CITY OF NEWTON
PURCHASING DEPARTMENT

CONTRACT FOR PUBLIC BUILDINGS

PROJECT MANUAL:

FIELD FACILITY BUILDING
NEWTON SOUTH HIGH SCHOOL

***INVITATION FOR BID* #12-15**

Pre Bid Meeting Date: September 22, 2011 at 12:30 p.m.

Filed Sub Opening Bid Date: September 29, 2011 at 12:30 p.m.

General Bid Opening Date: October 13, 2011 at 12:30 p.m.

Plans and Specifications
Prepared by:

Raymond Design Associates, Inc.
222 North Street
Hingham, Ma. 02043

SEPTEMBER 15, 2011

Setti D. Warren, Mayor

CITY OF NEWTON, MASSACHUSETTS

PURCHASING DEPARTMENT
purchasing@newtonma.gov
Fax (617) 796-1227

October 18, 2011

ADDENDUM #4

INVITATION FOR BID #12-15

FIELD FACILITY BUILDING AT NEWTON SOUTH HIGH SCHOOL

THIS ADDENDUM IS TO: **Address the following issue:**

Please disregard the N/A's located on page 2 of the General Contractor's bid price sheet. Please submit your bid using the attached bid price sheet without the N/A's.

Reminder, all bids are due Thursday, October 20, 2011 at 12:30.

All other terms and conditions of this bid remain unchanged.

PLEASE ENSURE THAT YOU ACKNOWLEDGE THIS ADDENDUM ON YOUR BID FORM.

Thank you.

Rositha Durham
Chief Procurement Officer

CITY OF NEWTON

DEPARTMENT OF PURCHASING

FORM FOR GENERAL BID #12-15

TO THE AWARDING AUTHORITY:

A. The undersigned proposes to furnish all labor and materials required for the new Field Facility Building at Newton South High School in Newton, Massachusetts in accordance with the accompanying plans and specifications prepared by Raymond Design Associates, Inc. for the contract price specified below, subject to additions and deductions according to the terms of the specifications.

B. This bid includes addenda number(s) _____, _____, _____, _____,

C. The proposed contract price is:

_____DOLLARS ($ _____)

COMPANY:_____

D. The sub-division of the proposed contract price is as follows:

Item 1. The work of the General Contractor, being all work other than that covered by Item 2

Total of Item 1: $ _____

Item 2. Sub-bids as follows:

Sub-Trade	Name of Sub-bidder	Amount	Bond Required ? (Yes or No)
MASONRY	_____	$ _____	_____
PLUMBING	_____	$ _____	_____
ELECTRICAL	_____	$ _____	_____

Total of Item 2: $ _____

The undersigned agrees that each of the above named sub-bidders will be used for the work indicated at the amount stated, unless a substitution is made. The undersigned further agrees to pay the premiums for the performance and payment bonds furnished by sub-bidders as requested herein and that all of the cost of all such premiums is included in the amount set forth in Item 1 of this bid.

The undersigned agrees that if s/he is selected as general contractor, s/he will promptly confer with the awarding authority on the question of sub-bidders; and that the awarding authority may substitute for any sub-bid listed above a sub-bid filed with the awarding authority by another sub-bidder for the sub-trade against whose standing and ability the undersigned makes no objection; and that the undersigned will use all such finally selected sub-bidders at the amounts named in their respective sub-bids and be in every way as responsible for them and their work as if they had been originally named in this general bid, the total contract price being adjusted to conform thereto.

E. The undersigned has completed and submits herewith the following documents:

- ❑ Signed Bid Form along with Form of Organization Sheet, 3 pages
- ❑ Bidder's Qualifications and References Form, 2 pages
- ❑ Certificate of Non-Collusion, 1 page
- ❑ A five percent (5%) bid deposit/bid guarantee
- ❑ DCAM Certificate of Eligibility, Form CQ 7 (Supplied by Bidder)
- ❑ DCAM Update Statement, Form CQ-3 (Supplied by Bidder)

F. The undersigned agrees that, if s/he is selected as general contractor, s/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 performance bond and also a labor and materials or payment bond, each of a surety company qualified to do business under the laws of the commonwealth and satisfactory to the awarding authority and each in the sum of the contract price, the premiums for which are to be paid by the general contractor and are included in the contract price.

The undersigned hereby certifies that s/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 and that s/he will comply fully with all laws and regulations applicable to awards made subject to section forty-four A of M.G.L. Chapter 149.

The undersigned further certifies that s/he intends to comply with the City of Newton Minority/Women Business Enterprise Plan, dated December 1999 to further expand business opportunities for minority firms.

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 work 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 _____

_____
(Name of General Bidder)

BY:_____
(Signature)

_____
(Printed Name and Title of Signatory)

_____
(Business Address)

_____
(City, State Zip)

_____/_____
(Telephone / FAX)

_____
(E-mail address)

NOTE: If the bidder is a corporation, indicate state of incorporation under signature, and affix corporate seal; if a partnership, give full names and residential addresses of all partners; and if an individual, give residential address if different from business address.

END OF GENERAL BID FORM

CITY OF NEWTON, MASSACHUSETTS

PURCHASING DEPARTMENT
purchasing@newtonma.gov
Fax (617) 796-1227

September 28, 2011

ADDENDUM #3

INVITATION FOR BID #12-15

FIELD FACILITY BUILDING AT NEWTON SOUTH HIGH SCHOOL

THIS ADDENDUM IS TO: **Answer the following Questions:**

Q1. Are all electrical power outlets to have a lockable cover?
A1. All power outlets in the Drawings are to be lockable in accordance with Note #7 of the 'Power Notes' under Detail 1/E1.0.

Q2. What is the model number of the electrical handhole shown in 2/E2.0?
A2. Per Note 3 of Detail 1/E2.0 the mfr of the handhole is 'Quazite' (or equal) and the model type is 'Composite Stackable' (or equal). The dimensions of the handhole are shown in the 'Electrical Handhole Detail' on Drawing E2.0.

Q3. What trim kits are to be used for the recessed lighting?
A3. Provide trim kits for gypsum wallboard ceilings.

Q4. Will the filed sub-bid deadline be moved?
A4. Yes see Addendum #2

All other terms and conditions of this bid remain unchanged.

PLEASE ENSURE THAT YOU ACKNOWLEDGE THIS ADDENDUM ON YOUR BID FORM.

Thank you.

Rositha Durham
Chief Procurement Officer

CITY OF NEWTON, MASSACHUSETTS

PURCHASING DEPARTMENT
purchasing@newtonma.gov
Fax (617) 796-1227

September 28, 2011

ADDENDUM #2

INVITATION FOR BID #12-15

FIELD FACILITY BUILDING AT NEWTON SOUTH HIGH SCHOOL

THIS ADDENDUM IS TO: **Answer the following Questions:**

This Addendum is to Change the Filed Sub Bid Opening the General Bid Opening Date's to:

Filed Sub Bids: October 6, 2011 at 12:30 p.m.

General Bid Opening Date: October 20, 2011 at 12:30 p.m.

All other terms and conditions of this bid remain unchanged.

PLEASE ENSURE THAT YOU ACKNOWLEDGE THIS ADDENDUM ON YOUR BID FORM.

Thank you.

Rositha Durham
Chief Procurement Officer

CITY OF NEWTON, MASSACHUSETTS

PURCHASING DEPARTMENT
purchasing@newtonma.gov
Fax (617) 796-1227

September 27, 2011

ADDENDUM #1

INVITATION FOR BID #12-15

FIELD FACILITY BUILDING AT NEWTON SOUTH HIGH SCHOOL

THIS ADDENDUM IS TO: **Answer the following Questions:**

Q1. Is a photo copy of Bid Bond from surety accepted in file sub bid of electrical or do you need original hard copy with bid?

A1. Original Hard Copy Required.

Q2. Do we need to include bidders' qualification and reference form and certificate of non -collusion from project manual in sub bid?

A2. Yes

Q3. Do we need to give duplicate form of sub bid in submission of bid?

A3. The General Contractor is not required to submit a duplicate form of the filed sub bid but must provide names and prices of subs on the general bid form.

Q4. Town will provide professional survey services for purposes of building permit and final submittal to building dept?

A4. No, bidders must provide the professional land surveyor.

Q5. Door and Frames drawings and specs call out conflicting things (aluminum frames, galv frames, hm doors, fiberglass doors, prehung doors. Please clarify what is required.

A5. Painted hollow metal door frames with fiberglass doors and continuous hinges are required at all doors.

Q6. Masonry jambs (block) should be called out to be filled solid by Masonry filed sub if door jambs are installed after masonry is erected.

A6. Masonry jambs (block cores) shall be filled solid by Masonry filed sub at all door jambs, whether door frames are installed before or after masonry is erected

Q7. Staging by Masonry Filed sub should be called out for staging to extend high enough to allow weather protection to be installed on masonry scaffolding.

A7. Staging by Masonry Filed sub shall extend high enough to allow weather protection to be installed on masonry scaffolding

Q8. S101/1 calls out slab on grade. Actually structural slab is 12" imported select granular fill needed? If needed what is spec on this?

A8. Delete reference to slab on grade and structural fill. It is a framed slab supported on piles.

Q9. Is filed sub plumber to take water and sewer lines to town provided capped connections or just 10' beyond building?

A9. Filed sub plumber to take water and sewer lines to city-provided capped connections shown on the Drawings.

Q10. Hung unit heater shown on H1. There is no unit heater correct?

A10. There are no unit heaters on the job.

Q11. Geotech report will be made available?

A11. The geotech report will be made available to the contractor awarded the job, after award. There is one boring in the location of the building and the remainder of the report covers the area of the football field, track and bleachers.

Q12. Asphalt roadway to site is structurally suitable for the installation equipment, concrete trucks and other deliveries including masonry and other trade deliveries?

A12. For the purposes of the bid, assume that concrete and other trucks can access the site via the asphalt path. Small six-wheel trucks loaded with stone have used the path without incident to date. If another finding is made after award, the contract will be adjusted.

Q13. Is electrical conduit EMT or Galvanized Steel?

A10. All electrical conduits on the job is to be galvanized steel, suitable for installation in masonry walls. All device boxes are to be recessed in CMU walls.

All other terms and conditions of this bid remain unchanged.

PLEASE ENSURE THAT YOU ACKNOWLEDGE THIS ADDENDUM ON YOUR BID FORM.

Thank you.

Rositha Durham

Rositha Durham
Chief Procurement Officer

PROJECT DIRECTORY

OWNER

Newton South High School
140 Brandeis Road
Newton Centre, Massachusetts

ARCHITECT

Raymond Design Associates, Inc.
222 North Street
Hingham, Ma 02043

CONSULTANTS

STRUCTURAL ENGINEER

RRC Engineering
78 South Street
Wrentham, Massachusetts 02093

MECHANICAL, ELECTRICAL, PLUMBING AND FIRE PROTECTION ENGINEERING

WB&A Wozny/Barbar & Associates, Inc.
1090 Washington Street
Hanover, Massachusetts 02339

SPECIFICATIONS CONSULTANT

Wil-Spec LLC
Lynnfield Medical Office Building
15 Post Office Square
South Lynnfield, Massachusetts 01940

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CITY OF NEWTON

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CITY OF NEWTON

PURCHASING DEPARTMENT

INVITATION FOR BID #12-15

The City of Newton invites sealed bids from Contractors for

FIELD FACILITY BUILDING
NEWTON SOUTH HIGH SCHOOL

Pre-bid Meeting will be held on site at: **12:30 p.m., September 22, 2011, 140 Brandeis Road at the sports field**
Filed Sub-Bids will be received until: **12:30 p.m., September 29, 2011**
General Contractors Bids will be received until: **12:30 p.m., October 13, 2011**
at the Purchasing Department, Room 204, Newton City Hall, 1000 Commonwealth Ave., Newton, MA 02459. Immediately following the deadline for filed sub bids all bids received within the time specified will be publicly opened and read aloud. Sub-Bid tabulation sheets will be available, online, to all General Bidders.

Contract Documents will be available on line at: **www.ci.newton.ma.us/bids** or for pickup at the Purchasing Department after 10:00 a.m., September 15, 2011.

There is no charge for contract documents. **Bids shall be submitted with one original and one copy.**

Work under this contract shall consist of: Construction of a New Field Facility Building (toilets and concessions) at the existing football/track complex at Newton South High School.

Work is expected to be completed within 180 calendar days from the Notice to Proceed.

All bidders are encouraged to attend the pre-bid conference. No allowance or adjustment to the contract price will be made on account of bidder's failure to become fully familiar with local conditions affecting the cost of work.

All General Bids must be accompanied by a copy of a "Certificate of Eligibility" (DCAM Form CQ-7) issued by the Department of Capital Asset Management (DCAM) and a "Contractor Update Statement" DCAM Form CQ-3). The category of work for which the Bidder must certified is: **General Building Construction**

All Filed Sub Bids must be accompanied by a copy of a "Certificate of Eligibility" (DCAM Form CQ-7) issued by the Department of Capital Asset Management (DCAM) and a "Contractor Update Statement" DCAM Form CQ-3). The category of work for which the Filed Sub Bidder(s) must be certified are: **Masonry**
Plumbing
Electrical

A bid deposit in an amount that is not less than five percent (5%) of the value of the bid, including all add alternates, is required. Bid deposits, payable to the City of Newton, shall be either in the form of a bid bond, or cash, or a certified check on, or a treasurer's or cashier's check issued by, a responsible bank or trust company. The City of Newton will award the contract to the lowest eligible and responsible bidder. Please Note: this bid, in accordance with the Chapter 303 Acts of 2008, contains Price Adjustments and new Prevailing Wage requirements. All bidders are required to familiarize themselves with these terms and conditions before submitting a bid.

All bids are subject to the provisions of M.G.L. Chapter 149, Section 44 A-J. **Wages are subject** to minimum wage rates determined by the Massachusetts Department of Labor and Industries pursuant to M.G.L. Chapter 149, Sec. 26 to 27H. The schedule of wage rates applicable to this contract is included in the bidding documents. In addtion, the prevailing wage schedule will be updated annually for all public construction projects lasting longer than one (1) year. You will be required to pay the rates set out in any updated prevailing wage schedule. Increases in prevailing wage schedules will not be the basis for change order requests. The successful bidder will be required to provide a Certificate of Insurance demonstrating current coverage of the type and amounts set forth in the Project Manual**.** The successful bidder will be required to furnish a **Performance and Labor and Materials Payment Bond each in the amount of 100%** of the contract total.

Once you've downloaded this bid from the internet website: **www.ci.newton.ma.us/bids** I strongly suggest you email (purchasing@newtonma.gov) your company's Name, address, EMAIL, phone, fax AND the INVITATION FOR BID NUMBER and Project Title, so that we may add you to the Bidders List and you will be notified of any/all addendums.

The City of Newton will reject any and all bids when required to do so by the above referenced General Laws. In addition, the City of Newton reserves the right to waive any informalities in any or all bids, or to reject any or all bids (in whole or in part) if it be in the public interest to do so.

City of Newton

Rositha Durham
Chief Procurement Officer

September 15, 2011

CITY OF NEWTON

DEPARTMENT OF PURCHASING

INSTRUCTIONS TO BIDDERS

ARTICLE 1 - BIDDER'S REPRESENTATION

1.1 Each General Bidder (hereinafter called the "Bidder") by making a bid (hereinafter called "bid") represents that:

1. The Bidder has read and understands the Contract Documents and the bid is made in accordance therewith.

2. The Bidder has visited the site and is familiar with the local conditions under which the Work has to be performed.

1.2 Failure to so examine the Contract Documents and site will not relieve any Bidder from any obligation under the bid as submitted.

ARTICLE 2 - REQUEST FOR INTERPRETATION

2.1 Bidders shall promptly notify the City of any ambiguity, inconsistency, or error which they may discover upon examination of the Contract Documents, the site, and local conditions.

2.2 Bidders requiring clarification or interpretation of the Contract Documents shall make a written request to the *Chief Procurement Officer*, at purchasing@newtonma.gov or via facsimile (617) 796-1227. The City will answer such requests if received Friday, September 23, 2011 at 12:00 noon.

2.3 Interpretation, correction, or change in the Contract Documents will be made by Addendum which will become part of the Contract Documents. The City will not be held accountable for any oral instruction.

2.4 Addenda will be emailed to every individual or firm on record as having taken a set of Contract Documents.

2.5 Copies of addenda will be made available for inspection at the location listed in the Invitation for Bids where Contract Documents are on file, in addition to being available online at **www.ci.newton.ma.us/bids**.

2.6 Bidders or proposers contacting ANY CITY EMPLOYEE regarding an Invitation for Bid (IFB) or a Request for Proposal (RFP), outside of the Purchasing Department, once an IFB or RFP has been released, may be disqualified from the bidding process.

2.7 Bidders downloading information off the internet web site are soley responsible for obtaining any addenda prior to the bid opening. If the bidder makes themselves known to the Purchasing Dept., at purchasing@newtonma.gov or via facsimile (617) 796-1227, they shall be placed on the bidder's list. Bidders must provide the Purchasing Dept. with their company's name, street address, city, state, zip, phone, fax, email address and **INVITATION FOR BID # 12-15**.

ARTICLE 3 - MBE PARTICIPATION

3.1 Notice is hereby given that the Mayor's Affirmative Action Plan for the City of Newton, dated is applicable to all contracts in excess of $10,000.00. A copy of this plan is on file at City of Newton Purchasing Department.

3.2 Notice is hereby given that the City of Newton Minority/Women Business Enterprise Plan dated December 1999 and the Supplemental Equal Employment Opportunity Anti-Discrimination and Affirmative Action Program is applicable to all City contracts for goods and services in excess of $50,000.00. Copies of these plans are incorporated in the bidding documents.

ARTICLE 4 - PREPARATION AND SUBMISSION OF BIDS

4.1 Bids shall be submitted on the "Form for General Bid" or "Form for Sub Bid" as appropriate, furnished by the City.

4.2 All entries on the Bid Form shall be made by typewriter or in ink.

4.3 Where so indicated on the Bid Form, sums shall be expressed in both words and figures. Where there is a discrepancy between the bid sum expressed in words and the bid sum expressed in figures, the words shall control.

4.4 Bid Deposits shall be submitted in the amount specified in the Invitation for Bids. They shall be made payable to the City of Newton and shall be either in the form of cash, certified check, treasurer's or cashier's check issued by a responsible bank or trust company, or a bid bond issued by a surety licensed to do business in the Commonwealth of Massachusetts; and shall be conditioned upon the faithful performance by the principal of the agreements contained in the bid.

Bid deposits of the three (3) lowest responsible and eligible Bidders shall be retained until the execution and delivery of the Owner/Contractor agreement.

4.5 The Bid, including the bid deposit shall be enclosed in a sealed envelope with the following plainly marked on the outside:

* GENERAL (or SUB) BID FOR:

* NAME OF PROJECT AND INVITATION NUMBER

* BIDDER'S NAME, BUSINESS ADDRESS, AND PHONE NUMBER

4.6 Date and time for receipt of bids is set forth in the Invitation for Bids.

4.7 Timely delivery of a bid at the location designated shall be the full responsibility of the Bidder.

4.8 All bids shall be submitted with one ORIGINAL and one COPY.

ARTICLE 5 - ALTERNATES

5.1 Each Bidder shall acknowledge Alternates (if any) in Section C on the Bid Form.

5.2 In the event an Alternate does not involve a change in the amount of the base bid, the Bidder shall so indicated by writing "No Change", or "N/C" or "0" in the space provided for that Alternate.

5.3 Bidders shall enter on the Bid Form a single amount for each Alternate which shall consist of the amount for work performed by the Contractor.

5.4 The low Bidder will be determined on the basis of the sum of the base bid and the accepted alternates.

ARTICLE 6 - WITHDRAWAL OF BIDS

6.1 Any bid may be withdrawn prior to the time designated for receipt of bids on written or telegraphic request. Telegraphic withdrawal of bids must be confirmed over the Bidder's signature by written notice postmarked on or before the date and time set for receipt of bids.

6.2 Withdrawn bids may be resubmitted up to the time designated for the receipt of bids.

6.3 No bids shall be withdrawn within thirty days, Saturdays, Sundays and legal holidays excluded, after the opening of the bids.

ARTICLE 7 - CONTRACT AWARD

7.1 The City of Newton will award the contract to the lowest eligible and responsible Bidder within thirty days, Saturdays, Sundays, and legal holidays excluded after the opening of bids.

7.2 The City of Newton reserves the right to waive any informalities in or to reject any or all Bids if it be in the public interest to do so.

7.3 As used herein, the term "lowest responsible and eligible Bidder" shall mean the Bidder (1) whose bid is the lowest of those bidders possessing the skill, ability and integrity necessary for the faithful performance of the work; (2) who shall

certify that he is able to furnish labor that can work in harmony with all other elements of labor employed or to be employed in the work; (3) who, where the provisions of section eight B of chapter twenty-nine apply, shall have been determined to be qualified thereunder.

7.4 Subsequent to the award and within five (5) days, Saturday, Sundays and legal holidays excluded, after the prescribed forms are presented for signature, the successful Bidder shall execute and deliver to the City a Contract in the form included in the Contract Documents in such number of counterparts as the City may require.

7.5 In the event that the City receives low bids in identical amount from two or more responsive and responsible Bidders, the City shall select the successful Bidder by a blind selection process such as flipping a coin or drawing names from a hat. The low Bidders who are under consideration will be invited to attend and observe the selection process.

ARTICLE 8 - TAXES

8.1 The Bidder shall not include in this bid any tax imposed upon the sale or rental of tangible personal property in this Commonwealth, such as any and all building materials, supplies, services and equipment required to complete the work.

8.2 The City is exempt from payment of the Massachusetts Sales Tax, and the Bidder shall not include any sales tax on its bid. The City's exemption Number is E-046-001-404.

END OF SECTION

CITY OF NEWTON

DEPARTMENT OF PURCHASING

FORM FOR GENERAL BID #12-15

TO THE AWARDING AUTHORITY:

A. The undersigned proposes to furnish all labor and materials required for the new Field Facility Building at Newton South High School in Newton, Massachusetts in accordance with the accompanying plans and specifications prepared by Raymond Design Associates, Inc. for the contract price specified below, subject to additions and deductions according to the terms of the specifications.

B. This bid includes addenda number(s) _____, _____, _____, _____,

C. The proposed contract price is:

_____DOLLARS ($ _____)

COMPANY:_____

D. The sub-division of the proposed contract price is as follows:

Item 1. The work of the General Contractor, being all work other than that covered by Item 2

Total of Item 1: $ N/A

Item 2. Sub-bids as follows:

Sub-Trade	Name of Sub-bidder	Amount	Bond Required ? (Yes or No)
MASONRY	N/A	$ N/A	N/A
PLUMBING	N/A	$ N/A	N/A
ELECTRICAL	N/A	$ N/A	N/A

Total of Item 2: $ N/A

The undersigned agrees that each of the above named sub-bidders will be used for the work indicated at the amount stated, unless a substitution is made. The undersigned further agrees to pay the premiums for the performance and payment bonds furnished by sub-bidders as requested herein and that all of the cost of all such premiums is included in the amount set forth in Item 1 of this bid.

