS FOR SILT FENCE

A. Filter Fabric; Filter Cloth:

1. Subarticle M.08.01-26, DOT Specifications.

2. Obtain manufacturer's certification that filter fabric conforms to the requirements of these Specifications.

3. Obtain the filter fabric from a manufacturer who produces the material for use in silt fences and who has a design for that use.

4. Do not use fabric susceptible to deterioration in sunlight.

5. Submit 2-foot square sample and technical data sheet for acceptance by the Owner.

6. Submit manufacturer's installation instructions for acceptance by the Owner.

B. Posts or Other Suitable Mounting:

1. Lengths of wood posts: As shown on the Drawings. Cross-section dimensions: As recommended by filter fabric manufacturer.

2. Other Suitable Mounting: As recommended by the manufacturer.

C. Provide materials as required by the manufacturer for attaching fabric to posts.

2.3 MATERIALS FOR ANTI-TRACKING PAD

A. Crushed Stone: Sound, tough and durable; free from soft, thin, elongated or laminated pieces and vegetable or other deleterious substances. Grading: Article M.01.01, DOT Specifications No. 4.

B. Filter Cloth: Subarticle M.08.01-26, DOT Specifications.

2.4 EROSION-CONTROL BLANKETS

A. Biodegradable wood excelsior, straw, or coconut-fiber mat enclosed in a photodegradable plastic mesh. Include manufacturer's recommended steel wire staples, 6 inches long.

PART 3 – EXECUTION

3.1 PLACING HAY BALES

A. Place hay bales at slopes, at catch basins and at other locations as shown on the Drawings.

B. Embed hay bales to a depth of 6 inches.

C. Drive stakes through hay bales into ground to secure hay bales.

D. Place and stake hay bales at all locations as necessary to intercept and to filter overland stormwater flows before these flows enter streams or ponds.

E. Whenever pumping water from excavations, discharge the water such that it passes through hay bales before entering a storm drain or water body.

F. Remove accumulated sediment and replace bales when system becomes clogged or when directed by the Owner.

G. Remove hay bales at completion of project unless the Owner directs otherwise.

3.2 CONSTRUCTION AND MAINTENANCE OF SILT FENCES

A. Construct silt fences as shown on the Drawings.

B. Construct silt fences in accordance with manufacturer's instructions as accepted by the Owner.

C. Maintain or replace silt fences until they are no longer necessary or as ordered by the Owner.

D. Remove silt fences at completion of project unless the Owner directs otherwise.

3.3 CONSTRUCTION AND MAINTENANCE OF ANTI-TRACKING PAD

A. Construct anti-tracking pad at location shown on the Drawings.

B. Excavate to length, width and depth dimensions as shown on the Drawings.

C. Place filter cloth on excavated subgrade.

D. Place crushed stone on filter cloth to depth as shown on the Drawings.

E. Maintain the entrance in a condition that will prevent tracking or flowing of sediment onto the public right-of-way. When necessary, increase thickness by adding additional crushed stone; or increase length by excavating to subgrade and placing additional filter cloth and crushed stone; or do both in order to prevent tracking or flowing of sediment. Immediately remove all sediment spilled, dropped, washed or tracked onto the public right-of-way.

F. Remove anti-tracking pad at completion of project unless the Architect directs otherwise or at a time when permanent access can be constructed.

3.4 CONSTRUCTION OF EROSION CONTROL BLANKETS

A. Protect seeded areas with slopes exceeding 1V:3H or as indicated on the plans with erosion-control blankets installed and stapled according to manufacturer's written instructions.

3.5 COMPLIANCE WITH GUIDELINES AND PERMITS

A. The Contractor shall review the CTDEEP guidelines (Connecticut Guidelines for Soil Erosion and Sediment Control), and the requirements of the General Permit for the Discharge of

Stormwater and Dewatering Wastewaters Associated with Construction Activities prior to any site disturbance.

B. Inspection shall be performed in accordance with the General Permit as directly cited below:

1. "Qualified personnel (provided by the permittee) shall inspect disturbed areas of the construction activity that have not been finally stabilized, structural control measures, and locations where vehicles enter or exit the site at least once every seven calendar days and within 24 hours of the end of a storm that is 0.1 inches or greater. Where sites have been temporarily or finally stabilized, such inspection shall be conducted at least once every month for three months."

2. "Disturbed areas used for storage of materials that are exposed to precipitation shall be inspected for evidence of, or the potential for, pollutants entering the drainage system. Erosion and sediment control measures shall be observed to ensure that they are operating correctly. Where discharge locations or points are assessable, they shall be inspected to ascertain whether erosion control measures are effective in preventing significant impacts to receiving waters. Locations where vehicles enter or exit the site shall be inspected for evidence of off-site sediment tracking."

3. "Based on the results of the inspection, the description of the potential sources and pollution prevention measures identified in the Plan shall be revised as appropriate as soon as practicable after such inspection. Such modification shall provide for timely implementation of any changes to the site within 24 hours and implementation of any changes to the Plan within three calendar days following the inspection. The plan shall be revised and the site controls updated in accordance with the General Permit."

C. Stormwater runoff shall be directed away from disturbed areas whenever possible by the use of temporary berms, swales hay bales or silt fence.

D. In areas where more than 2 acres will be disturbed, sediment traps or other controls will be constructed in accordance with the guidelines.

E. For discharge points that serve an area with more than 5 disturbed acres at one time, a sediment basin, designed in accordance with the guidelines, shall be installed and shall provide a minimum of 134 cubic yards of water storage per acre drained. The sediment basin shall be maintained until final stabilization of the contributing area. This requirement shall not apply to flows from off-site areas and flows from the site that are either undisturbed or have undergone final stabilization where such flows are diverted around the sediment basin. Outlet structures from sedimentation basins shall not encroach upon a wetland.

F. The Owner or its representative may require additional controls, as they are deemed necessary due to construction phasing, weather conditions, or other unforeseen conditions that cause excessive soil erosion or sedimentation.

END OF SECTION

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. Project Signage and Posts
2. Metal Bollards

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".
3. Division 32 Section "Plants".
4. Division 26 Section "Electrical".

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. 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 PROJECT SIGNAGE

A. 3/32" thick sign face – sheet aluminum signs in conformance with Form 817, Article M.18.13.

B. Graphic image, text, and sign to conform to State Statute and project requirements (see Drawings for schedule of graphics).

C. Posts: 2" tubular steel, galvanized, with domed cap. Fastening hardware for all signs shall be galvanized, and compatible with pole materials. Sample submittal required.

2.2 METAL BOLLARDS

A. Schedule 40 galvanized seamless pipe including concrete core and steel dome top with continuous weld to pipe..

B. Provide reflective tape as detailed. Color: White

C. Prime and paint. Colors to be approved.

2.3 LIGHT POLE BASES

A. See MEP/ Electrical specification

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 PROJECT SIGNAGE

A. Install signs and posts at each designated location.

B. Install signage plates and fabricated steel post/bollard assembly where and as detailed at handicap parking areas.

C. Signs to be installed level and plumb, at a constant vertical alignment.

3.3 HANDICAP PASSENGER LOADING AND VAN ACCESSIBLE SIGNAGE BOLLARDS

A. Install signage bollards at each designated handicap parking space or loading zone. Install as per detail.

3.4 BOLLARDS

A. Install bollards where and as detailed. Hold bollards at a constant alignment.

3.5 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 DESCRIPTION

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. 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. Painted pavement markings and legends.

3. Maintenance and protection of pedestrian traffic as required.

C. Related Sections:

1. Section 31 20 00 – Earth Moving;

2. Section 31 25 00 – Erosion and Sedimentation Controls;

3. Section 33 10 00 – Water Utilities;

4. Section 33 30 00 – Sanitary Sewerage Utilities;

5. Section 33 40 00 – Storm Drainage Utilities.

1.2 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.

1.3 REFERENCES

A. Wherever reference is made to the DOT Specifications, it shall mean the Connecticut Department of Transportation Standard Specifications for Roads, Bridges and Incidental Construction Form 817 (2016) as modified by Supplemental Specifications issued by the Connecticut Department of Transportation.

PART 2 - PRODUCTS

2.1 MATERIALS

A. Subbase crusher-run stone conforming to the requirements of Article M.01.01, for No. 6 stone (3/8" crushed stone), DOT Specifications or to the following:

Sieve Size	Percent Passing
3.5"	100
¾"	50-100
No. 4	25-75

The fraction, passing the No.4 sieve shall have less than 15% passing the No. 200 sieve.

B. Base: Processed aggregate for the base shall conform to the requirements of Article M.05.01, DOT Specifications. Coarse Aggregate shall be broken stone conforming to the requirements of Article M.05.01-2 (b).

C. Pavement Materials:

1. Bituminous concrete mixtures conforming to the requirements of Section M.04 of the DOT Specifications.

2. In Section M.04, reference is made to the Chief, Materials Testing Section, to the Materials Testing Section, and to the Laboratory; none will be involved in this work. Do the work of the Chief, the Section, and the Laboratory; or arrange for the producer of the bituminous concrete to do this work. Make the determinations, verifications, rejections, approvals, tests, and inspections as specified by Section M.04 and as necessary to produce satisfactory bituminous mixtures.

D. Tack Coat: Section M.04 of the DOT Specifications.

E. Joint Sealer: A rubber compound of the hot-poured type conforming to the requirements of Article M.04.02 of the DOT Specifications.

F. Paint: Shall conform to Section M.07.21 of the DOT Specifications for Hot Applied Pavement Marking Paint.

PART 3 - EXECUTION

3.1 INSPECTION

A. Examine the areas and conditions under which work of this Section will be installed. Correct conditions detrimental to proper and timely completion of the Work. Do not proceed until unsatisfactory conditions have been corrected.

3.2 FINAL PREPARATION OF SUBGRADE

A. After preparation of subgrade as specified in Section 31 20 00 – Earth Moving of these Specifications, thoroughly scarify and sprinkle the entire area to be paved, and then compact by rolling to a smooth, hard, even surface of 95 percent of modified optimum density to receive subbase. Finish to the required grades, with due allowance for the thickness of bituminous concrete courses to be placed thereon.

B. Equipment: Compact by rolling with a 15-Ton vibratory roller.

3.3 CONSTRUCTION OF SUBBASE AND BASE COURSE

A. After subgrade has been completed and accepted by the Architect, construct the subbase and base over all areas to be paved.

B. Construct subbase in accordance with the requirements of Article 2.12.03 of the DOT Specifications, however compact with four passes of a 15-Ton (static weight) roller.

C. Construct base in accordance with the applicable requirements of Article 3.04.03 of the DOT Specifications. Compact to at least 98 percent of modified optimum density.

3.4 CONSTRUCTION OF BITUMINOUS CONCRETE PAVEMENT

A. Construct pavement in courses as called for on the Drawings. Use a class of bituminous concrete for each course as indicated on the Drawings. Thickness of each course: As shown on the Drawings.

B. Construct the bituminous concrete pavement in accordance with Article 4.06.03 of the DOT Specifications, except as modified below:

1. Article 4.06.03-1 Samples: Samples will not be taken by Materials Testing Section. Arrange for the producing plant to take its own samples to ascertain that mixtures are proper. Provide certifications. The Contractor will have the ultimate responsibility.

2. Article 4.06.03-2 Mixing Plant Inspection:

   a. Inspections, verifications, determinations, and approvals at the mixing plants will not be made by the Chief, Materials Testing Section. The Contractor will be responsible for mixtures and shall take whatever steps are required to ensure production of satisfactory mixtures. He shall certify that mixtures do meet specifications.

   b. Weights of completed mixtures will not be required.

3. Article 4.06.03-3 Mixing Plant Inspection - Field Laboratory: Delete in its entirety.

4. Article 4.06.03-4: Delete "Assistant Manager of Materials Testing" and substitute "Contractor."

5. Article 4.06.03-5: Delete "Assistant Manager of Materials Testing" wherever it appears and substitute "Contractor."

C. Certifications: Furnish certified test reports, material certificates, and certificates of compliance in accordance with the requirements of Article 1.06.07 of the DOT Specifications.

3.5 APPLICATION OF PAINTED PAVEMENT MARKINGS AND LEGENDS

A. The contractor shall furnish a technical advisor, who shall be fully knowledgeable of all equipment operations and application techniques, to oversee the project operation.

B. Pavement markings shall be applied in accordance with the details shown on the Drawings, in accordance with Section 12.09 of the DOT Specifications and as directed by the Architect.

C. The road surface shall be cleaned to the satisfaction of the Architect just prior to application. Pavement cleaning shall consist of at least brushing with a rotary broom (non-metallic), and additionally as recommended by the material manufacturer and acceptable to the Architect.

D. The painted pavement markings application shall immediately follow the pavement cleaning. Operations shall be conducted only when the pavement surface temperatures are 50°F or greater.

E. After application the paint shall be protected from crossing vehicles and pedestrians for a time at least equivalent to the drying time of the paint.

F. The contractor shall place necessary “spotting” at appropriate points to provide horizontal control for striping and to determine necessary starting and cutoff points. Longitudinal joints, pavement edge and existing markings shall serve as horizontal control when so directed.

3.6 PROTECTION

A. Protect from traffic during all operations.

3.7 FINISH TOLERANCES

A. Finish surfaces to the following tolerances.

1. Subbase and Base: Plus 0.00 feet to minus 0.10 feet from line and grade shown on the Drawings.

2. Bituminous Concrete Surface Course: Plus or minus 0.05 feet at any point from line and grade shown on the Drawings. No variations in surface more than 1/8 inch in a 10-foot plane.

END OF SECTION

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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.
2. Running track rubberized surfacing.

B. Related Sections include the following:

1. Division 31 Section "Earth Moving".
2. Division 32 Section "Asphalt Paving".
3. Division 33 Section "Field Subdrainage System".

1.3 PROJECT CONDITIONS

A. The bid drawings, bid documents and project manual for 'Synthetic Grass and Running Track Surfacing, Derby High School City project COD2018-02 dated February 28, 2018" as modified by addenda are hereby incorporated into this specification in whole. The contractor shall carry the bid costs for the lowest responsible bidder for this bid (AstroTurf and ATT Sports) and shall carry the contract for the track and turf surfacing subcontractor, including materials, installation and warranties and shall include those costs in his bid price.

1.4 DEFINITIONS

A. Form 817: "Standard Specifications for Roads, Bridges, and Incidental Construction", State of Connecticut, Department of Transportation, Form 817, 2016 edition, as supplemented.

1.5 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.

1.6 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.

1.7 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 25ºF 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 ½ inch, no minus.
2. Surface Course: 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: 1/4 inch.
2. Surface Source: 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 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.

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 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.

3.10 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 13 13 — CONCRETE PAVING

PART 1 – GENERAL

1.1 DESCRIPTION

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. Work Included: Portland cement concrete sidewalks, utility pads and dumpster pads, complete in place, as shown on the Drawings and as specified.

C. Related Work Specified Elsewhere

1. Section 31 20 00 – Earth Moving;

2. Section 32 12 16 – Asphalt Paving.

1.2 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 concrete surfaces and operation of the required equipment, use only personnel who are thoroughly trained and experienced in the skills required.

1.3 APPLICABLE SPECIFICATIONS

A. Wherever reference is made to the DOT Specifications, it shall mean the Connecticut Department of Transportation Standard Specifications for Roads, Bridges and Incidental Construction Form 817 (2016) as modified by Supplemental Specifications issued by the Connecticut Department of Transportation.

PART 2 – PRODUCTS

2.1 MATERIALS

A. Concrete: Article M.03.01, DOT Specifications. Class: As indicated on the Drawings.

B. Air-Entraining Portland Cement and Air-Entraining Admixture: Article M.03.01, DOT Specifications.

C. Reinforcement:
   1. Welded Wire Mesh: WWM shall be used in all concrete sidewalk ramps and concrete sidewalk locations. The WWM shall be W1.4xW1.4 and conform to the latest AASHTO M55M/M55-94 "Standard Specifications for Welded Steel Wire Fabric for Concrete Reinforcement."

   2. Written request may be made to substitute synthetic:
      100% virgin polypropylene fibers, minimum 1.5lbs per cubic yard or as approved by the manufacturer. Acceptable manufacturers of polypropylene fibers are W.R. Grace, Fibermesh, and Forta Corp.

D. Sealant to be Saltguard® WB as manufactured by Prosoco, Inc. or approved equal.

E. Granular for Base: Article M.02.01, DOT Specifications.

F. Expansion and Isolation Joint Filler Strips: ASTM D 1751, asphalt saturated, cellular fibers, as manufactured by Sealtight, W.R. Meadows, or approved equal.

   1. Thickness – one-half inch.
   2. Depth – to match full section of concrete pavement/curb.

G. Removable Vinyl Joint Cap Strips: Compatible with filler strips width, as manufactured by Vinylex Corp. or approved equal. Provide in lengths equal to lengths of filler strips.

H. Joint Sealer: Compatible with filler strips, two component polyurethane elastomeric type complying with FS-TT-S-00227, self-leveling designed for pedestrian and vehicular traffic, as manufactured by Sika, Percora, or approved equal. Include primer and backing rods as required.

   1. Type: Class II, non-load bearing, for bonding freshly mixed to hardened concrete.
   2. Type: Class I and II, non-load bearing, for bonding hardened or freshly mixed concrete to hardened concrete.
   3. Type: Class IV and V, load bearing, for bonding hardened or freshly mixed concrete to hardened concrete.

Expansion Joint Filler: For installation at expansion joints: Bituminous cellular type, AASHTO M213.

PART 3 – EXECUTION

3.1 INSPECTION

A. Examine the areas and conditions under which work of this Section will be installed. Correct conditions detrimental to proper and timely completion of the Work. Do not proceed until unsatisfactory conditions have been corrected.

3.2 CONSTRUCTION METHODS

A. Conform to the requirements of Article 9.21.03 of the DOT Specifications.

B. Install expansion joint filler at expansion joints located as shown on the Drawings.

C. Curing and Protection

1. Protect interior and exterior concrete from moisture loss and premature drying for a minimum of 7 days. Follow applicable provisions of ACI 301.

