

# Invitation for Bid

No. 23-21

Town of Arlington

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# Boiler Replacement Police Headquarters

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Arlington, Massachusetts

AWARDING AUTHORITY

**TOWN OF ARLINGTON**

acting through and by its

**TOWN MANAGER**

Town Hall Annex

730 Massachusetts Ave

Arlington, MA 02476

ENGINEER

**Trinidad Engineering, Inc.**

144 North Rd – Suite 2100

Sudbury, MA 01776

April 20, 2023

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**SECTION 000001  
INVITATION FOR BID**

**PART 1 - GENERAL**

**SEALED BIDS FOR CONSTRUCTION OF:**

#23-21 Police Headquarters Boiler Replacement  
Arlington, MA.

**IN ACCORDANCE WITH CONTRACT DOCUMENTS PREPARED BY:**

Trinidad Engineering, Inc.  
144 North Road  
Suite 2100  
Sudbury, MA 01776

**HEREINAFTER CALLED THE ENGINEER, WILL BE RECEIVED BY:**

Town of Arlington

**ACTING BY AND THROUGH ITS**

Town Manager

Hereinafter called the "Awarding Authority" or "Owner" at:

Office of the Town Manager/Purchasing Department

Town Hall Annex, 2<sup>nd</sup> Floor

730 Massachusetts Ave.

Arlington, MA 02476

Attention: Purchasing Officer Mary Ellen DeNatale

- A. Bidding procedures and award of the Contract shall be in accordance with the provisions of General Laws of the Commonwealth of Massachusetts Chapter 30, Section 39M and Chapter 149, Sections 44A through 44J.
- B. For this project, the HVAC Bidder shall act as the Prime Contractor.
- C. Bids shall be received by the Awarding Authority at the address listed above, no later than 1. May 4, 2023, 10 a.m.  
at which time and place they will be publicly opened and read aloud. Any bid received after the time and date specified will not be considered.
- D. A bid deposit in the amount of five percent (5%) of the Bid amount shall be submitted with each Bid. Bid deposit shall be in the form of a) cash, b) a certified check on, or treasurer's or cashier's check issued by, a responsible bank or trust company and payable to Town of Arlington, or c) a bid bond in a form satisfactory to the Awarding Authority, with a surety company qualified to do business in the Commonwealth of Massachusetts, and conditioned upon faithful performance by the principal of the agreements contained in the Bid. Return of bid deposits will be in accordance with the provisions of the applicable Massachusetts General Laws.
- E. The Awarding Authority will reject Bids when required to do so by the above-referenced General Laws. In addition, the Awarding Authority reserves the right to waive any informalities in bidding and to reject any and all Bids if it deems it to be in the public interest to do so. The Awarding Authority further reserves the right to reject any bid if it determines that such bid does not represent the bid of a person or firm competent to perform the work as specified, or if less than three bids are received, or if bid prices are not acceptable without further competition.
- F. The successful Bidder will be required to furnish a Payment Bond in the amount of 50% of the applicable maximum Contract Amount. The cost of such bond shall be included in the bid

price. Such bond shall be of a surety company qualified to do business under the laws of the Commonwealth of Massachusetts and in a form satisfactory to the Awarding Authority.

- G. Work at the site shall begin on July 3, 2023, and shall be substantially complete on August 3, 2023.
- H. Wages and contributions to be paid employees on the Project shall not be less than those established by a schedule issued by the Director of the Department of Labor Standards of the Commonwealth of Massachusetts, in accordance with MGL c.149, §§ 26 to 27H inclusive, a copy of which is included in the Contract Documents and shall be made a part of the Contract.
- I. Contract Documents including Specifications will be available for download on the Town's website [www.arlingtonma.gov/purchasing](http://www.arlingtonma.gov/purchasing).
- J. The Awarding Authority is exempt from sales and federal excise tax to the extent permitted under law; bidders should not include such taxes in figuring or in references to any bid.
- K. There will be a pre-bid conference held at the site on April 27, 2023, at 2:00 p.m., 112 Mystic Street, Arlington, MA 02476.
- L. All employees of the successful Bidder who are assigned to the project must pass CORI and SORI background checks.
- M. Commonwealth of Massachusetts General Laws are incorporated herein by reference. Any inconsistency between the Invitation to Bid, Instructions to Bidders, Bid Forms, Conditions of the Contract, and any other Contract Documents and these statutes, or any other applicable statutes, bylaws, or regulations existing on the date on which the bids are to be received, shall not be grounds for invalidating the bidding procedures, but, where required by law, such statute, bylaw, or regulation shall be deemed to govern.

Sanford Pooler  
TOWN MANAGER

April 20, 2023

**END OF SECTION**

**SECTION 000002  
INSTRUCTIONS TO BIDDERS**

**PART 1 - GENERAL**

**1.01 COMPLEMENTARY DOCUMENT**

- A. INVITATION FOR BID, included herewith, is complementary to this document and shall be carefully reviewed by bidders for specific instructions which are not repeated herein.

**1.02 STATUTES REGULATING COMPETITIVE BIDDING**

- A. Bidding procedures and award of contract shall be in accordance with the provisions of Chapter 30, Section 39M and Chapter 149, Sections 44A through 44J of the General Laws of the Commonwealth of Massachusetts, including all current amendments.
- B. In the event of any discrepancy or inconsistency between the provisions of these Instructions to Bidders and Contract Documents and the above-mentioned statutes, the provisions of the above-mentioned statutes shall govern. In such event, the application of all remaining provisions not in conflict to any circumstance other than that in which the conflict occurs shall not be affected thereby.

**1.03 BIDDER'S QUALIFICATIONS**

- A. No individual or firm may submit a Bid unless it includes, in the Bid Form, a list of at least three (3) references for similar projects completed in the last five (5) years.
- B. All employees of the successful Bidder who are assigned to this project must pass CORI and SORI background checks.

**1.04 INTERPRETATION OF DOCUMENTS: NOTIFICATION OF ERRORS**

- A. Interpretation of the provisions of the Contract Documents will be made by the Engineer upon written request of any bidder, provided that such request is received by the Engineer at least seven (7) days prior to date of applicable bid opening, and that the Engineer considers such interpretation to be of sufficient importance. Oral or telephone interpretations will not generally be made, and if made, shall be strictly informal and not legally valid or binding.
- B. Engineer's interpretations shall be in the form of Addenda to the Contract Documents.
- C. Bidders are urged to communicate all errors or discrepancies found in the Contract Documents to the Engineer. Telephone calls pointing out any such errors or discrepancies will be taken by the Engineer, but only for the purpose of receiving the information in order that it may be properly processed, and not for interpretation or clarification.

**1.05 EXAMINATION OF CONTRACT DOCUMENTS AND SITE**

- A. Each Bidder shall carefully examine the Contract Documents to obtain a thorough understanding of the work of his bid in addition to work of related trades. In addition, each Bidder shall personally visit the site to become thoroughly acquainted with the conditions as they exist thereon.
- B. Failure of any Bidder to thoroughly examine the Contract Documents, or to visit and examine the site shall in no way relieve the bidder of any obligation with respect to his bid or of any responsibility assigned the bidder under the Contract.

**1.06 PRE-BID SITE VISIT WILL BE HELD ON:**

- A. Pre-bid site visit will be held on Thursday, April 27, 2023, at 2:00 p.m. at the site, 112 Mystic Street, Arlington.

**1.07 MODIFICATION AND WITHDRAWAL OF BIDS**

- A. Modifications of Bids will be permitted after submission of such bids provided clearly written, readily understandable instructions for same are received by the Awarding Authority in writing prior to time established for opening of such bids.
- B. No Bid may be withdrawn for a period of 30 days, excluding Saturdays, Sundays and legal holidays, after actual date of the Bid opening.

**1.08 ADDENDA**

- A. Engineer’s interpretations shall be in the form of Addenda to the Contract Documents. Addenda will be posted electronically to the Town of Arlington website [www.arlingtonma.gov/purchasing](http://www.arlingtonma.gov/purchasing). Failure to receive such Addenda shall in no way relieve any Bidder from the execution of its provisions. All Bidders are cautioned to verify the number of Addenda that have been issued and to secure any needed copies before submitting a bid.
- B. Bidders shall acknowledge each and every Addendum in the spaces provided on the Bid Form. Failure of a Bidder to do so may cause rejection of the bid.

**1.09 BID FORM**

- A. Bids must be submitted on the forms contained in the Bid and Contract Documents.
- B. All blank spaces provided on the bid forms shall be filled in with ink or typewritten. Where space is provided, sums shall be expressed in both words and figures. In case of discrepancy between the two, the written words shall govern.
- C. No interlineations, additions, alterations, or erasures shall be made on the forms.
- D. The Awarding Authority is exempt from sales and federal excise tax to the extent permitted under law; bidders should not include such taxes in figuring or in reference to any bid.

**1.10 ALTERNATES**

- A. Refer to Section 01 23 00 for additional information in reference to Alternates.

**1.11 SUBMISSION OF BIDS**

- A. The Bid Form shall be properly executed and enclosed with Bid Deposit (equal to 5% of the value of the total bid) in a sealed envelope. Sealed envelope shall be plainly marked on the outside with the following information:

#23-21 Police Headquarters Boiler Replacement  
Arlington, MA.

\_\_\_\_\_  
(Name of Bidder)

\_\_\_\_\_  
(Address of Bidder)

- B. If Bid is mailed, the above-required envelope shall be enclosed in a second envelope identified with the above markings and mailed to the place of bid opening, as stipulated in the Invitation for Bid. Mailed Bids must be received before the time scheduled for opening of bids.
- C. A bid deposit in the amount of five percent (5%) of the Bid amount shall be submitted with each Bid. Bid deposit shall be in the form of a) cash, b) a certified check on, or treasurer’s or cashier’s check issued by, a responsible bank or trust company and payable to Town of Arlington, or c) a bid bond in a form satisfactory to the Awarding Authority, with a surety company qualified to do business in the Commonwealth of Massachusetts, and conditioned upon faithful performance by the principal of the agreements contained in the Bid. Return of bid deposits will be in accordance with the provisions of the applicable Massachusetts General Laws.

**1.12 PAYMENT BOND**

- A. The Payment Bond required of the Contractor shall be in the amount of 50% of the Contract Sum from a surety company qualified to do business under the laws of the Commonwealth of Massachusetts and in a form satisfactory to the Awarding Authority.

**1.13 FOREIGN CORPORATIONS**

- A. The attention of bidders is called to the General Laws, Chapter 30, Section 39L, as amended by The Acts of 1967, Chapter 3, under which the Awarding Authority may not enter into a contract with a foreign corporation (a corporation not organized under the Laws of

Massachusetts), nor approve a foreign corporation as a contractor, unless the foreign corporation has filed with the Awarding Authority a certificate by the State Secretary stating that the foreign corporation has complied with General Laws, Chapter 181, Sections 3 and 5, and stating the date of such compliance.

#### **1.14 AWARD OF CONTRACT**

- A. The Contract will be awarded to the lowest responsible, competent and eligible bidder in accordance with Massachusetts General Laws.
- B. The Awarding Authority reserves the right to reject general bids in accordance with the provisions of Massachusetts General Laws.
- C. In addition, the Awarding Authority may consider informal and may reject any bid which is not prepared and submitted in accordance with all requirements of the bid documents, or which contains erasures, alterations, additions, errors or irregularities of any kind, or which contains proposed prices for any class or item of work which are, in the judgment of the Awarding Authority, substantially less or more than the actual cost to complete the work; provided, however, that the Awarding Authority reserves the right to waive any and all informalities as to form. Matters as to substance shall not be waived. Subject to the provisions of applicable laws, if the bid forms, specifications, or any other bid documents require submission of special information or data to accompany bids for any trade, if applicable, and any bidder neglects to furnish such information or data with its bid, the Awarding Authority may reject the bid of such bidder as incomplete; provided, however, that the Awarding Authority reserves the right to deem any such omission as an informality for which such bid will not be rejected, and to subsequently receive such information or data prior to award of the contract. See Section 3.00 above as to the Awarding Authority's right to reject the bid of any bidder who is not qualified, competent and responsible.

#### **1.15 COMMENCEMENT AND COMPLETION OF WORK**

- A. The successful bidder, upon execution of the Contract Agreement, which may constitute as Notice to Proceed unless specifically indicated by Awarding Authority otherwise, shall commence the work of the Contract within seven (7) calendar days. Thereafter the Contractor shall diligently and continuously carry on the work in such manner as to substantially complete the work as stipulated in the Invitation for Bid.

#### **1.16 LIQUIDATED DAMAGES**

- A. Liquidated damages for not completing the work within the time limit specified herein will be assessed by the Owner. Liquidated damages will be in the amount of \$100 per day. The liquidated damages amount is a minimum damage figure to compensate the Owner for administrative costs and loss or delay of its use of the project, and for added Owner's Project Manager, Engineer and consultant fees, and does not limit in any way the liability of the Contractor for damages in excess of the specified liquidated damages amount for other damages, in particular, damages for breach of Contract. It is expressly understood that such liquidated damages do not constitute a penalty.

#### **END OF DOCUMENT**

\*\*\*

**END OF SECTION**

**FORM FOR GENERAL BID**

To the Awarding Authority:

A. The Undersigned proposes to furnish all labor and materials required for

\_\_\_\_\_ (project)

in Arlington, Massachusetts, in accordance with the accordance with the accompanying plans and specifications prepared by

\_\_\_\_\_ (designer)

for the contract price specified below, subject to additions and deductions according to the terms of the specifications.

B. This bid includes addenda numbered \_\_\_\_\_

C. The proposed contract price is

\_\_\_\_\_ dollars

(\$ \_\_\_\_\_).

For Alternate No. \_\_\_\_\_ Add \$ \_\_\_\_\_; Subtract \$ \_\_\_\_\_

D. The undersigned agrees that if he is selected as general contractor, he will, within five days, Saturdays, Sundays and legal holidays excluded, after presentation thereof by the Awarding Authority, execute a contract in accordance with the terms of this bid and furnish a labor and materials or payment bond of a surety company qualified to business under the laws of the commonwealth and satisfactory to the Awarding Authority and in the sum of 50% of the contract price, the premium for which is to be paid by the general contractor and is included in the contract price; provided, however, that if there is more than one surety company, the surety companies shall be jointly and severally liable.

Name of General Bidder \_\_\_\_\_



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; that all employees to be employed at the worksite will have successfully completed a course in construction safety and health approved by the United States Occupational Safety and Health Administration that is at least 10 hours in duration at the time the employee begins work and who shall furnish documentation of successful completion of said course with the first certified payroll report for each employee; and that he will comply fully with all laws and regulations applicable to awards made subject to section forty-four A of chapter one hundred forty-nine of the General Laws.

The undersigned further certifies under the penalties of perjury that this bid is in all respects bona fide, fair, and made without collusion or fraud with any other person. As used in this subsection the word "person" shall mean any natural person, joint venture, partnership, corporation or other business or legal entity. The undersigned further certifies under penalty of perjury that the said undersigned is not presently debarred from doing public construction in the commonwealth under the provisions of section twenty-nine F of chapter twenty-nine, or any other applicable debarment provisions of any other chapter of the General Laws or any rule or regulation promulgated thereunder.

Date \_\_\_\_\_ BY: \_\_\_\_\_  
 (Signature of Authorized Individual)

\_\_\_\_\_  
 (Name of General Bidder)

\_\_\_\_\_  
 (Name of Person Signing Bid and Title)

\_\_\_\_\_  
 (Business Address)

\_\_\_\_\_  
 (City, State, Zip Code)

\_\_\_\_\_  
 (Business Telephone/FAX)

\_\_\_\_\_  
 (Business Email Address)

**CERTIFICATE OF NON-COLLUSION**

**TOWN OF ARLINGTON**

The undersigned certifies under penalties of perjury that this bid or proposal has been made and submitted in good faith and without collusion or fraud with any other person. As used in this certification the word "person" shall mean any natural person, business, partnership, corporation, union, committee, club, or other organization, entity, or group of individuals.

\_\_\_\_\_  
Signature of Individual Submitting Bid or Proposal

\_\_\_\_\_  
Name of Individual Submitting Bid or Proposal

\_\_\_\_\_  
Name of Business

\_\_\_\_\_  
Date

**THIS NON-COLLUSION FORM MUST BE SIGNED AND SUBMITTED  
WITH THE BID OR PROPOSAL.**

**CERTIFICATE OF TAX COMPLIANCE**

**TOWN OF ARLINGTON**

Pursuant to MGL Chapter 62C, Section 49A, I certify under the penalties of perjury that I have complied with all laws of the Commonwealth of Massachusetts relating to taxes, reporting of employees and contractors, and withholding and remitting child support.

\_\_\_\_\_  
Social Security Number or  
Federal Identification Number

\_\_\_\_\_  
Signature and Title of Individual or  
Responsible Corporate Officer

**STATEMENT OF BIDDER'S QUALIFICATIONS**

Please type or print legibly. If necessary, add additional sheets for starred items. This information will be utilized by the Town of Arlington for purposes of determining bidder responsiveness and responsibility with regard to the requirements and specifications of this contract.

**This form must be attached by the bidder to the completed bid form.**

1. Firm name \_\_\_\_\_

2. Number of years bidder has done business under its present name \_\_\_\_\_

\*3. Has the bidder ever failed to complete a contract awarded to her/him?

\_\_\_ YES \_\_\_ NO

If yes, where and why \_\_\_\_\_

\_\_\_\_\_

\*4. List all work the bidder has completed within the past 5 years that is comparable in scope, complexity and value to that of the work of this contract. Bidder must list a **minimum of three** such projects.

**Project Name/Location** \_\_\_\_\_

Owner Name/Address \_\_\_\_\_

Contract Value \_\_\_\_\_ Date Completed \_\_\_\_\_

Type of Work \_\_\_\_\_

Contact Person \_\_\_\_\_ Telephone No. \_\_\_\_\_

**Project Name/Location** \_\_\_\_\_

Owner Name/Address \_\_\_\_\_

Contract Value \_\_\_\_\_ Date Completed \_\_\_\_\_

Type of Work \_\_\_\_\_

Contact Person \_\_\_\_\_ Telephone No. \_\_\_\_\_

**Project Name/Location** \_\_\_\_\_

Owner Name/Address \_\_\_\_\_

Contract Value \_\_\_\_\_ Date Completed \_\_\_\_\_

Type of Work \_\_\_\_\_

Contact Person \_\_\_\_\_ Telephone No. \_\_\_\_\_

**Project Name/Location** \_\_\_\_\_

Owner Name/Address \_\_\_\_\_

Contract Value \_\_\_\_\_ Date Completed \_\_\_\_\_

Type of Work \_\_\_\_\_

Contact Person \_\_\_\_\_ Telephone No. \_\_\_\_\_

**Project Name/Location** \_\_\_\_\_

Owner Name/Address \_\_\_\_\_

Contract Value \_\_\_\_\_ Date Completed \_\_\_\_\_

Type of Work \_\_\_\_\_

Contact Person \_\_\_\_\_ Telephone No. \_\_\_\_\_

**Project Name/Location** \_\_\_\_\_

Owner Name/Address \_\_\_\_\_

Contract Value \_\_\_\_\_ Date Completed \_\_\_\_\_

Type of Work \_\_\_\_\_

Contact Person \_\_\_\_\_ Telephone No. \_\_\_\_\_

**SECTION 000006  
TOWN OF ARLINGTON - GENERAL CONTRACT**

THE TOWN OF ARLINGTON, a municipal corporation of the Commonwealth of Massachusetts, acting through its Town Manager, and

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(The Contractor) hereby mutually agree as follows:

**ARTICLE I – THE CONTRACT DOCUMENTS**

The Contract Documents, as defined in the CONSOLIDATED GENERAL CONDITIONS and SUPPLEMENTAL STATUTORY CONDITIONS, including said CONSOLIDATED GENERAL CONDITIONS and SUPPLEMENTAL STATUTORY CONDITIONS, are hereby incorporated by reference and made a part hereof, and shall include Addenda and Alternates, if any.

**ARTICLE II – GENERAL DESCRIPTION OF THE WORK**

The Contractor shall furnish all of the materials and perform all of the Work required by the Contract Documents entitled **Bid #23-21 Police Headquarters – Boiler Replacement, Arlington, MA**, prepared by Trinidad Engineering, acting as, and in these Contract Documents entitled, the Engineer.

**ARTICLE III – COMMENCEMENT AND COMPLETION OF WORK AND LIQUIDATED DAMAGES**

It is agreed that time is of the essence of this Contract.

The Contractor shall commence work only upon the execution of this Contract by the Town of Arlington by its Town Manager, the certification of the availability of the appropriation by the Town Comptroller, approval as to form by the Town Counsel, and upon issuance of a Notice to Proceed, and shall bring the Work to Substantial Completion by **August 3, 2023**, and to Final Completion within 15 calendar days thereafter. Liquidated damages in the amount of **\$100.00** per calendar day will be applicable after the date of Substantial Completion for which the project is not substantially complete, and for each day after the date of Final Completion for which the project is not finally complete, and otherwise in accordance with the provisions of the CONSOLIDATED GENERAL CONDITIONS and SUPPLEMENTARY STATUTORY CONDITIONS. The liquidated damages amount per calendar day is a minimum damage figure to compensate the Owner for administrative costs and loss or delay of its use of the building and site, and does not limit in any way the liability of the Contractor for damages in excess of the specified liquidated damages amount for other damages, for example, damages for breach of Contract, and added architect and consultant fees. It is expressly understood that such

liquidated damages do not constitute a penalty. All work shall be phased (if applicable) in accordance with the Contract Documents.

NOTE: NOTWITHSTANDING ANYTHING TO THE CONTRARY, THE TIME OF COMMENCEMENT SHALL ONLY BE BY WRITTEN NOTICE TO PROCEED WITH THE WORK AS DATED AND ISSUED TO THE CONTRACTOR BY THE TOWN OF ARLINGTON. NOTICE TO PROCEED MAY BE GIVEN ANYTIME AFTER THE AWARD OF THE CONTRACT, BUT NOT LATER THAN 14 DAYS AFTER THE EXECUTION OF THE CONTRACT.

**ARTICLE IV – COMPENSATION TO BE PAID BY TOWN**

The Town shall pay and the Contractor shall accept, as full compensation for everything furnished, done by or resulting to the Contractor in carrying out this Contract, subject to additions and deductions in the Contract Documents in the sum of:

\_\_\_\_\_ \$ \_\_\_\_\_

**ARTICLE V – AVAILABILITY OF APPROPRIATION**

This Contract is subject to an appropriation being available therefor.

This Contract is executed by the Town of Arlington and by the Contractor as of this \_\_\_\_\_ day of \_\_\_\_\_, **2023**.

**CONTRACTOR**

**FOR TOWN OF ARLINGTON**

\_\_\_\_\_  
Signature of Authorized Individual

\_\_\_\_\_  
Sanford Pooler, Town Manager

\_\_\_\_\_  
Name

Approved as to Form

\_\_\_\_\_  
Title

\_\_\_\_\_  
Douglas Heim, Town Counsel

\_\_\_\_\_  
Firm/Company Name

Certification of Funds

*(Affix Corporate Seal Here, if applicable)*

\_\_\_\_\_  
Ida Cody, Comptroller

#

PAYMENT BOND

Bond No. \_\_\_\_\_

KNOW ALL PERSONS BY THESE PRESENT, that we \_\_\_\_\_ with a place of business at \_\_\_\_\_ as principal (the "Principal"), and \_\_\_\_\_, a corporation qualified to do business in the Commonwealth of Massachusetts, with a place of business at \_\_\_\_\_ as Surety (the "Surety"), are held and firmly bound unto Town of Arlington as Obligee (the "Obligee"), in the sum of

\_\_\_\_\_ lawful money of the United States of America, to be paid to the Obligee, for which payment, well and truly to be made, we bind ourselves, our respective heirs, executors, administrators, successors and assigns, jointly and severally, firmly by these present.

WHEREAS, the Principal has assumed and made a contract with the Obligee, bearing the date of \_\_\_\_\_, for the \_\_\_\_\_.

NOW, THE CONDITIONS of this obligation are such that if the Principal and all subcontractors under said contract shall pay for all labor performed or furnished and for all materials used or employed in said contract and in any and all duly authorized modifications, alterations, extensions of time, changes or additions to said contract that may hereafter be made, notice to the Surety of such modifications, alterations, extensions of time, changes or additions being hereby waived, the foregoing to include any other purposes or items set out in, and to be subject to, the provisions of Massachusetts General Laws, Chapter 30, Section 39A, and Chapter 149, Section 29, as amended then this obligation shall become null and void; otherwise, it shall remain in full force and virtue.

IN WITNESS WHEREFORE, the Principal and Surety have hereto set their hands and seals this \_\_\_\_\_ day of \_\_\_\_\_, 2023.

PRINCIPAL

SURETY

\_\_\_\_\_

\_\_\_\_\_

[Name and Seal]

[Attorney-In-Fact][Seal]

[Title]

[Address]

[Phone]

Attest: \_\_\_\_\_

Attest: \_\_\_\_\_

The rate for this Bond is \_\_\_\_\_ % of the first \$ \_\_\_\_\_ and \_\_\_\_\_ % for the next \$ \_\_\_\_\_.

The total premium for this Bond is \$ \_\_\_\_\_.

END OF PAYMENT BOND

CONSOLIDATED GENERAL CONDITIONS  
OF THE CONTRACT FOR CONSTRUCTION

ARTICLE 1

GENERAL PROVISIONS

1.1 BASIC DEFINITIONS

1.1.1 THE CONTRACT DOCUMENTS

The Contract Documents consist of the Agreement between Owner and Contractor (hereinafter the Agreement), the Consolidated General Conditions of the Contract for Construction, the Supplemental Statutory Conditions, Drawings, Specifications, including all numbered sections, Addenda issued prior to execution of the Contract, Instructions to Bidders and Proposal, other documents listed in the Agreement, and Modifications issued after execution of the Contract. A Modification is (1) a written amendment to the Contract signed by both parties, (2) a Change Order, (3) a Construction Change Directive or (4) a written order for a minor change in the Work issued by the Architect. Unless specifically enumerated in the Agreement, the Contract Documents do not include other documents such as bidding requirements (advertisement or invitation to bid, Instructions to Bidders, sample forms, the Contractor's bid or portions of addenda relating to bidding requirements).

In the event of any conflict among the Contract Documents, the Documents shall be construed according to the following priorities:

Highest Priority:	Modifications
Second Priority:	Agreement
Third Priority:	Addenda--later date to take precedence
Fourth Priority:	Supplemental Statutory Conditions
Fifth Priority:	Consolidated General Conditions
Sixth Priority:	Specifications and Drawings
Seventh Priority:	Instructions to Bidders and Proposal

Any references throughout the contract documents (or any other project documents) to "General Conditions" or "Supplementary General Conditions" are deleted and "Consolidated General Conditions and Supplemental Statutory Conditions" is substituted therefor. All bidders and sub-bidders take note that the Town has consolidated and modified former versions of the standard form AIA Document A210 General Conditions of the Contract for Construction with the Town's desired Supplementary General Conditions into one document. The Supplemental Statutory Conditions remain intact and separate, and form a part of the Contract Documents.



### 1.1.2 THE CONTRACT

The Contract Documents form the Contract for Construction. The Contract represents the entire and integrated agreement between the parties hereto and supersedes prior negotiations, representations or agreements, either written or oral. The Contract may be amended or modified only by a Modification. Except as provided in Paragraph 3.18, nothing contained in the Contract Documents shall be construed to create any contractual relationship (1) between the Architect and the Contractor, (2) between the Owner or the Architect and a Subcontractor or Sub-subcontractor, (3) between the Owner and the Architect, or (4) between any persons or entities other than the Owner and the Contractor. The Contract Documents shall comply with the requirements of Mass. Gen. Laws Chapter 44, Section 31C.

### 1.1.3 THE WORK

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

### 1.1.4 THE PROJECT

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

### 1.1.5 THE DRAWINGS

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

### 1.1.6 THE SPECIFICATIONS

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

### 1.1.7 THE PROJECT MANUAL

The Project Manual is the volume usually assembled for the work which may include the bidding requirements, sample forms, Consolidated General Conditions of the Contract and Specifications.

## 1.2 EXECUTION, CORRELATION AND INTENT

1.2.1 The Contract Documents shall be signed by the Owner and Contractor as provided in the Agreement. A copy of the signed set shall be deposited with the Architect. If either the Owner or Contractor or both do not sign all the Contract Documents, the Architect shall identify such unsigned Documents upon request.

1.2.2 Execution of the Contract by the Contractor is a representation that the Contractor has visited the site, become familiar with local conditions under which the Work is to be performed, and correlated personal observations with requirements of the Contract Documents. By executing the Contract, the Contractor also certifies, under penalties of perjury, that to the best of his information, knowledge and belief he has complied with all laws of the Commonwealth of Massachusetts relating to taxes.

1.2.3 The intent of the Contract Documents is to include all items necessary for the proper execution and completion of the Work by the Contractor. The Contract Documents are complementary, and what is required by one shall be as binding as if required by all; performance by the Contractor shall be required only to the extent consistent with the Contract Documents and reasonably inferable from them as being necessary to produce the intended results. All Work mentioned or indicated in the Contract Documents shall be performed by the Contractor as part of this Contract unless it is specifically indicated in the Contract Documents that such Work is to be done by others.

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

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

1.2.6 Where codes, standards, requirements and publications of public and private bodies are referred to in the Specifications, references shall be understood to be to the latest revisions prior to the date of receiving bids, except where otherwise indicated.

1.2.7 Where no explicit quality or standards for materials or workmanship are established for Work, such Work or materials is to be of good, workmanlike quality for the intended use and consistent with the quality of the surrounding Work and of the construction of the Project generally.

1.2.8 All manufactured articles, materials, and equipment shall be applied, installed, connected, erected, used, cleaned, and conditioned in accordance with the manufacturer's written or printed directions and instructions unless otherwise indicated in the Contract Documents.

1.2.9 The Mechanical, Electrical and Fire Protection Drawings are diagrammatic only, and are not intended to show the alignment, physical locations or configurations of such Work.

Such Work shall be installed without additional cost to the Owner to clear all obstructions, permit proper clearances for the Work of other trades, and present an orderly appearance where exposed. Prior to beginning such Work, the Contractor shall prepare coordination drawings showing the exact alignment, physical location and configuration of the Mechanical, Electrical and Fire Protection installations and demonstrating to the Contractor's satisfaction that the installations will comply with the preceding sentence.

1.2.10 Exact locations of fixtures and outlets shall be obtained from the Architect as provided in Subparagraph 3.2.5 before the Work is roughed in; Work installed without such information from the Architect shall be relocated at the Contractor's expense.

1.2.11 Test boring or soil test information included with the Contract Documents or otherwise made available to the Contractor was obtained by the Owner for use by the Architect in the design of the Project or Work. The Owner does not hold out such information to the Contractor as an accurate or approximate indication of subsurface conditions, and no claim for extra cost or extension of time resulting from a reliance by the Contractor on such information shall be allowed except as provided in Subparagraph 4.3.6.

### 1.3 OWNERSHIP AND USE OF ARCHITECT'S DRAWINGS, SPECIFICATIONS AND OTHER DOCUMENTS

1.3.1 The Drawings, Specifications and other documents prepared by the Architect are instruments of the Architect's service through which the Work to be executed by the Contractor is described. The Contractor may retain one contract record set. Neither the Contractor nor any Subcontractor, Sub-subcontractor or material or equipment supplier shall own or claim a copyright in the Drawings, Specifications and other documents prepared by the Architect, and unless otherwise indicated, and except as provided in the Owner/Architect Agreement for the Project, the Architect shall be deemed the author of them and will retain all common law, statutory and other reserved rights, in addition to the copyright. All copies of them, except the Contractor's record set, shall be returned or suitably accounted for to the Architect, on request, upon completion of the Work. The Drawings, Specifications and other documents prepared by the Architect, and copies thereof furnished to the Contractor, are for use solely with respect to this Project. They are not to be used by the Contractor or any Subcontractor, Sub-subcontractor or material or equipment supplier on other projects or for additions to this Project outside the scope of the Work without the specific written consent of the Owner and Architect. The Contractor, Subcontractors, Sub-subcontractors and material or equipment suppliers are granted a limited license to use and reproduce applicable portions of the Drawings, Specifications and other documents prepared by the Architect appropriate to and for use in the execution of their Work under the Contract Documents. All copies made under this license shall bear the statutory copyright notice, if any, shown on the Drawings, Specifications and other documents prepared by the Architect. Submittal or distribution to meet official regulatory requirements or for other purposes in connection with this Project is not to be construed as publication in derogation of the Architect's copyright or other reserved rights.

Notwithstanding anything herein to the contrary, as between the Owner and Architect, their rights and obligations with respect to the Architect's instruments of service are governed by the provisions of the Owner/Architect Agreement for the Project.

#### 1.4 CAPITALIZATION

1.4.1 Terms capitalized in these General Conditions include those which are (1) specifically defined, (2) the titles of numbered articles and identified references to Paragraphs, Subparagraphs and Clauses in a document or (3) the titles of documents published by the American Institute of Architects.

#### 1.5 INTERPRETATION

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

### ARTICLE 2

#### OWNER

#### 2.1 DEFINITIONS

2.1.1 The Owner is the person or entity identified as such in the Agreement and is referred to throughout the Contract Documents as if singular in number. From time to time herein the Owner is referred to as the Town.

2.1.2 The Project Manager is the person or entity identified as such in writing by the Owner, at the Owner's option. The Project Manager shall act as the Owner's representative with respect to all matters pertaining to the Project. The duties, responsibilities, and obligations of the Project Manager under this Contract may be modified from time to time by the Town, so long as such modifications do not interfere materially with the Contractor's performance of the Work hereunder, and so long as the Contractor is given notice of any such modifications that affect the Contractor's performance of the Work.

#### 2.2 INFORMATION AND SERVICES REQUIRED OF THE OWNER

2.2.1 The Owner upon reasonable written request shall furnish to the Contractor in writing information which is necessary and relevant for the Contractor to evaluate, give notice of, or enforce mechanic's lien rights. Such information shall include a correct statement of the record legal title to the property on which the Project is located, usually referred to as the site, and the Owner's interest therein at the time of execution of the Agreement.

2.2.2 The Owner shall furnish surveys describing physical characteristics, legal limitations and utility locations for the site of the Project, and a legal description of the site.

2.2.3 Except for permits and fees which are the responsibility of the Contractor under the Contract Documents, the Owner shall secure and pay for necessary approvals, easements, assessments and charges required for construction, use or occupancy of permanent structures, or for permanent changes in existing facilities.

2.2.4 Information or services required of the Owner hereunder shall be furnished by the Owner with reasonable promptness after receipt from the Contractor of a written request for such information or services.

2.2.5 Unless otherwise provided in the Contract Documents, the Contractor will be furnished, free of charge, such copies of Drawings and Project Manuals as are reasonably necessary for execution of the Work.

2.2.6 The foregoing are in addition to other duties and responsibilities of the Owner enumerated herein and especially those in respect to Article 6 (Construction by Owner or by Separate Contractors), Article 9 (Payments and Completion) and Article 11 (Insurance and Bonds).

### 2.3 OWNER'S RIGHT TO STOP THE WORK

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

2.3.2 The Owner may order the Contractor in writing to suspend, delay, or interrupt all or any part of the Work for such period of time as it may determine to be appropriate for the convenience of the Owner; provided however, that if there is a suspension, delay or interruption ordered by the Owner for fifteen days or more or due to a failure of the Owner to act within the time specified in this Contract, the Owner shall make an adjustment in the Contract Sum for any increase in the cost of performance of this Contract, but shall not include any profit to the Contractor on such increase; and provided further, that the Owner shall not make any adjustment in the Contract Sum under this provision for any suspension, delay, interruption or failure to act to the extent that such is due to any cause for which this Contract provides for an equitable adjustment of the Contract Sum under any other contract provisions.

2.3.3 The Contractor must submit the amount of a claim under Subparagraph 2.3.2 to the Owner in writing as soon as practicable after the end of the suspension, delay, interruption or failure to act and, in any event, not later than 21 days after the end thereof. Except for costs due to a suspension order, the Owner shall not approve any costs in the claim incurred more than twenty days before the Contractor notified the Owner in writing of the act or failure to act involved in the claim.

## 2.4 OWNER'S RIGHT TO CARRY OUT THE WORK

2.4.1 If the Contractor defaults or neglects to carry out the Work in accordance with the Contract Documents and fails within a seven-day period after receipt of written notice from the Owner to begin and prosecute correction of such default or neglect with diligence and promptness, the Owner may, without prejudice to other remedies the Owner may have, correct such deficiencies. In such case an appropriate Construction Change Directive shall be issued deducting from payments then or thereafter due the Contractor the cost of correcting such deficiencies, including compensation for the Architect's additional services and expenses made necessary by such default, neglect or failure. If payments then or thereafter due the Contractor are not sufficient to cover such amounts, the Contractor shall pay the difference to the Owner.

## ARTICLE 3

### CONTRACTOR

#### 3.1 DEFINITION

3.1.1 The Contractor is the person or entity identified as such in the Agreement and is referred to throughout the Contract Documents as if singular in number. The term "Contractor" means the Contractor or the Contractor's authorized representative.

#### 3.2 REVIEW OF CONTRACT DOCUMENTS AND FIELD CONDITIONS BY CONTRACTOR

3.2.1 Before starting the Work, and at frequent intervals during the progress thereof, the Contractor shall carefully study and compare the Contract Documents with each other and with any information furnished by the Owner pursuant to Subparagraph 2.2.2 and shall at once report to the Architect any error, inconsistency or omission the Contractor may discover. Any necessary change shall be ordered as provided in Article 7, subject to the requirements of Paragraph 1.2 and other provisions of the Contract Documents. If the Contractor proceeds with the Work without such notice to the Architect, having discovered such errors, inconsistencies or omissions, or if by reasonable study of the Contract Documents the Contractor could have discovered such, the Contractor shall bear all costs arising therefrom.

3.2.2 The Contractor shall take field measurements and verify field conditions and shall carefully compare such field measurements and conditions and other information known to the Contractor with the Contract Documents before commencing activities. Errors, inconsistencies or omissions discovered shall be reported to the Architect at once. Any necessary change shall be ordered as provided in Article 7, subject to the requirements of Paragraph 1.2 and other provisions of the Contract Documents. If the Contractor proceeds with the Work without such notice to the Architect, having discovered such errors, inconsistencies or omissions, the Contractor shall bear all costs arising therefrom.

3.2.3 The Contractor shall perform the Work in accordance with the Contract Documents and any submittals made in accordance with Paragraph 3.12.

3.2.4 The Contractor shall give the Architect timely notice of any additional Drawings, Specifications, or instructions required to define the Work in greater detail, or to permit the proper progress of the Work.

3.2.5 The Contractor shall not proceed with any Work not clearly and consistently defined in detail in the Contract Documents, but shall request additional drawings or instructions from the Architect as provided in Subparagraph 3.2.4. If the Contractor proceeds with such Work without obtaining further Drawings, Specifications or instructions, the Contractor shall correct Work incorrectly done at the Contractor's own expense.

### 3.3 SUPERVISION AND CONSTRUCTION PROCEDURES

3.3.1 The Contractor shall supervise and direct the Work, using the Contractor's best skill and attention. The Contractor shall be solely responsible for, and have control over construction means, methods, techniques, sequences and procedures and for coordinating all portions of the Work under the Contract. Where the Contract Documents refer to particular construction means, methods, techniques, sequences or procedures or indicate or imply that such are to be used in the Work, such mention is intended only to indicate that the operations of the Contractor shall be such as to produce at least the quality of work implied by the operations described, but the actual determination of whether or not the described operations may be safely and suitably employed on the Work shall be the responsibility of the Contractor, who shall notify the Architect in writing of the actual means, methods, techniques, sequences or procedures which will be employed on the Work, if these differ from those mentioned in the Contract Documents. All loss, damage, liability, or cost of correcting defective work arising from the employment of any construction means, methods, techniques, sequences or procedures shall be borne by the Contractor, notwithstanding that such construction means, methods, techniques, sequences or procedures are referred to, indicated or implied by the Contract Documents, unless the Contractor has given timely notice to the Owner and Architect in writing that such means, methods, techniques, sequences or procedures are not safe or suitable, and the Owner has then instructed the Contractor in writing to proceed at the Owner's risk.

3.3.2 The Contractor shall be responsible to the Owner for acts and omissions of the Contractor's employees, Subcontractors and their agents and employees, and other persons performing portions of the Work under a contract with the Contractor.

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

3.3.4 The Contractor shall be responsible for inspection of portions of Work already performed under this Contract to determine that such portions are in proper condition to receive subsequent Work.

### 3.4 LABOR AND MATERIALS

3.4.1 Unless otherwise provided in the Contract Documents, the Contractor shall provide and pay for labor, materials, equipment, tools, construction equipment and machinery, water, heat, utilities, transportation, and other facilities and services necessary for proper execution and completion of the Work, whether temporary or permanent and whether or not incorporated or to be incorporated in the Work. The word “provide” shall mean furnish and install completely, including connections, unless otherwise specified.

3.4.2 The Contractor shall enforce strict discipline and good order among the Contractor’s employees and other persons carrying out the Contract. The Contractor shall not permit employment of unfit persons or persons not skilled in tasks assigned to them.

### 3.5 WARRANTY

3.5.1 The Contractor warrants to the Owner and Architect that materials and equipment furnished under the Contract will be of good quality and new unless otherwise required or permitted by the Contract Documents, that the Work will be free from defects not inherent in the quality required or permitted, and that the Work will conform with the requirements of the Contract Documents. Work not conforming to these requirements, including substitutions not properly approved and authorized, may be considered defective. The Contractor’s warranty excludes remedy for damage or defect occurring after Substantial Completion and caused by abuse, modifications not executed by the Contractor, improper or insufficient maintenance, improper operation, or normal wear and tear under normal usage.

3.5.2 The Contractor shall be responsible for determining that all materials furnished for the Work meet all requirements of the Contract Documents. The Architect may require the Contractor to produce reasonable evidence that a material meets such requirements, such as certified reports of past tests by qualified testing laboratories, reports of studies by qualified experts, or other evidence which, in the opinion of the Architect, would lead to a reasonable certainty that any material used, or proposed to be used in the Work, meets the requirements of the Contract Documents. All such data shall be furnished at the Contractor’s expense. This provision shall not require the Contractor to pay for periodic testing of different batches of the same material, unless such testing is specifically required by the Contract Documents to be performed at the Contractor’s expense.

3.5.3 If the Contractor proposes to use a material which, while suitable for the intended use, deviates in any way from the detailed requirements of the Contract Documents, the Contractor shall inform the Architect in writing of the nature of such deviations at the time the material is submitted for approval, and shall request written approval of the deviation from the requirements of the Contract Documents, in accordance with the procedures set forth in Mass. Gen. Laws Chapter 30, Section 39I.

3.5.4 In requesting approval of deviations or substitutions, the Contractor shall provide, upon request, evidence leading to a reasonable certainty that the proposed substitution or



deviation meets or exceeds the requirements set forth in Mass. Gen. Laws Chapter 30, Section 39M(b). If, in the opinion of the Architect, the evidence presented by the Contractor does not provide a sufficient basis for such reasonable certainty, the Architect may reject such substitution or deviation.

3.5.5 The Contract Documents are intended to produce a building of consistent character and quality of design. All components of the building including visible items of mechanical and electrical equipment have been selected to have a coordinated design in relation to the overall appearance of the building. The Architect shall judge the design and appearance of proposed substitutes on the basis of their suitability in relation to the overall design of the Project, as well as for their intrinsic merits. The Architect will not approve as equal to materials specified proposed substitutes which, in the Architect's opinion, would be out of character, obtrusive, or otherwise inconsistent with the character or quality of design of the Project. In order to permit coordinated design of color and finishes the Contractor shall, if required by the Architect, furnish the substituted material in any color, finish, texture, or pattern which would have been available from the manufacturer originally specified, at no additional cost to the Owner.

3.5.6 Any additional cost, or any loss or damage arising from the substitution of any material or any method for those originally specified shall be borne by the Contractor, notwithstanding approval or acceptance of such substitution by the Owner or the Architect, unless such substitution was made at the written request or direction of the Owner or the Architect.

3.5.7 The warranty provided in this paragraph 3.5 shall be in addition to and not in limitation of any other warranty required by the Contract Documents or otherwise prescribed by law.

3.5.8 The Contractor shall procure and deliver to the Architect, no later than the date claimed by the Contractor as the date of Substantial Completion, all special warranties required by the Contract Documents. Delivery by the Contractor shall constitute the Contractor's guarantee to the Owner that the warranties shall be performed in accordance with their terms and conditions.

### 3.6 TAXES

3.6.1 The Contractor shall pay sales, consumer, use and similar taxes for the Work or portions thereof provided by the Contractor which are legally enacted when bids are received or negotiations concluded, whether or not yet effective or merely scheduled to go into effect.

### 3.7 PERMITS, FEES AND NOTICES

3.7.1 Unless otherwise provided in the Contract Documents, the Contractor shall secure and pay for the building permit and other permits and governmental fees, licenses and inspections necessary for proper execution and completion of the Work which are customarily secured after execution of the Contract and which are legally required when bids are received or

negotiations concluded. Notwithstanding the foregoing, the Town hereby waives the fee for the Town's building permit for the Project.

3.7.2 The Contractor shall comply with and give notices required by laws, ordinances, rules, regulations and lawful orders of public authorities bearing on performance of the Work.

3.7.3 It is not the Contractor's responsibility to ascertain that the Contract Documents are in accordance with applicable laws, statutes, ordinances, building codes, and rules and regulations. However, if the Contractor observes that portions of the Contract Documents are at variance therewith, the Contractor shall promptly notify the Architect and Owner in writing, and necessary changes shall be accomplished by appropriate Modification.

3.7.4 If the Contractor performs Work knowing it to be contrary to laws, statutes, ordinances, building codes, and rules and regulations without such notice to the Architect and Owner, the Contractor shall assume full responsibility for such Work and shall bear the attributable costs.

### 3.8 ALLOWANCES

3.8.1-3.8.2 OMITTED.

### 3.9 SUPERINTENDENCE

3.9.1 The Contractor shall employ a competent superintendent, acceptable to the Owner, and necessary assistants who shall be in attendance at the Project site full time during the progress of the Work until the date of Substantial Completion, and for such additional time thereafter as the Architect may determine to be necessary for the expeditious completion of the Work. The superintendent shall be licensed to act as superintendent in accordance with all applicable laws for projects of this type. The Contractor shall remove the superintendent if requested to do so in writing by the Owner, and shall promptly replace him with a competent person reasonably acceptable to the Owner. The superintendent shall represent the Contractor, and communications given to the superintendent shall be as binding as if given to the Contractor.

3.9.2 The Contractor shall retain a competent Registered Professional Engineer or Registered Land Surveyor, acceptable to the Architect, who shall establish the exterior lines and required elevations of all buildings and structures to be erected on the site and shall establish sufficient lines and grades for the construction of associated Work such as, but not limited to, roads, utilities and site grading. The Engineer or Land Surveyor shall certify as to the actual location of the constructed facilities in relation to property lines, building lines, easements, and other restrictive boundaries.

3.9.3 The Contractor shall establish the building grades, lines, levels, column, wall and partition lines required by the various Subcontractors in laying out their Work.

3.9.4 The Contractor shall coordinate and supervise the Work performed by Subcontractors to the end that the Work is carried out without conflict between trades and so that

no trade, at any time, causes delay to the general progress of the Work. If such delays occur, the Owner may deduct anticipated liquidated damages from the Progress Payments to the Contractor. The Contractor and all Subcontractors shall at all times afford each trade, any separate contractor, or the Owner, every reasonable opportunity for the installation of Work and the storage of materials.

### 3.10 CONTRACTOR'S CONSTRUCTION SCHEDULES

3.10.1 The Contractor shall prepare and submit to the Architect a progress schedule, and shall comply with such schedule, as described in Subparagraphs 8.2.4 through 8.2.8.

### 3.11 DOCUMENTS AND SAMPLES AT THE SITE

3.11.1 The Contractor shall maintain at the site for the Owner one record copy of the Drawings, Specifications, Addenda, Change Orders and other Modifications, in good order and marked currently to record changes and selections made during construction, and in addition approved Shop Drawings, Product Data, Samples and similar required submittals. These shall be available to the Architect and shall be delivered to the Architect for submittal to the Owner upon completion of the Work.

### 3.12 SHOP DRAWINGS, PRODUCT DATA AND SAMPLES

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

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

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

3.12.4 Shop Drawings, Product Data, Samples and similar submittals are not Contract Documents. The purpose of their submittal is to demonstrate for those portions of the Work for which submittals are required the way the Contractor proposes to conform to the information given and the design concept expressed in the Contract Documents. Review by the Architect is subject to the limitations of this Paragraph 3.12 and Paragraph 4.2.

3.12.5 The Contractor shall review, approve and submit to the Architect Shop Drawings, Product Data, Samples and similar submittals required by the Contract Documents with reasonable promptness, in accordance with the Contractor's progress schedule approved by the Architect, and in such sequence as to cause no delay in the Work or in the activities of the Owner or of separate contractors. Submittals made by the Contractor which are not required by the Contract Documents may be returned without action.

3.12.6 The Contractor shall perform no portion of the Work requiring submittal and review of Shop Drawings, Product Data, Samples or similar submittals until the respective submittal has been reviewed by the Architect. Such Work shall be in accordance with reviewed and approved submittals.

3.12.7 By approving and submitting Shop Drawings, Product Data, Samples, and similar submittals, the Contractor thereby represents that the Contractor has determined and verified all dimensions, quantities, field dimensions, relations to existing work, coordination with work to be installed later, coordination with information on previously accepted Shop Drawings, Product Data, Samples, or similar submittals and verification of compliance with all the requirements of the Contract Documents. The accuracy of all such information is the responsibility of the Contractor. In reviewing Shop Drawings, Product Data, Samples, and similar submittals the Architect shall be entitled to rely upon the Contractor's representation that such information is correct and accurate.

3.12.8 The Contractor shall not be relieved of responsibility for deviations from requirements of the Contract Documents by the Architect's review of Shop Drawings, Product Data, Samples or similar submittals unless the Contractor has specifically informed the Architect in writing of such deviation at the time of submittal and the Architect has given written approval to the specific deviation. The Contractor shall not be relieved of responsibility for errors or omissions in Shop Drawings, Product Data, Samples or similar submittals by the Architect's review thereof.

3.12.9 The Contractor shall direct specific attention, in writing or on resubmitted Shop Drawings, Product Data, Samples or similar submittals, to revisions other than those requested by the Architect on previous submittals. Unless such notice has been given, the Architect's review of a resubmitted Shop Drawing, Product Data, Sample, or similar submittal shall not constitute acceptance of any changes not requested on the prior submittal.

3.12.10 Informational submittals upon which the Architect is not expected to take responsible action may be so identified in the Contract Documents.

3.12.11 When professional certification of performance criteria of materials, systems or equipment is required by the Contract Documents, the Owner shall be entitled to rely upon such certifications, and neither the Owner nor the Architect shall be expected to make any independent examination with respect thereto.

3.12.12 The Architect will not check dimensions or quantities on any Shop Drawings and will not assume any responsibility for any errors in dimensions or quantities on Shop Drawings.

### 3.13 USE OF SITE

3.13.1 The right of possession of the premises and the improvements made thereon by the Contractor shall remain at all times in the Owner. The Contractor's right to entry and use thereof arises solely from the permission granted by the Owner under the Contract Documents. The Contractor shall confine the Contractor's apparatus, the storage of materials and the

operations of the Contractor's workers to limits indicated by law, ordinances, the Contract Documents and permits and/or directions of the Architect, and shall not unreasonably encumber the premises with the Contractor's materials. The Owner shall not be liable to the Contractor, the Subcontractors, their employees or anyone else with respect to the conditions of the premises, except only for a condition caused directly and solely by the negligence of the Owner.

### 3.14 CUTTING AND PATCHING

3.14.1 The Contractor and its Subcontractors shall be responsible for cutting, fitting or patching required to complete the Work or to make its parts fit together properly, all to be performed in accordance with the requirements of the Contract Documents.

3.14.2 The Contractor shall not damage or endanger a portion of the Work or fully or partially completed construction of the Owner or separate contractors by cutting, patching or otherwise altering such construction, or by excavation. The Contractor shall not cut or otherwise alter such construction by the Owner or a separate contractor except with written consent of the Owner and of such separate contractor; such consent shall not be unreasonably withheld. The Contractor shall not unreasonably withhold from the Owner or a separate contractor the Contractor's consent to cutting or otherwise altering the Work.

### 3.15 CLEANING UP

3.15.1 The Contractor daily shall keep the premises and surrounding area free from accumulation of waste materials or rubbish caused by operations under the Contract. At completion of the Work the Contractor shall remove from and about the Project waste materials, rubbish, the Contractor's tools, construction equipment, machinery and surplus materials. Immediately prior to the Architect's inspection for Substantial Completion, the Contractor shall completely clean the premises. Concrete and ceramic surfaces shall be cleaned and washed. Resilient coverings shall be cleaned, waxed and buffed. Woodwork shall be dusted and cleaned. Sash, fixtures and equipment shall be thoroughly cleaned. Stains, spots, dust, marks and smears shall be removed from all surfaces. Hardware and all metal surfaces shall be cleaned and polished. Glass and plastic surfaces shall be thoroughly cleaned by professional window cleaners. All damaged, broken or scratched glass or plastic shall be replaced by the Contractor at the Contractor's expense.

3.15.2 If the Contractor fails to clean up as provided in the Contract Documents, the Owner may do so and the cost thereof shall be charged to the Contractor.

3.15.3 The provisions of paragraphs 3.15.1 and 3.15.2 shall apply equally to all subcontractors at the project insofar as each subcontractor's work is concerned.

### 3.16 ACCESS TO WORK

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

### 3.17 ROYALTIES AND PATENTS

3.17.1 The Contractor shall pay all royalties and license fees. The Contractor shall defend suits or claims for infringement of patent rights and shall hold the Owner and Architect harmless from loss on account thereof, but shall not be responsible for such defense or loss when a particular design, process or product of a particular manufacturer or manufacturers is required by the Contract Documents. However, if the Contractor has reason to believe that the required design, process or product is an infringement of a patent, the Contractor shall be responsible for such loss unless such information is promptly furnished to the Architect.

### 3.18 INDEMNIFICATION

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

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

3.18.3 The obligations of the Contractor under this Paragraph 3.18 shall not extend to the liability of the Architect, the Architect's consultants, and agents and employees of any of them arising out of (1) the preparation of maps, Drawings, opinions, reports, surveys, Change Orders, designs or Specifications, or (2) directions or instructions given by the Architect, the Architect's consultants, and agents or employees of any of them.

### 3.19 COVENANT NOT TO SUE

3.19.1 In consideration of the Contractor's undertaking to indemnify and hold harmless the Architect, the Architect's consultants and agents or employees of any of them, in accordance with Paragraph 3.18, agree that the Architect will not bring any civil suit, action or other proceeding in law, equity or arbitration against the Contractor, or the officers, employees, agents and servants of the Contractor, for or on account of any action which the Architect may have arising out of or in any manner connected with the Work, except to enforce the provisions of

Paragraph 3.18 and this Paragraph 3.19; and the Contractor, or any successor, assign or subrogee of the Contractor, agrees not to bring any civil suit, action or other proceeding in law, equity or arbitration against the Architect, or the officers, employees, agents and servants of the Architect, for the enforcement of any action which the Contractor may have arising out of or in any manner connected with the Work.

### 3.20 RECORD KEEPING REQUIREMENTS

3.20.1 The Contractor shall comply with all applicable requirements of Mass. Gen. Laws Chapter 30, Section 39R.

## ARTICLE 4

### ADMINISTRATION OF THE CONTRACT

#### 4.1 ARCHITECT

4.1.1 The Architect is the person lawfully licensed to practice architecture or an entity lawfully practicing architecture identified as such in the Agreement and is referred to throughout the Contract Documents as if singular in number. The term "Architect" means the Architect or the Architect's authorized representative.

4.1.2 Duties, responsibilities and limitations of authority of the Architect as set forth in the Contract Documents shall not be restricted, modified or extended without written consent of the Owner, Contractor and Architect. Consent shall not be unreasonably withheld. To the extent inconsistent herewith, the rights and responsibilities of the Architect shall be governed by the Owner/Architect Agreement for the Project.

4.1.3 In case of termination of employment of the Architect, the Owner shall appoint an architect whose status under the Contract Documents shall be that of the former architect.

#### 4.2 ARCHITECT'S ADMINISTRATION OF THE CONTRACT

4.2.1 The Architect will provide administration of the Contract as described in the Contract Documents. The Architect will advise and consult with the Owner. The Architect will have authority to act on behalf of the Owner only to the extent provided in the Contract Documents, unless otherwise modified by written instrument in accordance with other provisions of the Contract.

4.2.2 The Architect will visit the site at intervals appropriate to the stage of construction to become generally familiar with the progress and quality of the completed Work and to determine in general if the Work is being performed in a manner indicating that the Work, when completed, will be in accordance with the Contract Documents. The Architect will visit the site at least once per week during periods of active construction. The Architect will not be required to make exhaustive or continuous on-site inspections to check quality or quantity of the Work. On the basis of on-site observations as an architect, the Architect will keep the Owner informed

of progress of the Work, and will endeavor to guard the Owner against defects and deficiencies in the Work.

4.2.3 The Architect will not have control over or charge of and will not be responsible for construction means, methods, techniques, sequences or procedures, or for safety precautions and programs in connection with the Work, since these are solely the Contractor's responsibility as provided in Paragraph 3.3. The Architect will not be responsible for the Contractor's failure to carry out the Work in accordance with the Contract Documents. The Architect will not be responsible for acts or omissions of the Contractor, Subcontractors, or their agents or employees, or of any other persons performing portions of the Work.

4.2.4 Communications Facilitating Contract Administration. Except as otherwise provided in the Contract Documents or when direct communications have been specially authorized, the Owner and Contractor shall endeavor to communicate through the Project Manager. Communications by and with the Architect's consultants shall be through the Architect. Communications by and with Subcontractors and material suppliers generally shall be through the Contractor, although the Owner and Project Manager may have direct communications with subcontractors and suppliers intended to facilitate or expedite construction. Communications by and with separate contractors shall be through the Owner.

As to any written communications between two of the three of the Owner, Architect, and Contractor, a concurrent copy shall be sent to the third.

4.2.5 The Architect will have authority to reject Work which does not conform to the Contract Documents. Whenever the Architect considers it necessary or advisable for implementation of the intent of the Contract Documents, the Architect will have authority to require additional inspection or testing of the Work in accordance with Subparagraphs 13.5.2 and 13.5.3, whether or not such Work is fabricated, installed or completed. However, neither this authority of the Architect nor a decision made in good faith either to exercise or not to exercise such authority shall give rise to a duty or responsibility of the Architect to the Contractor, Subcontractors, material and equipment suppliers, their agents or employees, or other persons performing portions of the Work.

4.2.6 In accordance with generally accepted standards of professional practice the Architect will review, approve, and take other appropriate action upon the Contractor's submittals such as Shop Drawings, Product Data and Samples, for the purpose of checking for conformance with the Contract Documents. The Architect's action will be taken with reasonable promptness, while allowing sufficient time in the Architect's professional judgment to permit adequate review, and in any event shall take no longer than the time permitted by law. Review of such submittals is not conducted for the purpose of determining the accuracy and completeness of other details such as dimensions and quantities, or for substantiating instructions for installation or performance of equipment or systems, all of which remain the responsibility of the Contractor as required by the Contract Documents. The Architect's review of the Contractor's submittals shall not relieve the Contractor of obligations set forth in Paragraphs 3.3, 3.5 and 3.12. The Architect's review shall not constitute approval of safety precautions or, unless otherwise specifically stated by the Architect, of any construction means, methods,



techniques, sequences or procedures. The Architect's action with respect to any specific item shall not indicate approval of an assembly of which the item is a component.

4.2.7 The Architect will prepare Change Orders and Construction Change Directives, and may authorize minor changes in the Work as provided in Paragraph 7.4.

4.2.8 The Architect will conduct inspections to determine the date or dates of Substantial Completion and the date of final completion, will receive and forward to the Owner for the Owner's review and records written warranties and related documents required by the Contract and assembled by the Contractor, and will issue a final Certificate for Payment upon compliance with the requirements of the Contract Documents.

4.2.9 If the Owner and Architect agree in writing, the Architect will provide one or more project representatives to assist in carrying out the Architect's responsibilities at the site. The duties, responsibilities and limitations of authority of such project representatives shall be as set forth in an exhibit to be incorporated in the Contract Documents. If no such exhibit has been so incorporated, the duties, responsibilities, and limitations of authority of such project representatives shall be as set forth in the edition of AIA Document B352 current as of the date of the Agreement.

4.2.10 The Architect will interpret and decide matters concerning performance under and requirements of the Contract Documents on written request of either the Owner or Contractor. The Architect's response to such requests will be made with reasonable promptness and within any time limits agreed upon. The Architect may, as the Architect judges desirable, issue additional drawings or instructions indicating in greater detail the construction or design of the various parts of the Work; such drawings or instructions may be effected by field order or other notice to the Contractor, and provided such drawings or instructions are reasonably consistent with the previously existing Contract Documents, the Work shall be executed in accordance with such additional drawings or instructions without additional cost or extension of the Contract Time. If the Contractor claims additional cost or time on account of such additional drawings or instructions, the Contractor shall give the notice provided in Subparagraph 4.3.7.

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

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

### 4.3 CLAIMS AND DISPUTES

4.3.1 Definition. A Claim is a demand or assertion by one of the parties seeking, as a matter of right, adjustment or interpretation of Contract terms, payment of money, extension of time or other relief with respect to the terms of the Contract. The term "Claim" includes Change

Order requests by the Contractor as well as other disputes and matters in question between the Owner and Contractor arising out of or relating to the Contract. Claims must be made by written notice. The responsibility to substantiate Claims shall rest with the party making the Claim.

4.3.2 Decision of Architect. Claims arising prior to final payment or the earlier termination of the Contract shall be referred initially to the Architect for action as provided in Paragraph 4.4. Action by the Architect, as provided in Paragraph 4.4, shall be required as a condition precedent to arbitration of a Claim between the Contractor and Owner as to all such matters arising prior to the date final payment is due. Action by the Architect in response to a Claim shall not be a condition precedent to arbitration in the event (1) the position of Architect is vacant; (2) the Architect has failed to take action as required under Subparagraph 4.4.1 within 15 days after the Claim is made; (3) the Architect has failed to take action required under Subparagraph 4.4.4 within 30 days after the Claim is made, unless the Architect has notified the parties in writing of the reasons why action could not be taken within 30 days, and of the date by which action will be taken; or (4) the Claim relates to a mechanic's lien.

4.3.3 Time Limits on Claim. Claims by either party must be made within 35 days after occurrence of the event giving rise to such Claim or within 35 days after the claimant first recognizes the condition giving rise to the Claim, whichever is later. Claims must be made by written notice. Any change or addition to a previously made Claim shall be made by timely written notice in accordance with this Subparagraph 4.3.3.

4.3.4 Continuing Contract Performance. Pending final resolution of a Claim including arbitration, unless otherwise agreed in writing the Contractor shall proceed diligently with performance of the Contract and the Owner shall continue to make payments in accordance with the Contract Documents.

4.3.5 Waiver of Claims: Final Payment. The making of final payment shall constitute a waiver of Claims by the Owner except those arising from:

- .1 liens, Claims, security interests or encumbrances arising out of the Contract and unsettled;
- .2 failure of the Work to comply with the requirements of the Contract Documents; or
- .3 terms of special warranties required by the Contract Documents.

Any Claim which has not been waived in accordance with this Subparagraph shall be deemed to have accrued upon discovery by the Owner of the condition or breach upon which such Claim is based, for the purpose of any applicable statute of limitation.

4.3.6 Claims for Differing Subsurface or Latent Physical Conditions. If, during the progress of the Work, the Contractor or the Owner discovers that the actual subsurface or latent physical conditions encountered at the site differ substantially or materially from those shown on the plans or indicated in the Contract Documents, either the Contractor or the Owner may request

an equitable adjustment in the Contract Sum applying to Work affected by the differing site conditions. A request for such an adjustment shall be in writing and shall be delivered by the party making such claim to the other party as soon as possible after such conditions are discovered. Upon receipt of such a claim from a Contractor, or upon its own initiative, the Owner shall make an investigation of such physical conditions, and, if they differ substantially or materially from those shown on the plans or indicated in the Contract Documents or from those ordinarily encountered and generally recognized as inherent in Work of the character provided for in the plans and Contract Documents and are of such a nature as to cause an increase or decrease in the cost of performance of the Work or a change in the construction methods required for the performance of the Work which results in an increase or decrease in the cost of the Work, the Owner shall make an equitable adjustment in the Contract Sum and the Contract shall be modified in writing accordingly.

4.3.6.1 Should conditions encountered below the surface of the ground require that footings, foundations or other parts of the building or other structure be raised, lowered or changed, or if additional depth of excavation below the levels shown on the Drawings is required in order to provide proper bearing for the building or other structure or for any permanent utilities on the site or for permanent grading or other permanent site work, any change in the amount of excavation, dewatering, sheeting, protection, rock excavation, backfill, concrete or other structural work, or any other work permanently incorporated in the building shall be considered a change in the Work, and the Contract Sum shall be adjusted as provided in this Article, provided that the Work has been ordered in writing as provided in 7.1.1.

4.3.7 Claims for Additional Cost or Time. If the Contractor claims that any acts or omissions of the Owner or the Architect, including any instructions or orders, whether oral, written, by Drawings, or otherwise, involve extra cost or time, and the Contractor has not received a written acknowledgment by the Owner or Architect that extra payment will be made or time extended on account thereof, the Contractor shall promptly so notify the Architect in writing of such Claim and shall not proceed with the Work relating to such Claim until the Contractor has received a further written order to proceed except, as provided in Paragraph 10.3, in the case of an emergency affecting life or property. No Claim by the Contractor on account of such acts, omissions, instructions or orders shall be valid unless the Contractor has so notified the Architect before proceeding, and has received the further written order to proceed.

4.3.7.1 OMITTED

4.3.7.2 The Contractor shall have the burden of demonstrating the effect of the claimed act or omission on the Contract Sum or Contract Time, and shall furnish the Architect with such documentation relating thereto as the Architect may reasonably require. In the case of a continuing act or omission only one Claim is necessary.

4.3.7.3 Adverse weather conditions shall not be the basis for a Claim for additional time or cost.

4.3.8 Injury or Damage to Person or Property. If either party to the Contract suffers injury or damage to person or property because of an act or omission of the other party, of any of

the other party's employees or agents, or of others for whose acts such party is legally liable, written notice of such injury or damage, whether or not insured, shall be given to the other party within a reasonable time not exceeding 21 days after first observance. The notice shall provide sufficient detail to enable the other party to investigate the matter. If a Claim for additional cost or time related to this Claim is to be asserted, it shall be filed as provided in Subparagraph 4.3.7.

#### 4.4 REVIEW OF CLAIMS BY ARCHITECT

4.4.1 The Architect shall take one or more of the following actions within ten days of receipt of a Claim: (1) defer any action with respect to all or any part of a Claim and request additional information from either party; (2) decline to render a decision for any reason which he deems appropriate (including but not limited to the fact that the Claim involves allegations of fault on the part of the Architect); (3) render a decision on all or a part of the Claim, or (4) submit a schedule to the parties indicating when the Architect expects to take action. The Architect shall notify the parties in writing of any action taken with respect to such Claim. If the Architect renders a decision or declines to render a decision, either party may proceed in accordance with Paragraph 4.5. If the Architect decides that the Work relating to such Claim should proceed regardless of his disposition of such Claim, the Architect shall issue to the Contractor a written order to proceed. The Contractor shall proceed as instructed, and all rights of both parties with respect to such Claim shall be deemed to have been reserved.

4.4.2 If a Claim is resolved by agreement of the parties, the Architect will prepare or obtain appropriate documentation indicating the parties' agreement to the resolution. In the absence thereof the Claim shall be treated as not resolved.

4.4.3 If a Claim has not been resolved, the party making the Claim shall, within ten days after the Architect's request, take one or more of the following actions: (1) submit additional supporting data requested by the Architect; (2) modify the initial Claim; (3) respond to the Architect's action under paragraph 4.4.1; or (4) notify the Architect that the initial Claim stands. Upon receipt of the response or supporting data, the Architect will either reject or approve the claim in whole or in part.

#### 4.5 ARBITRATION

4.5.1 Controversies and Claims Subject to Arbitration. Any Claim arising out of or related to the Contract, or the breach thereof, except claims relating to aesthetic effect, shall be settled by arbitration, subject to the foregoing provisions of paragraph 4.4 and the provisions of Subparagraph 4.5.7. Arbitration will be conducted in accordance with the Construction Industry Arbitration Rules of the American Arbitration Association and judgment upon the award rendered by the Arbitrator or Arbitrators may be entered in any Court having jurisdiction thereof. In any such arbitration in which the amount stated in the demand is \$100,000 or less, a single arbitrator shall be appointed in accordance with the procedures set forth in the American Arbitration Association Construction Industry Arbitration Rules. In any such arbitration in which the amount stated in the demand is in excess of \$100,000, a panel of three arbitrators shall be appointed in accordance with the procedures set forth in the American Arbitration Association Construction Industry Arbitration Rules.

4.5.2 Rules For Arbitration. The parties may agree to any arbitration forum. If unable to agree, by default the forum shall be the American Arbitration Association. If the neutral arbitrator(s) is/are appointed by the American Arbitration Association, the said Association shall administer the arbitration and its Construction Industry Arbitration Rules shall govern all aspects of the proceeding including the enforcement of any award. If the neutral arbitrator(s) is/are not appointed by the American Arbitration Association, then the arbitrator(s) shall act as the administrator of the arbitration but the Construction Industry Arbitration Rules of the Association shall nonetheless govern all aspects of the proceeding, including the enforcement of any award. The arbitration panel shall have all of the powers and duties conferred on the Association pursuant to said rules.

In addition, the following rules shall govern the selection of arbitrators and the proceedings:

4.5.2.1 Neither party may appoint as arbitrator an employee or an owner of that party, nor the parent, spouse or child of an employee or owner of that party.

4.5.2.2 After the neutral arbitrator has been appointed, neither party may engage in ex parte communication with the arbitrator appointed by that party.

4.5.3 Contract Performance During Arbitration. During arbitration proceedings, the Owner and Contractor shall comply with Subparagraph 4.3.4.

4.5.4 When a written decision of the Architect states that the decision is final, any demand for arbitration of the matter covered by such decision must be made within two months after substantial completion of the project, as determined by the Architect in accordance with paragraph 9.8.2 hereof. The failure to demand arbitration within said two month period will result in the Architect's decision becoming final and binding upon the Owner and the Contractor.

4.5.4.1 A demand for arbitration shall be made within the time limits specified in Subparagraph 4.5.4, and in no event shall be made after the date when the institution of legal or equitable proceedings based on such Claim would be barred by the applicable statute of limitations.

4.5.5 Claims and Timely Assertion of Claims. A party who files a notice of demand for arbitration must assert in the demand all Claims then known to that party on which arbitration is permitted to be demanded. When a party fails to include a Claim through oversight, inadvertence or excusable neglect, or when a Claim has matured or been acquired subsequently, the arbitrator or arbitrators may permit amendment.

4.5.6 Judgment on Final Award. The award rendered by the arbitrator or arbitrators shall be final, and judgment may be entered upon it in accordance with applicable law in any court having jurisdiction thereof.

4.5.7 Notwithstanding any provision contained in this Paragraph 4.5 or elsewhere in the Contract Documents, the Owner reserves the following rights in connection with Claims and disputes between the Owner and the Contractor:

- .1 the right to institute legal action against the Contractor in any court of competent jurisdiction in lieu of demanding arbitration pursuant to this Paragraph 4.5, in which case the dispute or disputes which are the subject of such action shall be decided by such court, and not by arbitration;
- .2 the right to obtain from any court of competent jurisdiction a stay of any arbitration instituted by the Contractor, provided that the application for such stay is made before the appointment of the neutral arbitrator in such arbitration, in which case the dispute or disputes which are the subject of such arbitration shall be decided by such court, and not by arbitration;
- .3 the right to require the Contractor to join as a party in any arbitration between the Owner and the Architect relating to the Project, in which case the Contractor agrees to be bound by the decision of the arbitrator or arbitrators in such arbitration.