The undersigned agrees that if s/he is selected as general contractor, s/he will promptly confer with the awarding authority on the question of sub-bidders; and that the awarding authority may substitute for any sub-bid listed above a sub-bid filed with the awarding authority by another sub-bidder for the sub-trade against whose standing and ability the undersigned makes no objection; and that the undersigned will use all such finally selected sub-bidders at the amounts named in their respective sub-bids and be in every way as responsible for them and their work as if they had been originally named in this general bid, the total contract price being adjusted to conform thereto.

E. The undersigned has completed and submits herewith the following documents:

- ❑ Signed Bid Form along with Form of Organization Sheet, 3 pages
- ❑ Bidder's Qualifications and References Form, 2 pages
- ❑ Certificate of Non-Collusion, 1 page
- ❑ A five percent (5%) bid deposit/bid guarantee
- ❑ DCAM Certificate of Eligibility, Form CQ 7 (Supplied by Bidder)
- ❑ DCAM Update Statement, Form CQ-3, (Supplied by Bidder)

F. The undersigned agrees that, if s/he is selected as general contractor, s/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 performance bond and also a labor and materials or payment bond, each of a surety company qualified to do business under the laws of the commonwealth and satisfactory to the awarding authority and each in the sum of the contract price, the premiums for which are to be paid by the general contractor and are included in the contract price.

The undersigned hereby certifies that s/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 and that s/he will comply fully with all laws and regulations applicable to awards made subject to section forty-four A of M.G.L. Chapter 149.

The undersigned further certifies that s/he intends to comply with the City of Newton Minority/Women Business Enterprise Plan, dated December 1999 to further expand business opportunities for minority firms.

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 work 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 _____

_____
(Name of General Bidder)

BY:_____
(Signature)

_____
(Printed Name and Title of Signatory)

_____
(Business Address)

_____
(City, State Zip)

_____/_____
(Telephone / FAX)

_____
(E-mail address)

NOTE: If the bidder is a corporation, indicate state of incorporation under signature, and affix corporate seal; if a partnership, give full names and residential addresses of all partners; and if an individual, give residential address if different from business address.

END OF GENERAL BID FORM

Please complete this form and <u>attach it to your Bid Form</u>, regardless of it being a Form for General Bid or Sub Bid.

NOTE: Indicate form of organization. If the bidder is a corporation, indicate state of incorporation and affix corporate seal; if a partnership, give full name and residential addresses of all partners; and if an individual, give residential address if different from business address.

_____

Form of organization

_____

Partnership/individual names and addresses

_____

_____

I,_____ certify that I am the Secretary-Clerk of the corporation named as Bidder on the attached Bid Form, that_____, who signed the Bid Form on behalf of the corporation was then _____ of said corporation, and that his/her signature was genuine and that said Bid Form was duly signed, sealed and executed on behalf of said corporation.

(Corporate Seal)

FORM FOR SUB-BID #12-15

To all General Bidders Except those Excluded:

A. The Undersigned proposes to furnish all labor and materials required for completing, in accordance with the hereinafter described plans, specifications and addenda, all the work specified in Section No. _____ of the specifications and in any plans specified in such section, prepared by Raymond Design Associates, Inc. for the new Field Facility Building at Newton South High School in Newton, Massachusetts, for the contract sum of _____ _____dollars ($_____).

B. This sub-bid includes addenda numbered___, _____, _____, _____, _____, _____,

C. This sub-bid

☐ may be used by any general bidder except:

_____
_____

☐ may only be used by the following general bidders:

_____
_____

[To exclude general bidders, insert "X" in one box only and fill in blank following that box. Do not answer C if no general bidders are excluded.}

D. The undersigned agrees that, if he is selected as a sub-bidder, he will, within 5 days, Saturdays, Sundays and legal holidays excluded, after presentation of a subcontract by the general bidder selected as the general contractor, execute with such general bidder a subcontract in accordance with the terms of this sub-bid, and contingent upon the execution of the general contract, and, if requested so to do in the general bid by the general bidder, who shall pay the premiums therefor, or if prequalification is required pursuant to section 44D 3/4, furnish a performance and payment bond of a surety company qualified to do business under the laws of the commonwealth and satisfactory to the awarding authority, in the full sum of the subcontract price.

E. The names of all persons, firms and corporations furnishing to the undersigned labor or labor and materials for the class or classes or part thereof of work for which the provisions of the section of the specifications for this sub-trade require a listing in this paragraph, including the undersigned if customarily furnished by persons on his own payroll and in the absence of a contrary provision in the specifications, the name of each such class of work or part thereto and the bid price for such class of work or part thereof are:

Name	Class of Work	Bid price
_____	_____	_____
_____	_____	_____
_____	_____	_____
_____	_____	_____
_____	_____	_____

[Do not give bid price for any class or part thereof furnished by undersigned.]

F. The undersigned agrees that the above list of bids to the undersigned represents bona fide bids based on the hereinbefore described plans, specifications and addenda and that, if the undersigned is awarded the contract, they will be used for the work indicated at the amounts stated, if satisfactory to the awarding authority.

G. The undersigned further agrees to be bound to the general contractor by the terms of the hereinbefore described plans, specifications, including all general conditions stated therein, and addenda, and to assume toward him all the obligations and responsibilities that he, by those documents, assumes toward the owner.

H. The undersigned offers the following information as evidence of his qualifications to perform the work as bid upon according to all the requirements of the plans and specifications:

1. Have been in business under present business name _____ years.

2. Ever failed to complete any work awarded?_____

3. List one or more recent buildings with names of the general contractor and architect on which you served as a sub-contractor for work of similar character as required for the above-named building.

	Building	Architect	General Contractor	Amount of Contract
(a)	_____	_____	_____	_____
(b)	_____	_____	_____	_____
(c)	_____	_____	_____	_____

4. Bank reference _____

I. 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 and that he will comply fully with all laws and regulations applicable to awards of subcontracts subject to section forty-four F.

The undersigned further certifies under penalties of perjury that this sub-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 work 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_____

_____
(Name of Sub-bidder)

By _____
(Signature)

By _____
(Title and Name of Person Signing Bid)

_____
(Business Address)

_____
(Phone, Fax, and E-mail Address)

_____
(City, State, and Zip Code)

END OF FORM FOR SUB-BID

Please complete this form and <u>attach it to your Bid Form</u>, regardless of it being a Form for General Bid or Sub Bid.

NOTE: Indicate form of organization. If the bidder is a corporation, indicate state of incorporation and affix corporate seal; if a partnership, give full name and residential addresses of all partners; and if an individual, give residential address if different from business address.

_____

Form of organization

_____

Partnership/individual names and addresses

_____

_____

I,_____ certify that I am the Secretary-Clerk of the corporation named as Bidder on the attached Bid Form, that_____, who signed the Bid Form on behalf of the corporation was then _____ of said corporation, and that his/her signature was genuine and that said Bid Form was duly signed, sealed and executed on behalf of said corporation.

(Corporate Seal)

_____.

(State of Incorporation)

CITY OF NEWTON

BIDDER'S QUALIFICATIONS AND REFERENCES FORM

All questions must be answered, and the data given must be clear and comprehensive. Please type or print legibly. If necessary, add additional sheet for starred items. This information will be utilized by the City of Newton for purposes of determining bidder responsiveness and responsibility with regard to the requirements and specifications of the Contract.

1. FIRM NAME: _____

2. WHEN ORGANIZED: _____

3 INCORPORATED? _____ YES _____ NO DATE AND STATE OF INCORPORATION: _____

4. IS YOUR BUSINESS A **MBE**? _____YES _____NO **WBE**? _____YES _____NO or **MWBE**? _____YES _____NO

* 5. LIST ALL CONTRACTS CURRENTLY ON HAND, SHOWING CONTRACT AMOUNT AND ANTICIPATED DATE OFCOMPLETION:

_____
_____
_____
_____
_____

* 6. HAVE YOU EVER FAILED TO COMPLETE A CONTRACT AWARDED TO YOU?
_____ YES _____ NO
IF YES, WHERE AND WHY?

_____
_____

* 7. HAVE YOU EVER DEFAULTED ON A CONTRACT? _____ YES _____ NO
IF YES, PROVIDE DETAILS.

_____
_____

* 8. LIST YOUR VEHICLES/EQUIPMENT AVAILABLE FOR THIS CONTRACT:

_____
_____
_____
_____
_____
_____
_____

* 9. IN THE SPACES FOLLOWING, PROVIDE INFORMATION REGARDING CONTRACTS COMPLETED BY YOUR FIRM SIMILAR IN NATURE TO THE PROJECT BEING BID. A MINIMUM OF FOUR (4) CONTRACTS SHALL BE LISTED. PUBLICLY BID CONTRACTS ARE PREFERRED, BUT NOT MANDATORY.

PROJECT NAME: _____
OWNER: _____
CITY/STATE: _____

DOLLAR AMOUNT: $ _____ DATE COMPLETED: _____
PUBLICLY BID? _____YES _____ NO
TYPE OF WORK?: _____
CONTACT PERSON: _____ TELEPHONE #: ____)_____
CONTACT PERSON'S RELATION TO PROJECT?: _____
(i.e., contract manager, purchasing agent, etc.)

PROJECT NAME: _____
OWNER: _____
CITY/STATE: _____
DOLLAR AMOUNT: $ _____ DATE COMPLETED: _____
PUBLICLY BID? _____YES _____ NO
TYPE OF WORK?: _____
CONTACT PERSON: _____ TELEPHONE #: (____)_____
CONTACT PERSON'S RELATION TO PROJECT?: _____
(i.e., contract manager, purchasing agent, etc.)

PROJECT NAME: _____
OWNER: _____
CITY/STATE: _____
DOLLAR AMOUNT: $ _____ DATE COMPLETED: _____
PUBLICLY BID? _____YES _____ NO
TYPE OF WORK?: _____
CONTACT PERSON:_____ TELEPHONE #: (____)_____
CONTACT PERSON'S RELATION TO PROJECT?:_____
(i.e., contract manager, purchasing agent, etc.)

PROJECT NAME: _____
OWNER: _____
CITY/STATE: _____
DOLLAR AMOUNT: $ _____ DATE COMPLETED: _____
PUBLICLY BID? _____YES _____ NO
TYPE OF WORK?: _____
CONTACT PERSON: _____ TELEPHONE #:(____)_____
CONTACT PERSON'S RELATION TO PROJECT?: _____
(i.e., contract manager, purchasing agent, etc.)

10. The undersigned certifies that the information contained herein is complete and accurate and hereby authorizes and requests any person, firm, or corporation to furnish any information requested by the City of Newton in verification of the recitals comprising this statement of Bidder's qualifications and experience.

DATE: _____ BIDDER: _____

SIGNATURE: _____

PRINTED NAME: _____ TITLE: _____

END OF SECTION

CERTIFICATE OF NON-COLLUSION

The undersigned certifies under penalties of perjury that this bid or proposal has been made and submitted in good faith 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 or individuals.

_____
(Signature of individual)

_____
Name of Business

CONTRACT FORMS

The awarded bidder will be required to complete and submit the following documents in order to execute a contract pursuant to this bid.

The forms are provided for informational purposes only.

None of the following forms are required at the time of bid submittal.

CITY - CONTRACTOR AGREEMENT

CONTRACT NO. C- _____

THIS AGREEMENT made this ___ day of _____in the year Two Thousand and Eleven by and between the CITY OF NEWTON, a municipal corporation organized and existing under the laws of the Commonwealth of Massachusetts, hereinafter referred to as the CITY, acting through its Chief Procurement Officer, but without personal liability to him, and

hereinafter referred to as the CONTRACTOR.

The parties hereto for the considerations hereinafter set forth agree as follows:

I. **SCOPE OF WORK.** The Contractor shall furnish all labor, materials and equipment, and perform all work required in strict accordance with the Contract Documents for the following project:

FIELD FACILITY BUILDING
NEWTON SOUTH HIGH SCHOOL

II. **CONTRACT DOCUMENTS.** The Contract documents consist of the following documents, which are either attached to this Agreement or are incorporated herein by referenced:

a. This CITY-CONTRACTOR Agreement;

b. The City's Invitation For Bid #12-15 issued by the Purchasing Department;

c. The Project Manual for Newton South High School Field Facility Building, including Specifications, and if included or referenced therein, any Standard Terms and Conditions, Special Conditions, Equal Opportunity/Affirmative Action Requirements, Wage Rate Requirements, Wage Rate Schedule(s);

d. Addenda Number(s) ___N/A____;

e. The Bid Response of the CONTRACTOR submitted for this Project and accompanying documents and certifications;

f. Certificate(s) of Insurance and surety bond(s) submitted by the CONTRACTOR in connection with this Project;

g. Duly authorized and executed Amendments, Change Orders or Shipping Orders issued by the CITY after execution of this CITY-CONTRACTOR Agreement.

This CITY-CONTRACTOR Agreement, together with the other documents enumerated in this Article, constitute the entire Agreement between the CITY and the CONTRACTOR.

III. **PRIORITY OF DOCUMENTS.** In the event of inconsistency between the terms of this CITY -CONTRACTOR Agreement and the Project Manual, the terms of this Agreement shall prevail.

IV. **APPLICABLE STATUTES.** All applicable federal, state and local laws and regulations are incorporated herein by reference and the Contractor agrees to comply with same.

V. CONTRACT TERM. Work is expected to be completed within 180 calendar days from the Notice to Proceed.

VI. AUTHORIZATION OF AND PAYMENT FOR WORK PERFORMED. The execution of this contract does not constitute a notice to proceed or authorization to perform work. No work shall be commenced unless authorized by a written Work Order prepared by City of Newton Public Buildings Department specifying the work to be performed. The Contractor will be paid following completion and acceptance of the work authorized in accordance with the Contract. The City will use best efforts to pay within thirty (30) days of receipt of an invoice for the work authorized or acceptance of the work whichever date is later.

VII. RESPONSIBILITY FOR THE WORK/INDEMNIFICATION. The Contractor shall take all responsibility for the work, and shall take all precautions for preventing injuries to persons and property in or about the work and shall defend, indemnify and hold the City harmless from all loss, cost, damage or expense arising from injuries to persons or property in or about the work. The Contractor shall be responsible for any damage which may be caused by the failure or insufficiency of any temporary works. He shall effectively protect his work and shall be liable for all damage and loss by delay or otherwise caused by his neglect or failure so to do.

VIII. WARRANTY. Except as may be otherwise provided in the Project Manual, the Contractor shall replace, repair or make good, without cost to the City, any defects or faults arising within one (1) year after date of acceptance of work and materials furnished hereunder (acceptance not to be unreasonably delayed) resulting from imperfect or defective work done or materials furnished by the Contractor.

IX. PATENT INDEMNIFICATION. The Contractor agrees to assume the defense of and shall indemnify and save harmless the City and all persons acting for or on behalf of it from all suits and claims against them, or any of them, arising from or occasioned by the use of any material, equipment or apparatus, or any part thereof which infringes or is alleged to infringe on any patent rights. In case such material, equipment or apparatus, or any part thereof, in any such suit is held to constitute infringement, the Contractor, within a reasonable time, shall at its own expense, and as the City may elect, replace such material, equipment or apparatus with non-infringing material, equipment or apparatus, or remove the material, equipment, or apparatus and refund the sums paid therefor.

X. ASSIGNMENT/SUB-CONTRACTING. The Contractor agrees that he will not sell, assign or transfer this Contract or any part thereof or interest therein without the prior written consent of the City.

XI. TERMINATION. If the work to be done under this Contract shall be abandoned, or if this Contract or any part thereof shall be assigned or transferred, without the previous written consent of the City, or if the Contract or any claim hereunder shall be assigned by the Contractor otherwise than as herein specified, or if at any time the City determines that the conditions herein specified as to the rate of progress are not fulfilled, or that the work or any part thereof, is unnecessarily or unreasonably delayed, or that the Contractor has violated any of the provisions of this Contract, the City may terminate this Contract and/or notify the Contractor to discontinue such work or such part thereof as the City may designate, and the City may thereupon by agreement or otherwise, as it may determine, complete the work, or any part thereof; and for such completion the City for itself or for its Contractor may take possession of and use or cause to be used in the completion of the work thereof any of such materials, apparatus, machinery, implements, and tools of every description as may be found upon said work. Termination pursuant to this paragraph shall not entitle the Contractor to any claim for damages on account thereof, nor shall it relieve the Contractor of any liability under this Contract.

XII. GOVERNING LAW. This Contract shall be governed by and construed in accordance with the laws of the Commonwealth of Massachusetts.

XIII. SEVERABILITY. The provisions of this Contract are severable. If any section, paragraph, clause or provision of this Contract shall be finally adjudicated by a court of competent jurisdiction to be invalid, the remainder of this Contract shall be unaffected by such adjudication and all of the remaining provisions of this Contract shall remain in full force and effect as though such section, paragraph, clause or provision, or any part thereof so adjudicated to be invalid, had not been included herein, unless such remaining provisions, standing alone, are incomplete and incapable of being executed in accordance with the intent of the parties to this Contract.

XIV. AMENDMENTS TO THIS CONTRACT. This Contract may not be amended except in writing executed in the same manner as this CITY-CONTRACTOR Agreement.

IN WITNESS WHEREOF, the parties have caused this instrument to be executed under seal the day and year first above written.

CONTRACTOR

By_____
Title_____

Date_____

Affix Corporate Seal Here

City funds in the amount of
$ _____ are
available in account number
31I401A-5825
I further certify that the Mayor, or his designee, is authorized to execute contracts and approve change orders

By_____
Comptroller of Accounts

Date_____

CITY OF NEWTON

By_____
Chief Procurement Officer

Date_____

By_____
Commissioner of Public Buildings

Date_____

Approved as to Legal Form and Character

By_____
Associate City Solicitor

Date _____

CONTRACT AND BONDS APPROVED

By_____
Mayor or his designee

Date_____

CERTIFICATE OF AUTHORITY - CORPORATE

1. I hereby certify that I am the Clerk/Secretary of _____
(insert full name of Corporation)

2. corporation, and that _____
(insert the name of officer who signed the **contract and bonds**.)

3. is the duly elected_____
(insert the title of the officer in line 2)

4. of said corporation, and that on _____
(insert a date that is ***ON OR BEFORE*** the date the officer signed the **contract and bonds**.)

at a duly authorized meeting of the Board of Directors of said corporation, at which all the directors were present or waived notice, it was voted that

5. _____ the _____
(insert **name** from line 2) (insert **title** from line 3)

of this corporation be and hereby is authorized to execute contracts and bonds in the name and on behalf of said corporation, and affix its Corporate Seal thereto, and such execution of any contract of obligation in this corporation's name and on its behalf, with or without the Corporate Seal, shall be valid and binding upon this corporation; and that the above vote has not been amended or rescinded and remains in full force and effect as of the date set forth below.

6. ATTEST: _____ *AFFIX CORPORATE SEAL HERE*
(Signature of **Clerk or Secretary**)*

7. Name: _____
(Please print or type name in line 6)*

8. Date: _____
(insert a date that is ***ON OR AFTER*** the date the officer signed the **contract and bonds**.)

* The name and signature inserted in lines 6 & 7 **must** be that of the **Clerk or Secretary** of the corporation.

ATTESTATION

Pursuant to MG c. 62C, § 49A, the undersigned acting on behalf of the Contractor, certifies under the penalties of perjury that, to the best of the undersign's knowledge and belief, the Contractor is in compliance with all laws of the Commonwealth relating to taxes, reporting of employees and contractors, and withholding and remitting child support.*

_____
**Signature of Individual
or Corporate Contractor (Mandatory)

_____
*** Contractor's Social Security Number
Voluntary) or Federal Identification Number

By: _____
Corporate Officer
(Mandatory, if applicable)

Date: _____

* The provision in the Attestation relating to child support applies only when the Contractor is an individual.

** Approval of a contract or other agreement will not be granted unless the applicant signs this certification clause.

*** Your social security number will be furnished to the Massachusetts Department of Revenue to determine whether you have met tax filing or tax payment obligations. Providers who fail to correct their non-filing or delinquency will not have a contract or other agreement issued, renewed, or extended. This request is made under the authority of GL c. 62C, § 49A.

CITY OF NEWTON, MASSACHUSETTS

PERFORMANCE BOND

Know All Men By These Presents:

That we, _____, as PRINCIPAL, and _____, as SURETY, are held and firmly bound unto the City of Newton as Obligee, in the sum of

dollars **($_____)** to be paid to the Obligee, for which payments well and truly to be made, we bind ourselves, our respective heirs, executors, administrators, successors and assigns, jointly and severally, firmly by these presents.

Whereas, the said PRINCIPAL has made a contract with the Obligee, bearing the date of _____ _, 2011 for the construction of _____ in Newton, Massachusetts.

(Project Title)

Now, the condition of this obligation is such that if the PRINCIPAL and all Sub-contractors under said contract shall well and truly keep and perform all the undertakings, covenants, agreements, terms and conditions of said contract on its part to be kept and performed during the original term of said contract and any extensions thereof that may be granted by the Obligee, with or without notice to the SURETY, and during the life and any guarantee required under the contract, and shall also well and truly keep and perform all the undertakings, covenants, agreements, terms and conditions of any and all duly authorized modifications, alterations, changes or additions to said contract that may hereafter be made, notice to the SURETY of such modifications, alterations, changes or additions being hereby waived, then this obligation shall become null and void; otherwise, it shall remain in full force, virtue and effect.

In the event, that the contract is abandoned by the PRINCIPAL, or in the event that the Obligee terminates the employment of the PRINCIPAL or the authority of the PRINCIPAL to continue the work said SURETY hereby further agrees that said SURETY shall, if requested in writing by the Obligee, take such action as is necessary to complete said contract.

In Witness Whereof, the PRINCIPAL and SURETY have hereto set their hands and seals this ___day of _____ 2011.

PRINCIPAL	SURETY
_____	_____
BY_____	BY _____
(SEAL)	(ATTORNEY-IN-FACT) (SEAL)
_____ (Title)	
ATTEST: _____	ATTEST: _____

CITY OF NEWTON, MASSACHUSETTS

PAYMENT BOND

Know All Men By These Presents:

That we, _____, as PRINCIPAL, and _____, as SURETY, are held and firmly bound unto the City of Newton as Obligee, in the sum of

dollars **($_____)** to be paid to the Obligee, for which payments well and truly to be made, we bind ourselves, our respective heirs, executors, administrators, successors and assigns, jointly and severally, firmly by these presents.

Whereas, the said PRINCIPAL has made a contract with the Obligee, bearing the date of _____ _, 2011, for the construction of _____ in Newton, Massachusetts.

(Project Title)

Now, the conditions of this obligation are such that if the PRINCIPAL and all Sub-contractors 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, provisions of M.G.L. c. 30, sec. 39A, and M.G.L. c. 149 sec. 29, as amended, then this obligation shall become null and void; otherwise it shall remain in full force, virtue and effect.