2. Apply silane / siloxane type water repellent on all exposed concrete surfaces using manufacturer's recommendations.

END OF SECTION

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SECTION 32 18 23.13 – INFIELD SURFACING (ALTERNATE)

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. Furnishing and installation of new infield surface material
2. Furnishing and installation of sand drainage layer.

B. Related Sections include the following:

1. Division 31 Section "Site Clearing".
2. Division 31 Section "Earth Moving".
3. Division 32 Section "Athletic Equipment".
4. Division 32 Section "Topsoil".
5. Division 32 Section "Lawns".

1.3 DEFINITIONS

A. Connecticut DOT 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. Material Certificates: Provide copies of the material certificates signed by the material producer and the contractor, certifying that each material item complies with the specified requirements.

B. Samples: Submit samples of each component of surfacing material for approval.

C. Testing: Submit complete mechanical analysis reports of existing and proposed surfacing material detailing specific blends of material.

PART 2 - PRODUCTS

2.1 INFIELD SURFACING MATERIAL

A. General Infield mix for infield, bullpens and batting cages shall be "Dura-Edge Classic" color "Light brown" as available from Read Custom Soils, Westford MA. Or approved equal.

1. Infield Mix shall be comprised of the following:

Mechanical Analysis of Infield Mix

Sand	70%-75%
Silt /clay Clay (less than .002 mm)	12% 16%
Medium Sand	>50%
Silt/Clay Ratio	0.5-1.0

2. Infield – 6" depth

B. INFIELD MIX AT MOUNDS AND BATTER BOXES

1. Infield Mix at mounds and batters boxes shall be 'Dura Pitch Mound Clay' color "Light brown" as available Dura-Edge, Wrentham, MA. Or approved equal.

2. Pitchers Mound – 6" depth.

3. Batters Boxes – 6" depth.

2.2 INFIELD SOIL CONDITIONER

1. Soil conditioner:

a. Must be in illite, montmorillinite and silica blend at 40% minimum to 60% minimum amorphous silica. Material must be processed in a rotary kiln operation at temperatures not less than 1200 degrees Fahrenheit. Product must be screened and de dusted.

Ph: 7.0±.5

SIEVE ANALYSIS	PERCENT PASSING
#6 mesh	15.0
#8 mesh	31.5
#12 mesh	18.9
#20 mesh	30.9
#30 mesh	3.1
#40 mesh	0.5

2. Material shall be similar to Turface MVP, by Profile Products, LLC, Buffalo Grove, IL., or approved equal.

2.3 SAND: ASTM C33-03.6 Fine Aggregate, "2-NS" sand OR Form 817, Article M.11.04, gradation 'A'. Local bank sands may also be considered with written approval of architect.

PART 3 - EXECUTION

3.1 GENERAL: Install to the lines and grade shown on the Drawings.

A. Insure that the subgrade has been properly prepared and compacted.

B. Insure all bases anchoring/pitching plate, and subsurface improvements, have been properly installed, backfilled and compacted prior to placement of infield surfacing material.

3.2 PREPARATION

A. Thoroughly bulk mix, at an approved location, all borrow and stockpiled surfacing material to produce a homogeneous product.

3.3 INSTALLATION

A. Lightly loosen the subgrade. Install layer of sand to depth detailed. Roll and compact.

B. Do not install or work infield materials in a wet or saturated condition.

C. Install infield-surfacing products in all infield areas (base paths, batting and pitching areas, coach's boxes, etc.) as per details and supplier recommendations.

1. Apply soil conditioner, as needed to adjuast infield tilth and work-ability. Disking operation must create a homogeneous blend of infield surface material and soil conditioner.
2. Rake to smooth grade and nail drag. Compact thoroughly.

D. Dimensions indicated on drawings are after compaction.

E. Insure that lawn grades are flush with infield surfacing elevations and that drainage patterns are not interrupted.

3.4 MAINTENANCE

A. Maintain until final acceptance by raking and rolling, a smooth even surface with no weeds or other debris. Infield surfacing will not be accepted until all lawn areas in the specific field are established, maintained, and accepted.

B. Immediately prior to final inspection install bases and plates and perform final dragging of field surfaces.

C. Repair any settlements by installing additional material and rolling to a smooth surface.

END SECTION 32 18 23.13

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SECTION 32 18 23.26 — NATURAL TURF ATHLETIC FIELD CONSTRUCTION (ALTERNATE)

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. Construction of natural turf athletic fields.
2. Maintenance of natural turf athletic fields until acceptance

B. Related Sections include the following:

1. Division 1 Section "Alternates".
2. Division 31 Section "Earth Moving".
3. Division 33 Section "Athletic Field Underdrainage".
4. Division 33 Section "Irrigation System".
5. Division 32 Section "Topsoil".

C. The intent of this specification is to provide athletic fields that are high performance, competition grade.

1.3 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. Submit list of machinery to be used during subgrade preparation and topsoiling operations. No rubber tired machinery will be permitted except for light-weight, farm tractor grade machinery with wide tires designed for turf use. All heavy machinery must be track driven.

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 Owners, 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.
3. Sieve analysis of stockpiled subsoil.

G. Planting schedule indicating anticipated dates and locations for each type of seeding or sodding.

H. Field survey of athletic field finished grades, for approval, prior to lawn installation.

I. Maintenance instructions recommending procedures to be established by Owner for maintenance of lawns during an entire year. Submit before expiration of required maintenance periods.

1.4 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. Bidders must provide verification of experience with proposal.

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 successfully completed three (3) high performance athletic fields in the past five (5) years, similar to the design and materials specified herein. Athletic field construction shall have consisted of laser graded, underdrain system, clay athletic field surfacing, irrigation, and seeding.

B. Examine work to receive athletic field development and notify the architect of any defects. Specifically review the subgrade preparation. 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 1 Section "Project Meetings".

1.5 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.

1.6 GUARANTEE

A. Duration of guarantee shall be until the completion of the specified maintenance period and until Owner's final acceptance of all athletic fields.

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 Quality:
   a. Weed Seed: maximum of 0.50%, no noxious weed seed.
   b. Purity: minimum of 97% pure.
   c. Crop: maximum 0.50%.
   d. Germination Rate: minimum 85%.

2. Mixture for irrigated ATHLETIC FIELD Areas:

TYPE OF SEED	PERCENT BY WEIGHT
America Kentucky Bluegrass	30%
Limousine Kentucky Bluegrass	30%
Touchdown Kentucky Bluegrass	30%
Cutter Perennial Ryegrass (Endophyte enhanced)	10%

3. Hydroseeding is not allowed in ATHLETIC FIELD Areas.:

B. 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 roll width 2'-0".

1. Sod to be harvested from field, which is comprised of a "sandy loam" or "loamy sand" classification of soil unless otherwise approved.

2. Provide strongly rooted sod, not less than two (2) years old and free of weeds and undesirable native grasses and machine cut to pad thickness of 3/4" (+1/4"), excluding

top growth and thatch. Provide only sod capable of vigorous growth and development when planted (viable, not dormant).

American Kentucky Bluegrass	20%
Apollo Kentucky Bluegrass	20%
Limousine Kentucky Bluegrass	20%
Midnight Kentucky Bluegrass	20%
Devine Perennial Ryegrass (Endophyte enhanced)	20%

2.2 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 percent passing a 20-mesh sieve, for powder form of lime.

1. Provide lime in the form of dolomitic limestone.

2.3 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, phosphorus, 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.

2.4 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 time 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.

2.5 SALT MARSH HAY

A. Naturally harvested salt marsh hay, certified weed free.

2.6 CHEMICAL PREVENTATIVES AND CONTROLS

A. Commercial materials labeled for turf maintenance, State of Connecticut and EPA registered and approved for turf application.

2.7 SAND

A. State Specifications, Section M.11.04. Grade “B”.

2.8 MODIFIED FILL

A. Refer to Division 31 Section “Earth Moving” of this Specification.

2.9 GEOTEXTILE FABRIC

A. Refer to Division 31 Section “Earth Moving” of this specification for separation fabric, type of geotextile fabric.

2.10 WATER

A. Potable

B. The Contractor is solely responsible for furnishing all water necessary to complete the establishment, maintenance and acceptance of athletic fields, including temporary water, prior to installation/activation of any proposed irrigation system.

2.11 ATHLETIC FIELD LOCATION PIN

A. Location pin shall consist of a 3/4 inch diameter by 36 inch long, galvanized, solid steel pin.

B. Shall be encased in a concrete pier as detailed on the Drawings.

C. Provide concrete consisting of Portland cement per ASTM C 150, aggregates per ASTM C 33, and potable water. Mix materials to obtain concrete with a minimum 28 day compressive strength of 3500 psi. Use at least four sacks of cement per cu. yd., 1-inch maximum size aggregate, 3 inch maximum slump. Conform to Form 814A, Section M4.

D. Provide standard cylindrical cardboard tube liners for full depth of footing. Excavations for pier must be vertical and smooth.

PART 3 - EXECUTION

3.1 EXAMINATION

A. Examine areas to receive natural turf athletic fields 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 athletic fields between April 1 and June 1, and 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, pavements and other facilities, trees, shrubs, and plantings from damage caused by 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.

C. Insure that athletic field underdrainage has been installed in accordance with appropriate section of this Specification.

3.4 SAND

A. Where shown install sand layer, over subgrade and/or underdrainage system as detailed on the drawings.

B. Rake surface to a smooth, even plane and roll.

3.5 MODIFIED FILL

A. Apply approved, modified fill over geotextile fabric, to depth indicated on Drawings.

B. Install modified fill from the sidelines or edges inward toward the center of each field. Do not disturb the geotextile fabric or sand layer below.

C. Spread modified fill using rubber tire loaders or graders which do not have a compaction capacity greater than a small farm tractor. Keep all heavy equipment and trucks off modified fill.

3.6 ATHLETIC FIELD LOCATION PIN

A. Install location pins at the exact corner of every rectangular athletic field (i.e. football; soccer; lacrosse; field hockey). Locations shall be precisely set by Registered Land Surveyor.

B. Set pin and concrete, as detailed on Drawings, so that top of pin will be six inches below finished grade. Vertical excavation by auger is REQUIRED.

C. Protect pin from disturbance during installation of topsoil.

3.7 TOPSOIL

A. Amend athletic field topsoil per the requirements of this specification and provided topsoil testing. Install topsoil in accordance with Section “Topsoil” of this Specification.

3.8 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 1/2”. 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 trees 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.

3.9 ATHLETIC FIELD GRADING

A. Grade all athletic fields to a smooth, even surface with loose, uniformly fine texture using a grading tractor fitted with automatically controlled laser grading equipment (land plane or box plane). Laser guided system must be capable of generating a laser controlled, automatic system to within 1/4" tolerance the full length of the playing field.

B. Conduct a field survey of all athletic areas at 25' o.c. grid. Grades shall be checked using a dual plane laser operation survey instrument and shall be within 1/2" of required elevation, non cumulative. Correct irregularities beyond this tolerance to eliminate all mounds and depressions, and produce a stable, firm seeding or sodding surface.

3.10 ATHLETIC FIELD SEEDING

A. Install starter fertilizer on the finish grade.

B. Hydro-seeding of athletic fields is NOT permitted.

C. Sow specified seed at the specified rates using a culti packer, silt type seeder. Apply the seed in two directions with the second application made at approximately 75 degree angle to the first application.

3.11 SODDING

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 tightly fitted joints and no surface grade irregularities. But 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. Repair as necessary. Tamp and roll lightly to ensure contact with subgrade, eliminate air pockets, and form a smooth surface. Work sifted soil or fine sand into minor cracks between pieces of sod; remove excess to avoid smothering sod and adjacent grass. Provide full width strips on all perimeter edges.

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.

3.12 WATERING LAWN AREAS

A. Maintain a moist seed and sod bed at all times. Water seed bed 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 athletic field turf 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.

3.13 MAINTENANCE

A. Begin maintenance of athletic field turf immediately after each area is planted and continue until acceptable athletic field is established, but for not less than the following periods:

1. Seeded Areas: minimum 60 days after date of Substantial Completion, and after a minimum of 5 mowings.
2. Sodded Areas: minimum 45 days after date of Substantial Completion and a minimum of 3 mowings.
3. When full maintenance period has not elapsed before end of planting season, or if lawn is not fully established at that time, continue maintenance during next planting season.

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

C. Replant bare areas with same materials specified for athletic fields.

D. Add new mulch in areas where mulch has been disturbed by wind or maintenance operations sufficiently to nullify its purpose. Anchor as required to prevent displacement.

E. Crabgrass and broadleaf weed control.

1. General: Treat all athletic field turf areas with crabgrass or broadleaf weed control in conformance with manufacturer's recommendations as required (after diagnosis of weed/crabgrass presence).
2. Time: Conform to the manufacturer's recommendations.
3. Rate: Conform to the manufacturer's recommendations.

F. Disease Control

1. General: Treat any diseased athletic field turf areas with disease control in conformance with the manufacturer's recommendations as required (after diagnosis of disease organisms).
2. Time: Conform to the manufacturer's recommendations.
3. Rate: Conform to the manufacturer's recommendations.

G. Mow athletic field turf (seed or sod) 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 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 athletic field areas two weeks after seeding, 4 weeks after sodding.

I. Tertiary Fertilizations: Apply three (3) tertiary fertilizations at two week interval (4, 6, and 8 weeks after seeding) to entire seeded athletic field areas only.

3.14 SATISFACTORY LAWN

A. Seeded athletic field turf will be satisfactory and eligible for Owner's acceptance provided all requirements, including maintenance, have been met and a health, uniform, dense stand of grass is established, free of weeds and bare spots and surface irregularities, with coverage exceeding 90 percent over any 5 square selected by the Architect. Architect shall be the sole judge. Lawns must be free of weeds, crabgrass, and other undesirable plants, with no diseases present. Acceptance will not be made until all damaged areas have been restored to original conditions.

B. Sodded athletic field turf will be satisfactory provided requirements, including maintenance, have been met and healthy, well rooted, even colored, viable lawn is established, free of weeds, open joints, bare areas and surface irregularities.

C. Prior to acceptance of seeded athletic fields, the Contractor shall perform 4 inch deep by 3/8" inch hollow-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. Areas will not be accepted in "pieces" unless specifically agreed to by the Owner.

E. Replant athletic field turf 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.

3.15 CLEANUP AND PROTECTION

A. Promptly remove soil and debris created by athletic field turf 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 athletic field turf is established and accepted by the Owner.

3.16 LAWN MATERIALS INSTALLATION

A. Lawns: Provide materials in not less than the following quantities:

1. Weight of lime per 100 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.

3.17 SEED

A. 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.

B. 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.

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SECTION 32 31 01 – WOOD GUIDE RAIL (ALTERNATE)

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. Wood Guiderail (at Softball Field)
2. Miscellaneous Galvanized Fastening Hardware

B. Related Sections include the following:

1. Division 31 Section "Earth Moving".
2. Division 32 Section "Topsoil".
3. Division 32 Section "Turf and Grasses".

1.3 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.

1.4 QUALITY ASSURANCE

A. Wood Treatment: Comply with American Wood Preservers Association (AWPA) standards for wood preservative treatment scheduled.

B. Provide each piece of lumber factory grade marked in conformance with AWPA quality mark.

C. Allowable Tolerances: Guiderail shall not deviate more than ½" in to grade in each section.

PART 2 - PRODUCTS

2.1 WOOD (TIMBERS)

A. Rough sawn, No. 2 or better, pressure treated Southern Yellow Pine timbers.

B. Rails: AWPA use Category UC3B, with 0.25 PCF ACQ retention, size 5 inch by 8 inch by length indicated.

C. Posts: AWPA use Category UC4A, with 0.40 ACQ retention, 12" x 12", modified for dado joint assembly.

D. Kiln dried or air dried before and after treatment for 25% maximum moisture content.

2.2 ACCESSORIES

A. Provide miscellaneous steel hardware, concrete and accessories as required. All hardware shall be hot dipped galvanized, for exterior, high humidity, and treated wood conditions.

B. Wood Stain: A water-based exterior grade, translucent stain.

PART 3 - EXECUTION

3.1 PREPARATIONS

A. Obtain measurements and verify dimensions and details before proceeding with work.

3.2 JOB CONDITIONS

A. Confirm pavements, curbs and other improvements are completed prior to installation of specified improvements.

3.3 INSTALLATION

A. Install: Timber guide rails where and as show on the Drawings.

1. Posts shall be set at a constant vertical alignment above finish grade of each segment of guiderail.
2. Posts shall be held at a consistent distance from the edge of curbing as noted and shall be firmly installed below grade to the dimensions indicated.

B. Install: Rails as indicated, dadoed into posts.

C. Smoothly: finish grade around posts to prepare for replacement conditions. Provide topsoil as per Division 32, Section "Topsoil" for all proposed lawn areas. Do not allow water to stand adjacent to post bases.

D. At completion of installation, prep wood for staining keeping the surface free of dirt, oil and other debris. Stain according to manufacturer's recommendation. See Division 09.

3.4 FINISHING

A. Exposed edges of all timbers shall be chamfered ½" and lightly sanded to produce eased edges.

3.5 CLEANING

A. Clean up debris and cutting on a regular periodic basis.

B. Perform cleaning during installation of the work and completion of the work. Remove from site all excess materials, debris, tools and equipment. Repair damage resulting from rough carpentry work.

C. Dispose of all pressure treated lumber in a satisfactory legal manner.

3.6 PROTECTION

A. Protect until acceptance of project. Replace or refinish the surfaces if damaged prior to acceptance. Clean up all debris from installation. Dispose of excess pressure treated lumber in a satisfactory legal manner off-site.

END SECTION 32 31 01

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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 Marcelled Tension Wire.

10. ASTM A824 - Standard Specification Metallic-Coated Steel Marcelled 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. Mesh Size:

a. Field fencing: 2"

b. Backstop: 1-3/4”

3. Mesh Gage:

a. Field Fencing: Wire with a diameter of 9 gauge galvanized core fused. Measured prior to application of coating.

b. Backstop: Wire with a diameter of 6 gauge galvanized core fused. Measured prior to application of coating.

4. Gates: Height of gates shall match that of fence. Type and size of gates shall be as shown on the Drawings.

5. 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.