In case the Owner elects to proceed in accordance with 4.5.7.1 or 4.5.7.2 above, the word “litigation” shall be deemed to replace the word “arbitration” wherever the latter word appears in the Contract Documents.

## ARTICLE 5

### SUBCONTRACTORS

#### 5.1 DEFINITIONS

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

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

#### 5.2 AWARD OF SUBCONTRACTS AND OTHER CONTRACTS FOR PORTIONS OF THE WORK

5.2.1 Unless otherwise stated in the Contract Documents or the bidding requirements, the Contractor, as soon as practicable after award of the Contract, shall furnish in writing to the

Owner through the Architect the names of persons or entities (including those who are to furnish materials or equipment fabricated to a special design) proposed for each principal portion of the Work. The Architect will promptly reply to the Contractor in writing stating whether or not the Owner or the Architect, after due investigation, has reasonable objection to any such proposed person or entity. Failure of the Owner or Architect to reply promptly shall constitute notice of no reasonable objection.

5.2.2 The Contractor shall not contract with a proposed person or entity to whom the Owner or Architect has made reasonable and timely objection. The Contractor shall not be required to contract with anyone to whom the Contractor has made reasonable objection, unless otherwise required by law to do so.

5.2.3 If the Owner or Architect has reasonable objection to a person or entity proposed by the Contractor, the Contractor shall propose another to whom the Owner or Architect has no reasonable objection. The Contract Sum shall be increased or decreased by the difference in cost occasioned by such change and an appropriate Change Order shall be issued. However, no increase in the Contract Sum shall be allowed for such change unless the Contractor has acted promptly and responsively in submitting names as required.

5.2.4 The Contractor shall not change a Subcontractor, person or entity previously selected if the Owner or Architect makes reasonable objection to such change.

5.2.5 The form of each filed Subcontract shall be submitted to the Owner for its acceptance, which shall not be unreasonably withheld or delayed. The form of subcontract shall be that set forth in Mass. Gen. Laws Chapter 149, Section 44F. Each Subcontract shall expressly provide for the contingent assignment referred to in Paragraph 5.4.

### 5.3 SUBCONTRACTUAL RELATIONS

5.3.1 By appropriate agreement, written where legally required for validity, the Contractor shall require each Subcontractor, to the extent of the Work to be performed by the Subcontractor, to be bound to the Contractor by terms of the Contract Documents, and to assume toward the Contractor all the obligations and responsibilities which the Contractor, by these Documents, assumes toward the Owner and Architect, including without limitation the obligations set forth in Paragraph 3.18. Each Subcontract agreement shall preserve and protect the rights of the Owner and Architect under the Contract Documents with respect to the Work to be performed by the Subcontractor so that Subcontracting thereof will not prejudice such rights, and shall allow to the Subcontractor, unless specifically provided otherwise in the Subcontract agreement, the benefit of all rights, remedies and redress against the Contractor that the Contractor, by the Contract Documents, has against the Owner. Where appropriate, the Contractor shall require each Subcontractor to enter into similar agreements with Sub-subcontractors. The Contractor shall make available to each proposed Subcontractor, prior to the execution of the Subcontract agreement, copies of the Contract Documents to which the Subcontractor will be bound, and, upon written request of the Subcontractor, identify to the Subcontractor terms and conditions of the proposed Subcontract agreement which may be at

variance with the Contract Documents. Subcontractors shall similarly make copies of applicable portions of such documents available to their respective proposed Sub-subcontractors.

#### 5.4 CONTINGENT ASSIGNMENT OF SUBCONTRACTS

5.4.1 Each Subcontract agreement for a portion of the Work is assigned by the Contractor to the Owner provided that:

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

### ARTICLE 6

#### CONSTRUCTION BY OWNER OR BY SEPARATE CONTRACTS

#### 6.1 OWNER'S RIGHT TO PERFORM CONSTRUCTION AND TO AWARD SEPARATE CONTRACTS

6.1.1 The Owner reserves the right to perform construction or operations related to the Project with the Owner's own forces, and to award separate contracts in connection with other portions of the Project or other construction or operations on the site under Conditions of the Contract identical or substantially similar to these, including those portions related to insurance and waiver of subrogation. If the Contractor claims that delay or additional cost is involved because of such action by the Owner, the Contractor shall make such Claim as provided elsewhere in the Contract Documents.

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

6.1.3 The Owner shall provide for coordination of the activities of the Owner's own forces and of each separate contractor with the work of the Contractor, who shall cooperate with them. The Contractor shall participate with other separate contractors and the Owner in reviewing their progress schedules when directed to do so. The Contractor shall make any revisions to the progress schedules and Contract Sum deemed necessary after a joint review and mutual agreement. The progress schedules shall then constitute the schedules to be used by the Contractor, separate contractors and the Owner until subsequently revised.



## 6.2 MUTUAL RESPONSIBILITY

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

6.2.2 If part of the Contractor's Work depends for proper execution or results upon construction or operations by the Owner or a separate contractor, the Contractor shall, prior to proceeding with that portion of the Work, promptly report to the Architect apparent discrepancies or defects in such other construction that would render it unsuitable for such proper execution and results. Failure of the Contractor so to report shall constitute an acknowledgement that the Owner's or separate contractors' completed or partially completed construction is fit and proper to receive the Contractor's Work, except as to defects not then reasonable discoverable.

6.2.3 Costs caused by delays or by improperly timed activities or defective construction shall be borne by the party responsible therefor.

6.2.4 The Contractor shall promptly remedy damage wrongfully caused by the Contractor to completed or partially completed construction or to property of the Owner or separate contractors as provided in Subparagraph 10.2.5. If such separate contractor sues or initiates an arbitration proceeding against the Owner on account of any damage alleged to have been caused by the Contractor, the Owner shall notify the Contractor, who shall defend such proceedings at the Contractor's expense, and if any judgment or award against the Owner arises therefrom the Contractor shall pay or satisfy it and shall reimburse the Owner for all attorneys' fees and court or arbitration costs which the Owner has incurred.

6.2.5 Claims and other disputes and matters in question between the Contractor and a separate contractor shall be subject to the provisions of Paragraph 4.3 provided the separate contractor has reciprocal obligations.

6.2.6 The Owner and each separate contractor shall have the same responsibilities for cutting and patching as are described for the Contractor in Paragraph 3.14.

## 6.3 OWNER'S RIGHT TO CLEAN UP

6.3.1 If a dispute arises among the Contractor, separate contractors and the Owner as to the responsibility under their respective contracts for maintaining the premises and surrounding area free from waste materials and rubbish as described in Paragraph 3.15, the Owner may clean up and allocate the cost among those responsible as the Architect determines to be just.

## ARTICLE 7

### CHANGES IN THE WORK

#### 7.1 CHANGES

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

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

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

7.1.4 If unit prices are stated in the Contract Documents or subsequently agreed upon, and if quantities originally contemplated are so changed in a proposed Change Order or Construction Change Directive that application of such unit prices to quantities of Work proposed will cause substantial inequity to the Owner or Contractor, the applicable unit prices shall be equitably adjusted.

#### 7.2 CHANGE ORDERS

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

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

#### 7.3 CONSTRUCTION CHANGE DIRECTIVES

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

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

7.3.3 Upon request of the Owner or the Architect, the Contractor shall without cost to the Owner submit to the Architect, in such form as the Architect may require, an accurate written estimate of the cost of any proposed extra Work or change contemplated by a Construction Change Directive. The estimate shall indicate the quantity and unit cost of each item of materials, and the number of hours of work and hourly rate for each class of labor, as well as the description and amounts of all other costs chargeable under the terms of this Article. Unit labor costs for the installation of each item of materials shall be shown if required by the Architect. The Contractor shall promptly revise and resubmit such estimate if the Architect determines that it is not in compliance with the requirements of this Article, or that it contains errors of fact or mathematical errors. If required by the Architect, in order to establish the exact cost of new Work added or of previously required Work omitted, the Contractor shall obtain and furnish to the Architect bona fide proposals from recognized suppliers for furnishing any material included in such Work. Such estimates shall be furnished promptly so as to occasion no delay in the Work, and shall be furnished at the Contractor's expense. The Contractor shall state in the estimate any extension of time required for the completion of the Work if the change or extra work is ordered.

7.3.3.1 If the Construction Change Directive provides for an adjustment to the Contract Sum, the adjustment shall be based on one of the following methods, as selected by the Owner:

- (a) By unit prices stated in the Contract Documents or otherwise mutually agreed upon.
- (b) By Cost and Percentages (as defined below) estimated by the Contractor as provided in Subparagraph 7.3.3 and accepted by the Owner; the Contractor's estimate shall become a fixed price which shall not be changed by any variation in the actual cost of executing the Work covered by the change.
- (c) By actual Cost determined after the Work covered by the change is completed, plus Percentage.
- (d) By use of the dispute resolution procedures set forth in Paragraph 4.3.

As used in this Paragraph 7.3, "Cost" shall mean the estimated or actual net increase or decrease in cost to the Contractor, Subcontractor, or Sub-subcontractor for performing the Work covered by the change, including actual payments for materials, equipment, rentals, expendable items, wages and associated benefits to workmen and to supervisors employed full time at the site, insurance, bonds and other provable direct costs, but not including any administrative, accounting or expediting costs, or other indirect or overhead costs, or any wages or benefits of supervisory personnel not assigned full time to the site, or any amount for profit or fee to the Contractor, Subcontractor or Sub-subcontractor.

"Percentage" shall mean an allowance to be added to or subtracted from the Cost in lieu of overhead and profit and of any other expense which is not included in the Cost of the Work

covered by the change, as defined above. Percentage for a Sub-subcontractor shall be 10% of any net increase or decrease of Cost of any Work performed by the Sub-subcontractor's own forces plus 5% of any aggregate net increase in Cost of any Work performed for the Sub-subcontractor by other contractors. Percentage for a Subcontractor shall be such percentage allowances for overhead and profit as are set forth in the Subcontract between such Subcontractor and the Contractor. Percentage for the Contractor shall be 9 1/2% of any net increase or decrease of Cost of any Work performed by the Contractor's own forces plus 4 1/2% of any net increase or decrease in the Cost for all other Work covered by the change.

When in the reasonable judgment of the Architect a series of Construction Change Directives or Change Orders effect a single change, Percentage shall be calculated on the cumulative net increase or decrease in Cost, if any.

7.3.3.2 If the Owner elects to determine the cost of the Work as provided in method (a) of sub-Subparagraph 7.3.3.1, the unit prices shall be subject to Subparagraph 7.1.4. Notwithstanding the inclusion of unit prices in the Contract Documents, it shall be the Owner's option to require the Cost of any given change to be determined by one of the other methods stated in 7.3.3.1. If the Owner elects to determine the Cost of the change by unit prices and the nature of the work is such that its extent cannot readily be measured after the completion of such work or any subsequent work, the Contractor shall keep daily records, available at all times to the Architect for inspection, of the actual quantities of such work put in place, and delivery receipts or other adequate evidence, acceptable to the Architect, indicating the quantities of materials delivered to the site for use in such unit price work, and distinguishing such other similar material delivered for use in work included in the base Contract Sum. If so required by the Architect, materials for use in unit price work shall be stored apart from all other materials on the Project.

7.3.3.3 If the Owner elects to determine the cost of the Work as provided in methods (c) or (d) of sub-Subparagraph 7.3.3.1 or if the method of determining the cost has not been established before the Work is begun, the Contractor shall keep detailed daily records of labor and materials costs applicable to the Work.

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

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

7.3.6 If the Owner and Contractor do not agree with the adjustment in Contract Sum or Contract Time or the method for determining the adjustment, the dispute shall be governed by the procedures set forth in Paragraph 4.3.

## 7.4 MINOR CHANGES IN THE WORK

7.4.1 The Architect will have authority to order minor changes in the Work not involving adjustment in the Contract Sum or extension of the Contract Time and not inconsistent with the intent of the Contract Documents. Such changes shall be effected by written order and shall be binding on the Owner and Contractor. The Contractor shall carry out such written orders promptly.

## ARTICLE 8

### TIME

#### 8.1 DEFINITIONS

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

8.1.2 The date of commencement of the Work is the date established in the Agreement. The date shall not be postponed by the failure to act of the Contractor or of persons or entities for whom the Contractor is responsible.

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

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

#### 8.2 PROGRESS AND COMPLETION

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

8.2.2 The Contractor shall not knowingly, except by agreement or instruction of the Owner in writing, prematurely commence operations on the site or elsewhere prior to the effective date of insurance required by Article 11 to be furnished by the Contractor. The date of commencement of the Work shall not be changed by the effective date of such insurance. Unless the date of commencement is established by a notice to proceed given by the Owner, the Contractor shall notify the Owner in writing not less than five days or other agreed period before commencing the Work to permit the timely filing of mortgages, mechanic's liens and other security interests.

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

8.2.4 Within two weeks after award of the Contract, the Contractor shall submit to the Architect a Progress Schedule showing for each class of work the percentage completion to be obtained and the total dollar value of work to be completed as of the first of each month until Substantial Completion.

8.2.5 The Progress Schedule shall be based on an orderly progression of the Work, allowing adequate time for each operation (including adequate time for submission and review of submittals), and leading to a reasonable certainty of Substantial Completion by the date established in the Agreement. The Progress Schedule will be reviewed by the Architect for compliance with the requirements of this Article and will be accepted by the Architect or returned to the Contractor for revision and resubmittal. Unless specifically required by law, no payment under this Contract shall be due until the Progress Schedule has been approved by the Architect.

8.2.6 If in any application for payment as provided for in Paragraph 9.2, the total value of the completed Work in place, as certified by the Architect, is less than 90% of the total value of the Work in place estimated in the Progress Schedule, the Owner may, at the Owner's option, require the Contractor to accelerate the progress of the Work without cost to the Owner by increasing the work force or hours of work, or by other reasonable means approved by the Architect.

8.2.7 If each of three successive applications for payment indicate that the actual Work completed, as certified by the Architect, is less than 90% of the values estimated in the Progress Schedule to be completed by the respective dates, the Owner may at the Owner's option, treat the Contractor's delinquency as a default justifying the action permitted under Paragraph 14.2.

8.2.8 If the Architect has determined that the Contractor should be permitted to extend the time for completion as provided in Paragraph 8.3, the calendar dates in the Progress Schedule shall be adjusted accordingly to retain their same relationship to the adjusted date of Substantial Completion, and the dollar value of Work to be completed as of the first of each month shall be adjusted pro rata.

8.2.9 If the Contractor fails to submit any application for payment in any month, the Architect shall, for the purpose of this evaluation of progress, certify separately to the actual value of the Work in place completed as of the first of the month and to the best of the Architect's knowledge.

8.2.10 Nothing herein shall limit the Owner's right to liquidated or other damages for delays by the Contractor or to any other remedy which the Owner may possess under other provisions of the Contract Documents or by law.

8.2.11 The Progress Schedule required hereunder shall be a CPM Schedule in accordance with the Project Specifications and shall be updated in accordance therewith.

### 8.3 DELAYS AND EXTENSION OF TIME

8.3.1 If the Contractor is delayed at any time in progress of the Work by an act or neglect of the Owner or Architect, of an employee of either, or of a separate contractor employed by the Owner, or by changes ordered in the Work, or by labor disputes, fire, unusual delay in deliveries, unavoidable casualties or other causes (except weather) beyond the Contractor's control, or by delay authorized by the Owner, or by other causes which the Architect determines may justify delay, then the Contract Time shall be extended for such reasonable time as the Architect may determine.

8.3.2 Claims relating to time shall be made in accordance with applicable provisions of Paragraph 4.3.

8.3.3 The Contractor hereby agrees that the Contractor shall have no claim for damages of any kind against the Owner or the Architect on account of any delay in the commencement of the Work and/or any delay or suspension of any portion of the Work, whether such delay is caused by the Owner, the Architect, or otherwise, except as specifically provided in Subparagraphs 2.3.2 and 2.3.3. The Contractor acknowledges that, except as provided therein, the Contractor's sole remedy for any such delay and/or suspension will be an extension of time as provided in this Article.

8.3.4 No claim for delay shall be allowed on account of failure of the Architect to furnish Drawings, Specifications or instructions or to return Shop Drawings or Samples until the expiration of the applicable time period referred to in Mass. Gen. Laws Chapter 30, Section 39P, and not then unless such claim be reasonable.

8.3.5 No extension of time shall be granted because of seasonal or abnormal variations in temperature, humidity or precipitation, which conditions shall be wholly at the risk of the Contractor, whether occurring within the time originally scheduled for completion or within the period of any extension granted. There shall be no increase in the Contract Sum on account of any additional costs of operations or conditions resulting therefrom.

## ARTICLE 9

### PAYMENTS AND COMPLETION

#### 9.1 CONTRACT SUM

9.1.1 The Contract Sum is stated in the Agreement and, including authorized adjustments, is the maximum amount payable by the Owner to the Contractor for performance of the Work under the Contract Documents, or in equity, should the Contractor assert a quantum meruit claim for the fair value of Contractor's Work, regardless of whether the Contractor is terminated hereunder.

## 9.2 APPLICATIONS FOR PAYMENT

9.2.1 Within fifteen days after receipt from the Contractor, at the place designated by the Owner if such a place is so designated, of a periodic estimate requesting payment of the amount due for the preceding month, the Owner will make a periodic payment to the Contractor for the Work performed during the preceding month and for the materials not incorporated in the Work but delivered and suitably stored at the site (or at some location agreed upon in writing) to which the Contractor has title or to which a Subcontractor has title and has authorized the Contractor to transfer title to the Owner, less (1) retention based on the Owner's estimate of the fair value of its claims against the Contractor and less (2) a retention for direct payments to Subcontractors based on demands for same in accordance with the provisions of Subparagraph 9.6.2, and less (3) a retention not exceeding five percent of the approved amount of the periodic payment.

9.2.2 After the receipt of a periodic estimate requesting final payment and within sixty-five days after (a) the Contractor fully completes the Work or substantially completes the Work so that the value of the Work remaining to be done is, in the estimate of the Owner, less than one percent of the original Contract Sum, or (b) the Contractor substantially completes the work and the Owner takes possession for occupancy, whichever occurs first, the Owner shall pay the Contractor the entire balance due on the Contract less (1) a retention based on its estimate of the fair value of its claims against the Contractor and the cost of completing the incomplete and unsatisfactory items of Work and less (2) a retention for direct payments to Subcontractors based on demands for same in accordance with the provisions of Subparagraph 9.6.2, or based on the record of payments by the Contractor to the Subcontractors under this Contract if such record of payment indicates that the Contractor has not paid Subcontractors as provided in Subparagraph 9.6.2. If the Owner fails to make payment as herein provided, there shall be added to each such payment daily interest at the rediscount rate then charged by the Federal Reserve Bank of Boston commencing on the first day after said payment is due and continuing until the payment is delivered or mailed to the Contractor; provided, that no interest shall be due, in any event, on the amount due on a periodic estimate for final payment until fifteen days after receipt of such a periodic estimate from the Contractor, at the place designated by the Owner if such a place is so designated. The Contractor agrees to pay to each Subcontractor a portion of any such interest paid in accordance with the amount due each Subcontractor.

9.2.3 The Owner may make changes in any periodic estimate submitted by the Contractor, and the payment due on said periodic estimate shall be computed in accordance with the changes so made, but such changes or any requirement for a corrected periodic estimate shall not affect the due date for the periodic payment or the date for the commencement of interest charges on the amount of the periodic payment computed in accordance with the changes made, as provided herein; provided, that the Owner may, within seven days after receipt, return to the Contractor for correction, any periodic estimate which is not in the required form or which contains computations not arithmetically correct and, in that event, the date of receipt of such periodic estimate shall be the date of receipt of the corrected periodic estimate in proper form and with arithmetically correct computations. The date of receipt of a periodic estimate received on a Saturday, Sunday, or holiday shall be the first working day thereafter.



9.2.4 All periodic estimates shall be submitted to the Owner, or to the Owner's representative, and the date of receipt by the Owner or its representative shall be marked on the estimate. All periodic estimates shall contain a separate item for each filed subtrade and each sub-subtrade listed in sub-bid form as required by the Specifications and a column listing the amount paid to each Subcontractor and Sub-subcontractor as of the date the periodic estimate is filed. The person making payment for the Owner shall add the daily interest provided for herein to each payment for each day beyond the due date based on the date of receipt marked on the estimate.

9.2.5 The format and number of copies of applications for payment shall be as directed by the Architect. Such application shall be notarized, if required, and supported by such data substantiating the Contractor's right to payment as the Owner or Architect may require, such as copies of requisitions from Subcontractors and material suppliers, and reflecting retainage if provided for elsewhere in the Contract Documents.

9.2.5.1 Such applications may include requests for payment on account of changes in the Work which have been properly authorized by Construction Change Directives but not yet included in Change Orders when such Construction Change Directives have set forth an adjustment to the Contract Sum.

9.2.5.2 Such applications may not include requests for payment of amounts the Contractor does not intend to pay to a Subcontractor or material supplier because of a dispute or other reason.

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

9.3 The Contractor warrants that title to all Work covered by an application for payment will pass to the Owner either by incorporation in the construction or upon receipt of payment by the Contractor, whichever occurs first, free and clear of all liens, claims, security interests or encumbrances, hereinafter referred to in this Article 9 as "liens."

#### 9.4 CERTIFICATES FOR PAYMENT

9.4.1 The Architect will, within seven days after receipt of the Contractor's application for payment, either issue to the Owner a Certificate for Payment, with a copy to the Contractor, for such amount as the Architect determines is properly due, or notify the Contractor and Owner in writing of the Architect's reasons for withholding certification in whole or in part as provided in Subparagraph 9.5.1.

9.4.2 The issuance of a Certificate for Payment will constitute a representation by the Architect to the Owner, based on the Architect's observations at the site and the date comprising the application for payment, that the Work has progressed to the point indicated and that, to the best of the Architect's knowledge, information and belief, the quality of the Work is in accordance with the Contract Documents. The foregoing representations are subject to an evaluation of the Work for conformance with the Contract Documents upon Substantial Completion, to results of subsequent tests and inspections, to minor deviations from the Contract Documents correctable prior to completion, and to specific qualifications expressed by the Architect. The issuance of a Certificate for Payment will further constitute a representation that the Contractor is entitled to payment in the amount certified. However, the issuance of a Certificate for Payment will not be a representation that the Architect has (1) made exhaustive or continuous on-site inspections to check the quality or quantity of the Work, (2) reviewed construction means, methods, techniques, sequences or procedures, (3) reviewed copies of requisitions received from Subcontractors and material suppliers and other data requested by the Owner to substantiate the Contractor's right to payment or (4) made examination to ascertain how or for what purpose the Contractor has used money previously paid on account of the Contract Sum.

## 9.5 DECISIONS TO WITHHOLD CERTIFICATION

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

- .1 defective Work not remedied;
- .2 third party claims filed or reasonable evidence indicating probable filing of such claims;
- .3 failure of the Contractor to make payments properly to Subcontractors or for labor, materials or equipment;
- .4 reasonable evidence that the Work cannot be completed for the unpaid balance of the Contract Sum;
- .5 damage to the Owner or another contractor;

- .6 reasonable evidence that the Work will not be completed within the Contract Time, and that the retainage currently held by the Owner would not be adequate to cover actual or liquidated damages for the anticipated delay; or
- .7 persistent failure to carry out the Work in accordance with the Contract Documents.

9.5.2 When the above reasons for withholding certification are removed, certification will be made for amounts previously withheld.

## 9.6 PROGRESS PAYMENTS

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

### 9.6.2 Payments to Subcontractors

9.6.2.1 Forthwith after the Contractor receives payment on account of a periodic estimate, the Contractor shall pay to each Subcontractor the amount paid for the labor performed and the materials furnished by that Subcontractor, less any amount specified in any court proceedings barring such payment and also less any amount claimed due from the Subcontractor by the Contractor.

9.6.2.2 Not later than the sixty-fifth day after each Subcontractor substantially completes his work in accordance with the plans and Specifications, the entire balance due under the Subcontract less amounts retained by the Owner as the estimated cost of completing the incomplete and unsatisfactory items of work, shall be due the Subcontractor; and the Owner shall pay that amount to the Contractor. The Contractor shall forthwith pay to the Subcontractor the full amount received from the Owner less any amount specified in any court proceedings barring such payment and also less any amount claimed due from the Subcontractor by the Contractor.

9.6.2.3 Each payment made by the Owner to the Contractor pursuant to Subparagraphs 9.6.2.1 and 9.6.2.2 of this paragraph for the labor performed and the materials furnished by a Subcontractor shall be made to the Contractor for the account of that Subcontractor; and the Owner shall take reasonable steps to compel the Contractor to make each such payment to each such Subcontractor. If the Owner has received a demand for direct payment from a Subcontractor for any amount which has already been included in a payment to the Contractor or which is to be included in a payment to the Contractor for payment to the Subcontractor as provided in Subparagraphs 9.6.2.1 and 9.6.2.2, the Owner shall act upon the demand as provided in this section.

9.6.2.4 If, within seventy days after the Subcontractor has substantially completed the Subcontract work, the Subcontractor has not received from the Contractor the balance due under the Subcontract including any amount due for extra labor and materials furnished to the

Contractor, less any amount retained by the Owner as the estimated cost of completing the incomplete and unsatisfactory items of Work, the Subcontractor may demand direct payment of that balance from the Owner. The demand shall be by a sworn statement delivered to or sent by certified mail to the Owner, and a copy shall be delivered to or sent by certified mail to the Contractor at the same time. The demand shall contain a detailed breakdown of the balance due under the Subcontract and also a statement of the status of completion of the Subcontract work. Any demand made after substantial completion of the Subcontract work shall be valid even if delivered or mailed prior to the seventieth day after the Subcontractor has substantially completed the Subcontract work. Within ten days after the Subcontractor has delivered or so mailed the demand to the Owner and delivered or so mailed a copy to the Contractor, the Contractor may reply to the demand. The reply shall be by a sworn statement delivered to or sent by certified mail to the Owner and a copy shall be delivered to or sent by certified mail to the Subcontractor at the same time. The reply shall contain a detailed breakdown of the balance due under the Subcontract including any amount due for extra labor and materials furnished to the Contractor and of the amount due for each claim made by the Contractor against the Subcontractor.

9.6.2.5 Within fifteen days after receipt of the demand by the Owner, but in no event prior to the seventieth day after substantial completion of the Subcontract work, the Owner shall make direct payment to the Subcontractor of the balance due under the Subcontract including any amount due for extra labor and materials furnished to the Contractor, less any amount (i) retained by the Owner as the estimated cost of completing the incomplete or unsatisfactory items of Work, (ii) specified in any court proceedings barring such payment, or (iii) disputed by the Contractor in the sworn reply; provided, that the Owner shall not deduct from a direct payment any amount as provided in part (iii) if the reply is not sworn to, or for which the sworn reply does not contain the detailed breakdown required by Subparagraph 9.6.2.4. The Owner shall make further direct payments to the Subcontractor forthwith after the removal of the basis for deductions from direct payments made as provided in parts (i) and (ii) of this Subparagraph.

9.6.2.6 The Owner shall forthwith deposit the amount deducted from a direct payment as provided in part (iii) of Subparagraph 9.6.2.5 in an interest-bearing joint account in the names of the Contractor and the Subcontractor in a bank in Massachusetts selected by the Owner or agreed upon by the Contractor and the Subcontractor and shall notify the Contractor and the Subcontractor of the date of the deposit and the bank receiving the deposit. The bank shall pay the amount in the account, including accrued interest, as provided in an agreement between the Contractor and the Subcontractor or as determined by decree of a court of competent jurisdiction.

9.6.2.7 All direct payments and all deductions from demands for direct payments deposited in an interest-bearing account or accounts in a bank pursuant to Subparagraph 9.6.2.6 shall be made out of amounts payable to the Contractor at the time of receipt of demand for direct payment from a Subcontractor and out of amounts which later become payable to the Contractor and in the order of receipt of such demands from Subcontractors. All direct payments shall discharge the obligation of the Owner to the Contractor to the extent of such payment.

9.6.2.8 The Owner shall deduct from payments to the Contractor amounts which, together with the deposits in interest-bearing accounts pursuant to Subparagraph 9.6.2.6, are sufficient to

satisfy all unpaid balances of demands for direct payment received from Subcontractors. All such amounts shall be earmarked for such direct payments, and the Subcontractors shall have a right in such deductions prior to any claims against such amounts by creditors of the Contractor.

9.6.2.9 If the Subcontractor does not receive payments as provided in Subparagraph 9.6.2.1 or if the Contractor does not submit a periodic estimate for the value of the labor or materials performed or furnished by the Subcontractor and the Subcontractor does not receive payment for same when due less the deductions provided for in Subparagraph 9.6.2.1, the Subcontractor may demand direct payment by following the procedure in Subparagraph 9.6.2.4 and the Contractor may file a sworn reply as provided in that same Subparagraph. A demand made after the first day of the month following that for which the Subcontractor performed or furnished the labor and materials for which the Subcontractor seeks payment shall be valid even if delivered or mailed prior to the time payment was due on a periodic estimate from the Contractor. Thereafter the Owner shall proceed as provided in Subparagraphs 9.6.2.5, 9.6.2.6, 9.6.2.7 and 9.6.2.8.

9.6.3 Neither the Owner nor Architect shall have an obligation to pay or to see to the payment of money to a Subcontractor, Sub-subcontractor or material supplier, except as provided in Subparagraph 9.6.2, or otherwise as provided by law.

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

9.6.5 "Subcontractor" as used in Sub-subparagraphs 9.6.2.1 through 9.6.2.9 shall mean a person who files a sub-bid and receives a subcontract as a result of that filed sub-bid or who is approved by the awarding authority in writing as a person performing labor or both performing labor and furnishing materials pursuant to a contract with the Contractor. "Subcontractor" as used in other provisions of the Contract Documents shall, except as otherwise expressly provided, have the meaning set forth in Subparagraph 5.1.1.

## 9.7 FAILURE OF PAYMENT

9.7.1 If the Architect does not issue a Certificate for Payment, through no fault of the Contractor, within seven days after receipt of the Contractor's application for payment, or if the Owner does not pay the Contractor within seven days after the date established in the Contract Documents the amount certified by the Architect, then the Contractor may, upon seven additional days' written notice to the Owner and Architect, stop the Work until payment of the amount owing has been received. The Contract Time shall be extended as provided in Article 7.

## 9.8 SUBSTANTIAL COMPLETION

9.8.1 Substantial Completion is the stage in the progress of the Work when the Work is sufficiently complete in accordance with the Contract Documents so the Owner can occupy or utilize the Work for its intended use and only minor items which can be corrected or completed

without any material interference with the Owner's use of the Work remain to be corrected or completed.

9.8.2 When the Contractor considers that the Work, or a portion thereof designated in the Contract Documents for separate completion, is substantially complete and the premises comply with Subparagraph 3.15.1, the Contractor shall submit to the Architect (1) a list of items to be completed or corrected, (2) all special warranties required by the Contract Documents, endorsed by the Contractor and in a form reasonably acceptable to the Architect and (3) the permits and certificates referred to in Subparagraph 13.5.4. The failure to include any items on the list mentioned in the preceding sentence does not alter the responsibility of the Contractor to complete all Work in accordance with the Contract Documents. When the Architect on the basis of an inspection determines that the Work or designated portion thereof is substantially complete and the other conditions have been met, the Architect will then prepare a Certificate of Substantial Completion which shall establish the Date of Substantial Completion, shall state the responsibilities of the Owner and the Contractor for security, maintenance, heat, utilities, damage to the Work, and insurance, and shall fix the time within which the Contractor shall complete the items listed therein. Warranties required by the Contract Documents shall commence on the date of Substantial Completion. The Certificate of Substantial Completion shall be submitted to the Owner and Contractor for their written acceptance of the responsibilities assigned to them in such Certificate.

9.8.3 Upon Substantial Completion of the Work or designated portion thereof and upon application by the Contractor and certification by the Architect, the Owner shall make payment, reflecting adjustment in retainage, if any, for such Work or portion thereof as provided in the Contract Documents.

## 9.9 PARTIAL OCCUPANCY OR USE

9.9.1 The Owner may occupy or use any completed or partially completed portion of the Work at any stage. Such partial occupancy or use may begin whether or not the portion is substantially complete, provided that the respective responsibilities of the Owner and Contractor with respect to payments, retainage, if any, security, maintenance, heat, utilities, damage to the Work, insurance, correction of the Work, and warranties shall be established by agreement of the Owner and Contractor or, absent such agreement, shall be determined by the Architect subject to the right of either party to contest such determination as provided in Paragraph 4.5.

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

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

## 9.10 FINAL COMPLETION AND FINAL PAYMENT

9.10.1 Upon receipt of written notice that the Work is ready for final inspection and acceptance and upon receipt of a final application for payment, the Architect will promptly make such inspection and, when the Architect finds the Work acceptable under the Contract Documents and the Contract fully performed, the Architect will promptly issue a final Certificate for Payment stating that to the best of the Architect's knowledge, information and belief, and on the basis of the Architect's observations and inspections, the Work has been completed in accordance with terms and conditions of the Contract Documents. The Architect's final Certificate for Payment will constitute a further representation that conditions listed in Subparagraph 9.10.2 as precedent to the Contractor's being entitled to final payment have been fulfilled.

9.10.2 Neither final payment nor any remaining retained percentage shall become due until the Contractor submits to the Architect (1) an affidavit that payrolls, bills for materials and equipment, and other indebtedness connected with the Work for which the Owner or the Owner's property might be responsible or encumbered (less amounts withheld by Owner) have been paid or otherwise satisfied, (2) a certificate evidencing that insurance required by the Contract Documents to remain in force after final payment is currently in effect and will not be canceled or allowed to expire until at least 30 days' prior written notice has been given to the Owner, (3) a written statement that the Contractor knows of no substantial reason that the insurance will not be renewable to cover the period required by the Contract Documents, (4) consent of surety, if any, to final payment and (5), if required by the Owner, other data establishing payment or satisfaction of obligations, such as receipts, releases and waivers of liens, claims, security interests or encumbrances arising out of the Contract, to the extent and in such form as may be designated by the Owner. If a Subcontractor refuses to furnish a release or waiver required by the Owner, the Contractor may furnish a bond satisfactory to the Owner to indemnify the Owner against such lien. If such lien remains unsatisfied after payments are made, the Contractor shall refund to the Owner all money that the Owner may be compelled to pay in discharging such lien, including all costs and reasonable attorneys' fees.

9.10.3 If, after Substantial Completion of the Work, final completion thereof is materially delayed through no fault of the Contractor or by issuance of Change Orders affecting final completion, and the Architect so confirms, the Owner shall, upon application by the Contractor and certification by the Architect, and without terminating the Contract, make payment of the balance due for that portion of the Work fully completed and accepted. If the remaining balance for Work not fully completed or corrected is less than retainage stipulated in the Contract Documents, and if bonds have been furnished, the written consent of surety to payment of the balance due for that portion of the Work fully completed and accepted shall be submitted by the Contractor to the Architect prior to certification of such payment. Such payment shall be made under terms and conditions governing final payment, except that it shall not constitute a waiver of claims. The making of final payment shall constitute a waiver of claims by the Owner to the extent provided in Subparagraph 4.3.5.

9.10.4 Acceptance of final payment by the Contractor, a Subcontractor or material supplier shall constitute a waiver of claims by that payee except those previously made in writing

and identified by that payee as unsettled at the time of final application for payment. Such waivers shall be in addition to the waiver described in Subparagraph 4.3.5.

## ARTICLE 10

### PROTECTION OF PERSONS AND PROPERTY

#### 10.1 SAFETY PRECAUTIONS AND PROGRAMS

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

#### 10.2 SAFETY OF PERSONS AND PROPERTY

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

- .1 employees performing the Work and other persons who may be affected thereby;
- .2 the Work and materials and equipment to be incorporated therein, whether in storage on or off the site, under care, custody or control of the Contractor or the Contractor's Subcontractors or Sub-subcontractors;
- .3 other property at the site or adjacent thereto, such as trees, shrubs, lawns, walks, pavements, roadways, structures and utilities not designated for removal, relocation or replacement in the course of construction; and
- .4 any other property of the Owner, whether or not forming part of the Work, located at the site or adjacent thereto in areas to which the Contractor has access.

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

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

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



10.2.5 The Contractor shall promptly remedy damage and loss to property referred to in Clauses 10.2.1.2, 10.2.1.3 and 10.2.1.4. If the damage or loss is due in whole or in part to the Contractor's failure to take the precautions required by this Paragraph 10.2, the Contractor shall, subject to any reimbursement to which the Contractor is entitled under the property insurance required by the Contract Documents, bear the cost.

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

10.2.7 The Contractor shall not load or permit any part of the construction or site to be loaded so as to endanger its safety.

10.2.8 The Contractor shall provide and maintain in good operating condition suitable and adequate fire protection equipment and services, and shall comply with all reasonable recommendations regarding fire protection made by the representatives of the fire insurance company carrying insurance on the Work or by the local fire chief or fire marshal. The area within the site limits shall be kept orderly and clean, and all combustible rubbish shall be promptly removed from the site.

10.2.9 The Contractor shall at all time protect excavations, trenches, buildings and materials, from rain water, ground water, backup or leakage of sewers, drains and other piping, and from water of any other origin and shall remove promptly any accumulation of water. The Contractor shall provide and operate all pumps, piping and other equipment necessary to this end.

10.2.10 The Contractor shall remove snow and ice which might result in damage or delay.

10.2.11 During the progress of the Work and at all times prior to the date of Substantial Completion or occupancy of the Work by the Owner, whichever is earlier, the Contractor shall provide temporary heat, ventilation, and enclosure, as required by Mass. Gen. Laws Chapter 149, Section 44F(1). The permanent heating and ventilation systems may be used for these purposes when available unless otherwise provided in the Contract Documents.

### 10.3 EMERGENCIES

10.3.1 In an emergency affecting safety of persons or property, the Contractor shall act, at the Contractor's discretion, to prevent threatened damage, injury or loss. Additional compensation or extension of time claimed by the Contractor on account of an emergency shall be determined as provided in Paragraph 4.3 and Article 7.

### 10.4 VANDALISM

10.4.1 The Contractor shall be responsible for protecting the work, the work site, materials, and equipment stored at the site (or incorporated in the work), other property at the

site, or other property of the Owner, against vandalism by known or unknown persons. In discharging this obligation the Contractor shall utilize security personnel, measures, procedures, and equipment or materials necessary to prevent vandalism.

10.4.2 In the event of any damage caused by vandalism to the property/materials/equipment/items referenced in the preceding Article 10.4.1, and regardless of whether the Contractor has exercised due care in avoiding same, the Contractor shall be financially responsible therefor to whatever extent said damage is not indemnified by insurance coverage available to either the Contractor or Owner. The Contractor's obligation hereunder shall include payment of damages to whatever extent insurance coverage is unavailable due to self-insurance, a deductible, or a self-insured retention.

10.4.3 Any monies owed by the Contractor to the Owner on account of damages referenced in the preceding Article 10.4.2 may be offset by the Owner against any periodic payments made under the Contract.

## ARTICLE 11

### INSURANCE AND BONDS

#### 11.1 CONTRACTOR'S LIABILITY INSURANCE

11.1.1 The Contractor shall purchase from and maintain in a company or companies lawfully authorized to do business in the jurisdiction in which the Project is located and to which the Owner has no reasonable objection such insurance as will protect the Contractor from claims set forth below which may arise out of or result from the Contractor's operations under the Contract and for which the Contractor may be legally liable, whether such operations be by the Contractor or by a Subcontractor or by anyone directly or indirectly employed by any of them, or by anyone for whose acts any of them may be liable:

- .1 claims under workers' or workmen's compensation, disability benefit and other similar employee benefit acts which are applicable to the Work to be performed;
- .2 claims for damages because of bodily injury, occupational sickness or disease, or death of the Contractor's employees;
- .3 claims for damages because of bodily injury, sickness or disease, or death of any person other than the Contractor's employees;
- .4 claims for damages insured by usual personal injury liability coverage which are sustained (1) by a person as a result of an offense directly or indirectly related to employment of such person by the Contractor, or (2) by another person;

- .5 claims for damages, other than to the Work itself, because of injury to or destruction of tangible property, including loss of use resulting therefrom;
- .6 claims for damages because of bodily injury, death of a person or property damage arising out of ownership, maintenance or use of a motor vehicle; and
- .7 claims involving contractual liability insurance applicable to the Contractor's obligations under Paragraph 3.18.

11.1.2 The insurance required by Subparagraph 11.1.1 shall include all major divisions of coverage, and shall be on a comprehensive general basis including Premises and Operations (including X-C-U), Owner's and Contractor's Protective, Products and Completed Operations, and Owned, Nonowned, and Hired Motor Vehicles. Such insurance shall be written for not less than any limits of liability required by law or those set forth in the Contract Documents, whichever is greater.

All insurance shall be written on an occurrence basis, unless the Owner approves in writing coverage on a claims-made basis. Coverages, whether written on an occurrence or claims-made basis, shall be maintained without interruption from date of commencement of the Work until date of final payment and termination of any coverage required to be maintained after final payment. The Owner shall be added as an Additional Insured on all policies, which shall constitute primary insurance for the Owner in relation to any similar or concurrent insurance independently maintained by the Owner.

11.1.3 Certificates of insurance acceptable to the Owner shall be filed with the Owner prior to commencement of the Work. These Certificates and the insurance policies required by this Paragraph 11.1 shall contain a provision that coverages afforded under the policies will not be canceled or allowed to expire until at least 30 days' prior written notice has been given to the Owner. These certificates shall set forth evidence of all coverage required by 11.1.1 and 11.1.2. The form of certificate shall be AIA Document G705. The Contractor shall furnish to the Owner copies of any endorsements that are subsequently issued amending limits of coverage. If any of the foregoing insurance coverages are required to remain in force after final payment and are reasonably available, an additional certificate evidencing continuation of such coverage shall be submitted with the final application for payment as required by Subparagraph 9.10.2.

11.1.4 In addition to Statutory Workers' Compensation Coverage, the Contractor shall provide Employers Liability Coverage at the following limits of liability:

Each accident - \$500,000;

Disease - policy limit \$500,000;

Disease - each employee \$500,000.

11.1.5 The liability insurance coverage purchased by the Contractor in order to comply with Section 11.1.1 (.1-.7) above shall contain the following limits of liability:

- \$3,000,000 - general aggregate;
- \$3,000,000 - products/completed operations aggregate;
- \$1,000,000 - personal injury and advertising;
- \$1,000,000 - each occurrence;
- \$1,000,000 - auto liability including hired and non-owned;
- \$2,000,000 - umbrella.

## 11.2 OWNER'S LIABILITY INSURANCE

11.2.1 The Owner shall be responsible for purchasing and maintaining the Owner's usual liability insurance. Optionally, the Owner may purchase and maintain other insurance for self-protection against claims which may arise from operations under the Contract. The Contractor shall not be responsible for purchasing and maintaining this optional Owner's liability insurance unless specifically required by the Contract Documents.

## 11.3 PROPERTY INSURANCE BUILDERS RISK POLICY

11.3.1 Unless otherwise provided, the Owner shall purchase and maintain, in a company or companies lawfully authorized to do business in the jurisdiction in which the Project is located, property insurance in the amount of the initial Contract Sum as well as subsequent modifications thereto for the entire Work at the site on a replacement cost basis. Such property insurance shall be maintained, unless otherwise provided in the Contract Documents or otherwise agreed in writing by all persons and entities who are beneficiaries of such insurance, until final payment has been made as provided in Paragraph 9.10 or until no person or entity other than the Owner has an insurable interest in the property required by this Paragraph 11.3 to be covered, whichever is earlier. This insurance shall include interests of the Owner, the Contractor, Subcontractors and Sub-subcontractors in the Work.

11.3.1.1 Property insurance shall be on an all-risk policy form and shall insure against the perils of fire and extended coverage and physical loss or damage including, without duplication of coverage, theft, vandalism, malicious mischief, collapse, false-work, temporary buildings and debris removal including demolition occasioned by enforcement of any applicable legal requirements, and shall cover reasonable compensation for Architect's services and expenses required as a result of such insured loss. Coverage for other perils shall not be required unless otherwise provided in the Contract Documents. The form of policy for this coverage shall provide for coverage in the event of a loss up to the contemplated value of the property following completion of all Work required under the Contract.

11.3.1.2 If the Owner does not intend to purchase such property insurance required by the Contract and with all of the coverages in the amount described above, the Owner shall so inform the Contractor in writing prior to commencement of the Work. The Contractor may then effect insurance which will protect the interests of the Contractor, Subcontractors and Sub-subcontractors in the Work, and by appropriate Change Order the cost thereof shall be charged to the Owner. If the Contractor is damaged by the failure or neglect of the Owner to purchase or maintain insurance as described above, without so notifying the Contractor, then the Owner shall bear all reasonable costs properly attributable thereto.

11.3.1.3 The property insurance maintained hereunder by the Owner has a deductible of \$100,000 applicable to each/any claim thereunder. In the event of any property damage arising from any occurrence prior to the Architect's issuance of a final Certificate for Payment under Section 9.10.1, including but not limited to property damage arising from vandalism or casualty of any kind, the Contractor shall be responsible for the cost of said property damage: (a) to the extent not indemnified by the Owner's insurance policy because of said deductible; or (b) to the extent not indemnified by the Owner's insurance policy for any other reason.

11.3.1.4 Property insurance for portions of the Work stored off site and in transit shall be procured and the cost borne by the Contractor, unless otherwise provided in the Contract Documents.

11.3.2 Boiler and Machinery Insurance. The Owner shall purchase and maintain boiler and machinery insurance required by the Contract Documents or by law, which shall specifically cover such insured objects during installation and until final acceptance by the Owner; this insurance shall include interests of the Owner, Contractor, Subcontractors and Sub-subcontractors in the Work, and the Owner and Contractor shall be named insureds.

11.3.3 Loss of Use Insurance. The Owner, at the Owner's option, may purchase and maintain such insurance as will insure the Owner against loss of use of the Owner's property due to fire or other hazards, however caused. The Owner waives all rights of action against the Contractor for loss of use of the Owner's property, including consequential losses due to fire or other hazards however caused, to the extent covered and paid by insurance under this Subparagraph 11.3.3.

11.3.4 If the Contractor requests in writing that insurance for risks other than those described herein or for other special hazards be included in the property insurance policy, the Owner shall, if possible, include such insurance, and the cost thereof shall be borne by the Contractor.

11.3.5 If during the Project construction period the Owner insures properties, real or personal or both, adjoining or adjacent to the site by property insurance under policies separate from those insuring the Project, or if after final payment property insurance is to be provided on the completed Project through a policy or policies other than those insuring the Project during the construction period, the Owner shall waive all rights in accordance with the terms of Subparagraph 11.3.7 for damages caused by fire or other perils covered by this separate property

insurance. All separate policies shall provide this waiver of subrogation by endorsement or otherwise.

11.3.6 Before an exposure to loss may occur, the Owner shall file with the Contractor a copy of each policy that includes insurance coverages required by this Paragraph 11.3. Each policy shall contain all generally applicable conditions, definitions, exclusions and endorsements related to this Project. Each policy shall contain a provision that the policy will not be canceled or allowed to expire until at least 30 days' prior written notice has been given to the Contractor.

11.3.7 Waivers of Subrogation. INTENTIONALLY OMITTED.

11.3.8 A loss insured under Owner's property insurance shall be adjusted by the Owner and made payable to the Owner on its behalf and on behalf of the insureds, as their interests may appear, subject to requirements of any applicable mortgagee clause and of Subparagraph 11.3.10. The Contractor shall pay Subcontractors their just shares of insurance proceeds received by the Contractor, and by appropriate agreements, written where legally required for validity, shall require Subcontractors to make payments to their Subcontractors in similar manner.

11.3.9 If required in writing by a party in interest, the Owner shall, upon occurrence of an insured loss, give bond for proper performance of the Owner's duties all subject to the requirements, if any, of the Owner's construction and/or permanent lender. The cost of required bonds shall be charged against proceeds received by Owner. The Owner shall deposit in a separate account proceeds so received, which the Owner shall distribute in accordance with such agreement as the parties in interest may reach, or in accordance with an arbitration award in which case the procedure shall be as provided in Paragraph 4.5.

11.3.10 The Owner shall have power to adjust and settle a loss with insurers unless one of the parties in interest shall object in writing within five days after occurrence of loss to the Owner's exercise of this power; if such objection be made, arbitrators shall be chosen as provided in Paragraph 4.5. The Owner shall, in that case, make settlement with insurers in accordance with directions of such arbitrators. If distribution of insurance proceeds by arbitration is required, the arbitrators will direct such distribution.

#### 11.4 PERFORMANCE BOND AND PAYMENT BOND

11.4.1 The Contractor shall furnish bonds covering faithful performance of the Contract and payment of obligations arising thereunder as stipulated in bidding requirements or specifically required in the Contract Documents on the date of execution of the Contract. Said bonds shall satisfy the applicable statutory requirements of the place in which the Work is to be performed.

11.4.2 Upon the request of any person or entity appearing to be a potential beneficiary of bonds covering payment of obligations arising under the Contract, the Contractor shall promptly furnish a copy of the bonds or shall permit a copy to be made.

## ARTICLE 12

### UNCOVERING AND CORRECTION OF WORK

#### 12.1 UNCOVERING OF WORK

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

12.1.2 If a portion of the Work has been covered in accordance with the requirements specifically expressed in the contract documents, and which the Architect has not specifically requested to observe prior to its being covered, the Architect may request to see such Work and it shall be uncovered by the Contractor. If such Work is in accordance with the Contract Documents, costs of uncovering and replacement shall, by appropriate Change Order, be charged to the Owner. If such Work is not in accordance with the Contract Documents, the Contractor shall pay such costs unless the condition was caused by the Owner or a separate contractor in which event the Owner shall be responsible for payment of such costs.

#### 12.2 CORRECTION OF WORK

12.2.1 The Contractor shall promptly correct Work rejected by the Architect or failing to conform to the requirements of the Contract Documents, whether observed before or after Substantial Completion and whether or not fabricated, installed or completed. The Contractor shall bear costs of correcting such rejected work, including additional testing and inspections and compensation for the Architect's services and expenses made necessary thereby and any cost, loss, or damages to the Owner resulting from such failure or defect.

12.2.2 If, within one year after the date of Substantial Completion of the Work or designated portion thereof, or after the date for commencement of warranties established under Subparagraph 9.9.1, or by terms of an applicable special warranty required by the Contract Documents, any of the Work is found to be not in accordance with the requirements of the Contract Documents, the Contractor shall correct it promptly after receipt of written notice from the Owner to do so unless the Owner has previously given the Contractor a written acceptance of such condition. This period of one year shall be extended with respect to portions of Work first performed after Substantial Completion by the period of time between Substantial Completion and the actual performance of the Work. This obligation under this Subparagraph 12.2.2 shall survive acceptance of the Work under the Contract and termination of the Contract. The Owner shall give such notice promptly after discovery of the condition.

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

12.2.4 If the Contractor fails to correct nonconforming Work within a reasonable time, the Owner may correct it in accordance with Paragraph 2.4. If the Contractor does not proceed with correction of such nonconforming Work within a reasonable time fixed by written notice from the Architect, the Owner may remove it and store the salvable materials or equipment at the Contractor's expense. If the Contractor does not pay costs of such removal and storage within ten days after written notice, the Owner may upon ten additional days' written notice sell such materials and equipment at auction or at private sale and shall account for the proceeds thereof, after deducting costs and damages that should have been borne by the Contractor, including compensation for the Architect's services and expenses made necessary thereby. If such proceeds of sale do not cover costs which the Contractor should have borne, the Contract Sum shall be reduced by the deficiency. If payments then or thereafter due the Contractor are not sufficient to cover such amount, the Contractor shall pay the difference to the Owner.

12.2.5 The Contractor shall bear the cost of correcting destroyed or damaged construction, whether completed or partially completed, of the Owner or separate contractors caused by the Contractor's correction or removal of Work which is not in accordance with the requirements of the Contract Documents.

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

## 12.3 ACCEPTANCE OF NONCONFORMING WORK

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

## ARTICLE 13

### MISCELLANEOUS PROVISIONS

#### 13.1 GOVERNING LAW

13.1.1 The Contract shall be governed by the law of the place where the Project is located.



## 13.2 SUCCESSORS AND ASSIGNS

13.2.1 The Owner and Contractor respectively bind themselves, their partners, successors, assigns and legal representatives to the other party hereto and to partners, successors, assigns and legal representatives of such other party in respect to covenants, agreements and obligations contained in the Contract Documents. Except as hereinafter provided, neither party to the Contract shall assign the Contract or sublet it as a whole without the written consent of the other, nor shall the Contractor assign any moneys due or to become due to him hereunder, without the previous written consent of the Owner. The Owner may assign the Contract to any institutional lender providing construction or permanent financing for the Project or to any person acquiring the Owner's interest in the Project, and the Contractor agrees to execute all consents, certificates, and other documents required by such lender or other person in connection with such assignment.

13.2.2 If the Owner conveys its interest in the Project to a third party, any rights which the Owner may have against the Contractor arising from this Agreement shall automatically transfer to such third party.

## 13.3 WRITTEN NOTICE

13.3.1 Written notice shall be deemed to have been duly served if delivered in person to the individual or a member of the firm or entity or to an officer of the corporation for which it was intended, or if delivered at or sent by registered or certified mail to the last business address known to the party giving notice.

## 13.4 RIGHTS AND REMEDIES

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

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

## 13.5 TESTS AND INSPECTIONS

13.5.1 Tests, inspections and approvals of portions of the Work required by the Contract Documents or by laws, ordinances, rules, regulations or orders of public authorities having jurisdiction shall be made at an appropriate time. Unless otherwise provided, the Contractor shall make arrangements for such tests, inspections and approvals with an independent testing laboratory or entity acceptable to the Owner, or with the appropriate public authority, and shall bear all related costs of tests, inspections and approvals. The Contractor shall give the Architect timely notice of when and where tests and inspections are to be made so the Architect may

observe such procedures. The Owner shall bear costs of tests, inspections or approvals which do not become requirements until after bids are received or negotiations concluded.

13.5.2 If the Architect, Owner or public authorities having jurisdiction determine that portions of the Work require additional testing, inspection or approval not included under Subparagraph 13.5.1, the Architect will, upon written authorization from the Owner, instruct the Contractor to make arrangements for such additional testing, inspection or approval by an entity acceptable to the Owner, and the Contractor shall give timely notice to the Architect of when and where tests and inspections are to be made so the Architect may observe such procedures. The Owner shall bear such costs except as provided in Subparagraph 13.5.3.

13.5.3 If such procedures for testing, inspection or approval under Subparagraphs 13.5.1 and 13.5.2 reveal failure of the portions of the Work to comply with requirements established by the Contract Documents, the Contractor shall bear all costs made necessary by such failure including those of repeated procedures and compensation for the Architect's services and expenses.

13.5.4 The Contractor shall obtain and deliver promptly to the Architect any occupancy permit and any certificates of final inspection of any part of the Contractor's work and operating permits for any mechanical apparatus, such as elevators, escalators, boilers, air compressors, etc., which may be required by law to permit full use and occupancy of the premises by the Owner. Receipt of such permits or certificates by the Architect shall be a condition precedent to Substantial Completion of the Work.

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

## 13.6 LIMITATION OF LIABILITY

13.6.1 The Owner shall be liable only to the extent of its interest in the Project; and no officer, director, partner, agent or employee of the Owner (or any partner of a partner or any agent or employee of a partner) shall ever be personally or individually liable with respect to this Contract or the Work. Each Subcontract shall include the foregoing limitation, which shall be effective if the Owner ever succeeds to the Contractor's rights and obligations under a Subcontract.

13.7 The Contractor shall comply with any decisions of the Arlington Redevelopment Board applicable to the Project, and with any other Laws, By-Laws, Rules, and Regulations or Ordinances within the Town of Arlington.

## ARTICLE 14

### TERMINATION OR SUSPENSION OF THE CONTRACT

#### 14.1 TERMINATION BY THE CONTRACTOR

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

- .1 issuance of an order of a court or other public authority having jurisdiction; or
- .2 an act of government, such as declaration of national emergency, making material unavailable.

14.1.2 If one of the above reasons exists, the Contractor may, upon seven additional days' written notice to the Owner and Architect, terminate the Contract and recover from the Owner payment for Work executed and for proven loss with respect to materials, equipment, tools, and construction equipment and machinery, including reasonable overhead, profit and damages.

14.1.3 If the Work is stopped for a period of 60 days through no act or fault of the Contractor or a Subcontractor or their agents or employees or any other persons performing portions of the Work under contract with the Contractor because the Owner has persistently failed to fulfill the Owner's obligations under the Contract Documents with respect to matters important to the progress of the Work, the Contractor may, upon seven additional days' written notice to the Owner and the Architect, terminate the Contract and recover from the Owner as provided in Subparagraph 14.1.2.

#### 14.2 TERMINATION BY THE OWNER

14.2.1 If the Contractor is adjudged a bankrupt, or if the Contractor makes a general assignment for the benefit of the Contractor's creditors, or if a receiver is appointed on account of the Contractor's insolvency, or if the Contractor persistently or repeatedly refuses or fails, except in cases for which extension of time is provided, to supply enough properly skilled workmen or proper materials, or if the Contractor fails to make prompt payment to Subcontractors for materials or labor, or persistently disregards laws, ordinances, rules, regulations or orders of any public authority having jurisdiction, or otherwise is guilty of a significant violation of any provision of the Contract, including the failure to perform the Work in Accordance With the Contract, then the Contractor shall be in default, and the Owner may, without prejudice to any other right or remedy, and upon seven days' written notice to the Contractor, take possession of all materials, tools, appliances, equipment, construction equipment and machinery and vehicles, offices and other facilities on the Project site, and all

materials intended for the Work, wherever stored, and may terminate the employment of the Contractor, accept assignment of any or all Subcontracts pursuant to Paragraph 5.4, and finish the Work by whatever method the Owner may deem expedient. The Owner shall be entitled to collect from the Contractor all direct, indirect, liquidated, and consequential damages suffered by the Owner on account of the Contractor's default, including without limitation additional services and expenses of the Architect made necessary thereby. The Owner shall be entitled to hold all amounts due the Contractor at the date of termination until all of the Owner's damages have been established, and to apply such amounts to such damages.

14.2.2 When the Owner terminates the Contract for one of the reasons stated in Subparagraph 14.2.1, the Contractor shall not be entitled to receive further payment until the Work is finished. Any payment to the Contractor in quantum meruit shall be capped at the amount due under this Contract, including any adjustments, regardless of whether said termination by the Owner is deemed rightful or wrongful.

14.2.3 If the unpaid balance of the Contract Sum exceeds costs of finishing the Work, including compensation for the Architect's services and expenses made necessary thereby, such excess shall be paid to the Contractor. If such costs exceed the unpaid balance, the Contractor shall pay the difference to the Owner. The amount to be paid to the Contractor or Owner, as the case may be, shall be certified by the Architect, upon application, and this obligation for payment shall survive termination of the Contract.

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## SUPPLEMENTAL STATUTORY CONDITIONS

### ARTICLE 1 - WAGES AND EMPLOYMENT PRACTICES

- 1.1 Preference To Veterans and Citizens In Public Work; Rate of Wages. (Statutory reference: Mass. Gen. Laws Chapter 149, Section 26) This Paragraph applies to every contract or subcontract for the construction of public works by the Commonwealth or by a county, town or district, or by persons contracting or subcontracting for such works.
- 1.1.1 In the employment of mechanics and apprentices, teamsters, chauffeurs and laborers, preference shall first be given to citizens of the Commonwealth who have been residents of the Commonwealth for at least six months at the commencement of their employment, who are veterans as defined in Mass. Gen. Laws Chapter 4, Section 7, clause 43, and who are qualified to perform the work to which the employment relates; and secondly, to citizens of the Commonwealth generally who have been residents of the Commonwealth for at least six months at the commencement of their employment, and if they cannot be obtained in sufficient numbers, then to citizens of the United States, and every contract for such work shall contain a provision to this effect. Each county, town or district in the construction of public works, or persons contracting or subcontracting for such works, shall give preference to veterans and citizens who are residents of such county, town or district.
- 1.1.2 The rate per hour of the wages paid to said mechanics and apprentices, teamsters, chauffeurs and laborers in the construction of public works shall not be less than the rate or rates of wages to be determined by the Commissioner of Labor and Industries as hereinafter provided; provided, that the wages paid to laborers employed on said works shall not be less than those paid to laborers in the municipal service of the town or towns where said works are being constructed; provided, further, that where the same public work is to be constructed in two or more towns, the wages paid to laborers shall not be less than those paid to laborers in the municipal service of the town paying the highest rate; provided further, that if, in any of the towns where the works are to be constructed, a wage rate or wage rates have been established in certain trades and occupations by collective agreements or understandings in the private construction industry between organized labor and employers, the rate or rates to be paid on said works shall not be less than the rates so established; provided, further, that in towns where no such rate or rates have been so established, the wages paid to mechanics and apprentices, teamsters, chauffeurs and laborers on public works, shall not be less than the wages paid to the employees in the same trades and occupations by private employers engaged in the construction industry. This section shall also apply to regular employees of the Commonwealth or of a county, town or district, when such employees are employed in the construction, addition to or alteration of public buildings for which special appropriations of more than one thousand

dollars are provided. Payments by employers to health and welfare plans, pension plans and supplementary unemployment benefit plans under collective bargaining agreements or understandings between organized labor and employers shall be included for the purpose of establishing minimum wage rates as herein provided.

- 1.2 List of Jobs; Classifications; Determination of Rate of Wages; Schedule.  
(Statutory reference; Mass. Gen. Laws Chapter 149, Section 27) This Paragraph applies to every contract or subcontract for the construction of public works by the Commonwealth, or by a county, town or district.

The Commissioner of Labor and Industries shall prepare, for the use of such public officials or public bodies whose duty it shall be to cause public works to be constructed, a list of the several jobs usually performed on various types of public works upon which mechanics and apprentices, teamsters, chauffeurs and laborers are employed. The Commissioner shall classify said jobs, and he may revise such classifications from time to time, as he may deem advisable. Prior to awarding a contract for the construction of public works, said public official or public body shall submit to the Commissioner a list of the jobs upon which mechanics and apprentices, teamsters, chauffeurs and laborers are to be employed, and shall request the Commissioner to determine the rate of wages to be paid on each job. Said rates shall apply to all persons engaged in transporting gravel or fill to the site of said public works or removing gravel or fill from such site, regardless of whether such persons are employed by a contractor or subcontractor or are independent contractors or owner-operators. The Commissioner, subject to the provisions of Paragraph 1.1 of these Supplementary Statutory Conditions, shall proceed forthwith to determine the same, and shall furnish said official or public body with a schedule of such rate or rates of wages as soon as said determination shall have been made. In advertising or calling for bids for said works, the awarding official or public body shall incorporate said schedule in the advertisement or call for bids by an appropriate reference thereto, and shall furnish a copy of said schedule without cost, to any person requesting the same. Said schedule shall be made a part of the contract for said works and shall continue to the minimum rate or rates of wages for said employees during the life of the contract. Any person engaged in the construction of said works shall cause a legible copy of said schedule to be kept posted in a conspicuous place at the site of said works during the life of the contract. The aforesaid rates of wages in the schedule of wage rates shall include payment by employers to health and welfare plans, pension plans, and supplementary unemployment benefit plans and such payments shall be considered as payments to persons under this section performing work as herein provided. Any employer engaged in the construction of such works who does not make payments to a health and welfare plan, a pension plan and a supplementary unemployment benefit plan, where such payments are included in said rates of wages, shall pay the amount of said payments directly to each employee engaged in said construction. Note: The awarding authority does not guarantee the accuracy of any schedule of wage rates

furnished to the Contractor hereunder, and the Contractor shall be responsible for ascertaining the prevailing wages in the area where the work will be performed.

1.3 Employment Records To Be Kept By Contractor, Subcontractor; Statement of Compliance. (Statutory reference; Mass. Gen. Laws Chapter 149, Section 27B) This Paragraph applies to every contract or subcontract for the construction of public works by the Commonwealth, or by a county, town or district.

Every Contractor, Subcontractor or public body engaged in said public works to which Paragraph 1.2 of these Supplementary Statutory Conditions applies shall keep a true and accurate record of all mechanics and apprentices, teamsters, chauffeurs and laborers employed thereon, showing the name, address and occupational classification of each such employee on said works, and the hours worked by, and the wages paid to, each such employee, and shall furnish to the Commissioner of Labor and Industries, upon his request, a copy of said record, signed by the employer or his authorized agent under the penalties of perjury. Such records shall be open to inspection by any authorized representative of the Department of Labor and Industries at any reasonable time, and as often as may be necessary.

Each such Contractor, Subcontractor or public body shall preserve its payroll records for a period of three years from the date of completion of the contract.

Each such Contractor, Subcontractor or public body shall furnish to the Commissioner of Labor and Industries within fifteen days after completion of its portion of the work a statement, executed by the Contractor, Subcontractor, or public body or by any authorized officer or employee of the Contractor, Subcontractor or public body who supervises the payment of wages in the following form:

STATEMENT OF COMPLIANCE \_\_\_\_\_, 2004

I, \_\_\_\_\_, \_\_\_\_\_ do hereby state:  
(Name of signatory party) (Title)

That I pay or supervise the payment of the persons employed by (Contractor, Subcontractor or public body) \_\_\_\_\_ on the \_\_\_\_\_ and that all mechanics (building or project) and apprentices, teamsters, chauffeurs and laborers employed on said project have been paid in accordance with wages determined under the provisions of sections twenty-six and twenty-seven of chapter one hundred and forty-nine of the General Laws.

\_\_\_\_\_  
Signature

\_\_\_\_\_  
Title

The above mentioned copies of payroll records and statements of compliance shall be available for inspection by any interested party filing a written request to the Commissioner for such inspection.

- 1.4 Wages Paid to Operators of Trucks and Other Equipment. (Statutory reference: Mass. Gen. Laws Chapter 149, Section 27F) This Paragraph applies to every contract for the construction of public works by the Commonwealth, or by a county, city, town or district.

Prescribed rates of wages, as determined by the Commissioner of Labor and Industries, shall be paid to the operators of all trucks, vehicles or equipment employed on the Project. Said rates of wages shall be requested of said Commissioner by the awarding authority and shall be furnished by the Commissioner in a schedule containing the classification of jobs, and the rate of wages to be paid for each job. Said rates of wages shall include payments to health and welfare plans, or, if no such plan is in effect between employer and employees, the amount of such payments shall be paid directly to said operators.

- 1.5 Reserve Police Officers (Statutory reference: Mass. Gen. Laws. Chapter 149, Section 27B) This Paragraph 1.5 applies to every contract for the construction, alteration, maintenance, repair or demolition of, or addition to, any public works for the Commonwealth or any political subdivision thereof.

The Contractor shall pay to any reserve police officer employed by him in any city or town the prevailing rate of wage paid to regular police officers in such city or town.

- 1.6 Eight-Hour Day, etc. This Paragraph 1.6 applies only to contracts which are subject to the provisions of Mass. Gen. Laws Chapter 149, Sections 30 and 34.

No laborer, worker, mechanic, foreman or inspector working within this Commonwealth in the employ of the Contractor, Subcontractor or other person doing or contracting to do the whole or part of the work contemplated by the contract, shall be required or permitted to work more than eight hours in any one day or more than forty-eight hours in any one week, or more than six days in any one week, except in cases of emergency.

- 1.7 Lodging, etc. (Statutory reference: Mass. Gen. Laws Chapter 149, Section 25) This Paragraph applies to every contract with the Commonwealth, a county, city or town, or with a department, board, commission, or officer acting therefor, for the doing of public work.

Every employee under this contract shall lodge, board and trade where and with whom he elects, and neither the Contractor nor his agents or employees shall, either directly or indirectly, require as a condition of the employment of any



person that the employee shall lodge, board or trade at a particular place or with a particular person.

- 1.8 Access to Contractor's Records (Executive Order No. 195) This paragraph applies to every contract for the purchase of services or material by any agency, bureau, board, commission, institution, or department of the Commonwealth.

The Governor or his designee, the secretary of administration and finance, and the state auditor or his designee shall have the right at reasonable times and upon reasonable notice to examine the books, records, and other compilations of data of the Contractor which pertain to the performance and requirements of this contract.

- 1.9 Worker's Compensation Insurance (Statutory reference: Mass. Gen. Laws Chapter 149, Section 34A) This Paragraph 1.9 applies to every contract for the construction, alteration, maintenance, repair or demolition of, or addition to, any public building or other public works for the Commonwealth or any political subdivision thereof.

The Contractor shall, before commencing performance of the contract, provide by insurance for the payment of compensation and the furnishing of other benefits under Mass. Gen. Laws Chapter 152 to all persons to be employed under the contract, and the Contractor shall continue such insurance in full force and effect during the term of the contract. Sufficient proof of compliance with this Paragraph 1.9 must be furnished at the time of execution of this contract. Failure to provide and continue in force such insurance as aforesaid shall be deemed a material breach of the contract and shall operate as an immediate termination thereof. No cancellation of such insurance, whether by the insurer or by the insured, shall be valid unless written notice thereof is given by the party proposing cancellation to the other party and to the awarding authority at least fifteen days prior to the intended effective date thereof, which date shall be expressed in full notice.

## ARTICLE 2 - EQUAL EMPLOYMENT OPPORTUNITY AND AFFIRMATIVE ACTION

(Statutory reference: Mass. Gen. Laws Chapter 151B; Executive Orders No. 74, No. 116 and No. 246). The provisions of this Article 2 are intended to comply with the Commonwealth's Supplemental Equal Employment Opportunity Anti-Discrimination and Affirmative Action Program, referred to in Executive Order No. 116 and administered by the Massachusetts Commission Against Discrimination. If no specific percentage has been inserted in Subparagraph 2.2.3 below, the applicable minimum percentage provided for in such Supplemental Program shall be deemed to have been so inserted.

- 2.1 Definitions. For purposes of this Contract, "minority" refers to Asian-Americans, Blacks, Spanish-Surnamed Americans, North American Indians, and Cape Verdeans. "Commission" refers to the Massachusetts Commission Against Discrimination.

- 2.2 Non-Discrimination and Affirmative Action Requirements. During the performance of this Contract, the Contractor and all of his Subcontractors (hereinafter “Contractor”), for himself, his assignees and successors in interest, agree to comply with Subparagraphs 2.2.1 through 2.2.11.
- 2.2.1 In connection with the performance of Work under this Contract, the Contractor shall not discriminate against any employee or applicant for employment because of race, color, religious creed, national origin, age or sex. The aforesaid provision shall include, but not be limited to, the following: employment upgrading, demotion, or transfer; recruitment advertising; recruitment layoff; termination; rates of pay or other forms of compensation; conditions or privileges of employment; and selection for apprenticeship. The Contractor shall post hereafter in conspicuous places, available for employees and applicants for employment, notices to be provided by the Commission setting forth the provisions of the Fair Employment Practices Law of the Commonwealth.
- 2.2.2 In connection with the performance of Work under this Contract, the Contractor shall undertake in good faith affirmative action measures designed to eliminate any discriminatory barriers in the terms and conditions of employment on the grounds of race, color, religious creed, national origin, age or sex, and to eliminate and remedy any effects of such discrimination in the past. Such affirmative action shall entail positive and aggressive measures to ensure equal opportunity in the areas of hiring, upgrading, demotion or transfer, recruitment, layoff or termination, rate of compensation, and in-service or apprenticeship training programs. This affirmative action shall include all action required to guarantee equal employment opportunity for all persons, regardless of race, color, religious creed, national origin, age or sex. A purpose of this provision is to ensure to the fullest extent possible an adequate supply of skilled tradesmen for this and future Commonwealth public construction projects.
- 2.2.3 As part of his obligation of remedial action under the foregoing Subparagraph 2.2.2, the Contractor shall maintain on this project a not less than ten percent (10%) ratio of minority employee man hours to total man hours in each job category including but not limited to bricklayers, carpenters, cement masons, electricians, ironworkers, operating engineers, and those “classes of work” enumerated in Mass. Gen. Laws Chapter 149, Section 44F.
- 2.2.4 In the hiring of minority journeymen, apprentices, trainees and advanced trainees, the Contractor shall rely on referrals from a multi-employer affirmative action program approved by the Commission, traditional referral methods utilized by the construction industry, and referrals from agencies, not more than three in number at any one time, designated by the Liaison Committee (described in Subparagraph 2.2.5 below) or the Commission.