In Witness Whereof, the PRINCIPAL and SURETY have hereto set their hands and seals this ___day of_____2011.

PRINCIPAL	SURETY
_____	_____
BY_____	BY _____
(SEAL)	(ATTORNEY-IN-FACT) (SEAL)
_____ (Title)	
ATTEST: _____	ATTEST: _____

GENERAL CONDITIONS
OF THE CONTRACT
FOR NON-TECHNICAL SERVICES

The City of Newton, herein referred to as the City, does hereby establish the following General Conditions, applicable to this Invitation for Bids and any subsequent purchase order, work order, shipping order or contract resulting therefrom.

1.0 SCOPE OF SERVICES

1.1 The Contractor agrees to furnish all labor, materials, equipment and insurance necessary to perform and fully complete, in every respect, within the time frame herein specified, all work (hereinafter referred as the Services) described in the Project Manual.

1.2 The Contractor shall not make any changes in the scope of Services without the prior written consent of the City. The Contractor shall make reasonable revisions or corrections, within the scope of Services, to any work performed until submitted in a form acceptable to the City.

1.3 The City reserves the right to alter, add to or reduce the Services by delivering to the Contractor written notice specifying the nature and extent of such alteration, addition or reduction. Such notice shall be effective upon the later of actual receipt by the Contractor or upon the date given in such notice. No addition to the Services shall be made unless the City and the Contractor have agreed to such increase in writing.

2.0 CONTRACT TERM

2.1 The obligations of the Contractor identified herein shall commence upon execution of the City-Contractor Contract and shall continue in full force and effect for the duration of the contract term as identified in the Project Manual. The contractor shall commence the performance of services under this contract promptly upon receipt of the City's Notice to Proceed in accordance with the provisions identified in the Project Manual.

2.2 In the event the term of this contract exceeds a period of one year and notwithstanding any provision to the contrary herein, the City shall cancel this contract in the event that funds are not appropriated or otherwise made available to support continuation of performance by the Contractor in any fiscal year succeeding the first year.

3.0 EXECUTION

3.1 All work required hereunder shall be performed as promptly as possible, and in any event within the time herein set forth, and such work shall be subject to approval and acceptance by the City, but such approval and acceptance shall not relieve the Contractor from the obligation to correct any incomplete, inaccurate or defective work, all of which shall be promptly remedied by the Contractor on demand, without cost to the City. The Contractor shall obtain all the required licenses and permits for the work herein described.

3.2 The Contractor shall conform to all determinations and directions of the City concerning the Contractor's delivery of services in the event of inclement weather, equipment failure, picket lines on City property, or labor strikes by the contractor's employees.

4.0 COMPENSATION

4.1 The City shall pay the Contractor for services rendered under this contract in accordance with the amount(s) set forth in the Contractor's General Bid Form and pursuant to the provisions contained in the Project Manual.

4.2 Notwithstanding anything to the contrary contained in the Contract, the City may withhold any payment to the Contractor hereunder if and for so long as the Contractor fails to perform any of its obligations hereunder or otherwise is in default under this Contract including, without limitation, any failure to perform Services in full accordance with the amount sufficient in the reasonable opinion of the City to cure any such default or failure of performance by the Contractor.

4.3 In no event shall the City be required to pay any amounts for work deemed by it to be unacceptable, or which are otherwise disputed. In the event the City disputes any such amounts invoiced, it shall pay all amounts not in dispute and notify the Contractor in writing of the amounts disputed and the reasons therefor.

4.4 No payment made shall constitute or be construed as final acceptance or approval of that part of the Services to which payment relates, or relieve the Contractor of any of its obligations outlined in this Contract. Further, the City shall not be deemed, by virtue of making payments to the Contractor hereunder, to have released the Contractor from any claim or liability, or to have waived any action arising out of the breach of this Contract by the Contractor.

5.0 REPORTS AND DRAWINGS

When the Contractor has been paid for the Services performed by him or her, all reports, drawings, and other material furnished to the City shall become the City's property and may be used by the City (or such parties as the City may designate) thereafter in such manner and for such proposes as the City (or such parties as the City may designate) may deem advisable, without further employment of or additional compensation to the Contractor. The Contractor shall not release or disclose any report, drawing, or other material furnished to the Contractor by the City in connection with the performance of the Contractor's Services

6.0 CONTRACTOR'S ACCOUNTING RECORDS

The Contractor shall keep records pertaining to Services performed (including complete and detailed time records) on the basis of recognized bookkeeping practices, generally accepted accounting principles, and in accordance with such reasonable requirements to facilitate audit as the City may provide. All records shall be available to the City or its authorized representatives for review and audit during normal business hours.

7.0 ASSIGNMENT/SUBCONTRACTING

The Contractor agrees that he will not sell, assign or transfer this Contract or any part thereof or interest therein without the prior written consent of the City.

8.0 REMEDY FOR DEFAULT

If the Contractor, in the sole judgment of the City, shall violate or fail properly to comply with or perform in any material respect any condition, provision, or warranty hereof, the City shall have the right by prior written notice to the Contractor to have the services called for hereby otherwise performed, and/or to terminate this contract without prejudice to any other rights or remedies of the City under this contract. The Contractor shall pay any excess in the City's cost to so procure the services and any related goods, supplies, materials or equipment. In addition, and without limiting any other remedies available to the City, the Contractor shall be liable for all losses, costs and expenses incurred by the City which result from the Contractors noncompliance.

9.0 SUSPENSION OR TERMINATION

9.1 The City shall have the right, upon seven (7) days written notice to the Contractor so stating, to terminate, suspend, or postpone this contract in whole or in part for any reason deemed by the City to be in the public interest. Any such termination, suspension, or postponement shall not give rise to any cause of action for damages against the City. In the event that the City postpones or suspends the Services, the Contractor's time for performance of the Services shall be extended for a period equal to the period of such postponement or suspension. In the event of termination, suspension or postponement, the City shall pay: (a) for services and any related goods, supplies, materials and equipment furnished up to the time of termination, suspension, or postponement at the contract price upon delivery; (b) for work in process in the amount of the Contractor's cost, determined in accordance with ordinary accepted accounting practices, up to the time of termination, suspension, or postponement; and (c) for raw materials purchased by the Contractor as of the date of termination, suspension, or postponement and which are noncancelable at the Contractor's actual cost plus reasonable handling charges, but only to the extent that such raw materials were purchased in reliance upon this contract and are useful solely with respect to this contract.

9.2 Upon receipt of a notice of termination, suspension, or postponement the Contractor shall immediately cease all work hereunder and cancel all orders placed with respect to this contract. The Contractor's failure to so cancel shall relieve the City of the obligations of paragraph 10.1 above.

9.3 The City may postpone, suspend or terminate the Services immediately, by notice, hand delivery or certified mail, if the Contractor violates any of the provisions of this Contract, or fails to perform or observe any of the terms, covenants or conditions of this Contract, or abandons in whole or in part its Services, or becomes unable to perform its Services.

9.4 In the event of termination of this Contract, the Contractor shall promptly deliver to the City all documents, work papers, calculations, computer programs, data, drawings, plans, and other tangible work product, or materials pertaining to the Services performed under this Contract to the time of termination.

10.0 NOTICE

Any action, notice or request required to be taken, given or made by City or the Contractor hereunder may be taken, given or made only by those persons identified for that purpose on the Contract Form. All notices required to be given hereunder shall be deemed properly given if personally delivered, or if mailed by registered or certified mail, postage prepaid addressed to the address and officer identified on the Contract Form.

11.0 PROTECTION OF PROPERTY

The Contractor shall take all reasonable precautions to prevent damage to property, visible and concealed, and shall restore to substantially the same condition existing prior to the Contractor’s entry any disturbance or damage to property caused by the Contractor or any person acting under its control.

12.0 INSURANCE REQUIREMENTS

12.1 The Contractor shall provide insurance coverage as listed below. This insurance shall be provided at the Contractor's expense and shall be in full force and effect during the full term of this Contract.

WORKER'S COMPENSATION

Worker's Compensation:	Per M.G.L. c.. l49, s. 34 and c.. l52 as amended.

PURCHASING: We've seen these insurance amounts be much higher on past City Projects and suggest that they be reviewed – Gene Raymond, Raymond Design Associates, Inc.

PUBLIC LIABILITY

Personal Injury	$1,000,000 each occurrence $3,000,000 aggregate
Property Damage	$1,000,000 each occurrence $3,000,000 aggregate

VEHICLE LIABILITY

Personal Injury	$500,000 each person $1,000,000 aggregate
Property Damage	$300,000

12.2 The City shall be named as additional insureds on the Contractor's Liability Policies.

12.3 The Contractor shall not commence the work until proof of compliance with this Section 13.0 has been furnished to the City by submitting one copy of a properly endorsed insurance certificate issued by a company authorized to write insurance in the Commonwealth. This certificate shall indicate that the contractual liability coverage is in force.

12.4 The Contractor shall file the original and one certified copy of all policies with the City within fifteen (15) days after contract award. If the City is damaged by the Contractor's failure to maintain such insurance and to so notify the City, then the Contractor shall be responsible for all reasonable costs attributable thereto.

12.5 Cancellation of any insurance required by this contract, whether by the insurer or the insured, shall not be valid unless written notice thereof is given by the party proposing cancellation to the other party and City at least thirty days prior to the effective date thereof, which shall be expressed in said notice.

13.0 CONFLICT OF INTEREST

No member, agent or employee of the City shall , during his/her tenure or one year thereafter directly or indirectly, have any interest in any property to be included in, or any contract for property, materials or services to be furnished or used in connection with, this contract or the proceeds thereof.

14.0 COMPLIANCE WITH LAWS

All work to be performed and wages paid under this specification shall be in accordance with all applicable laws, state or federal, and all applicable ordinances, codes, rules, and regulations of the City of Newton, or any public board or office having any jurisdiction, regulation or control over any work to be done hereunder, including minimum wage rates. In particular, without limitation, the Contractor agrees to comply with all regulations pertaining to approvals for federal and state grants, and with all federal and state environmental laws and regulations. The Contractor agrees to assist in making any submissions to federal or state agencies as may be required in order to meet the requirements in this paragraph.

15.0 INDEMNIFICATION

The Contractor agrees to indemnify and save the City harmless from and against any and all costs, losses, expenses, liabilities, damages or claims for damages, including reasonable attorney's fees and expenses, on account of any injury or damage to buildings, improvements, or property of the City or on account of any injury (including death) or damage to any person, persons, firm, corporation or association, or on account of any infringement or claim of infringement of patents, arising out of or resulting from the deliveries provided for or performed under this contract or from any act,

omission or negligence of the contractor, his agents, employees, or assigns. The foregoing provisions shall not be deemed to be released, waived or modified in any respect by reason of any surety or insurance provided by the contractor under contract.

16.0 FORCE MAJEURE

The City may not hold the Contractor liable for any loss, expense or damage incurred by the City on account of failure of the Contractor to deliver services as specified herein, if that failure is caused by state of war, acts of enemies, expropriation or confiscation of facilities used by the Contractor, or compliance with any law, order, or regulation of any federal, state or municipal governmental authority, if the Contractor shall show that such compliance would impair this ability to perform a material provision of this contract, the Contractor having given the City reasonable notice of such cause.

17.0 DISPUTES

All claims, disputes and other matters in question between the City and the Contractor arising out of or relating to this Contract or the breach of it, shall be submitted for resolution to a court of competent jurisdiction in Massachusetts, unless otherwise agreed by the parties. No such action shall be brought, however, until the completion of all Services under this Contract or the earlier termination of this Contract as provided herein, the parties agreeing to negotiate any claims, disputes or other matters in question during the term of this Contract before resorting to litigation. As to all acts or failures to act by either party to this Contract, any applicable statute of limitations shall commence to run and any alleged cause of action shall be deemed to have accrued in any and all events when the other party becomes aware or should have been aware of such acts or failure to act.

18.0 GOVERNING LAW

This contract shall be governed by and construed in accordance with Massachusetts Law.

19.0 LIABILITY

The Contractor is retained solely for the purpose of and to the extent set forth in this Contract. The Contractor's relationship to the City for the purpose of services to be performed under this Contract shall be that of an independent contractor. The Contractor shall have no capacity or authority to involve the City in any contract or to incur any liability on behalf of the City. In no event shall the City be held liable as an employer or otherwise for any personal injury to or death of the Contractor's principals, employees, agents and/or representatives occasioned by or resulting from the Contractor's performance under this Contract.

20.0 LIENS

The Contractor shall cause to be removed from the property of the City any liens or other claims asserted by any person or entity claiming through or under the Contractor and arising out of Services performed under this Contract by such third party.

21.0 SEVERABILITY

In the event that any portion of this Contract is held illegal or unenforceable by a court of competent jurisdiction, the parties agree that such invalidity shall not affect the validity of the remaining portions of this Contract and Contractor and the City agree to substitute for the invalid provision a valid provision which most closely approximates the economics and intent of the invalid provision.

END OF SECTION

PUBLIC BUILDING MAINTENANCE CONTRACT
SUPPLEMENTAL CONDITIONS
COMMONWEALTH OF MASSACHUSETTS & CITY OF NEWTON

Article 1 - Method of Paying Subcontractors
(MGL. C.30, s.39F) .....

Article 2 - Method of Paying General Contractors
(MGL. C.30, s.39K) .....

Article 3 - Claims for Unforeseen Conditions
(MGL. C.30, s.39N) .....

Article 4 - Claims for Delay
(MGL. C.30, s.390) .....

Article 5 - Decisions and Approvals by Engineer
or Architect
(MGL. C.30, s.39P) .....

Article 6 - Preference in Employment, Wages
(MGL. C.149, s.26) .....

Article 7 - Hours of Work
(MGL. C.149, s.34) .....

Article 8 - Work by Foreign Corporations
(MGL. C.30, s.39L) .....

SPECIAL CONDITIONS - COMMONWEALTH OF MASSACHUSETTS

Article 1. METHOD OF PAYING SUBCONTRACTORS

(General Laws, Chapter 30, Section 39F as most recently amended by Chapter 450, §76 of the Acts of 1996)

(1.) Every contract awarded pursuant to section forty-four A to L, inclusive, of chapter one hundred and forty-nine shall contain the following subparagraphs (a) through (i) and every contract awarded pursuant to section thirty-nine M of chapter thirty shall contain the following subparagraphs (a) through (h) and in each case those subparagraphs shall be binding between the general contractor and each subcontractor.

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

(b) 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 awarding authority as the estimated cost of completing the incomplete and unsatisfactory items of work, shall be due the subcontractor; and the awarding authority shall pay that amount to the general contractor. The general contractor shall forthwith pay to the subcontractor the full amount received from the awarding authority less any amount specified in any court proceedings barring such payment and also less any amount claimed due from the subcontractor by the general contractor.

(c) Each payment made by the awarding authority to the general contractor pursuant to subparagraphs (a) and (b) of this paragraph for the labor performed and the materials furnished by a subcontractor shall be made to the general contractor for the account of that subcontractor, and the awarding authority shall take reasonable steps to compel the general contractor to make each such payment to each such subcontractor. If the awarding authority has received a demand for direct payment from a subcontractor for any amount which has already been included in a payment to the general contractor or which is to be included in a payment to the general contractor for payment to the subcontractor as provided in subparagraphs (a) and (b), the awarding authority shall act upon the demand as provided in this section.

(d) If, within seventy days after the subcontractor has substantially completed the subcontract work, the subcontractor has not received from the general contractor the balance due under the subcontract including any amount due for extra labor and materials furnished to the general contractor, less any amount retained by the awarding authority as the estimated cost of completing the incomplete and unsatisfactory items of work, the subcontractor may demand direct payment of the balance from the awarding authority. The demand shall be by a sworn statement delivered to or sent by certified mail to the awarding authority, and a copy shall be delivered to or sent by certified mail to the general 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 awarding authority and delivered or so mailed a copy to the general contractor, the general contractor may reply to the demand. The reply shall be by a sworn statement delivered to or sent by certified mail to the awarding authority 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 general contractor and of the amount due for each claim made by the general contractor against the subcontractor.

(e) Within fifteen days after receipt of the demand by the awarding authority, but in no event prior to the seventieth day after substantial completion of the subcontract work, the awarding authority 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 general contractor, less any amount (i) retained by the awarding authority 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 general contractor in the sworn reply; provided, that the awarding authority shall not deduct form 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 (d). The awarding authority 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.

(f) The awarding authority shall forthwith deposit the amount deducted from a direct payment as provided in part (iii) of subparagraph (e) in an interest-bearing joint account in the names of the general contractor and the subcontractor in a bank in Massachusetts selected by the awarding authority or agreed upon by the general contractor and the subcontractor and shall notify the general 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 general contractor and the subcontractor or as determined by a decree of a court of competent jurisdiction.

(g) All direct payments and all deductions from demands for direct payments deposited in an interest-bearing account for accounts in a bank pursuant to subparagraph (f) shall be made out of amounts payable to the general contractor at the time of receipt of a demand for direct payment from a subcontractor and out of amounts which later become payable to the general contractor and in the order of receipt of such demands from subcontractors. All direct payments shall discharge the obligation of the awarding authority to the general contractor to the extent of the such payment.

(h) The awarding authority shall deduct from payments to a general contractor amounts which, together with the deposits in interest-bearing accounts pursuant to subparagraph (f), 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 general contractor.

(i) If the subcontractor does not receive payment as provided in subparagraph (a) or if the general 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 (a), the subcontractor may demand direct payment by following the procedure in subparagraph (d) and the general 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 general contractor. Thereafter the awarding authority shall proceed as provided in subparagraph (e), (f), (g) and (h).

Article 2. METHOD OF PAYING GENERAL CONTRACTORS

(General Laws, Chapter 30, Section 39K as most recently amended by Chapter 145 of the Acts of 1991 and Chapter 151 of the Acts of 1993.)

Every contract for the construction, reconstruction, alteration, remodeling, repair or demolition of any public building by the commonwealth, or by any county, city, town, district, board, commission or other public body, when the amount is more than five thousand dollars in the case of the commonwealth and more than two thousand dollars in the case of any county, city, town, district, board, commission or other public body, shall contain the following paragraph:--Within fifteen days (forty-five days in the case of the commonwealth, including local housing authorities) after receipt from the contractor, at the place designated by the awarding authority if such a place is so designated, of a periodic estimate requesting payment of the amount due for the preceding month, the awarding authority 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 awarding authority, less (1) a retention based on its 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 section thirty-nine F, and less (3) a retention not exceeding five per cent of the approved amount of the periodic payment. 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 awarding authority, less than one per cent of the original contract price, or (b) the contractor substantially completes the work and the awarding authority takes possession for occupancy, whichever occurs first, the awarding authority 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 of 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 section thirty-nine F, 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 section thirty-nine F. If the awarding authority fails to make payment as herein provided, there shall be added to each such payment daily interest at the rate of three percentage points above 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 (twenty-four days in the case of the commonwealth) after receipt of such a periodic estimate from the contractor, at the place designated by the awarding authority 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.

The awarding authority 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 awarding

authority 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 shall be the first working day thereafter. The provisions of section thirty-nine G shall not apply to any contract for the construction, reconstruction, alteration, remodeling, repair or demolition of any public building to which this section applies.

All periodic estimates shall be submitted to the awarding authority, or to its designee as set forth in writing to the contractor, and the date of receipt by the awarding authority or its designee 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 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 awarding authority 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.

A certificate of the architect to the effect that the contractor has fully or substantially completed the work shall, subject to the provisions of section thirty-nine J, be conclusive for the purposes of this section.

Article 3. CLAIMS FOR UNFORESEEN CONDITIONS

(General Laws, Chapter 30, Section 39N as most recently amended by Chapter 774 of the Acts of 1972)

Every contract subject to section forty-four A of chapter one hundred and forty-nine or subject to section thirty-nine M of chapter thirty shall contain the following paragraph in its entirety and an awarding authority may adopt reasonable rules or regulations in conformity with that paragraph concerning the filing, investigation and settlement of such claims:

If, during the progress of the work, the contractor or the awarding authority 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 contracting authority may request an equitable adjustment in the contract price of the contract 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 contracting authority 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 contracting authority shall make an equitable adjustment in the contract price and the contract shall be modified in writing accordingly.

Article 4. CLAIMS FOR DELAY

(General Laws, Chapter 30, Section 390 as added by Chapter 116 of the Acts of 1973)

Every contract subject to the provisions of section thirty-nine M of this chapter or subject to section forty-four A of chapter one hundred forty-nine shall contain the following provisions (a) and (b) in their entirety and, in the event a suspension, delay, interruption or failure to act of the awarding authority increases the cost of performance to any subcontractor, that subcontractor shall have the same rights against the general contractor for payment for an increase in the cost of his performance as provisions (a) and (b) give the general contractor against the awarding authority, but nothing in provisions (a) and (b) shall in any way change, modify or alter any other rights which the general contractor or the subcontractor may have against each other.

(a) The awarding authority may order the general 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 awarding authority; provided however, that if there is a suspension, delay or interruption for fifteen days or more or due to a failure of the awarding authority to act within the time specified in this contract, the awarding authority shall make an adjustment in the contract price for any increase in the cost of performance of this contract but shall not include any profit to the general contractor on such increase; and provided further, that the awarding authority shall not make any adjustment in the contract price 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 price under any other contract provisions.

(b) The general contractor must submit the amount of a claim under provision (a) to the awarding authority in writing, as soon as practicable after the end of the suspension, delay, interruption of failure to act and, in any event, not later than the date of final payment under this contract and, except for costs due to a suspension order, the awarding authority shall not approve any costs in the claim incurred more than twenty days before the general contractor notified the awarding authority in writing of the act of failure to act involved in the claim.

Article 5. DECISIONS AND APPROVALS BY ENGINEER OR ARCHITECT

(General Laws, Chapter 30, Section 39P, as added by Chapter 1164 of the Acts of 1973)

Every contract subject to section thirty-nine M of this chapter or section forty-four A of chapter one hundred forty-nine which requires the awarding authority, any official, its architect or engineer to make a decision on interpretation of the specifications, approval of equipment, material or any other approval, or progress of the work, shall require that the decision be made promptly and, in any event, no later than thirty days after the written submission for decision; but if such decision requires extended investigation and study, the awarding authority, the official, architect or engineer shall, within thirty days after the receipt of the submission, give the party making the submission written notice of the reasons why the decision cannot be made within the thirty day period and the date by which the decision will be made.

Article 6. PREFERENCE IN EMPLOYMENT, WAGES

(General Laws, Chapter 149 Section 26 as most recently amended by Chapter 665 of the Acts of 1986 and Chapter 552 of the Acts of 1991).

In the employment of mechanics and apprentices, teamsters, chauffeurs and laborers in the construction of public works by the commonwealth, or by a county, town or district, or by persons contracting or subcontracting for such works, 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 male veterans as defined in clause Forty-third of section seven of chapter four, 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. 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 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, teamster, 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 appropriation 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.