5. Gate operators, including operating instructions.

6. Motors (if applicable): Show nameplate data, ratings, characteristics, and mounting arrangements.

C. Shop Drawings: Include plans, elevations, sections, details, and attachments to other work. Show accessories, hardware, gate operation, and operational clearances.

1. Gate Operator (if applicable): Show locations and details for installing operator components, switches, and controls. Indicate motor size, electrical characteristics, drive arrangement, mounting, and grounding provisions.

2. Wiring Diagrams (if applicable): For power, signal, and control wiring.

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.

3. Gate operator.

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 operators and controls.

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 depending on height of fence.

1. Vinyl Coated

2. Color: Black

2.3 CORNER, END, AND PULL POSTS

A. See Drawings for size depending on height of fence.

1. Vinyl Coated

2. Color: Black

2.4 BRACE ASSEMBLY

A. Rails

1. 1.25-inch nominal (1.660 O.D.) steel pipe, steel pipe, vinyl coated.

a. Vinyl Coated

b. Color: Black

B. Truss rod shall be 3/8-inch vinyl coated steel with adjustable turnbuckles or truss tightener.

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. Backstop: Wire with a diameter of 6 gauge galvanized core fused. Measured prior to application of coating.

c. Mesh Size:

1) Field Fencing: 2 inches. Measured prior to application of coating.

2) Backstop:1-3/4” inches. Measured prior to application of coating.

d. Polymer-Coated Fabric: ASTM F 668, Class 2b.

1) Color: Black, ASTM F 934.

e. 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 prost sizes based on fence height.

b. End, Corner and Pull Post: Refer to Drawings for prost 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 prost 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: Marcelled (spiraled or crimped) No. 7 gage, (0.177-inches) diameter, ASTM A824, ASTM F 1664, Class 2b over-coated steel wire.

B. Polymer coating over metallic coating.

C. Color: Black, ASTM F 934.

2.9 HARDWARE AND TIES

A. 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.

B. 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.

C. 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.

D. Wire ties shall be minimum 16-gage galvanized steel wire or minimum 9-gage aluminum alloy wire.

E. All fasteners shall be hot-dip galvanized, ASTM F2329.

F. Bolts: Steel, ASTM A307.

G. Washers: Steel, round, ASTM F844.

H. 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 MODULAR OR PANELIZED FENCE

A. Free-standing fence panels, minimum ten (10) foot panels of the height specified.

B. Fabric as specified.

C. Welded tubular steel frame.

D. Stands: Four sided welded tubular steel frame with center bar and tubular sleeves.

2.12 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 prost sizes based on fence height.

D. Gate Frames and Bracing: Round tubular steel.

1. Framing:

a. Size: Refer to Drawings for prost 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 bid 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: 360-degree inward and outward swing.

a. Hindges shall be welded into place and coated.

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.

5. Hinges shall be cast steel hinges capable of 360 degree opening. Set screw shall be installed drilled into the steel post 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.

2.13 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.

2.14 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 outside 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. Privacy Slats: Install slats in direction indicated, securely locked in place.

1. Diagonally, for privacy factor of 80 to 85.

N. 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 2-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 center of double gate openings.

3.7 GATE OPERATOR INSTALLATION (IF APPLICABLE)

A. General: Install gate operators according to manufacturer's written instructions, aligned and true to fence line and grade.

B. Excavation for Support Posts Pedestals Equipment Bases/Pads: Hand-excavate holes for bases/pads, in firm, undisturbed soil to dimensions and depths and at locations as required by gate-operator component manufacturer's written instructions and as indicated.

3.8 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.

3.9 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.

3.10 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.

3.11 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

SECTION 32 31 20 – SITE PIPE AND TUBE RAILINGS

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. Steel pipe railings for site handrails.

B. Related Sections include the following:

1. Division 03 Section "Cast-in-Place Concrete".
2. Division 09 Section "Painting".

1.3 PERFORMANCE REQUIREMENTS

A. General: In engineering railings to withstand structural loads indicated, determine allowable design working stresses of railing materials based on the following:

1. Steel: 72 percent of minimum yield strength.

B. Structural Performance: Provide railings capable of withstanding the effects of gravity loads and the following loads and stresses within limits and under conditions indicated:

1. Handrails:

a. Uniform load of 50 lbf/ ft. applied in any direction.
b. Concentrated load of 200 lbf applied in any direction.
c. Uniform and concentrated loads need not be assumed to act concurrently.

2. Top Rails:

a. Uniform load of 50 lbf/ ft. applied horizontally and concurrently with 100 lbf/ ft. applied vertically downward.
b. Concentrated load of 200 lbf applied in any direction.
c. Uniform and concentrated loads need not be assumed to act concurrently.

3. Infill of Rails/Guards:

a. Concentrated load of 200 lbf applied horizontally on an area of 1 sq. ft.
b. Uniform load of 50 lbf/sq. ft. applied horizontally.

c. Infill load and other loads need not be assumed to act concurrently.

C. Thermal Movements: Provide exterior railings that allow for thermal movements resulting from the following maximum change (range) in ambient and surface temperatures by preventing buckling, opening of joints, overstressing of components, failure of connections, and other detrimental effects. Base engineering calculation on surface temperatures of materials due to both solar heat gain and nighttime-sky heat loss.

1. Temperature Change (Range): 120 deg F, ambient; 180 deg F, material surfaces.

D. Control of Corrosion: Prevent galvanic action and other forms of corrosion by insulating metals and other materials from direct contact with incompatible materials.

1.4 SUBMITTALS

A. Product Data: For the following:

1. Manufacturer's product lines of mechanically connected railings.
2. Grout, anchoring cement, and paint products.

B. Shop Drawings: Include plans, elevations, sections, details, and attachments to other work.

1. For installed products indicated to comply with design loads, include structural analysis data signed and sealed by the qualified professional engineer, licensed in the **State of Connecticut** responsible for their preparation.

C. Welding certificates.

D. Qualification Data: For professional engineer.

E. Product Test Reports: Based on evaluation of comprehensive tests performed by a qualified testing agency, according to ASTM E 894 and ASTM E 935.

1.5 QUALITY ASSURANCE

A. Source Limitations: Obtain each type of railing through one source from a single manufacturer.

B. Welding: Qualify procedures and personnel according to the following:

1. AWS D1.1, "Structural Welding Code--Steel."

1.6 PROJECT CONDITIONS

A. Field Measurements: Verify actual locations of walls and other construction contiguous with railings by field measurements before fabrication and indicate measurements on Shop Drawings.

1. Established Dimensions: Where field measurements cannot be made without delaying the Work, establish dimensions and proceed with fabricating railings without field

measurements. Coordinate wall and other contiguous construction to ensure that actual dimensions correspond to established dimensions.

2. Provide allowance for trimming and fitting at site.

1.7 COORDINATION AND SCHEDULING

A. Coordinate installation of anchorages for railings. 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.

B. Schedule installation so wall attachments are made only to completed walls. Do not support railings temporarily by any means that do not satisfy structural performance requirements.

PART 2 - PRODUCTS

2.1 METALS, GENERAL

A. Metal Surfaces, General: Provide materials with smooth surfaces, without seam marks, roller marks, rolled trade names, stains, discolorations, or blemishes.

B. Brackets, Flanges, and Anchors: Cast or formed metal of same type of material and finish as supported rails, unless otherwise indicated.

2.2 STEEL AND IRON

A. Pipe: ASTM A 53/A 53M, Type F or Type S, Grade A, Standard Weight (Schedule 40), unless another grade and weight are required by structural loads.

1. Provide galvanized finish for exterior installations and where indicated.

B. Plates, Shapes, and Bars: ASTM A 36/A 36M.

C. Castings: Either gray or malleable iron, unless otherwise indicated.

1. Gray Iron: ASTM A 48/A 48M, Class 30, unless another class is indicated or required by structural loads.
2. Malleable Iron: ASTM A 47/A 47M.

2.3 FASTENERS

A. General: Provide the following:

1. Steel Railings: Plated steel fasteners complying with ASTM B 633, Class Fe/Zn 25 for electrodeposited zinc coating.

B. Fasteners for Anchoring Railings to Other Construction: Select fasteners of type, grade, and class required to produce connections suitable for anchoring railings to other types of construction indicated and capable of withstanding design loads.

C. Anchors: Provide torque-controlled expansion anchors, fabricated from corrosion-resistant materials with capability to sustain, without failure, a load equal to six times the load imposed when installed in unit masonry and equal to four times the load imposed when installed in concrete, as determined by testing per ASTM E 488 conducted by a qualified independent testing agency.

2.4 MISCELLANEOUS MATERIALS

A. Welding Rods and Bare Electrodes: Select according to AWS specifications for metal alloy welded.

1. For aluminum railings, provide type and alloy as recommended by producer of metal to be welded and as required for color match, strength, and compatibility in fabricated items.

B. Universal Shop Primer: Fast-curing, lead- and chromate-free, universal modified-alkyd primer complying with MPI#79.

1. Use primer with a VOC content of 420 g/L (3.5 lb/gal.) or less when calculated according to 40 CFR 59, Subpart D (EPA Method 24).
2. Use primer containing pigments that make it easily distinguishable from zinc-rich primer.

C. Shop Primer for Galvanized Steel: Zinc-dust, zinc-oxide primer formulated for priming zinc-coated steel and for compatibility with finish paint systems indicated, and complying with SSPC-Paint 5.

D. Galvanizing Repair Paint: High-zinc-dust-content paint for regalvanizing welds in steel, complying with SSPC-Paint 20.

E. Bituminous Paint: Cold-applied asphalt emulsion complying with ASTM D 1187.

F. Nonshrink, Nonmetallic Grout: Factory-packaged, nonstaining, noncorrosive, nongaseous grout complying with ASTM C 1107. Provide grout specifically recommended by manufacturer for interior and exterior applications.

2.5 FABRICATION

A. General: Fabricate railings to comply with requirements indicated for design, dimensions, member sizes and spacing, details, finish, and anchorage**,** but not less than that required to support structural loads.

B. Assemble railings in the shop to greatest extent possible to minimize field splicing and assembly. Disassemble units only as necessary for shipping and handling limitations. Clearly mark units for reassembly and coordinated installation. Use connections that maintain structural value of joined pieces.

C. Cut, drill, and punch metals cleanly and accurately. Remove burrs and ease edges to a radius of approximately 1/32 inch, unless otherwise indicated. Remove sharp or rough areas on exposed surfaces.

D. Form work true to line and level with accurate angles and surfaces.

E. Fabricate connections that will be exposed to weather in a manner to exclude water. Provide weep holes where water may accumulate.

F. Cut, reinforce, drill, and tap as indicated to receive finish hardware, screws, and similar items.

G. Connections: Fabricate railings with welded connections.

H. Welded Connections: Cope components at connections to provide close fit, or use fittings designed for this purpose. Weld all around at connections, including at fittings.

1. Use materials and methods that minimize distortion and develop strength and corrosion resistance of base metals.
2. Obtain fusion without undercut or overlap.
3. Remove flux immediately.
4. At exposed connections, finish exposed surfaces smooth and blended so no roughness shows after finishing and welded surface matches contours of adjoining surfaces.

I. Form changes in direction as follows:

1. By bending.

J. Form simple and compound curves by bending members in jigs to produce uniform curvature for each repetitive configuration required; maintain cross section of member throughout entire bend without buckling, twisting, cracking, or otherwise deforming exposed surfaces of components.

K. Close exposed ends of railing members with prefabricated end fittings.

L. Provide wall returns at ends of wall-mounted handrails, unless otherwise indicated. Close ends of returns unless clearance between end of rail and wall is 1/4 inch or less.

M. Brackets, Flanges, Fittings, and Anchors: Provide wall brackets, flanges, miscellaneous fittings, and anchors to interconnect railing members to other work, unless otherwise indicated.

N. Provide inserts and other anchorage devices for connecting railings to concrete or masonry work. Fabricate anchorage devices capable of withstanding loads imposed by railings. Coordinate anchorage devices with supporting structure.

O. For railing posts set in concrete, provide steel sleeves not less than 6 inches long with inside dimensions not less than 1/2 inch greater than outside dimensions of post, with steel plate forming bottom closure.

2.6 FINISHES, GENERAL

A. Comply with NAAMM's "Metal Finishes Manual for Architectural and Metal Products" for recommendations for applying and designating finishes.

B. Protect mechanical finishes on exposed surfaces from damage by applying a strippable, temporary protective covering before shipping.

C. Appearance of Finished Work: Variations in appearance of abutting or adjacent pieces are acceptable if they are within one-half of the range of approved Samples. Noticeable variations in the same piece are not acceptable. Variations in appearance of other components are acceptable if they are within the range of approved Samples and are assembled or installed to minimize contrast.

D. Provide exposed fasteners with finish matching appearance, including color and texture, of railings.

2.7 STEEL AND IRON FINISHES

A. Galvanized Railings:

1. Hot-dip galvanize exterior steel and iron railings, including hardware, after fabrication.
2. Comply with ASTM A 123/A 123M for hot-dip galvanized railings.
3. Comply with ASTM A 153/A 153M for hot-dip galvanized hardware.

B. Fill vent and drain holes that will be exposed in the finished Work, unless indicated to remain as weep holes, by plugging with zinc solder and filing off smooth.

C. For galvanized railings, provide hot-dip galvanized fittings, brackets, fasteners, sleeves, and other ferrous components.

D. For nongalvanized steel railings, provide nongalvanized ferrous-metal fittings, brackets, fasteners, and sleeves, except galvanize anchors to be embedded in exterior concrete or masonry.

E. Preparation for Shop Priming: After galvanizing, thoroughly clean railings of grease, dirt, oil, flux, and other foreign matter, and treat with metallic-phosphate process.

F. Preparation for Shop Priming: Prepare uncoated ferrous-metal surfaces to comply with minimum requirements indicated below for SSPC surface preparation specifications and environmental exposure conditions of installed railings:

1. Exterior Railings (SSPC Zone 1B): SSPC-SP 6/NACE No. 3, "Commercial Blast Cleaning."
2. Interior Railings (SSPC Zone 1A): SSPC-SP 7/NACE No. 4, "Brush-off Blast Cleaning."

G. Apply shop primer to prepared surfaces of railings, unless otherwise indicated. Comply with requirements in SSPC-PA 1, "Paint Application Specification No. 1: Shop, Field, and

Maintenance Painting of Steel," for shop painting. Primer need not be applied to surfaces to be embedded in concrete or masonry.

1. Do not apply primer to galvanized surfaces.
2. Stripe paint corners, crevices, bolts, welds, and sharp edges.

PART 3 - EXECUTION

3.1 INSTALLATION, GENERAL

A. Fit exposed connections together to form tight, hairline joints.

B. Perform cutting, drilling, and fitting required for installing railings. Set railings accurately in location, alignment, and elevation; measured from established lines and levels and free of rack.

1. Do not weld, cut, or abrade surfaces of railing components that have been coated or finished after fabrication and that are intended for field connection by mechanical or other means without further cutting or fitting.
2. Set posts plumb within a tolerance of 1/16 inch in 3 feet.
3. Align rails so variations from level for horizontal members and variations from parallel with rake of steps and ramps for sloping members do not exceed 1/4 inch in 12 feet.

C. Corrosion Protection: Coat concealed surfaces of aluminum that will be in contact with grout, concrete, masonry, wood, or dissimilar metals, with a heavy coat of bituminous paint.

D. Adjust railings before anchoring to ensure matching alignment at abutting joints.

E. Fastening to In-Place Construction: Use anchorage devices and fasteners where necessary for securing railings and for properly transferring loads to in-place construction.

3.2 RAILING CONNECTIONS

A. Welded Connections: Use fully welded joints for permanently connecting railing components. Comply with requirements for welded connections in Part 2 "Fabrication" Article whether welding is performed in the shop or in the field.

3.3 ANCHORING POSTS

A. Form or core-drill holes not less than 5 inches deep and 3/4 inch larger than OD of post for installing posts in concrete. Clean holes of loose material, insert posts, and fill annular space between post and concrete with nonshrink, nonmetallic grout, mixed and placed to comply with anchoring material manufacturer's written instructions.

B. Cover anchorage joint with flange of same metal as post, welded to post after placing anchoring material.

C. Anchor posts to metal surfaces with oval flanges, angle type, or floor type as required by conditions, connected to posts and to metal supporting members as follows:

1. For steel pipe railings, weld flanges to post and bolt to metal supporting surfaces.

3.4 ANCHORING RAILING ENDS

A. Anchor railing ends to metal surfaces with flanges bolted to metal surfaces and welded to railing ends.

3.5 ADJUSTING AND CLEANING

A. Clean aluminum and stainless steel by washing thoroughly with clean water and soap and rinsing with clean water.

B. Touchup Painting: Immediately after erection, clean field welds, bolted connections, and abraded areas of shop paint, and paint exposed areas with same material as used for shop painting to comply with SSPC-PA 1 for touching up shop-painted surfaces.

C. Galvanized Surfaces: Clean field welds, bolted connections, and abraded areas and repair galvanizing to comply with ASTM A 780.

3.6 PROTECTION

A. Protect finishes of railings from damage during construction period with temporary protective coverings approved by railing manufacturer. Remove protective coverings at time of Substantial Completion.

B. Restore finishes damaged during installation and construction period so no evidence remains of correction work. Return items that cannot be refinished in the field to the shop; make required alterations and refinish entire unit, or provide new units.

END OF SECTION 32 31 20

SECTION 32 32 23 — REINFORCED SEGMENTAL RETAINING WALLS

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. Segmental retaining walls with soil reinforcement.
2. Capstone
3. Fence footing brackets
4. Backfill requirements

B. Related Sections include the following:

1. Division 3 Section "Concrete Site Walls"
2. Division 31 Section "Site Clearing".
3. Division 31 Section "Earth Moving".
4. Division 32 Section "Chain Link Fence"
5. Division 33 Section "Storm Drainage".

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 REFERENCE STANDARDS

A. Engineering Design

1. NCMA Design Manual for Segmental Retaining Walls, Second Edition.
2. NCMA TEK 2-4 - Specifications for Segmental Retaining Wall Units.
3. NCMA SRWU-1 - Determination of Connection Strength between Geosynthetics and Segmental Concrete Units.
4. NCMA SRWU-2 - Determination of Shear Strength between Segmental Concrete Units.