- 2.2.5 At the discretion of the Commission there may be established for the life of this Contract a body to be known as the Liaison Committee. The Liaison Committee shall be composed of one representative each from the agency or agencies administering this project, hereinafter called the administering agency, the Commission and such other representatives as may be designated by the Commission in conjunction with the administering agency.
- 2.2.6 The Contractor (or his agent, if any, designated by him as the on-site equal employment opportunity officer) shall recognize the Liaison Committee as an affirmative action body, and shall establish a continuing working relationship with the Liaison Committee, consulting with the Liaison Committee on all matters related to minority recruitment, referral, employment and training.
- 2.2.7 The Contractor shall prepare projected manning tables on a quarterly basis. These shall be broken down into projections, by week, of workers required in each trade. Copies shall be furnished one week in advance of the commencement of the period covered, and also when updated, to the Commission and Liaison Committee.
- 2.2.8 Records of employment referral orders, prepared by the Contractor, shall be made available to the Commission and to the Liaison Committee on request.
- 2.2.9 The Contractor shall prepare weekly reports in a form approved by the Commission of hours worked in each trade by each employee, identified as a minority or non-minority. Copies of these shall be provided at the end of each week to the Commission and to the Liaison Committee.

If the Contractor shall use any Subcontractor on any work performed under this Contract, he shall take affirmative action to negotiate with qualified minority Subcontractors. This affirmative action shall cover both pre-bid and post-bid periods. It shall include notification to the Office of Minority Business Assistance (within the Executive Office of Communities and Development) or its designee, while bids are in preparation, of all products, work or services for which the Contractor intends to negotiate bids.

In the employment of journeymen, apprentices, trainees and advanced trainees, the Contractor shall give preference, first, to citizens of the Commonwealth who have served in the armed forces of the United States in time of war and have been honorably discharged therefrom or released from active duty therein, and who are qualified to perform the work to which the employment relates, and, secondly, to citizens of the Commonwealth generally, and, if such cannot be obtained in sufficient numbers, then to citizens of the United States.

A designee of the Commission and a designee of the Liaison Committee shall each have right of access to the construction site.

2.2.10 The Contractor shall maintain as a goal on this project a not less than five percent ratio of women work force to total project hours in both the general contract and each individual filed sub-bid contract.

A Labor Scheduling Table will be used as a tool for achieving a range of women work force participation for the entire project in both the general contract and each individual filed sub-bid contract. Said Labor Scheduling Table shall be in a form acceptable to the Town.

2.2.11 Before starting work, the Contractors (includes the General Contractor, for itself and its Subcontractors, as well as all filed sub-bid Contractors) will submit plans for achievement of the equal opportunity goals of the contract. All Contractors will be required to make a good faith effort to achieve these goals. The plan will indicate if the Contractors expect to achieve the requirements during the first quarter. If there are reasons why the Contractors do not expect to achieve the requirements during the first quarter year of the contract construction phase, then the Contractors shall provide a plan calculated to address, to the extent reasonably possible, these obstacles to a good faith effort to achieve such goals.

Not more than ten days following the end of each work quarter, the Contractors will report on the achievement of the goals, detailing the good faith efforts that have been made and will continue to be made and any other appropriate efforts not yet undertaken.

All reports will be signed by an officer or principal of the company who has the authority to contractually obligate the company.

2.3 The Contractor shall comply with the provisions of Executive Order No. 74, as amended by Executive Order No. 166, dated May 1, 1975, and of Mass. Gen. Laws Chapter 151B, both of which are herein incorporated by reference and made a part of this Contract.

2.4 The Contractor, in the performance of all Work, and prior to completion of the Work, will not discriminate on grounds of race, color, religious creed, national origin, age or sex in employment practices, in the selection or retention of Subcontractors, or in the procurement of materials and rentals of equipment.

2.5 In all solicitations either by competitive bidding or negotiation made by the Contractor either for work to be performed under a subcontract or for the procurement of materials or equipment, each potential Subcontractor or supplier shall be notified in writing by the Contractor of the Contractor's obligations under this Contract relative to non-discrimination and affirmative action.

2.6 The Contractor hereby certifies that he shall comply with the minority manpower ratio and specific action steps contained herein. The Contractor shall be required to obtain from each of its Subcontractors and submit to the administering agency

prior to the performance of any work under the Contract a certification by said Subcontractor, regardless of tier, that it will comply with the minority manpower ration and specific affirmative action steps contained herein. Such certification shall be provided on forms furnished by the administering agency or, in the absence thereof, on forms prescribed by the Commission.

2.7 The Contractor's certification form must be signed by all successful low bidder(s) prior to award by the administering agency.

2.8 Compliance Information, Reports and Sanctions.

2.8.1 The Contractor will provide all information and reports required by the administering agency or the Commission on instructions issued by either of them and will permit access to its facilities and books, records, accounts and other sources of information which may be determined by the Commission to affect the employment of personnel. This provision shall apply only to information pertinent to the Commonwealth's supplementary affirmative action contract requirements. Where information required is in the exclusive possession of another who fails or refuses to furnish this information, the Contractor shall so certify to the administering agency or the Commission as appropriate and shall set forth what efforts he has made to obtain the information.

2.8.2 Whenever the administering agency, the Commission or the Liaison Committee believes the Contractor or any Subcontractor may not be operating in compliance with the terms of this Paragraph 2.8, the Commission directly, or through its designated agent, shall conduct an appropriate investigation, and may confer with the parties, to determine if such Contractor is operating in compliance with the terms of this Paragraph 2.8. If the Commission or its agent finds the Contractor or any Subcontractor not in compliance, it shall make a preliminary report on noncompliance, and notify such Contractor in writing of such steps as will in the judgment of the Commission or its agent bring such Contractor into compliance. In the event that such Contractor fails or refuses to fully perform such steps, the Commission shall make a final report of non-compliance, and recommend to the administering agency the imposition of one or more of the sanctions listed below. If, however, the Commission believes the Contractor or any Subcontractor has taken or is taking every possible measure to achieve compliance, it shall not make a final report of non-compliance. Within fourteen days of the receipt of the recommendations of the Commission, the administering agency shall move to impose one or more of the following sanctions, as it may deem appropriate to attain full and effective enforcement:

- (i) The recovery by the administering agency from the Contractor of 1/100 of 1% of the contract award price or \$1,000, whichever sum is greater, in the nature of liquidated damages or, if a Subcontractor is in non-compliance, the recovery by the administering agency from the Contractor, to be assessed by the Contractor as a back charge against

the Subcontractor, of 1/10 or 1% of the subcontract price, or \$400, whichever sum is greater, in the nature of liquidated damages, for each week that such party fails or refuses to comply;

- (ii) The suspension of any payment or part thereof due under the Contract until such time as the Contractor or any Subcontractor is able to demonstrate his compliance with the terms of the contract;
- (iii) The termination, or cancellation, of the Contract, in whole or in part, unless the Contractor or any subcontractor is able to demonstrate within a specified time his compliance with the terms of the Contract;
- (iv) The denial to the Contractor or any Subcontractor of the right to participate in any future contracts awarded by the administering agency for a period of up to three years.

If at any time after the imposition of one or more of the above sanctions a Contractor is able to demonstrate that he is in compliance with this Paragraph 2.8, he may request that the administering agency, in consultation with the Commission, suspend the sanctions conditionally, pending a final determination by the Commission as to whether the Contractor is in compliance. Upon final determination of the Commission, the administering agency, based on the recommendation of the Commission, shall either lift the sanctions or reimpose them.

Sanctions enumerated under Subparagraph 2.8.2 of this Paragraph 2.8 shall not be imposed by the administering agency except after an adjudicatory proceeding, as that term is used in Mass. Gen. Laws Chapter 30A, has been conducted. No investigation by the Commission or its agent shall be initiated without prior notice to the Contractor.

2.9 Severability. The provisions of this Article 2 are severable, and if any of these provisions shall be held unconstitutional by any court of competent jurisdiction, the decision of such court shall not affect or impair any of the remaining provisions.

2.10 The Contractor shall comply with the provisions of Executive Order No. 246, relating to discrimination against and equal employment opportunity for the handicapped, which is herein incorporated by reference and made a part of this Contract. In connection with the performance of work under this Contract, the Contractor, Subcontractors and suppliers of goods and services shall not discriminate against the handicapped. Furthermore, Contractors, Subcontractors and suppliers of goods and services must give written notice of their commitments under this Paragraph 2.10 to any labor union, association or brotherhood with which they have a collective bargaining contract or other agreement, and must give such notice to handicapped contractors and to handicapped contractor

associations. A copy of such notice must be furnished to the awarding authority at the time of the signing of the contract.

2.11 Suspension of Payments.

2.11.1 If the awarding authority determines after investigation that the Contractor or any Subcontractor is not in compliance with the terms of Article 2, it may suspend any payment or portion thereof due under the Contract until the Contractor demonstrates compliance with the terms of Article 2.

2.11.2 Payment shall not be suspended if the awarding authority finds that the Contractor made his best efforts to comply with Article 2, or that some other justifiable reason exists for waiving the provisions of Article 2 in whole or in part.

2.11.3 Payment may be suspended only after the Contractor and any other interested party shall have been given the opportunity to present evidence in support of its position at an informal hearing held by the awarding authority and the awarding authority has concluded upon review of all the evidence that such penalty is justified.

2.11.4 This temporary suspension of payments by the awarding authority is separate from the sanctions set forth in Paragraph 2.8 above, which are determined by the Commission and recommended to the awarding authority.

ARTICLE 3 - MASSACHUSETTS PUBLIC CONSTRUCTION STATUTES

3.1 To whatever extent Massachusetts statutory laws regarding public construction apply to this project, said laws specifically are incorporated herein as if re-stated herein.

ARTICLE 4 - TITLE I GENERAL GOVERNMENT, ARTICLE 16 CONSTRUCTION PROJECTS, § 1-3 OF THE TOWN OF ARLINGTON GENERAL BY-LAWS

4.1 Women Work Force Participation.

4.1.1 The contractor shall maintain as a goal on this project a not less than five percent ratio of women work force to total project hours in both the general contract and each individual filed sub-bid contract, if applicable. The preceding sentence shall be included in all construction contracts whether entered into by the Town pursuant to the provisions of M.G.L. c. 149 or M.G.L. c. 30, § 39M et. seq. provided however, that if entered into under Chapter 30 same shall not be deemed to apply where the projected bid price as determined by the Director of Public Works is not likely to exceed \$200,000.

- 4.1.2 A Labor Scheduling Table which will be used as a tool for achieving a range of women work force participation for the entire project in both the general contract and each individual filed sub-bid contract.
- 4.2 Equal Opportunity Goal Compliance.
  - 4.2.1 Before starting work, the contractors (includes the general contractor, for itself and its subcontractors, as well as all filed sub-bid contractors, if applicable) will submit plans for achievement of the equal opportunity goals of the contract. All contractors will be required to make a good faith effort to achieve these goals. The plan will indicate if the contractors expect to achieve the requirements during the first quarter. If there are reasons why the contractors do not expect to achieve the requirements during the first quarter year of the contract construction phase, then the contractors shall provide a plan calculated to address, to the extent reasonably possible, these obstacles to a good faith effort to achieve such goals.
  - 4.2.2 Not more than ten days following the end of each work quarter, the contractors will report on the achievement of the goals, detailing the good faith efforts that have been made and will continue to be made and any other appropriate efforts not yet undertaken.
  - 4.2.3 All reports will be signed by an officer or principal of the company who has the authority to contractually obligate the company.
- 4.3 Recruitment and Training
  - 4.3.1 Any board, officer, committee, or other agency of the Town, which acts on behalf of the Town in making or supervising any contract, in any amount exceeding the sum of \$100,000 for the purchase of goods or services or for the construction, renovation, or repair of buildings or other improvement of real estate, may make arrangements with contractors and other interested agencies for special programs of recruitment and training in connection with the work to be performed on such contract, with the objective of promoting equal employment opportunity for members of minority groups protected by the fair employment laws of the Commonwealth and the United States. Any board, officer, committee or other Town agency may expend Town funds in carrying them out provided that appropriations specifically designed for such purposes have been voted by the Town Meeting.

215451.1



**SECTION 000010  
MASSACHUSETTS WEEKLY PAYROLL REPORT**

**END OF SECTION**

## WEEKLY PAYROLL RECORDS REPORT & STATEMENT OF COMPLIANCE

In accordance with Massachusetts General Law c. 149, §27B, a true and accurate record must be kept of all persons employed on the public works project for which the enclosed rates have been provided. A Payroll Form is available from the Department of Labor Standards (DLS) at [www.mass.gov/dols/pw](http://www.mass.gov/dols/pw) and includes all the information required to be kept by law. Every contractor or subcontractor is required to keep these records and preserve them for a period of three years from the date of completion of the contract.

On a weekly basis, every contractor and subcontractor is required to submit a certified copy of their weekly payroll records to the awarding authority; this includes the payroll forms and the Statement of Compliance form. The certified payroll records must be submitted either by regular mail or by e-mail to the awarding authority. Once collected, the awarding authority is required to preserve those records for three years from the date of completion of the project.

Each such contractor and subcontractor shall furnish weekly **and** within 15 days after completion of its portion of the work, to the awarding authority directly by first-class mail or e-mail, a statement, executed by the contractor, subcontractor or by any authorized officer thereof who supervised the payment of wages, this form, accompanied by their payroll:

### STATEMENT OF COMPLIANCE

\_\_\_\_\_, 20\_\_\_\_\_

I, \_\_\_\_\_, \_\_\_\_\_  
(Name of signatory party) (Title)

do hereby state:

That I pay or supervise the payment of the persons employed by

\_\_\_\_\_ on the \_\_\_\_\_  
(Contractor, subcontractor or public body) (Building or project)

and that all mechanics and apprentices, teamsters, chauffeurs and laborers employed on said project have been paid in accordance with wages determined under the provisions of sections twenty-six and twenty-seven of chapter one hundred and forty nine of the General Laws.

Signature \_\_\_\_\_

Title \_\_\_\_\_

**SECTION 00009  
THE MASSACHUSETTS PREVAILING WAGE LAW  
M.G.L. C. 149, §§26-27**

**NOTICE TO AWARDING AUTHORITIES**

- A. The enclosed wage schedule applies only to the specific project listed at the top of the schedule, and these rates will remain in effect for the duration of the project, except in the case of multi-year projects. For projects lasting longer than one year, awarding authorities must request updated rates.
- B. You should request an updated wage schedule from the Department of Labor Standards if you have not opened bids or selected a contractor within 90 days of the date of issuance of the enclosed wage schedule.
- C. The wage schedule shall be incorporated in any advertisement or call for bids for the project for which it has been issued.
- D. Once a contractor has been selected by the awarding authority, the wage schedule shall be made a part of the contract for that project.

**NOTICE TO CONTRACTORS**

- E. The enclosed wage schedule must be posted in a conspicuous place at the work site during the life of the project.
- F. The wages listed on the enclosed wage schedule must be paid to employees on public works projects regardless of whether they are employed by the prime contractor, a filed sub-bidder, or any sub-contractor.
- G. The enclosed wage schedule applies to all phases of the project, including the final clean-up. Contractors whose only role is to perform final clean-up must pay their employees according to this wage schedule.
- H. All apprentices must be registered with the Massachusetts Division of Apprenticeship Standards (DAS) in order to be paid at the lower apprentice rates. All apprentices must keep his/her apprentice identification card on his/her person during all work hours. If a worker is not registered with DAS, they must be paid the "total rate" listed on the wage schedule regardless of experience or skill level. For further information, please call 617-626-5409, or write to:

DAS  
19 Staniford Street, 1 st Floor  
P.O. Box 146759,  
Boston, MA 02114.

**END OF SECTION**



MAURA HEALEY  
Governor

KIM DRISCOLL  
Lt. Governor

THE COMMONWEALTH OF MASSACHUSETTS  
EXECUTIVE OFFICE OF LABOR AND WORKFORCE DEVELOPMENT  
DEPARTMENT OF LABOR STANDARDS

Prevailing Wage Rates

As determined by the Director under the provisions of the  
Massachusetts General Laws, Chapter 149, Sections 26 to 27H

LAUREN JONES  
Secretary

MICHAEL FLANAGAN  
Director

**Awarding Authority:** Town of Arlington  
**Contract Number:** 23-21 **City/Town:** ARLINGTON  
**Description of Work:** Police Headquarters - Boiler Replacement. Remove old gas boiler heating system and replace with three new condensing boilers.  
**Job Location:** 112 Mystic St, Arlington, MA

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Information about Prevailing Wage Schedules for Awarding Authorities and Contractors

- **The wage rates will remain in effect for the duration of the project, except in the case of multi-year public construction projects. For construction projects lasting longer than one year, awarding authorities must request an updated wage schedule no later than two weeks before the anniversary of the date the contract was executed by the awarding authority and the general contractor.** For multi-year CM AT RISK projects, the awarding authority must request an annual update no later than two weeks before the anniversary date, determined as the earlier of: (a) the execution date of the GMP Amendment, or (b) the execution date of the first amendment to permit procurement of construction services. The annual update requirement is not applicable to 27F "rental of equipment" contracts. **The updated wage schedule must be provided to all contractors, including general and sub-contractors, working on the construction project.**
- This wage schedule applies only to the specific project referenced at the top of this page and uniquely identified by the "Wage Request Number" on all pages of this schedule.
- An Awarding Authority must request an updated wage schedule if it has not opened bids or selected a contractor within 90 days of the date of issuance of the wage schedule. For CM AT RISK projects (bid pursuant to G.L. c.149A), the earlier of: (a) the execution date of the GMP Amendment, or (b) the bid for the first construction scope of work must be within 90-days of the wage schedule issuance date.
- The wage schedule shall be incorporated in any advertisement or call for bids for the project as required by M.G.L. c. 149, § 27. The wage schedule shall be made a part of the contract awarded for the project. The wage schedule must be posted in a conspicuous place at the work site for the life of the project in accordance with M.G.L. c. 149 § 27. The wages listed on the wage schedule must be paid to employees performing construction work on the project whether they are employed by the prime contractor, a filed sub-bidder, or a sub-contractor.
- Apprentices working on the project are required to be registered with the Massachusetts Division of Apprentice Standards (DAS). Apprentices must keep their apprentice identification card on their persons during all work hours on the project. An apprentice registered with DAS may be paid the lower apprentice wage rate at the applicable step as provided on the prevailing wage schedule. **Any apprentice not registered with DAS regardless of whether they are registered with another federal, state, local, or private agency must be paid the journeyworker's rate.**
- Every contractor or subcontractor working on the construction project must submit weekly payroll reports and a Statement of Compliance directly to the awarding authority by mail or email and keep them on file for three years. Each weekly payroll report must contain: the employee's name, address, occupational classification, hours worked, and wages paid. Do not submit weekly payroll reports to DLS. For a sample payroll reporting form go to <http://www.mass.gov/dols/pw>.
- Contractors with questions about the wage rates or classifications included on the wage schedule have an affirmative obligation to inquire with DLS at (617) 626-6953.
- Contractors must obtain the wage schedules from awarding authorities. Failure of a contractor or subcontractor to pay the prevailing wage rates listed on the wage schedule to all employees who perform construction work on the project is a violation of the law and subjects the contractor or subcontractor to civil and criminal penalties.
- Employees not receiving the prevailing wage rate set forth on the wage schedule may file a complaint with the Fair Labor Division of the office of the Attorney General at (617) 727-3465.

Classification	Effective Date	Base Wage	Health	Pension	Supplemental Unemployment	Total Rate
<b>Construction</b>						
(2 AXLE) DRIVER - EQUIPMENT <i>TEAMSTERS JOINT COUNCIL NO. 10 ZONE A</i>	12/01/2021	\$37.05	\$13.41	\$16.01	\$0.00	\$66.47
(3 AXLE) DRIVER - EQUIPMENT <i>TEAMSTERS JOINT COUNCIL NO. 10 ZONE A</i>	12/01/2021	\$37.12	\$13.41	\$16.01	\$0.00	\$66.54
(4 & 5 AXLE) DRIVER - EQUIPMENT <i>TEAMSTERS JOINT COUNCIL NO. 10 ZONE A</i>	12/01/2021	\$37.24	\$13.41	\$16.01	\$0.00	\$66.66
ADS/SUBMERSIBLE PILOT <i>PILE DRIVER LOCAL 56 (ZONE 1)</i>	08/01/2020	\$103.05	\$9.40	\$23.12	\$0.00	\$135.57
For apprentice rates see "Apprentice- PILE DRIVER"						
AIR TRACK OPERATOR <i>LABORERS - ZONE 1</i>	12/01/2022	\$43.93	\$9.10	\$17.57	\$0.00	\$70.60
	06/01/2023	\$44.93	\$9.10	\$17.57	\$0.00	\$71.60
	12/01/2023	\$46.18	\$9.10	\$17.57	\$0.00	\$72.85
For apprentice rates see "Apprentice- LABORER"						
AIR TRACK OPERATOR (HEAVY & HIGHWAY) <i>LABORERS - ZONE 1 (HEAVY &amp; HIGHWAY)</i>	12/01/2022	\$43.33	\$9.35	\$17.82	\$0.00	\$70.50
	06/01/2023	\$44.33	\$9.35	\$17.82	\$0.00	\$71.50
	12/01/2023	\$45.58	\$9.35	\$17.82	\$0.00	\$72.75
	06/01/2024	\$47.06	\$9.35	\$17.82	\$0.00	\$74.23
	12/01/2024	\$48.53	\$9.35	\$17.82	\$0.00	\$75.70
	06/01/2025	\$50.03	\$9.35	\$17.82	\$0.00	\$77.20
	12/01/2025	\$51.53	\$9.35	\$17.82	\$0.00	\$78.70
	06/01/2026	\$53.08	\$9.35	\$17.82	\$0.00	\$80.25
	12/01/2026	\$54.58	\$9.35	\$17.82	\$0.00	\$81.75
For apprentice rates see "Apprentice- LABORER (Heavy and Highway)"						
ASBESTOS REMOVER - PIPE / MECH. EQUIPT. <i>HEAT &amp; FROST INSULATORS LOCAL 6 (BOSTON)</i>	12/01/2020	\$38.10	\$12.80	\$9.45	\$0.00	\$60.35
ASPHALT RAKER <i>LABORERS - ZONE 1</i>	12/01/2022	\$43.43	\$9.10	\$17.57	\$0.00	\$70.10
	06/01/2023	\$44.43	\$9.10	\$17.57	\$0.00	\$71.10
	12/01/2023	\$45.68	\$9.10	\$17.57	\$0.00	\$72.35
For apprentice rates see "Apprentice- LABORER"						
ASPHALT RAKER (HEAVY & HIGHWAY) <i>LABORERS - ZONE 1 (HEAVY &amp; HIGHWAY)</i>	12/01/2022	\$42.83	\$9.35	\$17.82	\$0.00	\$70.00
	06/01/2023	\$43.83	\$9.35	\$17.82	\$0.00	\$71.00
	12/01/2023	\$45.08	\$9.35	\$17.82	\$0.00	\$72.25
	06/01/2024	\$46.56	\$9.35	\$17.82	\$0.00	\$73.73
	12/01/2024	\$48.03	\$9.35	\$17.82	\$0.00	\$75.20
	06/01/2025	\$49.53	\$9.35	\$17.82	\$0.00	\$76.70
	12/01/2025	\$51.03	\$9.35	\$17.82	\$0.00	\$78.20
	06/01/2026	\$52.58	\$9.35	\$17.82	\$0.00	\$79.75
	12/01/2026	\$54.08	\$9.35	\$17.82	\$0.00	\$81.25
For apprentice rates see "Apprentice- LABORER (Heavy and Highway)"						

Classification	Effective Date	Base Wage	Health	Pension	Supplemental Unemployment	Total Rate
ASPHALT/CONCRETE/CRUSHER PLANT-ON SITE <i>OPERATING ENGINEERS LOCAL 4</i>	12/01/2022	\$53.63	\$14.25	\$16.05	\$0.00	\$83.93
	06/01/2023	\$54.88	\$14.25	\$16.05	\$0.00	\$85.18
	12/01/2023	\$56.13	\$14.25	\$16.05	\$0.00	\$86.43
	06/01/2024	\$57.43	\$14.25	\$16.05	\$0.00	\$87.73
	12/01/2024	\$58.88	\$14.25	\$16.05	\$0.00	\$89.18
	06/01/2025	\$60.18	\$14.25	\$16.05	\$0.00	\$90.48
	12/01/2025	\$61.63	\$14.25	\$16.05	\$0.00	\$91.93
	06/01/2026	\$62.93	\$14.25	\$16.05	\$0.00	\$93.23
	12/01/2026	\$64.38	\$14.25	\$16.05	\$0.00	\$94.68
For apprentice rates see "Apprentice- OPERATING ENGINEERS"						
BACKHOE/FRONT-END LOADER <i>OPERATING ENGINEERS LOCAL 4</i>	12/01/2022	\$53.63	\$14.25	\$16.05	\$0.00	\$83.93
	06/01/2023	\$54.88	\$14.25	\$16.05	\$0.00	\$85.18
	12/01/2023	\$56.13	\$14.25	\$16.05	\$0.00	\$86.43
	06/01/2024	\$57.43	\$14.25	\$16.05	\$0.00	\$87.73
	12/01/2024	\$58.88	\$14.25	\$16.05	\$0.00	\$89.18
	06/01/2025	\$60.18	\$14.25	\$16.05	\$0.00	\$90.48
	12/01/2025	\$61.63	\$14.25	\$16.05	\$0.00	\$91.93
	06/01/2026	\$62.93	\$14.25	\$16.05	\$0.00	\$93.23
	12/01/2026	\$64.38	\$14.25	\$16.05	\$0.00	\$94.68
For apprentice rates see "Apprentice- OPERATING ENGINEERS"						
BARCO-TYPE JUMPING TAMPER <i>LABORERS - ZONE 1</i>	12/01/2022	\$43.43	\$9.10	\$17.57	\$0.00	\$70.10
	06/01/2023	\$44.43	\$9.10	\$17.57	\$0.00	\$71.10
	12/01/2023	\$45.68	\$9.10	\$17.57	\$0.00	\$72.35
For apprentice rates see "Apprentice- LABORER"						
BLOCK PAVER, RAMMER / CURB SETTER <i>LABORERS - ZONE 1</i>	12/01/2022	\$43.93	\$9.10	\$17.57	\$0.00	\$70.60
	06/01/2023	\$44.93	\$9.10	\$17.57	\$0.00	\$71.60
	12/01/2023	\$46.18	\$9.10	\$17.57	\$0.00	\$72.85
For apprentice rates see "Apprentice- LABORER"						
BLOCK PAVER, RAMMER / CURB SETTER (HEAVY & HIGHWAY) <i>LABORERS - ZONE 1 (HEAVY &amp; HIGHWAY)</i>	12/01/2022	\$43.33	\$9.35	\$17.82	\$0.00	\$70.50
	06/01/2023	\$44.33	\$9.35	\$17.82	\$0.00	\$71.50
	12/01/2023	\$45.58	\$9.35	\$17.82	\$0.00	\$72.75
	06/01/2024	\$47.06	\$9.35	\$17.82	\$0.00	\$74.23
	12/01/2024	\$48.53	\$9.35	\$17.82	\$0.00	\$75.70
	06/01/2025	\$50.03	\$9.35	\$17.82	\$0.00	\$77.20
	12/01/2025	\$51.53	\$9.35	\$17.82	\$0.00	\$78.70
	06/01/2026	\$53.08	\$9.35	\$17.82	\$0.00	\$80.25
	12/01/2026	\$54.58	\$9.35	\$17.82	\$0.00	\$81.75
For apprentice rates see "Apprentice- LABORER (Heavy and Highway)"						
BOILER MAKER <i>BOILERMAKERS LOCAL 29</i>	01/01/2023	\$47.37	\$7.07	\$20.31	\$0.00	\$74.75
	01/01/2024	\$48.12	\$7.07	\$20.60	\$0.00	\$75.79

**Classification**

**Effective Date    Base Wage    Health    Pension    Supplemental Unemployment    Total Rate**

**Apprentice - BOILERMAKER - Local 29**

**Effective Date - 01/01/2023**

Step	percent	Apprentice Base Wage	Health	Pension	Supplemental Unemployment	Total Rate
1	65	\$30.79	\$7.07	\$13.22	\$0.00	\$51.08
2	65	\$30.79	\$7.07	\$13.22	\$0.00	\$51.08
3	70	\$33.16	\$7.07	\$14.23	\$0.00	\$54.46
4	75	\$35.53	\$7.07	\$15.24	\$0.00	\$57.84
5	80	\$37.90	\$7.07	\$16.25	\$0.00	\$61.22
6	85	\$40.26	\$7.07	\$17.28	\$0.00	\$64.61
7	90	\$42.63	\$7.07	\$18.28	\$0.00	\$67.98
8	95	\$45.00	\$7.07	\$19.32	\$0.00	\$71.39

**Effective Date - 01/01/2024**

Step	percent	Apprentice Base Wage	Health	Pension	Supplemental Unemployment	Total Rate
1	65	\$31.28	\$7.07	\$13.22	\$0.00	\$51.57
2	65	\$31.28	\$7.07	\$13.22	\$0.00	\$51.57
3	70	\$33.68	\$7.07	\$14.23	\$0.00	\$54.98
4	75	\$36.09	\$7.07	\$15.24	\$0.00	\$58.40
5	80	\$38.50	\$7.07	\$16.25	\$0.00	\$61.82
6	85	\$40.90	\$7.07	\$17.28	\$0.00	\$65.25
7	90	\$43.31	\$7.07	\$18.28	\$0.00	\$68.66
8	95	\$45.71	\$7.07	\$19.32	\$0.00	\$72.10

**Notes:**

**Apprentice to Journeyworker Ratio:1:4**

BRICK/STONE/ARTIFICIAL MASONRY (INCL. MASONRY WATERPROOFING)	02/01/2023	\$60.35	\$11.49	\$22.34	\$0.00	\$94.18
BRICKLAYERS LOCAL 3 (BOSTON)	08/01/2023	\$62.40	\$11.49	\$22.34	\$0.00	\$96.23
	02/01/2024	\$63.65	\$11.49	\$22.34	\$0.00	\$97.48
	08/01/2024	\$65.75	\$11.49	\$22.34	\$0.00	\$99.58
	02/01/2025	\$67.05	\$11.49	\$22.34	\$0.00	\$100.88
	08/01/2025	\$69.20	\$11.49	\$22.34	\$0.00	\$103.03
	02/01/2026	\$70.55	\$11.49	\$22.34	\$0.00	\$104.38
	08/01/2026	\$72.75	\$11.49	\$22.34	\$0.00	\$106.58
	02/01/2027	\$74.15	\$11.49	\$22.34	\$0.00	\$107.98

**Classification**

**Effective Date    Base Wage    Health    Pension    Supplemental Unemployment    Total Rate**

**Apprentice - BRICK/PLASTER/CEMENT MASON - Local 3 Boston**

**Effective Date - 02/01/2023**

Step	percent	Apprentice Base Wage	Health	Pension	Supplemental Unemployment	Total Rate
1	50	\$30.18	\$11.49	\$22.34	\$0.00	\$64.01
2	60	\$36.21	\$11.49	\$22.34	\$0.00	\$70.04
3	70	\$42.25	\$11.49	\$22.34	\$0.00	\$76.08
4	80	\$48.28	\$11.49	\$22.34	\$0.00	\$82.11
5	90	\$54.32	\$11.49	\$22.34	\$0.00	\$88.15

**Effective Date - 08/01/2023**

Step	percent	Apprentice Base Wage	Health	Pension	Supplemental Unemployment	Total Rate
1	50	\$31.20	\$11.49	\$22.34	\$0.00	\$65.03
2	60	\$37.44	\$11.49	\$22.34	\$0.00	\$71.27
3	70	\$43.68	\$11.49	\$22.34	\$0.00	\$77.51
4	80	\$49.92	\$11.49	\$22.34	\$0.00	\$83.75
5	90	\$56.16	\$11.49	\$22.34	\$0.00	\$89.99

**Notes:**

**Apprentice to Journeyworker Ratio:1:5**

<b>BULLDOZER/GRADER/SCRAPER</b>	12/01/2022	\$53.05	\$14.25	\$16.05	\$0.00	\$83.35
<i>OPERATING ENGINEERS LOCAL 4</i>	06/01/2023	\$54.29	\$14.25	\$16.05	\$0.00	\$84.59
	12/01/2023	\$55.53	\$14.25	\$16.05	\$0.00	\$85.83
	06/01/2024	\$56.81	\$14.25	\$16.05	\$0.00	\$87.11
	12/01/2024	\$58.25	\$14.25	\$16.05	\$0.00	\$88.55
	06/01/2025	\$59.53	\$14.25	\$16.05	\$0.00	\$89.83
	12/01/2025	\$60.97	\$14.25	\$16.05	\$0.00	\$91.27
	06/01/2026	\$62.25	\$14.25	\$16.05	\$0.00	\$92.55
	12/01/2026	\$63.69	\$14.25	\$16.05	\$0.00	\$93.99

For apprentice rates see "Apprentice- OPERATING ENGINEERS"

<b>CAISSON &amp; UNDERPINNING BOTTOM MAN</b>	12/01/2022	\$43.73	\$9.35	\$17.97	\$0.00	\$71.05
<i>LABORERS - FOUNDATION AND MARINE</i>	06/01/2023	\$44.73	\$9.35	\$17.97	\$0.00	\$72.05
	12/01/2023	\$45.98	\$9.35	\$17.97	\$0.00	\$73.30
	06/01/2024	\$47.46	\$9.35	\$17.97	\$0.00	\$74.78
	12/01/2024	\$48.93	\$9.35	\$17.97	\$0.00	\$76.25
	06/01/2025	\$50.43	\$9.35	\$17.97	\$0.00	\$77.75
	12/01/2025	\$51.93	\$9.35	\$17.97	\$0.00	\$79.25
	06/01/2026	\$53.48	\$9.35	\$17.97	\$0.00	\$80.80
	12/01/2026	\$54.98	\$9.35	\$17.97	\$0.00	\$82.30

For apprentice rates see "Apprentice- LABORER"



Classification	Effective Date	Base Wage	Health	Pension	Supplemental Unemployment	Total Rate
CAISSON & UNDERPINNING LABORER <i>LABORERS - FOUNDATION AND MARINE</i>	12/01/2022	\$42.58	\$9.35	\$17.97	\$0.00	\$69.90
	06/01/2023	\$43.58	\$9.35	\$17.97	\$0.00	\$70.90
	12/01/2023	\$44.83	\$9.35	\$17.97	\$0.00	\$72.15
	06/01/2024	\$46.31	\$9.35	\$17.97	\$0.00	\$73.63
	12/01/2024	\$47.78	\$9.35	\$17.97	\$0.00	\$75.10
	06/01/2025	\$49.28	\$9.35	\$17.97	\$0.00	\$76.60
	12/01/2025	\$50.78	\$9.35	\$17.97	\$0.00	\$78.10
	06/01/2026	\$52.33	\$9.35	\$17.97	\$0.00	\$79.65
	12/01/2026	\$53.83	\$9.35	\$17.97	\$0.00	\$81.15
For apprentice rates see "Apprentice- LABORER"						
CAISSON & UNDERPINNING TOP MAN <i>LABORERS - FOUNDATION AND MARINE</i>	12/01/2022	\$42.58	\$9.35	\$17.97	\$0.00	\$69.90
	06/01/2023	\$43.58	\$9.35	\$17.97	\$0.00	\$70.90
	12/01/2023	\$44.83	\$9.35	\$17.97	\$0.00	\$72.15
	06/01/2024	\$46.31	\$9.35	\$17.97	\$0.00	\$73.63
	12/01/2024	\$47.78	\$9.35	\$17.97	\$0.00	\$75.10
	06/01/2025	\$49.28	\$9.35	\$17.97	\$0.00	\$76.60
	12/01/2025	\$50.78	\$9.35	\$17.97	\$0.00	\$78.10
	06/01/2026	\$52.33	\$9.35	\$17.97	\$0.00	\$79.65
	12/01/2026	\$53.83	\$9.35	\$17.97	\$0.00	\$81.15
For apprentice rates see "Apprentice- LABORER"						
CARBIDE CORE DRILL OPERATOR <i>LABORERS - ZONE 1</i>	12/01/2022	\$43.43	\$9.10	\$17.57	\$0.00	\$70.10
	06/01/2023	\$44.43	\$9.10	\$17.57	\$0.00	\$71.10
	12/01/2023	\$45.68	\$9.10	\$17.57	\$0.00	\$72.35
For apprentice rates see "Apprentice- LABORER"						
CARPENTER <i>CARPENTERS -ZONE 2 (Eastern Massachusetts)</i>	03/01/2023	\$45.12	\$9.33	\$19.97	\$0.00	\$74.42

**Apprentice - CARPENTER - Zone 2 Eastern MA**

**Effective Date - 03/01/2023**

Step	percent	Apprentice Base Wage	Health	Pension	Supplemental Unemployment	Total Rate
1	50	\$22.56	\$9.33	\$1.73	\$0.00	\$33.62
2	60	\$27.07	\$9.33	\$1.73	\$0.00	\$38.13
3	70	\$31.58	\$9.33	\$14.78	\$0.00	\$55.69
4	75	\$33.84	\$9.33	\$14.78	\$0.00	\$57.95
5	80	\$36.10	\$9.33	\$16.51	\$0.00	\$61.94
6	80	\$36.10	\$9.33	\$16.51	\$0.00	\$61.94
7	90	\$40.61	\$9.33	\$18.24	\$0.00	\$68.18
8	90	\$40.61	\$9.33	\$18.24	\$0.00	\$68.18

**Notes:**

% Indentured After 10/1/17; 45/45/55/55/70/70/80/80  
Step 1&2 \$30.71/ 3&4 \$36.93/ 5&6 \$56.82/ 7&8 \$63.06

**Apprentice to Journeyworker Ratio:1:5**

CARPENTER WOOD FRAME <i>CARPENTERS-ZONE 3 (Wood Frame)</i>	04/01/2023	\$24.16	\$7.21	\$4.80	\$0.00	\$36.17
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All Aspects of New Wood Frame Work

**Classification**

**Effective Date    Base Wage    Health    Pension    Supplemental Unemployment    Total Rate**

**Apprentice - CARPENTER (Wood Frame) - Zone 3**

**Effective Date - 04/01/2023**

Step	percent	Apprentice Base Wage	Health	Pension	Supplemental Unemployment	Total Rate
1	60	\$14.50	\$7.21	\$0.00	\$0.00	\$21.71
2	60	\$14.50	\$7.21	\$0.00	\$0.00	\$21.71
3	65	\$15.70	\$7.21	\$0.00	\$0.00	\$22.91
4	70	\$16.91	\$7.21	\$0.00	\$0.00	\$24.12
5	75	\$18.12	\$7.21	\$3.80	\$0.00	\$29.13
6	80	\$19.33	\$7.21	\$3.80	\$0.00	\$30.34
7	85	\$20.54	\$7.21	\$3.80	\$0.00	\$31.55
8	90	\$21.74	\$7.21	\$3.80	\$0.00	\$32.75

**Notes:**  
 % Indentured After 10/1/17; 45/45/55/55/70/70/80/80  
 Step 1&2 \$17.86/ 3&4 \$20.22/ 5&6 \$27.57/ 7&8 \$29.94

**Apprentice to Journeyworker Ratio:1:5**

CEMENT MASONRY/PLASTERING BRICKLAYERS LOCAL 3 (BOSTON)	01/01/2023	\$49.45	\$12.75	\$22.74	\$0.87	\$85.81
	07/01/2023	\$50.59	\$12.75	\$22.74	\$0.87	\$86.95
	01/01/2024	\$51.73	\$12.75	\$22.74	\$0.87	\$88.09

**Classification**

**Effective Date   Base Wage   Health   Pension   Supplemental Unemployment   Total Rate**

**Apprentice - CEMENT MASONRY/PLASTERING - Eastern Mass (Boston)**

**Effective Date - 01/01/2023**

Step	percent	Apprentice Base Wage	Health	Pension	Supplemental Unemployment	Total Rate
1	50	\$24.73	\$12.75	\$15.49	\$0.00	\$52.97
2	60	\$29.67	\$12.75	\$22.74	\$0.87	\$66.03
3	65	\$32.14	\$12.75	\$22.74	\$0.87	\$68.50
4	70	\$34.62	\$12.75	\$22.74	\$0.87	\$70.98
5	75	\$37.09	\$12.75	\$22.74	\$0.87	\$73.45
6	80	\$39.56	\$12.75	\$22.74	\$0.87	\$75.92
7	90	\$44.51	\$12.75	\$22.74	\$0.87	\$80.87

**Effective Date - 07/01/2023**

Step	percent	Apprentice Base Wage	Health	Pension	Supplemental Unemployment	Total Rate
1	50	\$25.30	\$12.75	\$15.49	\$0.00	\$53.54
2	60	\$30.35	\$12.75	\$22.74	\$0.87	\$66.71
3	65	\$32.88	\$12.75	\$22.74	\$0.87	\$69.24
4	70	\$35.41	\$12.75	\$22.74	\$0.87	\$71.77
5	75	\$37.94	\$12.75	\$22.74	\$0.87	\$74.30
6	80	\$40.47	\$12.75	\$22.74	\$0.87	\$76.83
7	90	\$45.53	\$12.75	\$22.74	\$0.87	\$81.89

**Notes:**  
Steps 3,4 are 500 hrs. All other steps are 1,000 hrs.

**Apprentice to Journeyworker Ratio:1:3**

CHAIN SAW OPERATOR	12/01/2022	\$43.43	\$9.10	\$17.57	\$0.00	\$70.10
LABORERS - ZONE 1	06/01/2023	\$44.43	\$9.10	\$17.57	\$0.00	\$71.10
	12/01/2023	\$45.68	\$9.10	\$17.57	\$0.00	\$72.35
For apprentice rates see "Apprentice- LABORER"						
CLAM SHELLS/SLURRY BUCKETS/HEADING MACHINES	12/01/2022	\$54.68	\$14.25	\$16.05	\$0.00	\$84.98
OPERATING ENGINEERS LOCAL 4	06/01/2023	\$55.95	\$14.25	\$16.05	\$0.00	\$86.25
	12/01/2023	\$57.23	\$14.25	\$16.05	\$0.00	\$87.53
	06/01/2024	\$58.55	\$14.25	\$16.05	\$0.00	\$88.85
	12/01/2024	\$60.03	\$14.25	\$16.05	\$0.00	\$90.33
	06/01/2025	\$61.36	\$14.25	\$16.05	\$0.00	\$91.66
	12/01/2025	\$62.83	\$14.25	\$16.05	\$0.00	\$93.13
	06/01/2026	\$64.16	\$14.25	\$16.05	\$0.00	\$94.46
	12/01/2026	\$65.64	\$14.25	\$16.05	\$0.00	\$95.94

For apprentice rates see "Apprentice- OPERATING ENGINEERS"

Classification	Effective Date	Base Wage	Health	Pension	Supplemental Unemployment	Total Rate
COMPRESSOR OPERATOR <i>OPERATING ENGINEERS LOCAL 4</i>	12/01/2022	\$35.08	\$14.25	\$16.05	\$0.00	\$65.38
	06/01/2023	\$35.90	\$14.25	\$16.05	\$0.00	\$66.20
	12/01/2023	\$36.72	\$14.25	\$16.05	\$0.00	\$67.02
	06/01/2024	\$37.57	\$14.25	\$16.05	\$0.00	\$67.87
	12/01/2024	\$38.52	\$14.25	\$16.05	\$0.00	\$68.82
	06/01/2025	\$39.37	\$14.25	\$16.05	\$0.00	\$69.67
	12/01/2025	\$40.32	\$14.25	\$16.05	\$0.00	\$70.62
	06/01/2026	\$41.18	\$14.25	\$16.05	\$0.00	\$71.48
	12/01/2026	\$42.13	\$14.25	\$16.05	\$0.00	\$72.43

For apprentice rates see "Apprentice- OPERATING ENGINEERS"

DELEADER (BRIDGE) <i>PAINTERS LOCAL 35 - ZONE 2</i>	01/01/2023	\$56.06	\$8.65	\$23.05	\$0.00	\$87.76
	07/01/2023	\$57.26	\$8.65	\$23.05	\$0.00	\$88.96
	01/01/2024	\$58.46	\$8.65	\$23.05	\$0.00	\$90.16
	07/01/2024	\$59.66	\$8.65	\$23.05	\$0.00	\$91.36
	01/01/2025	\$60.86	\$8.65	\$23.05	\$0.00	\$92.56

**Apprentice - PAINTER Local 35 - BRIDGES/TANKS**

**Effective Date - 01/01/2023**

Step	percent	Apprentice Base Wage	Health	Pension	Supplemental Unemployment	Total Rate
1	50	\$28.03	\$8.65	\$0.00	\$0.00	\$36.68
2	55	\$30.83	\$8.65	\$6.27	\$0.00	\$45.75
3	60	\$33.64	\$8.65	\$6.84	\$0.00	\$49.13
4	65	\$36.44	\$8.65	\$7.41	\$0.00	\$52.50
5	70	\$39.24	\$8.65	\$19.63	\$0.00	\$67.52
6	75	\$42.05	\$8.65	\$20.20	\$0.00	\$70.90
7	80	\$44.85	\$8.65	\$20.77	\$0.00	\$74.27
8	90	\$50.45	\$8.65	\$21.91	\$0.00	\$81.01

**Effective Date - 07/01/2023**

Step	percent	Apprentice Base Wage	Health	Pension	Supplemental Unemployment	Total Rate
1	50	\$28.63	\$8.65	\$0.00	\$0.00	\$37.28
2	55	\$31.49	\$8.65	\$6.27	\$0.00	\$46.41
3	60	\$34.36	\$8.65	\$6.84	\$0.00	\$49.85
4	65	\$37.22	\$8.65	\$7.41	\$0.00	\$53.28
5	70	\$40.08	\$8.65	\$19.63	\$0.00	\$68.36
6	75	\$42.95	\$8.65	\$20.20	\$0.00	\$71.80
7	80	\$45.81	\$8.65	\$20.77	\$0.00	\$75.23
8	90	\$51.53	\$8.65	\$21.91	\$0.00	\$82.09

**Notes:**

Steps are 750 hrs.

**Apprentice to Journeyworker Ratio:1:1**

DEMO: ADZEMAN <i>LABORERS - ZONE 1</i>	12/01/2022	\$43.33	\$9.10	\$17.57	\$0.00	\$70.00
	06/01/2023	\$44.33	\$9.10	\$17.57	\$0.00	\$71.00
	12/01/2023	\$45.58	\$9.10	\$17.57	\$0.00	\$72.25

Classification	Effective Date	Base Wage	Health	Pension	Supplemental Unemployment	Total Rate
For apprentice rates see "Apprentice- LABORER"						
DEMO: BACKHOE/LOADER/HAMMER OPERATOR <i>LABORERS - ZONE 1</i>	12/01/2022	\$44.33	\$9.10	\$17.57	\$0.00	\$71.00
	06/01/2023	\$45.33	\$9.10	\$17.57	\$0.00	\$72.00
	12/01/2023	\$46.58	\$9.10	\$17.57	\$0.00	\$73.25
For apprentice rates see "Apprentice- LABORER"						
DEMO: BURNERS <i>LABORERS - ZONE 1</i>	12/01/2022	\$44.08	\$9.10	\$17.57	\$0.00	\$70.75
	06/01/2023	\$45.08	\$9.10	\$17.57	\$0.00	\$71.75
	12/01/2023	\$46.33	\$9.10	\$17.57	\$0.00	\$73.00
For apprentice rates see "Apprentice- LABORER"						
DEMO: CONCRETE CUTTER/SAWYER <i>LABORERS - ZONE 1</i>	12/01/2022	\$44.33	\$9.10	\$17.57	\$0.00	\$71.00
	06/01/2023	\$45.33	\$9.10	\$17.57	\$0.00	\$72.00
	12/01/2023	\$46.58	\$9.10	\$17.57	\$0.00	\$73.25
For apprentice rates see "Apprentice- LABORER"						
DEMO: JACKHAMMER OPERATOR <i>LABORERS - ZONE 1</i>	12/01/2022	\$44.08	\$9.10	\$17.57	\$0.00	\$70.75
	06/01/2023	\$45.08	\$9.10	\$17.57	\$0.00	\$71.75
	12/01/2023	\$46.33	\$9.10	\$17.57	\$0.00	\$73.00
For apprentice rates see "Apprentice- LABORER"						
DEMO: WRECKING LABORER <i>LABORERS - ZONE 1</i>	12/01/2022	\$43.33	\$9.10	\$17.57	\$0.00	\$70.00
	06/01/2023	\$44.33	\$9.10	\$17.57	\$0.00	\$71.00
	12/01/2023	\$45.58	\$9.10	\$17.57	\$0.00	\$72.25
For apprentice rates see "Apprentice- LABORER"						
DIRECTIONAL DRILL MACHINE OPERATOR <i>OPERATING ENGINEERS LOCAL 4</i>	12/01/2022	\$53.05	\$14.25	\$16.05	\$0.00	\$83.35
	06/01/2023	\$54.29	\$14.25	\$16.05	\$0.00	\$84.59
	12/01/2023	\$55.53	\$14.25	\$16.05	\$0.00	\$85.83
	06/01/2024	\$56.81	\$14.25	\$16.05	\$0.00	\$87.11
	12/01/2024	\$58.25	\$14.25	\$16.05	\$0.00	\$88.55
	06/01/2025	\$59.53	\$14.25	\$16.05	\$0.00	\$89.83
	12/01/2025	\$60.97	\$14.25	\$16.05	\$0.00	\$91.27
	06/01/2026	\$62.25	\$14.25	\$16.05	\$0.00	\$92.55
	12/01/2026	\$63.69	\$14.25	\$16.05	\$0.00	\$93.99
For apprentice rates see "Apprentice- OPERATING ENGINEERS"						
DIVER <i>PILE DRIVER LOCAL 56 (ZONE 1)</i>	08/01/2020	\$68.70	\$9.40	\$23.12	\$0.00	\$101.22
For apprentice rates see "Apprentice- PILE DRIVER"						
DIVER TENDER <i>PILE DRIVER LOCAL 56 (ZONE 1)</i>	08/01/2020	\$49.07	\$9.40	\$23.12	\$0.00	\$81.59
For apprentice rates see "Apprentice- PILE DRIVER"						
DIVER TENDER (EFFLUENT) <i>PILE DRIVER LOCAL 56 (ZONE 1)</i>	08/01/2020	\$73.60	\$9.40	\$23.12	\$0.00	\$106.12
For apprentice rates see "Apprentice- PILE DRIVER"						
DIVER/SLURRY (EFFLUENT) <i>PILE DRIVER LOCAL 56 (ZONE 1)</i>	08/01/2020	\$103.05	\$9.40	\$23.12	\$0.00	\$135.57
For apprentice rates see "Apprentice- PILE DRIVER"						
DRAWBRIDGE OPERATOR (Construction) <i>DRAWBRIDGE - SEIU LOCAL 888</i>	07/01/2020	\$26.77	\$6.67	\$3.93	\$0.16	\$37.53
ELECTRICIAN <i>ELECTRICIANS LOCAL 103</i>	03/01/2023	\$59.23	\$13.00	\$21.63	\$0.00	\$93.86

**Classification**

**Effective Date    Base Wage    Health    Pension    Supplemental Unemployment    Total Rate**

**Apprentice - ELECTRICIAN - Local 103**

**Effective Date - 03/01/2023**

Step	percent	Apprentice Base Wage	Health	Pension	Supplemental Unemployment	Total Rate
1	40	\$23.69	\$13.00	\$0.71	\$0.00	\$37.40
2	40	\$23.69	\$13.00	\$0.71	\$0.00	\$37.40
3	45	\$26.65	\$13.00	\$16.13	\$0.00	\$55.78
4	45	\$26.65	\$13.00	\$16.13	\$0.00	\$55.78
5	50	\$29.62	\$13.00	\$16.63	\$0.00	\$59.25
6	55	\$32.58	\$13.00	\$17.13	\$0.00	\$62.71
7	60	\$35.54	\$13.00	\$17.63	\$0.00	\$66.17
8	65	\$38.50	\$13.00	\$18.13	\$0.00	\$69.63
9	70	\$41.46	\$13.00	\$18.62	\$0.00	\$73.08
10	75	\$44.42	\$13.00	\$19.13	\$0.00	\$76.55

**Notes:**  
App Prior 1/1/03; 30/35/40/45/50/55/65/70/75/80

**Apprentice to Journeyworker Ratio:2:3\*\*\***

ELEVATOR CONSTRUCTOR ELEVATOR CONSTRUCTORS LOCAL 4	01/01/2022	\$65.62	\$16.03	\$20.21	\$0.00	\$101.86
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**Apprentice - ELEVATOR CONSTRUCTOR - Local 4**

**Effective Date - 01/01/2022**

Step	percent	Apprentice Base Wage	Health	Pension	Supplemental Unemployment	Total Rate
1	50	\$32.81	\$16.03	\$0.00	\$0.00	\$48.84
2	55	\$36.09	\$16.03	\$20.21	\$0.00	\$72.33
3	65	\$42.65	\$16.03	\$20.21	\$0.00	\$78.89
4	70	\$45.93	\$16.03	\$20.21	\$0.00	\$82.17
5	80	\$52.50	\$16.03	\$20.21	\$0.00	\$88.74

**Notes:**  
Steps 1-2 are 6 mos.; Steps 3-5 are 1 year

**Apprentice to Journeyworker Ratio:1:1**

ELEVATOR CONSTRUCTOR HELPER ELEVATOR CONSTRUCTORS LOCAL 4	01/01/2022	\$45.93	\$16.03	\$20.21	\$0.00	\$82.17
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For apprentice rates see "Apprentice - ELEVATOR CONSTRUCTOR"

Classification	Effective Date	Base Wage	Health	Pension	Supplemental Unemployment	Total Rate
FENCE & GUARD RAIL ERECTOR (HEAVY & HIGHWAY) <i>LABORERS - ZONE 1 (HEAVY &amp; HIGHWAY)</i>	12/01/2022	\$42.83	\$9.35	\$17.82	\$0.00	\$70.00
	06/01/2023	\$43.83	\$9.35	\$17.82	\$0.00	\$71.00
	12/01/2023	\$45.08	\$9.35	\$17.82	\$0.00	\$72.25
	06/01/2024	\$46.56	\$9.35	\$17.82	\$0.00	\$73.73
	12/01/2024	\$48.03	\$9.35	\$17.82	\$0.00	\$75.20
	06/01/2025	\$49.53	\$9.35	\$17.82	\$0.00	\$76.70
	12/01/2025	\$51.03	\$9.35	\$17.82	\$0.00	\$78.20
	06/01/2026	\$52.58	\$9.35	\$17.82	\$0.00	\$79.75
	12/01/2026	\$54.08	\$9.35	\$17.82	\$0.00	\$81.25
For apprentice rates see "Apprentice- LABORER (Heavy and Highway)						
FIELD ENG.INST.PERSON-BLDG,SITE,HVY/HWY <i>OPERATING ENGINEERS LOCAL 4</i>	11/05/2022	\$48.67	\$14.25	\$16.05	\$0.00	\$78.97
	05/01/2023	\$49.91	\$14.25	\$16.05	\$0.00	\$80.21
	11/01/2023	\$51.15	\$14.25	\$16.05	\$0.00	\$81.45
	05/01/2024	\$52.39	\$14.25	\$16.05	\$0.00	\$82.69
	11/01/2024	\$53.68	\$14.25	\$16.05	\$0.00	\$83.98
	05/01/2025	\$55.12	\$14.25	\$16.05	\$0.00	\$85.42
	11/01/2025	\$56.41	\$14.25	\$16.05	\$0.00	\$86.71
	05/01/2026	\$57.85	\$14.25	\$16.05	\$0.00	\$88.15
	11/01/2026	\$59.14	\$14.25	\$16.05	\$0.00	\$89.44
05/01/2027	\$60.57	\$14.25	\$16.05	\$0.00	\$90.87	
For apprentice rates see "Apprentice- OPERATING ENGINEERS"						
FIELD ENG.PARTY CHIEF-BLDG,SITE,HVY/HWY <i>OPERATING ENGINEERS LOCAL 4</i>	11/01/2022	\$50.22	\$14.25	\$16.05	\$0.00	\$80.52
	05/01/2023	\$51.47	\$14.25	\$16.05	\$0.00	\$81.77
	11/01/2023	\$52.72	\$14.25	\$16.05	\$0.00	\$83.02
	05/01/2024	\$53.97	\$14.25	\$16.05	\$0.00	\$84.27
	11/01/2024	\$55.27	\$14.25	\$16.05	\$0.00	\$85.57
	05/01/2025	\$56.72	\$14.25	\$16.05	\$0.00	\$87.02
	11/01/2025	\$58.02	\$14.25	\$16.05	\$0.00	\$88.32
	05/01/2026	\$59.47	\$14.25	\$16.05	\$0.00	\$89.77
	11/01/2026	\$60.77	\$14.25	\$16.05	\$0.00	\$91.07
05/01/2027	\$62.22	\$14.25	\$16.05	\$0.00	\$92.52	
For apprentice rates see "Apprentice- OPERATING ENGINEERS"						
FIELD ENG.ROD PERSON-BLDG,SITE,HVY/HWY <i>OPERATING ENGINEERS LOCAL 4</i>	11/01/2022	\$24.31	\$14.25	\$16.05	\$0.00	\$54.61
	05/01/2023	\$25.05	\$14.25	\$16.05	\$0.00	\$55.35
	11/01/2023	\$25.78	\$14.25	\$16.05	\$0.00	\$56.08
	05/01/2024	\$26.51	\$14.25	\$16.05	\$0.00	\$56.81
	11/01/2024	\$27.27	\$14.25	\$16.05	\$0.00	\$57.57
	05/01/2025	\$28.12	\$14.25	\$16.05	\$0.00	\$58.42
	11/01/2025	\$28.88	\$14.25	\$16.05	\$0.00	\$59.18
	05/01/2026	\$29.73	\$14.25	\$16.05	\$0.00	\$60.03
	11/01/2026	\$30.49	\$14.25	\$16.05	\$0.00	\$60.79
05/01/2027	\$31.34	\$14.25	\$16.05	\$0.00	\$61.64	
For apprentice rates see "Apprentice- OPERATING ENGINEERS"						
FIRE ALARM INSTALLER <i>ELECTRICIANS LOCAL 103</i>	03/01/2023	\$59.23	\$13.00	\$21.63	\$0.00	\$93.86
For apprentice rates see "Apprentice- ELECTRICIAN"						

Classification	Effective Date	Base Wage	Health	Pension	Supplemental Unemployment	Total Rate
FIRE ALARM REPAIR / MAINTENANCE / COMMISSIONING <i>ELECTRICIANS</i>	03/01/2023	\$48.34	\$13.00	\$19.01	\$0.00	\$80.35
<i>LOCAL 103</i> For apprentice rates see "Apprentice- TELECOMMUNICATIONS TECHNICIAN"						
FIREMAN (ASST. ENGINEER) <i>OPERATING ENGINEERS LOCAL 4</i>	12/01/2022	\$43.54	\$14.25	\$16.05	\$0.00	\$73.84
	06/01/2023	\$44.56	\$14.25	\$16.05	\$0.00	\$74.86
	12/01/2023	\$45.57	\$14.25	\$16.05	\$0.00	\$75.87
	06/01/2024	\$46.63	\$14.25	\$16.05	\$0.00	\$76.93
	12/01/2024	\$47.81	\$14.25	\$16.05	\$0.00	\$78.11
	06/01/2025	\$48.87	\$14.25	\$16.05	\$0.00	\$79.17
	12/01/2025	\$50.04	\$14.25	\$16.05	\$0.00	\$80.34
	06/01/2026	\$51.10	\$14.25	\$16.05	\$0.00	\$81.40
	12/01/2026	\$52.28	\$14.25	\$16.05	\$0.00	\$82.58
For apprentice rates see "Apprentice- OPERATING ENGINEERS"						
FLAGGER & SIGNALER (HEAVY & HIGHWAY) <i>LABORERS - ZONE 1 (HEAVY &amp; HIGHWAY)</i>	12/01/2022	\$25.23	\$9.35	\$17.82	\$0.00	\$52.40
	06/01/2023	\$25.98	\$9.35	\$17.82	\$0.00	\$53.15
	12/01/2023	\$25.98	\$9.35	\$17.82	\$0.00	\$53.15
	06/01/2024	\$27.01	\$9.35	\$17.82	\$0.00	\$54.18
	12/01/2024	\$27.01	\$9.35	\$17.82	\$0.00	\$54.18
	06/01/2025	\$28.09	\$9.35	\$17.82	\$0.00	\$55.26
	12/01/2025	\$28.09	\$9.35	\$17.82	\$0.00	\$55.26
	06/01/2026	\$29.21	\$9.35	\$17.82	\$0.00	\$56.38
	12/01/2026	\$29.21	\$9.35	\$17.82	\$0.00	\$56.38
For apprentice rates see "Apprentice- LABORER (Heavy and Highway)"						
FLOORCOVERER <i>FLOORCOVERERS LOCAL 2168 ZONE 1</i>	03/01/2022	\$51.77	\$9.33	\$20.27	\$0.00	\$81.37

**Apprentice - FLOORCOVERER - Local 2168 Zone 1**

Effective Date - 03/01/2022

Step	percent	Apprentice Base Wage	Health	Pension	Supplemental Unemployment	Total Rate
1	50	\$25.89	\$9.33	\$1.79	\$0.00	\$37.01
2	55	\$28.47	\$9.33	\$1.79	\$0.00	\$39.59
3	60	\$31.06	\$9.33	\$14.90	\$0.00	\$55.29
4	65	\$33.65	\$9.33	\$14.90	\$0.00	\$57.88
5	70	\$36.24	\$9.33	\$16.69	\$0.00	\$62.26
6	75	\$38.83	\$9.33	\$16.69	\$0.00	\$64.85
7	80	\$41.42	\$9.33	\$18.48	\$0.00	\$69.23
8	85	\$44.00	\$9.33	\$18.48	\$0.00	\$71.81

Notes: Steps are 750 hrs.  
% After 10/1/17; 45/45/55/55/70/70/80/80 (1500hr Steps)  
Step 1&2 \$32.94/ 3&4 \$39.66/ 5&6 \$60.32/ 7&8 \$67.10

**Apprentice to Journeyworker Ratio:1:1**



<b>Classification</b>	<b>Effective Date</b>	<b>Base Wage</b>	<b>Health</b>	<b>Pension</b>	<b>Supplemental Unemployment</b>	<b>Total Rate</b>
<b>FORK LIFT/CHERRY PICKER</b> <i>OPERATING ENGINEERS LOCAL 4</i>	12/01/2022	\$53.63	\$14.25	\$16.05	\$0.00	\$83.93
	06/01/2023	\$54.88	\$14.25	\$16.05	\$0.00	\$85.18
	12/01/2023	\$56.13	\$14.25	\$16.05	\$0.00	\$86.43
	06/01/2024	\$57.43	\$14.25	\$16.05	\$0.00	\$87.73
	12/01/2024	\$58.88	\$14.25	\$16.05	\$0.00	\$89.18
	06/01/2025	\$60.18	\$14.25	\$16.05	\$0.00	\$90.48
	12/01/2025	\$61.63	\$14.25	\$16.05	\$0.00	\$91.93
	06/01/2026	\$62.93	\$14.25	\$16.05	\$0.00	\$93.23
	12/01/2026	\$64.38	\$14.25	\$16.05	\$0.00	\$94.68
For apprentice rates see "Apprentice- OPERATING ENGINEERS"						
<b>GENERATOR/LIGHTING PLANT/HEATERS</b> <i>OPERATING ENGINEERS LOCAL 4</i>	12/01/2022	\$35.08	\$14.25	\$16.05	\$0.00	\$65.38
	06/01/2023	\$35.90	\$14.25	\$16.05	\$0.00	\$66.20
	12/01/2023	\$36.72	\$14.25	\$16.05	\$0.00	\$67.02
	06/01/2024	\$37.57	\$14.25	\$16.05	\$0.00	\$67.87
	12/01/2024	\$38.52	\$14.25	\$16.05	\$0.00	\$68.82
	06/01/2025	\$39.37	\$14.25	\$16.05	\$0.00	\$69.67
	12/01/2025	\$40.32	\$14.25	\$16.05	\$0.00	\$70.62
	06/01/2026	\$41.18	\$14.25	\$16.05	\$0.00	\$71.48
	12/01/2026	\$42.13	\$14.25	\$16.05	\$0.00	\$72.43
For apprentice rates see "Apprentice- OPERATING ENGINEERS"						
<b>GLAZIER (GLASS PLANK/AIR BARRIER/INTERIOR SYSTEMS)</b> <i>GLAZIERS LOCAL 35 (ZONE 2)</i>	01/01/2023	\$45.56	\$8.65	\$23.05	\$0.00	\$77.26
	07/01/2023	\$46.76	\$8.65	\$23.05	\$0.00	\$78.46
	01/01/2024	\$47.96	\$8.65	\$23.05	\$0.00	\$79.66
	07/01/2024	\$49.16	\$8.65	\$23.05	\$0.00	\$80.86
	01/01/2025	\$50.36	\$8.65	\$23.05	\$0.00	\$82.06

**Classification**

**Effective Date   Base Wage   Health   Pension   Supplemental Unemployment   Total Rate**

**Apprentice - GLAZIER - Local 35 Zone 2**

**Effective Date - 01/01/2023**

Step	percent	Apprentice Base Wage	Health	Pension	Supplemental Unemployment	Total Rate
1	50	\$22.78	\$8.65	\$0.00	\$0.00	\$31.43
2	55	\$25.06	\$8.65	\$6.27	\$0.00	\$39.98
3	60	\$27.34	\$8.65	\$6.84	\$0.00	\$42.83
4	65	\$29.61	\$8.65	\$7.41	\$0.00	\$45.67
5	70	\$31.89	\$8.65	\$19.63	\$0.00	\$60.17
6	75	\$34.17	\$8.65	\$20.20	\$0.00	\$63.02
7	80	\$36.45	\$8.65	\$20.77	\$0.00	\$65.87
8	90	\$41.00	\$8.65	\$21.91	\$0.00	\$71.56

**Effective Date - 07/01/2023**

Step	percent	Apprentice Base Wage	Health	Pension	Supplemental Unemployment	Total Rate
1	50	\$23.38	\$8.65	\$0.00	\$0.00	\$32.03
2	55	\$25.72	\$8.65	\$6.27	\$0.00	\$40.64
3	60	\$28.06	\$8.65	\$6.84	\$0.00	\$43.55
4	65	\$30.39	\$8.65	\$7.41	\$0.00	\$46.45
5	70	\$32.73	\$8.65	\$19.63	\$0.00	\$61.01
6	75	\$35.07	\$8.65	\$20.20	\$0.00	\$63.92
7	80	\$37.41	\$8.65	\$20.77	\$0.00	\$66.83
8	90	\$42.08	\$8.65	\$21.91	\$0.00	\$72.64

**Notes:**

Steps are 750 hrs.