Article 7. HOURS OF WORK

(General Laws, Chapter 149 Section 34 as most recently amended by Chapter 552 of the Acts of 1991).

Every contract, except for the purchase of material or supplies, involving the employment of laborers, workmen, mechanics, foremen or inspectors, to which the commonwealth or any county or town, subject to section thirty, is a party, shall contain a stipulation that no laborer, workman, mechanic, foreman or inspector working within the commonwealth, in the employ of the contractor, subcontractor or other person doing or contracting to do the whole or a 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 case of emergency, or, in case any town subject to section thirty-one is a party to such a contract, more than eight hours in any one day, except as aforesaid, provided, that in contracts entered into by the department of highways for the construction or reconstruction of highways there may be inserted in said stipulation a provision that said department, or any contractor or subcontractor for said department, may employ laborers, workmen, mechanics, foremen and inspectors for more than eight hours in any one day in such construction or reconstruction when, in the opinion of the commissioner of labor and industries, public necessity so requires. Every such contract not containing the aforesaid stipulation shall be null and void.

Article 8. WORK BY FOREIGN CORPORATIONS

(General Laws, Chapter 30 Section 39L, as most recently amended by Chapter 3 of the Acts of 1967).

The Commonwealth and every county, city, town, district, board, commission or other public body which, as the awarding authority, requests
proposals, bids or subbids for any work in the construction, reconstruction, alteration, remodeling, repair or demolition of any public building or other public works (1) shall not enter into a contract for such work with, and shall not approve as a subcontractor furnishing labor and materials for a part of any such work, a foreign corporation which has not filed with such awarding authority a certificate of the state secretary stating that such corporation has complied with sections three and five of chapter one hundred and eighty-one and the date of such compliance, and (2) shall report to the state secretary and to the department of corporations and taxation any foreign corporation performing work under such contract or subcontract, and any person, other than a corporation, performing work under such contract or subcontract, and residing or having a principal place of business outside the Commonwealth.

END OF SUPPLEMENTAL CONDITIONS

BUILDING MAINTENANCE SERVICE CONTRACT

SPECIAL CONDITIONS

The following provisions supplement the General Conditions of the Contract for Non-Technical Services. In the event of conflict or discrepancy between the General Conditions and these Special Conditions, the provisions of the Special Conditions shall govern.

1.0 SUMMARY OF WORK

A. The Work under the Contract consists of:

1. Furnishing all labor, materials, tools, equipment and supervision necessary to accomplish the work described herein,in accordance with all specifications and requirements of the Project Manual.

2. All work either shown on the Drawings (if any) or included in the specifications unless specifically indicated as not to be done.

B. In addition, the work under the Contract includes:

1. Work outside the Project Site as called for in the Contract Documents and as required for the performance of the Work.

2. The restoration of any items damaged or destroyed by encroaching upon areas outside the Project Site.

3. Providing and restoring, where appropriate, all temporary facilities.

C. The Proposed Contract Price shall be complete costs, including overhead, profit, insurance, transportation, and all other costs connected with, or incidental to, the work described.

2.0 PROJECT SITE

A. The areas of work for this contract shall be Newton South High School, 140 Brandeis Road, Newton Massachusetts.

3.0 NOTICE TO PROCEED/FAILURE TO COMMENCE WORK

A. From time to time during the term of this Contract, the Contractor shall be issued notice to proceed in the form of a written Work Order issued by the Public Building Department listing specific work items to be performed in accordance with this Contract. The Contractor shall commence performance of the work within the time specified in the Work Order, and in no event within less than the time limits stated in the Work Specifications contained in the Project Manual.

B. In the event the contractor fails to commence performance within the specified time, and/or notifies the City of its inability to do so, the City shall call upon the second Contractor awarded pursuant to this bid (if any) to perform the required work.

C. In the event the second Contractor awarded pursuant to this bid is unable to commence performance within the required time, or if there is no second Contractor, the City reserves the right to contract for the work on the open market at the then prevailing rate and to deduct from any monies due or that may thereafter become due to the contractor the difference between the price stated for the work in the contract and the actual cost thereof to the City.

D. In the event of Contractor's repeated failure to commence work within the time required by these specifications, the City shall exercise all provisions contained in the General Conditions regarding default, suspension or termination of this contract.

4.0 PAYMENT

A. Upon completion of the work specified in the Work Order, the Contractor may submit an invoice to the Public Building Department for the work performed. The Contractor will be paid only upon accepted completion of the work authorized. It shall be Contractor's responsibility to notify the Public Building Department upon completion of the work and to insure the work is promptly inspected by a Building Department representative.

5.0 COMMUNICATIONS

A. All notices, demands, requests, instructions, approvals and claims must be in writing.

B. Any such notice shall be deemed to have been given as of the time of delivery, or of actual receipt in the case of telegrams or, in the case of mailing, when it should have been received in due course of post.

C. For communicating purposes, the office address of the Contractor shall be that stated on the signature page of the contract; that of the City shall be as stated in the Invitation for Bids. Any subsequent change in address of either party shall be communicated to the other in writing.

6.0 PLANS AND SPECIFICATIONS

A. The City will furnish to the Contractor, without charge, all copies of the specifications reasonably necessary in the performance of the contract work.

7.0 COORDINATION

The Contractor shall:

A. Supply to the City the name and telephone number of a responsible person who may be contacted during off-hour emergencies during the term of the Contract.

B. Cooperate at all times with the City and the Project Manager, and ensure the cooperation of his key personnel and that of his subcontractors.

8.0 CONDUCT OF THE WORK

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

B. The work shall be conducted between the hours of 8:00 a.m. and 5:00 p.m. on Monday through Friday. No work shall be done on holidays, Saturdays or Sundays except as specifically requested and authorized by the City.

C. Under no circumstances will the contractor be paid at a premium or overtime rate for any work performed without the express advance authorization of the City.

D. The Contractor is responsible for the security of partially completed work until the project is finally accepted by the City.

9.0 ALTERATION

A. The Contractor shall patch, repair and/or replace all existing materials and surfaces remaining exposed after installation of new work which have been affected by alteration or removal of existing work. All patch and repair work shall match existing.

10.0 GENERAL DIRECTIONS

A. Damage to Persons and Property

Any damage to buildings, roads, public roads, bituminous concrete areas, fences, lawn areas, trees, shrubbery, electric or telephone poles, underground utilities, etc., shall be repaired by the Contractor at his own expense.

Damaged property shall be returned to its original condition prior to the damages within a reasonable time period, except all utility outages shall be repaired immediately.

B. Protection of Persons and Property

The Contractor shall, at all times, leave an unobstructed way along the roadways and walks, and shall maintain barriers and lights for the protection of all persons and property in all locations where he has materials stored or work going on, and during the entire time such work is going on or material is stored.

C. Shutdown of Services

The Contractor's attention is especially called to the fact that continuous operation of building utilties and services is mandatory. During the period of construction of the new work and/or alterations to the existing work, the progress and sequence of installation shall be carefully planned and approved by the City. If any building is to be left without heat, hot water, city water, electricity, gas, sanitary facilities, or any other services, the Contractor shall provide reasonable written notice to the City before proceeding.

D. Care of Work

All work is to be carefully protected so that no injury will come to it from water, frost, accident, or any other cause and any injury which may come to any of the work shall be repaired immediately by the Contractor at his own expense and without additional cost to the City. This shall also apply to any abutting or adjoining work on premises. The Contractor shall be responsible for any damage and in the event of such damage, the Contractor shall repair the damage immediately at his own cost and without additional cost to the City.

E. Removal of Debris

Debris of any nature shall be completely removed from the site at the end of each days work and disposed of in accordance with all Federal, State and local regulations.

F. The Contractor is responsible for the security of all work until it is accepted by the City.

11.0 TEMPORARY UTILITIES

A. Prior to execution of the Work, the Contractor shall confer with a representative of the Public Building Department regarding the use of utilities and facilities at the worksite. No City utilities or facilities are to be used by the Contractor in the performance of this Contract without the prior approval of the City.

12.0 SUBMISSION OF PAYROLLS

A. The Contractor shall, with each invoice submitted during the term of this Contract, submit to the City two (2) legible copies of his payrolls documenting the wages paid to all employees performing on site labor relating to the work of this Contract. These copies shall be prepared on forms supplied by the City.

13.0 DRAWINGS (IF APPLICABLE)

A. The drawings attached herein and such drawings as may be issued per addendum, shall constitute an integral part of this section and shall serve as the working drawings.

B. Drawings shall not be scaled. Field verification is directed since actual locations, dimensions and levels are existing.

C. All items not specifically mentioned in the specifications or noted on the drawings, but which are obviously necessary to make a complete working installation, shall be included.

14.0 MATERIALS

A. Unless specifically so stated to the contrary the use of a manufacturer's name or style number is not restrictive, and is intended solely as an identification of the type and quality of the materials and services required. In all cases, the words “or approved equal” if not inserted are implied.

B. An item equal to that named or described in the specifications may upon written approval of the City be furnished by the Contractor. An item shall be considered equal to the item so named or described if (1) it is at least equal in quality, durability, appearance, strength and design; (2) it will perform at least equally the function imposed by the general design for the public work being contracted for or the material being purchased; (3) it conforms substantially, even with deviations, to the detailed requirements for the item in the specifications.

C. The name and identification of all materials other than the one specifically named shall be submitted to the City in writing for approval, prior to purchase, use or fabrication of such items. Approval shall be at the sole discretion of the City, shall be in writing to be effective, and the decision of the City shall be final. The City may require tests of all materials so submitted to establish quality standards at the Contractor's expense.

D. For the use of material other than the one specified, the Contractor shall assume the cost of and responsibility for satisfactorily accomplishing all changes that may be required in the work as shown. All directions, specifications and recommendations by manufacturers for the installation, handling, storing, adjustment, and operation of their equipment shall be complied with and responsibility for proper performance shall continue to rest with the Contractor.

E. The Contractor shall not have any right of appeal from the decision of the City condemning any materials furnished if the Contractor fails to obtain the approval for substitution in accordance with these provisions. If any substitutuin is more costly, the Contracotr shall pay for such costs

15.0 WARRANTY AND INDEMNIFICATION

A. In addition to other guarantees or warranties required under law or other sections of the specification, the Contractor warrants all materials furnished and labor performed under this Contract to be free from defects or errors in workmanship or installation for a period of one year from the date of Completion of the work, as certified by the Project Manager. The Contractor shall indemnify the Authority for the full cost of any damage to the property that may result by reason of such defects or errors and shall indemnify the Authority from and against any and all claims, demands. losses, costs, expenses, liabilities and damages, including reasonable attorney's fees and expenses, arising out of or on account of this Contract, including but not limited to claims brought against the Authority for alleged infringement of patents based upon any methods of construction or application of materials furnished under the Contract.

B. The Contractor shall indemnify, hold harmless and defend the City and its departments, officers, employees, servants, and agents from and against all actions, causes of actions, claims, demands, damages, costs, loss of services, expenses and compensation, including attorney's fees and interest arising out of or resulting directly or indirectly from the services rendered pursuant to this Contract, provided that any such action, cause of action, claim, demand, damage, cost, loss of service, expense, compensation (1) in any way grows out of bodily injury, sickness, disease or death, or to injury to or destruction of tangible property, which (2) is caused in whole or in part by any act or omission of the Contractor, anyone directly or indirectly employed by any of them or anyone for whose acts any of them may be liable, regardless of whether or not it is caused in part by a party indemnified hereunder.

END OF SECTION

CITY OF NEWTON
MINORITY/ WOMEN BUSINESS ENTERPRISE PLAN
DECEMBER 1, 1999
JANUARY 21, 2010 revised

STATEMENT OF POLICY:

Whereas it is the policy of the government of the United States of America, the Commonwealth of Massachusetts and the City of Newton that no person shall be discriminated against in any manner whatsoever on the grounds of race, religion, color, sex, handicap or national origin; and

Whereas, it is the policy of the government of the United States of America that no person shall, on the grounds of race, color, sex or national origin, be excluded from participation in, be denied the benefits of, or be subjected to discrimination under any program of activity funded entirely or in pail by the City, the State or Federal government; and

Whereas, it is the policy of the government of the United States of America to encourage that Minority/Women Business Enterprises shall have the maximum practicable opportunity to participate in Federal and State assisted projects; and all City funded contracts; and

Whereas, it is the policy of the City of Newton to encourage that minority/women business enterprises shall have the maximum practicable opportunity to participate in all City funded contracts; and

Whereas, the City of Newton, as a recipient of Federal and State funds subscribes to the above policies and will fully comply With Federal, State and local laws and directives governing non-discrimination, equal opportunity and affirmative action in all municipal activities; and

Whereas, to further enunciate the equal opportunity policy of the City of Newton's Minority/Women Business Program, the following responsibilities are specified

> This MINORITY/ WOMEN Business Enterprise Plan sets forth the administrative standards for the further implementation of the City of Newton's policy of the utilization of minority contractors and subcontractors.
>
> The City of Newton strongly affirms that it will not discriminate in any contractual procedures against any persons because of race, color, religion, age, disability, sex or national origin. This policy shall be administered with a positive supportive attitude.
>
> It is the responsibility of the City of Newton to take affirmative steps to implement this policy to insure equality of opportunity in conducting the Program including notifying those persons and businesses doing business with the City, that contracts for goods, services and construction, shall be made Without reference or regard to race, color, sex, age, handicap, religion or national origin.

Setti D. Warren Mayor

CITY OF NEWTON
MINORITY/ WOMEN BUSINESS ENTERPRISE PLAN
JANUARY 21, 2010

I. **DEFINITIONS:**

A. **Minority Person**- the term includes a person who is of Black Hispanic, Asian, American Indian or Cape Verdean origin.

B. Minority Business Enterprise (MBE) -- the term shall mean a business a) that is certified by SOMWBA; orb) I provides evidence satisfactory to the *City's* Affirmative Action Officer that it is a business owned or controlled by one or more of the following:

- an individual who is a minority person,
- a partnership or joint venture controlled by minority persons in which at least 51 % of the ownership interest is held by minority persons or,
- a corporation or other entity controlled by minority persons and in which at least 51 % of the stock is owned by one or more minority persons.

C. **Contract Compliance Officer** - the Chief Procurement Officer or his/her designee responsible for the implementation of Newton's Minority/Women Enterprise Plan ("MWBE Plan") and activities.

D. **MCAD** - Massachusetts Commission Against Discrimination.

E. SOMWBA -- State Office of Minority/Women Business Assistance.

F. **City** - The City of Newton.

G. **Women Business Enterprise** (WBE) - the term shall mean a business a) that is certified by SOMWBA; or b) provides evidence satisfactory to the City's Affirmative Action Officer that it is a business owned or controlled by one or more of the following:

- an individual who is a woman.
- a partnership or joint venture controlled by women in which at least 51% of the ownership interest is held by women, or
- a corporation or other entity controlled by women and in which at least 51% of the stock is owned by one or more women.

H. **MWBE** — Minority or Women Business Enterprise

II. **GOALS:**

Newton's Minority/Women Enterprise Plan ("MWBE Plan") shall be guided by the goals presented below to promote minority/women opportunities within the City.

These goals comprise the framework for those activities to be implemented as part of the MWBE Plan:

To take affirmative action in expanding opportunities for minority and women owned firms in obtaining contracts within the City of Newton.

To assure that all contractors, regardless of race color, religion, creed, national origin, sex, age, ancestry or handicap, shall have equal opportunity to City contracting activities.

To award, of the total annual City contract dollars expended, 10 percent to MBE and 5 percent to WBE for construction; for goods and services, 5 percent WBE and 5 percent MBE.

III. SOLICITATION ACTIVITIES:

To notify MWBEs of upcoming contracts for construction, professional services and supplies, funded in whole or in part with Federal, State, and City funds, the following activities will be undertaken. In addition on a regular basis, the City of Newton will distribute to its listing of MWBEs and SOMWBA, a summary of upcoming contract opportunities which are subject to the City's MWBE Plan.

A. Construction Contracts

All construction contracts with an estimated value over $50,000 will be formally advertised within local, regional, minority and special interest publications at least 14 days prior to the bid opening date.

For all such construction contracts a "Notice of Solicitation" of a project going out to bid will be distributed to appropriate SOMWBA or City certified firms at least 14 days prior to the bid opening date.

B. Contracts for Professional Services

The City of Newton will send notification of its advertised Request for Proposals to appropriate! SOMWBA or City certified firms Responding MWBE firms will be considered for contract award within the bounds of generally accepted management practice or with the applicable procurement law relating to securing the lowest cost and best services available.

C. Procurement of Supplies

The City of Newton will (where feasible) utilize MWBEs for the procurement of supplies in accordance with City purchasing procedures. These efforts will be documented and reported to MCAD, and the Mayor's office on a quarterly basis.

IV. CONSTRUCTION ACTIVITIES:

A. Goals

The City of Newton bid documents and contracts with an estimated value over $50,000 will contain the City's goal of 10% for MBE and 5% for 'WBE utilization for subcontracts,

B. Pre-Bid Conference

To affirmatively further the opportunities available to prospective bidders, the City will hold a pre-bid conference 5-7 days prior to the bid opening date for all City construction contracts and subcontracts with an estimated value over $50,000.

The pre-bid conference will provide an opportunity for contractors to: review and clarify the technical requirements of the projects, review the City's MWBE Plan; and review Equal Opportunity requirements. The *City* will advertise this conference and extend invitations to interested contractors as part of the notice of solicitation.

C. Bid Submission

All bids for City of Newton contracts with -an estimated value over $50,000 shall include a certification of intent to be completed by the bidder swing his/her intent to comply with the *City's* MWBE Plan. Failure to include this certification shall be an informality which may be waived if such certification is received prior to the award of the contract.

D. Contract Execution

Upon notification of award of the contract, the bidder shall provide a written plan detailing how it will comply with the MWBE Plan

E. Monitoring

Throughout the duration of the contract, the *City* of Newton through its Contract Compliance Officer, will monitor the progress and activities of all contractors and subcontractors as they attempt to comply with the MWBE Plan.

F. Enforcement

In the case of clear neglect to make a good faith effort to comply with this MWBE Plan, the City of Newton reserves the right to designate contractor, after a hearing, as ineligible for future City bid awards.

V. CONTRACT COMPLIANCE OFFICER/DUTIES AND RESPONSIBILITIES:

The Contract Compliance Officer, as liaison between minority firms and the City of Newton will have the overall responsibility for the implementation of Newton's MWBE Plan. This responsibility includes the development, management, dissemination of information; the provision of technical assistance to minority firms including clarification of procedures to be implemented; maintenance of relevant documentation; completion of reporting requirements; and performance of monitoring and evaluation activities; and maintenance and updating of listings of minority/women business.

The Contract Compliance Officer has oversight of all City procurements for construction, professional services and supplies and shall coordinate the implementation of the MWBE Plan with other *City* departments.

THE CITY OF NEWTON, MASSACHUSETTS
SUPPLEMENTAL EQUAL EMPLOYMENT OPPORTUNITY
ANTI-DISCRIMINATION AND AFFIRMATIVE ACTION PROGRAM

I. The requirements hereinafter set forth apply to construction contracts which involve an expenditure by the City of $50,000 or more.

II. For purposes of this contract "minority" refers to Asian Americans, Black, Hispanics American Indians and Cape Verdeans. The City refers to the- City of Newton

III. During the performance of this contract the Contractor and all of (his) Subcontractors (hereinafter collectively referred to as the Contractor) , for himself, his assignees, and successors in interest, agree as follows:

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: layoff; termination; rates of pay or other forms of compensation; conditions or privileges of employment; and the selection of apprenticeship. The Contractor shall post hereafter in conspicuous places, available for employees and applicants for employment, notices to be provided by the City setting forth the provisions of the Fair Employment Practices Law of the Commonwealth (MGL Chapter 151 B) . (See Attachment A)

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 employment: 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 City public construction projects

1. As part of this obligation of remedial action under the foregoing section, the contractor shall maintain on this project a not less than 5 percent 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 Section 44C of Chapter 149 of the Massachusetts General Laws.

2. In the hiring of minority journeymen, apprentices, trainees and advanced trainees, the Contractor shall rely on referrals, from the Contractor's affirmative action program approved by the City, traditional referral methods utilized by the construction industry, and referrals from agencies, not more than three in number at any one Lime, designated by the Liaison Committee or the City.

1. At the discretion of the City, there maybe established for the life of this contract a body to be known as the Liaison Committee, The Liaison Committee shall be composed of the Compliance Officer and one representative each from the Departments administering this project, hereinafter called the administering Departments, and such other representatives as may be designated by the City.

2. The Contractor (or, his/her agent, if any, designated by him/her as the onsite equal employment opportunity officer) shall recognize the Liaison Committee as the affirmative action body, and shall establish a continuing working relationship with the Liaison Committee on all matters related to minority recruitment, referral, employment and training.

3. The Contractor shall prepare manning tables on a quarterly basis.* These shall be broken down into projections, by week, for workers required in each trade. Copies shall be furnished one week in advance of the initiation of work and quarterly thereafter to the City and to the Liaison Committee.

4. Records of employment referral orders, prepared by the Contractor, shall be made available to the *City* and to the Liaison Committee on request.

5. The contractor shall prepare weekly reports in a form approved by the City of hours worked in each trade by each employee, identified as minority or non-minority. Copies of these reports shall be provided at the end of each week to the City and to the Liaison Committee.

* If job is less than three months, prepare for length of job.

VI. If the Contractor shall use any sub contractor on any work performed under this contract, he/she 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 State Office of: Minority *Business Assistance* or As designee, while bids are in preparation, of all products, work or services for which the Contractor intends to negotiate bids.

VII. In the employment of journeyman, apprentices, trainees, and advanced trainees, the Contractor shall give preference 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 there from 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

VIII. A designee of the City and a designee of the Liaison Committee shall each have the right of access no the Construction site,

IX. **Compliance with Requirements**

The Contractor shall comply with the provisions of Chapter 151 B of the Massachusetts General Laws, which are herein incorporated by reference and made as amended by Executive Order 227, and of Chapter 151B as amended, of the Massachusetts General Laws, both *of which* are herein incorporated by reference and made a part of this contract.

X. **Non-Discrimination**

The Contractor, in the performance of all work after award, and prior to completion of the contract work, will not discriminate on the grounds of race, color, religious creed,

national origin, age or sex in employment practices, in the selection or retention of sub-contractors, or in the procurement of materials and rentals of equipment.

XI. **Solicitations for sub-Contracts and for the Procurement of Materials and Equipment**

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 his contract relative to non-discrimination and affirmative action.

XII. **Bidders Certification Requirement**

1. The following certification statement will be inserted in the bid document just above the bidder's signature.

"The bidder hereby certifies he shall comply with tile minority manpower ratio and specific action steps contained in the City of Newton, Massachusetts Supplemental Equal Employment-- Opportunity Anti-Discrimination and Affirmative Action Program. The Contractor receiving the award of the contract shall be required to obtain from each of its subcontractors and submit to the contracting or, administering agency prior to the performance of any work under said contract a certification by said subcontractor, regardless of tier, that it will comply with the minority manpower ratio and specific affirmative action steps contained in the City of Newton Massachusetts Supplemental Equal Employment Opportunity Anti -Discrimination and Affirmative Action Program.