B. Segmental Retaining Wall Units

1. ASTM C 140 - Sampling and Testing Concrete Masonry Units
2. ASTM C 1262 - Evaluating the Freeze - Thaw Durability of Manufactured Concrete Masonry Units and Related Concrete Units.
3. ASTM C 33 - Specification for Concrete Aggregates

4. ASTM C 90 - Standard Specification for Load-Bearing Concrete Masonry Units
5. ASTM C 150- Specification for Portland Cement
6. ASTM C 595 - Specification for Blended Hydraulic Cements

C. Geotextile Filter

1. ASTM D 4751 - Standard Test Method for Apparent Opening Size

D. Geosynthetic Reinforcement

1. ASTM D 4595 - Test Method for Tensile Properties of Geotextiles by the Wide-Width Strip Method.
2. ASTM D 5262 - Test Method for Evaluating the Unconfined Creep Behavior of Geosynthetics.
3. GRI GG-1: Single Rib Geogrid Tensile Strength
4. GRI GG-5: Geogrid Pullout
5. GRI GT-6: Geotextile Pullout

E. Soils

1. ASTM D 698 - Moisture Density Relationship for Soils, Standard Method
2. ASTM D 422 - Gradation of Soils
3. ASTM D 424 - Atterberg Limits of Soils
4. ASTM D G51 - Soil pH

F. Drainage Pipe

1. ASTM D 3034 - Specification for Polyvinyl Chloride (PVC) Plastic Pipe
2. ASTM D 1248 - Specification for Corrugated Plastic Pipe

G. Where specifications and reference documents conflict, the Owner or Owner's Representative shall make the final determination of applicable document.

1.5 PERFORMANCE REQUIREMENTS

A. Structural Performance: Provide segmental retaining walls capable of withstanding the effects of loads due to soil pressures resulting from grades indicated.

1. Design retaining walls according to NCMA's "Design Manual for Segmental Retaining Walls". Note location of adjacent chain link fence – modify design of wall and geogrids as required to permit full depth concrete fence foundations.

1.6 SUBMITTALS

A. Product Data: For each type of segmental retaining wall and other manufactured products specified.

B. Provide engineered shop drawings of all walls, with appropriate loads and surcharges, prepared and sealed by a Structural Engineer responsible for their preparation. The information provided shall include design loadings and structural analysis. For walls over four feet in height, the Structural Engineer of record shall perform a global stability analysis utilizing the site soil

properties provided in the Geotechnical Report included in the Project Manual. The Engineer shall

1. Review the site soil and geometric conditions to ensure the designed wall is compatible with the site prior to construction and during construction to review actual conditions.
2. Shall Inspect the site conditions, materials incorporated into the retaining wall, and the construction practices used during the construction.
3. Shall provide the Architect with a letter after completion, certifying the design meets the requirements of this specification, the design was compatible with the site and the wall was constructed according to design. Include test data required by "Source Quality Control" in Section 2 for each roll of soil reinforcement.

C. Provide detailed drawings indicating layout and elevations of wall, specifying "steps" in wall elevations consistent with per project grading requirements. Steps shall be designed with a consistent spacing and shall be limited to the design and minimized in amount unless otherwise approved.

D. Samples for Verification: Sets for each color, finish, and pattern of unit required. Include 5 or more samples; in each set showing the full range of variations expected.

E. Qualification Data: Include lists of completed projects with project names and addresses, names and addresses of architects and owners, and other information specified.

F. Preconstruction Test Reports: Indicate and interpret test results for compliance with performance requirements.

G. Materials Submittals

1. Product Test Reports: Indicate compliance of retaining wall units, soil reinforcement and wall accessories with requirements of the design based on comprehensive testing of current products.
2. Include test data verifying properties used as basis of structural design.
3. Include test data required by "Source Quality Control" Paragraph 2.4 for each roll of soil reinforcement.

H. Research/Evaluation Reports: Evidence of system's compliance with building code in effect for Project from a model code organization acceptable to authorities having jurisdiction.

1.7 QUALITY ASSURANCE

A. Installer Qualifications: Engage an experienced Installer who has completed segmental retaining walls similar in material, design and extent to that indicated for Project that has resulted in construction with a record of successful in service performance.

B. Professional Engineer Qualifications: The professional engineer for wall designs shall be legally qualified to practice in the **State of Connecticut** and be experienced in providing engineering services of the kind indicated. Engineering services are defined as those performed for installations of systems that are similar to those indicated for this Project in material, design and extent.

C. Testing Agency Qualifications: An independent testing agency with the experience and capability to conduct the testing indicated without delaying the Work, as documented according to ASTM E 548.

D. Mockups: Before installing segmental retaining walls, construct sample wall panels to verify selections made under sample submittals and to demonstrate aesthetic effects and qualities of materials and execution. Build mockups to comply with the following requirements, using materials indicated for completed Work.

1. Locate mockups as directed by Architect and Project Manager.
2. Build mockups for each type of segmental retaining wall in sizes approximately 96 inches long by 36 inches high above finished grade at front of wall.

    a. Include typical base and cap or finished top construction.
    b. Include backfill to typical finished grades at both sides of wall.
    c. Include 36 inch return at 1 end of mockup with typical corner construction.

3. Maintain mockups during construction in an undisturbed condition as a standard for judging the completed Work.

    a. Approval of mockups does not constitute approval of deviations from Construct Documents contained in mockups, unless such deviations are specifically approved by Architect in writing.
    b. When directed, demolish and remove mockups from Project site.
    c. Approved mock-ups may be incorporated into the finished work.

E. Construction Tolerances: The following tolerances are the maximum allowable deviation from the planned wall construction:

1. Vertical Control: +/- 1.25 inches over a 10 ft distance, +/- 3 inches total
2. Horizontal Control: +/- 1.25 inches over a 10 ft distance, +/- 3 inches total
3. Rotation: +/- 2 degrees from planned wall batter
4. Bulging: 1.0 inch over a 10 ft distance

1.8 DELIVERY, STORAGE AND HANDLING

A. Deliver materials to Project Site in an undamaged condition.

B. Store and handle retaining wall units and related materials to prevent deterioration or damage due to moisture, temperature changes, contaminants, corrosion, breaking, chipping or other causes.

C. Store accessories, including metal items, to prevent corrosion and accumulation of dirt and oil.

D. The installing contractor shall check all materials delivered to the site to ensure that the correct materials have been received and are in good condition.

E. The Contractor shall store and handle all materials in accordance with the Manufacturer's recommendations and in a manner to prevent deterioration or damage due to moisture, temperature changes, contaminants, breaking, chipping or other causes.

F. Store and handle geotextiles according to ASTM D 4873.

PART 2 - PRODUCTS

2.1 MANUFACTURERS

A. Manufacturers: Basis of Design wall units are Concord Wall and Sienna Stone(alternate) units as manufactured by Unilock, or approved equal. As distributed by Unilock New England, Uxbridge, MA.

B. Subject to compliance with requirements, or equal wall unit products may be manufactured by one of the following:

1. Retaining Wall Units:

    a. Licensees of Allan Block Corp.
    b. Licensees of Amastone Co.
    c. Licensees of Anchor Wall Systems, Inc.
    d. Licensees of ICD Corp.
    e. Licensees of Keystone Retaining Wall Systems, Inc.
    f. Licensees of Kiltie Corp.; Versa-Loek Retaining Wall Systems Division.
    g. Licensees of Mesa Retaining Wall Systems.
    h. Licensees of Reinforced Earth Co., (The).
    i. Licensees of Rockwood Retaining Wall Systems.

2. Soil Reinforcement:

    a. Amoco Fabrics and Fibers Co.
    b. Huesker, Inc.
    c. Nicolon Corp.; Nicolon/Mirafi Group.
    d. Strata Systems, Inc.
    e. Tensar Earth Technologies, Inc.

2.2 RETAINING WALL UNITS

A. Siena Stone Concrete Segmental Retaining Wall Units: (ALTERNATE ELEVATED BLEACHER ACCESSIBLE SEATING)

1. The concrete wall modules shall be solid units 39” x 7.25” x 13.5” inches (318# ea), 39”x7.25”x20”(477# ea.) or 39”x7.25”x36.5” (954# ea) with a maximum tolerance of plus or minus 1/8 in. for each dimension.

2. The concrete wall modules shall have a integral shear key connection that shall be offset to permit a minimum wall batter of 1H : 8V.

3. The concrete wall modules shall have a minimum 28-day compressive strength of 35 MPa (5000 psi) as tested in accordance with ASTM C 140. The concrete shall have a maximum moisture absorption rate of 5 percent to ensure adequate freeze-thaw protection.

4. Provide corner, closed end and coping units as shown on the drawings compatible with the structure design system of the pavers and matching in color and appearance.

5. Color: Split face texture, Color to be Granite.

B. Concord Wall Concrete Segmental Retaining Wall Units:

1. The concrete wall modules shall be 15.75” x 5.87” x 11.75” inches (75.6# ea), 11.75 x 7.875” x 5.875” (43# ea.) or 9.875” x 11.75” x 5.875” (67.5# ea) or other standard system units with a maximum tolerance of plus or minus 1/8 in. for each dimension.

2. The wall modules shall have a integral shear key connection that shall be offset to permit a minimum wall batter of 1H : 8V.

3. The concrete wall modules shall have a minimum 28-day compressive strength of 35 MPa (5000 psi) as tested in accordance with ASTM C 140. The concrete shall have a maximum moisture absorption rate of 5 percent to ensure adequate freeze-thaw protection.

4. Color: Split face texture Color to be Granite to match Sienna units.

C. Surface Texture: Provide units with machine split faces and smooth walls and cast beds.

D. Special Units: Provide corner units, end units, cap units and other special shapes as necessary to produce retaining walls of dimensions and profiles indicated and to provide indicated textures on exposed surfaces.

2.3 INSTALLATION MATERIALS

A. Wall Backfill: shall consist of free draining sands or gravels with less than 5% passing the #200 sieve size or as specified in the Construction Drawings.

1. The Engineer shall review and determine the suitability of the wall infill soil at the time of construction.

B. Retained Soil: shall be on site soils unless specified otherwise in the Construction Specifications or as directed by the Owner or Owner's Representative. If imported fill is required, it shall be examined and approved by the Engineer.

C. Granular Backfill/Leveling Base Material: shall be non-frost susceptible, well graded compacted crushed stone similar to CT DOT 3/4" processed aggregate, or a concrete leveling base, or as shown on the Construction Drawings.

D. Drainage aggregate: shall be ornamental, free draining ¾" washed crushed stone similar to CT DOT gradation #6 or approved equal.

1. Drainage aggregate shall be a free draining angular granular material of uniform particle size which in all instances is separated from the native soils, sands or processed aggregates by a geotextile filter fabric.

E. Peastone: shall be ornamental, 3/8" washed crushed stone similar in gradation to CT DOT No. 8 stone.

F. Drainage Pipe: Refer to Specifications Division 33.

1. Drainage pipe shall be perforated corrugated HDPE or PVC pipe, with a minimum diameter of 100 mm (2 inches), protected by a geotextile filter to prevent the migration of soil particles into the pipe, or as specified on the construction drawings.

G. Geotextile Filter Fabric: shall be nonwoven #140N as manufactured by Mirafi or approved equal.

1. Apparent Opening Size: No. 1000 per ASTM D 4751.
2. Permeability: 150 gpm/sq. ft. per ASTM D 4491.
3. Grab Strength: 100 lbf per ASTM D 4632.

H. Geogrid Reinforcement:

1. The Design Engineer shall determine the type, strength and placement location of the reinforcing geosynthetic based on the approved wall system. The design properties of the reinforcement shall be determined according to the procedures outlined in this specification.

2. Detailed test data shall be submitted with the design calculations and shall include tensile strength (ASTM D 4595 or GGI GG-1), creep potential (ASTM D 5262), site damage and durability (GRI GG-4) and pullout resistance (GRI GG-5 or GRI-GT-6) and connection strength (NCMA SRWU-1).

I. Cap adhesive: Product supplied or recommended by retaining wall unit manufacturer for adhering cap units to units below.

J. Fence Post Footing Brackets: For fence posts set within 18" behind wall unit face provide 'Sleeve-it' model 1224R 12" diameter x 24" depth steel reinforced fence post footing brackets

for soil reinforced walls as manufactured by Strata Systems, Inc. or approved equal. Strata@geogrid.com

K. Other aggregate materials: Comply with requirements of Division 31, Section "Earth Moving".

L. Concrete: Division 32, Section "Concrete Pavement and Curbs".

1. "Porous" or "No-Fines" concrete refer to the same product and shall be a commonly available pervious or porous concrete mix acceptable to the engineer for the application used.

M. Drain Vents/ Rodent Screens. Provide metal drain wall screens at drainage weeps and rodent screens where drain lines daylight at ends of walls. Color to match segmental retaining wall block

PART 3 - EXECUTION

3.1 EXAMINATION

A. Examine areas to receive segmental retaining walls and conditions under which walls will be installed, with Installer present, for compliance with requirements for excavation tolerances, condition of subgrades, and other conditions affecting performance of retaining walls.

1. Do not proceed with installation until unsatisfactory conditions have been corrected.

3.2 RETAINING WALL INSTALLATION

A. General: Place units according to manufacturer's written instructions. Lay units in running bond, overlapping half units of course below.

1. Form corners and ends by using special units.
2. Do not use units with chips, cracks, voids, discolorations, and other defects that might be visible in finished work.
3. Mix units from several pallets or cubes, as they are placed, to produce uniform blend of colors and textures.
4. Cut unit with motor-driven masonry saw equipment to provide clean, sharp, unchipped edges. Cut units to provide pattern indicated and to fit adjoining work neatly. Use full units without cutting where possible.

B. Site Preparation

1. The foundation soil shall be excavated or filled as required to the grades and dimensions shown on the Construction Drawings or as directed by the Owner or Owner's Representative.

2. The foundation soil shall be proof rolled and examined by the Engineer to ensure that it meets the minimum strength requirements according to the design assumptions. If unacceptable foundation soil is encountered, the contractor shall excavate the affected areas and replace with suitable quality material under the direction of the Engineer.

3. In cut situations, the native soil shall be excavated to the lines and grades shown on the Construction Drawings and removed from the site or stockpiled for reuse as retained soil.

C. Wall Drainage System

1. The approved non-woven geotextile shall be set against the back of the first retaining wall unit, over the prepared foundation, and extend towards the back of the excavation, up the excavation face and back over the top of the infill soil to the retaining wall, or as shown in the Construction Drawings.

2. The drainage pipe shall be placed behind the leveling base, or lower course of facing units as shown in the Construction Drawings or as directed by the Engineer. The pipe shall be laid at a minimum gradient of 1% to ensure adequate drainage to free outlets.

3. T - Sections and outlet pipes shall be installed on the drainage pipe at 15 m (50 ft.) centers or as shown on the Construction Drawings.

4. The remaining length of geotextile shall be pulled taut and pinned over the face of the retained soil. Geotextile overlaps shall be a minimum of 1 ft. and shall be shingled down the face of the excavation in order to prevent the infiltration of retained soil into the wall infill.

D. Leveling Base or Spread Footing Placement

1. The leveling base material shall be crushed stone compacted to 98% Standard Proctor Density, or vibrated concrete along the grades and dimensions shown on the Construction Drawings or as directed by the Engineer. The minimum thickness of the leveling base shall be as shown on the drawings, or 7.25 inches.

E. Installation of Modular Concrete Retaining Wall Units

1. The bottom row of retaining wall modules shall be placed on the prepared leveling base as shown on the Construction Drawings. Care shall be taken to ensure that the wall modules are aligned properly, leveled from side to side and front to back and are in complete contact with the base material.

2. The wall modules above the bottom course shall be placed such that the tongue and grove arrangement provides the design batter (i.e. setback) of the wall face. Successive courses shall be placed to create a running bond pattern with the edge of all units being approximately aligned with the middle of the unit in the course below it.

3. The wall modules shall be swept clean before placing additional levels to ensure that no dirt, concrete or other foreign materials become lodged between successive lifts of the wall modules.

4. A maximum of 3 courses of wall units can be placed above the level of the infill soil at any time.

5. The contractor shall check the level of wall modules with each lift to ensure that no gaps are formed between successive lifts that may affect the pullout resistance of geogrid reinforcement, if applicable.

6. Care shall be taken to ensure that the wall modules and geosynthetic reinforcement are not broken or damaged during handling and placement.

F. Drainage Soil

1. The drainage soil will be placed behind the retaining wall modules with a minimum width of 1 ft. and separated from other soils using the approved nonwoven geotextile.

2. Drainage soil shall be placed behind the wall facing in maximum lifts of 6 inches and compacted to a minimum density of 95% Standard Proctor.

3. No heavy compaction equipment shall be allowed within 3 ft. of the back of the wall facia.

G. Infill Soil

1. Wall infill soil shall be placed behind the first course of the wall facing units in maximum lifts of 6 inches and compacted to a minimum density of 95% Standard Proctor. At the specified elevations, geogrid reinforcement shall be placed, as described in this specification. The fill shall be placed and compacted level with the top of the wall modules at the specified geogrid elevations prior to placing the geogrid reinforcement.

2. Wall infill soil shall be placed on top of the geogrid reinforcement layers in maximum lifts of 6 inches and compacted to a minimum of 95% Standard Proctor Density. Care shall be taken to ensure that the geogrid lays flat and taut during placement of the infill soil. This is best achieved by placing fill on top of the geogrid near the wall fascia and spreading toward the back of the infill soil zone.

3. No tracked construction equipment shall be allowed to operate directly on top of the geogrid until a minimum thickness of 6 inches of fill has been placed. Rubber tired equipment may drive on top of the geogrid at slow speeds but should exercise care not to stop suddenly or make sharp turns. No heavy equipment shall be allowed within 3 ft. of the back of the wall.

H. Geogrid Soil Reinforcement

1. Pre-cut sections of geogrid reinforcement shall be placed horizontally at the specified elevations and with longitudinal axis perpendicular to the wall face (i.e. machine direction), at the elevations shown on the Construction Drawings, or as directed by the Engineer.