**Apprentice to Journeyworker Ratio:1:1**

HOISTING ENGINEER/CRANES/GRADALLS	12/01/2022	\$53.63	\$14.25	\$16.05	\$0.00	\$83.93
OPERATING ENGINEERS LOCAL 4	06/01/2023	\$54.88	\$14.25	\$16.05	\$0.00	\$85.18
	12/01/2023	\$56.13	\$14.25	\$16.05	\$0.00	\$86.43
	06/01/2024	\$57.43	\$14.25	\$16.05	\$0.00	\$87.73
	12/01/2024	\$58.88	\$14.25	\$16.05	\$0.00	\$89.18
	06/01/2025	\$60.18	\$14.25	\$16.05	\$0.00	\$90.48
	12/01/2025	\$61.63	\$14.25	\$16.05	\$0.00	\$91.93
	06/01/2026	\$62.93	\$14.25	\$16.05	\$0.00	\$93.23
	12/01/2026	\$64.38	\$14.25	\$16.05	\$0.00	\$94.68

**Classification**

**Effective Date    Base Wage    Health    Pension    Supplemental Unemployment    Total Rate**

**Apprentice - OPERATING ENGINEERS - Local 4**

**Effective Date - 12/01/2022**

Step	percent	Apprentice Base Wage	Health	Pension	Supplemental Unemployment	Total Rate
1	55	\$29.50	\$14.25	\$0.00	\$0.00	\$43.75
2	60	\$32.18	\$14.25	\$16.05	\$0.00	\$62.48
3	65	\$34.86	\$14.25	\$16.05	\$0.00	\$65.16
4	70	\$37.54	\$14.25	\$16.05	\$0.00	\$67.84
5	75	\$40.22	\$14.25	\$16.05	\$0.00	\$70.52
6	80	\$42.90	\$14.25	\$16.05	\$0.00	\$73.20
7	85	\$45.59	\$14.25	\$16.05	\$0.00	\$75.89
8	90	\$48.27	\$14.25	\$16.05	\$0.00	\$78.57

**Effective Date - 06/01/2023**

Step	percent	Apprentice Base Wage	Health	Pension	Supplemental Unemployment	Total Rate
1	55	\$30.18	\$14.25	\$0.00	\$0.00	\$44.43
2	60	\$32.93	\$14.25	\$16.05	\$0.00	\$63.23
3	65	\$35.67	\$14.25	\$16.05	\$0.00	\$65.97
4	70	\$38.42	\$14.25	\$16.05	\$0.00	\$68.72
5	75	\$41.16	\$14.25	\$16.05	\$0.00	\$71.46
6	80	\$43.90	\$14.25	\$16.05	\$0.00	\$74.20
7	85	\$46.65	\$14.25	\$16.05	\$0.00	\$76.95
8	90	\$49.39	\$14.25	\$16.05	\$0.00	\$79.69

**Notes:**

**Apprentice to Journeyworker Ratio:1:6**

HVAC (DUCTWORK) SHEETMETAL WORKERS LOCAL 17 - A	02/01/2023	\$55.31	\$14.11	\$26.64	\$2.83	\$98.89
	08/01/2023	\$57.01	\$14.11	\$26.64	\$2.83	\$100.59
	02/01/2024	\$58.71	\$14.11	\$26.64	\$2.83	\$102.29
	08/01/2024	\$60.46	\$14.11	\$26.64	\$2.83	\$104.04
	02/01/2025	\$62.21	\$14.11	\$26.64	\$2.83	\$105.79
	08/01/2025	\$64.06	\$14.11	\$26.64	\$2.83	\$107.64
	02/01/2026	\$66.01	\$14.11	\$26.64	\$2.83	\$109.59

For apprentice rates see "Apprentice- SHEET METAL WORKER"

HVAC (ELECTRICAL CONTROLS) ELECTRICIANS LOCAL 103	03/01/2023	\$59.23	\$13.00	\$21.63	\$0.00	\$93.86
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For apprentice rates see "Apprentice- ELECTRICIAN"

HVAC (TESTING AND BALANCING - AIR) SHEETMETAL WORKERS LOCAL 17 - A	02/01/2023	\$55.31	\$14.11	\$26.64	\$2.83	\$98.89
	08/01/2023	\$57.01	\$14.11	\$26.64	\$2.83	\$100.59
	02/01/2024	\$58.71	\$14.11	\$26.64	\$2.83	\$102.29
	08/01/2024	\$60.46	\$14.11	\$26.64	\$2.83	\$104.04
	02/01/2025	\$62.21	\$14.11	\$26.64	\$2.83	\$105.79
	08/01/2025	\$64.06	\$14.11	\$26.64	\$2.83	\$107.64
	02/01/2026	\$66.01	\$14.11	\$26.64	\$2.83	\$109.59

Classification	Effective Date	Base Wage	Health	Pension	Supplemental Unemployment	Total Rate
For apprentice rates see "Apprentice- SHEET METAL WORKER"						
HVAC (TESTING AND BALANCING -WATER) <i>PIPEFITTERS LOCAL 537</i>	03/01/2023	\$63.43	\$12.50	\$20.80	\$0.00	\$96.73
	09/01/2023	\$65.18	\$12.50	\$20.80	\$0.00	\$98.48
	03/01/2024	\$66.98	\$12.50	\$20.80	\$0.00	\$100.28
	09/01/2024	\$68.78	\$12.50	\$20.80	\$0.00	\$102.08
	03/01/2025	\$70.58	\$12.50	\$20.80	\$0.00	\$103.88
For apprentice rates see "Apprentice- PIPEFITTER" or "PLUMBER/PIPEFITTER"						
HVAC MECHANIC <i>PIPEFITTERS LOCAL 537</i>	03/01/2023	\$63.43	\$12.25	\$20.80	\$0.00	\$96.48
	09/01/2023	\$65.18	\$12.25	\$20.80	\$0.00	\$98.23
	03/01/2024	\$66.98	\$12.25	\$20.80	\$0.00	\$100.03
	09/01/2024	\$68.78	\$12.25	\$20.80	\$0.00	\$101.83
	03/01/2025	\$70.58	\$12.25	\$20.80	\$0.00	\$103.63
For apprentice rates see "Apprentice- PIPEFITTER" or "PLUMBER/PIPEFITTER"						
HYDRAULIC DRILLS <i>LABORERS - ZONE 1</i>	12/01/2022	\$43.93	\$9.10	\$17.57	\$0.00	\$70.60
	06/01/2023	\$44.93	\$9.10	\$17.57	\$0.00	\$71.60
	12/01/2023	\$46.18	\$9.10	\$17.57	\$0.00	\$72.85
For apprentice rates see "Apprentice- LABORER"						
HYDRAULIC DRILLS (HEAVY & HIGHWAY) <i>LABORERS - ZONE 1 (HEAVY &amp; HIGHWAY)</i>	12/01/2022	\$43.33	\$9.35	\$17.82	\$0.00	\$70.50
	06/01/2023	\$44.33	\$9.35	\$17.82	\$0.00	\$71.50
	12/01/2023	\$45.58	\$9.35	\$17.82	\$0.00	\$72.75
	06/01/2024	\$47.06	\$9.35	\$17.82	\$0.00	\$74.23
	12/01/2024	\$48.53	\$9.35	\$17.82	\$0.00	\$75.70
	06/01/2025	\$50.03	\$9.35	\$17.82	\$0.00	\$77.20
	12/01/2025	\$51.53	\$9.35	\$17.82	\$0.00	\$78.70
	06/01/2026	\$53.08	\$9.35	\$17.82	\$0.00	\$80.25
	12/01/2026	\$54.58	\$9.35	\$17.82	\$0.00	\$81.75
For apprentice rates see "Apprentice- LABORER (Heavy and Highway)"						
INSULATOR (PIPES & TANKS) <i>HEAT &amp; FROST INSULATORS LOCAL 6 (BOSTON)</i>	09/01/2022	\$53.85	\$13.80	\$17.14	\$0.00	\$84.79

**Apprentice - ASBESTOS INSULATOR (Pipes & Tanks) - Local 6 Boston**

**Effective Date - 09/01/2022**

Step	percent	Apprentice Base Wage	Health	Pension	Supplemental Unemployment	Total Rate
1	50	\$26.93	\$13.80	\$12.42	\$0.00	\$53.15
2	60	\$32.31	\$13.80	\$13.36	\$0.00	\$59.47
3	70	\$37.70	\$13.80	\$14.31	\$0.00	\$65.81
4	80	\$43.08	\$13.80	\$15.25	\$0.00	\$72.13

**Notes:**

Steps are 1 year

**Apprentice to Journeyworker Ratio:1:4**

IRONWORKER/WELDER <i>IRONWORKERS LOCAL 7 (BOSTON AREA)</i>	03/16/2023	\$52.72	\$8.35	\$26.70	\$0.00	\$87.77
	03/16/2024	\$53.97	\$8.35	\$26.70	\$0.00	\$89.02

**Classification**

**Effective Date   Base Wage   Health   Pension   Supplemental Unemployment   Total Rate**

**Apprentice - IRONWORKER - Local 7 Boston**

**Effective Date - 03/16/2023**

Step	percent	Apprentice Base Wage	Health	Pension	Supplemental Unemployment	Total Rate
1	60	\$31.63	\$8.35	\$26.70	\$0.00	\$66.68
2	70	\$36.90	\$8.35	\$26.70	\$0.00	\$71.95
3	75	\$39.54	\$8.35	\$26.70	\$0.00	\$74.59
4	80	\$42.18	\$8.35	\$26.70	\$0.00	\$77.23
5	85	\$44.81	\$8.35	\$26.70	\$0.00	\$79.86
6	90	\$47.45	\$8.35	\$26.70	\$0.00	\$82.50

**Effective Date - 03/16/2024**

Step	percent	Apprentice Base Wage	Health	Pension	Supplemental Unemployment	Total Rate
1	60	\$32.38	\$8.35	\$26.70	\$0.00	\$67.43
2	70	\$37.78	\$8.35	\$26.70	\$0.00	\$72.83
3	75	\$40.48	\$8.35	\$26.70	\$0.00	\$75.53
4	80	\$43.18	\$8.35	\$26.70	\$0.00	\$78.23
5	85	\$45.87	\$8.35	\$26.70	\$0.00	\$80.92
6	90	\$48.57	\$8.35	\$26.70	\$0.00	\$83.62

**Notes:**

**Apprentice to Journeyworker Ratio:1:4**

JACKHAMMER & PAVING BREAKER OPERATOR LABORERS - ZONE 1	12/01/2022	\$43.43	\$9.10	\$17.57	\$0.00	\$70.10
	06/01/2023	\$44.43	\$9.10	\$17.57	\$0.00	\$71.10
	12/01/2023	\$45.68	\$9.10	\$17.57	\$0.00	\$72.35

For apprentice rates see "Apprentice- LABORER"

LABORER LABORERS - ZONE 1	12/01/2022	\$43.18	\$9.10	\$17.57	\$0.00	\$69.85
	06/01/2023	\$44.18	\$9.10	\$17.57	\$0.00	\$70.85
	12/01/2023	\$45.43	\$9.10	\$17.57	\$0.00	\$72.10

**Classification**

**Effective Date    Base Wage    Health    Pension    Supplemental Unemployment    Total Rate**

**Apprentice - LABORER - Zone 1**

**Effective Date - 12/01/2022**

Step	percent	Apprentice Base Wage	Health	Pension	Supplemental Unemployment	Total Rate
1	60	\$25.91	\$9.10	\$17.57	\$0.00	\$52.58
2	70	\$30.23	\$9.10	\$17.57	\$0.00	\$56.90
3	80	\$34.54	\$9.10	\$17.57	\$0.00	\$61.21
4	90	\$38.86	\$9.10	\$17.57	\$0.00	\$65.53

**Effective Date - 06/01/2023**

Step	percent	Apprentice Base Wage	Health	Pension	Supplemental Unemployment	Total Rate
1	60	\$26.51	\$9.10	\$17.57	\$0.00	\$53.18
2	70	\$30.93	\$9.10	\$17.57	\$0.00	\$57.60
3	80	\$35.34	\$9.10	\$17.57	\$0.00	\$62.01
4	90	\$39.76	\$9.10	\$17.57	\$0.00	\$66.43

**Notes:**

**Apprentice to Journeyworker Ratio:1:5**

LABORER (HEAVY & HIGHWAY)	12/01/2022	\$42.58	\$9.35	\$17.82	\$0.00	\$69.75
LABORERS - ZONE 1 (HEAVY & HIGHWAY)	06/01/2023	\$43.58	\$9.35	\$17.82	\$0.00	\$70.75
	12/01/2023	\$44.83	\$9.35	\$17.82	\$0.00	\$72.00
	06/01/2024	\$46.31	\$9.35	\$17.82	\$0.00	\$73.48
	12/01/2024	\$47.78	\$9.35	\$17.82	\$0.00	\$74.95
	06/01/2025	\$49.28	\$9.35	\$17.82	\$0.00	\$76.45
	12/01/2025	\$50.78	\$9.35	\$17.82	\$0.00	\$77.95
	06/01/2026	\$52.33	\$9.35	\$17.82	\$0.00	\$79.50
	12/01/2026	\$53.83	\$9.35	\$17.82	\$0.00	\$81.00

**Classification**

**Effective Date    Base Wage    Health    Pension    Supplemental Unemployment    Total Rate**

**Apprentice - LABORER (Heavy & Highway) - Zone 1**

**Effective Date - 12/01/2022**

Step	percent	Apprentice Base Wage	Health	Pension	Supplemental Unemployment	Total Rate
1	60	\$25.55	\$9.35	\$17.82	\$0.00	\$52.72
2	70	\$29.81	\$9.35	\$17.82	\$0.00	\$56.98
3	80	\$34.06	\$9.35	\$17.82	\$0.00	\$61.23
4	90	\$38.32	\$9.35	\$17.82	\$0.00	\$65.49

**Effective Date - 06/01/2023**

Step	percent	Apprentice Base Wage	Health	Pension	Supplemental Unemployment	Total Rate
1	60	\$26.15	\$9.35	\$17.82	\$0.00	\$53.32
2	70	\$30.51	\$9.35	\$17.82	\$0.00	\$57.68
3	80	\$34.86	\$9.35	\$17.82	\$0.00	\$62.03
4	90	\$39.22	\$9.35	\$17.82	\$0.00	\$66.39

**Notes:**

**Apprentice to Journeyworker Ratio:1:5**

LABORER: CARPENTER TENDER  
LABORERS - ZONE 1

12/01/2022	\$43.18	\$9.10	\$17.57	\$0.00	\$69.85
06/01/2023	\$44.18	\$9.10	\$17.57	\$0.00	\$70.85
12/01/2023	\$45.43	\$9.10	\$17.57	\$0.00	\$72.10

For apprentice rates see "Apprentice- LABORER"

LABORER: CEMENT FINISHER TENDER  
LABORERS - ZONE 1

12/01/2022	\$43.18	\$9.10	\$17.57	\$0.00	\$69.85
06/01/2023	\$44.18	\$9.10	\$17.57	\$0.00	\$70.85
12/01/2023	\$45.43	\$9.10	\$17.57	\$0.00	\$72.10

For apprentice rates see "Apprentice- LABORER"

LABORER: HAZARDOUS WASTE/ASBESTOS REMOVER  
LABORERS - ZONE 1

12/01/2022	\$43.33	\$9.10	\$17.57	\$0.00	\$70.00
06/01/2023	\$44.33	\$9.10	\$17.57	\$0.00	\$71.00
12/01/2023	\$45.58	\$9.10	\$17.57	\$0.00	\$72.25

For apprentice rates see "Apprentice- LABORER"

LABORER: MASON TENDER  
LABORERS - ZONE 1

12/01/2022	\$43.43	\$9.10	\$17.57	\$0.00	\$70.10
06/01/2023	\$44.43	\$9.10	\$17.57	\$0.00	\$71.10
06/01/2024	\$45.68	\$9.10	\$17.57	\$0.00	\$72.35

For apprentice rates see "Apprentice- LABORER"

LABORER: MASON TENDER (HEAVY & HIGHWAY)  
LABORERS - ZONE 1 (HEAVY & HIGHWAY)

12/01/2022	\$42.83	\$9.35	\$17.82	\$0.00	\$70.00
06/01/2023	\$43.83	\$9.35	\$17.82	\$0.00	\$71.00
12/01/2023	\$45.08	\$9.35	\$17.82	\$0.00	\$72.25
06/01/2024	\$46.56	\$9.35	\$17.82	\$0.00	\$73.73
12/01/2024	\$48.03	\$9.35	\$17.82	\$0.00	\$75.20
06/01/2025	\$49.53	\$9.35	\$17.82	\$0.00	\$76.70
12/01/2025	\$51.03	\$9.35	\$17.82	\$0.00	\$78.20
06/01/2026	\$52.58	\$9.35	\$17.82	\$0.00	\$79.75
12/01/2026	\$54.08	\$9.35	\$17.82	\$0.00	\$81.25

For apprentice rates see "Apprentice- LABORER (Heavy and Highway)"

<b>Classification</b>	<b>Effective Date</b>	<b>Base Wage</b>	<b>Health</b>	<b>Pension</b>	<b>Supplemental Unemployment</b>	<b>Total Rate</b>
<b>LABORER: MULTI-TRADE TENDER</b> <i>LABORERS - ZONE 1</i>	12/01/2022	\$43.18	\$9.10	\$17.57	\$0.00	\$69.85
	06/01/2023	\$44.18	\$9.10	\$17.57	\$0.00	\$70.85
	12/01/2023	\$45.43	\$9.10	\$17.57	\$0.00	\$72.10
For apprentice rates see "Apprentice- LABORER"						
<b>LABORER: TREE REMOVER</b> <i>LABORERS - ZONE 1</i>	12/01/2022	\$43.18	\$9.10	\$17.57	\$0.00	\$69.85
	06/01/2023	\$44.18	\$9.10	\$17.57	\$0.00	\$70.85
	12/01/2023	\$45.43	\$9.10	\$17.57	\$0.00	\$72.10
This classification applies to the removal of standing trees, and the trimming and removal of branches and limbs when related to public works construction or site clearance incidental to construction . For apprentice rates see "Apprentice- LABORER"						
<b>LASER BEAM OPERATOR</b> <i>LABORERS - ZONE 1</i>	12/01/2022	\$43.43	\$9.10	\$17.57	\$0.00	\$70.10
	06/01/2023	\$44.43	\$9.10	\$17.57	\$0.00	\$71.10
	12/01/2023	\$45.68	\$9.10	\$17.57	\$0.00	\$72.35
For apprentice rates see "Apprentice- LABORER"						
<b>LASER BEAM OPERATOR (HEAVY &amp; HIGHWAY)</b> <i>LABORERS - ZONE 1 (HEAVY &amp; HIGHWAY)</i>	12/01/2022	\$42.83	\$9.35	\$17.82	\$0.00	\$70.00
	06/01/2023	\$43.83	\$9.35	\$17.82	\$0.00	\$71.00
	12/01/2023	\$45.08	\$9.35	\$17.82	\$0.00	\$72.25
	06/01/2024	\$46.56	\$9.35	\$17.82	\$0.00	\$73.73
	12/01/2024	\$48.03	\$9.35	\$17.82	\$0.00	\$75.20
	06/01/2025	\$49.53	\$9.35	\$17.82	\$0.00	\$76.70
	12/01/2025	\$51.03	\$9.35	\$17.82	\$0.00	\$78.20
	06/01/2026	\$52.58	\$9.35	\$17.82	\$0.00	\$79.75
	12/01/2026	\$54.08	\$9.35	\$17.82	\$0.00	\$81.25
For apprentice rates see "Apprentice- LABORER (Heavy and Highway)"						
<b>MARBLE &amp; TILE FINISHERS</b> <i>BRICKLAYERS LOCAL 3 - MARBLE &amp; TILE</i>	02/01/2023	\$46.25	\$11.49	\$20.37	\$0.00	\$78.11
	08/01/2023	\$47.89	\$11.49	\$20.37	\$0.00	\$79.75
	02/01/2024	\$48.89	\$11.49	\$20.37	\$0.00	\$80.75
	08/01/2024	\$50.57	\$11.49	\$20.37	\$0.00	\$82.43
	02/01/2025	\$51.61	\$11.49	\$20.37	\$0.00	\$83.47
	08/01/2025	\$53.33	\$11.49	\$20.37	\$0.00	\$85.19
	02/01/2026	\$54.41	\$11.49	\$20.37	\$0.00	\$86.27
	08/01/2026	\$56.17	\$11.49	\$20.37	\$0.00	\$88.03
	02/01/2027	\$57.29	\$11.49	\$20.37	\$0.00	\$89.15



**Classification**

**Effective Date    Base Wage    Health    Pension    Supplemental Unemployment    Total Rate**

**Apprentice - MARBLE & TILE FINISHER - Local 3 Marble & Tile**

**Effective Date - 02/01/2023**

Step	percent	Apprentice Base Wage	Health	Pension	Supplemental Unemployment	Total Rate
1	50	\$23.13	\$11.49	\$20.37	\$0.00	\$54.99
2	60	\$27.75	\$11.49	\$20.37	\$0.00	\$59.61
3	70	\$32.38	\$11.49	\$20.37	\$0.00	\$64.24
4	80	\$37.00	\$11.49	\$20.37	\$0.00	\$68.86
5	90	\$41.63	\$11.49	\$20.37	\$0.00	\$73.49

**Effective Date - 08/01/2023**

Step	percent	Apprentice Base Wage	Health	Pension	Supplemental Unemployment	Total Rate
1	50	\$23.95	\$11.49	\$20.37	\$0.00	\$55.81
2	60	\$28.73	\$11.49	\$20.37	\$0.00	\$60.59
3	70	\$33.52	\$11.49	\$20.37	\$0.00	\$65.38
4	80	\$38.31	\$11.49	\$20.37	\$0.00	\$70.17
5	90	\$43.10	\$11.49	\$20.37	\$0.00	\$74.96

**Notes:**

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**Apprentice to Journeyworker Ratio:1:3**

MARBLE MASONS, TILELAYERS & TERRAZZO MECH	02/01/2023	\$60.37	\$11.49	\$22.31	\$0.00	\$94.17
BRICKLAYERS LOCAL 3 - MARBLE & TILE	08/01/2023	\$62.42	\$11.49	\$22.31	\$0.00	\$96.22
	02/01/2024	\$63.67	\$11.49	\$22.31	\$0.00	\$97.47
	08/01/2024	\$65.77	\$11.49	\$22.31	\$0.00	\$99.57
	02/01/2025	\$67.07	\$11.49	\$22.31	\$0.00	\$100.87
	08/01/2025	\$69.22	\$11.49	\$22.31	\$0.00	\$103.02
	02/01/2026	\$70.57	\$11.49	\$22.31	\$0.00	\$104.37
	08/01/2026	\$72.77	\$11.49	\$22.31	\$0.00	\$106.57
	02/01/2027	\$74.17	\$11.49	\$22.31	\$0.00	\$107.97

**Classification**

**Effective Date   Base Wage   Health   Pension   Supplemental Unemployment   Total Rate**

**Apprentice - MARBLE-TILE-TERRAZZO MECHANIC - Local 3 Marble & Tile**

**Effective Date - 02/01/2023**

Step	percent	Apprentice Base Wage	Health	Pension	Supplemental Unemployment	Total Rate
1	50	\$30.19	\$11.49	\$22.31	\$0.00	\$63.99
2	60	\$36.22	\$11.49	\$22.31	\$0.00	\$70.02
3	70	\$42.26	\$11.49	\$22.31	\$0.00	\$76.06
4	80	\$48.30	\$11.49	\$22.31	\$0.00	\$82.10
5	90	\$54.33	\$11.49	\$22.31	\$0.00	\$88.13

**Effective Date - 08/01/2023**

Step	percent	Apprentice Base Wage	Health	Pension	Supplemental Unemployment	Total Rate
1	50	\$31.21	\$11.49	\$22.31	\$0.00	\$65.01
2	60	\$37.45	\$11.49	\$22.31	\$0.00	\$71.25
3	70	\$43.69	\$11.49	\$22.31	\$0.00	\$77.49
4	80	\$49.94	\$11.49	\$22.31	\$0.00	\$83.74
5	90	\$56.18	\$11.49	\$22.31	\$0.00	\$89.98

**Notes:**

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**Apprentice to Journeyworker Ratio:1:5**

MECH. SWEEPER OPERATOR (ON CONST. SITES) <i>OPERATING ENGINEERS LOCAL 4</i>	12/01/2022	\$53.05	\$14.25	\$16.05	\$0.00	\$83.35
	06/01/2023	\$54.29	\$14.25	\$16.05	\$0.00	\$84.59
	12/01/2023	\$55.53	\$14.25	\$16.05	\$0.00	\$85.83
	06/01/2024	\$56.81	\$14.25	\$16.05	\$0.00	\$87.11
	12/01/2024	\$58.25	\$14.25	\$16.05	\$0.00	\$88.55
	06/01/2025	\$59.53	\$14.25	\$16.05	\$0.00	\$89.83
	12/01/2025	\$60.97	\$14.25	\$16.05	\$0.00	\$91.27
	06/01/2026	\$62.25	\$14.25	\$16.05	\$0.00	\$92.55
	12/01/2026	\$63.69	\$14.25	\$16.05	\$0.00	\$93.99

For apprentice rates see "Apprentice- OPERATING ENGINEERS"

MECHANICS MAINTENANCE <i>OPERATING ENGINEERS LOCAL 4</i>	12/01/2022	\$53.05	\$14.25	\$16.05	\$0.00	\$83.35
	06/01/2023	\$54.29	\$14.25	\$16.05	\$0.00	\$84.59
	12/01/2023	\$55.53	\$14.25	\$16.05	\$0.00	\$85.83
	06/01/2024	\$56.81	\$14.25	\$16.05	\$0.00	\$87.11
	12/01/2024	\$58.25	\$14.25	\$16.05	\$0.00	\$88.55
	06/01/2025	\$59.53	\$14.25	\$16.05	\$0.00	\$89.83
	12/01/2025	\$60.97	\$14.25	\$16.05	\$0.00	\$91.27
	06/01/2026	\$62.25	\$14.25	\$16.05	\$0.00	\$92.55
	12/01/2026	\$63.69	\$14.25	\$16.05	\$0.00	\$93.99

For apprentice rates see "Apprentice- OPERATING ENGINEERS"

MILLWRIGHT (Zone 1) <i>MILLWRIGHTS LOCAL 1121 - Zone 1</i>	01/02/2023	\$47.27	\$8.58	\$21.57	\$0.00	\$77.42
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**Apprentice - MILLWRIGHT - Local 1121 Zone 1**

**Effective Date - 01/02/2023**

Step	percent	Apprentice Base Wage	Health	Pension	Supplemental Unemployment	Total Rate
1	55	\$26.00	\$8.58	\$5.72	\$0.00	\$40.30
2	65	\$30.73	\$8.58	\$17.93	\$0.00	\$57.24
3	75	\$35.45	\$8.58	\$18.98	\$0.00	\$63.01
4	85	\$40.18	\$8.58	\$20.01	\$0.00	\$68.77

**Notes:** Step 1&2 Appr. indentured after 1/6/2020 receive no pension, but do receive annuity. (Step 1 \$5.72, Step 2 \$6.66)  
Steps are 2,000 hours

**Apprentice to Journeyworker Ratio:1:4**

<b>MORTAR MIXER</b>	12/01/2022	\$43.43	\$9.10	\$17.57	\$0.00	\$70.10
<i>LABORERS - ZONE 1</i>	06/01/2023	\$44.43	\$9.10	\$17.57	\$0.00	\$71.10
	12/01/2023	\$45.68	\$9.10	\$17.57	\$0.00	\$72.35

For apprentice rates see "Apprentice- LABORER"

<b>OILER (OTHER THAN TRUCK CRANES,GRADALLS)</b>	12/01/2022	\$24.37	\$14.25	\$16.05	\$0.00	\$54.67
<i>OPERATING ENGINEERS LOCAL 4</i>	06/01/2023	\$24.94	\$14.25	\$16.05	\$0.00	\$55.24
	12/01/2023	\$25.51	\$14.25	\$16.05	\$0.00	\$55.81
	06/01/2024	\$26.11	\$14.25	\$16.05	\$0.00	\$56.41
	12/01/2024	\$26.77	\$14.25	\$16.05	\$0.00	\$57.07
	06/01/2025	\$27.37	\$14.25	\$16.05	\$0.00	\$57.67
	12/01/2025	\$28.03	\$14.25	\$16.05	\$0.00	\$58.33
	06/01/2026	\$28.62	\$14.25	\$16.05	\$0.00	\$58.92
	12/01/2026	\$29.29	\$14.25	\$16.05	\$0.00	\$59.59

For apprentice rates see "Apprentice- OPERATING ENGINEERS"

<b>OILER (TRUCK CRANES, GRADALLS)</b>	12/01/2022	\$29.57	\$14.25	\$16.05	\$0.00	\$59.87
<i>OPERATING ENGINEERS LOCAL 4</i>	06/01/2023	\$30.27	\$14.25	\$16.05	\$0.00	\$60.57
	12/01/2023	\$30.96	\$14.25	\$16.05	\$0.00	\$61.26
	06/01/2024	\$31.68	\$14.25	\$16.05	\$0.00	\$61.98
	12/01/2024	\$32.48	\$14.25	\$16.05	\$0.00	\$62.78
	06/01/2025	\$33.20	\$14.25	\$16.05	\$0.00	\$63.50
	12/01/2025	\$34.00	\$14.25	\$16.05	\$0.00	\$64.30
	06/01/2026	\$34.72	\$14.25	\$16.05	\$0.00	\$65.02
	12/01/2026	\$35.52	\$14.25	\$16.05	\$0.00	\$65.82

For apprentice rates see "Apprentice- OPERATING ENGINEERS"

<b>OTHER POWER DRIVEN EQUIPMENT - CLASS II</b>	12/01/2022	\$53.05	\$14.25	\$16.05	\$0.00	\$83.35
<i>OPERATING ENGINEERS LOCAL 4</i>	06/01/2023	\$54.29	\$14.25	\$16.05	\$0.00	\$84.59
	12/01/2023	\$55.53	\$14.25	\$16.05	\$0.00	\$85.83
	06/01/2024	\$56.81	\$14.25	\$16.05	\$0.00	\$87.11
	12/01/2024	\$58.25	\$14.25	\$16.05	\$0.00	\$88.55
	06/01/2025	\$59.53	\$14.25	\$16.05	\$0.00	\$89.83
	12/01/2025	\$60.97	\$14.25	\$16.05	\$0.00	\$91.27
	06/01/2026	\$62.25	\$14.25	\$16.05	\$0.00	\$92.55
	12/01/2026	\$63.69	\$14.25	\$16.05	\$0.00	\$93.99

Classification	Effective Date	Base Wage	Health	Pension	Supplemental Unemployment	Total Rate
For apprentice rates see "Apprentice- OPERATING ENGINEERS"						
PAINTER (BRIDGES/TANKS) <i>PAINTERS LOCAL 35 - ZONE 2</i>	01/01/2023	\$56.06	\$8.65	\$23.05	\$0.00	\$87.76
	07/01/2023	\$57.26	\$8.65	\$23.05	\$0.00	\$88.96
	01/01/2024	\$58.46	\$8.65	\$23.05	\$0.00	\$90.16
	07/01/2024	\$59.66	\$8.65	\$23.05	\$0.00	\$91.36
	01/01/2025	\$60.86	\$8.65	\$23.05	\$0.00	\$92.56

**Apprentice - PAINTER Local 35 - BRIDGES/TANKS**

**Effective Date - 01/01/2023**

Step	percent	Apprentice Base Wage	Health	Pension	Supplemental Unemployment	Total Rate
1	50	\$28.03	\$8.65	\$0.00	\$0.00	\$36.68
2	55	\$30.83	\$8.65	\$6.27	\$0.00	\$45.75
3	60	\$33.64	\$8.65	\$6.84	\$0.00	\$49.13
4	65	\$36.44	\$8.65	\$7.41	\$0.00	\$52.50
5	70	\$39.24	\$8.65	\$19.63	\$0.00	\$67.52
6	75	\$42.05	\$8.65	\$20.20	\$0.00	\$70.90
7	80	\$44.85	\$8.65	\$20.77	\$0.00	\$74.27
8	90	\$50.45	\$8.65	\$21.91	\$0.00	\$81.01

**Effective Date - 07/01/2023**

Step	percent	Apprentice Base Wage	Health	Pension	Supplemental Unemployment	Total Rate
1	50	\$28.63	\$8.65	\$0.00	\$0.00	\$37.28
2	55	\$31.49	\$8.65	\$6.27	\$0.00	\$46.41
3	60	\$34.36	\$8.65	\$6.84	\$0.00	\$49.85
4	65	\$37.22	\$8.65	\$7.41	\$0.00	\$53.28
5	70	\$40.08	\$8.65	\$19.63	\$0.00	\$68.36
6	75	\$42.95	\$8.65	\$20.20	\$0.00	\$71.80
7	80	\$45.81	\$8.65	\$20.77	\$0.00	\$75.23
8	90	\$51.53	\$8.65	\$21.91	\$0.00	\$82.09

**Notes:**

Steps are 750 hrs.

**Apprentice to Journeyworker Ratio:1:1**

PAINTER (SPRAY OR SANDBLAST, NEW) *	01/01/2023	\$46.96	\$8.65	\$23.05	\$0.00	\$78.66
* If 30% or more of surfaces to be painted are new construction, NEW paint rate shall be used. <i>PAINTERS LOCAL 35 - ZONE 2</i>	07/01/2023	\$48.16	\$8.65	\$23.05	\$0.00	\$79.86
	01/01/2024	\$49.36	\$8.65	\$23.05	\$0.00	\$81.06
	07/01/2024	\$50.56	\$8.65	\$23.05	\$0.00	\$82.26
	01/01/2025	\$51.76	\$8.65	\$23.05	\$0.00	\$83.46

**Classification**

**Effective Date    Base Wage    Health    Pension    Supplemental Unemployment    Total Rate**

**Apprentice - PAINTER Local 35 Zone 2 - Spray/Sandblast - New**

**Effective Date - 01/01/2023**

Step	percent	Apprentice Base Wage	Health	Pension	Supplemental Unemployment	Total Rate
1	50	\$23.48	\$8.65	\$0.00	\$0.00	\$32.13
2	55	\$25.83	\$8.65	\$6.27	\$0.00	\$40.75
3	60	\$28.18	\$8.65	\$6.84	\$0.00	\$43.67
4	65	\$30.52	\$8.65	\$7.41	\$0.00	\$46.58
5	70	\$32.87	\$8.65	\$19.63	\$0.00	\$61.15
6	75	\$35.22	\$8.65	\$20.20	\$0.00	\$64.07
7	80	\$37.57	\$8.65	\$20.77	\$0.00	\$66.99
8	90	\$42.26	\$8.65	\$21.91	\$0.00	\$72.82

**Effective Date - 07/01/2023**

Step	percent	Apprentice Base Wage	Health	Pension	Supplemental Unemployment	Total Rate
1	50	\$24.08	\$8.65	\$0.00	\$0.00	\$32.73
2	55	\$26.49	\$8.65	\$6.27	\$0.00	\$41.41
3	60	\$28.90	\$8.65	\$6.84	\$0.00	\$44.39
4	65	\$31.30	\$8.65	\$7.41	\$0.00	\$47.36
5	70	\$33.71	\$8.65	\$19.63	\$0.00	\$61.99
6	75	\$36.12	\$8.65	\$20.20	\$0.00	\$64.97
7	80	\$38.53	\$8.65	\$20.77	\$0.00	\$67.95
8	90	\$43.34	\$8.65	\$21.91	\$0.00	\$73.90

**Notes:**  
Steps are 750 hrs.

**Apprentice to Journeyworker Ratio:1:1**

PAINTER (SPRAY OR SANDBLAST, REPAINT)	01/01/2023	\$45.02	\$8.65	\$23.05	\$0.00	\$76.72
PAINTERS LOCAL 35 - ZONE 2	07/01/2023	\$46.22	\$8.65	\$23.05	\$0.00	\$77.92
	01/01/2024	\$47.42	\$8.65	\$23.05	\$0.00	\$79.12
	07/01/2024	\$48.62	\$8.65	\$23.05	\$0.00	\$80.32
	01/01/2025	\$49.82	\$8.65	\$23.05	\$0.00	\$81.52

**Classification**

**Effective Date    Base Wage    Health    Pension    Supplemental Unemployment    Total Rate**

**Apprentice - PAINTER Local 35 Zone 2 - Spray/Sandblast - Repaint**

**Effective Date - 01/01/2023**

Step	percent	Apprentice Base Wage	Health	Pension	Supplemental Unemployment	Total Rate
1	50	\$22.51	\$8.65	\$0.00	\$0.00	\$31.16
2	55	\$24.76	\$8.65	\$6.27	\$0.00	\$39.68
3	60	\$27.01	\$8.65	\$6.84	\$0.00	\$42.50
4	65	\$29.26	\$8.65	\$7.41	\$0.00	\$45.32
5	70	\$31.51	\$8.65	\$19.63	\$0.00	\$59.79
6	75	\$33.77	\$8.65	\$20.20	\$0.00	\$62.62
7	80	\$36.02	\$8.65	\$20.77	\$0.00	\$65.44
8	90	\$40.52	\$8.65	\$21.91	\$0.00	\$71.08

**Effective Date - 07/01/2023**

Step	percent	Apprentice Base Wage	Health	Pension	Supplemental Unemployment	Total Rate
1	50	\$23.11	\$8.65	\$0.00	\$0.00	\$31.76
2	55	\$25.42	\$8.65	\$6.27	\$0.00	\$40.34
3	60	\$27.73	\$8.65	\$6.84	\$0.00	\$43.22
4	65	\$30.04	\$8.65	\$19.06	\$0.00	\$57.75
5	70	\$32.35	\$8.65	\$19.63	\$0.00	\$60.63
6	75	\$34.67	\$8.65	\$20.20	\$0.00	\$63.52
7	80	\$36.98	\$8.65	\$20.77	\$0.00	\$66.40
8	90	\$41.60	\$8.65	\$21.91	\$0.00	\$72.16

**Notes:**

Steps are 750 hrs.

**Apprentice to Journeyworker Ratio:1:1**

PAINTER / TAPER (BRUSH, NEW) *	01/01/2023	\$45.56	\$8.65	\$23.05	\$0.00	\$77.26
* If 30% or more of surfaces to be painted are new construction, NEW paint rate shall be used. PAINTERS LOCAL 35 - ZONE 2	07/01/2023	\$46.76	\$8.65	\$23.05	\$0.00	\$78.46
	01/01/2024	\$47.96	\$8.65	\$23.05	\$0.00	\$79.66
	07/01/2024	\$49.16	\$8.65	\$23.05	\$0.00	\$80.86
	01/01/2025	\$50.36	\$8.65	\$23.05	\$0.00	\$82.06

**Classification**

**Effective Date   Base Wage   Health   Pension   Supplemental Unemployment   Total Rate**

**Apprentice - PAINTER - Local 35 Zone 2 - BRUSH NEW**

**Effective Date - 01/01/2023**

Step	percent	Apprentice Base Wage	Health	Pension	Supplemental Unemployment	Total Rate
1	50	\$22.78	\$8.65	\$0.00	\$0.00	\$31.43
2	55	\$25.06	\$8.65	\$6.27	\$0.00	\$39.98
3	60	\$27.34	\$8.65	\$6.84	\$0.00	\$42.83
4	65	\$29.61	\$8.65	\$7.41	\$0.00	\$45.67
5	70	\$31.89	\$8.65	\$19.63	\$0.00	\$60.17
6	75	\$34.17	\$8.65	\$20.20	\$0.00	\$63.02
7	80	\$36.45	\$8.65	\$20.77	\$0.00	\$65.87
8	90	\$41.00	\$8.65	\$21.91	\$0.00	\$71.56

**Effective Date - 07/01/2023**

Step	percent	Apprentice Base Wage	Health	Pension	Supplemental Unemployment	Total Rate
1	50	\$23.38	\$8.65	\$0.00	\$0.00	\$32.03
2	55	\$25.72	\$8.65	\$6.27	\$0.00	\$40.64
3	60	\$28.06	\$8.65	\$6.84	\$0.00	\$43.55
4	65	\$30.39	\$8.65	\$7.41	\$0.00	\$46.45
5	70	\$32.73	\$8.65	\$19.63	\$0.00	\$61.01
6	75	\$35.07	\$8.65	\$20.20	\$0.00	\$63.92
7	80	\$37.41	\$8.65	\$20.77	\$0.00	\$66.83
8	90	\$42.08	\$8.65	\$21.91	\$0.00	\$72.64

**Notes:**

Steps are 750 hrs.

**Apprentice to Journeyworker Ratio:1:1**

PAINTER / TAPER (BRUSH, REPAINT)	01/01/2023	\$43.62	\$8.65	\$23.05	\$0.00	\$75.32
PAINTERS LOCAL 35 - ZONE 2	07/01/2023	\$44.82	\$8.65	\$23.05	\$0.00	\$76.52
	01/01/2024	\$46.02	\$8.65	\$23.05	\$0.00	\$77.72
	07/01/2024	\$47.22	\$8.65	\$23.05	\$0.00	\$78.92
	01/01/2025	\$48.42	\$8.65	\$23.05	\$0.00	\$80.12

**Classification**

**Effective Date    Base Wage    Health    Pension    Supplemental Unemployment    Total Rate**

**Apprentice - PAINTER Local 35 Zone 2 - BRUSH REPAINT**

**Effective Date - 01/01/2023**

Step	percent	Apprentice Base Wage	Health	Pension	Supplemental Unemployment	Total Rate
1	50	\$21.81	\$8.65	\$0.00	\$0.00	\$30.46
2	55	\$23.99	\$8.65	\$6.27	\$0.00	\$38.91
3	60	\$26.17	\$8.65	\$6.84	\$0.00	\$41.66
4	65	\$28.35	\$8.65	\$7.41	\$0.00	\$44.41
5	70	\$30.53	\$8.65	\$19.63	\$0.00	\$58.81
6	75	\$32.72	\$8.65	\$20.20	\$0.00	\$61.57
7	80	\$34.90	\$8.65	\$20.77	\$0.00	\$64.32
8	90	\$39.26	\$8.65	\$21.91	\$0.00	\$69.82

**Effective Date - 07/01/2023**

Step	percent	Apprentice Base Wage	Health	Pension	Supplemental Unemployment	Total Rate
1	50	\$22.41	\$8.65	\$0.00	\$0.00	\$31.06
2	55	\$24.65	\$8.65	\$6.27	\$0.00	\$39.57
3	60	\$26.89	\$8.65	\$6.84	\$0.00	\$42.38
4	65	\$29.13	\$8.65	\$7.41	\$0.00	\$45.19
5	70	\$31.37	\$8.65	\$19.63	\$0.00	\$59.65
6	75	\$33.62	\$8.65	\$20.20	\$0.00	\$62.47
7	80	\$35.86	\$8.65	\$20.77	\$0.00	\$65.28
8	90	\$40.34	\$8.65	\$21.91	\$0.00	\$70.90

**Notes:**

Steps are 750 hrs.

**Apprentice to Journeyworker Ratio:1:1**

PAINTER TRAFFIC MARKINGS (HEAVY/HIGHWAY)	12/01/2022	\$42.58	\$9.35	\$17.82	\$0.00	\$69.75
LABORERS - ZONE 1 (HEAVY & HIGHWAY)	06/01/2023	\$43.58	\$9.35	\$17.82	\$0.00	\$70.75
	12/01/2023	\$44.83	\$9.35	\$17.82	\$0.00	\$72.00
	06/01/2024	\$46.31	\$9.35	\$17.82	\$0.00	\$73.48
	12/01/2024	\$47.78	\$9.35	\$17.82	\$0.00	\$74.95
	06/01/2025	\$49.28	\$9.35	\$17.82	\$0.00	\$76.45
	12/01/2025	\$50.78	\$9.35	\$17.82	\$0.00	\$77.95
	06/01/2026	\$52.33	\$9.35	\$17.82	\$0.00	\$79.50
	12/01/2026	\$53.83	\$9.35	\$17.82	\$0.00	\$81.00

For apprentice rates see "Apprentice- LABORER (Heavy and Highway)

PANEL & PICKUP TRUCKS DRIVER	12/01/2021	\$36.88	\$13.41	\$16.01	\$0.00	\$66.30
TEAMSTERS JOINT COUNCIL NO. 10 ZONE A						

PIER AND DOCK CONSTRUCTOR (UNDERPINNING AND DECK)	08/01/2020	\$49.07	\$9.40	\$23.12	\$0.00	\$81.59
PILE DRIVER LOCAL 56 (ZONE 1)						

For apprentice rates see "Apprentice- PILE DRIVER"

PILE DRIVER	08/01/2020	\$49.07	\$9.40	\$23.12	\$0.00	\$81.59
PILE DRIVER LOCAL 56 (ZONE 1)						



**Apprentice - PILE DRIVER - Local 56 Zone 1**

**Effective Date - 08/01/2020**

Step	percent	Apprentice Base Wage	Health	Pension	Supplemental Unemployment	Total Rate
1	50	\$24.54	\$9.40	\$23.12	\$0.00	\$57.06
2	60	\$29.44	\$9.40	\$23.12	\$0.00	\$61.96
3	70	\$34.35	\$9.40	\$23.12	\$0.00	\$66.87
4	75	\$36.80	\$9.40	\$23.12	\$0.00	\$69.32
5	80	\$39.26	\$9.40	\$23.12	\$0.00	\$71.78
6	80	\$39.26	\$9.40	\$23.12	\$0.00	\$71.78
7	90	\$44.16	\$9.40	\$23.12	\$0.00	\$76.68
8	90	\$44.16	\$9.40	\$23.12	\$0.00	\$76.68

**Notes:**

% Indentured After 10/1/17; 45/45/55/55/70/70/80/80  
 Step 1&2 \$34.01/ 3&4 \$41.46/ 5&6 \$62.80/ 7&8 \$69.25

**Apprentice to Journeyworker Ratio:1:5**

**PIPEFITTER & STEAMFITTER**  
*PIPEFITTERS LOCAL 537*

03/01/2023	\$63.43	\$12.25	\$20.80	\$0.00	\$96.48
09/01/2023	\$65.18	\$12.25	\$20.80	\$0.00	\$98.23
03/01/2024	\$66.98	\$12.25	\$20.80	\$0.00	\$100.03
09/01/2024	\$68.78	\$12.25	\$20.80	\$0.00	\$101.83
03/01/2025	\$70.58	\$12.25	\$20.80	\$0.00	\$103.63

**Apprentice - PIPEFITTER - Local 537**

**Effective Date - 03/01/2023**

Step	percent	Apprentice Base Wage	Health	Pension	Supplemental Unemployment	Total Rate
1	40	\$25.37	\$12.25	\$8.55	\$0.00	\$46.17
2	45	\$28.54	\$12.25	\$20.80	\$0.00	\$61.59
3	60	\$38.06	\$12.25	\$20.80	\$0.00	\$71.11
4	70	\$44.40	\$12.25	\$20.80	\$0.00	\$77.45
5	80	\$50.74	\$12.25	\$20.80	\$0.00	\$83.79

**Effective Date - 09/01/2023**

Step	percent	Apprentice Base Wage	Health	Pension	Supplemental Unemployment	Total Rate
1	40	\$26.07	\$12.25	\$8.55	\$0.00	\$46.87
2	45	\$29.33	\$12.25	\$20.80	\$0.00	\$62.38
3	60	\$39.11	\$12.25	\$20.80	\$0.00	\$72.16
4	70	\$45.63	\$12.25	\$20.80	\$0.00	\$78.68
5	80	\$52.14	\$12.25	\$20.80	\$0.00	\$85.19

**Notes:**

\*\* 1:3; 3:15; 1:10 thereafter / Steps are 1 yr.  
 Refrig/AC Mechanic \*\*1:1;1:2;2:4;3:6;4:8;5:10;6:12;7:14;8:17;9:20;10:23(Max)

**Apprentice to Journeyworker Ratio:\*\***

Classification	Effective Date	Base Wage	Health	Pension	Supplemental Unemployment	Total Rate
PIPELAYER <i>LABORERS - ZONE 1</i>	12/01/2022	\$43.43	\$9.10	\$17.57	\$0.00	\$70.10
	06/01/2023	\$44.43	\$9.10	\$17.57	\$0.00	\$71.10
	12/01/2023	\$45.68	\$9.10	\$17.57	\$0.00	\$72.35
For apprentice rates see "Apprentice- LABORER"						
PIPELAYER (HEAVY & HIGHWAY) <i>LABORERS - ZONE 1 (HEAVY &amp; HIGHWAY)</i>	12/01/2022	\$42.83	\$9.35	\$17.82	\$0.00	\$70.00
	06/01/2023	\$43.83	\$9.35	\$17.82	\$0.00	\$71.00
	12/01/2023	\$45.08	\$9.35	\$17.82	\$0.00	\$72.25
	06/01/2024	\$46.56	\$9.35	\$17.82	\$0.00	\$73.73
	12/01/2024	\$48.03	\$9.35	\$17.82	\$0.00	\$75.20
	06/01/2025	\$49.53	\$9.35	\$17.82	\$0.00	\$76.70
	12/01/2025	\$51.03	\$9.35	\$17.82	\$0.00	\$78.20
	06/01/2026	\$52.58	\$9.35	\$17.82	\$0.00	\$79.75
	12/01/2026	\$54.08	\$9.35	\$17.82	\$0.00	\$81.25
For apprentice rates see "Apprentice- LABORER (Heavy and Highway)"						
PLUMBERS & GASFITTERS <i>PLUMBERS &amp; GASFITTERS LOCAL 12</i>	02/26/2023	\$65.19	\$14.07	\$18.36	\$0.00	\$97.62
	09/03/2023	\$66.94	\$14.07	\$18.36	\$0.00	\$99.37
	03/03/2024	\$68.74	\$14.07	\$18.36	\$0.00	\$101.17
	09/01/2024	\$70.54	\$14.07	\$18.36	\$0.00	\$102.97
	03/02/2025	\$72.34	\$14.07	\$18.36	\$0.00	\$104.77

**Apprentice - PLUMBER/GASFITTER - Local 12**

**Effective Date - 02/26/2023**

Step	percent	Apprentice Base Wage	Health	Pension	Supplemental Unemployment	Total Rate
1	35	\$22.82	\$14.07	\$6.63	\$0.00	\$43.52
2	40	\$26.08	\$14.07	\$7.52	\$0.00	\$47.67
3	55	\$35.85	\$14.07	\$10.24	\$0.00	\$60.16
4	65	\$42.37	\$14.07	\$12.04	\$0.00	\$68.48
5	75	\$48.89	\$14.07	\$13.85	\$0.00	\$76.81

**Effective Date - 09/03/2023**

Step	percent	Apprentice Base Wage	Health	Pension	Supplemental Unemployment	Total Rate
1	35	\$23.43	\$14.07	\$6.63	\$0.00	\$44.13
2	40	\$26.78	\$14.07	\$7.52	\$0.00	\$48.37
3	55	\$36.82	\$14.07	\$10.24	\$0.00	\$61.13
4	65	\$43.51	\$14.07	\$12.04	\$0.00	\$69.62
5	75	\$50.21	\$14.07	\$13.85	\$0.00	\$78.13

**Notes:**

\*\* 1:2; 2:6; 3:10; 4:14; 5:19/Steps are 1 yr  
Step4 with lic\$69.00, Step5 with lic\$76.87

**Apprentice to Journeyworker Ratio:\*\***

PNEUMATIC CONTROLS (TEMP.) <i>PIPEFITTERS LOCAL 537</i>	03/01/2023	\$63.43	\$12.00	\$20.80	\$0.00	\$96.23
	09/01/2023	\$65.18	\$12.00	\$20.80	\$0.00	\$97.98
	03/01/2024	\$66.98	\$12.00	\$20.80	\$0.00	\$99.78
	09/01/2024	\$68.78	\$12.00	\$20.80	\$0.00	\$101.58
	03/01/2025	\$70.58	\$12.00	\$20.80	\$0.00	\$103.38

Classification	Effective Date	Base Wage	Health	Pension	Supplemental Unemployment	Total Rate
For apprentice rates see "Apprentice- PIPEFITTER" or "PLUMBER/PIPEFITTER"						
PNEUMATIC DRILL/TOOL OPERATOR <i>LABORERS - ZONE 1</i>	12/01/2022	\$43.43	\$9.10	\$17.57	\$0.00	\$70.10
	06/01/2023	\$44.43	\$9.10	\$17.57	\$0.00	\$71.10
	12/01/2023	\$45.68	\$9.10	\$17.57	\$0.00	\$72.35
For apprentice rates see "Apprentice- LABORER"						
PNEUMATIC DRILL/TOOL OPERATOR (HEAVY & HIGHWAY) <i>LABORERS - ZONE 1 (HEAVY &amp; HIGHWAY)</i>	12/01/2022	\$42.83	\$9.35	\$17.82	\$0.00	\$70.00
	06/01/2023	\$43.83	\$9.35	\$17.82	\$0.00	\$71.00
	12/01/2023	\$45.08	\$9.35	\$17.82	\$0.00	\$72.25
	06/01/2024	\$46.56	\$9.35	\$17.82	\$0.00	\$73.73
	12/01/2024	\$48.03	\$9.35	\$17.82	\$0.00	\$75.20
	06/01/2025	\$49.53	\$9.35	\$17.82	\$0.00	\$76.70
	12/01/2025	\$51.03	\$9.35	\$17.82	\$0.00	\$78.20
	06/01/2026	\$52.58	\$9.35	\$17.82	\$0.00	\$79.75
	12/01/2026	\$54.08	\$9.35	\$17.82	\$0.00	\$81.25
For apprentice rates see "Apprentice- LABORER (Heavy and Highway)"						
POWDERMAN & BLASTER <i>LABORERS - ZONE 1</i>	12/01/2022	\$44.18	\$9.10	\$17.57	\$0.00	\$70.85
	06/01/2023	\$45.18	\$9.10	\$17.57	\$0.00	\$71.85
	12/01/2023	\$46.43	\$9.10	\$17.57	\$0.00	\$73.10
For apprentice rates see "Apprentice- LABORER"						
POWDERMAN & BLASTER (HEAVY & HIGHWAY) <i>LABORERS - ZONE 1 (HEAVY &amp; HIGHWAY)</i>	12/01/2022	\$43.58	\$9.35	\$17.82	\$0.00	\$70.75
	06/01/2023	\$44.58	\$9.35	\$17.82	\$0.00	\$71.75
	12/01/2023	\$45.83	\$9.35	\$17.82	\$0.00	\$73.00
	06/01/2024	\$47.31	\$9.35	\$17.82	\$0.00	\$74.48
	12/01/2024	\$48.78	\$9.35	\$17.82	\$0.00	\$75.95
	06/01/2025	\$50.28	\$9.35	\$17.82	\$0.00	\$77.45
	12/01/2025	\$51.78	\$9.35	\$17.82	\$0.00	\$78.95
	06/01/2026	\$53.33	\$9.35	\$17.82	\$0.00	\$80.50
	12/01/2026	\$54.83	\$9.35	\$17.82	\$0.00	\$82.00
For apprentice rates see "Apprentice- LABORER (Heavy and Highway)"						
POWER SHOVEL/DERRICK/TRENCHING MACHINE <i>OPERATING ENGINEERS LOCAL 4</i>	12/01/2022	\$53.63	\$14.25	\$16.05	\$0.00	\$83.93
	06/01/2023	\$54.88	\$14.25	\$16.05	\$0.00	\$85.18
	12/01/2023	\$56.13	\$14.25	\$16.05	\$0.00	\$86.43
	06/01/2024	\$57.43	\$14.25	\$16.05	\$0.00	\$87.73
	12/01/2024	\$58.88	\$14.25	\$16.05	\$0.00	\$89.18
	06/01/2025	\$60.18	\$14.25	\$16.05	\$0.00	\$90.48
	12/01/2025	\$61.63	\$14.25	\$16.05	\$0.00	\$91.93
	06/01/2026	\$62.93	\$14.25	\$16.05	\$0.00	\$93.23
	12/01/2026	\$64.38	\$14.25	\$16.05	\$0.00	\$94.68
For apprentice rates see "Apprentice- OPERATING ENGINEERS"						

Classification	Effective Date	Base Wage	Health	Pension	Supplemental Unemployment	Total Rate
PUMP OPERATOR (CONCRETE) <i>OPERATING ENGINEERS LOCAL 4</i>	12/01/2022	\$53.63	\$14.25	\$16.05	\$0.00	\$83.93
	06/01/2023	\$54.88	\$14.25	\$16.05	\$0.00	\$85.18
	12/01/2023	\$56.13	\$14.25	\$16.05	\$0.00	\$86.43
	06/01/2024	\$57.43	\$14.25	\$16.05	\$0.00	\$87.73
	12/01/2024	\$58.88	\$14.25	\$16.05	\$0.00	\$89.18
	06/01/2025	\$60.18	\$14.25	\$16.05	\$0.00	\$90.48
	12/01/2025	\$61.63	\$14.25	\$16.05	\$0.00	\$91.93
	06/01/2026	\$62.93	\$14.25	\$16.05	\$0.00	\$93.23
	12/01/2026	\$64.38	\$14.25	\$16.05	\$0.00	\$94.68
For apprentice rates see "Apprentice- OPERATING ENGINEERS"						
PUMP OPERATOR (DEWATERING, OTHER) <i>OPERATING ENGINEERS LOCAL 4</i>	12/01/2022	\$35.08	\$14.25	\$16.05	\$0.00	\$65.38
	06/01/2023	\$35.90	\$14.25	\$16.05	\$0.00	\$66.20
	12/01/2023	\$36.72	\$14.25	\$16.05	\$0.00	\$67.02
	06/01/2024	\$37.57	\$14.25	\$16.05	\$0.00	\$67.87
	12/01/2024	\$38.52	\$14.25	\$16.05	\$0.00	\$68.82
	06/01/2025	\$39.37	\$14.25	\$16.05	\$0.00	\$69.67
	12/01/2025	\$40.32	\$14.25	\$16.05	\$0.00	\$70.62
	06/01/2026	\$41.18	\$14.25	\$16.05	\$0.00	\$71.48
	12/01/2026	\$42.13	\$14.25	\$16.05	\$0.00	\$72.43
For apprentice rates see "Apprentice- OPERATING ENGINEERS"						
READY MIX CONCRETE DRIVERS after 4/30/12 (Drivers Hired After 4/30/2012) <i>TEAMSTERS 25 (Metro) - Aggregate</i>	08/01/2022	\$30.40	\$11.91	\$15.25	\$0.00	\$57.56
READY-MIX CONCRETE DRIVER <i>TEAMSTERS 25 (Metro) - Aggregate</i>	08/01/2022	\$34.41	\$11.91	\$15.25	\$0.00	\$61.57
RECLAIMERS <i>OPERATING ENGINEERS LOCAL 4</i>	12/01/2022	\$53.05	\$14.25	\$16.05	\$0.00	\$83.35
	06/01/2023	\$54.29	\$14.25	\$16.05	\$0.00	\$84.59
	12/01/2023	\$55.53	\$14.25	\$16.05	\$0.00	\$85.83
	06/01/2024	\$56.81	\$14.25	\$16.05	\$0.00	\$87.11
	12/01/2024	\$58.25	\$14.25	\$16.05	\$0.00	\$88.55
	06/01/2025	\$59.53	\$14.25	\$16.05	\$0.00	\$89.83
	12/01/2025	\$60.97	\$14.25	\$16.05	\$0.00	\$91.27
	06/01/2026	\$62.25	\$14.25	\$16.05	\$0.00	\$92.55
	12/01/2026	\$63.69	\$14.25	\$16.05	\$0.00	\$93.99
For apprentice rates see "Apprentice- OPERATING ENGINEERS"						
RIDE-ON MOTORIZED BUGGY OPERATOR <i>LABORERS - ZONE 1</i>	12/01/2022	\$43.43	\$9.10	\$17.57	\$0.00	\$70.10
	06/01/2023	\$44.43	\$9.10	\$17.57	\$0.00	\$71.10
	12/01/2023	\$45.68	\$9.10	\$17.57	\$0.00	\$72.35
For apprentice rates see "Apprentice- LABORER"						
ROLLER/SPREADER/MULCHING MACHINE <i>OPERATING ENGINEERS LOCAL 4</i>	12/01/2022	\$53.05	\$14.25	\$16.05	\$0.00	\$83.35
	06/01/2023	\$54.29	\$14.25	\$16.05	\$0.00	\$84.59
	12/01/2023	\$55.53	\$14.25	\$16.05	\$0.00	\$85.83
	06/01/2024	\$56.81	\$14.25	\$16.05	\$0.00	\$87.11
	12/01/2024	\$58.25	\$14.25	\$16.05	\$0.00	\$88.55
	06/01/2025	\$59.53	\$14.25	\$16.05	\$0.00	\$89.83
	12/01/2025	\$60.97	\$14.25	\$16.05	\$0.00	\$91.27
	06/01/2026	\$62.25	\$14.25	\$16.05	\$0.00	\$92.55
	12/01/2026	\$63.69	\$14.25	\$16.05	\$0.00	\$93.99

Classification	Effective Date	Base Wage	Health	Pension	Supplemental Unemployment	Total Rate
For apprentice rates see "Apprentice- OPERATING ENGINEERS"						
ROOFER (Inc.Roofing Waterproofing &Roofing Damproofg) ROOFERS LOCAL 33	02/01/2023	\$48.53	\$12.78	\$20.20	\$0.00	\$81.51
	08/01/2023	\$50.03	\$12.78	\$20.20	\$0.00	\$83.01
	02/01/2024	\$51.28	\$12.78	\$20.20	\$0.00	\$84.26
	08/01/2024	\$52.78	\$12.78	\$20.20	\$0.00	\$85.76
	02/01/2025	\$54.03	\$12.78	\$20.20	\$0.00	\$87.01
	08/01/2025	\$55.53	\$12.78	\$20.20	\$0.00	\$88.51
	02/01/2026	\$56.78	\$12.78	\$20.20	\$0.00	\$89.76

**Apprentice - ROOFER - Local 33**

**Effective Date - 02/01/2023**

Step	percent	Apprentice Base Wage	Health	Pension	Supplemental Unemployment	Total Rate
1	50	\$24.27	\$12.78	\$5.59	\$0.00	\$42.64
2	60	\$29.12	\$12.78	\$20.20	\$0.00	\$62.10
3	65	\$31.54	\$12.78	\$20.20	\$0.00	\$64.52
4	75	\$36.40	\$12.78	\$20.20	\$0.00	\$69.38
5	85	\$41.25	\$12.78	\$20.20	\$0.00	\$74.23

**Effective Date - 08/01/2023**

Step	percent	Apprentice Base Wage	Health	Pension	Supplemental Unemployment	Total Rate
1	50	\$25.02	\$12.78	\$5.59	\$0.00	\$43.39
2	60	\$30.02	\$12.78	\$20.20	\$0.00	\$63.00
3	65	\$32.52	\$12.78	\$20.20	\$0.00	\$65.50
4	75	\$37.52	\$12.78	\$20.20	\$0.00	\$70.50
5	85	\$42.53	\$12.78	\$20.20	\$0.00	\$75.51

**Notes:** \*\* 1:5, 2:6-10, the 1:10; Reroofing: 1:4, then 1:1  
 Step 1 is 2000 hrs.; Steps 2-5 are 1000 hrs.  
 (Hot Pitch Mechanics' receive \$1.00 hr. above ROOFER)

**Apprentice to Journeyworker Ratio:\*\***

ROOFER SLATE / TILE / PRECAST CONCRETE ROOFERS LOCAL 33	02/01/2023	\$48.78	\$12.78	\$20.20	\$0.00	\$81.76
	08/01/2023	\$50.28	\$12.78	\$20.20	\$0.00	\$83.26
	02/01/2024	\$51.53	\$12.78	\$20.20	\$0.00	\$84.51
	08/01/2024	\$53.03	\$12.78	\$20.20	\$0.00	\$86.01
	02/01/2025	\$54.28	\$12.78	\$20.20	\$0.00	\$87.26
	08/01/2025	\$55.78	\$12.78	\$20.20	\$0.00	\$88.76
	02/01/2026	\$57.03	\$12.78	\$20.20	\$0.00	\$90.01

For apprentice rates see "Apprentice- ROOFER"

SHEETMETAL WORKER SHEETMETAL WORKERS LOCAL 17 - A	02/01/2023	\$55.31	\$14.11	\$26.64	\$2.83	\$98.89
	08/01/2023	\$57.01	\$14.11	\$26.64	\$2.83	\$100.59
	02/01/2024	\$58.71	\$14.11	\$26.64	\$2.83	\$102.29
	08/01/2024	\$60.46	\$14.11	\$26.64	\$2.83	\$104.04
	02/01/2025	\$62.21	\$14.11	\$26.64	\$2.83	\$105.79
	08/01/2025	\$64.06	\$14.11	\$26.64	\$2.83	\$107.64
	02/01/2026	\$66.01	\$14.11	\$26.64	\$2.83	\$109.59

**Classification**

**Effective Date    Base Wage    Health    Pension    Supplemental Unemployment    Total Rate**

**Apprentice - SHEET METAL WORKER - Local 17-A**

**Effective Date - 02/01/2023**

Step	percent	Apprentice Base Wage	Health	Pension	Supplemental Unemployment	Total Rate
1	42	\$23.23	\$14.11	\$6.13	\$0.00	\$43.47
2	42	\$23.23	\$14.11	\$6.13	\$0.00	\$43.47
3	47	\$26.00	\$14.11	\$11.90	\$1.54	\$53.55
4	47	\$26.00	\$14.11	\$11.90	\$1.54	\$53.55
5	52	\$28.76	\$14.11	\$12.88	\$1.65	\$57.40
6	52	\$28.76	\$14.11	\$13.13	\$1.65	\$57.65
7	60	\$33.19	\$14.11	\$14.54	\$1.83	\$63.67
8	65	\$35.95	\$14.11	\$15.52	\$1.94	\$67.52
9	75	\$41.48	\$14.11	\$17.48	\$2.16	\$75.23
10	85	\$47.01	\$14.11	\$18.94	\$2.36	\$82.42

**Effective Date - 08/01/2023**

Step	percent	Apprentice Base Wage	Health	Pension	Supplemental Unemployment	Total Rate
1	42	\$23.94	\$14.11	\$6.13	\$0.00	\$44.18
2	42	\$23.94	\$14.11	\$6.13	\$0.00	\$44.18
3	47	\$26.79	\$14.11	\$11.90	\$1.58	\$54.38
4	47	\$26.79	\$14.11	\$11.90	\$1.58	\$54.38
5	52	\$29.65	\$14.11	\$12.88	\$1.70	\$58.34
6	52	\$29.65	\$14.11	\$13.13	\$1.70	\$58.59
7	60	\$34.21	\$14.11	\$14.54	\$1.89	\$64.75
8	65	\$37.06	\$14.11	\$15.52	\$2.00	\$68.69
9	75	\$42.76	\$14.11	\$17.48	\$2.23	\$76.58
10	85	\$48.46	\$14.11	\$18.94	\$2.45	\$83.96

**Notes:**  
Steps are 6 mos.

**Apprentice to Journeyworker Ratio:1:4**

SPECIALIZED EARTH MOVING EQUIP < 35 TONS <i>TEAMSTERS JOINT COUNCIL NO. 10 ZONE A</i>	12/01/2021	\$37.34	\$13.41	\$16.01	\$0.00	\$66.76
SPECIALIZED EARTH MOVING EQUIP > 35 TONS <i>TEAMSTERS JOINT COUNCIL NO. 10 ZONE A</i>	12/01/2021	\$37.63	\$13.41	\$16.01	\$0.00	\$67.05
SPRINKLER FITTER <i>SPRINKLER FITTERS LOCAL 550 - (Section A) Zone 1</i>	03/01/2023	\$66.20	\$10.90	\$23.20	\$0.00	\$100.30
	10/01/2023	\$67.95	\$10.90	\$23.20	\$0.00	\$102.05
	03/01/2024	\$69.75	\$10.90	\$23.20	\$0.00	\$103.85
	10/01/2024	\$71.55	\$10.90	\$23.20	\$0.00	\$105.65
	03/01/2025	\$73.35	\$10.90	\$23.20	\$0.00	\$107.45

**Classification**

**Effective Date    Base Wage    Health    Pension    Supplemental Unemployment    Total Rate**

**Apprentice - SPRINKLER FITTER - Local 550 (Section A) Zone 1**

**Effective Date - 03/01/2023**

Step	percent	Apprentice Base Wage	Health	Pension	Supplemental Unemployment	Total Rate
1	35	\$23.17	\$10.90	\$9.70	\$0.00	\$43.77
2	40	\$26.48	\$10.90	\$9.70	\$0.00	\$47.08
3	45	\$29.79	\$10.90	\$9.70	\$0.00	\$50.39
4	50	\$33.10	\$10.90	\$9.70	\$0.00	\$53.70
5	55	\$36.41	\$10.90	\$9.70	\$0.00	\$57.01
6	60	\$39.72	\$10.90	\$11.20	\$0.00	\$61.82
7	65	\$43.03	\$10.90	\$11.20	\$0.00	\$65.13
8	70	\$46.34	\$10.90	\$11.20	\$0.00	\$68.44
9	75	\$49.65	\$10.90	\$11.20	\$0.00	\$71.75
10	80	\$52.96	\$10.90	\$11.20	\$0.00	\$75.06

**Effective Date - 10/01/2023**

Step	percent	Apprentice Base Wage	Health	Pension	Supplemental Unemployment	Total Rate
1	35	\$23.78	\$10.90	\$9.70	\$0.00	\$44.38
2	40	\$27.18	\$10.90	\$9.70	\$0.00	\$47.78
3	45	\$30.58	\$10.90	\$9.70	\$0.00	\$51.18
4	50	\$33.98	\$10.90	\$9.70	\$0.00	\$54.58
5	55	\$37.37	\$10.90	\$9.70	\$0.00	\$57.97
6	60	\$40.77	\$10.90	\$11.20	\$0.00	\$62.87
7	65	\$44.17	\$10.90	\$11.20	\$0.00	\$66.27
8	70	\$47.57	\$10.90	\$11.20	\$0.00	\$69.67
9	75	\$50.96	\$10.90	\$11.20	\$0.00	\$73.06
10	80	\$54.36	\$10.90	\$11.20	\$0.00	\$76.46

**Notes:** Apprentice entered prior 9/30/10:  
40/45/50/55/60/65/70/75/80/85  
Steps are 850 hours

**Apprentice to Journeyworker Ratio:1:3**

STEAM BOILER OPERATOR OPERATING ENGINEERS LOCAL 4	12/01/2022	\$53.05	\$14.25	\$16.05	\$0.00	\$83.35
	06/01/2023	\$54.29	\$14.25	\$16.05	\$0.00	\$84.59
	12/01/2023	\$55.53	\$14.25	\$16.05	\$0.00	\$85.83
	06/01/2024	\$56.81	\$14.25	\$16.05	\$0.00	\$87.11
	12/01/2024	\$58.25	\$14.25	\$16.05	\$0.00	\$88.55
	06/01/2025	\$59.53	\$14.25	\$16.05	\$0.00	\$89.83
	12/01/2025	\$60.97	\$14.25	\$16.05	\$0.00	\$91.27
	06/01/2026	\$62.25	\$14.25	\$16.05	\$0.00	\$92.55
	12/01/2026	\$63.69	\$14.25	\$16.05	\$0.00	\$93.99

For apprentice rates see "Apprentice- OPERATING ENGINEERS"

Classification	Effective Date	Base Wage	Health	Pension	Supplemental Unemployment	Total Rate
TAMPERS, SELF-PROPELLED OR TRACTOR DRAWN <i>OPERATING ENGINEERS LOCAL 4</i>	12/01/2022	\$53.05	\$14.25	\$16.05	\$0.00	\$83.35
	06/01/2023	\$54.29	\$14.25	\$16.05	\$0.00	\$84.59
	12/01/2023	\$55.53	\$14.25	\$16.05	\$0.00	\$85.83
	06/01/2024	\$56.81	\$14.25	\$16.05	\$0.00	\$87.11
	12/01/2024	\$58.25	\$14.25	\$16.05	\$0.00	\$88.55
	06/01/2025	\$59.53	\$14.25	\$16.05	\$0.00	\$89.83
	12/01/2025	\$60.97	\$14.25	\$16.05	\$0.00	\$91.27
	06/01/2026	\$62.25	\$14.25	\$16.05	\$0.00	\$92.55
	12/01/2026	\$63.69	\$14.25	\$16.05	\$0.00	\$93.99

For apprentice rates see "Apprentice- OPERATING ENGINEERS"

TELECOMMUNICATION TECHNICIAN <i>ELECTRICIANS LOCAL 103</i>	03/01/2023	\$47.38	\$13.00	\$19.63	\$0.00	\$80.01
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**Apprentice - TELECOMMUNICATION TECHNICIAN - Local 103**

**Effective Date - 03/01/2023**

Step	percent	Apprentice Base Wage	Health	Pension	Supplemental Unemployment	Total Rate
1	45	\$21.32	\$13.00	\$0.65	\$0.00	\$34.97
2	45	\$21.32	\$13.00	\$0.65	\$0.00	\$34.97
3	50	\$23.69	\$13.00	\$15.20	\$0.00	\$51.89
4	50	\$23.69	\$13.00	\$15.20	\$0.00	\$51.89
5	55	\$26.06	\$13.00	\$15.58	\$0.00	\$54.64
6	60	\$28.43	\$13.00	\$15.96	\$0.00	\$57.39
7	65	\$30.80	\$13.00	\$16.34	\$0.00	\$60.14
8	70	\$33.17	\$13.00	\$16.73	\$0.00	\$62.90
9	75	\$35.54	\$13.00	\$17.11	\$0.00	\$65.65
10	80	\$37.90	\$13.00	\$17.48	\$0.00	\$68.38

Notes:

**Apprentice to Journeyworker Ratio:1:1**

TERRAZZO FINISHERS <i>BRICKLAYERS LOCAL 3 - MARBLE &amp; TILE</i>	02/01/2023	\$59.29	\$11.49	\$22.34	\$0.00	\$93.12
	08/01/2023	\$61.34	\$11.49	\$22.34	\$0.00	\$95.17
	02/01/2024	\$62.59	\$11.49	\$22.34	\$0.00	\$96.42
	08/01/2024	\$64.69	\$11.49	\$22.34	\$0.00	\$98.52
	02/01/2025	\$65.99	\$11.49	\$22.34	\$0.00	\$99.82
	08/01/2025	\$68.14	\$11.49	\$22.34	\$0.00	\$101.97
	02/01/2026	\$69.49	\$11.49	\$22.34	\$0.00	\$103.32
	08/01/2026	\$71.69	\$11.49	\$22.34	\$0.00	\$105.52
	02/01/2027	\$73.09	\$11.49	\$22.34	\$0.00	\$106.92



**Classification**

**Effective Date    Base Wage    Health    Pension    Supplemental Unemployment    Total Rate**

**Apprentice - TERRAZZO FINISHER - Local 3 Marble & Tile**

**Effective Date - 02/01/2023**

Step	percent	Apprentice Base Wage	Health	Pension	Supplemental Unemployment	Total Rate
1	50	\$29.65	\$11.49	\$22.34	\$0.00	\$63.48
2	60	\$35.57	\$11.49	\$22.34	\$0.00	\$69.40
3	70	\$41.50	\$11.49	\$22.34	\$0.00	\$75.33
4	80	\$47.43	\$11.49	\$22.34	\$0.00	\$81.26
5	90	\$53.36	\$11.49	\$22.34	\$0.00	\$87.19

**Effective Date - 08/01/2023**

Step	percent	Apprentice Base Wage	Health	Pension	Supplemental Unemployment	Total Rate
1	50	\$30.67	\$11.49	\$22.34	\$0.00	\$64.50
2	60	\$36.80	\$11.49	\$22.34	\$0.00	\$70.63
3	70	\$42.94	\$11.49	\$22.34	\$0.00	\$76.77
4	80	\$49.07	\$11.49	\$22.34	\$0.00	\$82.90
5	90	\$55.21	\$11.49	\$22.34	\$0.00	\$89.04

**Notes:**

**Apprentice to Journeyworker Ratio:1:3**

TEST BORING DRILLER LABORERS - FOUNDATION AND MARINE	12/01/2022	\$46.58	\$9.35	\$17.97	\$0.00	\$73.90
	06/01/2023	\$47.58	\$9.35	\$17.97	\$0.00	\$74.90
	12/01/2023	\$48.83	\$9.35	\$17.97	\$0.00	\$76.15
	06/01/2024	\$50.31	\$9.35	\$17.97	\$0.00	\$77.63
	12/01/2024	\$51.78	\$9.35	\$17.97	\$0.00	\$79.10
	06/01/2025	\$53.28	\$9.35	\$17.97	\$0.00	\$80.60
	12/01/2025	\$54.78	\$9.35	\$17.97	\$0.00	\$82.10
	06/01/2026	\$56.33	\$9.35	\$17.97	\$0.00	\$83.65
	12/01/2026	\$57.83	\$9.35	\$17.97	\$0.00	\$85.15

For apprentice rates see "Apprentice- LABORER"

TEST BORING DRILLER HELPER LABORERS - FOUNDATION AND MARINE	12/01/2022	\$42.70	\$9.35	\$17.97	\$0.00	\$70.02
	06/01/2023	\$43.70	\$9.35	\$17.97	\$0.00	\$71.02
	12/01/2023	\$44.95	\$9.35	\$17.97	\$0.00	\$72.27
	06/01/2024	\$46.43	\$9.35	\$17.97	\$0.00	\$73.75
	12/01/2024	\$47.90	\$9.35	\$17.97	\$0.00	\$75.22
	06/01/2025	\$49.40	\$9.35	\$17.97	\$0.00	\$76.72
	12/01/2025	\$50.90	\$9.35	\$17.97	\$0.00	\$78.22
	06/01/2026	\$52.45	\$9.35	\$17.97	\$0.00	\$79.77
	12/01/2026	\$53.95	\$9.35	\$17.97	\$0.00	\$81.27

For apprentice rates see "Apprentice- LABORER"

Classification	Effective Date	Base Wage	Health	Pension	Supplemental Unemployment	Total Rate
TEST BORING LABORER <i>LABORERS - FOUNDATION AND MARINE</i>	12/01/2022	\$42.58	\$9.35	\$17.97	\$0.00	\$69.90
	06/01/2023	\$43.58	\$9.35	\$17.97	\$0.00	\$70.90
	12/01/2023	\$44.83	\$9.35	\$17.97	\$0.00	\$72.15
	06/01/2024	\$46.31	\$9.35	\$17.97	\$0.00	\$73.63
	12/01/2024	\$47.78	\$9.35	\$17.97	\$0.00	\$75.10
	06/01/2025	\$49.28	\$9.35	\$17.97	\$0.00	\$76.60
	12/01/2025	\$50.78	\$9.35	\$17.97	\$0.00	\$78.10
	06/01/2026	\$52.33	\$9.35	\$17.97	\$0.00	\$79.65
	12/01/2026	\$53.83	\$9.35	\$17.97	\$0.00	\$81.15
For apprentice rates see "Apprentice- LABORER"						
TRACTORS/PORTABLE STEAM GENERATORS <i>OPERATING ENGINEERS LOCAL 4</i>	12/01/2022	\$53.05	\$14.25	\$16.05	\$0.00	\$83.35
	06/01/2023	\$54.29	\$14.25	\$16.05	\$0.00	\$84.59
	12/01/2023	\$55.53	\$14.25	\$16.05	\$0.00	\$85.83
	06/01/2024	\$56.81	\$14.25	\$16.05	\$0.00	\$87.11
	12/01/2024	\$58.25	\$14.25	\$16.05	\$0.00	\$88.55
	06/01/2025	\$59.53	\$14.25	\$16.05	\$0.00	\$89.83
	12/01/2025	\$60.97	\$14.25	\$16.05	\$0.00	\$91.27
	06/01/2026	\$62.25	\$14.25	\$16.05	\$0.00	\$92.55
	12/01/2026	\$63.69	\$14.25	\$16.05	\$0.00	\$93.99
For apprentice rates see "Apprentice- OPERATING ENGINEERS"						
TRAILERS FOR EARTH MOVING EQUIPMENT <i>TEAMSTERS JOINT COUNCIL NO. 10 ZONE A</i>	12/01/2021	\$37.92	\$13.41	\$16.01	\$0.00	\$67.34
TUNNEL WORK - COMPRESSED AIR <i>LABORERS (COMPRESSED AIR)</i>	12/01/2022	\$54.81	\$9.35	\$18.42	\$0.00	\$82.58
	06/01/2023	\$55.81	\$9.35	\$18.42	\$0.00	\$83.58
	12/01/2023	\$57.06	\$9.35	\$18.42	\$0.00	\$84.83
	06/01/2024	\$58.54	\$9.35	\$18.42	\$0.00	\$86.31
	12/01/2024	\$60.01	\$9.35	\$18.42	\$0.00	\$87.78
	06/01/2025	\$61.51	\$9.35	\$18.42	\$0.00	\$89.28
	12/01/2025	\$63.01	\$9.35	\$18.42	\$0.00	\$90.78
	06/01/2026	\$64.56	\$9.35	\$18.42	\$0.00	\$92.33
	12/01/2026	\$66.06	\$9.35	\$18.42	\$0.00	\$93.83
For apprentice rates see "Apprentice- LABORER"						
TUNNEL WORK - COMPRESSED AIR (HAZ. WASTE) <i>LABORERS (COMPRESSED AIR)</i>	12/01/2022	\$56.81	\$9.35	\$18.42	\$0.00	\$84.58
	06/01/2023	\$57.81	\$9.35	\$18.42	\$0.00	\$85.58
	12/01/2023	\$59.06	\$9.35	\$18.42	\$0.00	\$86.83
	06/01/2024	\$60.54	\$9.35	\$18.42	\$0.00	\$88.31
	12/01/2024	\$62.01	\$9.35	\$18.42	\$0.00	\$89.78
	06/01/2025	\$63.51	\$9.35	\$18.42	\$0.00	\$91.28
	12/01/2025	\$65.01	\$9.35	\$18.42	\$0.00	\$92.78
	06/01/2026	\$66.56	\$9.35	\$18.42	\$0.00	\$94.33
	12/01/2026	\$68.06	\$9.35	\$18.42	\$0.00	\$95.83
For apprentice rates see "Apprentice- LABORER"						

Classification	Effective Date	Base Wage	Health	Pension	Supplemental Unemployment	Total Rate
TUNNEL WORK - FREE AIR <i>LABORERS (FREE AIR TUNNEL)</i>	12/01/2022	\$46.88	\$9.35	\$18.42	\$0.00	\$74.65
	06/01/2023	\$47.88	\$9.35	\$18.42	\$0.00	\$75.65
	12/01/2023	\$49.13	\$9.35	\$18.42	\$0.00	\$76.90
	06/01/2024	\$50.61	\$9.35	\$18.42	\$0.00	\$78.38
	12/01/2024	\$52.08	\$9.35	\$18.42	\$0.00	\$79.85
	06/01/2025	\$53.58	\$9.35	\$18.42	\$0.00	\$81.35
	12/01/2025	\$55.08	\$9.35	\$18.42	\$0.00	\$82.85
	06/01/2026	\$56.63	\$9.35	\$18.42	\$0.00	\$84.40
	12/01/2026	\$58.13	\$9.35	\$18.42	\$0.00	\$85.90
For apprentice rates see "Apprentice- LABORER"						
TUNNEL WORK - FREE AIR (HAZ. WASTE) <i>LABORERS (FREE AIR TUNNEL)</i>	12/01/2022	\$48.88	\$9.35	\$18.42	\$0.00	\$76.65
	06/01/2023	\$49.88	\$9.35	\$18.42	\$0.00	\$77.65
	12/01/2023	\$51.13	\$9.35	\$18.42	\$0.00	\$78.90
	06/01/2024	\$52.61	\$9.35	\$18.42	\$0.00	\$80.38
	12/01/2024	\$54.08	\$9.35	\$18.42	\$0.00	\$81.85
	06/01/2025	\$55.58	\$9.35	\$18.42	\$0.00	\$83.35
	12/01/2025	\$57.08	\$9.35	\$18.42	\$0.00	\$84.85
	06/01/2026	\$58.63	\$9.35	\$18.42	\$0.00	\$86.40
	12/01/2026	\$60.13	\$9.35	\$18.42	\$0.00	\$87.90
For apprentice rates see "Apprentice- LABORER"						
VAC-HAUL <i>TEAMSTERS JOINT COUNCIL NO. 10 ZONE A</i>	12/01/2021	\$37.34	\$13.41	\$16.01	\$0.00	\$66.76
WAGON DRILL OPERATOR <i>LABORERS - ZONE 1</i>	12/01/2022	\$43.43	\$9.10	\$17.57	\$0.00	\$70.10
	06/01/2023	\$44.43	\$9.10	\$17.57	\$0.00	\$71.10
	12/01/2023	\$45.68	\$9.10	\$17.57	\$0.00	\$72.35
For apprentice rates see "Apprentice- LABORER"						
WAGON DRILL OPERATOR (HEAVY & HIGHWAY) <i>LABORERS - ZONE 1 (HEAVY &amp; HIGHWAY)</i>	12/01/2022	\$42.83	\$9.35	\$17.82	\$0.00	\$70.00
	06/01/2023	\$43.83	\$9.35	\$17.82	\$0.00	\$71.00
	12/01/2023	\$45.08	\$9.35	\$17.82	\$0.00	\$72.25
	06/01/2024	\$46.56	\$9.35	\$17.82	\$0.00	\$73.73
	12/01/2024	\$48.03	\$9.35	\$17.82	\$0.00	\$75.20
	06/01/2025	\$49.53	\$9.35	\$17.82	\$0.00	\$76.70
	12/01/2025	\$51.03	\$9.35	\$17.82	\$0.00	\$78.20
	06/01/2026	\$52.58	\$9.35	\$17.82	\$0.00	\$79.75
	12/01/2026	\$54.08	\$9.35	\$17.82	\$0.00	\$81.25
For apprentice rates see "Apprentice- LABORER (Heavy and Highway)"						
WASTE WATER PUMP OPERATOR <i>OPERATING ENGINEERS LOCAL 4</i>	12/01/2022	\$53.63	\$14.25	\$16.05	\$0.00	\$83.93
	06/01/2023	\$54.88	\$14.25	\$16.05	\$0.00	\$85.18
	12/01/2023	\$56.13	\$14.25	\$16.05	\$0.00	\$86.43
	06/01/2024	\$57.43	\$14.25	\$16.05	\$0.00	\$87.73
	12/01/2024	\$58.88	\$14.25	\$16.05	\$0.00	\$89.18
	06/01/2025	\$60.18	\$14.25	\$16.05	\$0.00	\$90.48
	12/01/2025	\$61.63	\$14.25	\$16.05	\$0.00	\$91.93
	06/01/2026	\$62.93	\$14.25	\$16.05	\$0.00	\$93.23
	12/01/2026	\$64.38	\$14.25	\$16.05	\$0.00	\$94.68
For apprentice rates see "Apprentice- OPERATING ENGINEERS"						

Classification	Effective Date	Base Wage	Health	Pension	Supplemental Unemployment	Total Rate
WATER METER INSTALLER <i>PLUMBERS &amp; GASFITTERS LOCAL 12</i>	02/26/2023	\$65.19	\$14.07	\$18.36	\$0.00	\$97.62
	09/03/2023	\$66.94	\$14.07	\$18.36	\$0.00	\$99.37
	03/03/2024	\$68.74	\$14.07	\$18.36	\$0.00	\$101.17
	09/01/2024	\$70.54	\$14.07	\$18.36	\$0.00	\$102.97
	03/02/2025	\$72.34	\$14.07	\$18.36	\$0.00	\$104.77

For apprentice rates see "Apprentice- PLUMBER/PIPEFITTER" or "PLUMBER/GASFITTER"

Additional Apprenticeship Information:

Minimum wage rates for apprentices employed on public works projects are listed above as a percentage of the pre-determined hourly wage rate established by the Commissioner under the provisions of the M.G.L. c. 149, ss. 26-27D. Apprentice ratios are established by the Division of Apprenticeship Training pursuant to M.G.L. c. 23, ss. 11E-11L.