XIII. **Contractor's Certification**

A Contractor's' certification form must be signed by all successful low bidders prior to award by the City. A Contractor shall not be eligible for award of a contract unless the contractor has executed and submitted the Contractor's Certification, which shall be deemed a part of the resulting contract. (See Attachment B)

XIV. **Subcontractor's Certification**

Prior to the award of any subcontract, regardless of tier, the prospective subcontractor must execute and submit: to the Prime Contractor a subcontractor's certification setting forth the subcontractor's compliance with this program, which shall be deemed a part of the resulting subcontract. (See Attachment C)

XV. **Compliance - Information, Reports and Sanctions**

1. The Contractor will provide all information and reports required by the administering department or, the City on instruction issued by either of them and will permit access to its facilities and any books, records, accounts and other sources of information which

may be determined by the City to affect the employment of personnel. This provision shall apply only to information pertinent to the City'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 department or the City as appropriate and shall set forth what efforts he/she has made to obtain the information.

2. Whenever the administering department, the City, or the Liaison Committee believes the General Contractor or any Subcontractor may not-, be operating in compliance with the terms of this Section, the City directly, or through its designated agent, shall conduct: an appropriate invest ig at ion, and may confer with the parties, to determine if such Contractor is operating in compliance with the terms of this Section. If the City or its agent finds the General Contractor or any Subcontractor not in compliance, it shall make a preliminary report on non-compliance, and notify such Contractor in writing of such steps as will in the judgment of the City or its agent bring such Contractor into compliance. In the event, that such Contractor fails or refuses to fully perform such steps, the City shall make a final report of non-compliance, and recommend to the administering department the imposition of one or more of the sanctions listed below. If, however, the City believes the General 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 at the receipt of the recommendations of the City, the administering department shall move to impose one or more of the following sanctions, as it may deem appropriate to attain full and effective enforcement:

(a) The recovery by the administering department from the General Contractor of 1/100 of!! of the contract award price or $1000 whichever sum is greater, in the nature of liquidated damages or
if a Subcontractor is in non-compliance, the recovery by the administering department from the General Contractor, to be assessed by the General Contractor as a back charge against the Subcontractor, of 1/10 of 1% of the sub-contract price, or $400 whichever sum is greater, in the nature of liquidated damages, for each week that such party fails or refuses to comply

(b) The suspension of *any* payment of part thereof due under the contract until such time as the General Contractor or any Subcontractor is able to demonstrate his compliance with the terms of the contract;

(c) The termination, or cancellation, of the contract, in whole or in part, unless the General Contractor or any Subcontractor is able to demonstrate within a specified time his/her compliance
with the terms of the City's affirmative action construction contract requirements; OR,

(d) The denial to the General Contractor or any Subcontractor of the right to participate in any future contracts awarded by the administering department for a

(e) Period of up to three years.

3. If at any time after the imposition of one or more of the above sanctions (unless the contract. has been terminated), a Contractor is able to demonstrate that he/she is in compliance with this section, he/she may request the City to suspend the sanctions conditionally pending a final determination by the City as to whether the Contractor is in

compliance. Upon final determination of the City, the administrating department, based upon the recommendation of the City, shall either lift the sanctions or continue them.

4. Sanctions enumerated under Section XV shall not: be imposed by the City except after the General Contractor or Subcontractor has had an opportunity for full and fair hearing with City. The non-compliance investigation shall be initiated without prior notice to the contractor. Any sanctions to be imposed shall be, set forth fully and completely in writing, and may then be appealed to t-he City in writing by the Contractor.

.XIV. **Severability**

The provisions of this section 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.

FAIR EMPLOYMENT LAW

The Fair Employment Law declares that it is illegal to discriminate on the basis of race, color, religious creed, national origin, sex, sexual orientation, age, ancestry or disability

IT IS UNLAWFUL:

- to print or circulate any advertisement or use any application form which directly or indirectly specifies any limitation on the basis of race, color, religious creed, national origin, sex, sexual orientation, age, ancestry or disability.
- to discharge or refuse to hire arty individual on file basis of their race, color, religious creed, national origin, sex, sexual orientation, age, ancestry, or disability.
- to discriminate against any individual in matters relating to compensation, terms, conditions, or privileges of employment because of their race, color, religious creed, national origin, sex, sexual orientation, age, ancestry or disability.
- to require a woman to leave her job at some arbitrary stage in her pregnancy or to refuse to let her return to work until a specified time set by the employer.
- to grant a female employee at least eight weeks leave for purposes of childbirth or to treat her absence differently than any other absence due to disability.
- to require an employee to remain at work during any day or part thereof that s/he observes as a religious holiday provided that the employee gives a ten-day notice and the absence does not cause undue hardship to the employer.
- to discharge or refuse to hire any person because of their failure to furnish information concerning admission to a center for the treatment of mentally ill persons.
- to discriminate against a job applicant for failure to furnish information, written or oral, concerning.- A) an arrest, detention or disposition regarding a violation of law in which no conviction resulted; B) a first conviction for any of the following misdemeanors: driving under the influence, simple assault, speeding, minor traffic violations, disturbance of the peace; or C) conviction for a misdemeanor where the date of the conviction or end of period of incarceration, if any, occurred more than five years prior to the employment application, and the applicant has not been convicted of any offense within the five years immediately before the date of application.

RETALIATION

It is illegal to retaliate against any person because s/he has opposed any practices forbidden under this Chapter or because s/he has filed a complaint, testified, or assisted in any proceeding before the Commission. It is also illegal to aid, abet, incite, compel or coerce the doings of any of the acts forbidden under this Chapter or to attempt to do so.

SEXUAL HARASSMENT

151B:1,18 The term "sexual harassment" shall mean sexual advances, requests for sexual favors, and other verbal or physical conduct of a sexual nature when (a) submission to or rejection of such advances, requests or conduct is made either explicitly or implicitly a term or condition of employment, or as a basis for employment decisions: (h) such advances,, requests or conduct have the purpose or effect of unreasonably interfering with an individual's work performance by creating an intimidating, hostile, humiliating or sexually offensive work environment.

COMPLAINTS

All complaints must be filed in writing. Information on the filing of complaints can be obtained by contacting the MASSACHUSETTS COMMISSION AGAINST DISCRIMINATION at the following locations:

Boston office:
One Ashburton Place
Room 601
Boston, MA 02108
(617) 727-3990

Springfield office:
436 Dwight Street
Suite 315
Springfield, MA 01103
(4 13) 739-2145

Attachment B

CITY OF NEWTON

Contractors Certification

A Contractor will not be eligible for award of a contract, unless such contractor has submitted the following certification, which is deemed a part of the resulting contract.

CONTRACTOR'S CERTIFICATION

_____Certifies that:
Contractor's Name

it tends to use the following listed construction trades in the work under the contract

_____ and

2. will comply with the minority manpower ration and specific affirmative action steps contained herein; and

3. will obtain from each of its subcontractors and submit to the contracting or administering agency prior to the award of any subcontract under this contract the subcontractor certification required by these bid conditions

_____
(Signature of authorized representative of Contractor)

Any contract for the provision of goods or services to the City of Newton or any of its departments is subject to the ordinance creating the Human Rights Commission, as it may be amended from Time to Time. Any complaints within the purview shall be forwarded immediately to the contracting agency, and a copy shall be sent to the Human Rights Commission; any complaints received by the contracting agency shall be forwarded to the contractor, and a copy shall be sent to the Human Rights Commission.

Attachment C

CITY OF NEWTON

Subcontractors Certification

Prior to the award of any subcontract , regardless of tier, the prospective subcontractor must execute and submit to the Prime Contractor the following certification, which will be deemed a part of the resulting subcontractor.

SUBCONTRACTOR`S CERTIFICATION

_____Certifies that:
Contractor's Name

it tends to use the following listed construction trades in the work under the contract

_____ and

will comply with the minority manpower ration and specific affirmative action steps contained herein; and

will obtain from each of its subcontractors and submit to the contracting or administering agency prior to the award of any subcontract under this contract the subcontractor certification required by these bid conditions

Pursuant to M.G.L. Ch. 62C, Sec. 49A, I certify under the penalties of perjury that, to the best of my knowledge and belief, I am in compliance with all laws of the Commonwealth relating to taxes, reporting of employees and contractors, and withholding and remitting child support.

_____
(Signature of authorized representative of Contractor)

In order to ensure that the said subcontractor's certification becomes part of all subcontracts under the prime contract, no subcontract shall be executed until an authorizee representative of the Administrative Agency administering this project has determined in writing, that the said certification has been incorporated in such subcontract, regardless of tier, Any subcontract executed without such written approval shall be void.

Any contract for the provision of goods or services to the City of Newton or any of its departments is subject to the ordinance creating the Human Rights Commission, as it may be amended from Time to Time. Any complaints within the purview shall be forwarded immediately to the contracting agency, and a copy shall be sent to the Human Rights Commission; any complaints received by the contracting agency shall be forwarded to the contractor, and a copy shall be sent to the Human Rights Commission.

CITY OF NEWTON

WAGE RATE REQUIREMENTS

1. GENERAL

A. This section summarizes the requirements for the payment of wages to laborers and mechanics employed under the Contract.

B. Other duties and requirements of law which may not be specified in this section apply and are inherently part of the Contract.

2. WAGE RATES

A. The rate per hour to be paid to mechanics, apprentices, teamsters, chauffeurs, and laborers employed on the Work shall not be less than the rate of wages in the attached "Minimum Wage Rates" as determined by the Commissioner of Labor and Industries. The schedule of prevailing wage rates will be updated annually for all public construction projects lasting longer than one (1) year. The contractor shall pay the prevailing wage rate set out in the applicable prevailing wage rate schedule. Increases in prevailing wage rates shall not be the basis for a change order.

B. Keep posted on the site a legible copy of said schedule. Keep on file the wage rates and classifications of labor employed on this Work in order that they may be available for inspection by the Owner, Administrator, or the Architect.

C. Apprentices employed pursuant to this determination of wage rates must be registered and approved by the State Apprenticeship Council wherever rates for journeymen or apprentices are not listed.

D. Pay reserve police officers employed on the Work the prevailing rate of wages paid to regular police officers as required by M.G.L. c 149, Sec. 34B, as amended. Such police officers shall be covered by Workmen's Compensation Insurance and Employers Liability Insurance by the Contractor.

E. The Contractor and all subcontractors shall, on a weekly basis throughout the term of the contract, provide to the City of Newton certified payroll affidavits verifying compliance with M.G.L. c.149, Sec. 27, 27A and 27B.

F. The Contractor and all subcontractors shall provide a Statement of Compliance within 15 days of the completion of its portion of the work. This statement shall be submitted to the Owner on the form found elsewhere in this section.

G. The Contractor shall maintain accurate and complete records, including payroll records, during the Contract term and for three years thereafter. Filings made by the Contractor pursuant to Clauses 47, 48 and 49 of the General Conditions shall be deemed to constitute compliance with State filing requirements under the Massachusetts Prevailing Wage Law.

END OF SECTION

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

DEVAL L. PATRICK
Governor

TIMOTHY P. MURRAY
Lt. Governor

JOANNE F. GOLDSTEIN
Secretary

HEATHER E. ROWE
Director

Prevailing Wage Rates

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

Awarding Authority: City of Newton

Contract Number: 12-15 **City/Town:** NEWTON

Description of Work: Newton South High School Field Facility Building Works - Field Facility Building at Newton South High School

Job Location: 140 Brandeis Road

Classification	Effective Dates and Total Rates					
Construction						
(2 AXLE) DRIVER - EQUIPMENT	08/01/2011	$46.120	12/01/2011	$46.780	06/01/2012	$47.080
	08/01/2012	$47.430	12/01/2012	$48.460		
(3 AXLE) DRIVER - EQUIPMENT	08/01/2011	$46.190	12/01/2011	$46.850	06/01/2012	$47.150
	08/01/2012	$47.500	12/01/2012	$48.530		
(4 & 5 AXLE) DRIVER - EQUIPMENT	08/01/2011	$46.310	12/01/2011	$46.970	06/01/2012	$47.270
	08/01/2012	$47.620	12/01/2012	$48.650		
ADS/SUBMERSIBLE PILOT	08/01/2011	$107.800				
AIR TRACK OPERATOR	06/01/2011	$50.850	12/01/2011	$52.100		
ASBESTOS REMOVER - PIPE / MECH. EQUIPT.	12/01/2009	$40.250				
ASPHALT RAKER	06/01/2011	$50.350	12/01/2011	$51.600		
ASPHALT/CONCRETE/CRUSHER PLANT-ON SITE	06/01/2011	$61.290	12/01/2011	$61.920	06/01/2012	$62.490
	12/01/2012	$63.110	06/01/2013	$63.890	12/01/2013	$64.670
BACKHOE/FRONT-END LOADER	06/01/2011	$61.290	12/01/2011	$61.920	06/01/2012	$62.490
	12/01/2012	$63.110	06/01/2013	$63.890	12/01/2013	$64.670
BARCO-TYPE JUMPING TAMPER	06/01/2011	$50.350	12/01/2011	$51.600		
BLOCK PAVER, RAMMER / CURB SETTER	06/01/2011	$50.850	12/01/2011	$52.100		
BOILER MAKER	01/01/2010	$55.850				

APPRENTICE: BOILERMAKER - Local 29

Ratio	Step	1	2	3	4	5	6	7	8
1:5	%	65.00	65.00	70.00	75.00	80.00	85.00	90.00	95.00

Apprentice wages shall be no less than the following:

Step 1$42.66/2$42.66/3$44.54/4$46.43/5$48.31/6$50.20/7$52.08/8$53.97

BRICK/STONE/ARTIFICIAL MASONRY (INCL. MASONRY WATERPROOFING)	08/01/2011	$73.000	02/01/2012	$73.990

APPRENTICE: BRICK/PLASTER/CEMENT MASON - Local 3 Newton

Ratio	Step	1	2	3	4	5
1:5	%	50.00	60.00	70.00	80.00	90.00

Apprentice wages shall be no less than the following:

Step 1$49.72/2$54.38/3$59.03/4$63.69/5$68.34

BULLDOZER/GRADER/SCRAPER	06/01/2011	$60.940	12/01/2011	$61.560	06/01/2012	$62.120
	12/01/2012	$62.740	06/01/2013	$63.510	12/01/2013	$64.290
CAISSON & UNDERPINNING BOTTOM MAN	06/01/2011	$51.250	12/01/2011	$52.500		
CAISSON & UNDERPINNING LABORER	06/01/2011	$50.100	12/01/2011	$51.350		
CAISSON & UNDERPINNING TOP MAN	06/01/2011	$50.100	12/01/2011	$51.350		
CARBIDE CORE DRILL OPERATOR	06/01/2011	$50.350	12/01/2011	$51.600		
CARPENTER	03/01/2011	$56.230	09/01/2011	$57.360	03/01/2012	$58.480

This wage schedule must be posted at the work site in accordance with M.G.L. ch. 149, sec. 27
Failure of the employer to pay "prevailing wage rates," which are the minimum wage rates listed above, on public works projects is a violation of M.G.L. ch. 149, sec. 27. Employees not receiving such rates should report the violation to the Office of Fair Labor and Business Practices, 100 Cambridge Street, Boston, MA 02108; Tel: 617-727-3465.

Issue Date: 08/31/2011 **Wage Request Number:** 20110831-013 **Page 1 of 11**

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

DEVAL L. PATRICK
Governor

TIMOTHY P. MURRAY
Lt. Governor

Prevailing Wage Rates

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

JOANNE F. GOLDSTEIN
Secretary

HEATHER E. ROWE
Director

Awarding Authority: City of Newton

Contract Number: 12-15 **City/Town:** NEWTON

Description of Work: Newton South High School Field Facility Building Works - Field Facility Building at Newton South High School

Job Location: 140 Brandeis Road

Classification	Effective Dates and Total Rates					
APPRENTICE: CARPENTER - Zone 2 Eastern MA						
Ratio Step 1 2 3 4 5 6 7 8						
1:5 % 50.00 60.00 70.00 75.00 80.00 80.00 90.00 90.00						
Apprentice wages shall be no less than the following:						
Step 1$26.27/2$29.47/3$41.91/4$43.51/5$46.68/6$46.68/7$51.46/8$50.87						
CEMENT MASONRY/PLASTERING	08/01/2011	$70.770	02/01/2012	$71.540		
CHAIN SAW OPERATOR	06/01/2011	$50.350	12/01/2011	$51.600		
CLAM SHELLS/SLURRY BUCKETS/HEADING MACHINES	06/01/2011	$62.290	12/01/2011	$62.920	06/01/2012	$63.490
	12/01/2012	$64.110	06/01/2013	$64.890	12/01/2013	$65.670
COMPRESSOR OPERATOR	06/01/2011	$49.910	12/01/2011	$50.350	06/01/2012	$50.740
	12/01/2012	$51.190	06/01/2013	$51.740	12/01/2013	$52.290
DELEADER (BRIDGE)	07/01/2011	$65.410	01/01/2012	$66.410	07/01/2012	$67.410
	01/01/2013	$68.410				
APPRENTICE: PAINTER Local 35 - BRIDGES/TANKS						
Ratio Step 1 2 3 4 5 6 7 8						
1:1 % 50.00 55.00 60.00 65.00 70.00 75.00 80.00 90.00						
Apprentice wages shall be no less than the following: Steps are 750 hrs.						
Step 1$29.31/2$34.57/3$37.00/4$39.43/5$50.35/6$52.75/7$55.18/8$60.05						
DEMO: ADZEMAN	06/01/2011	$50.100	12/01/2011	$51.350		
DEMO: BACKHOE/LOADER/HAMMER OPERATOR	06/01/2011	$51.100	12/01/2011	$52.350		
APPRENTICE: LABORER Demo Backhoe/Loader/Hammer Operator						
Ratio Step 1 2 3 4						
1:5 % 60.00 70.00 80.00 90.00						
Apprentice wages shall be no less than the following:						
Step 1$38.28/2$41.49/3$44.69/4$47.90						
DEMO: BURNERS	06/01/2011	$50.850	12/01/2011	$52.100		
APPRENTICE: LABORER Demo Burners						
Ratio Step 1 2 3 4						
1:5 % 60.00 70.00 80.00 90.00						
Apprentice Wages shall be no less than the following:						
Step 1$38.13/2$41.31/3$44.49/4$47.67						
DEMO: CONCRETE CUTTER/SAWYER	06/01/2011	$51.100	12/01/2011	$52.350		
DEMO: JACKHAMMER OPERATOR	06/01/2011	$50.850	12/01/2011	$52.100		
DEMO: WRECKING LABORER	06/01/2011	$50.100	12/01/2011	$51.350		
APPRENTICE: LABORER Demo Wrecking Laborer						
Ratio Step 1 2 3 4						
1:5 % 60.00 70.00 80.00 90.00						
Apprentice wages shall be no less than the following:						
Step 1$37.68/2$40.79/3$43.89/4$47.00						

This wage schedule must be posted at the work site in accordance with M.G.L. ch. 149, sec. 27
Failure of the employer to pay "prevailing wage rates," which are the minimum wage rates listed above, on public works projects is a violation of M.G.L. ch. 149, sec. 27. Employees not receiving such rates should report the violation to the Office of Fair Labor and Business Practices, 100 Cambridge Street, Boston, MA 02108; Tel: 617-727-3465.

Issue Date: 08/31/2011 **Wage Request Number:** 20110831-013 **Page 2 of 11**

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

DEVAL L. PATRICK
Governor

TIMOTHY P. MURRAY
Lt. Governor

JOANNE F. GOLDSTEIN
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HEATHER E. ROWE
Director

Prevailing Wage Rates

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

Awarding Authority: City of Newton

Contract Number: 12-15 **City/Town:** NEWTON

Description of Work: Newton South High School Field Facility Building Works - Field Facility Building at Newton South High School

Job Location: 140 Brandeis Road

Classification	Effective Dates and Total Rates					
DIRECTIONAL DRILL MACHINE OPERATOR	06/01/2011	$60.940	12/01/2011	$61.560	06/01/2012	$62.120
	12/01/2012	$62.740	06/01/2013	$63.510	12/01/2013	$64.290
DIVER	08/01/2011	$80.270				
DIVER TENDER	08/01/2011	$65.320				
DIVER TENDER (EFFLUENT)	08/01/2011	$85.380				
DIVER/SLURRY (EFFLUENT)	08/01/2011	$107.800				
ELECTRICIAN	03/01/2011	$68.290				

APPRENTICE: ELECTRICIAN - Local 103

Ratio	Step	1	2	3	4	5	6	7	8	9	10
2:3***	%	40.00	40.00	45.00	45.00	50.00	55.00	60.00	65.00	70.00	75.00

Apprentice wages shall be no less than the following Steps: App Prior 1/1/03; 30/35/40/45/50/55/65/70/75/80

1$37.38/2$37.38/3$44.81/4$44.81/5$46.95/6$49.08/7$51.22/8$53.35/9$55.49/10$57.62

ELEVATOR CONSTRUCTOR	01/01/2011	$66.690	01/01/2012	$68.190

APPRENTICE: ELEVATOR CONSTRUCTOR - Local 4

Ratio	Step	1	2	3	4	5
1:1	%	50.00	55.00	65.00	70.00	80.00

Apprentice rates shall be no less than the following: Steps 1-2 are 6 mos.; Steps 3-5 are 1 year

Step 1$34.26/2$43.76/3$48.86/4$51.41/5$56.50

ELEVATOR CONSTRUCTOR HELPER	01/01/2011	$52.830	01/01/2012	$54.330
FENCE & GUARD RAIL ERECTOR	06/01/2011	$50.350	12/01/2011	$51.600
FIELD ENG.INST.PERSON-BLDG,SITE,HVY/HWY	05/01/2011	$59.380		
FIELD ENG.PARTY CHIEF-BLDG,SITE,HVY/HWY	05/01/2011	$60.770		
FIELD ENG.ROD PERSON-BLDG,SITE,HVY/HWY	05/01/2011	$42.930		
FIRE ALARM INSTALLER	03/01/2011	$68.290		
FIRE ALARM REPAIR / MAINTENANCE / COMMISSIONING	03/01/2011	$56.300		
FIREMAN (ASST. ENGINEER)	06/01/2011	$55.100	12/01/2011	$55.630	06/01/2012	$56.100
	12/01/2012	$56.630	06/01/2013	$57.280	12/01/2013	$57.940
FLAGGER & SIGNALER	06/01/2011	$39.550	12/01/2011	$39.550		
FLOORCOVERER	03/01/2011	$61.110	09/01/2011	$62.360	03/01/2012	$63.610

APPRENTICE: FLOORCOVERER - Local 2168 Zone I

Ratio	Step	1	2	3	4	5	6	7	8
1:1	%	50.00	55.00	60.00	65.00	70.00	75.00	80.00	85.00

Apprentice rates shall be no less than the following: Steps are 750 hrs.