2. The geogrid shall be placed over the compacted infill soil and the wall facing units with the outside edge extending over the tongue of the bottom unit and to within 1 in. of the front facing unit. Care shall be taken to ensure that the wall modules are swept clean and that the geogrid is in complete contact with the top and bottom faces of the adjacent wall modules. The next course of wall modules shall be carefully placed on top of the lower modules to ensure that no pieces of concrete are chipped off and become lodged between unit layers.

3. The geogrid shall be pulled taut away from the back the wall modules during placement of infill soil. Alternatively, suitable anchoring pins or staples can be used to ensure that

there are no wrinkles or slackness prior to placement of the infill soil. The geogrid shall lay perfectly flat when pulled back perpendicular to the back of the wall fascia.

I. Retained Soil

1. Retained soils shall be placed and compacted behind the infill soil or drainage soil if applicable, in maximum lift thickness of 6 inches. The retained soils shall be undisturbed native material or engineered fill compacted to a minimum density of 95% Standard Proctor.

2. No heavy compaction equipment shall be allowed within 3 ft. of the back of the wall modules.

J. Finishing Wall

1. Items continue fill, geogrid and compaction for each lift until the grades indicated on the Construction Drawings are achieved.

2. Coping units shall be secured to the top of the wall with two 3/8 inch beads of the approved flexible concrete adhesive positioned 2 inches in front and behind the tongue of the last course of retaining wall units.

3. Finish grading above the wall to direct surface run off water away from the segmental retaining wall. Use a soil with a low permeability to restrict the rate of water infiltration into the retaining wall structure.

3.3 FIELD QUALITY CONTROL

A. Comply with requirements of Division 31, Section "Earth Moving" for in place soil density testing.

1. In each compacted backfill layer, perform at least 1 field in place density test for each 100 feet or less of retaining wall length, but no fewer than 2 tests along a wall face.
2. Perform additional testing if required by Project Manager or Architect.

3.4 ADJUSTING AND CLEANING

A. Remove and replace segmental retaining walls of the following description:

1. Broken, chipped, stained, or otherwise damaged units. Units may be repaired if methods and results are approved by Architect.
2. Segmental retaining walls not matching approved samples and mockups.
3. Segmental retaining walls not complying with other requirements indicated.
4. Cracks in units longer than ½".
5. Walls out of tolerance of specification as listed herein.

B. Replace in a manner which results in segmental retaining wall's matching approved samples and mockups, complying with other requirements, and showing no evidence of replacement, at no additional cost to the Owner.

END OF SECTION 32 32 23

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.

B. The work of this Section is affected by Alternates contained in Section 01 2300 – 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 of Testing and Material (ASTM).

D. Connecticut Interscholastic Athletic Association (CIAA).

E. National Federation of State High Schools (NFHS)

1.4 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 Landscape 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.

1.5 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.

1.6 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. Color: As selected by Engineer based on all options available from manufacturer.

C. 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 CIAA regulations.

2.2 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 “RED RAIDERS”.

2.3 FOOTBALL GOAL POSTS (BASE PLATE MOUNTED)

A. Provide one (1) complete set of Goal Posts for Main Field.

B. Football goal posts shall be all aluminum single support post, base plate mounted, 8-foot offset goose-neck type posts as manufactured by Sports Field Specialties, Inc. model GP4380PL, or approved equal.

C. Components:

1. Single Gooseneck Support: Fabricated of 6" Schedule 40 Aluminum Pipe (6.625" O.D.), 5' Radius, 8' Offset,

2. Standard Model Types and Mounting Styles Available:

a. Base Plate Mounting Style

3. Crossbar: Fabricated of 6” Schedule 40 Aluminum Pipe (6.625” O.D.)

4. Width: 23’-4” inside dimension between uprights – High School

a. Allowing for the adjustment of both the gooseneck/crossbarand upright/crossbar connections throughout the life of the football goal post ensuring proper alignment of all components.

b. No exposed hardware on the face of the goal.

c. Anti-vibration enhancements such as serrated washers and nyloc coated bolt ends.

D. Uprights: Fabricated of Extruded 6061-T6 Aluminum Tube (4"O.D.) with Rigid Wire Loop Welded to Upper End

1. Length: 20’

E. Powder Coated Finish: Yellow

F. Installation Package Consisting of the Following Components:

1. 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. One (1) Full Size Blank Filler Plug

G. Goal posts shall be supplied with wind directional flags.

1. Each post shall include a package of ten (10) additional shear-pins and two (2) directional flags.

H. Goal post foundations shall be reinforced concrete formed using CMP. Footing concrete and reinforcement shall meet manufactures recommendations.

I. Contractor to provide shop drawing, signed and sealed by State of CT PE, for goal post foundation for approval prior to installation.

2.4 SOCCER GOALS

A. Provide one (1) set, of two (2) goals shall be Sports Field Specialties SG824S square faced regulation soccer goal, with Sportsfield Specialties mobility/integrated wheel kit, and lockdown safety system.

1. or approved equal.

B. Soccer goals shall be synthetic turf type (without ground sleeves) precision-crafted, official size (24' wide, 8' high, 3' top and 8' bottom depths) soccer goals are engineered from hi-tech aluminum alloys for maximum durability. The main frame is fabricated of 4" stock slotted heavy-wall aluminum extrusion. The goal mouth features a white powder-coated finish for minimal maintenance. Goal shall include integrated wheel kit and rear cross bar anchoring (sand bags or weighted anchoring systems are not acceptable).

C. Goals shall include large loop stays and a ground bar made of 2" sq. slotted heavy-wall aluminum extrusion with rounded safety corners. The crossbar and ground bar each incorporate a one-piece design (no horizontal joints) for added stability. Goals shall be equipped with Rollaway Wheels. Side mounted wheels are not acceptable.

1. Nets shall be suitable for synthetic turf applications and operate safely without ground sleeves.

2. Provide two (2) complete sets containing two nets each. Color as selected by Engineer based on all options available from manufacturer.

2.5 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. KwikGoal Universal Weighted Soccer Corner Flags SCG6B1104.

1. Or approved equal.

2.6 BALL NETTING SYSTEM

A. Contractor shall provide complete ball safety netting system including, but not limited to, footings, sleeves, sleeve covers, posts, netting, and hardware.

1. 40’ high baseball tensioned backstop pole to pole backstop netting system. Ultra Cross Knotless Dyneema Netting, 1-3/4” square mesh. Sportsfield Specialties TNPPBUC or approved equal.

a. Height: 40’

b. Size: refer to Drawings

c. Color: Black

2. Contractor shall provide signed and stamped shop drawing by Structural Engineer licensed by the State of Connecticut for the backstop pole foundations.

2.7 BACKSTOP SAFETY NETTING SYSTEM (ALTERNATE)

A. Contractor shall provide complete ball safety netting system including, but not limited to, footings, sleeves, sleeve covers, posts, netting, and hardware.

1. 30’ high baseball tensioned pole to pole backstop netting system. Ultra Cross Knotless Dyneema Netting, 1-3/4” square mesh. Sportsfield Specialties TNPPBUC or approved equal.

a. Net Height: Varies – see plan

b. Size: refer to Drawings

c. Color: Black

2. Contractor shall provide signed and stamped shop drawing by Structural Engineer licensed by the State of Connecticut for the ball safety netting system pole foundations.

B. Provide shop drawing for footing. Stamped and Sealed Foundation Drawings and Calculations by a Licensed Professional Engineer of Record in the State of Project Location

2.8 SOFTBALL BATTING CAGE (ALTERNATE SOFTBALL)

A. Batting Cage shall be Single overhead batting Tunnel, with 4” O.D., 1/8” wall aluminum Tube crossbar and uprights with #36 black nylon 1-3/4” square mesh netting with weighted bottom 14’w X 55’L x 13’H and (2) 3’x6’ ‘doors’ Model# LGOBT-SS-P as manufactured by Sportsfield Specialties, Delhi, NY or approved equal. Provide ground sleeves and concrete footings for semi-permanent installation.

B. Provide synthetic turf surfacing under area of batting cage – see plan.

C. Contractor shall provide signed and stamped shop drawing by Structural Engineer licensed by the State of Connecticut for the backstop pole foundations.

2.9 CHAIN LINK TOP RAIL PADDING (ALTERNATE SOFTBALL)

A. Contractor shall provide complete chain link post & top rail padding system including, but not limited to, padding, ties, and hardware.

1. Chain link top rail pad to be installed on all softball field fencing 6’ and lower in height as manufactured by Sportsfield Specialties BCLTRP (CLTRHI) or approved equal.

a. 3” think high impact polyurethane foam covered by 18 oz. EcoGuard extruded vinyl.

b. UV resistant

c. 5-year warranty

d. Color: Red

2.10 SOFTBALL FOUL POLES (ALTERNATE SOFTBALL)

A. The pole should be at least 20 feet from the ground and shall be immediately adjacent to the outside of the home-run fence centered precisely on the foul line. Screening shall be attached to the fair side of the pole perpendicular to the foul line. Screening shall be 7' minimum in height. Foul poles shall be Sportsfield Specialties FPW420 or approved equal.

B. Poles shall be permanently installed on a semi-permanent installation in manufacturer provided sleeves in concrete bases. Install per manufacturer's instructions.

C. Color: Yellow.

D. Contractor shall provide signed and stamped shop drawing by Structural Engineer licensed by the State of Connecticut for the foul pole foundation.

2.11 SOFTBALL BASES AND PLATES (ALTERNATE SOFTBALL)

A. Provide and install 1 set of bases and plates for softball field. Provide home plate and pitchers plate for each bull pen. Provide 1 home plate for each batting cage/tunnel.

B. Bolco Breakaway Bases and Permanent Plates as manufactured by Adams USA, Cookville, TN 38501, 1-800-251-6857 or approved equal.

C. Pitchers plate shall be 24" long by 6" four (4) sided pitching rubber with aluminum cylindrical tube lining. Provide 1 plate for field, and each bull pen.

D. Bases - #6200 ML, including #255 – BATM Universal Steel ground anchor and #227 – FAS receptacles. Provide one (1) complete set for each infield area

E. Home Plate - #300 AS. Provide 1 plate for field and each bull pen and batting cage.

2.12 SOFTBALL PLAYERS BENCHES (ALTERNATE SOFTBALL)

A. Contractor shall provide complete bench system in each dugout including, but not limited to, anchoring system, benches, seating, and hardware.

1. Two tier aluminum team benches. Sportsfield Specialties ATBT (LG-TTAL) or approved equal.

a. Provide two (2) 15' long full length bench for each dugout.

1) Aluminum Finish

2.13 WIND & PRIVACY SCREEN (ALTERNATE SOFTBALL)

A. Contractor shall provide complete wind & privacy system including, but not limited to, screen, ties, and hardware.

1. 6' high x 40' wide wind & privacy screen. Sportsfield Specialties VCP6 or approved equal.

a. Color: Black

b. Logo: Derby three (3) color logo 3. White, black, and red

2.14 HOME BLEACHER COMPANION BENCHES
(ALTERNATE ELEVATED ACCESSIBLE SEATING)

A. New bleacher seating at front row of bleacher shall be 18” high, permanent, surface mount, back-less, aluminum benches, natural finish. Length varies, see plan. Provide a minimum of 2 legs per bench length with maximum 4 foot on center spacing between legs. Seat plank shall be 10” wide non-skid extruded aluminum planks with mechanically fastened, cast aluminum caps at each end. Planks shall be backed up by galvanized steel understructure to prevent damage and bending. Legs shall be 2”x2” heavy duty galvanized steel. Similar to Jaypro Model PB-15SM or approved equal.

2.15 CONCRETE:

A. Refer to Sections “Cast-In-Place Concrete” and “Concrete Pavement and Curbs” of this specification.

2.16 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 three color signs. Sign shall be supplied with radius corners and 4 (3/16") mounting holes, Provide and install eight (8) signs and mounting systems.

B. Sign shall include the facility name and generally the following:

DERBY HIGH SCHOOL
HOME OF THE RED RAIDERS

DEFILIPPO MEMORIAL FIELD

FIELD REGULATIONS

Any group wishing to use the field must obtain a permit by contacting the High School Athletic office at (xxx) xxx-xxxx

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 XXX Police Department at (XXX) XXX-XXXX 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.

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 86 10 TRACK AND 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. This Section includes the following:

1. Utility COM Boxes
2. Discus & Shotput Throwing Circles
3. Shotput Toe Board
4. Discus Cage
5. Long Jump Take Off Board System
6. Pole Vault box.
7. Crossing Matts
8. Pole Vault and High Jump Landing Pad Systems.
9. Track Hurdles

B. Related Sections include the following:

1. Division 01 section "Alternates"
2. Division 32 Section "Concrete Pavement and Curbs".
3. Division 32 Section "Track Surfacing".
4. Division 32 Section "Athletic Equipment".
5. Division 03 Section "Cast-in-Place Concrete".

1.3 SUBMITTALS

A. Shop Drawings: Contractor shall provide fully dimensioned manufacturer's shop Drawings detailing specified product and confirming anchoring system.

B. Manufacturer shall certify that all equipment meets current National Federation of High School Assoc. (NFHS) regulations and standards.

1.4 DEFINITIONS

A. National Federation of State High School Associations (NFHS)

1.5 JOB CONDITIONS

A. Coordinate/schedule of equipment installation with adjacent site and athletic improvements.

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. Color: As selected by Engineer based on all options available from manufacturer.

C. 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 NFSH AND CIAA regulations.

2.2 'COM BOXES' - ELECTRICAL/COMMUNINCATION BOXES

A. Provide and install electrical/communication boxes as shown on drawings within synthetic turf or track/field surfacing. Electrical Communication (COM) boxes shall be cat. No. CBIT1830 as manufactured by Sportsfield Specialties, inc. Delhi, NY. or approved equal. Provide all accessory covers and keys to the owner.

2.3 FIXED TRACK AND FIELD EQUIPMENT

A. Provide and install the following per manufacturer's instructions and as shown on drawings products shall be as manufactured by Sportsfield Specialties, inc. Delhi, NY. or approved equal. Provide all accessories, hardware and equipment for proper installation and operation.

1. Discus Throwing Circle: 2 inch by 2 inch, Aluminum for depressed throwing circle installation in concrete Model #TRDAA.

2. ShotPut/Hammer Throwing Circle: 84" Inside diameter, rolled Aluminum for depressed throwing circle Model #TRSPHAW.

3. Shot Put Toe Board: High School toe board for recessed circle installation, Cast Aluminum, Model #SPTBCARHS.

4. Discus Cage: 14-foot height, 6 pole with main and back-up nets, Model #DCHS. Provide ground sleeves, backup net, ground plugs and all accessories. Poles to be black powder coated finish. All nets to be UV treated #36 black nylon with 1.3/4" square and sewn rope binder on edges. Provide Complete set with all accessories and tools.

5. Take Off Boards: Shall be Model#LTJT0B8BL Synthetic take off board with stainless steel tray and leveling bolts. Provide Aluminum blanking lid with track surfacing for off season use. See details for quantity and locations.

6. Pole Vault Box: Cast Aluminum Pole vault box Model #PVBCAW powder coated white. Contractor to provide two ¼' drill holes in bottom corners for drainage per detail. Provide aluminum grommets for drill holes. Provide Model #PVBCPCA cast aluminum cover/plug – fill cover with track and field surfacing per instructions.

2.4 NON-FIXED TRACK AND FIELD EQUIPMENT (ALTERNATE)

A. Provide, assemble and install the following per manufacturer's instructions and as shown on drawings products shall be as manufactured by Sportsfield Specialties, inc. Delhi, NY. or approved equal. Provide all accessories, hardware and equipment for proper installation and operation.
   1. TRACK CROSSING MATS:
      a. Model Number TCM, non-woven polypropylene geotextile material with 19 oz. reinforced vinyl rapped galvanized steel chain perimeter.
      b. Provide two (2) at 30' long x 15" wide.
      c. Provide two (2) at 30' long x 7'-6' wide.
      d. Color: Black mat, Red border

B. POLE VAULT LANDING PADS: Shall be Jumpzone Champion Bronze TFPV202IL system including all weather cover, ground cover, Base Protectors and planting box safety collar. Provide Derby arrow-head logo similar to field logo shown on plan. Color to be red and black from standard selection.

C. POLE VAULT STANDARD FORMING SYSTEM: Provide and assemble complete pole vault system. Model PVS517 and PVSFS.

D. HIGH JUMP LANDING PADS: shall be JumpZone Challenger High Jump Pad System Model Number TFHJI68. Include ground cover and all weather cover. Color to be red and black from standard selection. Provide custom lettering "DERBY".

E. HIGH JUMP STANDARD SYSTEM: Provide and assemble complete high jump system. Model PVS517 and PVSFS.

F. HURDLES AND CARTS: Provide and assemble 80 hurdles. Hurdles shall be Model #HRHSA 41" advanced High School Aluminum rocker hurdle with adjustable height and weighted ground bars. Hurdle height shall be able to be adjusted without the use of special tools or equipment. Gateboards shall be polycarbonate with red and black graphics and "DERBY' printed on the front face. Colors shall be from manufacturer's standard color palette.
   1. Provide 8 all aluminum universal hurdle carts with 5" dia. Hard rubber casters for rocker type hurdles model number HLRCRT. Provide an all weather vinyl cover for each hurdle cart.

2.5 CONCRETE

A. Refer to Sections "Concrete Pavement and Curbs" and "Cast-In-Place Concrete".

PART 3 - EXECUTION

3.1 GENERAL

A. Install track and field equipment where and as indicated and in conformance with manufacturer recommendations.

B. Certify locations and dimensions of athletic improvements to be in conformance with current **NFHSA** standards.

3.2 DISCUS AND SHOT PUT PADS

A. Construct concrete pavements with cast depressed aluminum throwing circles. Finish as per Section "Concrete Pavement and Curbs" and as detailed.

B. Cut ½" wide x 1" deep slots at midsection of each face of pad to permit drainage.

C. Install protective discus cage/netting as detailed and in conformance with manufacturer recommendation.

3.3 TAKE OFF BOARD SYSTEM

A. Install take off board in concrete base as per manufacturer recommendations ad as per project details.

B. Insure that finished surfacing is maintained flush with take off board as per **NFHSA** standards and manufacturer recommendations.