All apprentices must be registered with the Division of Apprenticeship Training in accordance with M.G.L. c. 23, ss. 11E-11L.

All steps are six months (1000 hours.)

Ratios are expressed in allowable number of apprentices to journeymen or fraction thereof, unless otherwise specified.

\*\* Multiple ratios are listed in the comment field.

\*\*\* APP to JM; 1:1, 2:2, 2:3, 3:4, 4:4, 4:5, 4:6, 5:7, 6:7, 6:8, 6:9, 7:10, 8:10, 8:11, 8:12, 9:13, 10:13, 10:14, etc.

\*\*\*\* APP to JM; 1:1, 1:2, 2:3, 2:4, 3:5, 4:6, 4:7, 5:8, 6:9, 6:10, 7:11, 8:12, 8:13, 9:14, 10:15, 10:16, etc.

**SECTION 012300  
ALTERNATES**

**PART 1 - GENERAL**

**1.01 GENERAL PROVISIONS**

- A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 01 Specification Sections, apply to this Section.
- B. Carefully review and examine all other Contract Documents for requirements therein affecting the work of this Section. Furthermore, coordinate and sequence the work of this Section with all other trades affected.

**1.02 SUMMARY**

- A. This Section includes administrative and procedural requirements for alternates.
  - 1. The descriptions of alternates listed herein below and through the Contract Documents are intended to set the intent and to describe the major scope of work only. Such descriptions are not to be taken as limiting the work required under any of the alternates, and all associated work of all trades required to carry out the intent of each of the accepted alternates shall be performed without cost additional to that agreed upon as the alternate price(s).

**1.03 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.

**1.04 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. Where necessary, 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.

**1.05 SELECTION AND AWARD OF ALTERNATES**

- A. Indicate variation of Bid Price for each alternate described below and list where provided for on the Bid Form or any supplement to it, which requests a difference in Contract Price by adding to or subtracting from the base bid price.
- B. Every alternate contained in the Contract Documents are listed in a numerical sequence in order of priority. When the Awarding Authority decides to consider alternates in determining the lowest eligible and responsible bidder, the Awarding Authority will consider the alternates in descending numerical sequence, such that no single alternate shall be considered unless every alternate preceding it on the list has been added to or subtracted from the base bid price in accordance with MGL c.149, s.44G.

- C. The lowest responsible and eligible bid will be determined on the basis of the base bid, adjusted by such alternate(s) as may be included in the award of the Contract in the sole discretion of the Awarding Authority.

**PART 2 – PRODUCTS**

**2.01 [NOT USED]**

**PART 3 - EXECUTION**

**3.01 SCHEDULE OF ALTERNATES**

- A. The description of alternate(s) listed herein below and through the Contract Documents are intended to set the intent and to describe the major scope of work only. Such descriptions are not to be taken as limiting the work required under any of the alternates, and all associated work of all trades required to carry out the intent of each of the accepted alternates shall be performed without cost additional to that agreed upon as the alternate price.

**END OF SECTION**

\*\*\*

**SECTION 013113  
PROJECT COORDINATION**

**PART 1 - GENERAL**

**1.01 SUMMARY**

- A. This Section specifies supervisory and administrative requirements for the coordination of Work, including, but not limited to:
  - 1. Coordination by the contractor.
  - 2. Coordination Drawings.
  - 3. Existing utilities.
  - 4. Cutting and patching.
  - 5. Expedition of the Work to ensure compliance with schedules.

**1.02 COORDINATION BY THE CONTRACTOR**

- A. The Contractor shall be responsible for the management, supervision and coordination of the work of the entire Contract and shall be responsible to identify areas where the installation of work will be restricted, congested or difficult for any reasons. Consult the various affected trades and prepare Coordination Drawings of these areas. Failure to identify "problem" areas or to prepare to work out the same shall be the responsibility of the Contractor, and all necessary re-working and/or relocation of the installed elements resulting from failure to provide sufficient spaces, clearances, etc., shall be provided without additional cost to the Owner.
- B. Coordination Drawings are for the Contractor and the various Subcontractors' use during construction and shall not be construed as replacing any Shop Drawings or Record Drawings required elsewhere in the Contract Documents.

**1.03 COORDINATION DRAWINGS**

- A. General: The Contractor shall prepare Coordination Drawings for areas where close and careful coordination of various affected trades is required. The Contractor shall be fully responsible for coordinating trades, coordinating construction sequence and schedules, and coordinating actual installed location and interface of work.
- B. Timing: Prior to fabricating materials or beginning work, the Contractor shall supervise and direct the production of one complete set of Coordination Drawings showing complete coordination and integration of work.
- C. Contractor shall carefully review field conditions and modify Coordination Drawings in cooperation with affected Subcontractors to assure conflicts are resolved before work in field is begun.

**1.04 EXISTING UTILITIES**

- A. Modifications or extensions of the existing utility service systems, where applicable, shall be done under the direct observation of the Owner's Representative. All tests in connection with this work shall be witnessed by authorized personnel of the Contractor and the Owner's Representative.
- B. When an existing utility line must be cut and plugged or capped, moved, or relocated, or has become damaged the Contractor shall notify the Owner and the Utility company involved, and assure the protection, support, or moving of utilities to adjust them to the new work. The Contractor shall be responsible for all damage caused to existing active utilities under the work of this Contract, including resultant damages or injuries to persons or properties.

**1.05 CUTTING AND PATCHING**

- A. The Contractor shall coordinate and perform, or assign to the appropriate trade, all cutting, fitting, or patching as specified in Division 01 Section "Cutting and Patching".
- B. The Contractor shall provide all sheeting, shoring, bracing, underpinning, reinforcement and other temporary supports as may be required to maintain the integrity of, and prevent damage to, any structure or finish to be subjected to cutting work, and shall patch to restore to sufficient final strength, and acceptable appearance.

## **1.06 EXPEDITION OF THE WORK TO ASSURE COMPLIANCE WITH SCHEDULES**

- A. Coordinate appropriate schedule recovery actions may include, but not be limited to any of the following: assignment of additional labor, Subcontractors, or construction equipment; Work during other than normal working hours subject to other requirements in the Contract Documents; expediting of submittals or deliveries; or any combination of any of them.  
Overlapping or re-sequencing of activities shall be appropriate only if properly substantiated in the schedule recovery plan.

**END OF SECTION**

**2.01 \*\*\***



**SECTION 013300  
SUBMITTAL PROCEDURES**

**PART 1 - GENERAL**

**1.01 SUMMARY**

- A. This Section specifies administrative and procedural requirements for submittals required for performance of Work, including, but not limited to:
  - 1. Construction Progress Schedules.
  - 2. Schedule of Values.
  - 3. Submittal schedule.
  - 4. Shop Drawings.
  - 5. Product Data.
  - 6. Samples.
- B. Administrative Submittals: Refer to requirements specified in other Division 01 Specification Sections, and other Contract Documents, for administrative submittals, including, but not limited to:
  - 1. Permits.
  - 2. Applications for payment.
  - 3. Payment bonds.
  - 4. Insurance certificates.
  - 5. List of subcontractors.

**1.02 SUBMITTAL PROCEDURES**

- A. The Architect will review Product Data, Shop Drawings, Samples, and similar submittals two times: once upon original submission and a second time if a revisions or corrections are requested by the Architect. Submittals not initially approved by the Architect shall be corrected by the Contractor prior to the second submittal.
  - 1. The Contractor shall pay the Engineer at \$180/hour for reviewing Product Data, Shop Drawings, Samples, or similar submittals which have to be revised and resubmitted after the second review by the Engineer.
  - 2. The Contractor shall also pay the Engineer at \$180/hour for evaluating deviations and substitutions proposed by the Contractor, for making revisions to the Contract Documents on account thereof, responding to requests for information and providing other services on account of such proposed deviations or substitutions, all regardless of whether such proposed deviations or substitutions are approved or rejected.
- B. Coordination of Submittals: Coordinate preparation and processing of submittals with related construction activities. Transmit submittals sufficiently in advance of performance of Work, including related construction activities, to avoid delays. Coordinate each submittal with fabrication, purchasing, testing, delivery, other submittals and related pertinent activities that require sequential activity.
  - 1. The Architect may reject, or withhold action on submittals requiring coordination with other submittals until related submittals are received.
- C. Processing of Submittals: Allow sufficient review time to ensure installation will not be delayed because of time required to process submittals. Minimum processing times are as follows:
  - 1. Review by the Architect's Office Only: Allow at least ten (10) business days for review and processing.
  - 2. Review by the Architect and the Consultant: Allow at least ten (10) business days for review and processing of submittals by Architect, and at least an additional five (5) business days for review by each consultant.
  - 3. Reprocessing of Submittals: For submittals not approved initially, allow at least ten (10) business days for review and reprocessing of submittals by Architect, and at least an additional five (5) business days for review by each consultant.
  - 4. No extension of Contract Time will be authorized due to failure to transmit submittals sufficiently in advance of scheduled performance of Work.

- D. Contractor's Preparation of Submittals: Review and submit each submittal with a transmittal form. Place permanent label or title block on each submittal for identification. Indicate Project Name, Project Number, Specification Section number and title, date of submittal, name and address of Architect, name and Address of the Contractor, name and address of the Subcontractor and/or supplier, name and address of manufacturer, Drawing number and detail reference.
  - 1. Contractor's Review and Action Stamp: Provide suitable space on label or title block for Contractor's review and action stamp. Stamp and sign each submittal to show the Contractor's review and approval prior to transmittal to the Architect. Submittals not signed and stamped by Contractor will be returned without action.
  - 2. The Architect's Review and Action Stamp: Provide minimum 4 in. x 4 in. space on label or title block for the Architect's review and action stamp. Deliver submittals to the Architect at address listed on cover of Project Manual.
  - 3. Modify and customize submittals as required to show interface with adjacent work and attachment to building.
- E. Transmittal of Submittals: Transmit each item with a transmittal form. Identify Project, Contractor, subcontractor, major supplier; identify pertinent Drawing sheet and detail number, and Specification section number, as appropriate, on transmittal form.
  - 1. Source: Submittals received from sources other than the Contractor will be returned without action.
  - 2. Deviations from Contract Documents: When products, materials, or systems submitted deviate from Contract Documents, record deviations clearly on transmittal form with separate attached sheet as necessary.
- F. Comply with progress schedule for submittals related to Work progress.
- G. After Architect reviews submittal, revise and resubmit as required. Identify changes made since previous submittal. Changes not marked will be treated as having not been made, even if change is consistent with Contract Documents.
- H. Distribute copies of reviewed submittals to concerned persons. Instruct recipients to promptly report inability to comply with provisions.

### **1.03 CONSTRUCTION PROGRESS SCHEDULE**

- A. Timing: Present Construction Progress Schedule at the Pre-Construction Meeting for Owner and Architect's review. Update the schedule monthly with Payment Applications.
- B. Preparation of Construction Progress Schedule: Prepare individual fully developed, construction schedule identify milestones on a critical path.
- C. Distribution: Print and distribute Construction Progress Schedule to the Architect, the Owner, Subcontractors, and other parties affected. Post copies in field. Instruct recipients to report promptly to the Contractor in writing problems apparent from projections shown on schedule.
- D. Revisions: Update and reissue Construction Progress Schedule, along with baseline comparison, monthly in conjunction with Application for Payment. Submit remedial action plans to the Architect each month to eliminate conditions that may cause delay to the Project.

### **1.04 SHOP DRAWINGS**

- A. Provide accurately prepared, large scale and detailed shop drawings prepared specifically for this Project on reproducible sheets. Show adjacent conditions and related work. Show accurate field dimensions where appropriate. Identify materials and products shown. Note special coordination required. Standard information prepared without specific reference to Project is not considered shop drawings.
- B. Shop drawings include fabrication and installation drawings, including but not limited to plans, elevations, sections, details, setting diagrams, schedules, patterns, templates, and similar drawings.
- C. Show every component of fabricated item, notes regarding manufacturing process, coatings and finishes, identifying numbers conforming to Contract Documents (i.e. stair numbers, door numbers, etc.), dimensions, and appropriate trade names. Show anchorage and fastening

details, including type, size and spacing. Show material gage and thickness. Indicate welding details and joint types.

- D. Shop Drawing Sheet Size: Except for templates, patterns, and other full-size drawings, submit shop drawings on sheets at least 8-1/2 in. x 11 in., but no larger than 30 in. x 42 in.
- E. Submittal Quantities: Submit shop drawings in following quantities:
  - 1. Architectural: For shop drawings submitted for Architect's review, submit one reproducible and two black line print of each sheet.
  - 2. Consultants: For shop drawings that require Consultant's review, submit one reproducible and three black line prints of each sheet.

### **1.05 PRODUCT DATA**

- A. Definition: Product data includes manufacturers standard published literature, such as installation instructions, catalog cuts, color charts, rough-in diagrams, wiring diagrams and Material Safety Data Sheet. When product data must be prepared specifically because standard published data is not suitable for use, submit as shop drawing.
- B. Preparation: Mark each copy of product data to show applicable choices and options. Where published product data includes information on several products and choices, mark copies to clearly indicate information applicable to this Project.
- C. Do not submit product data until compliance with requirements of Contract Documents has been confirmed.
- D. Submittal Quantities: Submit product data in following quantities:
  - 1. Architectural Work: Submit number of copies required by the Contractor, plus additional two (2) copies to be retained by the Architect.
  - 2. Consultant's Work: Submit number of copies required by the Contractor, plus an additional one (1) copy to be retained by the Consultant, and an additional three (3) copies to the Architect. Forward copy of transmittal to the Consultant. The Consultant's review and comments will be made on copies returned to Architect, who will forward them to Contractor.
- E. Installer Copy: Verify that installer of Work possesses a current copy of Architect-approved product data prior to installation.

### **SAMPLES**

- A. Submit samples identical with materials and products to be installed. Where indicated, prepare samples to match Architect's sample. Label sample with description, source, manufacturer's name, and catalog number. Submit samples along with certifications that products comply with referenced standards.
- B. Architect Review: Architect will review samples for confirmation of visual intent, color, pattern, texture, and type. Architect will not test samples for compliance with other specified requirements, which shall remain exclusive responsibility of the Contractor.
- C. Submittal Quantities: When variation in color, pattern, or texture can be expected in finish work, submit multiple samples (minimum of three) to show approximate limits of variations. Submit samples in following quantities:
  - 1. Initial Selection: For initial selection of color, texture, and pattern, submit one full set of manufacturer's available samples.
  - 2. Verification Samples: Submit three sets of samples selected. One set will be returned to Contractor for use at Project Site for quality control comparisons.
- D. Distribution: Distribute additional sets of approved samples to subcontractors, suppliers, installers, and others required for proper performance of Work. Indicate distribution on transmittal forms.

### **2.02 SCHEDULE OF VALUES**

- A. Timing: Present Schedule of Values allocated to the various portions of the Work at the Pre-Construction Meeting for Owner and Architect's review and prior to the submission of the first Payment Application.

- B. When requested by the Architect, submit substantiating data supporting the values submitted.
- C. Intent: Unless objections are stated by the Architect, the Schedule of Values will be used as the basis for the Contractor's Applications for Payment.
- D. Form and Content of Schedule of Values: Type schedule on 8-1/2 in. x 11 in. white paper. Contractor's standard forms and automated printout will be considered for approval by the Architect upon Contractor's request. Identify schedule with title of Project and location, project number, name and address of the Architect, name and address of the Contractor, Contract designation, and date of submission.
  - 1. Line Item Categories: Follow the Table of Contents of Project Manual for major category items. Further sub-divide the major categories into smaller portions of the work as approved by Owner and Architect.
  - 2. List installed value of component parts of the Work in sufficient detail to serve as a basis for computing values for progress payments during construction.
- E. Sub-Values: For each major line item, list sub-values of major products or operations under the item.
- F. Overhead and Profit: For the various portions of the Work, include a directly proportional amount of the Contractor's overhead and profit.
- G. Stored Material: For items on which progress payments will be requested for stored materials, break down the value into the following sub-values:
  - 1. The cost of material, delivered and unloaded at Project Site, with taxes paid.
  - 2. Installation cost including overhead and profit.
- H. The sum of all values listed in the schedule shall equal the total Contract Sum.'

### **2.03 ENGINEER'S ACTION**

- A. General: Engineer will review submittals, stamp and indicate action, and return to Contractor. Architect will review submittals for conformance with design intent only. Architect's review and approval of submittals shall be held to limitations stated in the Conditions of the Contract. In no case shall approval or acceptance by Architect be interpreted as release of Contractor of responsibility to fulfill requirements of Contract Documents. No acceptance or approval of submittals, nor any indication or note marked by Architect on submittals, shall constitute authorization for increase in Contract Sum.
- B. When professional certification of performance criteria of materials, systems or equipment is required by the Contract Documents, the Owner and the Architect shall be entitled to rely upon the accuracy and completeness of such calculations and certifications, and neither the Owner nor the Architect shall be expected to make an independent examination with respect to the performance of such materials, systems or equipment.
- C. Action Stamp: Architect will stamp each submittal with an action stamp. Stamp sample is indicated below:

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#### **APPROVED ( ) APPROVED AS NOTED**

- 1. Revise and Resubmit ( ) Not Approved
- 2. Engineer's review is only for general conformance with design concept and compliance with requirements of Contract Documents. Review is based on Contractor's representation that he has checked and approved this submittal and has verified dimensions, quantities, field dimensions, relation to existing work, coordination with work to be installed later, and coordination with information in previously approved submittals. Accuracy of all such information is responsibility of the Contractor. Approval does not authorize, or relieve the Contractor of responsibility for deviations from drawings, specifications, supplementary documents furnished by the Engineer, or previously approved submittals unless the Contractor has, in writing, called the Engineer's attention to such deviations at the time of submittal. The Contractor is solely responsible for the accuracy of all information in the submittal and for details of fabrication and installation. Refer to Contract Documents for further submittal requirements and limitations on scope

of the Engineers's review.

**TRINIDAD ENGINEERING, INC.**

**BY:**

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- A. Stamp indicates action taken as follows:
  - 1. "APPROVED": No corrections, no marks: Resubmission not required.
  - 2. "APPROVED AS NOTED": Minor amount of corrections; all items may be fabricated without further corrections to original submittal; checking is complete and all corrections are deemed obvious without ambiguity. Resubmission not required.
  - 3. "REVISE AND RESUBMIT": Minor corrections required; items noted shall not be fabricated until further corrections of original submittal is completed and Architect approval is obtained; checking is complete; clarify details of items noted by checker for approval; items without marks may be fabricated without further submittal. Resubmission required.
  - 4. \*NOT APPROVED": Submittal does not conform to Contract Documents, and requires too many corrections, or is rejected for other justifiable reasons. Engineer will state reasons for rejection. Correct and resubmit. Do not fabricate.
- B. Other Action: Submittal for information or record purposes will be returned with no action marked.
- C. Required Resubmittals: Make corrections or changes to submittals required by Architect and resubmit until approved. Revise initial shop drawings or product data, and resubmit as specified for initial submittal. Indicate changes made other than those requested by Architect. Submit new samples as required for initial submittal.

**7.02 DISTRIBUTION BY CONTRACTOR**

- A. Distribution: When submittal is marked "APPROVED", or "APPROVED AS NOTED", make prints and copies and distribute to the Subcontractors, suppliers, fabricators, and other parties requiring information from submittal for proper coordination and performance of the Work. Print copies of shop drawings from approved reproducible only.

**END OF SECTION**

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**SECTION 014100  
REGULATORY REQUIREMENTS**

**PART 1 - GENERAL**

**1.01 GENERAL PROVISIONS**

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

**1.02 DEFINITIONS**

- A. Regulations include 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, whether lawfully imposed by authorities having jurisdiction or not.

**1.03 REGULATIONS**

- A. Applicability of Standards: Except where the Contract Documents include more stringent requirements, applicable regulatory requirements have the same force and effect as if bound or copied directly into the Contract Documents. Such regulatory requirements are made a part of the Contract Documents by reference.
- B. Publication Dates: Comply with the regulatory requirements in effect as of the date of the Contract Documents unless a specific date is indicated in the Contract Documents or the governing regulations cited herein.
- C. Conflicting Requirements: Where compliance with two or more requirements is specified and the regulatory requirements establish different or conflicting requirements for minimum quantities or quality levels, comply with the most stringent and highest quality requirement. Request a decision from the Architect before proceeding on requirements that are different but apparently equal, and where it is uncertain which requirement is the most stringent.
  - 1. Minimum Quantity or Quality Levels: The quantity or quality level shown or specified shall be the minimum acceptable. 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 the requirements. Request a clarification from the Architect regarding uncertainties before proceeding.
- D. Copies of Regulations: Each entity engaged in construction on the Project is required to be familiar with regulatory requirements applicable to its construction activity. Copies of applicable regulations are not bound with the Contract Documents.
  - 1. Where copies of regulations are needed to perform a required construction activity, the Contractor shall obtain copies directly from the publication source.

**1.04 GOVERNING REGULATIONS AND AUTHORITIES**

- A. Obtain copies of the latest applicable State Codes and Regulations including but not limited to the following regulations and retain at the Project Site to be available for reference by parties who have a reasonable need during submittals, planning, and progress of the Work, until Substantial Completion.
  - 1. 780 CMR - Massachusetts State Building Code, 9th Edition.
  - 2. International Building Code / 2015.
  - 3. International Existing Building Code / 2015.
  - 4. 248 CMR 10.00 - Massachusetts Uniform State Plumbing Code.
  - 5. 527 CMR 12.00 - Massachusetts Electrical Code / National Electric Code / NFPA 70-2017.
  - 6. 527 CMR 1.00 - Massachusetts Comprehensive Fire Safety Code / NFPA 1-2012.
  - 7. International Mechanical Code / 2015.
  - 8. International Plumbing Code / 2015.
  - 9. International Energy Conservation Code / 2015.
  - 10. NFPA 101.
  - 11. 521 CMR - Massachusetts Architectural Access Board Regulations.

12. United States Department of Justice, N° 28 CFR Part 36 - Americans With Disabilities Act, (Public Law 101-336).
  13. ICC/ANSI A117.1 - Accessible and Usable Buildings and Facilities / 2009.
  14. OSHA 29 CFR Part 1910 Occupational Safety and Health Regulations/1999.
  15. OSHA 29 CFR Part 1926 Occupational Safety and Health Regulations for Construction/1999.
  16. Local zoning bylaws.
  17. Local wetland regulations, including but not limited to applicable Order of Conditions.
  18. All other applicable local, state and federal laws, codes, regulations, and ordinances.
- B. Trade Union Jurisdictions: Maintain current information on jurisdictional matters, regulations, actions and pending actions; and administer/supervise performance of Work in a manner which will minimize possibility of disputes, conflicts, delays, claims or losses.
- C. Wage and hour rates: refer to Division 00 Section "Massachusetts Prevailing Wage Laws".
- D. For Massachusetts State Building Code and how it can be obtained see <http://www.mass.gov/eopss/consumer-prot-and-bus-lic/license-type/csl/building-codebbrs.html> (The Official Website of the Executive Office of Public Safety and Security).

#### **1.05 SUBMITTALS**

- A. Permits, Licenses, and Certificates: For the 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.

#### **PART 2 - PRODUCTS**

##### **2.01 [NOT USED]**

#### **PART 3 - EXECUTION**

##### **3.01 [NOT USED]**

#### **END OF SECTION**

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**SECTION 015000**  
**TEMPORARY CONSTRUCTION FACILITIES AND CONTROLS**

**PART 1 - GENERAL**

**1.01 SUMMARY**

- A. This Section specifies temporary construction facilities and controls, including, but not limited to:
  - 1. Temporary utilities.
  - 2. Temporary construction and support facilities.
  - 3. Protection facilities.
  - 4. Any other means, methods, equipment and aids Contractor may deem necessary for the execution of the Work.
  - 5. Maintaining all services to Owner-occupied areas at all times.

**1.02 REFERENCES**

- A. Comply with requirements of authorities having jurisdiction, codes, OSHA, and industry standards including, but not limiting to the following. Where these standard conflict with other specified requirements, the most restrictive requirements shall govern.
  - 1. American National Standards Institute (ANSI):
  - 2. Safety Requirements for Construction and Demolition.
  - 3. National Electrical Contractors Association (NECA):
  - 4. Temporary Job Utilities and Services
  - 5. National Fire Protection Association (NFPA):
  - 6. National Electrical Code
  - 7. Building Construction and Demolition Operations
  - 8. NEMA and UL standards

**1.03 PROJECT CONDITIONS**

- A. Conditions of Use: Maintain temporary facilities clean and neat in appearance. Operate in a safe and efficient manner. Take necessary fire prevention measures. Do not overload temporary facilities. Do not allow hazardous, dangerous, or unsanitary conditions to develop on site.
- B. Maintain the continuity of all temporary or permanent utility services at all times unless otherwise directed by the Owner.

**1.04 QUALITY ASSURANCE**

- A. Tests and Inspections: Arrange for authorities having jurisdiction to test and inspect each temporary utility before use. Obtain required certifications and permits
- B. Accessible Temporary Egress: Comply with applicable provisions in the U.S. Architectural & Transportation Barriers Compliance Board's ADA-ABA Accessibility Guidelines; ICC/ANSI A117.1; and 521 CMR - Massachusetts Architectural Access Board Regulations.
- C. Maintaining required means of egress for all Owner-occupied areas in accordance with 780 CMR - Massachusetts State Building Code.
- D. Dust- and HVAC-Control Measure: Submit plans and narrative that indicates the dust- and HVAC-control measures proposed for use, proposed locations, and proposed time frame for their installation. Identify further options if proposed measures are later determined to be inadequate. Include the following:
  - 1. Locations of dust-control partitions.
  - 2. HVAC system isolation methods.
  - 3. Waste handling procedures.
  - 4. Other dust-control measures.



## **PART 2 - PRODUCTS**

### **2.01 MATERIALS, GENERAL**

- A. Temporary materials may be new or used, but must be adequate in capacity for the required usage, must not create unsafe conditions, and must not violate requirements of applicable codes and standards.
- B. Polyethylene Sheet: Reinforced, fire-resistive sheet, 10-mil (0.25-mm) minimum thickness, with flame-spread rating of 15 or less per ASTM E 84 and passing NFPA 701 Test Method 2.
- C. Dust-Control Adhesive-Surface Walk-off Mats: min. 20" x 30" size Dirt Catcher Super Sticky Mat by 3M.

### **2.02 PROTECTION OF THE EXISTING CONSTRUCTION, FURNISHINGS AND FINISHES**

- A. Where necessary, fully cover and protect the existing construction, furnishings and finishes with heavy duty cotton drop clothes or plastic sheeting to prevent any damages or soiling resulted from performing the Work of this Contract.
  - 1. Contractor shall cover the entire floor surfaces of the access routes used for construction but outside of the designated construction areas with heavyweight non-staining 46 mil Ram Board, taping the edges to maintain position. Reapply papers as required to maintain proper floor protection.
  - 2. Where staging, hoisting, and/or heavy construction equipment are used, overlay Ram Board with 1/2" thick plywood or 440 Homasote to protect existing flooring from any soiling or damage caused by the work of this Contract.
  - 3. At every interior temporary exit from the construction areas, provide a zippered plastic sheeting door and a Dust-Control Adhesive-Surface Walk-off Mat. Replace mat when no longer effective.
- B. Clean, repair, and restore damages and soiling caused by the work of this Contract at no cost to the Owner. Immediately remove and replace the damaged existing construction, furnishings and finishes beyond repair at the Contractor's expenses.

### **2.03 TEMPORARY FIRE PROTECTION**

- A. Contractor shall take all necessary precautions for the prevention of fire during construction. Keep work area orderly and clean and remove combustible rubbish promptly off site. Combustible materials shall be stored on site in a manner and at locations acceptable to local Fire Officials. Contractor shall comply with all suggestions regarding fire protection made by the insurance company with which the Owner maintains his fire insurance.
- B. Contractor shall provide and maintain in good working order, under all conditions, readily available to all portions of the work area, suitable and adequate fire protection equipment and services. Such facilities shall include, but not be limited to, two (2) UL labeled, 2-1/2 gal. Type ABC fire extinguishers.

### **2.04 TEMPORARY STAGING AND SCAFFOLDING**

- A. Contractor shall furnish, erect, and maintain in safe condition all staging and scaffolding required to properly carry out and complete the work. Staging and scaffolding thus provided shall comply in all respects to the governing laws and codes.

### **2.05 TEMPORARY HOISTING EQUIPMENT AND MACHINERY**

- A. Contractor shall furnish, install, operate, and maintain in safe condition all hoisting equipment and machinery required to properly carry out and complete the work. All hoisting equipment and machinery, and operation shall comply in all respects to the governing laws and codes.

### **TEMPORARY UTILITIES**

- A. Contractor will be allowed to make connection and/or utilize Owner's existing water and electricity where required for the performance of the work. Contractor shall be responsible for furnishing, installing, and maintaining temporary facilities required for use and further specified as follows:
  - 1. Owner will pay for water and electrical energy used on the Project from the beginning of construction operations to the Date of Substantial Completion of the Work.

2. The furnishing of utilities by the Owner for the convenience of the Contractor and without charge shall be conditional upon the Contractor being conservative and prudent in their use. In the event Contractor are repeatedly wasteful in the use of the utilities thus provided, the Owner reserves the right to charge Contractor at an equitable rate for the energy consumed.

### **3.02 TEMPORARY LIGHTING**

- A. The Contractor shall be responsible to arrange for adequate indoor lighting to illuminate staging, dangerous projections, and the like as required to protect the safety of workmen and other personnel.
- B. The Contractor shall furnish all extension cords, task lights, and accessories required to adequately illuminate the work surfaces for proper execution of the work.

### **3.03 TEMPORARY TRASH REMOVAL**

- A. Contractor shall be responsible for trash removal for all trades, and shall have the trash and construction debris hauled away, and legally disposed of off the site on daily basis. At his discretion, Contractor may provide dumpster type trash container for his own use and for the use by all subcontractors. The dumpster thus provided must be placed at a location approved by the Owner and shall be emptied at sufficient intervals to maintain the capacity and continuously ready to receive trash and debris. Use of the Owner's dumpster shall be strictly prohibited.
- B. Construction waste disposal must comply with the 310 CMR 19.017: Massachusetts Waste Disposal Ban Regulation.

### **3.04 NOISE, DUST, AND POLLUTION CONTROL**

- A. All work performed under the Contract shall conform to the requirements of Massachusetts General Laws Chapter III, Sections 31C and 142D, and Rules and Regulations adopted thereto by the Massachusetts Department of Public Health, and the requirements of local noise, dust, and pollution control ordinances, and regulative agencies applicable to the work.

### **3.05 TEMPORARY STORAGE FACILITIES**

- A. Space for storage shall be confined to within the work areas unless at other specific locations as directed and approved by the Owner in writing.
- B. Storage of material within the existing building will be permitted only provided such storage, and the handling required thereby, does not damage or overload the building structure or finishes, does not interfere with the safe and expeditious performance of the work, does not interfere with Owner's operations or block the required exit ways, and does not present or cause a fire or other hazard.

## **PART 3 - EXECUTION**

### **4.01 TEMPORARY WEATHER PROTECTION**

- A. Where building envelop elements of the building providing weather protection are to be temporarily opened to the weather, they shall be fully enclosed or covered with securely attached and well draining enclosures against inclement weather, to assure absolute weather protection. Any and all damages to the existing construction, including all materials, equipment, furnishings, and finishes thereon, caused by inadequate weather protection shall be immediately made good by the Contractor without further cost to the Owner.

### **4.02 TEMPORARY SANITARY FACILITY**

- A. Use of any existing school sanitary facility is strictly prohibited. Contractor shall provide sufficient sanitary facility for his own use in accordance with Division 01 Section "Temporary Sanitary Facilities".

### **4.03 MAINTENANCE, TERMINATION, AND REMOVAL**

- A. Enforce strict discipline in use of temporary facilities. Limit waste and abuse.

- B. Maintain temporary facilities in operating condition; repair damages immediately upon discovery. Unless otherwise requested by Owner, remove each temporary facilities when no longer useful. Clean and renovate existing work affected by the work of this contract.

**END OF SECTION**

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**SECTION 016000  
PRODUCT REQUIREMENTS**

**PART 1 - GENERAL**

**1.01 PRODUCTS INCORPORATED INTO THE WORK**

- A. Conform to applicable specifications and standards.
- B. Comply with size, make, type and quality specified, or as specifically approved in writing by the Architect.
- C. Manufactured and Fabricated Products:
  - 1. Design, fabricate and assemble in accord with the best engineering and shop practices.
  - 2. Manufacture like parts of duplicate units to standard size and gages, to be interchangeable.
  - 3. Two or more items of the same kind shall be identical, by the same manufacturer.
  - 4. Products shall be suitable for service conditions.
  - 5. Equipment capacities, sizes, and dimensions shown or specified shall be adhered to unless variations are specifically approved in writing.
- D. Do not use material or equipment for any purpose other than that for which it is designed or is specified.
- E. No asbestos containing products or lead containing products shall be permitted on this Project.
- F. All finishes and materials used in this Project shall be low V.O.C.

**1.02 WORKMANSHIP**

- A. Comply with industry standards except when more restrictive tolerances or specified requirements indicate more rigid standards or more precise workmanship.
- B. Perform work by persons qualified to produce workmanship of specified quality.
- C. Secure Products in place with positive anchorage devices designed and sized to withstand stresses, vibration, and racking.

**1.03 MANUFACTURERS' INSTRUCTIONS**

- A. When work is specified to comply with manufacturers' instructions, submit copies of said instructions, as specified in Division 01 Section "Submittal Procedures", distribute copies to persons involved, and maintain one set in field office.
- B. Perform work in accordance with details of instructions and specified requirements. Should a conflict exist between Specifications and manufacturer's instructions, consult with Architect.

**1.04 TRANSPORTATION AND HANDLING**

- A. Arrange deliveries of products in accord with construction schedules, coordinate to avoid conflict with work and conditions at the site.
- B. Transport Products by methods to avoid Product damage; deliver in undamaged condition in manufacturer's unopened containers or packaging, dry.
- C. Provide equipment and personnel to handle Products by methods to prevent soiling or damage.
- D. Promptly inspect shipments to assure that Products comply with requirements, quantities are correct, and products are undamaged.

**1.05 STORAGE AND PROTECTION**

- A. Store Products in accordance with manufacturer's instructions, with seals and labels intact and legible. Store sensitive Products in weather-tight enclosures; maintain within temperature and humidity ranges required by manufacturer's instructions.
- B. After installation, provide coverings to protect Products from damage from traffic and construction operations, remove when no longer needed.

**1.06 PRODUCT OPTIONS**

- A. Product options:

1. Products specified only by reference standard: Any Product meeting that standard.
2. Products specified by naming three or more manufacturers: Products of any named manufacturer meeting Specifications.
3. Products specified by naming one manufacturer and "or equal": Submit a request for substitution for any manufacturer not specifically named.

#### **1.07 PRODUCT SUBSTITUTIONS**

- A. Substitutions of products shall comply with requirements of Chapter 30, Section 39M of General Laws, and additional requirements and procedures specified herein.
- B. Where products or materials are specified by manufacturer's name, trade name or catalog reference, an item shall be considered equal to the item so named or described if in the opinion of the Architect that:
  1. It is at least equal in quality, durability, appearance, strength and design; including compliance with applicable specifications and compatibility with physical space allocations provided for the item;
  2. It performs at least equally the function imposed by the general design for the work;
  3. It conforms substantially, even with deviations to the detailed requirements for the item as indicated by the Contract Documents.
- C. Should the Contractor, after the award of the Contract, wish to use any products or materials other than those specified, he shall request written permission of the Architect using Substitution Request Form attached at the end of this Section. His request shall name and adequately describe (including shop drawings) the proposed substitutions, furnish any information requested by the Architect, and state what difference, if any, will be made in the Contract price, including the cost of changes in the Work, for such substitutions should they be accepted. Upon receipt of complete information from the Contractor, the Architect will consider all aspects of the proposed substitution and advise the Contractor in writing approving or disapproving the substitution. The principal reasons for approval or disapproval of the substitution will be enumerated by the Architect. Disapproval of the substitution shall not be cause for an increase in Contract price or a delay in schedule.
- D. Request constitutes a representation that Contractor:
  1. Has investigated proposed Product and determined that it meets or exceeds, in all respects, specified Product.
  2. Will provide the same warranty for substitution as for specified Product.
  3. Will coordinate installation and make other changes which may be required for Work to be complete in all respects at no additional cost to the Owner.
  4. Waives claims for additional costs which may subsequently become apparent.
- E. Substitutions will not be considered when they are indicated or implied on Shop Drawing or Product Data submittals without separate written request, or when acceptance will require substantial revision of Contract Documents.
- F. Architect will determine acceptability of proposed substitution, and will notify Contractor of acceptance or rejection in writing within a reasonable time.

#### **END OF SECTION**

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**SECTION 017300  
EXECUTION REQUIREMENTS**

**PART 1 - GENERAL**

**1.01 GENERAL PROVISIONS**

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

**1.02 SUMMARY**

- A. Section includes general administrative and procedural requirements governing execution of the Work including, but not limited to, the following:
  1. Examination.
  2. Preparation.
  3. Installation of the Work.
  4. Progress cleaning.
  5. Protection of installed construction.

**1.03 RELATED WORK**

- A. Examine Contract Documents for requirements that affect work of this Section. Other Specification Sections that directly relate to work of this Section include, but are not limited to:
  1. Division 01 Section "Summary of Work": for limits on use of Project site.
  2. Division 01 Section "Submittal Procedures": for submitting surveys.
  3. Division 01 Section "Cutting and Patching": for execution requirements of executing cutting and patching.
  4. Division 01 Section "Contract Closeout": for requirements of executing final cleaning.

**1.04 INFORMATIONAL SUBMITTALS**

- A. Landfill Receipts: Submit copy of receipts issued by a landfill facility, licensed to accept hazardous materials, for hazardous waste disposal.

**1.05 QUALITY ASSURANCE**

- A. Manufacturer's Installation Instructions: Obtain and maintain on-site manufacturer's written recommendations and instructions for installation of products and equipment.

**PART 2 - PRODUCTS**

**2.01 [NOT USED.]**

**PART 3 - EXECUTION**

**3.01 EXAMINATION**

- A. Existing Conditions: The existence and location of underground and other utilities and construction indicated as existing are not guaranteed. Before beginning work, investigate and verify the existence and location of underground utilities, mechanical and electrical systems, and other construction affecting the Work.
  1. Before construction, verify the location and invert elevation at points of connection of sanitary sewer, and water-service piping; underground plumbing and electrical services, and other utilities.
  2. Furnish location data for work related to Project that must be performed by public utilities serving Project site.
- B. Examination and Acceptance of Conditions: Before proceeding with each component of the Work, 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. Examine roughing-in for mechanical and electrical systems to verify actual locations of connections before equipment and fixture installation.
  2. Examine walls, floors, roofs, and other substrates for suitable conditions where products and systems are to be applied or installed.

3. Verify compatibility with and suitability of substrates, including compatibility with existing finishes or primers.
- C. Written Report: Where a written report listing conditions detrimental to performance of the Work is required by other Sections, include the following:
1. Description of the Work.
  2. List of detrimental conditions, including substrates.
  3. List of unacceptable installation tolerances.
  4. Recommended corrections.
- D. Proceed with installation only after unsatisfactory conditions have been corrected. Proceeding with the Work indicates acceptance of surfaces and conditions.

### **3.02 PREPARATION**

- A. 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.
- B. Space Requirements: Verify space requirements and dimensions of items shown diagrammatically on Drawings.
- C. Review of Contract Documents and Field Conditions: Immediately on discovery of the need for clarification of the Contract Documents caused by differing field conditions outside the control of Contractor, submit a request for information to Architect according to requirements in Division 01 Section "Project Coordination".

### **3.03 INSTALLATION OF THE WORK**

- 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 96 inches in occupied spaces.
- 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. Sequence the Work and allow adequate clearances to accommodate movement of construction items on site and placement in permanent locations.
- F. Tools and Equipment: Do not use tools or equipment that produce harmful noise levels.
- G. 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.
- H. Attachment: Provide blocking and attachment plates and anchors and fasteners of adequate size and number to securely anchor each component in place, accurately located and aligned with other portions of the Work. Where size and type of attachments are not indicated, verify size and type required for load conditions.
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.
- I. 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.
- J. Hazardous Materials: Use products, cleaners, and installation materials that are not considered hazardous.

### **3.04 PROGRESS CLEANING**

- A. General: Clean Project site and work areas daily, including common areas. 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 waste materials more than seven days during normal weather or three days if the temperature is expected to rise above 80 deg F (27 deg C).
  3. Containerize hazardous and unsanitary waste materials separately from other waste. Mark containers appropriately and dispose of legally, according to regulations.
    - a. Use containers intended for holding waste materials of type to be stored.
- 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: Do not bury or burn waste materials on-site. Do not wash waste materials down sewers or into waterways.
- 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 until 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.

### **3.05 PROTECTION OF INSTALLED CONSTRUCTION**

- A. Comply with manufacturer's written instructions for temperature and relative humidity.
- B. Provide final protection and maintain conditions that ensure installed Work is without damage or deterioration until date of Substantial Completion.
  1. Repair, restore, or replace if not repairable, any and all damaged work at no cost to the Owner.

### **END OF SECTION**



4.01 \*\*\*

**SECTION 017329  
CUTTING AND PATCHING**

**PART 1 - GENERAL**

**1.01 SUMMARY**

- A. This Section specifies administrative and procedural requirements for cutting, fitting, and patching required to complete the Work or to:
  - 1. Make several parts fit together properly.
  - 2. Uncover portions of the Work to provide for installations of ill-timed work.
  - 3. Remove and replace defective work.
  - 4. Remove and replace work not conforming to requirements of Contract Documents.
  - 5. Provide routine penetrations of non-structural elements.
- B. Unless otherwise specifically specified in other Sections, the Contractor shall coordinate and perform, or assign to the appropriate trades, all cutting, fitting, and patching.

**1.02 QUALITY ASSURANCE**

- A. Permission to patch any items of work does not imply a waiver of the Owner's right to require complete removal and replacement in said areas or said items if, in the Architect's opinion, patching does not satisfactorily restore quality and appearance of work.
- B. Do not cut-and-patch structural work in anyway resulting in a reduction of load-carrying capacity or load/deflection ratio.
- C. Do not cut-and-patch operational elements and safety- related components in any way resulting in a reduction of capacities to perform in the manner intended or resulting in decreased operational life, increased maintenance, or decreased safety.
- D. Do not cut-and-patch work that is exposed to view in a manner resulting in reduction of visual qualities or in substantial evidence of cut-and-patch work, both as judged solely by the Architect. Remove and replace visually unsatisfactory work as directed by Architect.

**1.03 SUBMITTALS**

- A. Submit a written request to the Architect well in advance of executing any cutting or alteration that affects:
  - 1. Work of the Owner or separate contractor.
  - 2. Structural value or integrity of any element of the Project.
  - 3. Integrity or effectiveness of weather-exposed or moisture-resistant elements or systems.
  - 4. Efficiency, operational life, maintenance, or safety of operational elements.
  - 5. Visual qualities of sight-exposed elements.

**PART 2 - PRODUCTS**

**2.01 MATERIALS**

- A. Except as otherwise indicated or authorized by the Architect, provide materials for cutting-and-patching which will result in equal-or-better work than the work being cut-and-patched, in terms of performance characteristics and including visual effect where applicable. Comply with the requirements of the material manufacturer, and use materials identical with the original materials where feasible and where recognized that satisfactory results can be produced thereby.
- B. Comply with specifications and standards for each specific product involved.

**PART 3 - EXECUTION**

**3.01 INSPECTION**

- A. Inspect conditions of Project, including elements subject to damage or to movement during cutting and patching.
- B. After uncovering work, inspect conditions affecting installation of Products, or performance of work.

- C. Report unsatisfactory or questionable conditions to the Architect in writing; do not proceed with work until the Architect has provided further instructions.

### **3.02 PREPARATION**

- A. Provide adequate temporary support as necessary to assure structural value or integrity of affected portion of Work.
- B. Provide devices and methods to protect other portions of the Project from damage.
- C. Provide protection from elements for that portion of the Project which may be exposed by cutting and patching work, and maintain excavations free from water.

### **3.03 PERFORMANCE**

- A. Execute cutting and patching by methods that will prevent damage to other work, and will provide proper surfaces to receive installation of repairs.
  - 1. In general, where mechanical cutting is required, cut work with sawing and grinding tools, not with hammering and chopping tools. Core drill openings through concrete work.
  - 2. Prior to cutting any structural steel or concrete work, contact the Architect in writing. Do not cut any structural steel and concrete work until approval has been granted by the Architect.
- B. Execute fitting and adjustment of products to provide a finished installation to comply with specified products, functions, tolerances, and finishes.
- C. Restore work which has been cut or removed; install new products to provide completed Work in accordance with requirements of Contract Documents.
- D. Patch with seams that are durable and as invisible as possible. Comply with specified tolerances for the work.
- E. Refinish entire surfaces as necessary to provide an even finish to match adjacent finishes:
  - 1. For continuous surfaces, refinish to nearest intersection.
  - 2. For an assembly, refinish entire unit.

### **END OF SECTION**

#### **4.01 \*\*\***

**SECTION 017700  
CONTRACT CLOSE-OUT**

**PART 1 - GENERAL**

**1.01 SUMMARY**

- A. This Section specifies administrative and procedural requirements during contract close-out. Including, but not limited to:
  - 1. Substantial Completion.
  - 2. Final Acceptance.
  - 3. Record document submittal.
  - 4. Maintenance data.
  - 5. Warranties.
  - 6. Final cleaning.

**1.02 SUBSTANTIAL COMPLETION**

- A. Prior to requesting inspection for certification of Substantial Completion, complete the following:
  - 1. On Application for Payment, show 100% completion for portions of work claimed as substantially complete. Submit list of incomplete items, value of incomplete work, reasons work is not complete, and scheduled or projected time of completion.
  - 2. Submission of warranties.
  - 3. Submission of maintenance data and instructions.
  - 4. Submission of final Project Record Documents.
  - 5. Final cleaning.
  - 6. Application for reduction of retainage.
  - 7. Consent of surety.
  - 8. Notification of shifting insurance coverage.
- B. Within reasonable time, Architect will inspect to determine status of completion.
- C. Should the Architect determine Work is not substantially complete, he will promptly notify Contractor in writing, giving reasons therefor. The Architect's notification will be detailed or general as he deems appropriate to the actual status of completion observed.
  - 1. Reinspection Fees: Should Architect perform reinspection due to failure of Work to comply with claims made by the Contractor, the Contractor shall compensate Architect for such additional services at \$125/hr, and deduct the amount of such compensation from final payment to the Contractor.
- D. The Contractor shall substantially complete work, and remedy any noted deficiencies, and send a second written notice of substantial Completion. Architect will reinspect the Work.
- E. When Architect determines Work is Substantially Complete, he will prepare Certificate of Substantial Completion in accordance with the Consolidated General Conditions. Specific time period shall be established by the Certificate of Substantial Completion for the Contractor to complete all work for Final Acceptance.

**1.03 FINAL ACCEPTANCE**

- A. Prior to requesting final inspection for certification of Final Acceptance and final payment, complete the following:
  - 1. Submission of final payment request with releases and supporting documentation.
  - 2. Completion of incomplete Work.
  - 3. Assurances that unsettled claims have been or will be settled.
  - 4. Submission of updated final settlement, including accounting for final additional changes to the Contract Sum. Show additional Contract Sum, additions and deduction, previous Change Orders, Total Adjusted Contract Sum, previous payments and Contract Sum due.
  - 5. Submission of consent of surety.
  - 6. Submission of evidence of final, continuing insurance coverage complying with insurance requirements.
  - 7. Prove that taxes, fees, and similar obligations have been paid.

8. Remove temporary facilities and service.
  9. Remove surplus materials, rubbish and similar elements.
  10. Certify Work has been inspected for compliance with Contract Documents.
  11. Certify Work has been completed in accordance with Contract Documents, and deficiencies listed with Certificate of Substantial Completion have been corrected.
  12. Certify Work is complete and ready for final inspection.
  13. Certify materials incorporated have no asbestos containing materials or lead.
  14. Acceptance of Work by the Owner.
- B. The Architect will inspect to verify status of completion with reasonable promptness.
1. Should the Architect consider Work is incomplete or defective, the Contractor will promptly notify Contractor in writing, listing incomplete or defective work.
  2. The Contractor shall take immediate steps to remedy deficiencies and send a second written certification that Work is complete, and Architect will reinspect the work.
  3. When the Architect finds Work is acceptable, he will consider closeout submittals.
  4. Reinspection Fees: Should Architect perform reinspection due to failure of Work to comply with claims made by the Contractor, The Contractor shall compensate Architect for such additional services at \$125/hr, and deduct the amount of such compensation from final payment to the Contractor.
- C. Application for Final Payment: Submit Application for Final Payment in accordance with procedures and requirements of the Consolidated General Conditions.

#### **1.04 RECORD DOCUMENTS**

- A. General: Maintain a complete set of record Documents. Do not use Record Documents for construction purposes. Provide access to Record Documents for Architect's and Owner's reference. General, without limitation, Record Documents shall include the following:
1. Record Drawings: Maintain a clean set of mylars of Contract Drawings and shop drawings, updated to show actual installation. Give particular attention to concealed items.
  2. Record Project Manual: Maintain a clean Project manual, including Addenda, Change Orders, Architect Field Orders, and other modifications, updated to show changes in actual work performed. Give particular attention to substitutions, selection of options, and similar information.
  3. Record Product Data: Maintain one copy of each approved Product Data submittal, updated to show changes from products delivered, work performed, and from manufacturer's recommended installation instructions.
  4. Record Samples: Maintain one copy of each approved Sample submitted.
- B. Maintenance of Documents and Samples: Store documents and samples in Contractor's office apart from documents used for construction. File documents and samples in accordance with CSI format. Maintain documents in clean, dry, legible conditions and in good order.
- C. Recording: Label each document "PROJECT RECORD" in neat large printed letters. Record information concurrently with construction progress. Do not conceal any work until required information is recorded.
- D. Drawings: Legibly update all Drawings to record actual construction, including the following:
1. Field changes of dimension and detail.
  2. Changes made by Change Order.
  3. Details not in original Contract Documents.
- E. Specifications and Addenda: Legibly mark each Section to record:
1. Manufacturer, trade name, catalog number, and supplier of each product and item of equipment actually installed.
  2. Changes made by Change Order.
- F. Submittal: At Contract Close-out, deliver Record Documents to Architect. Accompany submittal with transmittal letter in duplicate, indicating the date, project title and number, Contractor's name and address, title and number of Record Document, and signature of Contractor or his authorized representative.

## **1.05 MAINTENANCE DATA**

- A. Prepare and submit Maintenance Data as specified in this Section and referenced in other pertinent Sections of Specifications. Organize Maintenance Data into suitable sets, bound and indexed. Mark appropriate identification on front and spine of each binder. Including the following types of information;
  - 1. Emergency instructions.
  - 2. Copies of warranties.
  - 3. Inspection procedures.
- B. Provide sufficient instruction to Owner's personnel in maintenance of products.
- C. Format of Data: Prepare data in form of instruction manual for use by the Owner's personnel. Format shall be 8-1/2 in. x 11 in., in 20 pound, white, typed pages. Text shall be manufacturer's printed data or neatly typewritten. Drawings shall be bound with text, with reinforced punched binder tabs/ fold larger drawings to sizes of text pages. Provide fly-leaf for each separate product or each piece of operating equipment. Provide indexed tabs.
  - 1. Binders: Provide commercial quality three-ring binders with durable and cleanable plastic covers, with maximum ring size of 1 inch. When multiple binders are used, correlate the data into related consistent groupings.
  - 2. Binder Cover: Identify each volume with typed or printed title 'Maintenance Instructions'. List the title of Project, identity of separate structure as applicable, and identity of general subject matter covered in the manual.
- D. Content of Manual: Neatly typewritten table of contents for each volume, arranged in systematic order, indicating the Contractor's name and address, and a list of each product, indexed to content of the volume. Provide a separate list with each product, name, address, and telephone number of subcontractor or installer, and local source of supplies for parts and replacement.
  - 1. Provide in each volume a copy of each warranty, bond, and service contract issued.

## **1.06 INSTRUCTION OF OWNER'S PERSONNEL**

- A. Prior to final inspection or acceptance, provide adequate instructions to Owner's designated operating and maintenance personnel in the maintenance of all products.
- B. Maintenance manual shall constitute the basis of instruction.

## **1.07 WARRANTIES**

- A. General: assemble warranties, bonds, and service and maintenance contracts, executed by each of the respective manufacturers, suppliers, and subcontractors.
- B. Information required: provide information on the proper procedures in case of failure. Indicate instances which might affect the validity of warranty. Indicate Contractor, name of responsible principal, address, and telephone number.
- C. Form of Submittal: Prepare duplicate packets of 8-1/2 X 11 in., punched sheets for installation in standard three-ring binder. Fold larger sheets to fit into binders.
  - 1. Cover of Packet: Identify each packet with typed or printed title 'WARRANTIES'. List the project title and number, and name of Contractor.
  - 2. Binders: Bind into commercial quality, three-ring, with durable and cleanable plastic covers.

## **PART 2 - PRODUCTS**

### **2.01 CLEANING MATERIALS**

- A. Provide cleaning materials that will not create hazards to health nor property, and will not damage surfaces or finishes. Use only cleaning materials and methods recommended by cleaning material manufacturer.

## **PART 3 - EXECUTION**

### **3.01 FINAL CLEANING**

- A. Employ experienced workers or professional cleaners for Final Cleaning. Clean each surface to the condition expected in a normal building cleaning and maintenance program. Comply with manufacturer's instructions and recommendation.
- B. Clean and restore general work areas and adjoining surfaces soiled or damaged by the work of this Contract. Where performance of subsequent work could result in damage to completed work, provide protective covering to prevent potential damage.
- C. Complete the following cleaning operations prior to requesting inspection for Certification of Substantial Completion:
  - 1. All advertising matter and temporary instructional material shall be removed from exposed surfaces throughout. Remove labels that are not permanent.
  - 2. Clean work area of rubbish, litter and other foreign substances. Follow the product manufacturer's instructions; clean entire work area to a dust-free condition. Remove grease, mastic, adhesives, dust, dirt, stains, fingerprints, labels, and other foreign materials from sight-exposed surfaces.

### **END OF SECTION**

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**SECTION 230001**  
**CONDITIONS FOR HEATING, VENTILATION, AND AIR CONDITIONING SYSTEMS**

**PART 1 - GENERAL**

**1.01 DESCRIPTION**

- A. These Conditions add to, supplement, the GENERAL and SPECIAL CONDITIONS of the Contract Documents. The General and Special Conditions are part of this Section and shall apply as if written in full herein.

**1.02 SCOPE**

- A. The work included in this section shall consist of providing all materials, labor, tools and incidentals necessary to install and make ready for owner's use a complete HEATING, VENTILATION, AND AIR CONDITIONING SYSTEM (HVAC) for the proposed building as called for in the contract documents.
- B. Review all drawings and visit the site; observe dimensions, construction, and details not shown on drawings.
- C. The following drawings are part of the contract documents and are included as part of the HVAC system pages. The system shall include, but is not limited to, the following drawings:

**1.03 RESPONSIBILITY OF BIDDERS**

- A. Bidders shall examine all drawings and specifications issued and SHALL VISIT THE SITE of work. Bidders must be familiar with codes, rules, and regulations (and their local interpretations) in effect at the site of the work.
- B. Where any of the above is at variance with the drawings and specifications, the code requirements shall take precedence, and any cost necessary to meet these shall be included in the bid price.
- C. This contractor is assumed to be skilled in the trade and is solely responsible for compliance with health and safety regulations, performing the work in a safe and competent manner, and in installation procedures required for the work as outlined in these documents.

**1.04 MECHANICAL PLANS**

- A. The mechanical plans are intended to be diagrammatic and are based on one manufacturer's equipment. They are not intended to show every item in its exact location, the exact dimensions, or all the details of the equipment. The contractor shall verify the actual dimensions of the equipment proposed to ensure that the equipment would fit in the available space.
- B. Installation shall be within the limitations imposed by the architectural, structural, electrical and plumbing requirements, with adequate space for maintenance

**1.05 QUESTIONS AND CLARIFICATIONS OF THE BID DOCUMENTS**

- A. Bidders shall not rely on verbal clarifications of the drawings or specifications. Any questions or clarifications shall be referred to the architect and/or engineer at least five working days prior to bidding to allow for issuance of an addendum. After the five-day deadline, bidder shall make a decision and qualify the bid, if the bidder feels it necessary.
- B. Bidder shall base bid on items of equipment actually named in bid documents or addendums issued prior to bidding.

**1.06 GUARANTEES**

- A. All equipment, materials, and workmanship shall be guaranteed for a period of one year, beginning with the date of acceptance of the project in writing. Special warranties will be called for under some sections of EQUIPMENT. This warranty shall be in writing and shall include written copies of factory warranties with expiration dates on items of equipment where the warranty date might differ from the acceptance date, such as five-year warrantee of sealed refrigeration systems. No warrantee shall start before the acceptance date.



- B. The contractor's warranty shall include at least two inspections of the system to repair and replace any items found to be defective during this period. The first shall be approximately six months after the acceptance of the system and the second at the end of the first year.

### **1.07 REQUIRED SUBMITTALS**

- A. Prior to starting any installation, submit no less than 2 nor more than 2 copies of items proposed for this work with necessary illustrations, drawings and engineering data for review by the engineer. Submit in time to allow no less than 15 working days for checking and transmittal without delaying the construction schedule. Submit all items at one time no less than 30 days after award of the contract.
- B. Submittals shall be clearly marked to show the intended item, with identification as to unit number or other marking to show location, service, and function. Submittals not marked to identify the equipment and application will be rejected
- C. Any equipment installed without prior acceptance shall be subject to rejection unless such items were identified by name and model number in the bid documents
- D. The supplier, by submitting, certifies that the materials or equipment proposed is satisfactory for the application intended, including adverse conditions that may prevail at the job site, and that the materials and equipment are in current production with no known plans to cease production.
- E. Contractor agrees that submittals processed by the engineer are not change orders; that the purpose of submittals by the contractor is to demonstrate to the engineer that the contractor understands the design concept; and that this understanding is demonstrated by indicating which equipment and materials he or she intends to furnish and install and the fabrication and installation methods he or she intends to use
- F. Contractor further agrees that if deviations, discrepancies, or conflicts between submittals and contract documents are discovered either prior to or after submittals is processed by the engineer, the contract documents shall control and shall be followed.
- G. Submittals shall include.
  - 1. All equipment; exhaust, heating, ventilation, etc.
  - 2. Voltage, phase, and amps of each electrical item such as motors, heaters etc.
  - 3. All auxiliary equipment. .
  - 4. Supply and return registers, grilles, etc.
  - 5. Pipe, valves, insulation, etc.

## **PART 2 - PRODUCTS**

### **2.01 DESCRIPTION**

- A. All products shall be first-line quality, of grade and type shown on the drawings and specified, or equivalents accepted by the architect or engineer in writing.
- B. All products shall be in current production with no notice having been given that this product is to be drastically changed, modified, or discontinued from production
- C. The supplier, by submitting, certifies that the equipment being proposed is proper for the application intended and that it has the capacity called for.

### **2.02 COMPLETE SYSTEM**

- A. All products, materials, and accessories shall be furnished and installed as required for a complete system ready for owner's beneficial use.

### **2.03 EQUIPMENT AND MATERIAL DEVIATIONS**

- A. When any material or equipment is identified on the plans or in the Specifications by reference to ONE manufacturer's name or model number, it is intended for the contractor to bid the project using that manufacturer's product. As an alternate to the base bid, the contractor may submit a second bid with acceptable alternates that will be considered after the bid is awarded.
- B. Not used

- C. Bidders are advised to ascertain such acceptance from their suppliers by requesting copies of the acceptance in writing signed by the architect or engineer from their suppliers.

#### **2.04 MOTORS AND STARTERS**

- A. All electric motors shall be premium efficiency type with maximum of 1750 rpm with totally enclosed fan cooled motor enclosures. Motors located on air handling units shall be mounted in rubber supports or the fan shall be independently supported with spring isolators.
- B. Electrical characteristics shall be determined from Electrical Drawings and verified on the job from the electrical contractor.
- C. Motor starters shall be sized by the National Electric Code (NEC), and proper heater elements shall be provided and installed. Starters shall have overload trip element in each phase.

#### **2.05 LABELING**

- A. All electrical equipment and items consisting primarily of electrical components shall bear a label of and independent testing laboratory, such as Underwriters' Laboratory (UL).
- B. Where such testing and labeling service is available for other products, such as fire dampers, boilers, etc., the equipment shall bear such label.

### **PART 3 - EXECUTION**

#### **3.01 DESCRIPTION**

- A. All work shall be performed by competent mechanics with a minimum of five years of experience. Mechanics are to use proper tools and equipment to produce first-quality work. All work shall be neatly installed, accessible for maintenance, and complete with all accessories required.

#### **3.02 ACCESSIBILITY**

- A. All equipment shall be installed in such a way that all components requiring access (such as drain pans, drains, fire dampers, control dampers, control operators, motors, drives etc.) are so located and installed that they may be serviced, reset, replaced or recalibrated, etc., by service people with normal service tools and equipment. If any equipment or components are shown in such a position that this contractor cannot comply with the above, the contractor shall notify the general contractor and attempt to resolve the problem of access. If this consultation is not successful, the architect and engineer shall be notified in writing and a decision requested.

#### **3.03 WORK BY THIS CONTRACTOR**

- A. Cutting, patching, furring, painting, electrical, plumbing, etc., shall be done by the affected trade at this contractor's expense for changes required in work already installed or work required by other trades for changes made by this contractor in type or size of equipment purchased. This contractor to remove cut or make access through existing panels and walls above ceiling as necessary to run new ductwork above ceiling.

#### **3.04 WORK NOT INCLUDED**

#### **3.05 SPECIAL SUPPORTS**

- A. Furnish and install all supports and special supports required for equipment installed under this Section.