Step 1$28.38/2$30.17/3$41.41/4$43.20/5$46.78/6$48.57/7$52.15/8$53.95

FORK LIFT/CHERRY PICKER	06/01/2011	$61.290	12/01/2011	$61.920	06/01/2012	$62.490
	12/01/2012	$63.110	06/01/2013	$63.890	12/01/2013	$64.670
GENERATOR/LIGHTING PLANT/HEATERS	06/01/2011	$49.910	12/01/2011	$50.350	06/01/2012	$50.740
	12/01/2012	$51.190	06/01/2013	$51.740	12/01/2013	$52.290

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Failure of the employer to pay "prevailing wage rates," which are the minimum wage rates listed above, on public works projects is a violation of M.G.L. ch. 149, sec. 27. Employees not receiving such rates should report the violation to the Office of Fair Labor and Business Practices, 100 Cambridge Street, Boston, MA 02108; Tel: 617-727-3465.

Issue Date: 08/31/2011 **Wage Request Number:** 20110831-013 **Page 3 of 11**

THE COMMONWEALTH OF MASSACHUSETTS
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DEVAL L. PATRICK
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Director

Prevailing Wage Rates

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

Awarding Authority: City of Newton

Contract Number: 12-15 **City/Town:** NEWTON

Description of Work: Newton South High School Field Facility Building Works - Field Facility Building at Newton South High School

Job Location: 140 Brandeis Road

Classification	Effective Dates and Total Rates					
GLAZIER (GLASS PLANK/AIR BARRIER/INTERIOR SYSTEMS)	07/01/2011	$54.910	01/01/2012	$55.910	07/01/2012	$56.910
	01/01/2013	$57.910				

APPRENTICE: GLAZIER - Local 35 Zone 2

Ratio	Step	1	2	3	4	5	6	7	8
1:1	%	50.00	55.00	60.00	65.00	70.00	75.00	80.00	90.00

Apprentice wages shall be no less than the following: Steps are 750 hrs.

Step 1$24.06/2$28.79/3$30.70/4$32.60/5$43.00/6$44.87/7$46.78/8$50.60

HOISTING ENGINEER/CRANES/GRADALLS	06/01/2011	$61.290	12/01/2011	$61.920	06/01/2012	$62.490
	12/01/2012	$63.110	06/01/2013	$63.890	12/01/2013	$64.670

APPRENTICE: HOIST/PORT. ENG.- Local 4

Ratio	Step	1	2	3	4	5	6	7	8
1:6	%	55.00	60.00	65.00	70.00	75.00	80.00	85.00	90.00

Apprentice wages shall be no less than the following:

Step 1$31.50/2$45.65/3$47.61/4$49.56/5$51.52/6$53.47/7$55.43/8$57.38

HVAC (DUCTWORK)	08/01/2011	$66.740	02/01/2012	$67.990	08/01/2012	$69.240
	02/01/2013	$70.490				
HVAC (ELECTRICAL CONTROLS)	03/01/2011	$68.290				
HVAC (TESTING AND BALANCING - AIR)	08/01/2011	$66.740	02/01/2012	$67.990	08/01/2012	$69.240
	02/01/2013	$70.490				
HVAC (TESTING AND BALANCING -WATER)	09/01/2010	$68.730	09/01/2011	$69.230		
HVAC MECHANIC	09/01/2010	$68.730	09/01/2011	$69.230		
HYDRAULIC DRILLS	06/01/2011	$50.850	12/01/2011	$52.100		
INSULATOR (PIPES & TANKS)	09/01/2010	$61.660				

APPRENTICE: ASBESTOS INSULATOR (Pipes & Tanks) - Local 6 Boston

Ratio	Step	1	2	3	4
1:4	%	50.00	60.00	70.00	80.00

Apprentice wages shall be no less than the following: Steps are 1 year

Step 1$37.34/2$42.20/3$47.07/4$51.93

IRONWORKER/WELDER	03/16/2011	$61.930	09/16/2011	$62.930	03/16/2012	$63.930
	09/16/2012	$64.930	03/16/2013	$66.180		

APPRENTICE: IRONWORKER - Local 7 Boston

Ratio	Step	1	2	3	4	5	6
**	%	60.00	70.00	75.00	80.00	85.00	90.00

Apprentice wages shall be no less than the following: ** Structural 1:6; Ornamental 1:4

Step 1$47.42/2$51.05/3$52.86/4$54.67/5$56.49/6$58.30

JACKHAMMER & PAVING BREAKER OPERATOR	06/01/2011	$50.350	12/01/2011	$51.600
LABORER	06/01/2011	$50.100	12/01/2011	$51.350

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Issue Date: 08/31/2011 **Wage Request Number:** 20110831-013 **Page 4 of 11**

THE COMMONWEALTH OF MASSACHUSETTS
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Prevailing Wage Rates

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

Awarding Authority: City of Newton

Contract Number: 12-15 **City/Town:** NEWTON

Description of Work: Newton South High School Field Facility Building Works - Field Facility Building at Newton South High School

Job Location: 140 Brandeis Road

Classification	Effective Dates and Total Rates					
APPRENTICE: LABORER - Zone 1						
Ratio Step 1 2 3 4						
1:5 % 60.00 70.00 80.00 90.00						
Apprentice wages shall be no less than the following:						
Step 1$37.68/2$40.79/3$43.89/4$47.00						
LABORER: CARPENTER TENDER	06/01/2011	$50.100	12/01/2011	$51.350		
LABORER: CEMENT FINISHER TENDER	06/01/2011	$50.100	12/01/2011	$51.350		
LABORER: HAZARDOUS WASTE/ASBESTOS REMOVER	06/01/2011	$50.100	12/01/2011	$51.350		
LABORER: MASON TENDER	06/01/2011	$50.350	12/01/2011	$51.600		
LABORER: MULTI-TRADE TENDER	06/01/2011	$50.100	12/01/2011	$51.350		
LABORER: TREE REMOVER	06/01/2011	$50.100	12/01/2011	$51.350		
This classification applies to the wholesale removal of standing trees including all associated trimming of branches and limbs, and applies to the removal of branches at locations not on or around utility lines.						
LASER BEAM OPERATOR	06/01/2011	$50.350	12/01/2011	$51.600		
MARBLE & TILE FINISHERS	08/01/2011	$60.950	02/01/2012	$61.740		
APPRENTICE: MARBLE & TILE FINISHER - Local 3 Marble & Tile						
Ratio Step 1 2 3 4 5						
1:3 % 50.00 60.00 70.00 80.00 90.00						
Apprentice wages shall be no less than the following: Steps are 800 hrs.						
Step 1$43.19/2$46.74/3$50.29/4$53.85/5$57.40						
MARBLE MASONS,TILELAYERS & TERRAZZO MECH	08/01/2011	$73.040	02/01/2012	$74.030		
APPRENTICE: MARBLE-TILE-TERRAZZO MECHANIC - Local 3 Marble & Tile						
Ratio Step 1 2 3 4 5						
1:3 % 50.00 60.00 70.00 80.00 90.00						
Apprentice wages shall be no less than the following:						
Step 1$49.74/2$54.40/3$59.06/4$63.72/5$68.38						
MECH. SWEEPER OPERATOR (NON-CONSTRUCTION)	07/01/2011	$30.290				
MECH. SWEEPER OPERATOR (ON CONST. SITES)	06/01/2011	$60.940	12/01/2011	$61.560	06/01/2012	$62.120
	12/01/2012	$62.740	06/01/2013	$63.510	12/01/2013	$64.290
MECHANICS MAINTENANCE	06/01/2011	$60.940	12/01/2011	$61.560	06/01/2012	$62.120
	12/01/2012	$62.740	06/01/2013	$63.510	12/01/2013	$64.290
MILLWRIGHT (Zone I)	04/01/2011	$57.850				
APPRENTICE: MILLWRIGHT - Local 1121 Zone 1						
Ratio Step 1 2 3 4 5 6 7 8						
1:5 % 50.00 55.00 60.00 65.00 70.00 75.00 80.00 85.00						
Apprentice wages shall be no less than the following:						
Step 1$37.10/2$38.77/3$42.04/4$43.72/5$46.19/6$47.87/7$50.35/8$52.02						
MORTAR MIXER	06/01/2011	$50.350	12/01/2011	$51.600		

This wage schedule must be posted at the work site in accordance with M.G.L. ch. 149, sec. 27
Failure of the employer to pay "prevailing wage rates," which are the minimum wage rates listed above, on public works projects is a violation of M.G.L. ch. 149, sec. 27. Employees not receiving such rates should report the violation to the Office of Fair Labor and Business Practices, 100 Cambridge Street, Boston, MA 02108; Tel: 617-727-3465.

Issue Date: 08/31/2011 **Wage Request Number:** 20110831-013 **Page 5 of 11**

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

DEVAL L. PATRICK
Governor

TIMOTHY P. MURRAY
Lt. Governor

JOANNE F. GOLDSTEIN
Secretary

HEATHER E. ROWE
Director

Prevailing Wage Rates

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

Awarding Authority: City of Newton

Contract Number: 12-15 **City/Town:** NEWTON

Description of Work: Newton South High School Field Facility Building Works - Field Facility Building at Newton South High School

Job Location: 140 Brandeis Road

Classification	Effective Dates and Total Rates					
OILER (OTHER THAN TRUCK CRANES,GRADALLS)	06/01/2011	$43.340	12/01/2011	$43.680	06/01/2012	$43.960
	12/01/2012	$44.300	06/01/2013	$44.720	12/01/2013	$45.140
OILER (TRUCK CRANES, GRADALLS)	06/01/2011	$46.520	12/01/2011	$46.910	06/01/2012	$47.250
	12/01/2012	$47.640	06/01/2013	$48.120	12/01/2013	$48.610
OTHER POWER DRIVEN EQUIPMENT - CLASS II	06/01/2011	$60.940	12/01/2011	$61.560	06/01/2012	$62.120
	12/01/2012	$62.740	06/01/2013	$63.510	12/01/2013	$64.290
PAINTER (BRIDGES/TANKS)	07/01/2011	$65.410	01/01/2012	$66.410	07/01/2012	$67.410
	01/01/2013	$68.410				

APPRENTICE: PAINTER Local 35 - BRIDGES/TANKS

Ratio	Step	1	2	3	4	5	6	7	8
1:1	%	50.00	55.00	60.00	65.00	70.00	75.00	80.00	90.00

Apprentice wages shall be no less than the following: Steps are 750 hrs.

Step 1$29.31/2$34.57/3$37.00/4$39.43/5$50.35/6$52.75/7$55.18/8$60.05

PAINTER (SPRAY OR SANDBLAST, NEW) *	07/01/2011	$56.310	01/01/2012	$57.310	07/01/2012	$58.310
* If 30% or more of surfaces to be painted are new construction, NEW paint rate shall be used.	01/01/2013	$59.310				

APPRENTICE: PAINTER Local 35 Zone 2 - Spray/Sandblast - New

Ratio	Step	1	2	3	4	5	6	7	8
1:1	%	50.00	55.00	60.00	65.00	70.00	75.00	80.00	90.00

Apprentice wages shall be no less than the following:

Step 1$24.76/2$29.56/3$31.54/4$33.51/5$43.98/6$45.92/7$47.90/8$51.86

PAINTER (SPRAY OR SANDBLAST, REPAINT)	07/01/2011	$54.370	01/01/2012	$55.370	07/01/2012	$56.370
	01/01/2013	$57.370				

APPRENTICE: PAINTER Local 35 Zone 2 - Spray/Sandblast - Repaint

Ratio	Step	1	2	3	4	5	6	7	8
1:1	%	50.00	55.00	60.00	65.00	70.00	75.00	80.00	90.00

Apprentice wages shall be no less than the following:

Step 1$23.79/2$28.49/3$30.37/4$32.25/5$42.62/6$44.47/7$46.35/8$50.11

PAINTER (TRAFFIC MARKINGS)	06/01/2011	$50.100	12/01/2011	$51.350		
PAINTER / TAPER (BRUSH, NEW) *	07/01/2011	$54.910	01/01/2012	$55.910	07/01/2012	$56.910
* If 30% or more of surfaces to be painted are new construction, NEW paint rate shall be used.	01/01/2013	$57.910				

APPRENTICE: PAINTER - Local 35 Zone 2 - BRUSH NEW

Ratio	Step	1	2	3	4	5	6	7	8
1:1	%	50.00	55.00	60.00	65.00	70.00	75.00	80.00	90.00

Apprentice wages shall be no less than the following: Steps are 750 hrs.

Step 1$24.06/2$28.79/3$30.70/4$32.60/5$43.00/6$44.87/7$46.78/8$50.60

PAINTER / TAPER (BRUSH, REPAINT)	07/01/2011	$52.970	01/01/2012	$53.970	07/01/2012	$54.970
	01/01/2013	$55.970				

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Prevailing Wage Rates

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

Awarding Authority: City of Newton

Contract Number: 12-15 **City/Town:** NEWTON

Description of Work: Newton South High School Field Facility Building Works - Field Facility Building at Newton South High School

Job Location: 140 Brandeis Road

Classification	Effective Dates and Total Rates					
APPRENTICE: PAINTER Local 35 Zone 2 - BRUSH REPAINT						
Ratio Step 1 2 3 4 5 6 7 8						
1:1 % 50.00 55.00 60.00 65.00 70.00 75.00 80.00 90.00						
Apprentice wages shall be no less than the following: Steps are 750 hrs.						
Step 1$23.09/2$27.72/3$29.53/4$31.34/5$41.64/6$43.42/7$45.23/8$48.85						
PANEL & PICKUP TRUCKS DRIVER	08/01/2011	$45.950	12/01/2011	$46.610	06/01/2012	$46.910
	08/01/2012	$47.260	12/01/2012	$48.290		
PIER AND DOCK CONSTRUCTOR (UNDERPINNING AND DECK)	08/01/2011	$65.320				
PILE DRIVER	08/01/2011	$65.320				
APPRENTICE: PILE DRIVER - Local 56 Zone 1						
Ratio Step 1 2 3 4 5 6 7 8						
1:3 % 60.00 65.00 70.00 75.00 80.00 85.00 90.00 95.00						
Apprentice wages shall be no less than the following:						
Step 1$49.27/2$51.28/3$53.28/4$55.29/5$57.30/6$59.30/7$61.31/8$63.31						
PIPEFITTER & STEAMFITTER	09/01/2010	$68.730	09/01/2011	$69.230		
APPRENTICE: PIPEFITTER - Local 537						
Ratio Step 1 2 3 4 5						
** % 40.00 45.00 60.00 70.00 80.00						
Apprentice Rates-Step1$33.44/2$43.38/3$50.29/4$54.90/5$59.51 ** 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)						
PIPELAYER	06/01/2011	$50.350	12/01/2011	$51.600		
PLUMBERS & GASFITTERS	03/01/2011	$67.500	09/01/2011	$68.620	03/01/2012	$69.420
	09/01/2012	$70.670	03/01/2013	$71.920		
APPRENTICE: PLUMBER - Local 12						
Ratio Step 1 2 3 4 5						
** % 35.00 40.00 55.00 65.00 75.00						
Apprentice wages shall be no less than the following: ** 1:2; 2:6; 3:10; 4:14; 5:19/Steps are 1 yr						
Step 1$30.01/2$32.89/3$41.54/4$47.31/ 4w/lic$50.20 /5$53.09/ 5w/lic$55.98						
PNEUMATIC CONTROLS (TEMP.)	09/01/2010	$68.730	09/01/2011	$69.230		
PNEUMATIC DRILL/TOOL OPERATOR	06/01/2011	$50.350	12/01/2011	$51.600		
POWDERMAN & BLASTER	06/01/2011	$51.100	12/01/2011	$52.350		
POWER SHOVEL/DERRICK/TRENCHING MACHINE	06/01/2011	$61.290	12/01/2011	$61.920	06/01/2012	$62.490
	12/01/2012	$63.110	06/01/2013	$63.890	12/01/2013	$64.670
PUMP OPERATOR (CONCRETE)	06/01/2011	$61.290	12/01/2011	$61.920	06/01/2012	$62.490
	12/01/2012	$63.110	06/01/2013	$63.890	12/01/2013	$64.670
PUMP OPERATOR (DEWATERING, OTHER)	06/01/2011	$49.910	12/01/2011	$50.350	06/01/2012	$50.740
	12/01/2012	$51.190	06/01/2013	$51.740	12/01/2013	$52.290
READY-MIX CONCRETE DRIVER	05/01/2011	$41.690				

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Prevailing Wage Rates

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

Awarding Authority: City of Newton

Contract Number: 12-15 **City/Town:** NEWTON

Description of Work: Newton South High School Field Facility Building Works - Field Facility Building at Newton South High School

Job Location: 140 Brandeis Road

Classification	Effective Dates and Total Rates					
RECLAIMERS	06/01/2011	$60.940	12/01/2011	$61.560	06/01/2012	$62.120
	12/01/2012	$62.740	06/01/2013	$63.510	12/01/2013	$64.290
RESIDENTIAL WOOD FRAME (All Other Work)	04/01/2011	$48.420				
RESIDENTIAL WOOD FRAME CARPENTER **	04/01/2011	$36.810				

** The Residential Wood Frame Carpenter classification applies only to the construction of new, wood frame residences that do not exceed four stories including the basement.

As of 9/1/09 Carpentry work on wood-frame residential WEATHERIZATION projects shall be paid the RESIDENTIAL WOOD FRAME CARPENTER rate.

APPRENTICE: CARPENTER (Residential Wood Frame) - Zone 2

Ratio	Step	1	2	3	4	5	6	7	8
1:5	%	60.00	60.00	65.00	70.00	75.00	80.00	85.00	90.00

Apprentice wages shall be no less than the following:

Step 1$20.88/2$27.11/3$28.33/4$29.54/5$30.75/6$31.96/7$33.17/8$34.39

RIDE-ON MOTORIZED BUGGY OPERATOR	06/01/2011	$50.350	12/01/2011	$51.600	
ROLLER/SPREADER/MULCHING MACHINE	06/01/2011	$60.940	12/01/2011	$61.560	06/01/2012	$62.120
	12/01/2012	$62.740	06/01/2013	$63.510	12/01/2013	$64.290
ROOFER (Inc.Roofer Waterproofng &Roofer Damproofg)	08/01/2011	$56.860	02/01/2012	$57.860	08/01/2012	$58.860
	02/01/2013	$59.860				

APPRENTICE: ROOFER - Local 33

Ratio	Step	1	2	3	4	5
**	%	50.00	60.00	65.00	75.00	85.00

** 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.

Apprentice rates no less than: Step 1$31.71/2$42.24/3$44.06/4$47.72/5$51.38

ROOFER SLATE / TILE / PRECAST CONCRETE	08/01/2011	$57.110	02/01/2012	$58.110	08/01/2012	$59.110
	02/01/2013	$60.110				

APPRENTICE: ROOFER (Slate/Tile/Precast Concrete) - Local 33

Ratio	Step	1	2	3	4	5
**	%	50.00	60.00	65.00	75.00	85.00

Apprentices wages shall be paid no less than the following:

Step 1$31.84/2$42.39/3$44.23/4$47.91/5$51.59

SHEETMETAL WORKER	08/01/2011	$66.740	02/01/2012	$67.990	08/01/2012	$69.240
	02/01/2013	$70.490				

APPRENTICE: SHEET METAL WORKER - Local 17-A

Ratio	Step	1	2	3	4	5	6	7
1:4	%	40.00	45.00	50.00	60.00	65.00	75.00	85.00

Apprentice wages shall be no less than the following: Steps 1-3 are 1 year; Steps 4-7 are 6 mos.