C. Install stone drainage sumps under each take-off board. Drill weep holes through concrete base to drain vault boxes.

3.4 PROTECTION/CLEAN UP

A. Protect: until acceptance of the project. Replace or refinish the surfaces if damaged prior to acceptance.

B. Clean up all debris from equipment installation procedures.

END OF SECTION 32 86 10

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 1 Section "Alternates".
2. Division 31 Section "Site Clearing".
3. Division 31 Section "Earth Moving".
4. 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 municipality the 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.

C. Submit list of machinery to be used during subgrade preparation and topsoil operations. NO rubber-tired machinery will be permitted except for light-weight, farm-tractor grade machinery with wide tires designed for turf use. All heavy machinery must be track-drive.

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 BORROW TOPSOIL

A. Shall be a sandy loam, or fine loamy sand (per USDA Soil Classification index), with a minimum 70% 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, (topsoil for athletic field construction shall be free of stones over ½" diameter), 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.

B. Topsoil shall have the following optimum ranges unless otherwise approved by the Architect.

1. Organic Matter Content: 3 – 7%
2. Acidity range: pH 5.5 to pH 7.4

C. Nutrient levels shall be achieved by the Contractor's addition of amendments to the topsoil to meet the optimum nutrient levels specified in the testing laboratory report.

2.2 STOCKPILED TOPSOIL

A. Stockpiled topsoil shall conform to all requirements of paragraph 2.1. **S**tockpiled topsoil material to be re-used on site must be screened. General lawn area topsoil must be screened to remove all sod and debris over ¾" in any dimension. Athletic Field topsoil (at softball only) must be screened to remove all sod and debris over ½" in any dimension.

B. Provide amendments to stockpiled topsoil (organic material, sand, etc.) to produce topsoil in conformance with 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 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 two (2) inches or greater in dimension. Remove debris and stone off-site.

D. For athletic field areas refer to section 32 18 23.26 – Natural Turf Athletic Field Construction

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 athletic fields shall have a minimum of 8 inches 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. Install topsoil in athletic fields by dumping topsoil at the sideline/edges, and pushing towards the center of each

field, utilizing equipment no larger than a small farm tractor. Keep all heavy equipment and trucks off the topsoil. Take care not to disturb approved subgrade.

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. Material approved for reuse but not required to be installed shall become property of the Contractor. Contractor shall not be reimbursed for additional topsoil needing to be brought back onto site to meet final topsoil requirements unless existing topsoil is deemed unacceptable.

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. Seeding new lawns and athletic fields.
4. Furnishing and applying slope seed mixtures.
5. Maintenance of all lawns and athletic fields until acceptance.

B. Related Sections include the following:

1. Division 1 Section "Alternates".
2. Division 31 Section "Site Clearing".
3. Division 31 Section "Earth Moving".
4. Division 32 Section "Irrigation".
5. Division 32 Section "Natural Turf Athletic Field Construction"
6. Division 32 Section "Topsoil".
7. 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 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. 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. 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.

E. 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.

F. Planting schedule indicating anticipated dates and locations for each type of seeding or sodding.

G. Field survey of athletic field finished grades, for approval, prior to lawn installation.

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 1 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 Town 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 Town 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.

1.9 PROJECT CONDITIONS

A. Planting Restrictions: Plant during one of the following periods.
1. Spring Planting: April 1 - June 15.
2. Fall Planting: August 15 - October 1.

B. Weather Limitations: Proceed with planting only when existing and forecasted weather conditions permit planting to be performed when beneficial and optimum results may be obtained. Apply products during favorable weather conditions according to manufacturer's written instructions. Changes to planting dates shall only be made with prior written approval by the Architect.

1.10 MAINTENANCE SERVICE

A. Turf Maintenance during construction: Contractor shall provide full maintenance of all areas within the limits of work by skilled employees of turf installer or a professional maintenance crew. Contractor is responsible for turf maintenance until lawns are established a as defined in Part 3 of this specification and accepted by the Engineer. The Contractor shall begin maintenance at the start of construction (for undisturbed areas) and immediately after each area

is planted. Maintenance shall continue until an acceptable stand of turf is established and accepted by the Architect and Owner but for not less than the following periods:

B. Existing Lawn areas: The Contractor is responsible for maintenance of all lawn and landscape areas within the limits of construction until the acceptance of new lawn areas by the architect. Existing lawns shall not be allowed to go to seed or exceed 4" in total height. The contractor is responsible for restoring any lawn area damaged by lack of maintenance to a 'new' condition.

C. New Lawns: The Contractor is responsible for the first three regular mowings, after which time the Owner is responsible for mowing (only). The Contractor shall remain responsible for follow up fertilization and maintenance as noted in the specification. The contractor shall also be responsible for coordinating the transition of mowing and maintenance responsibilities with the Owner to prevent gaps in maintenance.

D. Seeded Turf Maintenance Period: 90 days (minimum) from date of planting completion.

E. When the maintenance period has not elapsed before the end of a planting season, or if turf is not fully established, continue maintenance during next planting season (s).

F. This is a minimum. Refer to requirements for acceptable lawns in part 3 of this specification.

G. Continuing Maintenance Proposal: From Installer to Owner, for mowing subsequent to the first three mowings, in the form of a standard yearly (or other period) maintenance agreement, starting on date initial maintenance service is concluded. State services, obligations, conditions, and terms for agreement period and for future renewal options.

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.

B. Seed Species: Seed of grass species as follows, with not less than 95 percent germination, not less than 85 percent pure seed, and not more than 0.5 percent weed seed.

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. 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 50% Manhattan 50% Saturn	30%
Fine leaf or Creeping Fescue 50% Pennlawn 50% Jamestown II	25%
Kentucky Bluegrass 50% Glade 50% Cobart	45%

F. Mixture for Irrigated Athletic Field Areas (Softball):
(refer to Athletic Field Construction Specification Section 32 86 00

G. Mixture for Non-Irrigated Athletic Field Areas (Field Events):

TYPE OF SEED	% BY WEIGHT	% MIN. PURITY	% MIN. GERMINATION
Premium Perennial Ryegrass	75%	97%	95%
Kentucky Bluegrass	25%	98%	80%

2.2 SLOPE SEED MIX

A. Refer to Drawings for application areas of special mixes for environmentally sensitive areas.

B. Seed mixture Type “A” (non-maintained, upland slope) shall consist of:

Creeping Red Fescue (Festuca rubra), Virginia Wild Tye (Elymus Virginicus), Deertongue (Panicum clandestinum), Switchgrass (Panicum firgatum) Partridge Pea (Chamaecrista fasciculata), Showy Tick-trefoil (Desmodium canadense).

1. Application rate shall be 35 pounds per acre.

2.3 WILDFLOWER SEED MIXTURE

A. Creeping Red Fescue (Festuca rubra), Little Bluestem (Schizachyrium scoparium), Indian Grass (Sorghastrum nutans), Partridge Pea (Chamaecrista fasciculata), Wild Blue Lupine (Lupinus perennis), Common Milkweed (Asclepias syriaca), Smooth Aster (Aster laevis), Blue Vervain (Verbena hastata), Riverbank Wild Rye (Elymus raparius), Butterfly Milkweed (Asclepius tuberosa), Grass-leaved Goldenrod (Solidago graminifolia), New York Aster (Aster novi-belgii), Grey Goldenrod (Solidago nemoralis).

B. Application rate shall be 15 pounds per acre.

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 form 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: Biodegradeable 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 – defribrated 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. 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. (1/2" at Athletic Fields). 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 ATHLETIC FIELD GRADING

A. Grade all athletic fields to a smooth, even surface with loose, uniformly fine texture using a grading tractor fitted with automatically controlled laser grading equipment (land plane or box plane). Laser guided system must be capable of generating a laser controlled, automatic system to within 1/4" tolerance the full length of the playing field.

B. The entire area shall present and even grade with no depressions where water will stand. Topsoil shall be smoothly blended to existing finish grades at adjacent existing conditions. The planarity of the field shall conform to EN 13036 Surface Planarity as performed by an independent Certified Testing Agency. Surface irregularities are to be correct prior to installation of seed to eliminate all mound and depressions, and produce a stable, firm surface. Contractor is responsible for maintaining surface planarity during seeding and maintenance activities.

C. 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 ½ inch of required elevation. Correct irregularities in elevation beyond this tolerance.

3.6 ATHLETIC FIELD SEEDING

A. Install starter fertilizer on the finish grade.

B. Sow specified seed at the specified rats using a culti-packer, slit type seeder. Apply the seed in two directions with the second application made at approximately 75 degree angle to the first application.

C. Hydro-seeding of athletic fields is NOT permitted.

D. After seeding, install 2-sf piece of sod around each irrigation head to prevent washing from leak off of heads.

3.7 LAWN DEVELOPMENT

A. General: All disturbed areas not developed otherwise shall be developed as lawn as indicated on the Drawings and as specified.

3.8 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.

3.9 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.

3.10 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.

3.11 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 and athletic fields by watering, fertilizing, weeding, mowing, trimming, replanting bare or eroded areas and remulch 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).
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).
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.

3.12 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 minor regarding 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 6 inches.

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

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.

3.13 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 95 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, stones, debris, other undesirable plants, surface irregularities, and 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.

3.14 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.

3.15 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.

3.16 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.

3.17 SEED

A. 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.

END OF SECTION 32 92 00

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SECTION 33 10 00 — WATER UTILITIES

PART 1 – GENERAL

1.1 DESCRIPTION

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. Work Included: Furnishing and installing ductile iron water mains and fittings, and appurtenant valves and fittings, complete in place, as shown on the Drawings and as specified.

C. Related Sections:

1. Section 31 20 00 – Earth Moving;

2. Section 31 23 33 – Trenching and Backfilling;

3. Section 32 12 16 – Asphalt Paving.

1.2 REFERENCES

A. ANSI/ASTM D2922 – Density of Soil and Soil-Aggregate in Place by Nuclear Methods (Shallow Depth).

B. AWWA C104 – American National Standard for Cement-Mortar Lining for Cast-Iron and Ductile-Iron Fittings for Water.

C. AWWA C110 – American National Standard for Gray-Iron and Ductile-Iron Fittings, 2 in. through 48 in. for Water and Other Liquids.

D. AWWA C111 – American National Standard for Rubber Gasket Joints for Cast Iron and Ductile Pressure Pipe and Fittings.

E. AWWA C151 – American National Standard for Ductile-Iron Pipe, Centrifugally cast in Metal Molds or Sand-Lined Molds for Water or Other Liquids.

F. AWWA C153 – American National Standard for Ductile-Iron Pipe Compact Fittings 3 Inch through 12 Inch for Water and Other Liquids.

G. AWWA C500 – Metal-Seated Gate Valves for Water Supply Service.

H. AWWA C502 – Dry-Barrel Fire Hydrants.

I. AWWA C550 – Protective Epoxy Interior Coatings for Valves and Hydrants.

J. AWWA C600 – Installation of Gray and Ductile Iron Water Mains and Appurtenances.

K. AWWA C651 – Disinfecting Water Mains.

1.3 QUALITY ASSURANCE

A. Qualifications of installers: 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. Comply with local water authority standards. The local water authority is The South Central Connecticut Regional Water Authority.

1.4 SUBMITTALS

A. Submit data on the following:

1. Product Data: Provide data indicating pipe, fittings, valves, and pipe accessories.

2. Manufacturer's Installation Instructions: Indicate special procedures required to install the products specified.

3. Manufacturer's Certificate: Certify that products meet or exceed specified requirements.

1.5 DELIVERY, STORAGE AND HANDLING

A. Protection: Use all means necessary to protect the materials of this Section before, during, and after installation, to protect the work and materials of all other trades, and to protect all objects designated to remain.

B. Protection of utilities: Protect existing utilities as specified in Section 31 20 00 – Earth Moving.

C. Delivery and Storage: Deliver all materials to the job site in their original containers with all labels intact and legible at time of use. Store in strict accordance with the manufacturers' recommendations as accepted by the Engineer.

D. Replacements: In the event of damage, immediately make all repairs and replacements necessary to the acceptance of the Engineer and at no additional cost to the Owner.

1.6 REFERENCES

A. Wherever reference is made to the DOT Specifications, it shall mean the Connecticut Department of Transportation Standard Specifications for Roads, Bridges and Incidental Construction Form 817 (2016) as modified by Supplemental Specifications issued by the Connecticut Department of Transportation.

1.7 REGULATORY REQUIREMENTS

A. Relation to sanitary sewer lines: Lay water lines at least 10 feet horizontally from any existing, or proposed, sewer lines if possible. If conditions prevent a lateral separation of 10 feet, a water line may be laid within 10 feet of a sanitary sewer if:

1. It is laid in a separate trench, or if it is laid in the same trench with the sanitary sewer line located at one side of a bench of undisturbed earth, and if;

2. In either case the elevation of the bottom of the water line is at least 18 inches above the top of the sanitary sewer line. Where water lines cross over sewer lines, install the water line so that the bottom of the water line is at least 18 inches above the top of the sewer line. When water, or sewer, location cannot be varied to provide separating distance, construct water line with mechanical joint pipe for a distance of 10 feet either side of sewer. One full length of water line is to be centered over sewer so that both joints will be as far from the sewer as possible.

3. Where it is not possible to obtain horizontal or vertical separation specified above, construct both water line and sewer line of mechanical joint, cement lined ductile iron pipe. Pressure test both pipes at 200 psi in accordance with AWWA C600.

PART 2 – PRODUCTS

2.1 PIPE MATERIALS

A. Type K Soft temper copper tubing to conform to ASTM B43-58.

B. Ductile Iron Pipe: AWWA C151, Class 52, cement lined in accordance with AWWA C104, 18 foot nominal laying length, push on joints with SBR gaskets in accordance with AWWA C111.

C. Fittings (1”-2”) Flared or Iron Pipe Size (I.P.S.) thread connections only and conform to latest revision of AWWA Standard C800. Fittings (4”-12”): Compact ductile iron fittings in accordance with AWWA C153, double cement lined in accordance with AWWA C110, mechanical joints with SBR gaskets, Corten nuts and bolts and ductile iron retainer glands, where required.

D. Retainer Glands: Ductile iron conforming to ASTM A536, 250 psi minimum working pressure, 2:1 minimum safety factor, Corten nuts and bolts, MEGALUG as manufactured by EBBA iron, Inc.

E. Tapping Sleeve: Fabricated carbon steel with fusion bonded epoxy coating, 200 psi minimum working pressure, SBR gaskets and sealing material, stainless steel bolting materials, provide with NPT test port and plug.

2.2 METAL SEATED GATE VALVES AND TAPPING VALVES

A. Valve: Conform to AWWA C500, mechanical joints ends, ductile iron retainer glands, SBR gaskets, Corten mechanical joint bolts and nuts, non-rising stem, 2" nut operator, 200 psi working pressure, type 304 stainless steel bonnet and O-ring stem seal bolting hardware. All valves shall open per the South Central Connecticut Regional Water Authority standards.

B. Valve Box: 5-1/4 inch diameter, cast iron, flared base, slip type, flange top, tapered cover with long skirt and two pick holes, coal tar epoxy coated. Cover to have water identification markings.

C. Valve Extension Stem (if required): Provide self-centering steel valve extension stem with 2" nut operator, coal tar epoxy coated. Top of extension stem to be 1 foot below finished grade.

2.3 BEDDING MATERIAL

A. Sand: Use sand or sandy soil conforming to the requirements of Article M.08.08-21, DOT Specifications.

PART 3 – EXECUTION

3.1 GENERAL

A. Examine the areas and condition under which work of this Section will be performed. Correct conditions detrimental to the timely and proper completion of the Work. Do not proceed until unsatisfactory conditions have been corrected.

3.2 PREPARATION

A. Hand trim excavations to required elevations. Correct over excavation as specified in Section 31 20 00 – Earth Moving.

B. Remove large stones or other hard matter, which could damage pipe or impede consistent backfilling or compaction.

C. Clean pipe and fitting interiors prior to lowering into trench. Keep clean during laying operations.

3.3 BEDDING

A. Excavate pipe trench in accordance with Section 31 20 00 – Earth Moving for work of this Section. Hand trim excavation for accurate placement of pipe to elevations indicated.

B. Place and compact bedding material at trench bottom, level materials in continuous layer.

3.4 INSTALLATION

A. General

1. Carefully examine each pipe prior to placing. Promptly set aside all defective pipe and all damaged pipe. Clearly identify all defects. Do not install defective pipe or damaged pipe.

2. Install pipe, fittings and accessories in accordance with AWWA C600 and manufacturer's instructions. Seal joints watertight.

3. Place all pipe to grades and alignment shown on the Drawings.

4. Provide all equipment for lowering pipe safely into the trenches.

5. Lay pipe by proceeding upgrade with the spigot ends of bell-and-spigot pipe pointing in the direction of flow.

B. When the Engineer has accepted conditions at the bottom of the trench, place and compact the bedding of sand. Provide a bedding surface to support the barrel of the pipe throughout its entire length. Accurately shape the bedding to conform to the lower quarter of the pipe. Make depressions in the bedding for making pipe joints.

C. Make watertight pipe joints. Use gaskets as specified for each kind of pipe. Do the jointing in accordance with the pipe manufacturer's instructions and as follows:

1. Clean gaskets and mating surfaces of pipes. Use lubricant on gaskets and pipes if required by pipe manufacturer. Align pipe to be installed with previously installed pipe, and, with gasket in place, put joint together. After pipes are put together, inspect joint to verify that gasket is properly positioned and that joint has been properly made and is tight. If, while making the joint, the gasket becomes loose or displaced, remove the pipe and remake the joint to the acceptance of the Engineer.

2. Pipe to be installed "in the dry". Do not use pipe for trench drainage. Keep trench dry to prevent pipe floatation.

3. Cap ends of pipe when work is not in progress.

4. All mechanical joint fittings, bends, etc. shall be restrained a minimum of three (3) pipe lengths on either side of the fitting per South Central Connecticut Regional Water Authority standards.