#### **3.06 NOISE AND VIBRATION**

- A. Install vibration isolators, flexible connectors, expansion joints, and other safety measures to prevent noise and vibration from being transmitted to occupied areas. Equipment shall be selected to operate within the noise level recommended office work and its distance away from its location.
- B. Following installation, make proper adjustments to eliminate excessive noise and vibration.

#### **3.07 PERMITS, CODES AND LAWS**

- A. All work shall be in accordance with the following rules and regulations and any applicable laws.

1. National Fire Protection Association (NFPA)
  2. Occupational Safety and Health Administration (OSHA)
  3. State Building Codes (SBC)
  4. Local Building Codes (LBC)
- B. Where any of the above is at variance with the drawings and specifications, the code requirements shall take precedence and any cost necessary to meet these shall be included in the contract.
- C. This contractor is assumed to be skilled in the trade and is solely responsible for compliance with OSHA regulations, performing the work in a safe and complete manner, and in installation procedures required for this work. All supervision assigned to this project shall be experienced in this type of work. This contractor's superintendent shall be designated as Safety Inspector, unless the contractor designated another person and notifies the engineer of this change.

### **3.08 REVIEW BY ENGINEER**

- A. This contractor shall notify the engineer at the following stages of construction so that the engineer may visit the site for review and consultation:
1. When demo starts
  2. When ductwork installation starts
  3. When coil work starts
  4. When equipment installation starts
  5. When ceiling installation will cover any work not reviewed
  6. When any lines or ducts are to be permanently concealed by construction
  7. When balancing and testing is started
- B. Should this contractor fail to notify the engineer at the times prescribed above, it shall then be his or her responsibility and cost to make ductwork accessible, expose any concealed lines or demonstrate the acceptability of any part of the system. Any extra cost, caused by the removal of work by other trades, shall be borne by this contractor.

### **3.09 EARLY STARTUP**

- A. This contractor shall do all possible to see that the mechanical equipment is connected with electrical power as early as possible, so that final balancing and testing can be started. Should this contractor be ready for operation and power is not available, the general contractor and architect or engineer shall be notified.

### **3.10 CLEANING AND PAINTING**

- A. Thoroughly clean all equipment and remove all trash, cartons, etc., from the area. Make any necessary corrections or repair/replace any damaged materials or equipment. Leave the entire system in a thoroughly clean and orderly manner.
- B. Any finished surface that have been scratched or discolored shall be touched up or repainted with paint to match the original color. If any part has been bent, broken or otherwise damaged, it shall be replaced prior to final review.
- C. All metal items inside the building subject to rusting, and all ferrous metal exposed to weather, shall be given one coat of rust preventive primer as soon as installed.

**END OF SECTION**

**SECTION 230519  
METERS AND GAUGES FOR HVAC PIPING**

**PART 1 GENERAL**

**1.01 SECTION INCLUDES**

- A. Pressure gauges and pressure gauge taps.
- B. Thermometers and thermometer wells.

**1.02 RELATED REQUIREMENTS**

- A. Section 232113 - Hydronic Piping.

**1.03 REFERENCE STANDARDS**

- A. ASME B40.100 - Pressure Gauges and Gauge Attachments 2022.
- B. ASTM E1 - Standard Specification for ASTM Liquid-in-Glass Thermometers 2014 (Reapproved 2020).
- C. ASTM E77 - Standard Test Method for Inspection and Verification of Thermometers 2014 (Reapproved 2021).

**1.04 SUBMITTALS**

- A. Product Data: Provide list that indicates use, operating range, total range and location for manufactured components.

**1.05 FIELD CONDITIONS**

- A. Do not install instrumentation when areas are under construction, except for required rough-in, taps, supports and test plugs.

**PART 2 PRODUCTS**

**2.01 PRESSURE GAUGES**

- A. Manufacturers:
  - 1. Dwyer Instruments, Inc; [\_\_\_\_]: [www.dwyer-inst.com/#sle](http://www.dwyer-inst.com/#sle).
  - 2. Moeller Instrument Company, Inc; [\_\_\_\_]: [www.moellerinstrument.com/#sle](http://www.moellerinstrument.com/#sle).
  - 3. Omega Engineering, Inc; [\_\_\_\_]: [www.omega.com/#sle](http://www.omega.com/#sle).
- B. Pressure Gauges: ASME B40.100, UL 393 drawn steel case, phosphor bronze bourdon tube, rotary brass movement, brass socket, with front recalibration adjustment, black scale on white background.
  - 1. Case: Steel with brass bourdon tube.
  - 2. Size: 4-1/2 inch diameter.
  - 3. Mid-Scale Accuracy: One percent.
  - 4. Scale: Psi and KPa.

**2.02 PRESSURE GAUGE TAPPINGS**

- A. Gauge Cock: Tee or lever handle, brass for maximum 150 psi.

**2.03 STEM TYPE THERMOMETERS**

- A. Manufacturers:
  - 1. Dwyer Instruments, Inc; [\_\_\_\_]: [www.dwyer-inst.com/#sle](http://www.dwyer-inst.com/#sle).
  - 2. Omega Engineering, Inc; [\_\_\_\_]: [www.omega.com/#sle](http://www.omega.com/#sle).
  - 3. Weksler Glass Thermometer Corp; [\_\_\_\_]: [www.wekslerglass.com/#sle](http://www.wekslerglass.com/#sle).
- B. Thermometers - Fixed Mounting: Red- or blue-appearing non-toxic liquid in glass; ASTM E1; lens front tube, cast aluminum case with enamel finish.
  - 1. Size: 9 inch scale.
  - 2. Window: Clear Lexan.
  - 3. Accuracy: 2 percent, per ASTM E77.
  - 4. Calibration: Degrees F.

- C. Thermometers - Adjustable Angle: Red- or blue-appearing non-toxic liquid in glass; ASTM E1; lens front tube, cast aluminum case with enamel finish, cast aluminum adjustable joint with positive locking device; adjustable 360 degrees in horizontal plane, 180 degrees in vertical plane.
  - 1. Size: 9 inch scale.
  - 2. Window: Clear Lexan.
  - 3. Accuracy: 2 percent, per ASTM E77.
  - 4. Calibration: Degrees F.

#### **2.04 DIAL THERMOMETERS**

- A. Manufacturers:
  - 1. Dwyer Instruments, Inc; [\_\_\_\_\_]: [www.dwyer-inst.com/#sle](http://www.dwyer-inst.com/#sle).
  - 2. Omega Engineering, Inc; [\_\_\_\_\_]: [www.omega.com/#sle](http://www.omega.com/#sle).
  - 3. Weksler Glass Thermometer Corp; [\_\_\_\_\_]: [www.wekslerglass.com/#sle](http://www.wekslerglass.com/#sle).
- B. Thermometer: ASTM E1, stainless steel case, adjustable angle with front recalibration, bimetallic helix actuated with silicone fluid damping, white with black markings and black pointer hermetically sealed lens, stainless steel stem.
  - 1. Size: 3 inch diameter dial.
  - 2. Accuracy: 1 percent.
  - 3. Calibration: Degrees F.

#### **2.05 THERMOMETER SUPPORTS**

- A. Socket: Brass separable sockets for thermometer stems with or without extensions as required, and with cap and chain.

### **PART 3 EXECUTION**

#### **3.01 INSTALLATION**

- A. Install positive displacement meters with isolating valves on inlet and outlet to AWWA M6. Provide full line size valved bypass with globe valve for liquid service meters.
- B. Provide one pressure gauge per pump, installing taps before strainers and on suction and discharge of pump. Pipe to gauge.
- C. Install thermometers in piping systems in sockets in short couplings. Enlarge pipes smaller than 2-1/2 inch for installation of thermometer sockets. Ensure sockets allow clearance from insulation.
- D. Provide instruments with scale ranges selected according to service with largest appropriate scale.
- E. Install gauges and thermometers in locations where they are easily read from normal operating level. Install vertical to 45 degrees off vertical.

#### **3.02 SCHEDULE**

- A. Pressure Gauge Tappings, Location:
  - 1. Boiler - inlets and outlets.
- B. Thermometer Sockets, Location:
  - 1. Main Header on secondary loop where boilers connect. - inlet and outlet. Outlet several diameters down stream of boiler connection.

**END OF SECTION**

**SECTION 230523  
GENERAL-DUTY VALVES FOR HVAC PIPING**

**PART 1 GENERAL**

**1.01 SECTION INCLUDES**

- A. Ball valves.
- B. Butterfly valves.
- C. Check valves.

**1.02 RELATED REQUIREMENTS**

- A. Section 230719 - HVAC Piping Insulation.
- B. Section 232113 - Hydronic Piping.

**1.03 ABBREVIATIONS AND ACRONYMS**

- A. CWP: Cold working pressure.
- B. EPDM: Ethylene propylene copolymer rubber.
- C. NBR: Acrylonitrile-butadiene, Buna-N, or nitrile rubber.
- D. NRS: Nonrising stem.
- E. OS&Y: Outside screw and yoke.
- F. PTFE: Polytetrafluoroethylene.
- G. RS: Rising stem.
- H. TFE: Tetrafluoroethylene.
- I. WOG: Water, oil, and gas.

**1.04 REFERENCE STANDARDS**

- A. API STD 594 - Check Valves: Flanged, Lug, Wafer, and Butt-Welding 2022.
- B. ASME B1.20.1 - Pipe Threads, General Purpose, Inch 2013 (Reaffirmed 2018).
- C. ASME B16.1 - Gray Iron Pipe Flanges and Flanged Fittings: Classes 25, 125, and 250 2020.
- D. ASME B16.5 - Pipe Flanges and Flanged Fittings: NPS 1/2 through NPS 24 Metric/Inch Standard 2020.
- E. ASME B16.10 - Face-to-Face and End-to-End Dimensions of Valves 2022.
- F. ASME B16.18 - Cast Copper Alloy Solder Joint Pressure Fittings 2021.
- G. ASME B16.34 - Valves — Flanged, Threaded, and Welding End 2020.
- H. ASME B31.9 - Building Services Piping 2020.
- I. ASME BPVC-IX - Boiler and Pressure Vessel Code, Section IX - Qualification Standard for Welding, Brazing, and Fusing Procedures; Welders; Brazers; and Welding, Brazing, and Fusing Operators 2021.
- J. ASTM A126 - Standard Specification for Gray Iron Castings for Valves, Flanges, and Pipe Fittings 2004 (Reapproved 2019).
- K. ASTM A536 - Standard Specification for Ductile Iron Castings 1984, with Editorial Revision (2019).
- L. ASTM B62 - Standard Specification for Composition Bronze or Ounce Metal Castings 2017.
- M. MSS SP-45 - Drain and Bypass Connections 2020.
- N. MSS SP-67 - Butterfly Valves 2022.
- O. MSS SP-71 - Gray Iron Swing Check Valves, Flanged and Threaded Ends 2018.
- P. MSS SP-80 - Bronze Gate, Globe, Angle, and Check Valves 2019.

- Q. MSS SP-110 - Ball Valves Threaded, Socket-Welding, Solder Joint, Grooved and Flared Ends 2010, with Errata .

### **1.05 SUBMITTALS**

- A. See Section 013000 - Administrative Requirements for submittal procedures.
- B. Product Data: Provide data on valves including manufacturers catalog information. Submit performance ratings, rough-in details, weights, support requirements, and piping connections.
- C. Maintenance Materials: Furnish Owner with one wrench for every five plug valves, in each size of square plug valve head.

### **1.06 QUALITY ASSURANCE**

- A. Manufacturer:
  - 1. Obtain valves for each valve type from single manufacturer.
  - 2. Company must specialize in manufacturing products specified in this section, with not less than three years of documented experience.

### **1.07 DELIVERY, STORAGE, AND HANDLING**

- A. Prepare valves for shipping as follows:
  - 1. Minimize exposure of operable surfaces by setting plug and ball valves to open position.
  - 2. Protect valve piping connections such as grooves, weld ends, threads, and flange faces.
  - 3. Secure check valves in either the closed position or open position.
- B. Use the following precautions during storage:
  - 1. Maintain valve end protection and protect flanges and specialties from dirt.
    - a. Provide temporary inlet and outlet caps.
    - b. Maintain caps in place until installation.
  - 2. Store valves in shipping containers and maintain in place until installation.
    - a. Store valves indoors in dry environment.

## **PART 2 PRODUCTS**

### **2.01 APPLICATIONS**

- A. See drawings for specific valve locations.
- B. Listed pipe sizes shown using nominal pipe sizes (NPS) and nominal diameter (DN).
- C. Provide the following valves for the applications if not indicated on drawings:
  - 1. Isolation (Shutoff): Butterfly, Gate, Ball, and Plug.
  - 2. Swing Check (Pump Outlet):
    - a. Size 2 inch and Smaller: Bronze with bronze disc.
- D. Required Valve End Connections for Non-Wafer Types:
  - 1. Copper Tube:
    - a. Size 2 inch and Smaller: Threaded ends, except solder-joint valve-ends.
- E. Heating Hot Water Valves:
  - 1. Size 2 inch and Smaller, Brass and Bronze Valves:
    - a. Threaded ends.
    - b. Ball: Full port, one piece, brass trim.
    - c. Swing Check: Bronze disc, Class 125.
  - 2. Size 2-1/2 inch and Larger, Iron Valves:
    - a. 2-1/2 inch to 4 inch: Threaded ends.
    - b. Single-Flange Butterfly: 2-1/2 inch to 12 inch, aluminum-bronze disc, EPDM seat, 200 CWP.

### **2.02 GENERAL REQUIREMENTS**

- A. Valve Pressure and Temperature Ratings: No less than rating indicated; as required for system pressures and temperatures.
- B. Valve Sizes: Match upstream piping unless otherwise indicated.

- C. Valve Actuator Types:
  1. Hand Lever: Quarter-turn valves 6 inch and smaller.
- D. Valves in Insulated Piping: Provide 2 inch stem extensions and the following features:
  1. Ball Valves: Extended operating handle of non-thermal-conductive material, and protective sleeve that allows operation of valve without breaking the vapor seal or disturbing insulation.
- E. Valve-End Connections:
  1. Threaded End Valves: ASME B1.20.1.
  2. Flanges on Iron Valves: ASME B16.1 for flanges on iron valves.
  3. Pipe Flanges and Flanged Fittings 1/2 inch through 24 inch: ASME B16.5.
  4. Solder Joint Connections: ASME B16.18.
- F. General ASME Compliance:
  1. Ferrous Valve Dimensions and Design Criteria: ASME B16.10 and ASME B16.34.
  2. Building Services Piping Valves: ASME B31.9.
- G. Bronze Valves:
  1. Fabricate from dezincification resistant material.
  2. Copper alloys containing more than 15 percent zinc are not permitted.

### **2.03 BRONZE, BALL VALVES**

- A. General:
  1. Fabricate from dezincification resistant material.
  2. Copper alloys containing more than 15 percent zinc are not permitted.
- B. Two Piece, Full Port with Bronze or Brass Trim:
  1. Comply with MSS SP-110.
  2. WSP Rating: 150 psi.
  3. WOG Rating: 400 psi.
  4. Body: Forged bronze or dezincified-brass alloy.
  5. End Connections: Pipe thread or solder.
  6. Seats: PTFE.
  7. Stem: Stainless steel.
  8. Ball: Stainless Steel

### **2.04 IRON, SINGLE FLANGE BUTTERFLY VALVES**

- A. Lug Style; Bidirectional dead-end service without use of downstream flange:
  1. Comply with MSS SP-67, Type I.
  2. Wafer Style, CWP Ratings:
    - a. Sizes 2 to 12 inch: 200 psi.
    - b. Sizes 14 to 24 inch: 150 psi.
    - c. Vacuum Service: Down to 29.9 in-Hg.
  3. Lug Style, CWP Ratings:
    - a. Sizes 2 to 12 inch: 150 psi.
    - b. Sizes 14 to 24 inch: 100 psi.
    - c. Vacuum Service: Down to 29.9 in-Hg.
  4. Body Material: ASTM A126 cast iron or ASTM A536 ductile iron.
  5. Stem: One or two-piece stainless steel.
  6. Seat: EPDM.
  7. Disc: Aluminum-bronze.
  8. Removable Manual Actuator: Lockable handle or worm-gear-connected handwheel with open/close position indication.
  9. Service Temperature Range: Minus 30 to 250 degrees F.
  10. Manufacturers:
    - a. Apollo Valves; [\_\_\_\_\_]: [www.apollovalves.com/#sle](http://www.apollovalves.com/#sle).
    - b. FNW; 711: [www.fnw.com/#sle](http://www.fnw.com/#sle).



- c. Jomar Valves, a division of Jomar Group; [\_\_\_\_]: [www.jomarvalve.com/#sle](http://www.jomarvalve.com/#sle).
- d. Nexus Valve, Inc; [\_\_\_\_]: [www.nexusvalve.com/#sle](http://www.nexusvalve.com/#sle).

## **2.05 BRONZE, LIFT CHECK VALVES**

- A. Class 125:
  - 1. Comply with MSS SP-80, Type 1, Metal Disc to Metal Seat and Type 2, Nonmetallic Disc to Metal Seat.
  - 2. CWP Rating: 200 psi.
  - 3. Design: Vertical flow.
  - 4. Body: Bronze.
  - 5. Ends: Threaded.
  - 6. Disc (Type 1): Bronze.
  - 7. Disc (Type 2): NBR or PTFE.

## **2.06 BRONZE, SWING CHECK VALVES**

- A. Class 125:
  - 1. Pressure and Temperature Rating: MSS SP-80, Type 3.
  - 2. Design: Y-pattern, horizontal or vertical flow.
  - 3. WSP Rating: 200 psi.
  - 4. Body: Bronze, ASTM B62.
  - 5. End Connections: Threaded or soldered.
  - 6. Disc: Bronze.
  - 7. gasket seal

## **PART 3 EXECUTION**

### **3.01 EXAMINATION**

- A. Discard all packing materials and verify that valve interior, including threads and flanges, are completely clean without signs of damage or degradation that could result in leakage.
- B. Verify valve parts to be fully operational in all positions from closed to fully open.
- C. Confirm gasket material to be suitable for the service, to be of correct size, and without defects that could compromise effectiveness.
- D. Should valve is determined to be defective, replace with new valve.

### **3.02 INSTALLATION**

- A. Provide unions or flanges with valves to facilitate equipment removal and maintenance while maintaining system operation and full accessibility for servicing.
- B. Provide separate valve support as required and locate valve with stem at or above center of piping, maintaining unimpeded stem movement.
- C. Install check valves where necessary to maintain direction of flow as follows:
  - 1. Lift Check: Install with stem plumb and vertical.
  - 2. Swing Check: Install horizontal maintaining hinge pin level.

**END OF SECTION**

**SECTION 230529  
HANGERS AND SUPPORTS FOR HVAC PIPING AND EQUIPMENT**

**PART 1 GENERAL**

**1.01 SECTION INCLUDES**

- A. Support and attachment components.

**1.02 RELATED REQUIREMENTS**

- A. Section 033000 - Cast-in-Place Concrete: Concrete equipment pads.

**1.03 REFERENCE STANDARDS**

- A. ASTM A123/A123M - Standard Specification for Zinc (Hot-Dip Galvanized) Coatings on Iron and Steel Products 2017.
- B. ASTM A153/A153M - Standard Specification for Zinc Coating (Hot-Dip) on Iron and Steel Hardware 2016a.
- C. ASTM A181/A181M - Standard Specification for Carbon Steel Forgings, for General-Purpose Piping 2022.
- D. ASTM A36/A36M - Standard Specification for Carbon Structural Steel 2019.
- E. ASTM A47/A47M - Standard Specification for Ferritic Malleable Iron Castings 1999, with Editorial Revision (2022).
- F. ASTM A283/A283M - Standard Specification for Low and Intermediate Tensile Strength Carbon Steel Plates 2018.
- G. ASTM A395/A395M - Standard Specification for Ferritic Ductile Iron Pressure-Retaining Castings for Use at Elevated Temperatures 1999 (Reapproved 2022).
- H. ASTM B633 - Standard Specification for Electrodeposited Coatings of Zinc on Iron and Steel 2023.
- I. ASTM E84 - Standard Test Method for Surface Burning Characteristics of Building Materials 2023.
- J. ASTM E96/E96M - Standard Test Methods for Gravimetric Determination of Water Vapor Transmission Rate of Materials 2022a.
- K. FM (AG) - FM Approval Guide Current Edition.
- L. MFMA-4 - Metal Framing Standards Publication 2004.
- M. MSS SP-58 - Pipe Hangers and Supports - Materials, Design, Manufacture, Selection, Application, and Installation 2018, with Amendment (2019).
- N. UL (DIR) - Online Certifications Directory Current Edition.
- O. UL 723 - Standard for Test for Surface Burning Characteristics of Building Materials Current Edition, Including All Revisions.

**1.04 ADMINISTRATIVE REQUIREMENTS**

- A. Coordination:
  - 1. Coordinate sizes and arrangement of supports and bases with the actual equipment and components to be installed.
  - 2. Coordinate the work with other trades to provide additional framing and materials required for installation.
  - 3. Coordinate compatibility of support and attachment components with mounting surfaces at the installed locations.
  - 4. Coordinate the arrangement of supports with ductwork, piping, equipment and other potential conflicts installed under other sections or by others.
  - 5. Notify Architect of any conflicts with or deviations from Contract Documents. Obtain direction before proceeding with work.
- B. Sequencing:

1. Do not install products on or provide attachment to concrete surfaces until concrete has fully cured in accordance with Section 033000.

### 1.05 SUBMITTALS

- A. See Section 013000 - Administrative Requirements for submittal procedures.
- B. Product Data: Provide manufacturer's standard catalog pages and data sheets for channel (strut) framing systems, nonpenetrating rooftop supports, post-installed concrete and masonry anchors, and thermal insulated pipe supports.
- C. Shop Drawings: Include details for fabricated hangers and supports where materials or methods other than those indicated are proposed for substitution.

### 1.06 QUALITY ASSURANCE

- A. Comply with applicable building code.
- B. Installer Qualifications for Powder-Actuated Fasteners (when specified): Certified by fastener system manufacturer with current operator's license.

### 1.07 DELIVERY, STORAGE, AND HANDLING

- A. Receive, inspect, handle, and store products in accordance with manufacturer's instructions.

## PART 2 PRODUCTS

### 2.01 SUPPORT AND ATTACHMENT COMPONENTS

- A. General Requirements:
  1. Provide all required hangers, supports, anchors, fasteners, fittings, accessories, and hardware as necessary for the complete installation of HVAC work.
  2. Provide products listed, classified, and labeled as suitable for the purpose intended, where applicable.
  3. Where support and attachment component types and sizes are not indicated, select in accordance with manufacturer's application criteria as required for the load to be supported with a minimum safety factor of [\_\_\_\_\_]. Include consideration for vibration, equipment operation, and shock loads where applicable.
  4. Do not use wire, chain, perforated pipe strap, or wood for permanent supports unless specifically indicated or permitted.
  5. Steel Components: Use corrosion resistant materials suitable for the environment where installed.
    - a. Indoor Dry Locations: Use zinc-plated steel or approved equivalent unless otherwise indicated.
    - b. Zinc-Plated Steel: Electroplated in accordance with ASTM B633.
    - c. Galvanized Steel: Hot-dip galvanized after fabrication in accordance with ASTM A123/A123M or ASTM A153/A153M.
- B. Metal Channel (Strut) Framing Systems: Factory-fabricated continuous-slot metal channel (strut) and associated fittings, accessories, and hardware required for field-assembly of supports.
  1. Manufacturers:
    - a. Cooper B-Line, a division of Eaton Corporation; [\_\_\_\_\_]: [www.cooperindustries.com/#sle](http://www.cooperindustries.com/#sle).
    - b. Thomas & Betts Corporation; [\_\_\_\_\_]: [www.tnb.com/#sle](http://www.tnb.com/#sle).
    - c. Unistrut, a brand of Atkore International Inc; [\_\_\_\_\_]: [www.unistrut.com/#sle](http://www.unistrut.com/#sle).
  2. Provide factory-fabricated continuous-slot metal channel (strut) and associated fittings, accessories, and hardware required for field-assembly of supports.
  3. Comply with MFMA-4.
  4. Channel Material:
    - a. Indoor Dry Locations: Use painted steel, zinc-plated steel, or galvanized steel.
  5. Minimum Channel Thickness: Steel sheet, 12 gauge, 0.1046 inch.
  6. Minimum Channel Dimensions: 1-5/8 inch width by 13/16 inch height.
- C. Channel Nuts:

1. Provide carbon steel channel nut with epoxy copper or zinc finish and long, regular, or short spring.
- D. Hanger Rods:
1. Threaded zinc-plated steel unless otherwise indicated.
  2. Minimum Size, Unless Otherwise Indicated or Required:
    - a. Equipment Supports: 1/2 inch diameter.
    - b. Piping up to 1 inch: 1/4 inch diameter.
    - c. Piping larger than 1 inch: 3/8 inch diameter.
    - d. Trapeze Support for Multiple Pipes: 3/8 inch diameter.
- E. Pipe Supports:
1. Material: ASTM A395/A395M ductile iron, ASTM A36/A36M carbon steel, ASTM A47/A47M malleable iron, ASTM A181/A181M forged steel, or ASTM A283/A283M steel.
  2. Liquid Temperatures Up To 180 degrees F:
    - a. Overhead Support: MSS SP-58 Types 1, 3 through 12.
    - b. Support From Below: MSS SP-58 Types 35 through 38.
  3. Operating Temperatures from 122 to 446 degrees F:
    - a. Overhead Support: MSS SP-58 Type 1 or 3 through 12, with appropriate saddle of MSS SP-58 Type 40 for insulated pipe.
- F. Beam Clamps:
1. MSS SP-58 types 19 through 23, 25 or 27 through 30 based on required load.
  2. Beam C-Clamp: MSS SP-58 type 23, malleable iron and steel with plain, stainless steel, and zinc finish.
  3. Small or Junior Beam Clamp: MSS SP-58 type 19, malleable iron with plain finish. For inverted usage provide manufacturer listed size(s).
  4. Wide Mouth Beam Clamp: MSS SP-58 type 19, malleable iron with plain finish.
  5. Centerload Beam Clamp with Extension Piece: MSS SP-58 type 30, malleable iron with plain finish.
  6. FM (AG) and UL (DIR) Approved Beam Clamp: MSS SP-58 type 19, plain finish,
  7. Provide clamps with hardened steel cup-point set screws and lock-nuts for anchoring in place.
  8. Material: ASTM A395/A395M ductile iron, ASTM A36/A36M carbon steel, ASTM A47/A47M malleable iron, ASTM A181/A181M forged steel, or ASTM A283/A283M steel.
- G. Riser Clamps:
1. For insulated pipe runs, provide two bolt-type clamps designed for installation under insulation.
  2. MSS SP-58 type 1 or 8, carbon steel or steel with epoxy plated, plain, stainless steel, or zinc plated finish.
  3. Medium Split Horizontal Pipe Clamp: MSS SP-58 type 4, carbon steel or stainless steel with epoxy plated, plain, stainless steel, or zinc plated finish.
  4. Copper Tube Pipe Clamp: MSS SP-58 type 8, epoxy plated copper.
  5. UL (DIR) listed: Pipe sizes 1/2 to 8 inch.
- H. U-Bolts:
1. MSS SP-58 Type 24, carbon steel u-bolt for pipe support or anchoring.
- I. Pipe Hangers:
1. Hangers:
    - a. Provide hinged split ring and yoke roller hanger with epoxy copper or plain finish.
    - b. Material: ASTM A47/A47M malleable iron or ASTM A36/A36M carbon steel.
    - c. Provide hanger rod and nuts of the same type and material for a given pipe run.
    - d. Provide coated or plated hangers to isolate steel hangers from dissimilar metal tube or pipe.
  2. Swivel Ring Hangers, Adjustable:
    - a. MSS SP-58 Type 10, epoxy-painted, zinc-colored.

- b. Material: ASTM A395/A395M ductile iron, ASTM A36/A36M carbon steel, ASTM A47/A47M malleable iron, ASTM A181/A181M forged steel, or ASTM A283/A283M steel.
    - c. FM (AG) and UL (DIR) listed for specific pipe size runs and loads.
  - 3. Clevis Hangers, Adjustable:
    - a. Copper Tube: MSS SP-58 Type 1, epoxy-plated copper.
- J. Pipe Shields for Insulated Piping:
  - 1. General Construction and Requirements:
    - a. Surface Burning Characteristics: Comply with ASTM E84 or UL 723.
    - b. Shields Material: UV-resistant polypropylene with glass fill.
    - c. Maximum Insulated Pipe Outer Diameter: 12-5/8 inch.
    - d. Minimum Service Temperature: Minus 40 degrees F.
    - e. Maximum Service Temperature: 178 degrees F.
    - f. Pipe shields to be provided at hanger, support, and guide locations on pipe requiring insulation or additional support.
- K. Anchors and Fasteners:
  - 1. Unless otherwise indicated and where not otherwise restricted, use the anchor and fastener types indicated for the specified applications.
  - 2. Concrete: Use preset concrete inserts, expansion anchors, or screw anchors.
  - 3. Solid or Grout-Filled Masonry: Use expansion anchors or screw anchors.
  - 4. Hollow Masonry: Use toggle bolts.
  - 5. Hollow Stud Walls: Use toggle bolts.
  - 6. Steel: Use beam-ceiling clamps, beam clamps, machine bolts, or welded threaded studs.
  - 7. Beam Ceiling Flanges: ASTM A47/A47M Grade 32510, malleable iron or stainless steel with copper, plain, stainless steel, or zinc finish.
  - 8. Sheet Metal: Use sheet metal screws.
  - 9. Wood: Use wood screws.
  - 10. Plastic and lead anchors are not permitted.
  - 11. Powder-actuated fasteners are not permitted.
  - 12. Hammer-driven anchors and fasteners are not permitted.
  - 13. Preset Concrete Inserts: Continuous metal channel (strut) and spot inserts specifically designed to be cast in concrete ceilings, walls, and floors.
    - a. Comply with MFMA-4.
    - b. Channel Material: Use galvanized steel.
    - c. Manufacturer: Same as manufacturer of metal channel (strut) framing system.

## **PART 3 EXECUTION**

### **3.01 EXAMINATION**

- A. Verify that field measurements are as indicated.
- B. Verify that mounting surfaces are ready to receive support and attachment components.
- C. Verify that conditions are satisfactory for installation prior to starting work.

### **3.02 INSTALLATION**

- A. Install products in accordance with manufacturer's instructions.
- B. Install anchors and fasteners in accordance with ICC Evaluation Services, LLC (ICC-ES) evaluation report conditions of use where applicable.
- C. Provide independent support from building structure. Do not provide support from piping, ductwork, conduit, or other systems.
- D. Unless specifically indicated or approved by Architect, do not provide support from suspended ceiling support system or ceiling grid.
- E. Unless specifically indicated or approved by Architect, do not provide support from roof deck.

- F. Do not penetrate or otherwise notch or cut structural members without approval of Structural Engineer.
- G. Equipment Support and Attachment:
  - 1. Use metal fabricated supports or supports assembled from metal channel (strut) to support equipment as required.
  - 2. Use metal channel (strut) secured to studs to support equipment surface-mounted on hollow stud walls when wall strength is not sufficient to resist pull-out.
  - 3. Use metal channel (strut) to support surface-mounted equipment in wet or damp locations to provide space between equipment and mounting surface.
  - 4. Securely fasten floor-mounted equipment. Do not install equipment such that it relies on its own weight for support.
- H. Preset Concrete Inserts: Use manufacturer-provided closure strips to inhibit concrete seepage during concrete pour.
- I. Secure fasteners according to manufacturer's recommended torque settings.
- J. Remove temporary supports.

### **3.03 FIELD QUALITY CONTROL**

- A. See Section 014000 - Quality Requirements for additional requirements.
- B. Inspect support and attachment components for damage and defects.
- C. Repair cuts and abrasions in galvanized finishes using zinc-rich paint recommended by manufacturer. Replace components that exhibit signs of corrosion.
- D. Correct deficiencies and replace damaged or defective support and attachment components.

**END OF SECTION**

**SECTION 230553  
IDENTIFICATION FOR HVAC PIPING AND EQUIPMENT**

**PART 1 GENERAL**

**1.01 SECTION INCLUDES**

- A. Nameplates.
- B. Tags.
- C. Pipe markers.

**1.02 REFERENCE STANDARDS**

- A. ASME A13.1 - Scheme for the Identification of Piping Systems 2020.
- B. ASTM D709 - Standard Specification for Laminated Thermosetting Materials 2017.

**1.03 SUBMITTALS**

- A. See Section 013000 - Administrative Requirements for submittal procedures.
- B. List: Submit list of wording, symbols, letter size, and color coding for mechanical identification.
- C. Chart and Schedule: Submit valve chart and schedule, including valve tag number, location, function, and valve manufacturer's name and model number.

**PART 2 PRODUCTS**

**2.01 IDENTIFICATION APPLICATIONS**

- A. Heat Transfer Equipment: Nameplates.
- B. Piping: Tags.
- C. Valves: Tags and ceiling tacks where located above lay-in ceiling.

**2.02 NAMEPLATES**

- A. Manufacturers:
  - 1. Advanced Graphic Engraving, LLC; [\_\_\_\_]: [www.advancedgraphicengraving.com/#sle](http://www.advancedgraphicengraving.com/#sle).
  - 2. Brimar Industries, Inc; [\_\_\_\_]: [www.pipemarker.com/#sle](http://www.pipemarker.com/#sle).
  - 3. Craftmark Pipe Markers; [\_\_\_\_]: [www.craftmarkid.com/#sle](http://www.craftmarkid.com/#sle).
  - 4. Kolbi Pipe Marker Co; [\_\_\_\_]: [www.kolbipipemarkers.com/#sle](http://www.kolbipipemarkers.com/#sle).
- B. Letter Color: White.
- C. Letter Height: 1/4 inch.
- D. Background Color: Black.
- E. Plastic: Comply with ASTM D709.

**2.03 TAGS**

- A. Manufacturers:
  - 1. Advanced Graphic Engraving; [\_\_\_\_]: [www.advancedgraphicengraving.com/#sle](http://www.advancedgraphicengraving.com/#sle).
  - 2. Brady Corporation; [\_\_\_\_]: [www.bradycorp.com/#sle](http://www.bradycorp.com/#sle).
  - 3. Brimar Industries, Inc; [\_\_\_\_]: [www.pipemarker.com/#sle](http://www.pipemarker.com/#sle).
  - 4. Craftmark Pipe Markers; [\_\_\_\_]: [www.craftmarkid.com/#sle](http://www.craftmarkid.com/#sle).
  - 5. Kolbi Pipe Marker Co; [\_\_\_\_]: [www.kolbipipemarkers.com/#sle](http://www.kolbipipemarkers.com/#sle).
- B. Metal Tags: Brass with stamped letters; tag size minimum 1-1/2 inch diameter with smooth edges.

**2.04 PIPE MARKERS**

- A. Manufacturers:
  - 1. Brady Corporation; [\_\_\_\_]: [www.bradycorp.com/#sle](http://www.bradycorp.com/#sle).
  - 2. Brimar Industries, Inc; [\_\_\_\_]: [www.pipemarker.com/#sle](http://www.pipemarker.com/#sle).
  - 3. Craftmark Pipe Markers; [\_\_\_\_]: [www.craftmarkid.com/#sle](http://www.craftmarkid.com/#sle).
  - 4. Kolbi Pipe Marker Co; [\_\_\_\_]: [www.kolbipipemarkers.com/#sle](http://www.kolbipipemarkers.com/#sle).

- B. Color: Comply with ASME A13.1.
- C. Plastic Tape Pipe Markers: Flexible, vinyl film tape with pressure-sensitive adhesive backing and printed markings.
- D. Color code as follows:
  - 1. Heating, Cooling, and Boiler Feedwater: Green with white letters.

### **PART 3 EXECUTION**

#### **3.01 PREPARATION**

- A. Degrease and clean surfaces to receive adhesive for identification materials.
- B. Prepare surfaces in accordance with Section 099123 for stencil painting.

#### **3.02 INSTALLATION**

- A. Install nameplates with corrosive-resistant mechanical fasteners, or adhesive. Apply with sufficient adhesive to ensure permanent adhesion and seal with clear lacquer.
- B. Install tags with corrosion resistant chain.
- C. Install plastic tape pipe markers complete around pipe in accordance with manufacturer's instructions.

#### **3.03 SCHEDULE**

- A. Equipment Type:
  - 1. Identification:
  - 2. Background:
    - a. Size:
    - b. Color:
  - 3. Lettering:
    - a. Size:
    - b. Color:

**END OF SECTION**



**SECTION 230593  
BALANCING AND TESTING OF AIR AND WATER SYSTEMS**

**PART 1 - GENERAL**

**1.01 DESCRIPTION**

- A. These Conditions add to, supplement, the GENERAL and SPECIAL CONDITIONS of the Contract Documents. The General and Special Conditions are part of this Section and shall apply as if written in full herein.

**1.02 SCOPE**

- A. This section specifies the requirements and procedures for total mechanical systems testing, adjusting, and balancing. Requirements include measurement and establishment of the fluid quantities of the mechanical systems as required to meet design specifications, and recording and reporting the results.
- B. Test adjust and balance the following mechanical systems;
  - 1. Supply air systems
  - 2. Water systems
  - 3. Verify temperature control system operation

**1.03 DEFINITIONS**

- A. System testing, adjusting and balancing is the process of checking and adjusting all the building environmental systems to produce the design objectives. It includes:
  - 1. The balance of air distribution
  - 2. Adjustment of total system to provide design quantities
  - 3. Electrical measurement
  - 4. Verification of performance of all equipment and automatic controls
- B. Test: To determine quantitative performance of equipment
- C. Adjust: To regulate the specified fluid flow rate and air patterns at the terminal equipment (e.g. reduce fan speed, throttling).
- D. Balance: To proportion flows within the distribution system (submains, branches, and terminals) according to specified design quantities.
- E. Procedure: Standardized approach and execution of sequence of work operations to yield reproducible results.
- F. Report forms: Test data sheets arranged for the collecting test data in logical order for submission and review. These data should also form the permanent record to be used as the basis for required future testing, adjusting and balancing.
- G. Terminal: The point where the controlled fluid enters or leaves the distribution system. These are supply inlets on water terminals, supply outlets on air terminals, return outlets on water terminals and exhaust or return inlets on air terminals such as registers, grilles, diffusers, louvers, and hoods.
- H. Main: Duct or pipe containing the system's major or entire fluid flow.
- I. Submain: Duct or pipe containing part of the system's capacity and serving two or more branch mains.
- J. Branch main: Duct or pipe serving two or more terminals.
- K. Branch: Duct or pipe serving a single terminal.

**1.04 SUBMITTALS**

- A. Certified Reports: Submit testing, adjusting and balancing reports bearing the seal and signature of the Test and Balance Engineer. The reports shall be certified proof that the systems have been tested, adjusted and balanced in accordance with the referenced standards; are an accurate representation of how the systems have been installed; are a true representation of how the systems are operating at the completion of the testing, adjusting and balancing procedures; and are an accurate record of all final quantities measured, to establish

normal operating values of the systems. Follow the procedures and format specified below:

1. Final Reports: Upon verification and approval of draft reports, prepare final reports, type written, and organized and formatted as specified below. Submit 2 complete sets of final reports.
2. Report format: Report forms shall be those standard forms prepared by the Associated Air Balance Council (AABC) for each respective item and system to be tested, adjusted and balanced. Divide the contents in the binder into the listed divisions separated by divider tabs:
  - a. General information and Summary
  - b. Air systems
  - c. Water systems
  - d. Temperature control systems
3. Report contents: Provide the following minimum information, forms and data:
  - a. General Information and Summary: Inside cover sheet to identify testing, adjusting and balancing agency, contractor, owner, architect, engineer and project.
  - b. The remainder of the report shall contain the appropriate forms containing as a minimum, the information indicated on the standard report forms prepared by AABC and NEBB, for each respective item and system.

#### **1.05 QUALITY ASSURANCE**

- A. Test and Balance Engineer's Qualifications: Certification from either the Associated Air Balancing Council (AABC) or National Environmental Balancing Bureau (NEBB). Training to include at least 5 years of experience in testing, adjusting and balancing lab HVAC systems.

#### **1.06 PROJECT CONDITIONS**

- A. Systems Operation: Systems shall be fully operational prior to beginning procedures.

### **PART 2 - PRODUCTS**

#### **2.01 NOT USED**

### **PART 3 - EXECUTION**

#### **3.01 RESPONSIBILITY FOR PROPER BALANCING AND TESTING**

- A. The General Contractor is responsible for the performance of the entire building, including the work of this section. After this contractor has completed the installation, the superintendent for the general contractor shall monitor the Balancing and Testing of the system and shall certify that the readings required under this section have actually been made and that all systems are in actual operation. The Test and Balance data shall be signed by the general superintendent. At time of final review, if it is apparent that these readings have not been made, or that equipment is not in operation, the expense for the return of the engineer and/or architect shall be billed to the general contractor.

#### **3.02 READING REQUIRED TO BE REPORTED**

- A. The following readings shall be made and reported to the engineer after the building has been balanced and all equipment is operating properly. Each reading should have a date and time of day at which it was recorded. All air flows and water flows on drawings are to be measured and verified.
- B. Electrical readings required are:
  1. Measured voltage and amps on EACH phase of each motor (compressor, fan, condenser fan(s), exhaust fans, pumps, etc.) while the equipment is under maximum normal load.
  2. The nameplate voltage and current for each of the above motors.
- C. Water readings readings required are:
  1. Gpm water flows for each boiler

### **3.03 READING REQUIRED TO BE REPORTED**

- A. After the above information is received by the engineer, it will be reviewed and compared against the design. The engineer will generally review the job for the owner and recommend final acceptance or the holding of funds pending additional work. Such review will not be scheduled until the above information can be reviewed and accepted. The work required under this contract is not complete until this information is accepted as accurate and completes.

**END OF SECTION**

**SECTION 230719  
HVAC PIPING INSULATION**

**PART 1 GENERAL**

**1.01 SECTION INCLUDES**

- A. Piping insulation.
- B. Flexible removable and reusable blanket insulation.
- C. Jacketing and accessories.

**1.02 RELATED REQUIREMENTS**

- A. Section 232113 - Hydronic Piping: Placement of hangers and hanger inserts.

**1.03 REFERENCE STANDARDS**

- A. ASTM B117 - Standard Practice for Operating Salt Spray (Fog) Apparatus 2019.
- B. ASTM C177 - Standard Test Method for Steady-State Heat Flux Measurements and Thermal Transmission Properties by Means of the Guarded-Hot-Plate Apparatus 2019.
- C. ASTM C518 - Standard Test Method for Steady-State Thermal Transmission Properties by Means of the Heat Flow Meter Apparatus 2021.
- D. ASTM C547 - Standard Specification for Mineral Fiber Pipe Insulation 2022a.
- E. ASTM C552 - Standard Specification for Cellular Glass Thermal Insulation 2022.
- F. ASTM C795 - Standard Specification for Thermal Insulation for Use in Contact with Austenitic Stainless Steel 2008 (Reapproved 2018).
- G. ASTM D610 - Standard Practice for Evaluating Degree of Rusting on Painted Steel Surfaces 2008 (Reapproved 2019).
- H. ASTM E84 - Standard Test Method for Surface Burning Characteristics of Building Materials 2023.
- I. ASTM E96/E96M - Standard Test Methods for Gravimetric Determination of Water Vapor Transmission Rate of Materials 2022a.
- J. UL 723 - Standard for Test for Surface Burning Characteristics of Building Materials Current Edition, Including All Revisions.

**1.04 SUBMITTALS**

- A. See Section 013000 - Administrative Requirements for submittal procedures.
- B. Product Data: Provide product description, thermal characteristics, list of materials and thickness for each service, and locations.

**1.05 QUALITY ASSURANCE**

- A. Manufacturer Qualifications: Company specializing in manufacturing the Products specified in this section with not less than three years of documented experience.
- B. Applicator Qualifications: Company specializing in performing the type of work specified in this section with minimum five years of experience.

**1.06 DELIVERY, STORAGE, AND HANDLING**

- A. Accept materials on site, labeled with manufacturer's identification, product density, and thickness.

**1.07 FIELD CONDITIONS**

- A. Maintain ambient conditions required by manufacturers of each product.
- B. Maintain temperature before, during, and after installation for minimum of 24 hours.

## **PART 2 PRODUCTS**

### **2.01 REGULATORY REQUIREMENTS**

- A. Surface Burning Characteristics: Flame spread index/Smoke developed index of 25/50, maximum, when tested in accordance with ASTM E84 or UL 723.

### **2.02 GLASS FIBER, RIGID**

- A. Manufacturers:
  - 1. CertainTeed Corporation; [\_\_\_\_\_]: [www.certainteed.com/#sle](http://www.certainteed.com/#sle).
  - 2. Johns Manville Corporation; [\_\_\_\_\_]: [www.jm.com/#sle](http://www.jm.com/#sle).
  - 3. Owens Corning Corporation; Fiberglas Pipe Insulation ASJ: [www.ocbuildingspec.com/#sle](http://www.ocbuildingspec.com/#sle).
- B. Insulation: ASTM C547 and ASTM C795; rigid molded, noncombustible, with wicking material to transport condensed water to the outside of the system for evaporation to the atmosphere.
  - 1. K Value: ASTM C177, 0.23 at 75 degrees F.
  - 2. Maximum Service Temperature: 220 degrees F.
  - 3. Maximum Moisture Absorption: 0.2 percent by volume.
- C. Vapor Barrier Jacket: White kraft paper with glass fiber yarn, bonded to aluminized film; moisture vapor transmission when tested in accordance with ASTM E96/E96M of 0.02 perm-inches.
- D. Vapor Barrier Lap Adhesive: Compatible with insulation.

### **2.03 JACKETING AND ACCESSORIES**

- A. PVC Plastic.
  - 1. Jacket: One piece molded type fitting covers and sheet material, off-white color.
    - a. Minimum Service Temperature: 0 degrees F.
    - b. Maximum Service Temperature: 150 degrees F.
    - c. Moisture Vapor Permeability: 0.002 perm inch, maximum, when tested in accordance with ASTM E96/E96M.
    - d. Thickness: 10 mil, 0.010 inch.
    - e. Connections: Brush on welding adhesive.

### **2.04 ACCESSORIES**

- A. General Requirements:
  - 1. Provide required accessories in accordance with and subject to the recommendations of the insulation manufacturer.
  - 2. Furnish compatible materials which do not contribute to corrosion, soften, or otherwise attack surfaces to which applied, in either the wet or dry state.
  - 3. Comply with ASTM C795 requirements for materials to be used on stainless steel surfaces.
  - 4. Supply materials that are asbestos free.
- B. Corrosion Inhibitors:
  - 1. Corrosion Control Gel:
    - a. Corrosion Protection: Comply with ASTM B117 and ASTM D610.

## **PART 3 EXECUTION**

### **3.01 EXAMINATION**

- A. Test piping for design pressure, liquid tightness, and continuity prior to applying insulation materials.
- B. Verify that surfaces are clean and dry, with foreign material removed.

### **3.02 INSTALLATION**

- A. Install in accordance with manufacturer's instructions.
- B. Install in accordance with NAIMA National Insulation Standards.

- C. Exposed Piping: Locate insulation and cover seams in least visible locations.
- D. For hot piping conveying fluids over 140 degrees F, insulate flanges and unions at equipment.
- E. Glass Fiber Insulated Pipes Conveying Fluids Above Ambient Temperature:
  - 1. Provide standard jackets, with or without vapor barrier, factory-applied, or field-applied. Secure with self-sealing longitudinal laps and butt strips with pressure-sensitive adhesive. Secure with outward clinch expanding staples.
  - 2. Insulate fittings, joints, and valves with insulation of like material and thickness as adjoining pipe. Finish with glass cloth and adhesive or PVC fitting covers.
- F. Inserts and Shields:
  - 1. Application: Piping 1-1/2 inches diameter or larger.
  - 2. Shields: Galvanized steel between pipe hangers or pipe hanger rolls and inserts.
  - 3. Insert location: Between support shield and piping and under the finish jacket.
  - 4. Insert Configuration: Minimum 6 inches long, of same thickness and contour as adjoining insulation; may be factory fabricated.

### **3.03 SCHEDULE**

- A. Heating Systems:
  - 1. Heating Water Supply and Return:

**END OF SECTION**

**SECTION 230800  
COMMISSIONING OF HVAC**

**PART 1 GENERAL**

**1.01 SUMMARY**

- A. See Section 019113 - General Commissioning Requirements for overall objectives; comply with the requirements of Section 019113.
- B. This section covers the Contractor's responsibilities for commissioning; each subcontractor or installer responsible for the installation of a particular system or equipment item to be commissioned is responsible for the commissioning activities relating to that system or equipment item.
- C. The Commissioning Authority (CA) directs and coordinates all commissioning activities and provides Prefunctional Checklists and Functional Test Procedures for Contractor's use.
- D. The entire HVAC system is to be commissioned, including commissioning activities for the following specific items:
  - 1. Boiler Control system.
  - 2. Boilers
  - 3. Other equipment and systems explicitly identified elsewhere in Contract Documents as requiring commissioning.
- E. The Prefunctional Checklist and Functional Test requirements specified in this section are in addition to, not a substitute for, inspection or testing specified in other sections.

**1.02 RELATED REQUIREMENTS**

- A. Section 230593 - Testing, Adjusting, and Balancing for HVAC.

**1.03 REFERENCE STANDARDS**

- A. ASHRAE Guideline 1.1 - HVAC&R Technical Requirements for the Commissioning Process 2007, with Errata (2012).

**1.04 SUBMITTALS**

- A. Updated Submittals: Keep the Commissioning Authority informed of all changes to control system documentation made during programming and setup; revise and resubmit when substantial changes are made.
- B. Draft Prefunctional Checklists and Functional Test Procedures for Control System: Detailed written plan indicating the procedures to be followed to test, checkout and adjust the control system prior to full system Functional Testing; include at least the following for each type of equipment controlled:
  - 1. System name.
  - 2. List of devices.
  - 3. Step-by-step procedures for testing each controller after installation, including:
    - a. Process of verifying proper hardware and wiring installation.
    - b. Process of downloading programs to local controllers and verifying that they are addressed correctly.
    - c. Process of performing operational checks of each controlled component.
    - d. Plan and process for calibrating valve and damper actuators and all sensors.
    - e. Description of the expected field adjustments for transmitters, controllers and control actuators should control responses fall outside of expected values.
  - 4. Copy of proposed log and field checkout sheets to be used to document the process; include space for initial and final read values during calibration of each point and space to specifically indicate when a sensor or controller has "passed" and is operating within the contract parameters.
  - 5. Description of the instrumentation required for testing.
  - 6. Indicate what tests on what systems should be completed prior to TAB using the control system for TAB work. Coordinate with the Commissioning Authority and TAB contractor for this determination.

- C. Startup Reports, Prefunctional Checklists, and Trend Logs: Submit for approval of Commissioning Authority.
- D. HVAC Control System O&M Manual Requirements. In addition to documentation specified elsewhere, compile and organize at minimum the following data on the control system:
  - 1. Specific step-by-step instructions on how to perform and apply all functions, features, modes, etc. mentioned in the controls training sections of this specification and other features of this system. Provide an index and clear table of contents. Include the detailed technical manual for programming and customizing control loops and algorithms.
  - 2. Full as-built set of control drawings.
  - 3. Full as-built sequence of operations for each piece of equipment.
  - 4. Full points list; in addition to the information on the original points list submittal, include a listing of all rooms with the following information for each room:
    - a. Floor.
    - b. Room number.
    - c. Room name.
    - d. Air handler unit ID.
    - e. Reference drawing number.
    - f. Air terminal unit tag ID.
    - g. Heating and/or cooling valve tag ID.
    - h. Minimum air flow rate.
    - i. Maximum air flow rate.
  - 5. Full print out of all schedules and set points after testing and acceptance of the system.
  - 6. Full as-built print out of software program.
  - 7. Electronic copy on disk of the entire program for this facility.
  - 8. Marking of all system sensors and thermostats on the as-built floor plan and HVAC drawings with their control system designations.
  - 9. Maintenance instructions, including sensor calibration requirements and methods by sensor type, etc.
  - 10. Control equipment component submittals, parts lists, etc.
  - 11. Warranty requirements.
  - 12. Copies of all checkout tests and calibrations performed by the Contractor (not commissioning tests).
  - 13. Organize and subdivide the manual with permanently labeled tabs for each of the following data in the given order:
    - a. Sequences of operation.
    - b. Control drawings.
    - c. Points lists.
    - d. Controller and/or module data.
    - e. Thermostats and timers.
    - f. Sensors and DP switches.
    - g. Valves and valve actuators.
    - h. Dampers and damper actuators.
    - i. Program setups (software program printouts).
- E. Project Record Documents: See Section 017800 for additional requirements.
  - 1. Submit updated version of control system documentation, for inclusion with operation and maintenance data.
  - 2. Show actual locations of all static and differential pressure sensors (air, water and building pressure) and air-flow stations on project record drawings.
- F. Draft Training Plan: In addition to requirements specified in Section 017900, include:
  - 1. Follow the recommendations of ASHRAE Guideline 1.1.
  - 2. Control system manufacturer's recommended training.
  - 3. Demonstration and instruction on function and overrides of any local packaged controls not controlled by the HVAC control system.



- G. Training Manuals: See Section 017900 for additional requirements.
  - 1. Provide three extra copies of the controls training manuals in a separate manual from the O&M manuals.

## **PART 2 PRODUCTS**

### **2.01 TEST EQUIPMENT**

- A. Provide all standard testing equipment required to perform startup and initial checkout and required functional performance testing; unless otherwise noted such testing equipment will NOT become the property of Owner.
- B. Equipment-Specific Tools: Where special testing equipment, tools and instruments are specific to a piece of equipment, are only available from the vendor, and are required in order to accomplish startup or Functional Testing, provide such equipment, tools, and instruments as part of the work at no extra cost to Owner; such equipment, tools, and instruments are to become the property of Owner.

## **PART 3 EXECUTION**

### **3.01 PREPARATION**

- A. Cooperate with the Commissioning Authority in development of the Prefunctional Checklists and Functional Test Procedures.
- B. Furnish additional information requested by the Commissioning Authority.
- C. Prepare a preliminary schedule for HVAC pipe and duct system testing, flushing and cleaning, equipment start-up and testing, adjusting, and balancing start and completion for use by the Commissioning Authority; update the schedule as appropriate.
- D. Notify the Commissioning Authority when pipe and duct system testing, flushing, cleaning, startup of each piece of equipment and testing, adjusting, and balancing will occur; when commissioning activities not yet performed or not yet scheduled will delay construction notify ahead of time and be proactive in seeing that the Commissioning Authority has the scheduling information needed to efficiently execute the commissioning process.
- E. Put all HVAC equipment and systems into operation and continue operation during each working day of testing, adjusting, and balancing and commissioning, as required.
- F. Provide test holes in ducts and plenums where directed to allow air measurements and air balancing; close with an approved plug.
- G. Provide temperature and pressure taps in accordance with Contract Documents.
  - 1. Provide a pressure/temperature plug at each water sensor that is an input point to the control system.

### **3.02 INSPECTING AND TESTING - GENERAL**

- A. Submit startup plans, startup reports, and Prefunctional Checklists for each item of equipment or other assembly to be commissioned.
- B. Perform the Functional Tests directed by the Commissioning Authority for each item of equipment or other assembly to be commissioned.
- C. Provide two-way radios for use during the testing.
- D. Valve/Damper Stroke Setup and Check:
  - 1. For all valve/damper actuator positions checked, verify the actual position against the control system readout.
  - 2. Set pump/fan to normal operating mode.
  - 3. Command valve/damper closed; visually verify that valve/damper is closed and adjust output zero signal as required.
  - 4. Command valve/damper open; verify position is full open and adjust output signal as required.
  - 5. Command valve/damper to a few intermediate positions.
  - 6. If actual valve/damper position does not reasonably correspond, replace actuator or add pilot positioner (for pneumatics).

- E. Isolation Valve or System Valve Leak Check: For valves not by coils.
  1. With full pressure in the system, command valve closed.
  2. Use an ultra-sonic flow meter to detect flow or leakage.
- F. Deficiencies: Correct deficiencies and re-inspect or re-test, as applicable, at no extra cost to Owner.

### **3.03 TAB COORDINATION**

- A. TAB: Testing, adjusting, and balancing of HVAC.
- B. Coordinate commissioning schedule with TAB schedule.
- C. Review the TAB plan to determine the capabilities of the control system toward completing TAB.
- D. Provide all necessary unique instruments and instruct the TAB technicians in their use; such as handheld control system interface for setting terminal unit boxes, etc.
- E. Have all required Prefunctional Checklists, calibrations, startup and component Functional Tests of the system completed and approved by the Commissioning Authority prior to starting TAB.
- F. Provide a qualified control system technician to operate the controls to assist the TAB technicians or provide sufficient training for the TAB technicians to operate the system without assistance.

### **3.04 CONTROL SYSTEM FUNCTIONAL TESTING**

- A. Prefunctional Checklists for control system components will require a signed and dated certification that all system programming is complete as required to accomplish the requirements of Contract Documents and the detailed Sequences of Operation documentation submittal.
- B. Do not start Functional Testing until all controlled components have themselves been successfully Functionally Tested in accordance with Contract Documents.
- C. Using a skilled technician who is familiar with this building, execute the Functional Testing of the control system as required by the Commissioning Authority.
- D. Functional Testing of the control system constitutes demonstration and trend logging of control points monitored by the control system.
  1. The scope of trend logging is partially specified; trend log up to 50 percent more points than specified at no extra cost to Owner.
  2. Perform all trend logging specified in Prefunctional Checklists and Functional Test procedures.
- E. Functionally Test integral or stand-alone controls in conjunction with the Functional Tests of the equipment they are attached to, including any interlocks with other equipment or systems; further testing during control system Functional Test is not required unless specifically indicated below.
- F. Demonstrate the following to the Commissioning Authority during testing of controlled equipment; coordinate with commissioning of equipment.
  1. Setpoint changing features and functions.
  2. Sensor calibrations.
- G. Demonstrate to the Commissioning Authority:
  1. That all specified functions and features are set up, debugged and fully operable.
  2. That scheduling features are fully functional and setup, including holidays.
  3. That all graphic screens and value readouts are completed.
  4. Correct date and time setting in central computer.
  5. That field panels read the same time as the central computer; sample 10 percent of field panels; if any of those fail, sample another 10 percent; if any of those fail test all remaining units at no extra cost to Owner.

6. Functionality of field panels using local operator keypads and local ports (plug-ins) using portable computer/keypad; demonstrate 100 percent of panels and 10 percent of ports; if any ports fail, sample another 10 percent; if any of those fail, test all remaining units at no extra cost to Owner.
  7. Power failure and battery backup and power-up restart functions.
  8. Global commands features.
  9. Security and access codes.
  10. Occupant over-rides (manual, telephone, key, keypad, etc.).
  11. O&M schedules and alarms.
  12. Occupancy sensors and controls.
  13. All control strategies and sequences not tested during controlled equipment testing.
- H. If the control system, integral control components, or related equipment do not respond to changing conditions and parameters appropriately as expected, as specified and according to acceptable operating practice, under any of the conditions, sequences, or modes tested, correct all systems, equipment, components, and software required at no additional cost to Owner.

### **3.05 OPERATION AND MAINTENANCE MANUALS**

- A. See Section 017800 for additional requirements.
- B. Add design intent documentation furnished by Architect to manuals prior to submission to Owner.
- C. Submit manuals related to items that were commissioned to Commissioning Authority for review; make changes recommended by Commissioning Authority.
- D. Commissioning Authority will add commissioning records to manuals after submission to Owner.

### **3.06 DEMONSTRATION AND TRAINING**

- A. See Section 017900 for additional requirements.
- B. Demonstrate operation and maintenance of HVAC system to Owner' personnel; if during any demonstration, the system fails to perform in accordance with the information included in the O&M manual, stop demonstration, repair or adjust, and repeat demonstration. Demonstrations may be combined with training sessions if appropriate.
- C. These demonstrations are in addition to, and not a substitute for, Prefunctional Checklists and demonstrations to the Commissioning Authority during Functional Testing.
- D. Provide classroom and hands-on training of Owner's designated personnel on operation and maintenance of the HVAC system, control system, and all equipment items indicated to be commissioned. Provide the following minimum durations of training:
  1. Boilers and System: 8 hours.
- E. TAB Review: Instruct Owner's personnel for minimum [\_\_\_\_] hours, after completion of TAB, on the following:
  1. Review final TAB report, explaining the layout and meanings of each data type.
  2. Discuss any outstanding deficient items in control, ducting or design that may affect the proper delivery of air or water.
  3. Identify and discuss any terminal units, duct runs, diffusers, coils, fans and pumps that are close to or are not meeting their design capacity.
  4. Discuss any temporary settings and steps to finalize them for any areas that are not finished.
  5. Other salient information that may be useful for facility operations, relative to TAB.
- F. HVAC Control System Training: Perform training in at least three phases:
  1. Phase 1 - Basic Control System: Provide minimum of [\_\_\_\_] hours of actual training on the control system itself. Upon completion of training, each attendee, using appropriate documentation, should be able to perform elementary operations and describe general hardware architecture and functionality of the system.

- a. This training may be held on-site or at the manufacturer's facility.
- b. If held off-site, the training may occur prior to final completion of the system installation.
- c. For off-site training, Contractor shall pay expenses of up to two attendees.
- 2. Phase 2 - Integrating with HVAC Systems: Provide minimum of [\_\_\_\_] hours of on-site, hands-on training after completion of Functional Testing. Include instruction on:
  - a. The specific hardware configuration of installed systems in this facility and specific instruction for operating the installed system, including interfaces with other systems, if any.
  - b. Security levels, alarms, system start-up, shut-down, power outage and restart routines, changing setpoints and alarms and other typical changed parameters, overrides, freeze protection, manual operation of equipment, optional control strategies that can be considered, energy savings strategies and set points that if changed will adversely affect energy consumption, energy accounting, procedures for obtaining vendor assistance, etc.
  - c. Trend logging and monitoring features (values, change of state, totalization, etc.), including setting up, executing, downloading, viewing both tabular and graphically and printing trends; provide practice in setting up trend logging and monitoring during training session.
  - d. Every display screen, allowing time for questions.
  - e. Point database entry and modifications.
- 3. Phase 3 - Post-Occupancy: Six months after occupancy conduct minimum of [\_\_\_\_] hours of training. Tailor training session to questions and topics solicited beforehand from Owner. Also be prepared to address topics brought up and answer questions concerning operation of the system.
- G. Provide the services of manufacturer representatives to assist instructors where necessary.
- H. Provide the services of the HVAC controls instructor at other training sessions, when requested, to discuss the interaction of the controls system as it relates to the equipment being discussed.

**END OF SECTION**

**SECTION 231123  
FACILITY NATURAL-GAS PIPING**

**PART 1 GENERAL**

**1.01 SECTION INCLUDES**

- A. Pipe, pipe fittings, valves, and connections for natural gas piping systems.

**1.02 RELATED REQUIREMENTS**

- A. Section 230553 - Identification for HVAC Piping and Equipment.
- B. Section 335216 - Gas Hydrocarbon Piping.

**1.03 REFERENCE STANDARDS**

- A. ANSI LC 1/CSA 6.26 - Fuel Gas Piping Systems Using Corrugated Stainless Steel Tubing 2019.
- B. ANSI Z223.1 - National Fuel Gas Code 2021.
- C. ASME B16.3 - Malleable Iron Threaded Fittings: Classes 150 and 300 2021.
- D. ASME B31.1 - Power Piping 2022.
- E. ASME B31.9 - Building Services Piping 2020.
- F. ASTM A47/A47M - Standard Specification for Ferritic Malleable Iron Castings 1999, with Editorial Revision (2022).
- G. ASTM A53/A53M - Standard Specification for Pipe, Steel, Black and Hot-Dipped, Zinc-Coated, Welded and Seamless 2022.
- H. ASTM A234/A234M - Standard Specification for Piping Fittings of Wrought Carbon Steel and Alloy Steel for Moderate and High Temperature Service 2022.
- I. ASTM F708 - Standard Practice for Design and Installation of Rigid Pipe Hangers 1992 (Reapproved 2022).
- J. AWWA C606 - Grooved and Shouldered Joints 2015.
- K. ICC-ES AC01 - Acceptance Criteria for Expansion Anchors in Masonry Elements 2015.
- L. ICC-ES AC106 - Acceptance Criteria for Predrilled Fasteners (Screw Anchors) in Masonry Elements 2015.
- M. ICC-ES AC193 - Acceptance Criteria for Mechanical Anchors in Concrete Elements 2015.
- N. MSS SP-58 - Pipe Hangers and Supports - Materials, Design, Manufacture, Selection, Application, and Installation 2018, with Amendment (2019).
- O. MSS SP-78 - Gray Iron Plug Valves, Flanged and Threaded Ends 2011.
- P. MSS SP-110 - Ball Valves Threaded, Socket-Welding, Solder Joint, Grooved and Flared Ends 2010, with Errata .

**1.04 SUBMITTALS**

- A. See Section 013000 - Administrative Requirements, for submittal procedures.
- B. Product Data: Provide data on pipe materials, pipe fittings, valves, and accessories. Provide manufacturers catalog information. Indicate valve data and ratings.
- C. Maintenance Materials: Furnish the following for Owner's use in maintenance of project.
  - 1. See Section 016000 - Product Requirements, for additional provisions.
  - 2. Valve Repacking Kits: One for each type and size of valve.

**1.05 QUALITY ASSURANCE**

- A. Perform work in accordance with applicable codes.

**1.06 DELIVERY, STORAGE, AND HANDLING**

- A. Accept valves on site in shipping containers with labeling in place. Inspect for damage.

- B. Provide temporary end caps and closures on piping and fittings. Maintain in place until installation.
- C. Protect piping systems from entry of foreign materials by temporary covers, completing sections of the work, and isolating parts of completed system.

## **PART 2 PRODUCTS**

### **2.01 NATURAL GAS PIPING, ABOVE GRADE**

- A. Steel Pipe: ASTM A53/A53M, Schedule 40 black.
  - 1. Fittings: ASME B16.3, malleable iron, or ASTM A234/A234M, wrought steel welding type.
  - 2. Joints: Threaded or welded to ASME B31.1.

### **2.02 FLANGES, UNIONS, AND COUPLINGS**

- A. Unions for Pipe Sizes 3 Inches and Under:
  - 1. Ferrous Pipe: Class 150 malleable iron threaded unions.
- B. Flanges for Pipe Size Over 1 Inch:
  - 1. Ferrous Pipe: Class 150 malleable iron threaded or forged steel slip-on flanges; preformed neoprene gaskets.
- C. Mechanical Couplings for Grooved and Shouldered Joints: Two or more curved housing segments with continuous key to engage pipe groove, circular C-profile gasket, and bolts to secure and compress gasket.
  - 1. Dimensions and Testing: In accordance with AWWA C606.
  - 2. Housing Material: Provide ASTM A47/A47M malleable iron, ductile iron, or [\_\_\_\_], galvanized.
  - 3. Bolts and Nuts: Hot dipped galvanized or zinc-electroplated steel.
  - 4. When pipe is field grooved, provide coupling manufacturer's grooving tools.
- D. Dielectric Connections: Union with galvanized or plated steel threaded end, copper solder end, water impervious isolation barrier.

### **2.03 PIPE HANGERS AND SUPPORTS**

- A. Provide hangers and supports that comply with MSS SP-58.
  - 1. If type of hanger or support for a particular situation is not indicated, select appropriate type using MSS SP-58 recommendations.
  - 2. Overhead Supports: Individual steel rod hangers attached to structure or to trapeze hangers.
  - 3. Trapeze Hangers: Welded steel channel frames attached to structure.
  - 4. Vertical Pipe Support: Steel riser clamp.
  - 5. Floor Supports: Concrete pier or steel pedestal with floor flange; fixture attachment.
- B. Hanger Fasteners: Attach hangers to structure using appropriate fasteners, as follows:
  - 1. Concrete Wedge Expansion Anchors: Complying with ICC-ES AC193.
  - 2. Masonry Wedge Expansion Anchors: Complying with ICC-ES AC01.
  - 3. Concrete Screw Type Anchors: Complying with ICC-ES AC193.
  - 4. Masonry Screw Type Anchors: Complying with ICC-ES AC106.

### **2.04 PLUG VALVES**

- A. Provide lubricated plug as shut off at each boiler connection. Plug to be Massachusetts Approved.

### **2.05 STRAINERS**

- A. Manufacturers:
  - 1. Armstrong International, Inc; [\_\_\_\_]: [www.armstronginternational.com/#sle](http://www.armstronginternational.com/#sle).
  - 2. WEAMCO; [\_\_\_\_]: [www.weamco.com/#sle](http://www.weamco.com/#sle).
- B. Size 2 inch and Under:
  - 1. Threaded brass body for 175 psi CWP, Y pattern with 1/32 inch stainless steel perforated screen.

2. Class 150, threaded bronze body 300 psi CWP, Y pattern with 1/32 inch stainless steel perforated screen.
3. Provide strainer at boiler inlet after plug valve.

### **PART 3 EXECUTION**

#### **3.01 PREPARATION**

- A. Ream pipe and tube ends. Remove burrs. Bevel 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.

#### **3.02 INSTALLATION**

- A. Install in accordance with manufacturer's instructions.
- B. Provide non-conducting dielectric connections wherever jointing dissimilar metals.
- C. Provide clearance in hangers and from structure and other equipment for installation of insulation and access to valves and fittings.
- D. Pipe vents from gas pressure reducing valves to outdoors and terminate in weather proof hood.
- E. Pipe Hangers and Supports:
  1. Install in accordance with ASME B31.9.
  2. Place hangers within 12 inches of each horizontal elbow.
  3. Use hangers with 1-1/2 inch minimum vertical adjustment. Design hangers for pipe movement without disengagement of supported pipe.
  4. Where several pipes can be installed in parallel and at same elevation, provide multiple or trapeze hangers.

#### **3.03 APPLICATION**

- A. Install unions downstream of valves and at equipment or apparatus connections.
- B. Provide plug valves in natural gas systems for shut-off service.

#### **3.04 SERVICE CONNECTIONS**

- A. Provide new gas service complete with gas meter and regulators in accordance with Section 335216. Gas service distribution piping to have initial minimum pressure of 7 inch wg. Provide regulators on each line serving gravity type appliances, sized in accordance with equipment.

#### **3.05 SCHEDULES**

- A. Pipe Hanger Spacing:
  1. Metal Piping:
    - a. Pipe Size: 1/2 inches to 1-1/4 inches:
      - 1) Maximum Hanger Spacing: 6.5 ft.
      - 2) Hanger Rod Diameter: 3/8 inches.
    - b. Pipe Size: 1-1/2 inches to 2 inches:
      - 1) Maximum Hanger Spacing: 10 ft.
      - 2) Hanger Rod Diameter: 3/8 inch.

**END OF SECTION**

**SECTION 232113  
HYDRONIC PIPING**

**PART 1 GENERAL**

**1.01 SECTION INCLUDES**

- A. Hydronic system requirements.
- B. Heating water piping, above grade.
- C. Heating water and glycol piping, above grade.
- D. Equipment drains and overflows.
- E. Pipe hangers and supports.
- F. Unions, flanges, mechanical couplings, and dielectric connections.
- G. Valves:
  - 1. Ball valves.
  - 2. Check valves.
- H. Flow controls.

**1.02 RELATED REQUIREMENTS**

- A. Section 230719 - HVAC Piping Insulation.
- B. Section 232500 - HVAC Water Treatment: Pipe cleaning.