Step 1$29.49/2$35.19/3$38.16/4$43.32/5$46.03/6$51.45/7$56.37

SIGN ERECTOR	06/01/2009	$37.780

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Prevailing Wage Rates

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

Awarding Authority: City of Newton

Contract Number: 12-15 **City/Town:** NEWTON

Description of Work: Newton South High School Field Facility Building Works - Field Facility Building at Newton South High School

Job Location: 140 Brandeis Road

Classification	Effective Dates and Total Rates					
APPRENTICE: SIGN ERECTOR - Local 35 Zone 2						
Ratio Step 1 2 3 4 5 6 7 8 9						
1:1 % 50.00 55.00 60.00 65.00 70.00 75.00 80.00 85.00 90.00						
Apprentice wages shall be no less than the following: Steps are 4 mos.						
Step 1$19.48/2$23.12/3$24.36/4$25.60/5$30.34/6$31.58/7$32.82/8$34.06/9$35.30						
SPECIALIZED EARTH MOVING EQUIP < 35 TONS	08/01/2011	$46.410	12/01/2011	$47.070	06/01/2012	$47.370
	08/01/2012	$47.720	12/01/2012	$48.750		
SPECIALIZED EARTH MOVING EQUIP > 35 TONS	08/01/2011	$46.700	12/01/2011	$47.360	06/01/2012	$47.660
	08/01/2012	$48.010	12/01/2012	$49.040		
SPRINKLER FITTER	01/01/2011	$70.550	09/01/2011	$71.350	01/01/2012	$71.500
	03/01/2012	$72.250	09/01/2012	$73.250	01/01/2013	$73.400
	03/01/2013	$74.400				
APPRENTICE: SPRINKLER FITTER - Local 550						
Ratio Step 1 2 3 4 5 6 7 8 9 10						
1:1 % 40.00 45.00 50.00 55.00 60.00 65.00 70.00 75.00 80.00 85.00						
Apprentice wages shall be no less than the following steps:						
1$36.20/2$38.75/3$41.30/4$43.85/5$46.40/6$48.95/7$51.50/8$54.05/9$56.60/10$59.15						
STEAM BOILER OPERATOR	06/01/2011	$60.940	12/01/2011	$61.560	06/01/2012	$62.120
	12/01/2012	$62.740	06/01/2013	$63.510	12/01/2013	$64.290
TAMPERS, SELF-PROPELLED OR TRACTOR DRAWN	06/01/2011	$60.940	12/01/2011	$61.560	06/01/2012	$62.120
	12/01/2012	$62.740	06/01/2013	$63.510	12/01/2013	$64.290
TELECOMMUNICATION TECHNICIAN	03/01/2011	$56.300				
APPRENTICE: TELECOMMUNICATION TECHNICIAN - Local 103						
Ratio Step 1 2 3 4 5 6 7 8						
1:1 % 40.00 45.00 50.00 55.00 60.00 65.00 75.00 80.00						
Apprentice wages shall be no less than the following:						
Step 1$37.09/2$38.69/3$40.30/4$41.89/5$43.49/6$45.10/7$48.30/8$49.90						
TERRAZZO FINISHERS	08/01/2011	$71.940	02/01/2012	$72.930		
APPRENTICE: TERRAZZO FINISHER - Local 3 Marble & Tile						
Ratio Step 1 2 3 4 5						
1:3 % 50.00 60.00 70.00 80.00 90.00						
Apprentice wages shall be no less than the following: Steps are 800 hrs.						
Step 1$49.19/2$53.74/3$58.29/4$62.84/5$67.39						
TEST BORING DRILLER	06/01/2011	$51.500	12/01/2011	$52.750		
APPRENTICE: TEST BORING DRILLER (Laborers Foundation & Marine)						
Ratio Step 1 2 3 4						
1:3 % 60.00 70.00 80.00 90.00						
Apprentice wages shall be no less than the following:						
Step 1$38.58/2$41.81/3$45.04/4$48.27						

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Prevailing Wage Rates

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

Awarding Authority: City of Newton

Contract Number: 12-15 **City/Town:** NEWTON

Description of Work: Newton South High School Field Facility Building Works - Field Facility Building at Newton South High School

Job Location: 140 Brandeis Road

Classification	Effective Dates and Total Rates					
TEST BORING DRILLER HELPER	06/01/2011	$50.220	12/01/2011	$51.470		
TEST BORING LABORER	06/01/2011	$50.100	12/01/2011	$51.350		
APPRENTICE: TEST BORING LABORER (Laborers Foundation & Marine)						

Ratio	Step	1	2	3	4
1:3	%	60.00	70.00	80.00	90.00

Apprentice wages shall be no less than the following:

Step 1$37.74/2$40.83/3$43.92/4$47.01

TRACTORS/PORTABLE STEAM GENERATORS	06/01/2011	$60.940	12/01/2011	$61.560	06/01/2012	$62.120
	12/01/2012	$62.740	06/01/2013	$63.510	12/01/2013	$64.290
TRAILERS FOR EARTH MOVING EQUIPMENT	08/01/2011	$46.990	12/01/2011	$47.650	06/01/2012	$47.950
	08/01/2012	$48.300	12/01/2012	$49.490		
TUNNEL WORK - COMPRESSED AIR	06/01/2011	$62.930	12/01/2011	$64.180		
TUNNEL WORK - COMPRESSED AIR (HAZ. WASTE)	06/01/2011	$64.930	12/01/2011	$66.180		
TUNNEL WORK - FREE AIR	06/01/2011	$55.000	12/01/2011	$56.250		
TUNNEL WORK - FREE AIR (HAZ. WASTE)	06/01/2011	$57.000	12/01/2011	$58.250		
VAC-HAUL	08/01/2011	$46.410	12/01/2011	$47.070	06/01/2012	$47.370
	08/01/2012	$47.720	12/01/2012	$48.750		
WAGON DRILL OPERATOR	06/01/2011	$50.350	12/01/2011	$51.600		
WASTE WATER PUMP OPERATOR	06/01/2011	$61.290	12/01/2011	$61.920	06/01/2012	$62.490
	12/01/2012	$63.110	06/01/2013	$63.890	12/01/2013	$64.670
WATER METER INSTALLER	03/01/2011	$67.500	09/01/2011	$68.620	03/01/2012	$69.420
	09/01/2012	$70.670	03/01/2013	$71.920		
Outside Electrical - East						
CABLE TECHNICIAN (Power Zone)	08/29/2011	$35.310				
CABLEMAN (Underground Ducts & Cables)	08/29/2011	$46.110				
DRIVER / GROUNDMAN CDL	08/29/2011	$40.830				
DRIVER / GROUNDMAN -Inexperienced (<2000 Hrs)	08/29/2011	$33.050				
EQUIPMENT OPERATOR (Class A CDL)	08/29/2011	$50.110				
EQUIPMENT OPERATOR (Class B CDL)	08/29/2011	$43.340				
GROUNDMAN	08/29/2011	$32.550				
GROUNDMAN -Inexperienced (<2000 Hrs.)	08/29/2011	$27.790				
JOURNEYMAN LINEMAN	08/29/2011	$59.620				
APPRENTICE: LINEMAN (Outside Electrical) - East Local 104						

Ratio	Step	1	2	3	4	5	6	7
1:2	%	60.00	65.00	70.00	75.00	80.00	85.00	90.00

Apprentice wages shall be no less than the following:

Step 1$34.59/2$36.99/3$39.65/4$42.30/5$44.95/6$47.61/7$50.76

TELEDATA CABLE SPLICER	07/18/2011	$32.900	07/16/2012	$33.300
TELEDATA LINEMAN/EQUIPMENT OPERATOR	07/18/2011	$31.330	07/16/2012	$31.700

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Prevailing Wage Rates

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

Awarding Authority: City of Newton

Contract Number: 12-15 **City/Town:** NEWTON

Description of Work: Newton South High School Field Facility Building Works - Field Facility Building at Newton South High School

Job Location: 140 Brandeis Road

Classification	Effective Dates and Total Rates			
TELEDATA WIREMAN/INSTALLER/TECHNICIAN	07/18/2011	$31.330	07/16/2012	$31.700
TREE TRIMMER	02/01/2009	$19.010		
This classification applies only to the trimming of branches on and around utility lines.				
TREE TRIMMER GROUNDMAN	02/01/2009	$17.060		
This classification applies only to the trimming of branches on and around utility lines.				

Additional Apprentice 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) unless otherwise specified.

* Ratios are expressed in allowable number of apprentices to journeymen or fraction thereof.
** 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.

This wage schedule must be posted at the work site in accordance with M.G.L. ch. 149, sec. 27
Failure of the employer to pay "prevailing wage rates," which are the minimum wage rates listed above, on public works projects is a violation of M.G.L. ch. 149, sec. 27. Employees not receiving such rates should report the violation to the Office of Fair Labor and Business Practices, 100 Cambridge Street, Boston, MA 02108; Tel: 617-727-3465.

Issue Date: 08/31/2011 **Wage Request Number:** 20110831-013 **Page 11 of 11**

The Massachusetts Prevailing Wage Law
M.G.L. ch. 149, §§ 26 – 27

NOTICE TO AWARDING AUTHORITIES

- 'The enclosed wage schedule applies only to the specific project listed at the top and will be updated for any public construction project lasting longer than one (1) year.
- 'You should request an updated wage schedule from the Division of Occupational Safety if you have not opened bids or selected a contractor within 90 days of the date of issuance of the enclosed wage schedule.
- 'The wage schedule shall be incorporated in any advertisement or call for bids for the project for which it has been issued.
- '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

- The enclosed wage schedule, and any updated schedule, must be posted in a conspicuous place at the work site during the life of the project.
- 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.
- 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.
- All apprentices must be registered with the Massachusetts Division of Apprentice Training in order to be paid at the reduced apprentice rates. If a worker is not registered with the Division of Apprentice Training, they must be paid the “total rate” listed on the wage schedule regardless of experience or skill level. For further information, please call (617) 727-3486 or write to the Division of Apprentice Training, 399 Washington Street, 4th Floor, Boston, MA 02108

WEEKLY PAYROLL RECORDS REPORT
& STATEMENT OF COMPLIANCE

In accordance with Massachusetts General Law c149, §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 has been printed on the reverse of this page 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.

In addition, every contractor and subcontractor is required to submit a copy of their weekly payroll records to the awarding authority. This is required to be done on a weekly basis. Once collected, the awarding authority is also required to preserve those records for three years.

In addition, each such contractor, subcontractor or public body shall furnish to the Department of Labor & Workforce Development/Division of Occupational Safety within fifteen days after completion of its portion of the work a statement, executed by the contractor, subcontractor or public body who supervises the payment of wages, in the following form:

STATEMENT OF COMPLIANCE

_____, 2011

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 _____

DIVISION OF OCCUPATIONAL SAFETY, 399 WASHINGTON STREET, 5TH FL., BOSTON, MA. 02108

WEEKLY PAYROLL REPORT FORM

Company Name:

Project Name:

Awarding Auth.:

Work Week Ending:

Prime Contractor

Subcontractor
List Prime Contractor:

Employer Signature:

Print Name & Title:

Employee Name & Address	Work Classification	Hours Worked							(A) Tot. Hrs.	(B) Hourly Base Wage	Employer Contributions			(F) [B+C+D+E] Hourly Total Wage (prev. wage)	(G) [A*F] Weekly Total Amount
											(C) Health & Welfare	(D) Pension	(E) Supp. Unemp.		
		S	M	T	W	T	F	S							

NOTE: Every contractor and subcontractor is required to submit a copy of their weekly payroll records to the awarding authority.

Section 01 10 00

SUMMARY

PART 1 - GENERAL

1.1 SECTION INCLUDES

A. Project description.

B. Project's environmental goals.

C. Definitions – Owner, and Architect.

D. Work by Owner.

E. Coordination with Owner

F. Project Manual formats and conventions.

1.2 PROJECT DESCRIPTION

A. Work covered by Contract Documents: The Project consists of new field facility building at Newton South High School.

1. Work included beyond the Contract Limits: Protection and replacement of abutting sidewalks and roadways.
2. Completeness: The Work shall be as shown on the Drawings and be complete in every respect and in conformance with all applicable requirements of the governing laws and codes.

B. Contract time: The Contractor may begin on-site work on, or after receipt of a written Notice to Proceed, or suitable Letter of Intent. After commencement of work, the Contractor shall pursue the Work continuously and with diligence, and bring the Project to Substantial Completion within number of days indicated on the Invitation to Bid.

1. Substantial completion is the stage in the progress of the Work when the work or designated portion thereof is sufficiently complete in accordance with the Contract Documents so the Owner can occupy or utilize the Work for its intended use. This includes any and all permits required by governmental agencies necessary for occupancy and use.

C. Building Permits: Contractor is responsible to ensure all required permits are obtained, and that the work pertaining to permits is properly inspected and certified. Filed Subcontractors are required to obtain permits relating to their work.

1.3 PROJECT ENVIRONMENTAL GOALS

A. Objectives: Utilize pollution prevention materials, sustainable construction methods, low VOC and none-off-gassing products to maintain of healthy Indoor Air Quality (IAQ) during the construction process:

1. Incorporate green products and sustainable materials into the Project. To the greatest extent possible, the Contractor shall:

a. Use products with low embodied energy (production, manufacturing, and transportation).

b. Use products that maximize recycled content in materials products, and systems.

c. Use products easy to maintain, repair, and that can be cleaned using non-toxic substances..

d. Use products will not negatively affect healthy indoor air quality.

e. Use reusable and recyclable packaging.

f. Avoid use of ozone-depleting compounds, such as HCFCs from refrigerants or foam insulation materials.

B. Water resource protection: Conserve and use water efficiently, limit on-site fresh water usage to the greatest extent possible, control water distribution systems and waste, minimize use of imported or mined water. Utilize water-conserving appliances and equipment.

C. Air Quality is achieved by compliance with the limitation of indoor air concentrations of certain pollutants, at or below the established maximum allowable concentrations. Healthy air quality goals shall be maintained during construction, and through building commissioning.

1. Use construction practices that achieve the most efficient use of resources and materials.

1.4 DEFINITIONS – OWNER AND ARCHITECT

A. Wherever the term "Owner" is used in this specification, it refers to:

City of Newton, Massachusetts

1. The terms “Owner” and “Awarding Authority” as used in the Project Manual have the same meaning and are interchangeable in Contract Documents. Both terms refer to the same entity.

2. Important Tax Note: City of Newton is exempt from certain taxes. It is therefore required that the Contractor and all Subcontractors purchasing taxable goods or services make known to suppliers that tax-exempt status of the Owner, in order that such taxes will not be applied to the goods under Contract. In the event that such taxes are paid on any items, the Contractor shall obtain rebates for the taxes and reimburse the Owner in the full amount by change order. The Owner will provide the necessary evidence and certificates of its tax-exempt status upon request of those concerned. The most prevalent taxes concerned are:

a. Federal Excise Taxes as applied to articles which are taxable under Chapter 32 of the Internal Revenue Code of 1954, as amended. The Owner’s Excise Tax Exemption Certificate Number is applicable.

b. Sales and Use Tax imposed by the Commonwealth of Massachusetts: The Owner has been assigned Exemption Certificate Number with respect to leases, rental, or purchase of “tangible personal property”, including building materials and supplies, subject to the Massachusetts Sales and Use Tax. This exemption does not apply to any equipment leased or rented by the Contractor for his own use on the construction of the Project.

3. All papers required to be delivered to the Owner shall, unless otherwise specified in writing to the contrary, be delivered to the office of the Architect:

B. Wherever the term "Architect", “Designer”, or “Architect/Engineer”, is used in the Contract Documents, it refers to:

Raymond Design Associates, Inc.
222 North Street
Hingham, Ma 0204

1.5 WORK BY OWNER

A. Related work under separate agreements: The Owner will award a separate contract which will commence prior to or during the work of this Contract; which in general includes:

1. Testing Laboratory Services.

B. Owner Furnished and Installed (OFI) Products: The Contractor has coordinating responsibility for the following work, provided by others under separate agreement(s) with the Owner:

1. Telephone/Data and communications systems.
2. Security alarm and detection systems.
3. Snacks/Drinks: all equipment and furnishings.

1.6 COORDINATION WITH OWNER

A. The portion of the facility immediately outside of the work area' will remain completely occupied by the Owner' throughout the term of construction. Isolate construction activity to the highest degree possible from students.

B. Suspension of Work: The Owner retains the right to temporarily suspend work at any time when the noise or disturbance created by construction proves disruptive to the students. The Owner may request of the Contractor to utilize other means and methods, if practical, and acceptable to the Architect, which are less disruptive.

1.7 PROJECT MANUAL FORMATS AND CONVENTIONS

A. Project Manual Format: The Project Manual is organized into Divisions and subdivided into Sections and Documents using Construction Specification Institute (CSI) publication "MasterFormat, 2004 Edition" numbering system.

1. Section Identification: Six/Eight digit Section numbers are utilized and cross-referenced throughout the Contract Documents. Sections in the Project Manual are in numeric sequence; however, the sequence is incomplete because only those Section numbers which are applicable to this Project are used.
2. Division One of the Project Manual governs procedural and administrative requirements of the Work. Division One requirements are applicable to all Sections and Documents in the Project Manual.

B. Specification Content: The Specifications use certain conventions for the style of language and the intended meaning of certain terms, words, and phrases when used in particular situations. These conventions are as follows:

1. Abbreviated Language: Language used in the Specifications and other Contract Documents is abbreviated. Words and meanings shall be interpreted as appropriate. Words implied, but not stated, shall be inferred as the sense requires. Singular words shall be interpreted as plural, and plural words shall be interpreted as singular as applicable to the context of the Contract Documents.
2. Imperative mood and streamlined language is generally used in the Specifications. Requirements expressed in the imperative mood are to be performed by Contractor. Occasionally, the indicative or subjunctive mood may be used in the Section Text for clarity to describe responsibilities that must be fulfilled indirectly by Contractor or by others when so noted.
   a. The words "shall," "shall be," or "shall comply with," depending on the context, are implied where a colon (:) is used within a sentence or phrase.

PART 2 - PRODUCTS (Not Used)

PART 3 - EXECUTION (Not Used)

End of Section

Section 01 25 13

PRODUCT SUBSTITUTION PROCEDURES

PART 1 - GENERAL

1.1 SECTION INCLUDES

A. Product options.

B. Product options.

1. Product selections.
2. Additional product selection requirements regarding sustainable and environmental-friendly products.
3. Visual matching.

C. Product substitution procedures.

1.2 RELATED SECTIONS

A. Section 01 60 00 - PRODUCT REQUIREMENTS: Basic product requirements.

1.3 PRODUCT OPTIONS

A. Product selections: Comply with the following for selection of products:

1. Products specified by reference standards or by description only: Provide any acceptable product meeting those standards or description.
2. Products specified by performance requirements only: Provide any acceptable product which has been tested to show compliance with specified requirements, including indicated performances.
3. Products specified by naming one or more manufacturers: Provide products of manufacturers named, or submit a request for substitution for any manufacturer or product not named in accordance with Massachusetts General Laws, Chapter 30, Section 39M(b).

B. Additional product selection requirements regarding sustainable and environmental-friendly products and materials conforming to Owner’s sustainable/environmental program.

1. Provide products which comply with VOC emission limits required by the Owner’s Sustainability/Environmental Policy and in compliance with applicable codes.
2. Provide products which comply with specified requirements for recycled content.
3. Provide complete written documentation with all product substitutions that the proposed products are fully compliant to specific environmental and sustainability requirements applicable to the substitution.

C. Visual matching: Where Specifications require matching a sample, the Architect's decision on whether a proposed product matches is final. Where no product matches and complies with other requirements, comply with provisions for "substitutions" for selection of a matching product in another category.

1.4 PRODUCT SUBSTITUTION

A. Products specified by reference standards or by description only: Any product meeting those standards or description.

B. Pursuant to Massachusetts General Laws, Chapter 30, Section 39M(b), where products or materials are prescribed by manufacturer name, trade name or catalog reference, the word “or approved equal” shall be implied. The Architect will evaluate the proposed “equal” item on the following criteria:

1. The submitted “equal” item is at least equal in quality, durability, appearance, strength and design.
2. The submitted “equal” item is at least equal in function for the purpose intended by the design of the Work.
3. The submitted “equal” item conforms substantially to the detailed requirements for the items as indicated by the specifications.
4. The submitted “equal” item fully conforms to the sustainability and environmental requirements to comply with Owner’s Sustainability/Environmental Policy.

C. The Architect's evaluation and decision on whether a proposed product is equal to that specified, based on the above evaluation requirements, is final. The Contractor retains the right to appeal the Architect’s determination of equality through regulated statutory provisions.

1. The Architect and Owner reserve the right to reject proposed substitutions where data for VOCs is not provided or where emissions of individual VOCs are higher than for specified materials.

PART 2 - PRODUCTS (Not Used)

PART 3 - EXECUTION (Not Used)

End of Section

Section 01 31 00

PROJECT MANAGEMENT AND COORDINATION

PART 1 - GENERAL

1.1 SECTION INCLUDES

A. Project coordination.

B. Project site administration.

C. Project meetings.

1.2 GENERAL PROJECT COORDINATION

A. Coordination: The General Contractor is fully responsible for coordinating the Work of this Contract including scheduling, submittals, Work and other activities included in various Sections to assure efficient and orderly sequence of installation of interdependent construction elements. The Contractor is responsible for coordinating actual installed location and interface of work, and to make provisions to accommodate items scheduled for later installation.

B. Where installation of one component depends on installation of other components before or after its own installation, schedule activities in the sequence required to obtain efficient installation with the least amount of alterations, or cutting and patching, to completed Work.

1. The Contractor shall be responsible to uncover work completed in order to install ill-timed work, at no additional cost to the Owner.

C. Where space is limited, coordinate installation of different components to assure maximum accessibility for maintenance, service and repair.

D. Coordinate space requirements and installation of mechanical and electrical work which are indicated diagrammatically on Drawings. Follow routing shown for pipes, ducts, and conduit, as closely as practicable; place runs parallel with line of building. Utilize spaces efficiently to maximize accessibility for other installations, for maintenance, and for repairs.

E. Verify that utility requirement characteristics of operating equipment are compatible with building utilities. Coordinate work of various Sections having interdependent responsibilities for installing, connecting to, and placing in service such equipment.

F. In finished areas except as otherwise indicated, conceal pipes, ducts, and wiring within the construction. Coordinate locations of fixtures and outlets with finish elements.

G. Coordinate completion and clean up of Work of separate Sections in preparation for Substantial Completion and Owner's occupancy.

H. After Owner occupancy of premises, coordinate access to site for correction of defective Work and Work not in accordance with Contract Documents, to minimize disruption of Owner's activities.

1.3 UTILITIES, MECHANICAL AND ELECTRICAL COORDINATION

A. Coordinate all Work of this Project. Provide full and complete coordination for utilities, mechanical and electrical work in Divisions 11, 13, and 21 through 28, with Work of other Divisions.

1. Each Filed-subcontractor shall compare his drawings and specifications with those of other Trades and report any discrepancies between them to the General Contractor. The General Contractor shall obtain from the Architect written instructions for changes necessary in the mechanical or electrical work, to ensure that all work is installed in coordination and cooperation with other Trades installing interrelated work. Before installation, each Filed-subcontractor shall make proper provisions to avoid interferences in a manner approved by the Architect. All changes required in the work of each Filed-subcontractor caused by his negligence, shall be corrected by him at his own expense, to the Architect's satisfaction.

B. Give all advance notice to public utility companies as required by law, and provide proper disposition, subject to Architect’s approval of all existing pipe lines, conduits, sewers, drains, poles, wiring, and other utilities that in any way interfere with the Work, whether or not they are specifically shown on the Drawings.

C. Coordination regarding existing utilities:

1. Notify Owner and appropriate authorities when coming across an unknown utility line(s), and await decision as to how to dispose of same.
2. When an existing utility line must be cut and plugged or capped, moved, or relocated, or has become damaged, notify the Owner and Utility company involved, and assure the protection, support, or moving of utilities to adjust them to the new work.
3. The Contractor shall be responsible for all damage caused to existing, active utilities located within the limits of this Contract, whether or not such utilities are shown on the Drawings, including resultant damages or injuries to persons or properties.

D. General coordination of piping, ductwork, conduits and equipment:

1. The Contract Drawings are diagrammatic only intending to show general runs and general locations of piping, ductwork, equipment and sprinkler heads. Determine exact routing and location of individual systems prior to fabrication of components or installation.
   a. Piping runs requiring pitch have “right-of-way” over those systems what do not pitch.
   b. System components whose elevations cannot be changed have “right-of-way” over those components whose elevations can be changed.
2. Adjust locations of piping, ductwork, conduits and equipment as required to accommodate new work with interferences anticipated and as encountered during installation.
   a. Locate piping, conduits and ductwork to be clear of swinging doors, access doors, and clear for unimpeded equipment access.
3. Provide all offsets, transitions and changes of direction for all systems, as may be required to maintain proper clearances for headroom, and as may be required for coordination with other “fixed-in-place” building components (such as structural systems).
   a. Furnish all vents, drains and similar accessories as may be required for offsets, transitions and changes of direction.
4. Provide openings in the work for penetration of mechanical and electrical work.

5. Coordinate final locations of ceiling mounted devices (including air distribution devices, thermostats, heaters, control devices, sprinkler heads and similar work) with reflected ceiling plans. Review locations with Architect and obtain approval of all devices prior to installation.

1.4 GENERAL PROJECT ADMINISTRATION

A. Prepare memoranda for distribution to each party involved outlining required coordination procedures. Include required notices, reports, and attendance at meetings.

B. Prepare similar memoranda for the Owner and separate contractors where coordination of their Work is required.

C. Conduct conferences among Filed-subcontractors, subcontractors and others concerned with the Work, to establish and maintain coordination and schedules, and to resolve coordination matters in dispute.

D. Administrative Procedures: Coordinate scheduling and timing of administrative procedures with other activities to avoid conflicts and ensure orderly progress. Such activities include:

1. Preparation of schedules.
2. Installation and removal of temporary facilities.
3. Delivery and processing of submittals.
4. Progress meetings.
5. Project Closeout activities.