3.5 INSTALLATION OF TAPPING SLEEVE AND VALVE

A. Tapping of the water main shall be performed by South Central Connecticut Regional Water Authority. The Contractor shall coordinate all work and pay all necessary fees to the Utilities Department. The Contractor shall excavate as necessary to provide adequate space for tapping sleeve and valve installation.

3.6 INSTALLATION OF GATE VALVES

A. Install valves at locations indicated on the Drawings.

B. Provide a firm foundation and side support by tamping bedding material under and at the sides of the valves. Install valves with valve stems vertical.

C. Install valve boxes over valves such that vertical stems of valves are coincident with centerlines of valve boxes. Set boxes firmly in place by tamping bedding material under and at the sides of the boxes. Support valve boxes during backfilling; maintain vertical alignment. Install so that top of valve box is flush with final grade.

D. Install valve stem extensions of correct lengths on valves.

3.7 CONCRETE CRADLES, CONCRETE ENCASEMENTS AND CONCRETE THRUST BLOCKS

A. Construct concrete cradles, concrete encasements and concrete thrust blocks for additional support or protection of pipe at locations indicated on the Drawings or as directed by the Engineer.

3.8 COVER AND BACKFILL FOR PIPES

A. Protect finished installation from damage.

B. Place and compact sand blanket to two (2') feet above pipe so that all the space in the trench on each side of the pipe is entirely filled and well compacted.

C. Place warning tape over pipe as shown on the drawings. Tape shall clearly indicate "Buried Water Line" and be composed of a metallic material so as to be detectable by magnetic underground location indicators.

D. Place and compact suitable backfill material over sand blanket. Backfill in accordance with the requirements specified under Section 31 23 33 – Trenching and Backfilling.

3.9 PRESSURE TESTING AND DISINFECTION

A. The Contractor shall perform all testing and disinfecting required, at no additional cost to the Owner.

B. Arrange for local water authority to witness this work.

C. After installation of each waterline section, pipelines shall be tested for water tightness in accordance with AWWA C600. For these tests, the Contractor shall furnish suitable testing plugs or caps, all necessary pressure pumps, pipe connections, gages, or other equipment, all labor, and all water required.

D. Conduct leakage test at a pressure of 200 psi unless otherwise specified and maintain this pressure for 2 hours.

E. Before being placed in service, the completed water distribution system shall be disinfected in accordance with AWWA 651, "Standard Procedure for Disinfecting Water Mains." The Engineer shall approve the specific procedure before doing the work.

F. Water used to disinfect the water distribution system shall be chlorine neutralized as it is discharged from the system.

G. Perform bacterial and water quality testing to demonstrate compliance with applicable water quality standards. Sampling to be accomplished through sampling taps. Use of hydrants for sampling is prohibited.

H. Disinfect, flush and test water distribution system, repeatedly as required at Contractor's expense, to comply with applicable water quality standards.

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SECTION 33 30 00 — SANITARY SEWERAGE UTILITIES

PART 1 – GENERAL

1.1 DESCRIPTION

A. Work Included: Construction of sanitary sewers, manholes and related work, complete in place, as shown on the Drawings and as specified. Leakage testing of sanitary sewers and manholes will also be required.

B. Related Sections:

1. Section 31 20 00 – Earth Moving;

2. Section 31 23 33 – Trenching and Backfilling;

3. Section 31 25 00 – Erosion and Sedimentation Controls.

1.2 QUALITY ASSURANCE

A. Qualifications of installers: 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.

1.3 SUBMITTALS

A. Submit Product Data

1. Manufacturers' descriptive literature for all items proposed to be furnished and installed under this Section, including Material Safety Data Sheets (MSDS) on all PVC adhesives and primers.

2. Manufacturer's specifications and other data required to demonstrate compliance with the specified requirements.

3. Verification of installer’s qualifications.

1.4 DELIVERY, STORAGE AND HANDLING

A. Protection: Use all means necessary to protect the materials of this Section before, during, and after installation, to protect the work and materials of all other trades, and to protect all objects designated to remain.

B. Delivery and Storage: Deliver all materials to the job site in their original containers with all labels intact and legible at time of use. Store in strict accordance with the manufacturers' recommendations as accepted by the Engineer.

C. Replacements: In the event of damage, immediately make all repairs and replacements necessary to the acceptance of the Engineer and at no additional cost to the Owner.

1.5 REFERENCES

A. Wherever reference is made to the DOT Specifications, it shall mean the Connecticut Department of Transportation Standard Specifications for Roads, Bridges and Incidental Construction Form 817 (2016) as modified by Supplemental Specifications issued by the Connecticut Department of Transportation.

PART 2 – PRODUCTS

2.1 PIPE MATERIALS

A. Polyvinyl Chloride Pipe

1. Pipe: ASTM D3034, SDR 35 (Sizes: 4-15 in.)

2. Joints: Bell and spigot with O-ring gasket compressed between the bell and the spigot.

3. Gasket: Rubber gasket conforming to the requirements of AASHTO M198 or elastomeric gasket conforming to the requirements of ASTM D3212.

B. Provide fittings or couplings for joining pipes of different materials or provide concrete for fabricating a concrete collar where pipes of different materials are joined.

2.2 MANHOLE MATERIALS

A. Precast Reinforced Concrete Manhole Sections: Bases, manhole entrance slabs, riser sections, and conical sections shall conform to dimensions as shown on the Drawings and to the requirements of ASTM C478. All joints between sections shall be tongue and groove joints with recesses for rubber O-ring gaskets.

B. Rubber O-ring gaskets for joints shall conform to the requirements for rubber gaskets as specified under 5.9 Rubber Gaskets, ASTM C361.

C. Manhole Steps: Copolymer Polypropylene Plastic Manhole steps with serrated safety tread. Do not install steps by drilling and mortaring in place after casting of manhole sections.

D. Holes shall be preformed in the walls of base sections to accept sewer pipe. Flexible sleeves shall be cast into the preformed holes, as shown on the Drawings. The sleeves shall be made to fit and to be clamped around the pipe with stainless steel bands.

E. Alternatively, sleeves with internal-expanding stainless steel clamps may be used to install sleeves in preformed pipe holes.

F. Grout shall conform to Subarticle M.03.01-12 of the DOT Specifications.

G. Lubricant for use on joints and for use on O-ring rubber gaskets shall be an accepted vegetable soap compound.

H. Mortar shall conform to Article M.11.04 of the DOT Specifications.

I. Concrete grading rings, if used, shall conform to the requirements of ASTM C139.

J. Bricks used for adjusting frames to grade shall conform to the requirements of AASHTO M91, Grade MS. Bricks used for constructing inverts shall conform to the requirements of AASHTO M91, Grade SM.

K. Manhole frames and covers shall be standard models as shown on the Drawings. Material shall be cast iron conforming to the requirements of AASHTO M105, Class 25. Covers shall bear uniformly on their supports.

L. Dampproofing material and primer shall conform to the requirements of Article M.12.05 of the DOT Specifications.

2.3 BEDDING, COVER AND BACKFILL MATERIALS

A. Crushed stone for bedding shall be sound, tough and durable; it shall be free from soft, thin elongated, or laminated pieces and vegetable or other deleterious substances. Grading Article M.01.01, DOT Specifications. Size: As indicated on the Drawings.

B. Sand Blanket for Cover: Use sand or sandy soil conforming to the requirements of Article M.08.08-21 of the DOT Specifications.

C. Geotextile Filter Cloth: Section 31 23 33 – Trenching and Backfilling.

D. Suitable Backfill Material: Section 31 23 33 – Trenching and Backfilling

PART 3 – EXECUTION

3.1 GENERAL

A. Examine the areas and condition under which work of this Section will be performed. Correct conditions detrimental to the timely and proper completion of the Work. Do not proceed until unsatisfactory conditions have been corrected.

3.2 CONNECTIONS

A. Where a new pipe is to be connected into an existing manhole, the Contractor shall carefully cut into the existing manhole to obtain the minimum diameter hole required to construct the sewer to the line and grade indicated on the plans. The use of blunt instruments or excessive force will not be permitted.

B. The hole around the pipe shall be carefully sealed with non-shrink grout to obtain a watertight connection. A suitable invert channel, compatible with the existing formed invert, shall then be formed in the bottom of the existing manhole to the satisfaction of the Engineer.

3.3 CLEANING PIPELINES, MANHOLES AND APPURTENANCES

A. Upon completion of construction, all dirt and other foreign material shall be removed from pipelines and manholes. No materials shall be left to impede sewage flows.

END OF SECTION

SECTION 33 40 00 — STORM DRAINAGE UTILITIES

PART 1 – GENERAL

1.1 DESCRIPTION

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. Work Included: Storm drain pipes, catch basins, manholes and related work, complete in place, as shown on the Drawings and as specified.

C. Related Sections:

1. Section 31 20 00 – Earth Moving;

2. Section 31 23 33 – Trenching and Backfilling;

3. Section 31 25 00 – Erosion and Sedimentation Controls.

1.2 QUALITY ASSURANCE

A. Qualifications of installers: 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.

1.3 SUBMITTALS

A. Product Data:

1. Manufacturers' descriptive literature for all items proposed to be furnished and installed under this Section, including Material Safety Data Sheets (MSDS) on all PVC adhesives and primers.

2. Manufacturer's specifications and other data required to demonstrate compliance with the specified requirements.

3. Manufacturers' recommended installation procedures which, when accepted by the Owner, shall become the basis for inspecting and accepting or rejecting actual installation procedures used on this Work.

4. Verification of installer's qualifications.

1.4 DELIVERY, STORAGE AND HANDLING

A. Protection: Use all means necessary to protect the materials of this Section before, during, and after installation, to protect the work and materials of all other trades, and to protect all objects designated to remain.

B. Delivery and Storage: Deliver all materials to the job site in their original containers with all labels intact and legible at time of use. Store in strict accordance with the manufacturers' recommendations as accepted by the Architect.

C. Replacements: In the event of damage, immediately make all repairs and replacements necessary to the acceptance of the Architect and at no additional cost to the Owner.

1.5 REFERENCES

A. Wherever reference is made to the DOT Specifications, it shall mean the Connecticut Department of Transportation Standard Specifications for Roads, Bridges and Incidental Construction Form 817 (2016) as modified by Supplemental Specifications issued by the Connecticut Department of Transportation.

PART 2 – PRODUCTS

2.1 PIPE MATERIALS

A. Polyvinyl Chloride Pipe

1. Pipe: ASTM D3034, SDR 35 (Sizes: 4-15 in.)

2. Joints: Bell and spigot with O-ring gasket compressed between the bell and the spigot.

3. Gasket: Rubber gasket conforming to the requirements of AASHTO M198 or elastomeric gasket conforming to the requirements of ASTM D3212.

4. For Perforated pipe, make perforations 5/8-in. diameter on 5-in. centers, 120 degrees apart.

5. Flat Panel Drain: Polyethylene minimum cell classification of 424420C as described in ASTM D3350.

6. Slot Drain: Smooth interior and annular exterior corrugations with aluminum slot mounted longitudinally along the length of the pipe and shall meet AASHTO M252 Type S.

B. Reinforced Concrete Pipe

1. Pipe: Article M.08.01-6, DOT Specifications.

2. Gasket: Article M.08.01-20, DOT Specifications.

C. High Density Polyethylene Pipe

1. Pipe: All high-density polyethylene pipe shall have corrugated exterior and smooth interior and shall meet the following:

Sizes 3" to 10"	AASHTO M252, ASTM D3350 324420C
Sizes 12" to 38"	AASHTO M294, ASTM D3350 335420C

2. Coupling: Water Tight: Couplings designated on the drawings as watertight shall be gasketed, bell and spigot in accordance with the respective AASHTO specification. The bell shall be an integral part of the pipe for sizes up to and including 36" and shall provide a minimum pull apart strength of 400 pounds. Joints shall be accepted as water tight after passing a field air test after installation to ensure a leakage rate not to exceed 200 GPD/in = dia/mile or, in lieu of a field test, shall be accepted as water tight based on the manufacturer's certification that the leakage rate does not exceed 200 GPD/in-dia/mile based on laboratory testing.

2.2 CATCH BASINS, YARD DRAINS, AND MANHOLES

A. Materials shall conform to the requirements of Article M.08.02 of the DOT Specifications.

B. Protective compound material: Article M.03.01-11 of the DOT Specifications.

C. Mortar: Article M.11.04 of the DOT Specifications.

D. Pervious material: Article M.02.05 of the DOT Specifications.

E. Galvanize steel frames and grates in accordance with the requirements of Article M.06.03, DOT Specifications. Do not galvanize cast iron frames and grates.

2.3 BEDDING, BASE, COVER AND BACKFILL MATERIALS

A. Crushed stone for bedding shall be sound, tough and durable; it shall be free from soft, thin elongated, or laminated pieces and vegetable or other deleterious substances. Grading Article M.01.01, DOT Specifications. Size: As indicated on the Drawings.

B. Suitable Backfill Material: Section 31 23 33 – Trenching and Backfilling.

PART 3 – EXECUTION

3.1 GENERAL

A. Examine the areas and condition under which work of this Section will be performed. Correct conditions detrimental to the timely and proper completion of the Work. Do not proceed until unsatisfactory conditions have been corrected.

3.2 EXCAVATION

A. Make excavations for catch basins, infiltration basins, yard drains, manholes, pipes and other drainage items in accordance with the provisions of Section 31 20 00 – Earth Moving and Section 31 23 33 – Trenching and Backfilling.

B. Protect bottoms of excavations from frost. Do not place bedding, structures, pipes, or fill materials on frozen ground.

C. Provide dewatering as specified under Section 31 20 00 – Earth Moving. Keep excavations dry.

3.3 LAYING PIPE; JOINTING PIPE

A. General

1. Carefully examine each pipe prior to placing. Promptly set aside all defective pipe and all damaged pipe. Clearly identify all defects. Do not install defective pipe or damaged pipe.

2. Place all pipe to grades and alignment shown on the Drawings.

3. Provide all equipment for lowering pipe safely into the trenches.

4. Lay pipe by proceeding upgrade with the spigot ends of bell-and-spigot pipe, and the tongue ends of tongue-and-groove pipe pointing in the direction of flow.

B. When the Owner has accepted conditions at the bottom of the trench, place and compact the bedding of crushed stone. Provide a bedding surface to support the barrel of the pipe throughout its entire length. Accurately shape the bedding to conform to the lower quarter of the pipe. Make depressions in the bedding for making pipe joints.

C. Make watertight pipe joints. Use gaskets as specified for each kind of pipe. Do the jointing in accordance with the pipe manufacturer's instructions and as follows:

1. Clean gaskets and mating surfaces of pipes. Use lubricant on gaskets and pipes if required by pipe manufacturer. Align pipe to be installed with previously installed pipe, and, with gasket in place, put joint together. After pipes are put together, inspect joint to verify that gasket is properly positioned and that joint has been properly made and is tight. If, while making the joint, the gasket becomes loose or displaced, remove the pipe and remake the joint to the acceptance of the Architect.

D. Fill depressions under joints with granular fill bedding material and compact the material thoroughly.

E. Joining pipe of different materials: Provide fittings or couplings made for the pipe materials joining, or provide a concrete collar.

F. Place and compact bedding material (granular fill or in the case of underdrains, crushed stone) around both sides of pipe and over the top of the pipe as shown on the Drawings.

G. Place warning tape over pipe as shown on the drawings. Tape shall clearly indicate "Buried Storm Line" and be composed of a metallic material so as to be detectable by magnetic underground location indicators.

H. Place and compact suitable backfill material over bedding (cover) material as shown on the Drawings and in accordance with the requirements of Section 31 20 00 – Earth Moving and Section 31 23 33 – Trenching and Backfilling.

3.4 CONSTRUCTION OF CATCH BASINS, YARD DRAINS AND MANHOLES

A. When conditions at the bottom of the excavation are satisfactory to the Owner, place and compact the granular fill base. Bring the top of the granular base to the proper grade. Make granular base flat to uniformly support catch basin, yard drain, or manhole.

B. Construct catch basins, manholes, etc. and join pipes to structures in accordance with requirements of Article 5.07.03 of the DOT Specifications. Those requirements include:

1. Lay masonry units and metal frames in full mortar beds. In addition to the requirements of Article 5.07.03, apply a field coat of SS-1 emulsion to metal frames, grates and covers immediately before installation.

2. Plan to backfill with pervious material to extent indicated; provide a drainage opening in each wall immediately above the bottom of the pervious material, as indicated.

3. If cast-in-place concrete is used for tops, use bar reinforcement and apply protective compound material as indicated. Comply with other applicable requirements of Article 5.07.03.

C. When structures are constructed in sandy soils, apply damp proofing to outside wall surfaces.

D. Coordinate the backfilling work using suitable backfill material where indicated and pervious backfill material where indicated. Conform to backfilling requirements of Section 31 20 00 – Earth Moving and Section 31 23 33 – Trenching and Backfilling.

3.5 PIPE CONNECTIONS TO EXISTING DRAINAGE STRUCTURES

A. When connecting a new pipe into an existing drainage structure, carefully cut into the structure to produce the smallest possible hole for the pipe. Do not use blunt instruments or excessive force in cutting the hole. Locate the hole so that, when connected, the pipeline will be at line and grade indicated on the Drawings.

B. Carefully seal around the pipe with an acceptable non-shrink grout to obtain a watertight connection.

3.6 BACKFILLING

A. Backfill and compact backfill material in accordance with the provisions of Section 31 20 00 – Earth Moving and Section 31 23 33 – Trenching and Backfilling.

B. Where accepted by the Owner, sheeting and portions of bracing used may be left in place. Do not leave untreated sheeting in place beneath structures or pavements.

3.7 RAISING MANHOLES AND CATCH BASINS

A. Within the project area, raise all existing manholes and catch basins to finished grade.

B. Precast Concrete Manholes and Catch Basins

1. Raise by adding additional precast riser sections or by adding courses of brick or block as indicated on the Drawings.

2. If the total depth of adjusting brick or block exceeds 12 inches, raise by using precast riser sections. With brick or block, final adjustment not to exceed 12 inches.