**1.03 REFERENCE STANDARDS**

- A. ASME BPVC-IX - Boiler and Pressure Vessel Code, Section IX - Qualification Standard for Welding, Brazing, and Fusing Procedures; Welders; Brazers; and Welding, Brazing, and Fusing Operators 2021.
- B. ASME B16.3 - Malleable Iron Threaded Fittings: Classes 150 and 300 2021.
- C. ASME B16.18 - Cast Copper Alloy Solder Joint Pressure Fittings 2021.
- D. ASME B16.22 - Wrought Copper and Copper Alloy Solder-Joint Pressure Fittings 2021.
- E. ASME B31.9 - Building Services Piping 2020.
- F. ASTM A53/A53M - Standard Specification for Pipe, Steel, Black and Hot-Dipped, Zinc-Coated, Welded and Seamless 2022.
- G. ASTM A234/A234M - Standard Specification for Piping Fittings of Wrought Carbon Steel and Alloy Steel for Moderate and High Temperature Service 2022.
- H. ASTM B32 - Standard Specification for Solder Metal 2020.
- I. ASTM B88 - Standard Specification for Seamless Copper Water Tube 2022.
- J. ASTM B88M - Standard Specification for Seamless Copper Water Tube (Metric) 2020.
- K. ASTM D1785 - Standard Specification for Poly(Vinyl Chloride) (PVC) Plastic Pipe, Schedules 40, 80, and 120 2021a.
- L. ASTM D2241 - Standard Specification for Poly(Vinyl Chloride) (PVC) Pressure-Rated Pipe (SDR Series) 2020.
- M. ASTM D2466 - Standard Specification for Poly(Vinyl Chloride) (PVC) Plastic Pipe Fittings, Schedule 40 2021.
- N. ASTM D2467 - Standard Specification for Poly(Vinyl Chloride) (PVC) Plastic Pipe Fittings, Schedule 80 2020.
- O. ASTM D2855 - Standard Practice for the Two-Step (Primer and Solvent Cement) Method of Joining Poly (Vinyl Chloride) (PVC) or Chlorinated Poly (Vinyl Chloride) (CPVC) Pipe and Piping Components with Tapered Sockets 2020.
- P. ASTM F708 - Standard Practice for Design and Installation of Rigid Pipe Hangers 1992 (Reapproved 2022).



- Q. ASTM F1476 - Standard Specification for Performance of Gasketed Mechanical Couplings for Use in Piping Applications 2007 (Reapproved 2019).
- R. AWS A5.8M/A5.8 - Specification for Filler Metals for Brazing and Braze Welding 2019.
- S. AWS D1.1/D1.1M - Structural Welding Code - Steel 2020, with Errata (2022).
- T. AWWA C606 - Grooved and Shouldered Joints 2015.
- U. MSS SP-58 - Pipe Hangers and Supports - Materials, Design, Manufacture, Selection, Application, and Installation 2018, with Amendment (2019).

#### **1.04 SUBMITTALS**

- A. See Section 013000 - Administrative Requirements for submittal procedures.
- B. Product Data:
  - 1. Include data on pipe materials, pipe fittings, valves, and accessories.
  - 2. Provide manufacturers catalog information.
  - 3. Indicate valve data and ratings.
  - 4. Show grooved joint couplings, fittings, valves, and specialties on drawings and product submittals, specifically identified with the manufacturer's style or series designation.
- C. Maintenance Materials: Furnish the following for Owner's use in maintenance of project.
  - 1. See Section 016000 - Product Requirements, for additional provisions.

#### **1.05 QUALITY ASSURANCE**

- A. Manufacturer Qualifications: Company specializing in manufacturing products of the type specified in this section, with minimum three years of documented experience.
- B. Installer Qualifications: Company specializing in performing work of the type specified in this section, with minimum 5 years of experience.
- C. Date stamp all castings used for coupling housings, fittings, valve bodies, etc. for quality assurance and traceability.
- D. Welder Qualifications: Certify in accordance with ASME BPVC-IX.

### **PART 2 PRODUCTS**

#### **2.01 HYDRONIC SYSTEM REQUIREMENTS**

- A. Comply with ASME B31.9 and applicable federal, state, and local regulations.
- B. Piping: Provide piping, fittings, hangers, and supports as required, as indicated, and as follows:
  - 1. Where more than one piping system material is specified, provide joining fittings that are compatible with piping materials and ensure that the integrity of the system is not jeopardized.
  - 2. Use non-conducting dielectric connections whenever jointing dissimilar metals.
  - 3. Mechanical joints may be used on copper piping system.
    - a. Accessible locations include those exposed on interior of building, in pipe chases, and in mechanical rooms, aboveground outdoors, and as approved by Architect.
    - b. Use rigid joints unless otherwise indicated.
  - 4. Provide pipe hangers and supports in accordance with ASME B31.9 or MSS SP-58 unless indicated otherwise.
- C. Pipe-to-Valve and Pipe-to-Equipment Connections: Use flanges or unions to allow disconnection of components for servicing; do not use direct welded, soldered, or threaded connections.
- D. Valves: Provide valves where indicated:
  - 1. Provide drain valves where indicated, and if not indicated, provide at least at main shut-off, low points of piping, bases of vertical risers, and at equipment. Use 3/4 inch gate valves with cap; pipe to nearest floor drain.
  - 2. For shut-off and to isolate parts of systems or vertical risers, use gate, ball, or butterfly valves.

3. For throttling service, use plug cocks. Use non-lubricated plug cocks only when shut-off or isolating valves are also provided.

E. Welding Materials and Procedures: Comply with ASME BPVC-IX.

## **2.02 HEATING WATER PIPING, ABOVE GRADE**

- A. Steel Pipe: ASTM A53/A53M, Schedule 40, black, using one of the following joint types:
1. Welded Joints: ASTM A234/A234M, wrought steel welding type fittings; AWS D1.1/D1.1M welded for all pipe over 2 inches
  2. Threaded Joints: ASME B16.3, malleable iron fittings when transitioning to pipe 2 inches and less.
- B. Copper Tube: ASTM B88 (ASTM B88M), Type L (B), drawn, for pipes 2 inches and less using one of the following joint types:
1. Solder Joints: ASME B16.18 cast brass/bronze or ASME B16.22 solder wrought copper fittings.
    - a. Solder: ASTM B32 lead-free solder, HB alloy (95-5 tin-antimony) or tin and silver.
    - b. Braze: AWS A5.8M/A5.8 BCuP copper/silver alloy.
  2. Tee Connections: Mechanically extracted collars with notched and dimpled branch tube.
  3. Mechanical Press Sealed Fittings: Double pressed type complying with ASME B16.22, utilizing EPDM, nontoxic synthetic rubber sealing elements.

## **2.03 EQUIPMENT DRAINS AND OVERFLOWS**

- A. PVC Pipe: ASTM D1785, Schedule 40, or ASTM D2241, SDR 21 or 26.
1. Fittings: ASTM D2466 or D2467, PVC.
  2. Joints: Solvent welded in accordance with ASTM D2855.

## **2.04 PIPE HANGERS AND SUPPORTS**

- A. Provide hangers and supports that comply with MSS SP-58.
1. If type of hanger or support for a particular situation is not indicated, select appropriate type using MSS SP-58 recommendations.
  2. Hangers for Pipe Sizes 1/2 to 1-1/2 Inches: Malleable iron, adjustable swivel, split ring.
  3. Hangers for Hot Pipe Sizes 2 to 4 Inches: Carbon steel, adjustable, clevis.
  4. Multiple or Trapeze Hangers: Steel channels with welded spacers and hanger rods.
  5. Wall Support for Pipe Sizes to 3 Inches: Cast iron hook.
  6. Vertical Support: Steel riser clamp.
  7. Floor Support for Hot Pipe Sizes to 4 Inches: Cast iron adjustable pipe saddle, lock nut, nipple, floor flange, and concrete pier or steel support.
  8. Copper Pipe Support: Carbon steel ring, adjustable, copper plated.
  9. Hanger Rods: Mild steel threaded both ends, threaded one end, or continuous threaded.
  10. Inserts: Malleable iron case of galvanized steel shell and expander plug for threaded connection with lateral adjustment, top slot for reinforcing rods, lugs for attaching to forms; size inserts to suit threaded hanger rods.
- B. In grooved installations, use rigid couplings with offsetting angle-pattern bolt pads or with wedge-shaped grooves in header piping to permit support and hanging in accordance with ASME B31.9.

## **2.05 UNIONS, FLANGES, MECHANICAL COUPLINGS, AND DIELECTRIC CONNECTIONS**

- A. Unions for Pipe of 2 Inches and Less:
1. Ferrous Piping: 150 psi brass or malleable iron, threaded.
  2. Copper Pipe: Bronze, soldered joints.
  3. Manufacturers:
    - a. Nexus Valve, Inc; [\_\_\_\_]: [www.nexusvalve.com/#sle](http://www.nexusvalve.com/#sle).
- B. Flanges for Pipe 2 Inches and Greater:
1. Ferrous Piping: 150 psig forged steel, slip-on.
  2. Copper Piping: Bronze.
  3. Gaskets: 1/16 inch thick, preformed neoprene.

- C. Mechanical Couplings for Grooved and Shouldered Joints: Two or more curved housing segments with continuous key to engage pipe groove, circular C-profile gasket, and bolts to secure and compress gasket.
  - 1. Dimensions and Testing: In accordance with AWWA C606.
  - 2. Mechanical Couplings: Comply with ASTM F1476.
  - 3. Bolts and Nuts: Hot dipped galvanized or zinc-electroplated steel.
  - 4. When pipe is field grooved, provide coupling manufacturer's grooving tools.
  - 5. Manufacturers:
    - a. Anvil International; [\_\_\_\_\_]: [www.anvilintl.com/#sle](http://www.anvilintl.com/#sle).
    - b. Apollo Valves; [\_\_\_\_\_]: [www.apollovalves.com/#sle](http://www.apollovalves.com/#sle).
    - c. Grinnell Products; [\_\_\_\_\_]: [www.grinnell.com/#sle](http://www.grinnell.com/#sle).
- D. Dielectric Connections:
  - 1. Waterways:
    - a. Water impervious insulation barrier capable of limiting galvanic current to 1 percent of short circuit current in a corresponding bimetallic joint.
    - b. Dry insulation barrier able to withstand 600-volt breakdown test.
    - c. Construct of galvanized steel with threaded end connections to match connecting piping.
    - d. Suitable for the required operating pressures and temperatures.
  - 2. Flanges:
    - a. Dielectric flanges with same pressure ratings as standard flanges.
    - b. Water impervious insulation barrier capable of limiting galvanic current to 1 percent of short circuit current in a corresponding bimetallic joint.
    - c. Dry insulation barrier able to withstand 600-volt breakdown test.
    - d. Construct of galvanized steel with threaded end connections to match connecting piping.
    - e. Suitable for the required operating pressures and temperatures.
  - 3. Unions:
    - a. 1/2 to 1 Inches: Brass solder to galvanized FPT.
    - b. 1/2 to 2 Inches: Brass solder to galvanized FPT.
    - c. 1/2 to 1 Inches: Brass to galvanized FPT or FIP (Female Iron Pipe).
    - d. 3/4 to 1/2 Inch Reducer: Brass solder to galvanized FPT.
    - e. Service: 250 psi, minus 20 to 180 deg F.

## 2.06 BALL VALVES

- A. Manufacturers:
  - 1. Anvil International; [\_\_\_\_\_]: [www.anvilintl.com/#sle](http://www.anvilintl.com/#sle).
  - 2. Apollo Valves; [\_\_\_\_\_]: [www.apollovalves.com/#sle](http://www.apollovalves.com/#sle).
  - 3. Victaulic Company; [\_\_\_\_\_]: [www.victaulic.com/#sle](http://www.victaulic.com/#sle).
  - 4. Viega LLC; [\_\_\_\_\_]: [www.viega.us/#sle](http://www.viega.us/#sle).
- B. Up To and Including 2 Inches:
  - 1. Bronze one piece body, chrome plated brass ball, teflon seats and stuffing box ring, lever handle with balancing stops, solder ends with union.
- C. Over 2 Inches:
  - 1. Ductile iron body, chrome plated stainless steel ball, teflon, Virgin TFE, or [\_\_\_\_\_] seat and stuffing box seals, lever handle, gear operated, or [\_\_\_\_\_], flanged ends, rated to 800 psi.

## 2.07 SWING CHECK VALVES

- A. Manufacturers:
  - 1. Anvil International; [\_\_\_\_\_]: [www.anvilintl.com/#sle](http://www.anvilintl.com/#sle).
  - 2. Apollo Valves; [\_\_\_\_\_]: [www.apollovalves.com/#sle](http://www.apollovalves.com/#sle).
  - 3. Grinnell Products; [\_\_\_\_\_]: [www.grinnell.com/#sle](http://www.grinnell.com/#sle).
  - 4. Victaulic Company; [\_\_\_\_\_]: [www.victaulic.com/#sle](http://www.victaulic.com/#sle).

- B. Up To and Including 2 Inches:
  - 1. Bronze body, bronze trim, bronze rotating swing disc, with composition disc, solder ends.

## **2.08 SPRING LOADED CHECK VALVES**

- A. Manufacturers:
  - 1. Anvil International; [\_\_\_\_\_]: [www.anvilintl.com/#sle](http://www.anvilintl.com/#sle).
  - 2. Shurjoint Piping Products, Inc; [\_\_\_\_\_]: [www.shurjoint.com/#sle](http://www.shurjoint.com/#sle).
  - 3. Victaulic Company; [\_\_\_\_\_]: [www.victaulic.com/#sle](http://www.victaulic.com/#sle).
- B. Iron body, bronze trim, split plate, hinged with stainless steel spring, resilient seal bonded to body, wafer, or threaded lug ends.

## **2.09 FLOW CONTROLS**

- A. Manufacturers:
  - 1. Bell & Gossett, a brand of Xylem, Inc; [\_\_\_\_\_]: [www.bellgossett.com/#sle](http://www.bellgossett.com/#sle).
  - 2. ITT Bell & Gossett; [\_\_\_\_\_]: [www.bellgossett.com/#sle](http://www.bellgossett.com/#sle).
  - 3. Taco, Inc; [\_\_\_\_\_]: [www.taco-hvac.com/#sle](http://www.taco-hvac.com/#sle).
- B. Construction: Class 125, Brass or bronze body with union on inlet and outlet, temperature and pressure test plug on inlet and outlet, blowdown/backflush drain.
- C. Calibration: Control flow within 10 percent of selected rating, over operating pressure range of 10 times minimum pressure required for control, minimum pressure 2 psi.

## **PART 3 EXECUTION**

### **3.01 PREPARATION**

- A. Ream pipe and tube ends. Remove burrs. Bevel plain end ferrous pipe.
- B. Prepare pipe for grooved mechanical joints as required by coupling manufacturer.
- C. Remove scale and dirt on inside and outside before assembly.
- D. Prepare piping connections to equipment using jointing system specified.
- E. Keep open ends of pipe free from scale and dirt. Protect open ends with temporary plugs or caps.
- F. After completion, fill, clean, and treat systems. See Section 232500 for additional requirements.

### **3.02 INSTALLATION**

- A. Install in accordance with manufacturer's instructions.
- B. Install heating water, glycol, chilled water, condenser water, and engine exhaust piping to ASME B31.9 requirements.
- C. PVC Pipe: Make solvent-welded joints in accordance with ASTM D2855.
- D. Route piping in orderly manner, parallel to building structure, and maintain gradient.
- E. Install piping to conserve building space and to avoid interference with use of space.
- F. Group piping whenever practical at common elevations.
- G. Slope piping and arrange to drain at low points.
- H. Pipe Hangers and Supports:
  - 1. Install in accordance with ASME B31.9, ASTM F708, or MSS SP-58.
  - 2. Install hangers to provide minimum 1/2-inch space between finished covering and adjacent work.
  - 3. Place hangers within 12 inches of each horizontal elbow.
  - 4. Use hangers with 1-1/2 inches minimum vertical adjustment. Design hangers for pipe movement without disengagement of supported pipe.
  - 5. Where several pipes can be installed in parallel and at same elevation, provide multiple or trapeze hangers.
  - 6. Provide copper plated hangers and supports for copper piping.

- I. Provide clearance in hangers and from structure and other equipment for installation of insulation and access to valves and fittings. See Section 230719.
- J. Install valves with stems upright or horizontal, not inverted.

### **3.03 SCHEDULES**

- A. Hanger Spacing for Copper Tubing.
  - 1. 1/2 Inch and 3/4 inch: Maximum span, 5 feet; minimum rod size, 1/4 inch.
  - 2. 1 Inch: Maximum span, 6 feet; minimum rod size, 1/4 inch.
  - 3. 1-1/2 Inches and 2 Inches: Maximum span, 8 feet; minimum rod size, 3/8 inch.
- B. Hanger Spacing for Steel Piping.
  - 1. 3 Inches: Maximum span, 12 feet; minimum rod size, 3/8 inch.
  - 2. 4 Inches: Maximum span, 14 feet; minimum rod size, 1/2 inch.
- C. Hanger Spacing for Plastic Piping.
  - 1. 1/2 Inch: Maximum span, 42 inches; minimum rod size, 1/4 inch.
  - 2. 3/4 Inch: Maximum span, 45 inches; minimum rod size, 1/4 inch.
  - 3. 1 Inch: Maximum span, 51 inches; minimum rod size, 1/4 inch.

**END OF SECTION**

**SECTION 232114  
HYDRONIC SPECIALTIES**

**PART 1 GENERAL**

**1.01 SECTION INCLUDES**

- A. Air vents.
- B. Air separators.
- C. Strainers.
- D. Balancing valves.

**1.02 RELATED REQUIREMENTS**

- A. Section 232113 - Hydronic Piping.

**1.03 REFERENCE STANDARDS**

- A. ASME B16.11 - Forged Fittings, Socket-Welding and Threaded 2021.
- B. ASME BPVC-VIII-1 - Boiler and Pressure Vessel Code, Section VIII, Division 1: Rules for Construction of Pressure Vessels 2021.

**1.04 ADMINISTRATIVE REQUIREMENTS**

- A. Preinstallation Meeting: Conduct a preinstallation meeting one week prior to the start of the work of this section; require attendance by all affected installers.
- B. Sequencing: Ensure that utility connections are achieved in an orderly and expeditious manner.

**1.05 SUBMITTALS**

- A. See Section 013000 - Administrative Requirements for submittal procedures.
- B. Product Data: Provide product data for manufactured products and assemblies required for this project. Include component sizes, rough-in requirements, service sizes, and finishes. Include product description and model.
- C. Maintenance Data: Include installation instructions, assembly views, lubrication instructions, and replacement parts list.
- D. Maintenance Materials: Furnish the following for Owner's use in maintenance of project.
  - 1. See Section 016000 - Product Requirements for additional provisions.
  - 2. Extra Glycol Solution: One container, 1 gallon size.

**1.06 QUALITY ASSURANCE**

- A. Manufacturer Qualifications: Company specializing in manufacturing the type of products specified in this section, with minimum three years of documented experience.

**1.07 DELIVERY, STORAGE, AND HANDLING**

- A. Accept valves on site in shipping containers with labeling in place. Inspect for damage.
- B. Provide temporary end caps and closures on piping and fittings. Maintain in place until installation.
- C. Protect piping systems from entry of foreign materials by temporary covers, completing sections of the work, and isolating parts of completed system.

**PART 2 PRODUCTS**

**2.01 AIR VENTS**

- A. Manufacturers:
  - 1. Armstrong International, Inc; [\_\_\_\_]: [www.armstronginternational.com/#sle](http://www.armstronginternational.com/#sle).
  - 2. Bell & Gossett, a brand of Xylem, Inc; [\_\_\_\_]: [www.bellgossett.com/#sle](http://www.bellgossett.com/#sle).
  - 3. Taco, Inc; [\_\_\_\_]: [www.taco-hvac.com/#sle](http://www.taco-hvac.com/#sle).
- B. Float Air Vent:

1. Brass or semi-steel body, copper, polypropylene, or solid non-metallic float, stainless steel valve and valve seat; suitable for system operating temperature and pressure; with isolating valve.
  2. Cast iron body and cover, float, bronze pilot valve mechanism suitable for system operating temperature and pressure; with isolating valve.
- C. Maximum Fluid Pressure: 150 psi.
- D. Maximum Fluid Temperature: 250 degrees F.

## 2.02 AIR SEPARATORS

- A. Centrifugal Air Separators/Strainers:
1. Manufacturers:
    - a. Armstrong International, Inc; [\_\_\_\_]: [www.armstronginternational.com/#sle](http://www.armstronginternational.com/#sle).
    - b. Bell & Gossett, a brand of Xylem, Inc; [\_\_\_\_]: [www.bellgossett.com/#sle](http://www.bellgossett.com/#sle).
    - c. Taco, Inc; [\_\_\_\_]: [www.taco-hvac.com/#sle](http://www.taco-hvac.com/#sle).
  2. Primed steel body, tested and stamped in accordance with ASME BPVC-VIII-1 with integral bronze strainer, tangential flanged inlet and outlet connections, and internal stainless steel air collector tube.
  3. Maximum Service Flow and Pressure: 16 gpm at 125 psi.
  4. Full size of pipe, install as high as possible.

## 2.03 STRAINERS

- A. Manufacturers:
1. Armstrong International, Inc; [\_\_\_\_]: [www.armstronginternational.com/#sle](http://www.armstronginternational.com/#sle).
  2. Flexicraft Industries; [\_\_\_\_]: [www.flexicraft.com/#sle](http://www.flexicraft.com/#sle).
  3. Grinnell Products; [\_\_\_\_]: [www.grinnell.com/#sle](http://www.grinnell.com/#sle).
- B. Size 2 inch and Under:
1. Provide threaded, grooved, or sweat brass or iron body for up to 175 psi working pressure, Y-pattern strainer with 1/32 inch stainless steel perforated screen.
  2. Body Material by Fluid Service:
    - a. Cast Iron or Brass:
      - 1) Steam: Up to 250 psi at 450 degrees F.
      - 2) Liquids: Up to 400 psi at 150 degrees F.

## 2.04 BALANCING VALVES

- A. Manufacturers:
1. Armstrong International, Inc: [www.armstronginternational.com/#sle](http://www.armstronginternational.com/#sle).
  2. Bell & Gossett, a brand of Xylem, Inc: [www.bellgossett.com/#sle](http://www.bellgossett.com/#sle).
  3. Taco, Inc: [www.taco-hvac.com/#sle](http://www.taco-hvac.com/#sle).
- B. Size 2 inch and Smaller:
1. Provide ball or globe style with flow balancing, shut-off capabilities, memory stops, and minimum of two metering ports and female sweat, NPT threaded, press, or soldered connections.
  2. Metal construction materials consist of bronze or brass.
  3. Non-metal construction materials consist of Teflon, EPDM, or engineered resin.

## PART 3 EXECUTION

### 3.01 INSTALLATION

- A. Install specialties in accordance with manufacturer's instructions.
- B. Provide manual air vents at system high points and as indicated.
- C. Provide valved drain and hose connection on strainer blowdown connection.

**END OF SECTION**

## **SECTION 232123 HYDRONIC PUMPS**

### **PART 1 GENERAL**

#### **1.01 SECTION INCLUDES**

- A. Circulators.

#### **1.02 RELATED REQUIREMENTS**

- A. Section 230513 - Common Motor Requirements for HVAC Equipment.
- B. Section 230934 - Variable-Frequency Motor Controllers.
- C. Section 253500 - Integrated Automation Instrumentation and Terminal Devices for HVAC.

#### **1.03 REFERENCE STANDARDS**

- A. NEMA 250 - Enclosures for Electrical Equipment (1000 Volts Maximum) 2020.
- B. NEMA MG 1 - Motors and Generators 2021.
- C. NFPA 70 - National Electrical Code Most Recent Edition Adopted by Authority Having Jurisdiction, Including All Applicable Amendments and Supplements.
- D. UL 778 - Standard for Motor-Operated Water Pumps Current Edition, Including All Revisions.

#### **1.04 SUBMITTALS**

- A. See Section 013000 - Administrative Requirements for submittal procedures.
- B. Product Data: Provide certified pump curves showing performance characteristics with pump and system operating point plotted. Include NPSH curve when applicable. Include electrical characteristics and connection requirements.

#### **1.05 QUALITY ASSURANCE**

- A. Manufacturer Qualifications: Company specializing in manufacture, assembly, and field performance of pumps, with minimum three years of documented experience.

### **PART 2 PRODUCTS**

#### **2.01 MANUFACTURERS**

- A. Armstrong Fluid Technology, Inc; [\_\_\_\_\_]: [www.armstrongfluidtechnology.com/#sle](http://www.armstrongfluidtechnology.com/#sle).
- B. Bell & Gossett, a Xylem Inc. brand; [\_\_\_\_\_]: [www.bellgossett.com/#sle](http://www.bellgossett.com/#sle).
- C. Taco.

#### **2.02 GENERAL**

- A. Provide pumps that operate at specified system fluid temperatures without vapor binding and cavitation, are non-overloading in parallel or individual operation, and operate within 25 percent of midpoint of published maximum efficiency curve.
- B. Electrical Requirements:
  - 1. Listed and classified by UL or testing agency acceptable to authority having jurisdiction as suitable for the purpose specified and indicated.
  - 2. Variable Frequency Drives (VFDs): Provide in accordance with Section 230934, except for integral-VFDs.
  - 3. Enclosures: Provide unspecified product(s) required to fit motor:

#### **2.03 CIRCULATORS**

- A. Horizontal shaft, single-stage pump with direct connected, resilient-mount, oil lubricated motor for discharge pressures of up to 125 psi.
- B. Casing: Cast iron, with flanged pump connections.
- C. Impeller: Non-ferrous keyed to shaft.
- D. Bearings: Oil-lubricated bronze sleeve.
- E. Shaft: Alloy steel with bronze sleeve, integral thrust collar.



- F. Seal: Mechanical seal, 225 degrees F maximum continuous duty temperature.
- G. Drive: Flexible coupling.
- H. Electrical:
  - 1. Fractional hp.
  - 2. 120 VAC, single phase, 60 Hz.
  - 3. Sized and selected by boiler manufacturer.
  - 4. Motor: 1,750 rpm unless indicated otherwise; see Section 230513.
  - 5. Wiring Terminations: Provide terminal lugs to match branch circuit conductor quantities, sizes, and materials indicated. Enclose terminal lugs in terminal box sized to NFPA 70.

## **PART 3 EXECUTION**

### **3.01 INSTALLATION**

- A. Install in accordance with manufacturer's instructions.
- B. Provide access space around pumps for service. Provide no less than minimum space recommended by manufacturer.
- C. Decrease from line size with long radius reducing elbows or reducers. Support piping adjacent to pump such that no weight is carried on pump casings. For close-coupled or base-mounted pumps, provide supports under elbows on pump suction and discharge line sizes 4 inches and over.
- D. Controls Human-Machine Interface (HMI): HVAC operator terminal; see Section 253500.

### **3.02 SCHEDULES**

- A. Pumps:
  - 1. Manufacturer:
  - 2. Model:
  - 3. Seal Type:
  - 4. Flow Capacity:
  - 5. Head Pressure:
  - 6. Motor Size:

**END OF SECTION**

**SECTION 235100  
BREECHINGS, CHIMNEYS, AND STACKS**

**PART 1 GENERAL**

**1.01 SECTION INCLUDES**

- A. Manufactured breechings.
- B. Double wall metal stacks.
- C. Special gas venting.

**1.02 RELATED REQUIREMENTS**

- A. Section 078400 - Firestopping.

**1.03 REFERENCE STANDARDS**

- A. ANSI Z223.1 - National Fuel Gas Code 2021.
- B. ASME B31.9 - Building Services Piping 2020.
- C. NFPA 54 - National Fuel Gas Code 2021.
- D. NFPA 82 - Standard on Incinerators and Waste and Linen Handling Systems and Equipment 2019.
- E. NFPA 211 - Standard for Chimneys, Fireplaces, Vents, and Solid Fuel-Burning Appliances 2019.
- F. SMACNA (DCS) - HVAC Duct Construction Standards Metal and Flexible 2021.
- G. UL 441 - Standard for Gas Vents Current Edition, Including All Revisions.
- H. UL 1738 - Standard for Venting Systems for Gas-Burning Appliances, Categories II, III, and IV Current Edition.

**1.04 DEFINITIONS**

- A. Breeching: Vent connector.
- B. Vent: That portion of a venting system designed to convey flue gases directly outdoors from a vent connector or from an appliance when a vent connector is not used.
- C. Vent Connector: That part of a venting system that conducts the flue gases from the flue collar of an appliance to a chimney or vent, and may include a draft control device.

**1.05 ADMINISTRATIVE REQUIREMENTS**

- A. Preinstallation Meeting: Conduct a preinstallation meeting one week prior to the start of the work of this section; require attendance by all affected installers.

**1.06 SUBMITTALS**

- A. See Section 013000 - Administrative Requirements for submittal procedures.
- B. Product Data: Provide data indicating factory built chimneys, including dimensional details of components and flue caps, dimensions and weights, electrical characteristics and connection requirements.
- C. Manufacturer's Instructions: Include installation instructions, and indicate assembly, support details, and connection requirements.
- D. Manufacturer's qualification statement.

**1.07 QUALITY ASSURANCE**

- A. Manufacturer Qualifications: Company specializing in manufacturing the type of products specified in this section, with minimum three years of documented experience.
- B. Installer Qualifications: Company specializing in performing the type of work specified in this section with minimum three years documented experience, and approved by manufacturer.

## **PART 2 PRODUCTS**

### **2.01 MANUFACTURERS**

- A. Breechings, Chimneys, and Stacks:
  - 1. DuraVent; DuraStack Pro (DIS2): [www.duravent.com/#sle](http://www.duravent.com/#sle).
  - 2. Metal-Fab, Inc; [ ]: [www.mtlfab.com/#sle](http://www.mtlfab.com/#sle).
  - 3. Z-Flex U.S. Inc; [ ]: [www.z-flex.com/#sle](http://www.z-flex.com/#sle).

### **2.02 BREECHINGS, CHIMNEYS, AND STACKS - GENERAL REQUIREMENTS**

- A. Regulatory Requirements:
  - 1. Comply with applicable codes for installation of natural gas burning appliances and equipment.
  - 2. Factory-built vents and chimneys used for venting natural draft appliances to comply with NFPA 211 and UL listed and labeled.

### **2.03 SPECIAL GAS VENTING (CATEGORY II, III, AND IV)**

- A. Single-Wall Special Gas Venting:
  - 1. Provide single-wall metal stacks, tested to UL 1738 and UL listed with positive pressure rating for use with building heating equipment; comply with NFPA 54.
  - 2. Fabricate with 28-gauge, 0.0156-inch 29-4C stainless steel minimum.
  - 3. Design, fabricate, and install gastight to prevent products of combustion from leaking into building. Securely connect inner joints and seal in accordance with manufacturer's instructions.
  - 4. Accessories, UL Labeled:
    - a. Ventilated Roof Thimble: Consists of roof penetration, vent flashing with spacers, and storm collar.
    - b. Rain/Stack Cap: Consists of conical rainshield with inverted cone for partial rain protection with low flow resistance.

## **PART 3 EXECUTION**

### **3.01 INSTALLATION**

- A. Install in accordance with manufacturer's instructions.
- B. Install in accordance with NFPA 54
- C. Install breechings with minimum of joints. Align accurately at connections, with internal surfaces smooth.
- D. Rigidly support breechings from building structure with suitable ties, braces, hangers and anchors to hold to shape and prevent buckling. Support vertical breechings, chimneys, and stacks at 12-foot spacing, to adjacent structural surfaces, or at floor penetrations. Refer to SMACNA (DCS) for equivalent duct support configuration and size.
- E. Pitch breechings with positive slope up from fuel-fired equipment to chimney or stack.
- F. Install firestopping to preserve fire resistance rating of partitions and other elements, using materials and methods specified in Section 078400.
- G. Assemble and install stack sections in accordance with NFPA 82, UL Listings, and industry practices. Join sections with acid-resistant joint cement. Connect base section to foundation using anchor lugs.
- H. Level and plumb chimney and stacks.
- I. Clean breechings, chimneys, and stacks during installation, removing dust and debris.
- J. At appliances, provide slip joints permitting removal of appliances without removal or dismantling of breechings, breeching insulation, chimneys, or stacks.

### **3.02 SCHEDULES**

**END OF SECTION**

**SECTION 235216  
CONDENSING BOILERS**

**PART 1 GENERAL**

**1.01 SECTION INCLUDES**

- A. Manufactured units.
- B. Boiler construction.
- C. Boiler trim.
- D. Fuel burning system.
- E. Factory installed controls.

**1.02 RELATED REQUIREMENTS**

- A. Section 232114 - Hydronic Specialties.
- B. Section 232123 - Hydronic Pumps.
- C. Section 235100 - Breechings, Chimneys, and Stacks.
- D. Section 260583 - Wiring Connections: Electrical characteristics and wiring connections.

**1.03 REFERENCE STANDARDS**

- A. AHRI Directory of Certified Product Performance - Air-Conditioning, Heating, and Refrigeration Institute (AHRI) Current Edition.
- B. AHRI 1500 - Performance Rating of Commercial Space Heating Boilers 2015.
- C. ANSI Z21.13 - American National Standard for Gas-Fired Low-Pressure Steam and Hot Water Boilers 2022.
- D. ASHRAE Std 90.1 I-P - Energy Standard for Buildings Except Low-Rise Residential Buildings Most Recent Edition Adopted by Authority Having Jurisdiction, Including All Applicable Amendments and Supplements.
- E. ASHRAE Std 135 - A Data Communication Protocol for Building Automation and Control Networks 2020, with Errata and Amendments (2022).
- F. ASME B16.5 - Pipe Flanges and Flanged Fittings: NPS 1/2 through NPS 24 Metric/Inch Standard 2020.
- G. ASME BPVC-IV - Boiler and Pressure Vessel Code, Section IV - Rules for Construction of Heating Boilers 2021.
- H. Modbus (PS) - The Modbus Organization Communications Protocol. Latest Update.
- I. NBBI Manufacturer and Repair Directory - The National Board of Boiler and Pressure Vessel Inspectors (NBBI) Current Edition.
- J. NFPA 54 - National Fuel Gas Code 2021.
- K. SCAQMD 1146.1 - Emissions of Oxides of Nitrogen from Small Industrial, Institutional, and Commercial Boilers, Steam Generators, and Process Heaters 1990, with Amendment (2018).

**1.04 ADMINISTRATIVE REQUIREMENTS**

- A. Preinstallation Meeting: Conduct a preinstallation meeting one week prior to the start of the work of this section; require attendance by all affected installers.
- B. Sequencing: Ensure that utility connections are achieved in an orderly and expeditious manner.

**1.05 SUBMITTALS**

- A. See Section 013000 - Administrative Requirements for submittals procedures.
- B. Product Data: Provide data indicating general assembly, components, controls, safety controls, and wiring diagrams with electrical characteristics and connection requirements, and service connections.

- C. Manufacturer's Installation Instructions: Indicate assembly, support details, connection requirements, and include start up instructions.
- D. Manufacturer's Field Reports: Burner manifold gas pressure, percent carbon monoxide (CO), percent oxygen (O), percent excess air, flue gas temperature at outlet, ambient temperature, net stack temperature, percent stack loss, percent combustion efficiency, and heat output.
  - 1. Indicate compliance with specified performance and efficiency.
  - 2. Provide results of the following combustion tests:
    - a. Boiler firing rate.
    - b. Over fire draft.
    - c. Burner manifold gas pressure.
    - d. Percent carbon monoxide.
    - e. Percent oxygen.
    - f. Percent excess air.
    - g. Flue gas temperature at outlet.
    - h. Ambient temperature.
    - i. Net stack temperature.
    - j. Percent combustion efficiency.
- E. Operation and Maintenance Data: Include manufacturer's descriptive literature, operating instructions, cleaning procedures, replacement parts list, and maintenance and repair data.
- F. Warranty: Submit manufacturer warranty and ensure forms have been completed in Owner's name and registered with manufacturer.

#### **1.06 QUALITY ASSURANCE**

- A. Manufacturer Qualifications: Company specializing in manufacturing the type of products specified in this section, with minimum three years of documented experience.

#### **1.07 DELIVERY, STORAGE, AND HANDLING**

- A. Protect boilers from damage by leaving factory inspection openings and shipping packaging in place until final installation.

#### **1.08 WARRANTY**

- A. See Section 017800 - Closeout Submittals for additional warranty requirements.
- B. Provide a five year warranty to include coverage for the heat exchanger.

### **PART 2 PRODUCTS**

#### **2.01 MANUFACTURERS**

- A. Modular Condensing Hot Water Boiler for Indoor Applications:
  - 1. Lochinvar LLC; [\_\_\_\_\_]: [www.lochinvar.com/#sle](http://www.lochinvar.com/#sle).
  - 2. Weil McClain.
  - 3. Fulton Companies

#### **2.02 MANUFACTURED UNITS**

- A. Factory assembled, factory fire-tested, self-contained, readily transported unit ready for automatic operation except for connection of water, fuel, electrical, and vent services.
- B. Unit: Metal membrane wall, water or fire tube, condensing boiler on integral structural steel frame base with integral fuel burning system, firing controls, boiler trim, insulation, and removable jacket, suitable for indoor application.
- C. Electrical Characteristics:
  - 1. 8.5 rated load amperes.
  - 2. 120 VAC, single phase, 60 Hz.
- D. Stainless Steel Heat Exchangers
- E. Commerical Duty
- F. Number and Capacity listed on drawings

- G. Factory Inter communication between boilers for efficient staging with out the need for the building management system to stage or set firing rates of boilers.
- H. BacNET or Modbus card providing system data unique to the boiler system including alarms.
- I. Minimum 5:1 turn down firing rate on each boiler.
- J. Number and capacity listed on construction drawings

### **2.03 BOILER CONSTRUCTION**

- A. Comply with the minimum requirements of ASME BPVC-IV and ANSI Z21.13 for construction of boilers.
- B. Assembly to bear the ASME "H" stamp and comply with the efficiency requirements of the latest edition of ASHRAE Std 90.1 I-P.
- C. Required Directory Listings:
  - 1. AHRI Directory of Certified Product Performance - Air-Conditioning, Heating, and Refrigeration Institute (AHRI); current edition at [www.ahrinet.org](http://www.ahrinet.org).
  - 2. NBBI Manufacturer and Repair Directory - The National Board of Boiler and Pressure Vessel Inspectors (NBBI); current edition at [www.nationalboard.org](http://www.nationalboard.org).
- D. Heat Exchanger: Construct with materials that are impervious to corrosion where subject to contact with corrosive condensables.
- E. Provide adequate tappings, observation ports, removable panels, and access doors for entry, cleaning, and inspection.
- F. Insulate casing with insulation material, protected and covered by heavy-gauge metal jacket.
- G. Factory apply boiler base and other components, that are subject to corrosion, with durable, painted finish.

### **2.04 BOILER TRIM**

- A. ASME rated pressure relief valve 75 psig
- B. Flow switch.
- C. Electronic Low Water Cut-off: Complete with test light and manual reset button to automatically prevent firing operation whenever boiler water falls below safe level.
- D. Temperature and pressure gauge.
- E. Pressure Switches:
  - 1. High gas pressure.
  - 2. Low gas pressure.
  - 3. Air pressure.
- F. Manual reset high limit.
- G. Boiler Pump (where required by boiler design):
  - 1. Primary pump, factory supplied and sized for field installation to ensure minimum, continuous circulation through boiler.
  - 2. Where pump is not provided by boiler manufacturer, provide pump in accordance with boiler manufacturer's recommendations.
  - 3. Pump time delay.

### **2.05 FUEL BURNING SYSTEM**

- A. Provide forced draft automatic burner or pulse combustion, integral to boiler, designed to burn natural gas, and maintain fuel-air ratios automatically.
  - 1. Blower Design: Statically and dynamically balanced to supply combustion air; direct connected to motor.
  - 2. Forced Draft Design: Mixes combustion air and gas to achieve 90 percent combustion efficiency.
  - 3. Pulse Combustion Design: Self-aspirating, not requiring blower for combustion.
  - 4. Combustion Air Filter: Protects fuel burning system from debris.

- B. Gas Train: Plug valve, safety gas valve, gas-air ratio control valve, and pressure regulator controls air and gas mixture.
- C. Emission of Oxides of Nitrogen Requirements: Comply with SCAQMD 1146.1 for natural gas fired system, as applicable.
- D. Intakes: Combustion air intake capable of accepting free mechanical room air or direct outside air through a sealed intake pipe.

## **2.06 FACTORY INSTALLED CONTROLS**

- A. Option for internal or external (0-10) VDC control.
- B. Temperature Controls:
  - 1. Automatic reset type to control fuel burning system firing rate to maintain temperature.
  - 2. Manual reset type to control fuel burning system to prevent boiler water temperature from exceeding safe system water temperature.
  - 3. Low-fire start time delay relay.
- C. Electronic PI setpoint/modulation control system.
- D. Microprocessor-based, fuel/air mixing controls.
- E. BAS, SCADA, or other Integrated Automation Link: ASHRAE Std 135 BACnet MS/TP.
  - 1. External Point Mapping: Provide mapping table for each parameter included in the local visual interface with software-toggle flag to allow reduced mapping of available points.

## **PART 3 EXECUTION**

### **3.01 INSTALLATION**

- A. Install in accordance with manufacturer's instructions.
- B. Install boiler and provide connection of natural gas service in accordance with requirements of NFPA 54 and applicable codes.
- C. Install Boiler on wall and provide with condensate neutralizing system. Connect with CPVC to nearest floor drain.
- D. Factory start up
- E. Pipe cooled condensate produced by the combustion process from the boiler condensate connection and/or flue stack with suitable piping material to neutralizer prior to discharging into nearest floor drain.
- F. Install primary boiler pump in accordance with Section 232123.
- G. Provide piping connection and accessories in accordance with Section 232114.
- H. Provide for connection to electrical service in accordance with Section 260583.
- I. Connect vent combustion generated fumes to breeching, chimney or exhaust stack; see Section 235100.

### **3.02 CLOSEOUT ACTIVITIES**

- A. Demonstrate proper operation of equipment to Owner's designated representative.
- B. Provide a factory start up and complete functional report showing proper gas pressures, temperatures and water flow rates in accordance with manufacturer's rated performance. Report any deficiencies in operation to the owner, engineer and the general contractor.
- C. Demonstration: Demonstrate operation of system to Owner's personnel.
  - 1. Use operation and maintenance data as reference during demonstration.
  - 2. Briefly describe function, operation, and maintenance of each component.
- D. Training: Train Owner's personnel on operation and maintenance of system.
  - 1. Use operation and maintenance manual as training reference, supplemented with additional training materials as required.
  - 2. Provide minimum of two hours of training.
  - 3. Location: At project site.

### **3.03 SCHEDULES**

- A. Condensing Boilers:
  - 1. Manufacturer:
  - 2. Model:
  - 3. Fuel:
  - 4. Input at Sea Level:
  - 5. Working Pressure:
  - 6. Primary Boiler Pump (Where applicable):

**END OF SECTION**



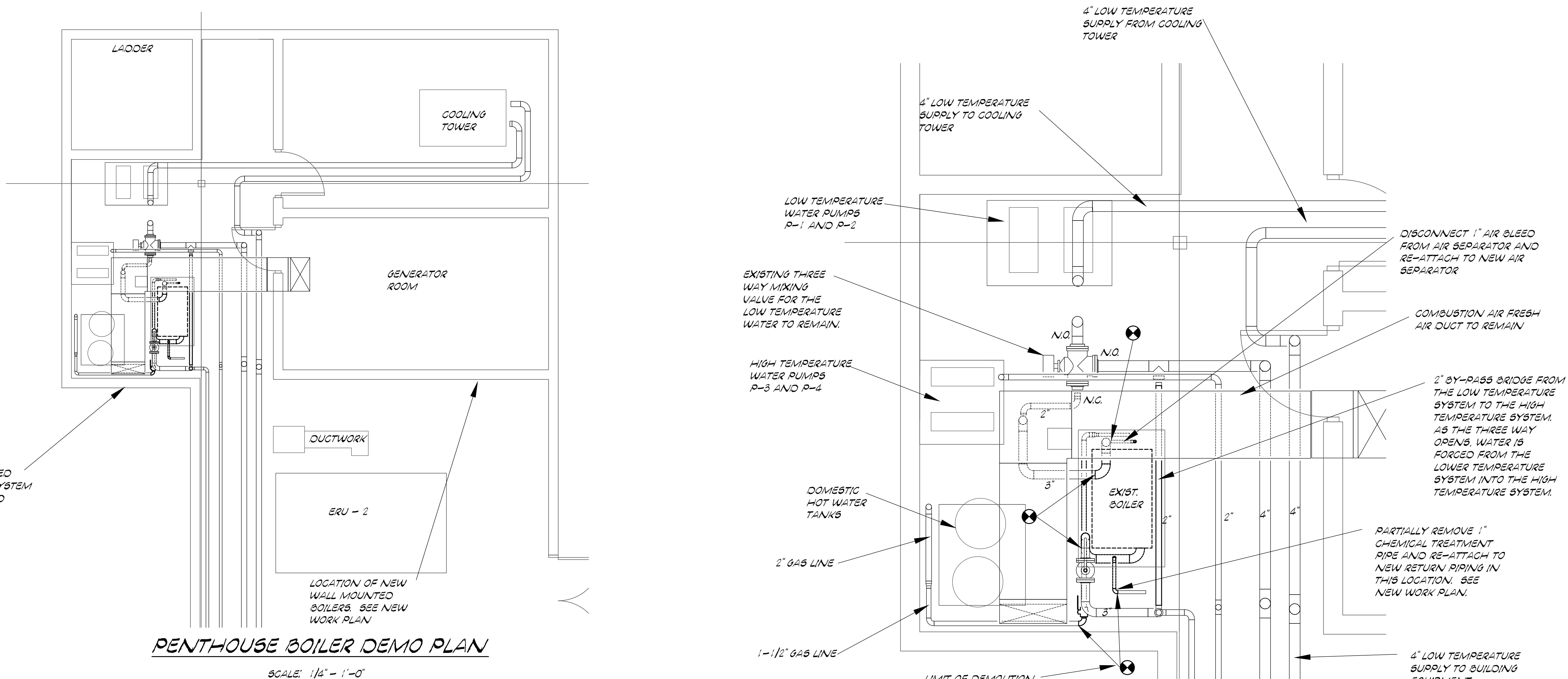
CONSULTANTS



**BOILER REPLACEMENT**

OWNER

**POLICE HEADQUARTERS**  
112 MYSTIC STREET  
ARLINGTON, MA 02474



**PENTHOUSE BOILER DEMO PLAN**

SCALE: 1/4" = 1'-0"

**ENLARGED PENHOUSE BOILER DEMO PLAN**

SCALE: 1/2" = 1'-0"

**GENERAL NOTES:**

- ADDITIONAL SPECIFICATIONS ARE INCLUDED AS SEPARATE DOCUMENTS TO THESE DRAWINGS AND ARE PART OF THIS CONTRACT DRAWING SET.
- ALL WORK SHALL BE COORDINATED WITH ALL OTHER TRADES BEFORE ANY INSTALLATION MAY BE DONE.
- WORK IS SHOWN DIAGRAMATICALLY. EXACT SIZE AND LOCATION OF COILS, DAMPERS AND FILTER RACKS NEED TO BE FIELD VERIFIED BEFORE ORDERING. EXACT LOCATION OF VAV BOXES NEEDS TO BE VERIFIED AND COORDINATED.
- THE PREMISES SHALL BE KEPT CLEAN OF ALL CONSTRUCTION DEBRIS AT ALL TIMES. DAILY CLEAN UP WILL BE REQUIRED AT THE END OF EACH SHIFT. THE PROJECT SITE WILL BE LEFT BROOM CLEAN AT END OF PROJECT.
- ANY EQUIPMENT, PIPING OR EXISTING BUILDING CONSTRUCTION DAMAGED DURING THE PROCESS OF THIS WORK WILL BE REPAIRED OR REPLACED TO ITS ORIGINAL CONDITION TO THE OWNER'S SATISFACTION AT NO ADDITIONAL COST TO THE OWNER.
- EQUIPMENT LISTED IN THIS BID PACKAGE IS THE BASIS OF DESIGN. OTHER EQUIPMENT CAN BE PROVIDED AS LONG AS IT MEETS THE REQUIREMENTS OF THESE DRAWINGS AND SPECIFICATIONS.
- THE INTENT OF THIS PROJECT IS TO REMOVE AN OLD GAS BOILER HEATING SYSTEM AND TO REPLACE IT WITH 3 NEW CONDENSING BOILERS. THE INTENT OF THE THREE BOILERS IS TO KEEP THEM SMALL FOR WALL MOUNTING. NO CONCRETE HOUSE KEEPING PADS. THEY MUST HAVE STAINLESS STEEL HEAT EXCHANGERS. MUST BE CONDENSING BOILERS. MUST TALK TO EACH OTHER AND MODULATE HEATING CAPACITY WITHOUT BEING CONNECTED TO THE BUILDING CONTROL SYSTEM. MUST BE A PRIMARY LOOP HEATING SYSTEM TIED INTO THE SECONDARY HIGH TEMPERATURE LOOP. THEY MUST BE COMMERCIAL BOILER RATED.

**SEQUENCE OF OPERATION:**

- THIS HEATING SYSTEM IS A TWO TEMPERATURE SYSTEM. THE HIGH TEMPERATURE LOOP IS USED IN CONVENTIONAL HEATING UNITS SUCH AS UNIT HEATERS AND BASEBOARD, WHILE THE LOW TEMPERATURE LOOP IS USED FOR HEAT PUMPS.
- THE WATER FOR THE LOW TEMPERATURE SYSTEM CIRCULATES IN A CONTINUOUS LOOP THROUGH THE EXISTING THREE-WAY MIXING VALVE, INTO THE LOW TEMPERATURE PUMPS, THEN THROUGH THE COOLING TOWER.
- THE HIGH TEMPERATURE BOILER SYSTEM FEEDS INTO THE LOW TEMPERATURE SYSTEM THROUGH THE THREE WAY VALVE. AS WATER FLOWS INTO THE THREE WAY VALVE, WATER FLOWS OUT OF THE LOW TEMPERATURE SYSTEM BACK INTO THE HIGH TEMPERATURE SYSTEM THROUGH A 2" BY-PASS. AS A RESULT OF AGE AND VERY LOW FLOW RATES, THE EXISTING THREE WAY CONTROL VALVE IS LEAKING HOT WATER INTO THE LOW TEMPERATURE LOOP. A NEW 2", FULL PORT, 24 VOLT, SOLENOID CONTROL VALVE, CV-1 WILL BE INSTALLED IN THE 2" BY-PASS LINE. WHEN THE THREE WAY VALVE IS CLOSED, THE SOLENOID VALVE WILL CLOSE. WHEN THE THREE WAY VALVE IS OPEN THE 2" SOLENOID VALVE WILL OPEN.
- THE LEAD BOILER, B-1 WILL BE STARTED AND STOPPED THROUGH THE EXISTING BOILER START RELAY. THE EXISTING OUTDOOR RESET TEMPERATURES WILL BE REUSED FROM THE EXISTING CONTROL STRATEGY.
- THE EXISTING WATER TEMPERATURE SENSORS WILL REMAIN AND BE USED TO CONTROL BOILER OPERATION.
- A NEW COMMUNICATION PANEL WILL BE INSTALLED TO TALK TO THE BOILERS THROUGH THEIR COMMUNICATION PORT. THE BOILER MANUFACTURER WILL PROVIDE AN INTERFACE PANEL FOR EACH BOILER TO TALK TO THE POLICE STATIONS EXISTING BUILDING MANAGEMENT SYSTEM.
- ONCE STARTED, THE BOILERS WILL TALK TO EACH OTHER THROUGH THEIR CONNECTED CONTROL WIRING (OUTSIDE OF THE BUILDING MANAGEMENT SYSTEM) AND MODULATE THEIR FIRING RATES TO MEET THE DESIGN WATER TEMPERATURES.
- NEW WALL MOUNTED TEMPERATURE SENSORS, T1 AND T2 WILL BE WIRED BACK TO B-1 TO PROVIDE TEMPERATURE INPUTS TO ITS INTERNAL CONTROL SYSTEM.
- BOILERS B-1, B-2 AND B-3 WILL OPTIMIZE THEIR FIRING RATES USING ITS OWN INTERNAL CONTROL LOGIC TO RUN EACH BOILER AT PART LOAD TO ACHIEVE THE HIGHEST COMBUSTION EFFICIENCY.
- THESE BOILERS WILL ALSO PROVIDE POWER TO THEIR ASSOCIATED CIRCULATION PUMP. IF REQUIRED BY THE BOILER MANUFACTURER, PROVIDE A FLOW SWITCH IN THE PRIMARY LOOP TO INDICATE PRIMARY PUMP IS RUNNING FOR EACH BOILER SO THE BOILER KNOWS IT HAS FLOW.
- ERROR CODES AND ALARMS WILL BE SENT VIA THE INTERFACE PANEL TO THE BUILDING MANAGEMENT SYSTEM IF HEATING FAILURE OCCURS.
- A NEW GRAPHICAL USER INTERFACE WILL BE CREATED TO SHOW THE NEW PIPING AND BOILER ARRANGEMENT IN THE BUILDING MANAGEMENT SYSTEM.
- AT A MINIMUM, THE NEW GRAPHIC WILL SHOW THE FOLLOWING:
  - FIRING RATES OF EACH BOILER
  - SUPPLY AND RETURN WATER TEMPERATURE READ BY THE BOILERS
  - PUMP ACTIVATION ON/OFF
  - PUMP AND BOILER FAILURE

**GENERAL DEMOLITION NOTES:**

- REMOVE BOILER, FLUE PIPING, (BOTH 6" AND 14" FLUE), GAS PIPING, HIGH AND LOW VOLTAGE ELECTRICAL, 3" SUPPLY, 3" RETURN (TO EXISTING 3" SHUT OFF) AND 1" CHEMICAL FEED PIPING TO RETURN LINE. ALL CONDUITS, HANGERS AND SUPPORTS ARE TO BE REMOVED. THE REMAINING HOUSE KEEPING PAD SHOULD BE CLEAR OF ALL ASSOCIATED BOILER ACCESSORIES. OVERHEAD WILL BE CLEARED OF ALL SUPPORT ITEMS THAT ARE ASSOCIATED WITH THE REMOVED PIPING AND EQUIPMENT.
- FLUE PIPING TO BE REMOVED BACK THE THE VERTICAL STACK AND CARPED. THE 14" VERTICAL STACK AND THE 4" FLUE PIPING TO THE EXISTING DOMESTIC HOT WATER HEATERS ARE TO REMAIN. ANY DAMAGE TO THAT FLUE SYSTEM DURING DEMOLITION WILL NEED TO BE REPAIRED BY THIS CONTRACTOR.

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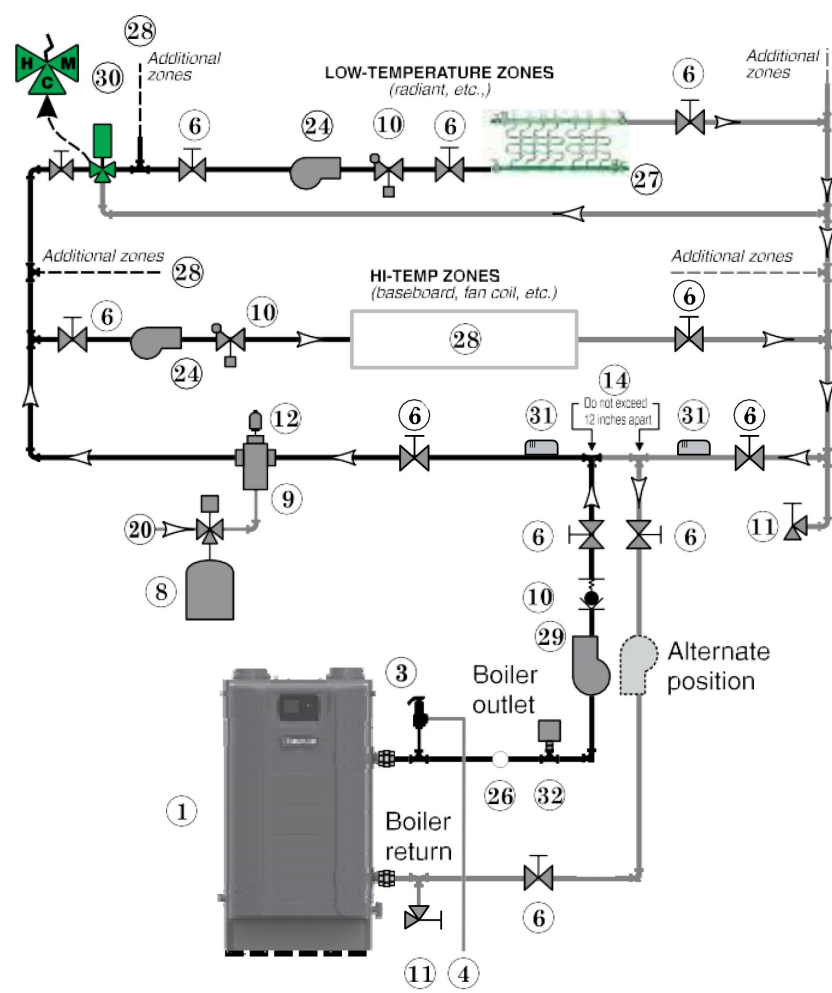
CONSULTANTS



**BOILER REPLACEMENT**

OWNER

**POLICE HEADQUARTERS**  
 112 MYSTIC STREET  
 ARLINGTON, MA 02474

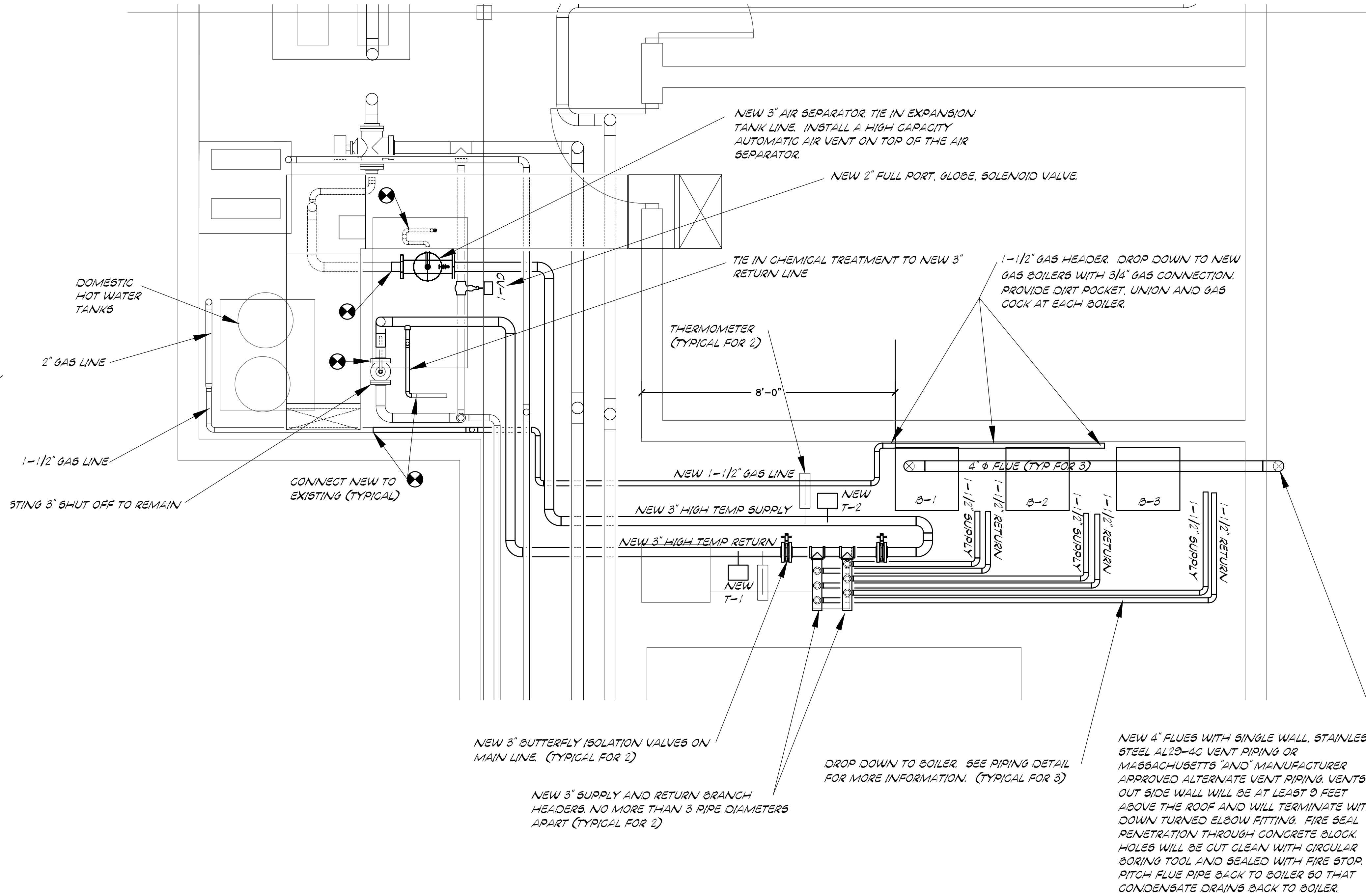


**NOTES FOR BOILER PIPING DETAIL**

1. NEW WALL-MOUNTED HOT WATER BOILER WITH NEUTRALIZING GRAVITY CONDENSATE PACKAGE PIPED TO DRAIN WITH FULL SIZE CPVC PIPING
3. RELIEF VALVE, SUPPLIED WITH BOILER, FIELD PIPED - MUST BE PIPED TO BOILER SUPPLY CONNECTION
4. NEW RELIEF VALVE PIPING TO 6" ABOVE FLOOR
6. NEW ISOLATION BALL VALVES
8. EXISTING EXPANSION TANK, DIAPHRAGM TYPE
9. NEW AIR SEPARATOR
10. NEW FLOW/CHECK VALVES OR SPRING CHECK
11. NEW PURGE/DRAIN VALVES (ONE DRAIN VALVE SHIPPED LOOSE WITH BOILER)
12. NEW AUTO AIR VENT
14. NEW PRIMARY/SECONDARY CONNECTION (TEES NO MORE THAN 12 INCHES APART). SEE PLAN FOR MULTIPLE BOILERS
16. NOT SHOWN, NEW 1-1/2" Y-STRAINER WITH BLOW DOWN VALVE ON BOILER INLET AFTER SHUT OFF
19. NOT SHOWN, NEW 1-1/2" BALANCING VALVE ON HOT WATER RETURN
20. EXISTING MAKE-UP WATER SUPPLY - TO REMAIN AND REUSE BACKFLOW PREVENTERS, PRESSURE-REDUCING VALVES, AND FILL VALVES
24. EXISTING ZONE PUMPS FOR REFERENCE ONLY
26. NEW PRESSURE/TEMPERATURE GAUGE, SUPPLIED WITH BOILER, FIELD PIPED FOR REFERENCE ONLY HEATING CIRCUITS
28. ADDITIONAL HEATING CIRCUITS FOR REFERENCE ONLY
29. BOILER CIRCULATOR, PROVIDED WITH BOILER, SIZED BY MANUFACTURER
30. MIXING DEVICE, SHOWN FOR REFERENCE ONLY
31. SYSTEM SUPPLY AND RETURN TEMPERATURE WELL SENSORS: WELLS INSTALLED BY A PIPING CONTRACTOR, AT LEAST 6 PIPE DIAMETERS (BUT NO MORE THAN 3 FEET) FROM BOILER CONNECTION TEES
32. LOW WATER CUT-OFF, PROVIDED BY THE CONTRACTOR

**NEW BOILERS PIPING DETAIL**

SCALE: NONE



**NEW BOILERS & HEAT EXCHANGER PLAN**

SCALE: 1/2" = 1'-0"

**BOILER SCHEDULE**

NO.	AREA SERVED	MAKE	MODEL	INPUT MBH	OUTPUT MBH, DOE	FLUE OUT	WATER SUPPLY	WATER RETURN	GAS CONN	MIN GAS IN, H2O	MAX GAS IN, H2O	VOLT / PHASE	AMPS	APPROX * WEIGHT	NOTES
B-1	ENTIRE BUILDING	WEIL MCCLAIN	EVERGREEN EVG 299	299	280	4"	1-1/2"	1-1/2"	3/4"	5	14	120/1	8.4	260	1 TO 7
B-2	ENTIRE BUILDING	WEIL MCCLAIN	EVERGREEN EVG 299	299	280	4"	1-1/2"	1-1/2"	3/4"	5	14	120/1	8.4	260	1 TO 7
B-3	ENTIRE BUILDING	WEIL MCCLAIN	EVERGREEN EVG 299	299	280	4"	1-1/2"	1-1/2"	3/4"	5	14	120/1	8.4	260	1 TO 7

**NOTES:**

1. INSTALL PER MANUFACTURER'S RECOMMENDATIONS
2. PROVIDE ALL FITTINGS AS CALLED OUT IN THE BOILER DETAIL DRAWING
3. WALL MOUNT BOILER
4. PROVIDE CONDENSATE NEUTRALIZING KIT RATED FOR BOILER MAX OUTPUT, ONE KIT CAN BE USED FOR ALL THREE BOILERS. PROVIDE CONDENSATE ISOLATION VALVES. SECURE CONDENSATE DRAIN TO FLOOR AND RUN TO FLOOR DRAIN NEAR ERU-1. DRAINS TO BE CPVC, 3/4" MINIMUM. ALL DRAINS AND NEUTRALIZING KIT TO BE INSTALL IN SUCH A WAY THAT THE CONDENSATE DRAINS UNDER GRAVITY AT A PITCH OF 1/8" PER FOOT TO DRAIN. MATCH EXISTING MOUNTING HARDWARE FOR DRAIN SUPPORT SIMILAR TO SUPPORT FOR ERU-2 CONDENSATE DRAIN. (ERU=ENERGY RECOVERY UNIT).
5. BOILER CIRCULATING PUMP FOR THE PRIMARY WATER LOOP TO BE SIZED AND PROVIDED BY THE BOILER MANUFACTURER. THE POWER FOR THE PUMP WILL COME FROM THE BOILER. THE BOILER DISCONNECT SWITCH WILL BE USED AS THE PUMP DISCONNECT SWITCH. THE BOILER ELECTRICAL CONNECTED LOAD WITH PUMP WILL NOT EXCEED 16 AMPS PER BOILER.
6. COMBUSTION AIR INTAKE WILL BE FROM ROOM AIR AND THE EXISTING COMBUSTION AIR DUCTWORK
7. PROVIDE WITH MOBUS COMMUNICATION FOR FUTURE TIE INTO BUILDING MANAGEMENT SYSTEM

NA	02/28/23	ISSUED FOR BID
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**PENTHOUSE NEW WORK PLAN**





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CONSULTANTS



**BOILER REPLACEMENT**

OWNER

**POLICE HEADQUARTERS**  
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MARK	DATE	DESCRIPTION
1	02/22/2023	FOR CONSTRUCTION

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 CAD DWG FILE: L22040 E001.DWG  
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**ELECTRICAL  
 LEGEND AND GEN. NOTES**

E001  
 SHEET 1 OF 4

**GENERAL ELECTRICAL DEMOLITION NOTES**

- EXISTING EQUIPMENT AND DEVICES INDICATED ON THE CONTRACT DOCUMENTS ARE NOT "AS BUILT". INFORMATION SHOWN WAS OBTAINED FROM EXISTING DRAWINGS, WHICH ARE NOT "AS BUILT", AND GENERAL ENGINEERING FIELD OBSERVATIONS. THE ELECTRICAL CONTRACTOR (EC) MUST VISIT THE SITE IN ORDER TO DETERMINE THE ACTUAL EXISTING BUILDING CONDITIONS WHICH MAY AFFECT THEIR BIDDING. FAILURE TO PERFORM THE SITE VISIT WILL RESULT IN NO EXTRA COMPENSATION FOR ANY ADDITIONAL WORK REQUIRED TO OVERCOME EXISTING CONDITIONS, EXCEPT FOR CONCEALED CONDITIONS THAT COULD ONLY BE OBSERVED BY PERFORMING SOME LEVEL OF DEMOLITION.
- THE EC SHALL PERFORM THE ELECTRICAL DEMOLITION WORK IN COOPERATION WITH THE OTHER TRADES AND MEET THE SCHEDULE AND PHASING PLAN APPROVED BY THE GENERAL CONTRACTOR (GC). CONFLICTS BETWEEN EXISTING ELECTRICAL CONDITIONS AND THE INSTALLATION OF NEW WORK OF ANY TRADE SHALL BE BROUGHT TO THE ATTENTION OF THE GC FOR RESOLUTION PRIOR TO PROCEEDING WITH THE WORK.
- DEMOLITION WORK MUST BE PROVIDED IN STRICT ACCORDANCE WITH THE NATIONAL/STATE ELECTRICAL CODES AND ALL LOCAL CODES.
- SYSTEMS MUST REMAIN "ON-LINE" AND SHUT-DOWNS MUST BE MINIMIZED AS MUCH AS POSSIBLE. HOWEVER, EC MUST DE-ENERGIZE ALL FEEDERS AND BRANCH CIRCUITS SERVING EQUIPMENT TO BE REMOVED AND PROVIDE OSHA APPROVED "LOCKOUT-TAGOUT" HARDWARE AT THEIR POWER SOURCE BREAKER OR DISCONNECT SWITCHES. WORKING WITH EXPOSED LIVE UNGROUNDED CONDUCTORS WILL NOT BE ALLOWED. IF SHUT-DOWNS AFFECT AREAS OUTSIDE THE SCOPE OF THE CONTRACT DOCUMENTS, THEY SHALL BE COORDINATED WITH THE BUILDING MANAGEMENT STAFF. ANY PRIME TIME REQUIRED TO PERFORM ELECTRICAL DEMOLITION WORK OR NEW ELECTRICAL WORK SHALL BE CARRIED AS PART OF THE ELECTRICAL CONTRACT COST.
- EC MUST FIELD SURVEY AND SELECTIVELY DEMOLISH OR REVISE THE EXISTING ELECTRICAL POWER DISTRIBUTION EQUIPMENT AND WIRING, WHETHER OR NOT FULLY INDICATED ON THE ELECTRICAL CONSTRUCTION DOCUMENTS. SURVEY MUST INCLUDE LOCATING, FIELD-TRACING AND DOCUMENT ALL CONDUITS AND/OR WIRING, INCLUDING THEIR ENDPOINTS, TO MINIMIZE ANY DISRUPTION OF SERVICES DUE TO ACCIDENTAL CUTTING DURING ELECTRICALLY ASSOCIATED DEMOLITION WORK.
- LOCATIONS OF EXISTING EQUIPMENT ARE SHOWN IN THEIR APPROXIMATE LOCATION. EC SHALL DETERMINE THE EXACT LOCATION OF ALL EXISTING EQUIPMENT PRIOR ANY DEMOLITION WORK AND AGREES TO BE RESPONSIBLE FOR ANY AND ALL DAMAGES WHICH MIGHT BE OCCASIONED BY THEIR FAILURE TO EXACTLY LOCATE AND PROTECT SUCH EQUIPMENT.
- EC MAY REUSE EXISTING BRANCH CIRCUIT WIRING IF FOUND TO BE IN GOOD WORKING CONDITIONS AND INSTALLED IN A CURRENT CODE COMPLIANT MANNER. EC MUST SURVEY AND TEST THE WIRING IN QUESTION IN ORDER TO DETERMINE IF THEIR WORKING CONDITIONS ARE SATISFACTORY.
- ALL EXISTING CONDUIT/WIRING AND JUNCTION BOXES NOT BEING REUSED SHALL BE REMOVED, INCLUDING BLANK PLATE DEVICE BOXES. CONDUIT TURNING UP FROM CONCRETE FLOORS IN WALLS BEING REMOVED SHALL BE CUT FLUSH WITH FLOORS. CUT RACEWAY SHALL BE GROUTED BY THE GENERAL CONTRACTOR.
- ALL EXISTING ELECTRICAL EQUIPMENT, DEVICES OR WIRING NOT INDICATED ON THE CONSTRUCTION DOCUMENTS SHALL REMAIN UNLESS THE AREA IS TO BE REVISED ONLY TO THE EXTENT SHOWN ON THE CONTRACT DRAWINGS AND SHALL BE LEFT IN SATISFACTORY OPERATING CONDITION.
- ALL WIRING FEEDING AREAS THAT ARE NOT PART OF THIS CONTRACT SHALL ONLY BE INTERRUPTED BY PERMISSION AND SCHEDULING WITH THE OWNER'S REPRESENTATIVE.
- ADEQUATE ACCESS SHALL BE PROVIDED FOR ALL NEW OR RELOCATED EQUIPMENT, JUNCTION OR PULL BOXES AS REQUIRED BY TO COMPLY WITH THE ELECTRICAL CODES.
- ALL EXISTING FIXTURES, SWITCHES AND DEVICES SHALL BE DEMOLISHED AND REMOVED AS INDICATED ON DRAWINGS INCLUDING WIRES, BOXES AND RACEWAYS. AFFECTED WALLS AND CEILINGS MUST BE REPATCHED AND REFINISHED BY GC.
- EC SHALL PROPERLY DISPOSE ANY DEVICE OR EQUIPMENT CONTAINING HAZARDOUS MATERIALS (I.E. MERCURY IN FLUORESCENT LAMPS, PCB IN BALLAST AND AND OIL FILLED TRANSFORMERS, ETC.).
- EC SHALL REVISE THE EXISTING AFFECTED PANELBOARD'S POWER AND LIGHTING BRANCH CIRCUITS AND CLEARLY MARK AS "SPARE" ANY CIRCUIT THAT BECOMES UNUSED AFTER DEMO WORK.

**GENERAL ELECTRICAL CONSTRUCTION NOTES**

- ELECTRICAL INSTALLATION SHALL MEET THE REQUIREMENTS OF THE NATIONAL, STATE AND LOCAL CITY ELECTRICAL CODES AS WELL AS IN ACCORDANCE WITH THE LOCAL ELECTRICAL INSPECTOR REQUIREMENTS. THE ELECTRICAL CONTRACTOR (EC) SHALL COORDINATE ALL ELECTRICAL INSPECTOR REQUIREMENTS PRIOR TO ANY CONSTRUCTION.
- EC SHALL OBTAIN ALL ELECTRICAL PERMITS AND INSPECTIONS, INCLUDING COVERING FOR ANY COSTS ASSOCIATED WITH THEM.
- ALL ELECTRICAL MATERIAL SHALL BE OF THE HIGHEST QUALITY SPECIFICATION GRADE AND UL LISTED. THE ELECTRICAL CONTRACTOR SHALL SUBMIT ALL ELECTRICAL MATERIAL SHOP DRAWINGS TO THE ENGINEER FOR REVIEW AND ACCEPTABILITY PRIOR TO INSTALLATION.
- ALL ELECTRICAL CONSTRUCTION SHALL BE IN CONFORMANCE WITH THE PROJECT'S CONSTRUCTION PHASING PLAN. ALL EXISTING ELECTRICAL SYSTEMS SHALL BE KEPT FULLY OPERATIONAL WITH MINIMUM SHUTDOWNS UNTIL THE NEW SYSTEMS ARE FULLY OPERATIONAL. ALL SYSTEMS DISRUPTIONS AND SHUTDOWNS MUST BE PLANNED, SCHEDULED AND ACCEPTABLE TO THE BUILDING MANAGEMENT STAFF.
- ALL NEW ELECTRICAL DISTRIBUTION EQUIPMENT, INCLUDING POWER DISCONNECT SWITCHES, SHALL HAVE ENGRAVED PLASTIC NAMEPLATES INDICATING THEIR NAME, VOLTAGE, PHASES, WIRES, FREQUENCY AND NAME OF POWER SOURCE EQUIPMENT. IN ADDITION, ALL PANELBOARDS MUST BE PROVIDED WITH TYPED CIRCUIT DIRECTORIES.
- THE ELECTRICAL CONTRACTOR SHALL PROVIDE INTERCONNECTION WIRING DIAGRAMS FOR ANY EQUIPMENT PROVIDED BY OTHER TRADES OR ANY SUBMITTED ELECTRICAL EQUIPMENT THAT DEVIATES FROM THESE CONTRACT DOCUMENTS. NO ROUGH WIRING SHALL COMMENCE UNTIL THE INTERCONNECTION WIRING DIAGRAMS HAVE BEEN SUBMITTED/APPROVED.
- ALL ELECTRICAL CONDUCTORS SHALL BE COPPER WITH TYPE "THHN/THWN" INSULATION. THE MINIMUM CONDUIT AND POWER CONDUCTOR SIZES SHALL BE 3/4 INCH AND # 12 AWG. RACEWAYS SHALL BE TERMINATED WITH FLEXIBLE RACEWAYS TO EQUIPMENT FOR BOTH VIBRATION ISOLATION AND MAINTENANCE.
- ALL MATERIAL AND CONSTRUCTION WORK SHALL BE ROUGH AND FINAL INSPECTED BY THE ENGINEER AND TOWN CODE ENFORCEMENT OFFICIAL PRIOR TO ACCEPTANCE AND PAYMENTS. ALL CIRCUITS AND EQUIPMENT SHALL BE VERIFIED FOR PROPER WIRING AND OPERATION. ELECTRICAL CONTRACTOR SHALL GUARANTEE ALL WORK AND MATERIAL (PARTS AND LABOR) FOR ONE YEAR AFTER FINAL ACCEPTANCE.
- CONDUIT RUNS ARE SHOWN DIAGRAMMATICALLY ONLY AND SHALL BE INSTALLED IN A MANNER TO PREVENT CONFLICTS WITH EQUIPMENT AND BUILDING CONDITIONS. ALL "AS-SUPPLIED" ELECTRICAL EQUIPMENT AND WIRING MUST BE FULLY COORDINATED BY THE EC PRIOR TO RELEASE AND/OR INSTALLATION.
- THE EQUIPMENT LAYOUTS, CONDUIT/WIRE SIZES AND WIRING DIAGRAMS INCLUDED IN THESE CONSTRUCTION DOCUMENTS REPRESENT A SUGGESTED DESIGN BASED UPON INFORMATION GENERALLY AVAILABLE TO THE ENGINEER AT THE TIME OF DESIGN. THIS ALSO APPLIES TO EQUIPMENT PROVIDED BY OTHERS BUT WIRED BY THE ELECTRICAL CONTRACTOR. THE ELECTRICAL CONTRACTOR SHALL CONFIRM AND COORDINATE THE WIRING AND INSTALLATION REQUIREMENTS OF ALL THE ELECTRICAL EQUIPMENT, AND EQUIPMENT PROVIDED BY OTHERS, PRIOR TO ANY CONSTRUCTION. MODIFICATION ACCEPTABLE TO THE ARCHITECT MAY BE MADE BY THE ELECTRICAL CONTRACTOR TO ACCOMMODATE ACTUALLY INSTALLED EQUIPMENT, HOWEVER, THE BASIC SEQUENCE AND METHOD OF CONTROL MUST BE MAINTAINED AS INDICATED ON THE DRAWINGS AND SPECIFICATIONS. DIFFERING EQUIPMENT LOCATIONS OR WIRING DUE TO INCOMPLETE COORDINATION SHALL BE PROVIDED BY THE ELECTRICAL CONTRACTOR AT NO ADDITIONAL COSTS TO THE OWNER.
- ALL ITEMS REQUIRING ELECTRICAL POWER, AND SHOWN ON THE ELECTRICAL DRAWINGS, WHETHER OR NOT A CIRCUIT HAS BEEN ASSIGNED, SHALL BE POWERED AND WIRED BY THE EC, UNLESS SPECIFICALLY NOTED OTHERWISE. EC SHALL INCLUDE ALL SUCH ITEMS IN ITS BID, ASSUMING, FOR BIDDING PURPOSES, THAT THE CIRCUIT EMANATES FROM THE SAME SOURCE AS OTHER SIMILAR ITEMS IN THE AREA. NO ADDITIONAL FUNDING WILL BE ALLOWED FOR WIRING OF ITEMS SHOWN IN THE ELECTRICAL DRAWINGS BUT NOT ASSIGNED A SPECIFIC CIRCUIT, UNLESS CIRCUIT SOURCE DIFFERS SIGNIFICANTLY FROM ABOVE ASSUMPTION.
- THE ELECTRICAL CONTRACTOR, WHENEVER POSSIBLE, SHALL RUN CONDUIT AND WIRE CONCEALED. ALL NEW RACEWAYS IN AREAS WITH EXPOSED CEILINGS SHALL BE INSTALLED ALONG THE BUILDING STRUCTURE AND AT THE WALL/CEILING CORNERS TO MINIMIZE THEIR APPEARANCE. NO NEW WIRING SHALL CROSS ANY OPEN STRUCTURES.

- CONDUIT AND WIRE AS INDICATED ON THE CONSTRUCTION DOCUMENTS SHALL BE PVC, GALVANIZED RMC, EMT OR MC AS SPECIFIED FOR DIFFERENT AREAS.  
 IN THE BUILDING AREAS WITH HUNG CEILINGS, GENERALLY ALL ELECTRICAL WIRING SHALL BE CONCEALED ABOVE THE HUNG CEILINGS AND WITHIN THE WALLS, SOFFITS AND FURRED OUT BUILDING STRUCTURE BEAMS.  
 GENERALLY, THE TYPES OF WIRING PER BUILDING AREA ARE AS FOLLOWS:
- USE TYPE "EMT" CONDUIT WITH COMPRESSION FITTINGS AND THHN WIRING FOR ALL EXPOSED WIRING IN AREAS WITHOUT HUNG CEILINGS AND FOR WIRING WITHIN MASONRY WALLS.
- USE TYPE "MC" CABLE WITH THHN WIRES, OVERSIZED NEUTRALS, GROUND CONDUCTOR, AND ANTI-SHORT BUSHINGS FOR ALL WIRING WITHIN WALLS, BEAMS AND ABOVE HUNG CEILINGS. ALL EXISTING WALLS SHALL BE "FISHED" WITH NEW "MC" WIRING UNLESS EXISTING WALLS ARE HARD MASONRY TYPE WALLS WHERE SURFACE MOUNTED RACEWAYS (WIEMOLD TYPE "G6000") SHALL BE FURNISHED AND INSTALLED.
- USE TYPE "PVC-40" CONDUIT WITH THHN WIRING FOR ALL INDOOR AREAS DESIGNATED AS "NEMA 3R" AND FOR INSTALLATIONS WITHIN THE CONCRETE INCLUDING MASONRY WALLS, CONCRETE FLOORS AND ELECTRICAL DUCTBANKS.
- USE GALVANIZED TYPE "RMC" CONDUIT WITH THREADED RAIN-TIGHT CONNECTORS AND THWN WIRING FOR ALL OUTDOOR AREAS.
- PANELBOARD 3-PHASE BRANCH CIRCUIT HOMERUNS SHALL BE IN CONDUIT WITH OVERSIZED NEUTRALS. THE USE OF MC CABLES FOR HOMERUNS WILL NOT BE ACCEPTABLE. IN ADDITION, ANY HOMERUNS > 100'-0" MUST BE NUMBER 10 PHASE SIZE (MINIMUM).
- OUTLET BOXES, SWITCHES, RECEPTACLES, PULL/JUNCTION BOXES, TERMINAL BOXES, ETC. SHALL BE PROVIDED WITH NEMA "1" ENCLOSURES FOR ALL INDOOR LOCATIONS, UNLESS AREA IS DESIGNATED AS NEMA "3R"; AND NEMA "3R" ENCLOSURES FOR ALL OUTDOOR LOCATIONS.
- ALL WIRING PENETRATIONS THRU FIRE OR SMOKE RATED WALLS AND FLOORS SHALL BE SEALED WITH A FIRE STOPPING CAULKING. ALL WIRING CROSSING BUILDING EXPANSION JOINTS SHALL HAVE EXPANSION FITTINGS. FOR LOCATIONS OF FIRE RATED WALLS AND EXPANSION JOINTS REFER TO THE APPLICABLE ARCHITECTURAL AND STRUCTURAL DRAWINGS. ALL FIRE STOPPING SHALL BE FURNISHED AND INSTALLED BY THE GENERAL CONTRACTOR.
- ALL ELECTRICAL EQUIPMENT AND ASSOCIATED WIRING SHALL BE FURNISHED, INSTALLED AND WIRED IN STRICT ACCORDANCE WITH ALL APPLICABLE MANUFACTURER'S TECHNICAL REQUIREMENTS. CONTRACTOR'S WORK INCLUDES ALL NECESSARY COORDINATION WITH MANUFACTURER'S RECOMMENDATIONS.
- EC SHALL NOTE THE HVAC AUTOMATIC TEMPERATURE CONTROLS AND ASSOCIATED WIRING IS PART OF THE HVAC CONTRACTOR'S WORK. HOWEVER, EC SHALL INCLUDE ALL REQUIRED TECH ASSISTANCE TO THE GC AND THEIR EQUIP REPS DURING THE NEW HVAC EQUIPMENT FIELD TESTING.
- AT THE END OF THE PROJECT, THE ELECTRICAL CONTRACTOR SHALL PROVIDE ACCURATE "AS-BUILT" ELECTRICAL DRAWINGS AND INTERCONNECTION WIRING DIAGRAMS REFLECTING THE INSTALLED CONDITIONS. THE ELECTRICAL WORK SHALL NOT BE CONSIDERED SUBSTANTIALLY COMPLETE UNTIL ALL ELECTRICAL DRAWINGS HAVE BEEN SUBMITTED AND REVIEWED TO BE ACCEPTABLE BY THE ENGINEER.

**ELECTRICAL ABBREVIATIONS LIST**

- A AMPERES
- AF AMP FRAME
- AFF ABOVE FINISHED FLOOR
- AIC AMPERES INTERRUPTING CAPACITY
- AL ALUMINUM
- AS AMP SENSOR
- AT AMP TRIP
- ATS AUTOMATIC TRANSFER SWITCH
- AUX AUXILIARY
- AWG AMERICAN WIRE GAUGE
- C COUNTER HEIGHT MOUNTED
- CLF CURRENT LIMITING FUSE
- CB CIRCUIT BREAKER
- CKT CIRCUIT
- CP CONTROL PANEL OR EQUIPMENT CONNECTION PANEL
- CPT CONTROL POWER TRANSFORMER
- CR CONTROL RELAY
- CT CURRENT TRANSFORMER
- CTL CONTROL
- CWS CONDUIT WALL SLEEVE
- CU COPPER
- E EXISTING TO REMAIN
- EC ELECTRICAL CONTRACTOR
- EF EXHAUST FAN
- E/G ENGINE GENERATOR
- EM EXISTING ELECTRICAL EQUIPMENT OR DEVICE TO BE MODIFIED AT SAME LOCATION
- EPB ELECTRICAL PANELBOARD
- ER EXISTING ELECTRICAL EQUIPMENT SHALL BE REMOVED AND RELOCATED. EXISTING WIRING SHALL REMAIN, EXTEND TO LOCATION AND RECONNECT TO EQUIPMENT
- EX EXISTING ELECTRICAL EQUIPMENT OR DEVICE TO BE REMOVED. AT SAME LOCATION INSTALL NEW EQUIPMENT OR DEVICE. REUSE EXISTING CONDUIT AND RE-CONNECT TO EXISTING WIRES.
- EXISTING ELECTRICAL EQUIPMENT OR DEVICE AND WIRING TO BE REMOVED, REPLACED AND RELOCATED. REUSE EXISTING CONDUIT AND WIRES BUT EXTEND TO NEW EQUIPMENT LOCATION
- EZ EXISTING ELECTRICAL EQUIPMENT TO REMAIN BUT REWIRED
- F FIXED TEMPERATURE
- FA FIRE ALARM
- FDS FUSED DISCONNECT SWITCH
- FLEX FLEXIBLE
- G GROUND CABLE
- GF GROUND FAULT CIRCUIT INTERRUPTER
- GFP GROUND FAULT PROTECTION FOR EQUIPMENT
- GRD GROUND
- HP HORSEPOWER
- HVAC HEATING, VENTILATION AND AIR CONDITIONING
- JB JUNCTION BOX
- KVA KILO-AMPERES
- KW KILO-WATTS
- LTG LIGHTING
- MCB MAIN CIRCUIT BREAKER
- MLO MAIN LUGS ONLY
- MTD MOUNTED
- NC NORMALLY CLOSED
- NEC NATIONAL ELECTRICAL CODE
- NEMA NATIONAL ELECTRICAL MANUFACTURERS ASSOCIATION
- N.I.C. NOT IN CONTRACT
- NO NUMBER OR NORMALLY OPEN
- NTS NOT TO SCALE
- OL OVERLOAD
- P POLES
- PB PANELBOARD
- PH PHASE
- PWR POWER
- RGS RIGID GALVANIZED STEEL
- SMR SURFACE MOUNTED RACEWAY
- SW SWITCH
- TD TIME DELAY RELAY
- TELE TELEPHONE
- TRANSF TRANSFORMER
- TX TRANSFORMER
- UL UNDERWRITERS LABORATORY
- UON UNLESS OTHERWISE NOTED
- USB RECEPTACLE WITH USB CHARGING PORTS
- V VOLTS
- WP WEATHERPROOF
- WR WEATHER RESISTANT

NOT ALL SYMBOLS AND ABBREVIATIONS ARE USED, PROVIDED FOR GENERAL REFERENCE (ONLY)

**LINE TYPES AND MISC LEGEND**

- # SHEET KEYNOTE CALLOUT WITH NUMBER ID INDICATED.
- X E3.## DETAIL CALLOUT WITH DETAIL ID AND SHEET LOCATION INDICATED
- 1B ELECTRICAL EQUIPMENT ID TAG WITH SECTION 1 CUBICLE B INDICATED.
- S BREAKER ACCESSORY - SHUNT TRIP
- E BREAKER ACCESSORY - ADJUSTABLE ELECTRONIC TRIP
- CB BREAKER FUNCTION - GROUND FAULT
- CR CONTROL RELAY
- BOLTED MOLDED CASE CIRCUIT BREAKER
- DRAW-OUT MOLDED CASE OR INSULATED CASE CIRCUIT BREAKER
- DRAW-OUT INSULATED CASE CIRCUIT BREAKER WITH IEEE FUNCTION 52 INDICATED.
- 60A 45A CLF FUSED DISCONNECT SWITCH WITH AMPERAGE INDICATED AND FUSE TYPE.

**POWER LEGEND**

- TYPE A1 SIMPLEX RECEPTACLE WITH CIRCUIT AND TYPE INDICATED
- TYPE A1 DUPLEX RECEPTACLE WITH CIRCUIT AND TYPE INDICATED
- TYPE A1 SWITCHED RECEPTACLE WITH CIRCUIT AND TYPE INDICATED
- TYPE A1 QUAD RECEPTACLE WITH CIRCUIT NUMBER AND TYPE INDICATED
- TYPE A1 SPECIAL RECEPTACLE WITH NEMA TYPE AND CIRCUIT INDICATED
- A1 CEILING MOUNTED DUPLEX RECEPT. WITH CIRCUIT INDICATED
- B JUNCTION BOX WITH BLANK FACEPLATE
- J JUNCTION BOX - WALL MOUNTED
- CS JUNCTION BOX - CEILING MOUNTED
- CR CONTROL RELAY
- C CARBON MONOXIDE DETECTOR
- BSS BOILER SHUTOFF SWITCH
- BCP BOILER CONTROL PANEL
- DISCONNECT SWITCH NON-FUSED POWER DISCONNECT SWITCH
- DISCONNECT SWITCH FUSED POWER DISCONNECT SWITCH
- MOTOR RATED SWITCH FOR APPLIANCE OR SWITCHED RECEPTACLE
- DENOTED ELECTRICAL DEMOLITION WORK
- PANELBOARD OR LOADCENTER

**DRAWINGS LIST:**

- E0.01 LEGEND AND GEN. NOTES
- E1.11 POWER PLAN
- E2.01 DIAGRAMS AND DETAILS
- E3.01 SPECIFICATIONS





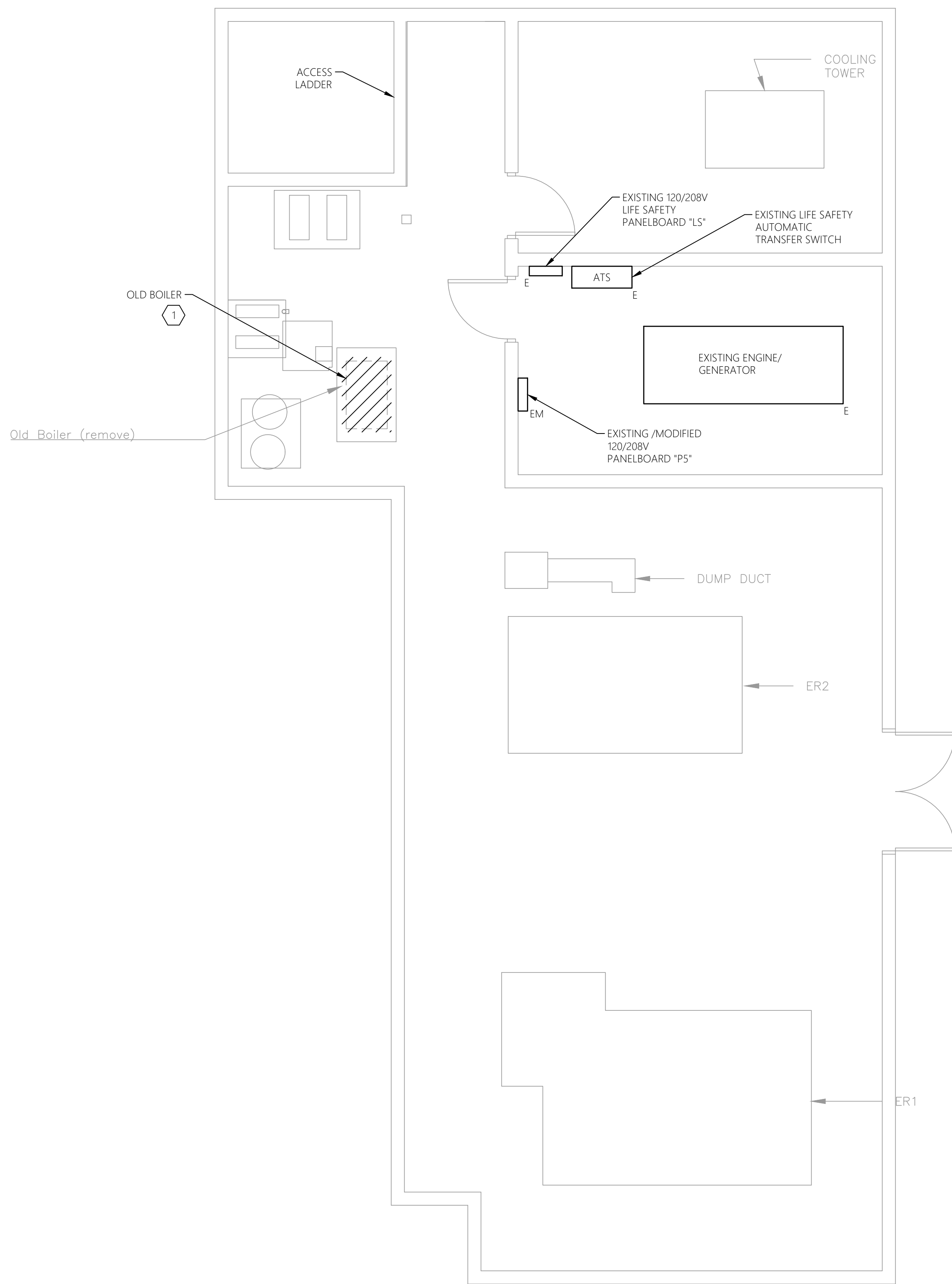
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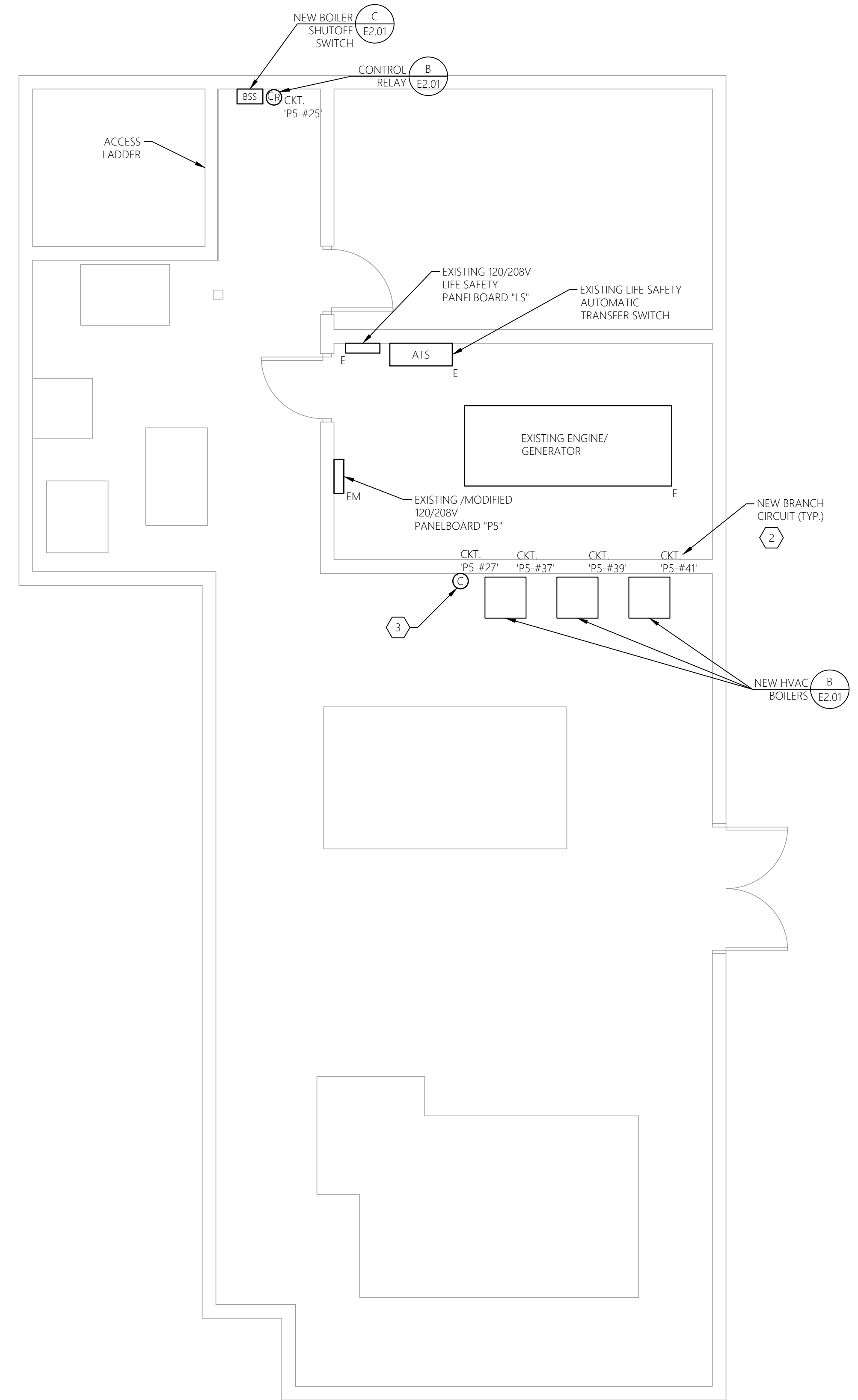
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**A DEMOLITION PLAN**  
 SCALE: 1/4" = 1'-0"

**ELECTRICAL PLANS KEY NOTES**

1. EC SHALL DISCONNECT AND REMOVE ALL WIRING DEVICES, JUNCTION BOXES AND FUSED DISCONNECT SWITCHES CURRENTLY SERVING THE BOILER, REFERENCED BY THIS NOTE. EC SHALL MARK EXISTING CIRCUIT AS "SPARE", FOR FUTURE USE, AND REMOVE ALL UNUSED CONDUITS AND WIRES ASSOCIATED WITH THIS EQUIPMENT. DEMOLISHED EQUIPMENT WILL BE REMOVED BY OTHERS. NOTE, BASED ON OBSERVATIONS DURING OUR INITIAL SITE VISIT, IT APPEARS THE CIRCUIT SERVING THIS BOILER ORIGINATES AT PANELBOARD \*P5\*.
2. EC SHALL CONNECT NEW BOILERS TO EXISTING 20A-1P BRANCH CIRCUIT BREAKERS IN EXISTING 120/208V PANELBOARD \*P5\* AS INDICATED ON THE PROPOSED PLANS. EC'S WORK INCLUDES SURVEYING INDICATED CIRCUIT BREAKERS TO CONFIRM THEY ARE UNUSED AND AVAILABLE. NOTE, CIRCUITS WERE "OFF", UNMARKED AND UNLABELED DURING OUR SITE INVESTIGATION.
3. EC SHALL FURNISH/INSTALL NEW HARDWIRED (120V), WALL MOUNTED CARBON MONOXIDE DETECTOR IN THE VICINITY OF THE NEW GAS BOILERS. CONNECT TO INDICATED BRANCH CIRCUIT BREAKER VIA 2-#12AWG & 1-#12GND IN 3/4" C. BRANCH CIRCUIT WIRING, MOUNTING HEIGHT AS RECOMMENDED BY THE EQUIPMENT'S MANUFACTURER.



**B PROPOSED PLAN**  
 SCALE: 1/4" = 1'-0"

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PROJECT NO: 22040  
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**ELECTRICAL POWER PLAN**

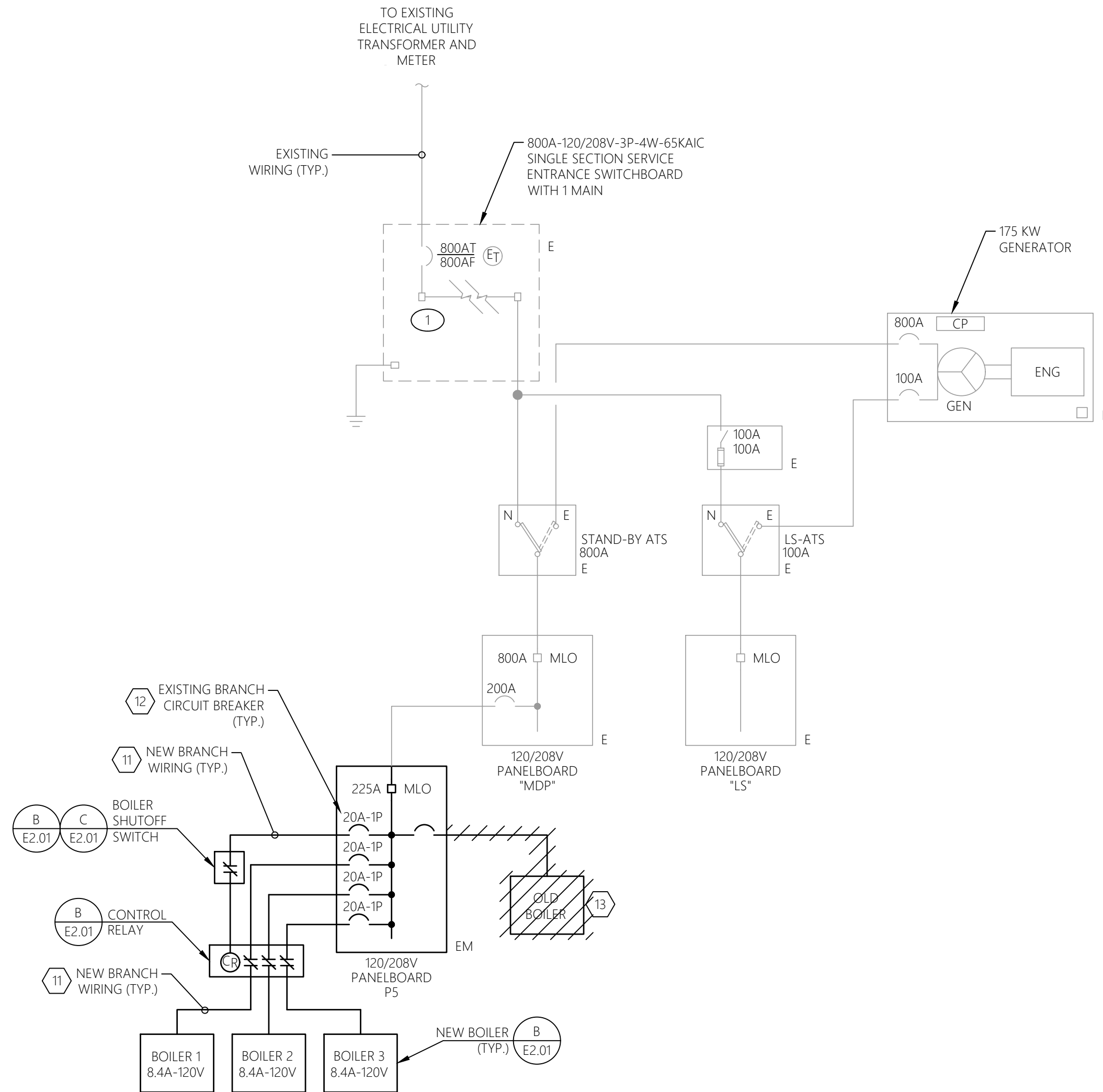
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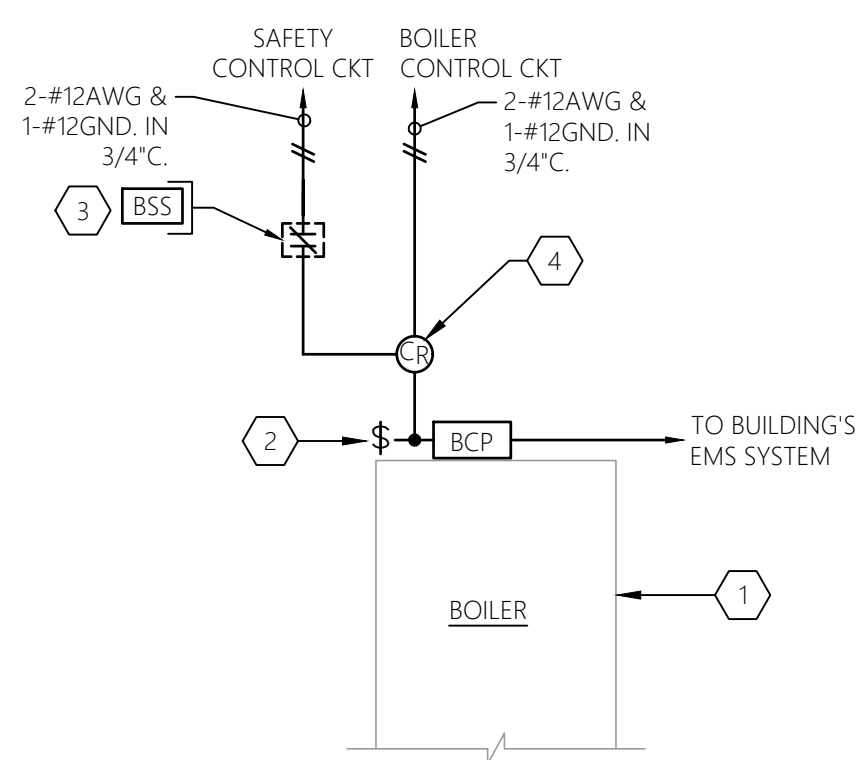
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**A PARTIAL ONE LINE DIAGRAM**  
SCALE: N.T.S.

PARTIAL ONE LINE DIAGRAM NOTES

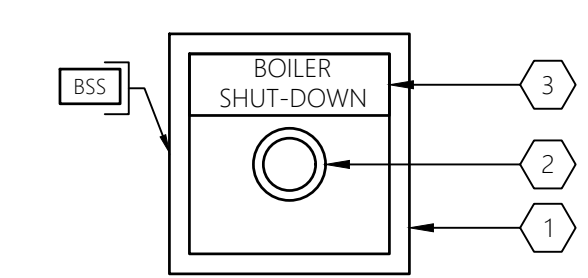
- ELECTRICAL CONTRACTOR (EC) SHALL FIELD SURVEY THE AFFECTED EXISTING POWER DISTRIBUTION EQUIPMENT AND ASSOCIATED WIRING IN ORDER TO VERIFY THE ENGINEER'S DIAGRAMS. NOTE, THE ENGINEER PREPARED THE DIAGRAM FROM EXISTING DRAWINGS (WHICH ARE NOT AS-BUILTS) AND VISUAL WALK THROUGH INSPECTION. EC'S WORK INCLUDES MAKING ALL NECESSARY ADJUSTMENTS TO THE EXISTING AND NEW CIRCUITS TO SUIT THE EXISTING CONDITIONS, DEMOLITION AND NEW WORK'S EFFECT ON THE EXISTING CIRCUITS AND PROVIDING "AS BUILT" PANELBOARD DIRECTORIES FROM THE FIELD SURVEY AND NEW CONSTRUCTION.
- EC SHALL FIELD MODIFY THE EXISTING/AFFECTED POWER DISTRIBUTION EQUIPMENT & THEIR ASSOCIATED BRANCH CIRCUIT BREAKERS AS INDICATED. NOTE THE DESIGN INTENT IS TO REUSE THE BRANCH CIRCUITS THAT BECAME AVAILABLE AFTER THE DEMO PHASE. THE EXISTING TO REMAIN CIRCUITS, SERVING OUT OF SCOPE AREAS, SHALL NOT BE DEMOLISHED.
- EC SHALL FURNISH/INSTALL NEW ELECTRICAL POWER DISTRIBUTION EQUIPMENT (IE - PWR DISC SWITCHES), FOR THE LOCATION OF THE EXISTING AND NEW POWER EQUIPMENT, REFER TO THE PROPOSED BLDG POWER PLANS DWGS.
- THE ENTIRE ELECTRICAL INSTALLATION SHALL BE SUPPLIED AND INSTALLED IN STRICT ACCORDANCE WITH ALL APPLICABLE STATE AND LOCAL BUILDING/ELECTRICAL CODES, LAWS, ORDINANCES AND INSURANCE REQUIREMENTS. EC'S WORK INCLUDES ALL COORDINATION WITH THE LOCAL ELECTRICAL INSPECTOR PRIOR TO ANY DEMOLITION OR NEW ELECTRICAL CONSTRUCTION WORK.
- EC'S WORK INCLUDES CLEANING, TIGHTENING AND FIELD TESTING TO VERIFY THE OPERATING CONDITION OF THE EXISTING/MODIFIED AND NEW POWER DISTRIBUTION EQUIPMENT.
- EC'S WORK INCLUDES ADDING NEW ENGRAVED PLASTIC NAMEPLATES TO ALL OF THE NEW POWER EQUIPMENT. ALL NAMEPLATES SHALL HAVE NAME, VOLTAGE, PHASE, WIRE, FREQUENCY AND POWER SUPPLY SOURCE INFORMATION (NAME AND LOCATION).  
120 VOLT 1 PH 2W 60 HZ  
"BOILER-#"  
FED FROM  
PANELBOARD "P5" CKT-#
- PRIOR THE INSTALLATION OF ANY BREAKERS, EC SHALL FIELD MEASURE THE EXISTING PANELBOARD'S OPERATING LOADS IN ORDER TO VERIFY EXISTING CAPACITIES. EC SHALL PROVIDE PANELBOARD AMPERE READINGS TO THE A/E FOR EVALUATION. PROVIDE LOADINGS IN AMPERES ON EVERY POWER PHASE.
- EC IS TO DE-ENERGIZE ANY PANELBOARD AND BRANCH CIRCUITS PRIOR TO INSTALL OR MODIFY ANY ELECTRICAL EQUIPMENT. WORKING WITH EXPOSED LIVE UNGROUNDED CONDUCTORS WILL NOT BE ALLOWED.
- ALL POWER SHUTDOWNS SHALL BE MINIMIZED. EC SHALL PROVIDE A PROPOSED ELECTRICAL CONSTRUCTION SCHEDULE WHICH CLEARLY INDICATES ALL MILESTONES AND SHUTDOWN DURATIONS IN ORDER FOR THE BUILDING OWNER TO REVIEW/APPROVE. NOTE, ANY POWER INTERRUPTIONS SHOULD BE SCHEDULED WITH THE ELECTRIC UTILITY COMPANY (IF REQUIRED). EC MUST ASSUME ALL POWER OUTAGES WORK MUST BE COMPLETED ON THE WEEKENDS (IE - PREMIUM LABOR OVERTIME).
- PRIOR TO DE-ENERGIZING ANY PANELBOARDS, BRANCH CIRCUITS OR OTHER ELECTRICAL EQUIPMENT, EC SHALL FIELD SURVEY TO VERIFY NO CRITICAL EQUIPMENT, LIGHTING, RECEPTACLES, ETC WILL BE ADVERSELY AFFECTED.
- EC SHALL FURNISH/INSTALL NEW BRANCH CIRCUIT WIRING AS INDICATED ON THE BOILERS WIRING DETAIL.
- EC SHALL CONNECT NEW BOILERS TO EXISTING 20A-1P BRANCH CIRCUIT BREAKERS IN 120/208V PANELBOARD "P5" AS INDICATED ON THE PROPOSED PLANS. EC'S WORK INCLUDES SURVEYING INDICATED CIRCUIT BREAKERS TO CONFIRM THEY ARE UNUSED AND AVAILABLE. NOTE, CIRCUITS WERE "OFF", UNMARKED AND UNLABELED DURING OUR SITE INVESTIGATION.
- EC SHALL DISCONNECT AND REMOVE ALL WIRING DEVICES, JUNCTION BOXES AND FUSED DISCONNECT SWITCHES CURRENTLY SERVING THE BOILER. REFERENCED BY THIS NOTE. EC SHALL MARK EXISTING CIRCUIT AS "SPARE", FOR FUTURE USE, AND REMOVE ALL UNUSED CONDUITS AND WIRES ASSOCIATED WITH THIS EQUIPMENT. DEMOLISHED EQUIPMENT WILL BE REMOVED BY OTHERS.



**B BOILERS WIRING DETAIL**  
SCALE: N.T.S.

BOILER WIRING DETAIL NOTES

- BOILER WHICH IS FURNISHED & INSTALLED BY MECHANICAL CONTRACTOR.
- EC SHALL FURNISH/INSTALL A TOGGLE TYPE POWER DISCONNECT SWITCH (120VAC/20A/1P).
- EC SHALL FURNISH/INSTALL A BOILER SAFETY SWITCH OUTSIDE THE BOILER ROOM AS INDICATED ON THE POWER PLAN. NOTE, SWITCH SHALL "DE-ENERGIZE" THE BOILER'S CONTROL BRANCH CIRCUIT FOR ALL BOILERS.
- EC SHALL FURNISH/INSTALL A CONTROL RELAY WITH 120V CONTACTS SHALL OPEN UPON "BSS" ACTUATION, DE-ENERGIZING THE BOILER'S CONTROL CIRCUIT. PROVIDE 1 CONTROL RELAY AND SET OF "BSS" TO DE-ENERGIZE ALL BOILERS IN THE ROOM.
- BOILER'S AUTOMATIC TEMPERATURE CONTROLS INCLUDE THEIR SAFETIES (IE - LOW WATER CUT-OFF, HIGH PRESSURE, ETC) INCLUDING THEIR ASSOCIATED ATC WIRING SHALL BE FURNISHED/INSTALLED BY THE MECH CONTRACTOR.
- EC'S WORK INCLUDES ALL COORDINATION WITH THE "AS SUPPLIED" BOILER EQUIPMENT PRIOR TO ANY ELEC EQUIPMENT RELEASE AND/OR ROUGH WIRING.
- DETAIL IS TYPICAL FOR 3 BOILERS. ALL BOILERS MUST BE CONNECTED TO DIFFERENT CONTROL CIRCUITS AND DOWNSTREAM OF THE BSS. REFER TO PROPOSED PLANS FOR CIRCUIT INFORMATION.



**C BOILER SHUT-OFF SWITCH WIRING DETAIL**  
SCALE: N.T.S.

NEW BOILERS SHUT-OFF SWITCH WIRING DETAIL NOTES

- EC SHALL FURNISH/INSTALL GALVANIZED STEEL JUNCTION BOX AND ASSOCIATED WIRING FOR THE NEW "BSS" SWITCH.
- EC SHALL FURNISH/INSTALL NEW EMERGENCY "RED" PUSHBUTTON WITH UP TO 6 MAINTAINED NORMALLY CLOSED (NC) CONTACTS, PULL TO RESET, AND CLEAR PLEXI-GLASS PROTECTIVE COVER. UNIT SHALL BE A PILLA MODEL # BS0120-MT4-PILCLHC0V1.
- PUSHBUTTON SHALL SUPPLIED WITH A FACTORY PROVIDED NAMEPLATE WHICH READS "EMERGENCY BOILER SHUT-DOWN".
- EC'S WORK INCLUDES ALL COORDINATION WITH THE NEW BOILERS SHUTDOWN SAFETIES AND CONTROLS.

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**ELECTRICAL**  
**DIAGRAMS AND DETAILS**





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### ELECTRICAL SPECIFICATIONS

#### 1) SCOPE OF WORK -

THE ELECTRICAL CONTRACTOR (EC) SHALL FURNISH ALL LABOR, MATERIAL, SUPPLIES, EQUIPMENT, TOOLS AND SERVICES NECESSARY FOR AND REASONABLY INCIDENTAL TO COMPLETION OF THE ELECTRICAL WORK AS SPECIFIED AND AS SHOWN ON THE ELECTRICAL DRAWINGS. THE ELECTRICAL SYSTEMS SHALL BE FULLY INSTALLED, ADJUSTED, FIELD TESTED AND READY FOR USE BY THE OWNER.

THE ELECTRICAL WORK MUST BE CONSTRUCTED PER THE ARCHITECT'S PROJECT SCHEDULE. THE ELECTRICAL CONTRACTOR SHALL INCLUDE IN THEIR BID ALL REQUIRED PREMIUM OVERTIME LABOR WHICH WILL BE REQUIRED TO MEET THE CONSTRUCTION SCHEDULE INCLUDING ANY "BUILDING OWNERS" LIMITATIONS REGARDING CORING, NOISE, TRASH REMOVAL, ETC.

IN ADDITION, THE EXISTING BUILDING ELECTRICAL SYSTEMS MUST BE KEPT "ON-LINE" WITH MINIMUM SHUT-DOWNS. ANY SHUT-DOWNS MUST BE SCHEDULED/ COORDINATED/APPROVED BY BOTH THE BUILDING MANAGERS AND ARCHITECT.

EC IS TO DE-ENERGIZE ANY PANELBOARD AND BRANCH CIRCUITS PRIOR TO INSTALL OR MODIFY ANY ELECTRICAL EQUIPMENT. WORKING WITH EXPOSED LIVE UNGROUNDED CONDUCTORS WILL NOT BE ALLOWED.

THE SCOPE OF WORK SHALL INCLUDE, BUT NOT BE LIMITED TO, THE FOLLOWING ITEMS. IN ADDITION, THE ELECTRICAL CONTRACTOR SHALL PROVIDE ALL MATERIAL AND WORK IN ACCORDANCE WITH THE OWNER'S FIT-UP CONSTRUCTION REQUIREMENTS. THE ARCHITECT SHOULD BE CONTACTED REGARDING ANY CONSTRUCTION IMPROVEMENTS REQUIREMENTS.

- A) THE EC SHALL FULLY FIELD SURVEY THE AFFECTED BUILDING AREA, INCLUDING AS A MINIMUM THE BLDG SPACE'S PANELBOARDS, MOTOR STARTERS, ETC. IN ADDITION, THE AFFECTED BRANCH WIRING MUST BE FIELD SURVEYED SUFFICIENTLY IN ORDER TO REVISE AS INDICATED. NOTE, THERE ARE AVAILABLE ELEC DRAWINGS WHICH ARE NOT "AS BUILT" OR MAY NOT INCLUDE ANY RECENT ELECTRICAL CONSTRUCTION REVISIONS. EC'S FIELD SURVEY WORK ALSO INCLUDES FIELD MEASURING OPERATING AMPERES (PRIOR TO ANY DEMOLITION OR RE-CONSTRUCTION) OF THE EXIST AFFECTED PANELBOARDS.

PROVIDE "MARKED UP" FIELD SURVEY ELECTRICAL DRAWINGS WHICH INDICATE THE COMPLETION OF THE SPECIFIED FIELD SURVEYING OF THE EXISTING ELECTRICAL EQUIPMENT AND WIRING CONDITIONS IN ORDER TO PRODUCE ACCURATE "AS-BUILT" ELEC DRAWINGS.

- B) PROVIDE POWER DISTRIBUTION SYSTEM REVISIONS INCLUDING BUT NOT LIMITED TO SURVEY OF THE EXISTING PANELBOARDS, MOTOR STARTERS AND ASSOCIATED WIRING. NEW PANELBOARD BRANCH CIRCUIT BREAKERS AND ASSOCIATED WIRING SHALL BE FURNISHED AND INSTALLED AS INDICATED ON THE DRAWINGS. IN ADDITION, GENERALLY ALL EXISTING AFFECTED POWER DISTRIBUTION EQUIPMENT AS A MINIMUM SHALL BE CLEANED AND TIGHTENED (IF NECESSARY).

- C) THE ELECTRICAL CONTRACTOR SHALL PROVIDE ANY ADDITIONAL SELECTIVE DEMOLITION THAT IS REQUIRED FOR THE NEW WORK INCLUDING A FIELD SURVEY OF THE EXISTING AFFECTED MECH HVAC AND PLBG EQUIPMENT AS REQUIRED FOR THE SELECTIVE DEMOLITION AND RECONSTRUCTION.

- D) THE EC SHALL PROVIDE "MARKED UP" FIELD SURVEY DRAWINGS WHICH INDICATE THE EXISTING PANELBOARD CIRCUITS FOR ALL EXISTING AFFECTED OUTLETS IN ORDER TO PRODUCE ACCURATE "AS-BUILT" ELECTRICAL DRAWINGS.

#### 2) CODE REQUIREMENTS -

THE ENTIRE ELECTRICAL INSTALLATION SHALL BE SUPPLIED AND INSTALLED IN STRICT ACCORDANCE WITH ALL APPLICABLE STATE AND LOCAL BUILDING/ELECTRICAL CODES, LAWS, ORDINANCES AND INSURANCE REQUIREMENTS.

EC'S WORK INCLUDES ALL COORDINATION WITH THE LOCAL ELECTRICAL INSPECTOR PRIOR TO ANY DEMOLITION OR NEW ELECTRICAL CONSTRUCTION WORK. THIS INCLUDES ALL COORDINATION WITH THE LOCAL FIRE DEPARTMENT ON THE PROPOSED REVISIONS TO THE EXISTING FIRE ALARM SYSTEM.

#### 3) INTERPRETATION OF DRAWINGS -

THE DRAWINGS ARE DIAGRAMMATIC ONLY AND ARE NOT INTENDED TO SHOW THE EXACT LOCATIONS OF NEW OR EXISTING UTILITIES AND ARE SUBJECT TO FIELD INSTALLATION ADJUSTMENTS AT THE TIME OF INSTALLATION BY THE ELECTRICAL CONTRACTOR.

THE ELECTRICAL CONTRACTOR SHALL BE HELD ACCOUNTABLE TO VERIFY WITH THE ARCHITECT, THE EXACT LOCATIONS OF EXISTING AND NEW WORK PRIOR TO ITS ACTUAL INSTALLATION.

ANY WORK INSTALLED CONTRARY TO OR WITHOUT SUCH APPROVAL BY THE ARCHITECT SHALL BE SUBJECT TO CHANGE AS DIRECTED BY THE ARCHITECT. NO ADDITIONAL COMPENSATION WILL BE ALLOWED TO THE ELECTRICAL CONTRACTOR FOR SUCH CHANGES.

#### 4) EXAMINATION OF PREMISES -

THE ELECTRICAL CONTRACTOR SHALL VISIT THE SITE PRIOR TO SUBMITTING THE BID AND FAMILIARIZE THEMSELVES WITH THE EXISTING CONDITIONS. NO ADDITIONAL COMPENSATION WILL BE ALLOWED FOR EXTRA WORK REQUIRED DUE TO THE LACK OF KNOWLEDGE OF THE EXISTING BUILDING/SITE CONDITIONS. IN ADDITION, EACH BIDDING EC MUST INCLUDE ANY BLDG OWNER LIMITATIONS ON ELEC SYSTEM OUTAGES, BLDG ACCESS, ETC WHICH MAY AFFECT THEIR BID.

#### 5) COOPERATIONS -

THE ELECTRICAL CONTRACTOR SHALL COOPERATE WITH ANY OTHER CONTRACTORS THAT MAY BE ON THE SITE. ANY CONFLICTING CONDITIONS SHALL BE CALLED TO THE ATTENTION OF THE ARCHITECT. EC'S WORK INCLUDES ALL NECESSARY TIME FOR COORDINATION WITH ALL PROJECT SUPPLIERS, CONTRACTORS, ETC.

#### 6) QUALITY OF WORKMANSHIP -

THE WORKMANSHIP OF THE ENTIRE ELECTRICAL INSTALLATION SHALL BE FIRST CLASS IN EVERY RESPECT AND ONLY COMPETENT AND EXPERIENCED LICENSED LABOR SHALL BE ALLOWED ON THE JOB. THE ARCHITECT RESERVES THE RIGHT TO REQUEST THE DISMISSAL OF ANY WORKMAN WHOSE WORK AND PERFORMANCE IS NOT SATISFACTORY. A LICENSED ELECTRICIAN SHALL BE ON SITE AT ALL TIMES DURING ANY DEMOLITION OR NEW WORK.

GENERAL PRACTICES FOR ELECTRICAL CONSTRUCTION SHALL BE IN STRICT ACCORDANCE WITH THE LATEST VERSION OF NECA-1, "STANDARD FOR GOOD WORKMANSHIP IN ELECTRICAL CONSTRUCTION".

#### 7) GUARANTEE -

THE ELECTRICAL CONTRACTOR SHALL GUARANTEE (PARTS AND LABOR) ALL THE ELECTRICAL MATERIALS AND WORKMANSHIP AGAINST DEFECTS AND FAULTY INSTALLATION FOR A PERIOD OF ONE (1) YEAR STARTING FROM THE DATE OF FINAL ACCEPTANCE OF THE WORK (IN WRITING) BY THE ARCHITECT. THE ELECTRICAL CONTRACTOR SHALL MAKE GOOD AT THEIR EXPENSE ANY DEFECTS IN MATERIAL AND WORKMANSHIP, EXCEPT WHERE SUCH IS CAUSED BY ABUSE OR MISUSE BY THE BUILDING MAINTENANCE PERSONNEL.

#### 8) CUTTING AND PATCHING -

THE ELECTRICAL CONTRACTOR SHALL BE RESPONSIBLE FOR ALL CUTTING, PATCHING AND CORE DRILLING AND ALL NECESSARY GALVANIZED STEEL FOR SUPPORT AND INSTALLATION OF THE ELECTRICAL MATERIAL AND EQUIPMENT. THIS INCLUDES ANY REQUIRED SCAFFOLDING OR SIMILAR EQUIPMENT FOR THE ELECTRICAL WORK INSTALLATION.

IN ADDITION, ALL PENETRATIONS THRU FIRE RATED WALLS SHALL BE CAULKED WITH FIRE/SMOKE STOPPING MATERIAL BY THE ELECTRICAL CONTRACTOR. THE EC SHALL CORE THE FLOOR AND INSTALL A FIRE RATED ELECTRIC SERVICE FEED FOR ANY PARTITION RECEPTACLES WHICH ARE NOT ACCESSIBLE FROM THE CEILING OR AN ADJACENT WALL. EC SHALL REFER TO THE ARCHITECTURAL DRAWINGS FOR ALL FIRE/SMOKE RATINGS.

#### 9) PERMITS AND INSPECTIONS -

THE ELECTRICAL CONTRACTOR SHALL OBTAIN AND PAY FOR ALL PERMITS, INSPECTIONS, LICENSES AND CERTIFICATIONS REQUIRED FOR WORK SPECIFIED OR SHOWN ON THE ELECTRICAL DRAWINGS. NO ELECTRICAL WORK SHALL COMMENCE UNTIL ALL ELECTRICAL CONSTRUCTION IS COORDINATED WITH THE MUNICIPALITY'S INSPECTIONAL SERVICES DEPT. ANY DIFFERING INSPECTOR REQUIREMENTS SHALL BE PROVIDED BY THE ELECTRICAL CONTRACTOR WITHOUT ANY ADDITIONAL COMPENSATION.

#### 10) COORDINATION -

THE ELECTRICAL CONTRACTOR SHALL BE RESPONSIBLE FOR COORDINATING ALL OF THE ELECTRICAL POWER SUPPLIES AND WIRING WITH THE "AS SUPPLIED" AND "EXISTING" EQUIPMENT. NO WIRING SHALL BE INSTALLED UNTIL THE ELECTRICAL CONTRACTOR HAS VERIFIED THE EXACT REQUIRED POWER AND INTERCONNECTION WIRING. NO ADDITIONAL COMPENSATION SHALL BE PROVIDED FOR WIRING COORDINATION CONSTRUCTION PROBLEMS. EC WORK INCLUDES A FIELD SURVEY OF ALL AFFECTED EXISTING ELEC EQUIPMENT AND ASSOCIATED WIRING.

PRIOR TO MATERIAL RELEASE AND INSTALLATION, THE EC SHALL COORDINATE ALL ELECTRICAL EQUIPMENT WITH THE ARCHITECTURAL AND MECHANICAL DRAWINGS AND SPECIFICATIONS. ALL MISCOORDINATION BY THE EC SHALL BE PROVIDED AT NO ADDITIONAL COSTS TO THE OWNER OR THE ARCHITECT/ENGINEER.

THE CONTRACTOR SHALL PROVIDE, PRIOR TO THE INSTALLATION, COORDINATION DRAWINGS. COORDINATION DRAWINGS SHALL BE DONE IN AUTOCAD AND SHALL INCLUDE ALL OTHER TRADES INVOLVED IN THE PROJECT. THE ELECTRICAL CONTRACTOR SHALL BEGIN THE DRAWINGS AND ONCE COMPLETED THE OTHER TRADES SHALL BE ADDED IN THE FOLLOWING ORDER: HVAC, PLUMBING, FIRE PROTECTION. THE CONTRACTOR FOR EACH DISCIPLINE SHALL BE RESPONSIBLE FOR PROVIDING THE NECESSARY CAD DRAFTING FOR THEIR WORK. ANY COORDINATION ISSUES SHALL BE WORKED OUT BY THE CONTRACTORS PRIOR TO SUBMISSION OF THE DRAWINGS FOR APPROVAL. ANY COORDINATION ISSUES THAT CANNOT BE CORRECTED BY THIS CONTRACTOR COLLABORATION SHALL BE HIGHLIGHTED IN THE COORDINATION DRAWING APPROVAL SUBMISSION.

#### 11) RECORD DRAWINGS -

CONTRACTOR SHALL MAINTAIN A COMPLETE SET OF CONTRACT DRAWINGS AT JOB SITE WITH COLORED MARKINGS INDICATING PROGRESS OF WORK. THIS SET OF CONTRACT DRAWINGS IS TO BE SEPARATE FROM AND IN ADDITION TO CONTRACTOR'S CONSTRUCTION SET. EVERY UNIT OF EQUIPMENT, DEVICE, CONDUIT AND WIRE IS TO BE MARKED WHEN INSTALLED. USE GREEN TO INDICATE INSTALLATION AS SHOWN ON DRAWINGS AND USE RED TO INDICATE FIELD CHANGES.

UPON COMPLETION OF WORK, CAD RECORD DRAWING FILES SHALL BE SUBMITTED SHOWING THE "AS-BUILT" CONDITION INCLUDING WORK INSTALLED AND ALL MODIFICATIONS OR ADDITIONS TO THE ORIGINAL DESIGN. THIS INCLUDES BRANCH CIRCUIT NUMBERS FOR ALL LIGHTING, RECEPTACLES, EQUIPMENT, ETC. OBTAIN THE CAD FILES FOR THE PREPARATION OF AS-BUILT DRAWINGS FROM THE ARCHITECT. THE ARCHITECT AND ENGINEER ARE NOT GRANTING ANY OWNERSHIP OR PROPERTY INTEREST IN THE CAD DRAWINGS BY DELIVERY OF THE CAD FILES. THE USE OF THE CAD FILES AND DRAWINGS ARE LIMITED FOR THE SOLE PURPOSES OF ASSISTING THE CONTRACTOR'S PERFORMANCE IN ITS CONTRACTUAL OBLIGATIONS WITH RESPECT TO THIS PROJECT. ANY REUSE AND/OR OTHER USE BY THE CONTRACTOR WILL BE AT THE CONTRACTOR'S SOLE RISK AND WITHOUT LIABILITY TO THE ARCHITECT AND ENGINEER.

#### 12) MATERIAL AND EQUIPMENT -

- A) MATERIAL - ALL ELECTRICAL CONSTRUCTION MATERIAL SHALL BE OF THE HIGHEST QUALITY (SPECIFICATION GRADE) AND U.L. LISTED. SUBMIT ALL MATERIAL SHOP DRAWINGS FOR REVIEW AND ACCEPTABILITY TO THE ARCHITECT/ENGINEER (PRIOR TO ANY INSTALLATION). THE ENGINEER'S SHOP DRAWINGS REVIEWS ARE LIMITED TO ONLY TWO REVIEWS PER ITEM. ADDITIONAL REVIEWS SHALL BE BACKCHARGED TO THE CONTRACTOR AT THE ENGINEER'S STANDARD HOURLY BILLING RATES AND EXPENSES.

ANY MATERIAL, NOT SUBMITTED AND APPROVED, WHICH DOES NOT MEET THE DRAWINGS AND SPECIFICATIONS REQUIREMENTS, MAY AT THE OPTION OF THE ARCHITECT BE REMOVED AND REPLACED BY THE ELECTRICAL CONTRACTOR AT NO ADDITIONAL COST.

ANY "OR EQUAL" EQUIPMENT REVIEWS SHALL BE CONSIDERED AS ADDITIONAL ENGINEERING SERVICES AND BACKCHARGED TO THE CONTRACTOR AT THE ENGINEER'S STANDARD HOURLY BILLING RATES AND EXPENSES.

- B) WIRING - ALL WIRING SHALL BE "EMT" RACEWAYS WITH TYPE "THWN/THHN" COPPER CONDUCTORS FOR EXPOSED WORK IN THE BUILDING. ALL CONCEALED WIRING IN THE WALLS AND ABOVE HUNG CEILINGS SHALL BE TYPE "MC" METAL CLAD CABLE WITH COPPER CONDUCTORS. THE USE OF "NM", "NMC" OR "NMS" NONMETALLIC-SHEATHED CABLE (ROMEX) IS NOT ACCEPTABLE. MINIMUM POWER CONDUCTOR SIZE IS NO. 12 AWG. ALL POWER WIRING SHALL HAVE COPPER GROUNDING CONDUCTORS. ALL MULTIPHASE HOMERUNS SHALL HAVE NO 10 OVER-SIZED NEUTRAL CONDUCTORS.

WHERE WIRING REQUIRES THAT CONDUITS BE RUN EXPOSED OUTSIDE, THE RACEWAYS MUST BE "RGS" TYPE, SUPPORTED APPROPRIATELY, WITH COMPATIBLE WEATHERPROOF JUNCTION/PULL BOXES AND CONDUIT BODIES USED AS NEEDED. ALL OUTSIDE JUNCTION BOXES, FITTINGS, ETC SHALL BE CAST GALVANIZED METAL. UNDER NO CIRCUMSTANCES SHALL EITHER "EMT" OR "PVC" CONDUIT OR BOXES/BODIES BE USED IN THESE SPACES.

RIGID RACEWAYS SHALL BE TERMINATED WITH FLEXIBLE CONDUIT TO EQUIPMENT FOR BOTH VIBRATION ISOLATION AND MAINTENANCE.

SURFACE MOUNTED RACEWAYS AS INDICATED ON THE DRAWINGS SHALL BE FURNISHED AND INSTALLED BY THE ELECTRICAL CONTRACTOR. ALL RACEWAYS SHALL BE FIELD PAINTED BY THE GENERAL CONTRACTOR.

- C) EXISTING EQUIPMENT MODIFICATIONS - THE CONTRACTOR SHALL PROVIDE THE NECESSARY ELECTRICAL MODIFICATIONS OF THE EXISTING ELECTRICAL WORK BASED ON THE EXISTING FIELD CONDITIONS AND PROPOSED NEW WORK. ALL EXISTING WIRING AND EQUIPMENT NOT REUSED SHALL BE DEMOLISHED COMPLETELY. THE ORIGINAL EQUIPMENT MANUFACTURER SHALL BE CONTACTED IN ORDER TO FURNISH AND ANY NECESSARY EXISTING POWER DISTRIBUTION EQUIPMENT MODIFICATIONS. ALL NEW CIRCUIT BREAKERS SHALL MATCH THE ORIGINAL UNITS AND SUPPLIED BY THE ORIGINAL MANUFACTURER.

- D) NAMEPLATES AND PANELBOARD CIRCUIT DIRECTORIES - ALL NEW AND EXISTING/MODIFIED ELECTRICAL EQUIPMENT (PANELBOARDS, STARTERS, SWITCHES, ETC) SHALL HAVE ENGRAVED PLASTIC NAMEPLATES WITH THEIR NAME, VOLTAGE, PHASES, WIRES, FREQUENCY AND POWER SUPPLY SOURCE INDICATED. ALL NEW AND EXISTING/MODIFIED PANELBOARDS BRANCH CIRCUIT DIRECTORIES SHALL BE TYPED. THE EXISTING MODIFIED PANELBOARDS SHALL HAVE NEW TYPED DIRECTORIES INSTALLED.

SPECIAL PURPOSE POWER RECEPTACLES SHALL BE IDENTIFIED WITH SMALL ENGRAVED PLASTIC NAMEPLATES (I.E.COPIER).

- E) WIRING DEVICES - ALL WIRING DEVICES SHALL BE HEAVY DUTY SPECIFICATION GRADE QUALITY. ALL SWITCHES SHALL BE RATED FOR 20 AMPERES AT 120/277 VAC AND ALL RECEPTACLES SHALL BE 20 AMPERES AT 120VAC. ALL WIRING DEVICES SHALL BE "WHITE" WITH STAINLESS STEEL FACEPLATES. THE TOGGLE TYPE DISCONNECT SWITCHES SHALL BE HORSEPOWER INDUCTIVE LOAD RATED.

#### 13) INSTALLATION -

- A) WIRING IDENTIFICATION - ALL POWER WIRING SHALL BE COLOR CODED PER ITS VOLTAGE CLASS AND HAVE SELF ADHESIVE NUMERICAL IDENTIFICATION TAGS THAT INDICATES THE PANELBOARD AND BRANCH CIRCUIT NUMBER. ALL FIRE ALARM WIRING SHALL HAVE NUMERICAL SELF ADHESIVE IDENTIFICATION AT ALL TERMINATIONS.

- B) ELECTRICAL EQUIPMENT - EQUIPMENT SHALL BE LEVEL, PLUMB AND TRUE WITH THE STRUCTURE AND OTHER EQUIPMENT; ALSO IN A HORIZONTAL OR VERTICAL POSITION AS INTENDED.

- C) RACEWAYS - RACEWAYS SHALL BE FIRMLY AND SECURELY FASTENED TO OR SUPPORTED FROM THE BUILDING STRUCTURE OR STRUCTURAL MEMBER.

EXPOSED RACEWAYS SHALL BE RUN PARALLEL AND PERPENDICULAR TO THE BUILDING SURFACE OR EXPOSED STRUCTURAL MEMBERS AND FOLLOW THE SURFACE CONTOURS AS MUCH AS PRACTICAL TO PRESENT A NEAT APPEARANCE. USE EXPANSION FITTINGS ACROSS ALL BUILDING EXPANSION JOINTS.

RACEWAYS TO EQUIPMENT SUBJECT TO VIBRATION (IE. MOTORS, TRANSFORMERS, ETC.) SHALL BE TERMINATED IN A BOX AND FINAL CONNECTIONS MADE WITH FLEXIBLE CONDUIT. THE BOX SHALL BE LOCATED AS CLOSE AS PRACTICAL TO THE EQUIPMENT TERMINALS.

- D) METAL-CLAD (MC) CABLE - TYPE MC CABLES SHALL BE INSTALLED IN STRICT ACCORDANCE WITH THE LATEST VERSION OF NECA/NACMA-120, "STANDARD FOR INSTALLING ARMORED CABLE (AC) AND METAL-CLAD CABLE (MC)".

ALL MC WIRING SHALL BE UNTWISTED, UNTANGLED, BUNDLED AND INSTALLED PARALLEL OR PERPENDICULAR TO WALLS IN A NEAT AND WORKMANLIKE MANNER. NO DIAGONAL RUNS SHALL BE PERMITTED. MC WIRING MUST BE SECURED AND SUPPORTED EVERY 6FT WITH METAL CLIPS. THE WIRES OR TEFLON TIE WRAPS ARE NOT ACCEPTABLE. MC CABLES MUST ALSO BE SECURED WITHIN 1/2IN OF EVERY BOX, CABINET, FITTING OR CABLE TERMINATION AND SUPPORTED PROPERLY WHERE THEY ARE ROUTED AROUND OBSTACLES.

ALL MC CABLE SPLICES AND TERMINATIONS MUST BE PROVIDED WITH ANTI-SHORT BUSHINGS AND MADE IN A SUITABLE ENCLOSURE, BOX OR OTHER SUITABLE FITTING SUCH AS A CONDUIT BODY. ANY MC WIRING, WHICH DOES NOT MEET THESE SPECIFICATION REQUIREMENTS, MAY AT THE OPTION OF THE ENGINEER BE REMOVED AND REPLACED BY THE ELECTRICAL CONTRACTOR AT NO ADDITIONAL COST.

- E) HANGERS AND SUPPORTS - ALL ELECTRICAL MATERIALS OR EQUIPMENT SHALL BE FIRMLY SUPPORTED TO THE BUILDING STRUCTURE OR STRUCTURAL MEMBER IN A SAFE AND PERMANENT MANNER BY THE USE OF HANGERS AND SUPPORTS.

- F) JUNCTION BOX IDENTIFICATION - ALL POWER JUNCTION BOXES SHALL HAVE THE VOLTAGE AND PANELBOARD/CIRCUIT NUMBERS OF ITS CONDUCTORS MARKED ON ITS COVER PLATE.

- G) POWER WIRING TERMINATIONS - ALL FEEDER TERMINATIONS SHALL BE COMPLETED WITH MULTI-LUG CONNECTORS IN THE WIREWAY. SPLIT-BOLT TAPED CONNECTORS ARE NOT ACCEPTABLE. ALL LUGS AT THE CONNECTORS AND EQUIPMENT SHALL BE TORQUED TO THE RECOMMENDED PRESSURES.

- H) INSPECTIONS - ALL ELECTRICAL WORK AND MATERIAL SHALL BE ROUGH AND FINAL INSPECTED BY THE ARCHITECT/ENGINEER, PRIOR TO ACCEPTANCE AND PROGRESS PAYMENTS. ALL CIRCUITS AND EQUIPMENT CONTROL/ALARM SHALL BE FIELD DEMONSTRATED BY THE ELECTRICAL CONTRACTOR TO INDICATE PROPER COORDINATION, WIRING AND OPERATION. IF THE ROUGH INSPECTIONS ARE NOT REQUESTED UNTIL THE DROP CEILINGS ARE INSTALLED, THE EC SHALL REMOVE CEILING TILES AS REQUIRED FOR ENGINEERING INSPECTIONS.

- I) FIELD TESTING - ALL NEW DISTRIBUTION EQUIPMENT, BREAKERS, FEEDER WIRING AND GROUNDING SYSTEM SHALL BE TESTED TO "NETA" STANDARDS.

THE EC SHALL FIELD TEST ALL RECEPTACLES WITH PLUG-IN TESTER FOR POLARITY, OVERLOAD, GROUND-FAULT, ETC.

THE EC SHALL BE RESPONSIBLE FOR ALL TESTS RECORDS AND CERTIFICATIONS. THE TESTS SHALL BE PERFORMED AFTER THE EQUIPMENT INSTALLATION. FURNISH FIVE COPIES OF ALL TEST RESULTS AND INSPECTION REPORTS TO PRIME CONSULTANT AND ENGINEER.

IF TESTS AND INSPECTION DATA INDICATE DEFICIENCIES IN THE OPERATION OF DIVERSE COMPONENTS, THE CONTRACTOR SHALL PROMPTLY CAUSE THE NECESSARY ADJUSTMENTS, CORRECTIONS, MODIFICATION AND/OR REPLACEMENTS NECESSARY TO BE MADE TO MEET THE SPECIFIED REQUIREMENTS AT NO ADDITIONAL COST TO THE BUILDING OWNER OR TENANT. CONTRACTOR SHALL REPEAT ALL THE TESTS ON COMPONENTS PREVIOUSLY FOUND DEFICIENT.

MARK	DATE	DESCRIPTION
1	02/22/2023	FOR CONSTRUCTION
PROJECT NO: <i>E22040</i>		
CAD DWG FILE: <i>E22040 E301.DWG</i>		
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<b>ELECTRICAL SPECIFICATIONS</b>		
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