C. Brick or Block Manholes and Catch Basins

1. Raise manholes in kind.

2. If the total depth of the manhole or Catch Basin (top of frame to lowest invert) will be increased to more than eight feet, rebuild the manhole or catch basin using 12-inch thick brick or block.

D. Reset existing frames and covers except where the Drawings call for replacement.

END OF SECTION

SECTION 33 42 10 —TRENCH DRAIN

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. Installation of trench and slot drains in and around the running track, including:

a. Polymer concrete drains.
b. In-line catch basins.
c. Grating.

B. Related Sections: The following Sections contain requirements that relate to his Section.

1. Division 31 Section "Earth Moving".
2. Division 33 Section "Athletic Field Underdrainage".
3. Division 03 Section "Cast-in-Place Concrete".

1.3 DEFINITIONS

A. Form 817: "Standard Specifications for Roads, Bridges and Incidental Construction", State of Connecticut, Department of Transportation, Form 817, 2016 edition, with all supplements.

1.4 QUALITY ASSURANCE

A. Installers must be licensed by the manufacturer to install specified product.

B. Installers: Subcontractors for this work shall submit record of five (5) similar projects satisfactory completed within the previous three years and shall be thoroughly qualified to perform described work. Owner must approve all contractors/subcontractors prior to commencement of this work.

1.5 SUBMITTALS

A. Submit Product Data

1. Manufacturer's descriptive literature for all items proposed to be furnished and installed under this Section.
2. Manufacturer's specifications and other data required to demonstrate compliance with the specified requirements.

3. Manufacturer's recommended installation procedures which, when accepted by the Architect, shall become the basis for inspecting and accepting or rejecting actual installation procedures used on this Work.

1.6 PRODUCT HANDLING

A. Protection: Use all means necessary to protect the materials of this Section before, during, and after installation, to protect the work and materials of all other trades, and to protect all object designated to remain.

B. Delivery and Storage: Deliver all materials to the job site in their original containers with all labels intact and legible at time of use. Store in strict accordance with the manufacturer's recommendations as accepted by the Architect.

C. Replacements: In the event of damage, immediately male all repairs and replacements necessary to the acceptance of the Architect and at no additional cost to the Owner.

PART 2 - PRODUCTS

2.1 CHANNEL DRAIN

A. Trench drain system shall be similar to ACO System 4000 as manufactured by ACO Polymer Products, Inc., and distributed by Sportsfield Specialties, Inc., 41155 State Highway 10, Delhi, NY, or approved equal. Standard Channels shall be neutral 12" depth channels similar to catalog numbers 4030 or 40303 or approved equal.
   1. Provide accessories or modified trench drain sections per project details and surfacing installed, as appropriate.

B. Channel drain shall be fabricated from durable polymer concrete, being a blend of high grade polyester resin and quartz aggregate. The material must be resistant to ultra violet degradation, chemical attack and impervious to freeze-thaw cycles.

C. Channels shall have a bottom radius, smooth interior surface, interlocking tongue and groove ends, with a top edge modified to retain the edges of the grating. Top portion of channel shall contain ¼ inch square notches to receive storm water run-off from surface of bituminous concrete base.

D. Slot drain system shall be ACO Polymer Products Inc. System 3000 slot drain system utilizing Straight channels part no. 05657, radius channels part no. 05658 or approved equal.
   1. Provide in line catch basin at ends of runs and connections to drainage systems. In-line basins shall have integral trash buckets and polymer slot drain style cover. Cut or pour track surfacing to allow easy cover removal.
   2. At track D-Area installations provide radius slot drain sections unless otherwise noted.

E. Provide a in-line catch basin at the outlet end of every trench drain run. Inline catch basins shall have grates that contrast in color to adjacent trench drain runs. Include plastic trash bucket and all accessories for catch basin connection, and installation.
   1. Grates for catch basins shall be Brick Model #97396 or approved equal.

F. Grates, where used, shall be UV stable, grey plastic, ADA accessible grates similar to Model number 97385 capable of locking securely to the channel with a bolt and toggle bar. Edges shall be PVC compound, enhanced with UV stabilizers and ½ inch tall.

G. All accessory equipment, including end plates and cleanouts shall be included to form a complete system.

2.2 CONCRETE: Division 32 Section Concrete Pavement and Curbs.

2.3 CONCRETE BRICK: CT DOT Form 817, Article M.08.02.2.

PART 3 - EXECUTION

3.1 PREPARATION

A. Provide layout and elevations of trench drain; services to be completed by licensed surveyor. Certify conformance with project requirements and track length.

B. Install minimum 6" depth of processed aggregate and compact to minimum 98% per Division 31 Section "Earth Moving".

3.2 INSTALLATION

A. Brick Set Method.

1. Locate the position of each one meter channel joint.
2. Place concrete at location of each joint. Install concrete brick so the brick fully supports the joint of two adjoining drain channels. Location and elevation to be precise to allow proper engagement of the joint. Brick to be level on all axes so that channels lie perfectly flat.

B. Install channels and catch basins with tight, closed joint. Align longitudinal grooves on the top edge of adjacent channels.

C. Install grates, locked in place and overlapping the channel joints. Confirm placement of trench drain system.

D. Install concrete bedding and support as detailed. Place concrete in such a way to avoid any displacement of channel. Slope and trowel sides of concrete.

E. Protect concrete until cured. After concrete has set, remove grates.

F. Install "L" edging if detailed for synthetic track and natural grass surface. Conform to manufacturer recommendations.

3.3 CLEANUP/PROTECTION

A. Remove all excess material from site.

B. Protect until completion of work.

END OF SECTION 33 42 10

SECTION 33 46 16 FIELD SUBDRAINAGE SYSTEM

PART 1 GENERAL

1.1 SUMMARY

A. Section includes:

1. Installation of a multi-component synthetic field drainage system on top of a prepared subgrade and perimeter collector drains.

2. Testing, 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 PROJECT CONDITIONS

A. The bid drawings, bid documents and project manual for 'Synthetic Grass and Running Track Surfacing, Derby High School City project COD2018-02 dated February 28, 2018" as modified by addenda are hereby incorporated into this specification in whole. The contractor shall carry the bid costs for the lowest responsible bidder for this bid (AstroTurf and ATT Sports) and shall carry the contract for the track and turf surfacing subcontractor, including materials, installation and warranties and shall include those costs in his bid price.

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. State of Connecticut.

D. Form 817: "Standard Specifications for Roads, Bridges and Incidental Construction", State of Connecticut, Department of Transportation, Form 817, 2016 edition, as amended

E. American Association of State High and Transportation Officials (AASHTO).

1. AASHTO M252 - Standard Specification for Corrugated Polyethylene Drainage Pipe

F. 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/ft3(2,700 kN-m/m3)).

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.

G. Fédération Internationale de Football Association (FIFA)

1. EN 13036 – Surface Planarity/Surface Regularity

1.4 SUBMITTALS

A. Sampling and Testing Laboratory: Submit name and qualifications of commercial sampling and testing laboratory for Engineer’s approval.

B. Testing Agency: Submit name and qualifications of third-party in-field quality control Testing Agency for Engineer’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

2. Geotextile

E. Confirmation of Acceptance, Design: Submit a signed written statement signed by the manufacturer of the all-weather grass surfacing materials confirming that:

1. The field subdrainage system design meets the requirements of the all-weather 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 relive 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 three (3) months from proposed material placement date. Testing data older than three (3) 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 relive 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 1.6 "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 relive Contractor from his obligation to meet the performance requirements of the field subdrainage system in all regards.

K. Progress Survey: Submit Progress Survey prepared by Professional Land Surveyor for review by Engineer and turf installer.

L. 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 all-weather grass surfacing materials installer (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 all-weather grass surfacing material.

2. No conditions exist that are in conflict with the all-weather grass surfacing material warranty requirements.

1.5 DELIVERY, STORAGE AND HANDLING

A. 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.

B. 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.

C. 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.

1.6 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. Engineer 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 Engineer'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 Engineer'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

1.7 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

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.

C. Drainage Test, Pre-Construction

1. Construct a minimum 15-foot by 15-foot (15 ft x 15 ft) sample panel of the field subdrainage system (Geotextile, Field Base Bottom Stone, and Field Base Top Stone) on top of a prepared subgrade section in an area approved by Engineer.

2. Field subdrainage system sample panel shall be complete and in-place, representative of final construction per the Drawings and Specifications. Material testing and compaction testing on the sample panel shall be submitted to confirm the sample panel conforms to the drawings and specifications.

3. Perform an infiltration test, double-ring infiltrometer, ASTM F1551/EN 12616 - Standard Test Method for Comprehensive Characterization of Synthetic Turf Playing Surfaces and Materials, on the sample panel's Field Base Bottom Stone layer after placement and compaction. Alternative infiltration testing will not be considered valid.

    a. Testing criteria: The mock-up Field Base Bottom Stone layer of the sample panel will be considered acceptable when an infiltration rate of no less than 30 inches per hour (30 in/hr) is demonstrated.

4. Perform an infiltration test, double-ring infiltrometer ASTM F1551/EN 12616 - Standard Test Method for Comprehensive Characterization of Synthetic Turf Playing Surfaces and Materials, on the completed sample panel (top and bottom stone). Alternative infiltration testing will not be considered valid.

    a. Testing criteria: The mock-up field subdrainage system panel will be considered acceptable when an infiltration rate of no less than 20 inches per hour (20 in/hr) is demonstrated.

5. Sample panel may not be utilized as part of the final work. Remove the panel when testing is completed.

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

1. During construction, prior to the delivery of material to the Project Site, provide representative testing for the following materials:

    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 Engineer-approved pre-construction material testing submittals.

    a. If testing indicates that materials demonstrate differing characteristics as indicated in Engineer-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 Engineer's review. Allow Engineer 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. 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

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 the completed Collector Drain. Alternative infiltration testing will not be considered valid.

    b. Testing Frequency: Perform four tests on opposite corners of the field.

    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, as the Bottom Stone layer of the field subdrainage system/base is completed. 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 Top 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

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.

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 ½ inch of required elevation. Correct irregularities in elevation beyond this tolerance.

B. Field Base, Bottom Stone

1. The planarity of the finished 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.

C. Field Base, Top Stone

1. The planarity of the finished 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. 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 COLLECTOR 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 Engineer'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 30%.

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 (ConnDOT M.01.01, No. 67)

Sieve	Percent Passing by Weight
1”	100
3/4”	90-100
3/8”	20-55
No. 4	0-10
No. 8	0-5

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 Engineer’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 30%.

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

Sieve	Percent Passing by Weight
1/2”	100
3/8”	90-100
1/4"	75-90
No. 10	15-35
No. 30	5-15
No. 40	0-10
No. 100	0-5
No. 200	0-2

2.5 COLLECTOR PIPE 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 30%.

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, CT. DOT M02.06 grading C.

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 Utlimate	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^{-1}	1.8
Flow Rate	ASTM D 4491	gal/min/ft2	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^2	4.5
Thickness	ASTM D 5199	Mils (mm)	44 (1.12)

PART 3 EXECUTION

3.1 GENERAL

A. Notify "Call-Before-You-Dig" to request a utility mark-out for the Project Site prior to any earth disturbance. Provide written confirmation to Engineer 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 Engineer 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.

2. Completed field base stone elevations.

3. Completed top stone elevations.

4. Completed field subdrainage system elevations and drain locations, including collector pipe and flat panel piping.

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 Engineer 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 paper and AutoCAD 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

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 Engineer-approved material as required.

2. Reconstruct sub-grades damaged by freezing temperatures, frost, rain, accumulated water or construction activities, as directed by Engineer.

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 Engineer.

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 GEOTEXTILE

A. Install geotextile as shown on the Drawings or as called-for in the Specifications. Installation methods shall comply with manufacturer's written instructions.

B. Ensure that geotextile is protected during installation from clogging, tears, and other damage.

1. Layer Separation and Stabilization

a. Place fabric on a normally prepared subgrade area attending the full width of the sub-base layer being protected.

b. Place fabric in a loose and unstretched condition to minimize shifting, puncture, and/or tearing. Overlap fabric roll-ends and edges a minimum of 12 inches with adjacent material.

c. Place Bottom Stone material within 2 weeks after placement of fabric to minimize exposure. Place sub-base material in a manner to minimize slippage of the fabric. If excessive slippage occurs, use steel securing pins per manufacturer's guidelines.

2. Pipe or Drainage System

a. Provide smooth side and bottom trench surfaces so the fabric does not bridge depressions in the soil and is not damaged by rock projections.

b. Use fabric of a width to permit a minimum trench-width overlap across the backfill at the trench top.

c. Lay the fabric flat in the prepared trench without stretching. Lay the top of the fabric back on the sides to allow for the placement of the aggregate backfill and pipe.

d. Overlap ends of rolls an amount equal to the trench width prior to fabric placement. Where pockets or cavities occur in the trench bottom or sides, fill them with acceptable granular material to prevent distortion or damage to the fabric.

e. Backfill aggregate and install pipe in a manner to prevent damage to the fabric. Compact aggregate backfill and overlap the fabric across the trench top. Do not allow the fabric to be exposed for more than 2 weeks without covering with backfill.

3.6 FLAT PANEL DRAIN

A. Install flat panel drains as indicated on the Drawings.

B. Install all drain components in accordance with the manufacturer's instructions.

3.7 DRAINAGE STONE, BOTTOM STONE AND TOP STONE

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

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 subdrainge 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 Engineer to have caused damage or contamination of the dynamic stone material the Contractor shall remove and replace all affected areas to the satisfaction of Engineer.

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.

3.8 PERIMETER COLLECTOR DRAIN

A. Install drain pipe and bedding system as indicated on the Drawings.

B. Installed drains shall be kept clean and uncontaminated. Less select materials shall not be permitted to become mixed with drainage stone.

3.9 DRAINAGE TESTING

A. Complete post-installation drainage testing of the installed field subdrainage system/base in accordance with Article 1.7.

3.10 CLEAN UP

A. Contractor shall remove all debris, residuals, and materials at the conclusion of the work.

END OF SECTION

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SECTION 33 79 00 - SITE GROUNDING

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. Rod electrodes.
2. Exothermic connections.
3. Mechanical connectors.
4. Wire.

1.3 REFERENCES

A. Institute of Electrical and Electronics Engineers:
1. IEEE 142 - Recommended Practice for Grounding of Industrial and Commercial Power Systems.
2. IEEE C2 - National Electrical Safety Code.

B. International Electrical Testing Association:
1. NETA ATS - Acceptance Testing Specifications for Electrical Power Distribution Equipment and Systems.

1.4 SYSTEM DESCRIPTION

A. Rod electrodes for local grounding at utility transformer, generator and exterior metallic poles.

1.5 PERFORMANCE REQUIREMENTS

A. Overall Resistance to Ground: 25 ohms.

1.6 SUBMITTALS

A. Section 01 33 00 - Submittal Procedures: Requirements for submittals.

B. Shop Drawings: Indicate layout and installation details of grounding components.

C. Product Data: Submit data for grounding electrodes and connectors.

D. Test Reports: Indicate overall resistance to ground.

1.7 CLOSEOUT SUBMITTALS

A. Section 01 70 00 - Execution and Closeout Requirements: Requirements for submittals.

B. Project Record Documents: Record actual locations of electrodes and connections.

1.8 QUALIFICATIONS

A. Manufacturer: Company specializing in manufacturing Products specified in this section with minimum three years documented experience.

PART 2 PRODUCTS

2.1 ROD ELECTRODES

A. Manufacturers:
1. Copperweld, Inc.
2. Erico, Inc.
3. O-Z Gedney Co.
4. Thomas & Betts, Electrical
5. Substitutions: Section 01 60 00 - Product Requirements.

B. Product Description:
1. Material: Copper-clad steel.
2. Diameter: 5/8 inch.
3. Length: 8 feet.

C. Connector: Connector for exothermic welded connection.

2.2 EXOTHERMIC CONNECTIONS

A. Manufacturers:
1. Cadweld, Erico, Inc.
2. Copperweld, Inc.
3. ILSCO Corporation.
4. O-Z Gedney Co.
5. Thomas & Betts, Electrical.
6. Substitutions: Section 01 60 00 - Product Requirements

B. Product Description: Exothermic materials, accessories, and tools for preparing and making permanent field connections between grounding system components.

2.3 MECHANICAL CONNECTORS

A. Manufacturers:
1. Copperweld, Inc.
2. Erico, Inc.

3. ILSCO Corporation
4. O-Z Gedney Co.
5. Thomas & Betts, Electrical.
6. Substitutions: Section 01 60 00 - Product Requirements

B. Description: Bronze connectors, suitable for grounding and bonding applications, in configurations required for particular installation.

2.4 WIRE

A. Material: Stranded copper.

B. Horizontal Electrodes: #4 AWG, minimum size.

C. Connections to Electrodes: #4 AWG, minimum size.

D. Bonding Other Objects: 4 AWG, minimum size.

E. Mechanical Connector: Bronze.

F. Grounding Boxes: Bronze.

PART 3 EXECUTION

3.1 EXAMINATION

A. Section 01 30 00 - Administrative Requirements: Verification of existing conditions before starting work.

B. Verify final backfill and compaction has been completed before driving rod electrodes.

3.2 INSTALLATION

A. Install rod electrodes in vertical position with bottom at least 5 feet below frost line.

B. Install interconnecting wire 2 feet below frost line.

C. Provide chemical treatment at each vertical electrode site.
1. Saturate treatment chemicals with water following application.
2. Dig circular trench centered on electrode. Make trench 12 inches deep with 18 inch inside diameter. Uniformly distribute 50 lb of treatment material in bottom of trench and cover with topsoil.

3.3 FIELD QUALITYCONTROL

A. Section 01 70 00 - Execution and Closeout Requirements: Field inspecting, testing, adjusting, and balancing.

B. Inspect and test in accordance with NETA ATS, except Section 4.

C. Perform inspections and tests listed in NETA ATS, Section 7.13. Make final grounding system measurements three or four days after chemical treatment.

3.4 DEMONSTRATION

A. Section 01 70 00 - Execution and Closeout Requirements: Requirements for demonstration and training.

B. Demonstrate location of each accessible grounding connection and each chemical treatment well.

END OF SECTION 33 79 00

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