1.5 SITE MOBILIZATION CONFERENCE

A. In addition to the pre-bid conference, the Architect may, prior to commencement of the Work, schedule a meeting at a meeting room provided by the Owner.

1. Attendance is required by Owner, Architect, engineering consultants, General Contractors' Project Manager and Superintendent, Filed-subcontractors, and other major subcontractors, applicators, installers and suppliers. Other persons are required to attend as the Architect may direct or the General Contractor may wish to have present.
2. Items of Agenda:
   a. Use of premises by Owner, Contractor, and subcontractor(s).
   b. Owner's requirements and partial occupancy considerations.
   c. Demolition procedures, identity tagging of existing furnishings and equipment for salvage or disposal.
   d. Temporary utilities.
   e. Barricading and protection of the public, dust barriers.
   f. Survey and building layout.
   g. Potentially difficult areas of work.
   h. Project coordination.
   i. Security and housekeeping procedures.
   j. Construction schedules.
   k. Work beyond Contract Limit.
   l. Procedures for testing and inspection.

m. Procedures for maintaining record documents.

n. Requirements for equipment start-up.

o. Inspection and acceptance of equipment put into service during construction period.

1.6 PROGRESS MEETINGS

A. The Architect or its representative will schedule and administer meetings throughout the progress of the Work; make arrangements for meetings, prepare agenda with copies for participants, preside at meetings, record minutes and distribute copies within one week to Contractor, Owner and participants of meeting only. Contractor is responsible for distribution to subcontractors, vendors, suppliers and others who are affected by decisions made.

1. Scheduled Frequency: The Contractor, Architect, and Owner shall mutually agree on the schedule and frequency of progress meetings.

B. Attendance: Required are Contractor's Project Manager and Project Superintendent, and each Filed-Subcontractor, applicator, installer, and supplier whose work is on-going or scheduled. Owner, Architect, engineering consultants, and other persons are required to attend as the Architect may direct. Subcontractors, vendors, suppliers shall be present at meetings upon request of Contractor.

1. Attendee Authority: Subcontractors and supplier representatives present at meetings shall have authority to act for and make commitments for, the entity which they represent.

2. Restricted Attendance: Owner and Architect reserve the right to expel or exclude from any Progress Meeting any person(s) or company representative(s) without statement of reason or excuse.

3. Attendance of Architect’s Consultants: Contractor shall make an attendance request for specific Architect’s consultants and engineers at least 72 hours in advance of the meeting. Clearly identify In the request all consultant related issues and topics to be discussed at the meeting. The Architect will decide if its consultant or engineer will attend.

4. Attendance of Owner’s Independent Consultants: Contractor shall make an attendance request for specific Owner’s consultants at least 72 hours in advance of the meeting. Clearly identify In the request all consultant related issues and topics to be discussed at the meeting. The Owner will decide if its consultant will attend.

C. Items of Agenda:

1. Review minutes of previous meetings.

2. Review of Work progress.

3. Field observations, problems, and decisions.

4. Identifications of problems which impede planned progress.

5. Review of submittals schedule and status of submittals.

a. Review of environmental/sustainability-related submittals, schedule and status.

6. Review of off-site fabrication and delivery schedules.

7. Maintenance of progress schedule.

8. Corrective measures to regain projected schedules.

9. Coordination of projected progress.

10. Maintenance of quality and work standards.

11. Progress of Work to be adjusted under coordination requirements, and effect of proposed changes on progress schedule and coordination.
12. Other business relating to Work.

1.7 SPECIAL MEETINGS AND BUILDING COMMITTEE MEETINGS

A. Special Project Meetings held by the Contractor: The General Contractor shall conduct special project meetings as required throughout the course of the Work. Special Project Meetings are those held in addition to the regularly scheduled progress meetings. The Architect and Owner are not required to attend these meetings.

1. Special meeting issues may include, but are not limited to:
   a. Safety issues.
   b. Labor issues.
   c. Special schedule issues.

B. Building Committee Meetings: Contractor is advised of obligation to attend Building Committee Meetings (held in evenings) as requested by Owner or Architect, at no additional cost to the Contract.

C. Additional Special Meetings requested by the Architect or Owner: The General Contractor along with any requested or necessary Filed subcontractors, subcontractors, applicators, vendors or material suppliers shall attend additional meetings when requested by the Architect or Owner as they deem necessary. Such meetings may be convened on short notice if conditions at the project site so require and attendance is mandatory. The Architect and Owner are not limited as to the number of additional meetings that may be requested or the agenda for such meetings.

PART 2 - PRODUCTS (Not Used)

PART 3 - EXECUTION (Not Used)

End of Section

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Section 01 32 00

CONSTRUCTION PROGRESS DOCUMENTATION

PART 1 - GENERAL

1.1 SECTION INCLUDES

A. Survey and layout data.

B. Scheduling of the Work.

C. Contract progress reporting.

1. Construction schedule updates.
2. Daily construction reports.

D. Work Documentation: Periodic site observations.

1.2 SURVEY AND LAYOUT DATA

A. Prior to starting any construction work, stake out all limits of cut and fill, the limits of proposed walkways and site improvements. Promptly upon completion of layout work and before any construction work is begun on the site, notify the Architect and Designated Owner's Representative, who shall conduct a field inspection of the stake-out. The Architect reserves the right to adjust the location of such layouts as it deems necessary to comply with the intent of the Contract Documents.

1.3 SCHEDULING OF THE WORK

A. Submit Gantt/Bar progress schedule in triplicate within 15 days after date of Owner-Contractor Agreement for Architect's review. Revise and resubmit as required.

B. Schedule shall be of format approved by Architect showing complete sequence of construction activity, identifying Work of separate stages and other logically grouped activities. For each separate phase, stage of Work and individual activities, indicate the early and late start dates, early and late finish dates, float dates, and duration.

1. The Schedule shall show the sequence and phasing of activities required and reflect the manner in which actual work will be performed. The number of activities shown in the Schedule must be at least equal and related to the number of items listed in the Schedule of Values including back-up detail.
2. Indicate implementation and termination of each temporary utility.
3. Define portions of work which are dependent on the schedule of other related activities and phasing.
4. Define activities on which the work is dependent, including:
   a. Submittal of shop drawings, equipment schedules, samples, color submission, coordination drawings, templates, fabrication and material delivery times.
   b. Architect/Engineer's review of shop drawings, equipment schedules, samples and templates.
   c. Delivery times of equipment furnished under separate Contracts with Owner, where the Contractor has responsibility for installation or coordination.

5. Conclude all activities on one common end date, show contract completion date as a milestone activity on the Schedule.

1.4 CONTRACT PROGRESS REPORTING

A. Construction schedule updates:

1. During progress of Work, revise and resubmit with Applications for Payment in accordance with the provisions of the General Conditions and Supplementary Conditions.
2. Maintain progress schedule with project progress and utilize the plan in planning, coordinating and performing the work under this Contract.
3. Furnish copies of the Progress schedule, and revisions, to all subcontractors, installers, equipment vendors and suppliers.
4. Update schedule showing actual progress of Work in progress, identify Work started and completed during the previous update period. Show the estimated time required to complete each activity started but not yet completed, and reflect any changes in the schedule.
5. Prepare a Schedule Analysis for submission with revised project schedules. The Schedule Analysis shall include a description of problem areas, current and anticipated delaying factors and their estimated impact on performance of other activities and completion dates, and an explanation of corrective action to be taken. All activities that are behind schedule by more than two weeks shall be addressed individually in the Schedule Analysis.
6. Submit revised schedules with attached Schedule Analysis, with each Application for Payment; clearly identify changes since previous version. Indicate estimated percentage of completion for each item of Work at each submission.

B. Daily construction reports: Prepare a daily construction report, submit duplicate copies to the Architect at weekly intervals. Record the following information concerning events at the site:

1. List of subcontractors at the site, and approximate count of personnel.
2. Accidents, unusual events, and emergency procedures.
3. High and low temperatures, general weather conditions (when exterior work is in progress).
4. Meetings and significant decisions.
5. Stoppages, delays, shortages, losses.
6. Emergency procedures.
7. Orders and requests of governing authorities.
8. Change Orders received, and implemented.
9. Services connected, disconnected.
10. Meter readings and similar recordings.
11. Equipment or system tests and start-ups.
12. Partial Completions/occupancies.
13. Substantial completions authorized.

C. Special Reports:

1. Unusual Event Reporting: When an event of an unusual and significant nature occurs at Project site, whether or not related directly to the Work, prepare and submit a special

report. List chain of events, persons participating, response by Contractor's personnel, evaluation of results or effects, and similar pertinent information.

1.5 WORK DOCUMENTATION - PERIODIC SITE OBSERVATIONS

A. Observe and maintain a record of tests. Record the following:

1. Specification section number, product(s), and name of subcontractor or installer.
2. Name of testing agency and name of inspector.
3. Name of manufacturer's representative present.
4. Date, time and duration of tests.
5. Type of test and results.
6. Retesting required.

B. Observe startup and adjustments; record time and date of equipment start-up and results.

C. Observe equipment demonstrations to Owner; record times and additional information required for operation and maintenance manuals.

D. Assist Architect/Engineer with final inspections. Prepare list of items to be completed and corrected.

PART 2 - PRODUCTS (Not Used)

PART 3 - EXECUTION (Not Used)

End of Section

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Section 01 33 00

SUBMITTAL PROCEDURES

PART 1 - GENERAL

1.1 SECTION INCLUDES

A. Submittal coordination.

B. Submittal procedures and grading.

C. Schedule of Submissions.

D. Shop drawings, product data and samples.

E. Manufacturer's instructions.

F. Manufacturer's certificates.

G. Emergency addresses.

H. Erosion control program.

1.2 SUBMITTAL COORDINATION

A. Make submittals in a proper and timely fashion, allowing for administrative procedures, Architect's review, corrections to submissions and resubmittal, if necessary, and fabrication of products without delaying the project. Minimum processing times required by the Architect are as follows:

1. Review for Architect's Office only: Allow a minimum of 10 working days for review and processing. Some submittals may require additional time.
   a. Simultaneous submission of a large number of shop drawings and product data may require longer than 10 working days for review. (In particular submittals for Divisions 3, 5, 6, 21, 22, 23, 25 and 26).
   b. Complex Systems (structural, mechanical, electrical) may require longer than 10 working days for review each time shop drawings, layout drawings, and product data are submitted or resubmitted.
2. Review by Architect and its consultant(s): Allow 10 working days for review and processing of submittals by Architect plus an additional 5 working days for review by each consultant as applicable.
3. Reprocessing of submittals: For submittals requiring resubmittal, re-processing time required shall be the same as first submittal.
4. No extension of Contract Time will be authorized due to failure to transmit submittals sufficiently in advance of scheduled performance of Work.

B. Make submittals of similar items, systems, or those specified in a single specification section together.

C. Make submittals for products which other products are contingent upon, first.

D. The Contractor is fully responsible for delay in the delivery of materials or progress of work caused by late review of shop drawings due to failure of the Contractor to submit, revise, or

resubmit shop drawings in adequate time to allow the Architect checking and processing of each submission or resubmission.

1.3 SCHEDULE OF SUBMISSIONS

A. Schedule procedure: Immediately after being awarded the Contract, meet with the Architect to discuss the schedule of submissions and then prepare and submit within 14 calendar days for approval a schedule of submissions for the Work. The schedule of submissions shall be related to the entire Project, and shall contain the following:

1. Shop Drawing Schedule (for shop and setting drawings to be provided by the Contractor).
2. Sample Schedule (for samples to be provided by the Contractor).
3. With respect to portions of the Work to be performed by Subcontractors, such schedule of submissions for the work of each Subcontractor shall be submitted for approval within 30 calendar days after execution of a subcontract with such Subcontractor.

B. List all submissions required of each trade:

1. Include the Specification Section number, name of subcontractor or vendor, submittal type, item, description, type, quantity and size (where applicable) of each submission.
2. For each submission, provide the following dates, as estimated:
   a. Scheduled date of submission.
   b. Required date of approval. (permit time for appropriate review and resubmissions as may be required).
   c. Estimated date of beginning fabrication or manufacture of product (where applicable).
   d. Required date of submission of product to testing laboratory.
   e. Required date of testing laboratory approval.
   f. Required date for delivery of product to site.
   g. Required date for beginning of installation of product.
   h. Required date for completion of installation (and in-place testing).

C. For each submittal, schedule to allow adequate time for review by the Architect and its consultants. The Architect will not be responsible for Work performed in shop or field prior to approval. Long-lead items requiring expedited action must be clearly indicated.

1. The schedule shall be reviewed and resubmitted as necessary to conform to approved modifications to the construction Project Schedule, and shall be updated as may be required by the Architect.

D. Posting of submittal schedule: Print and distribute the submittal schedule to Architect, Owner, subcontractors and other parties affected. Post copies in field.

E. Update schedule throughout progress of the Project, coordinated with scheduling changes in the Work, and redistribute monthly in conjunction with submittal of Application for Payment.

1.4 SUBMITTAL PROCEDURES AND GRADING

A. Prepare and submit to the Architect the following:

1. Construction Schedule.
2. Schedule of Values.

3. Schedule of shop drawings, product data, and samples.
4. Schedule of Environmental Submissions.

B. Provide space for Contractor, Architect and engineering consultant review stamps, on the front page of each item's submittal copy. Apply Contractor's stamp, signed or initialed certifying that review, verification of products required, field dimensions, adjacent construction Work, and coordination of information, is in accordance with the requirements of the Work and the Contract Documents. The Architect's stamp shall contain the following data (Engineering consultant review stamps may vary in language, but intent of language is similar):

_____ APPROVED
_____ DISAPPROVED
_____ APPROVED AS NOTED, Resubmission Not Required
_____ NOTED, No Action Required
_____ REVISE AND RESUBMIT

1. The Architect will insert the date of action taken and an identification of the person taking the action.
2. Submittal grading:
   a. APPROVED - No corrections, no marks.
   b. DISAPPROVED - Submittal is rejected as not in accord with the Contract Documents, too many corrections, or other justifiable reasons. When returning submission, Architect will state reasons for rejection. Correct and resubmit, do not fabricate.
   c. APPROVED AS NOTED, Resubmission Not Required - Minor corrections required are as noted; all items can be fabricated as noted, without further correction and resubmission of original submission; checking is complete and all corrections are deemed obvious without ambiguity.
   d. NOTED, No Action Required - No corrections by Architect, submittal is referred to consulting engineer(s) for review and approval or rejection. Do not fabricate rejected items or those requiring correction; revise and resubmit as directed by consulting engineer.
   e. REVISE AND RESUBMIT - Resubmission is required; checking may be incomplete; details of items noted by checker are to be clarified further before full review can be given. Correct and resubmit, do not fabricate noted items requiring correction.
3. Review/approval neither extends nor alters any contractual obligations of the Architect, Engineer or Contractor.

C. Identify all variations from Contract Documents, and product or system limitations which may be detrimental to successful performance of the completed work.

D. Coordinate related submittals and schedule submissions to expedite the Project; deliver to Architect at the following address:

Raymond Design Associates, Inc.
222 North Street
Hingham, Ma 02043

E. Transmit submittals to Architect at the above address, with individual transmittal forms, Document 00 62 12 – PRODUCT SUBMITTAL FORM for each submission. Document 00 62 12

is bound into the Project manual, at the end of this Section; unbound copies are available from the Architect.

1. On transmittal form, identify Project, Contractor, subcontractor, installer, or supplier, pertinent Drawing sheet and detail number(s), and specification Section number, as appropriate. Transmittals received by the Architect from sources other than the Contractor will be returned without any action taken.
2. Contractor shall number submittals sequentially by Specifications Section prior to submittal. Resubmitted items shall retain number and be noted as resubmitted (example 260000-1 R1).

F. Contractor's review: Review all shop drawings, product data and samples. Include, without limitation, verification of the following:

1. Proper title, original date, drawing number (which shall be changed if resubmitted), revision numbers and dates, designation of project contractor, subcontractor and/or supplier.
2. Identification of Shop Drawings, Product Data or Samples by Specification Section and subsection or paragraph where appropriate and identification of Contract Drawings by number and detail.
3. On each submittal, as a minimum, Contractor shall identify the following:
   a. Errors, inconsistencies, and omissions discovered in the contract documents and field conditions must be reported at once to the Architect.
   b. Any variations from code requirements contained in the contract documents must be reported promptly in writing to both the Architect and Owner.
   c. Promptly report to the Architect information that any design, process, or product infringes on a patent.
   d. Names of subcontractor(s) and supplier(s). Include name(s) of contact person(s), address, telephone and fax number(s).

G. Revise and resubmit submittals as required, identify all changes made since previous submittal. Distribute copies of reviewed submittals to concerned parties; instruct parties to promptly report any inability to comply with provisions.

1.5 SUBMITTAL QUANTITY REQUIREMENTS

A. Furnish Architect with the following quantities of each submittal:

1. Shop drawings: 1 reproducible and 2 blackline prints per drawing.
2. Product data, manufacturer’s instructions and certificates and similar submissions: 4 copies.
3. Samples: Sets of 2 identical samples of each submission required.
4. Emergency addresses: 1 copy to Architect, and 1 copy direct to Owner.
5. Erosion control program: 2 copies.

1.6 SHOP DRAWINGS

A. General: Provide accurately prepared, large scale and detailed shop drawings prepared specifically for this Project. Shop drawings shall include fabrication and installation drawings, setting diagrams, schedules, patterns, templates and similar drawings. Standard information prepared without specific reference to Project are not considered shop drawings.

1. Show adjacent conditions and related work. Show accurate field dimensions where appropriate.

2. Identify materials and products shown. Note all conditions where require coordination with other trades and special installation procedures.
3. Show gage and thickness of materials.
4. Indicate welding details and joint types.
5. Show every component of fabricated items, notes regarding manufacturing process coatings and finishes, identifying numbers conforming to the Contract Documents (i.e. stair numbers, door numbers and similar items), dimensions, and appropriate trade names.
6. Show anchorage and fastening details, including type, size and spacing.
7. Review each submittal for conformity with the Contract requirements prior to submittal, certify such review on each shop drawing with Contractor's stamp, signature and date. Reference on shop drawings to other sections, installers, suppliers, or trade(s) shall designate the appropriate specification sections, and the term "by others" shall not be used.

B. Size of Format: Not less than 8-1/2 by 11 inches, and no larger than 30 by 42 inches, except for templates, patterns and similar full-size drawings.

C. The Architect's comments and corrections will be made on the reproducibles copy and returned to the Contractor. If necessary, the Contractor then shall make the necessary corrections on the original drawings and resubmit the corrected drawings in manner specified. All additional prints of any reproducibles required for the Architect's own use, and those of engineering consultants, will be made without cost to the Contractor. The Contractor is responsible to furnish (at no additional cost to Owner) all prints needed for use by the Contractor, subcontractors, installers, vendors and suppliers.

D. Drawing submittals returned "APPROVED" or "APPROVED AS NOTED" as set forth below: Contractor shall obtain and distribute adequate prints for construction, including one print of each for the Owner's Project Representative, and then return the transparencies to the subcontractor or supplier from whom he originally received them.

E. Drawing submittals returned "DISAPPROVED" or "REVISE AND RESUBMIT", as set forth below: Contractor shall first obtain a record print and then forward them to source for correction of original drawings, and resubmission of a new reproducibles and prints as above.

F. Each drawing shall have a title block on the right hand side containing the following data:

Name of project -	NEWTON SOUTH HIGH SCHOOL FIELD FACILITY BUILDING
Architect -	Raymond Design Associates, Inc.
Contractor -	
Subcontractor/supplier -	
Date of submission -	

G. Each drawing shall have a clear space on the right hand side for review stamps of both the Architect and Contractor.

1. The 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 Contractor's review and approval prior to transmittal Architect. Submittals not signed and stamped by Contractor will be returned without action.
   a. Only submittals received from the General Contractor will be considered for review by the Architect. Contractor shall review each submittal for accuracy and

conformance with the requirements of the Contract Documents, and particularly for field measurements and proper fit with adjoining work. Modify submittals as required to show interface with adjacent work and attachment to Building.

b. The Contractor's Review and Action Stamp shall contain the following language or similar:

> APPROVED FOR CONFORMANCE
> WITH THE CONTRACT DOCUMENTS.
>
> All dimensions and quantities have been reviewed and are accepted by _____
>
> ***General Contractor's Name***
>
> All dimensions and field conditions have been or will be verified prior to fabrication of the items described herein.

c. Submittals received from the Contractor shall be signed and comply with review requirements. Submittals not certified or improperly certified (stamped but not reviewed) will be returned to the Contractor without Architect's review. Claims due to the return of uncertified, improperly prepared or inadequately reviewed submittals will be rejected.

1.7 PRODUCT DATA

A. Submit Product data as specified, and as the Architect may additionally prescribe. Product data includes, but is not limited to:

1. Catalog cuts.
2. Complete specifications.
3. Standard color charts.
4. Performance data.
   a. Compliance with recognized trade association standards.
   b. Compliance with recognized testing agency standards, labels and seals.
5. Environmental data including, but not limited to:
   a. Chemical composition.
   b. Recycled (pre and post consumer) content.
   c. VOC content.
   d. Material certifications as applicable to product.
6. Certified laboratory test report data.
7. Health and safety precautions.
8. Illustrated capacities, characteristics, wiring diagrams, controls, and other pertinent information for complete product and product use description.

B. If more than one size or type is shown on any printed sheet, indicate clearly intended item(s).

C. When accepted or not accepted, the Architect will retain three copies. Submit sufficient copies for all other parties. No copies stamped REJECTED or RESUBMIT shall be sent to the job site.

1.8 SAMPLES

A. Submit samples clearly labeled as to its material, type or make, manufacturer, size or gauge, and other pertinent data, accompanied by an appropriate transmittal form. Samples shall show full range of color and texture variation that can be expected.

1. When accepted or not accepted, the Architect will retain one set of samples and return the other to the Contractor. Samples will not be permitted for use in the project.

1.9 MANUFACTURER'S INSTRUCTIONS

A. When specified in individual specification Sections, submit manufacturer's printed instructions for delivery, handling, storage, assembly, installation, start-up, adjusting, and finishing.

B. Identify conflicts between manufacturer's instructions and Contract Documents.

1.10 MANUFACTURER'S CERTIFICATES

A. When specified in individual specification Sections, submit manufacturer's certificates and installer certificates to Architect for review.

B. Indicate material or product conforms to or exceeds specified requirements. Submit supporting reference date, affidavits, and certifications as appropriate.

C. Certificates may be recent or previous test results on material or product, but must be acceptable to Architect.

1.11 EROSION CONTROL PROGRAM

A. Submit erosion control program within 21 days after date of written Notice To Proceed for Architect's review. Revise and resubmit as required.

B. Erosion control program shall indicate proposed methods, materials to be employed, and schedule for effecting erosion and siltation control and preventing erosion damage. Provide sufficient information to fully explain the program; the following are the minimum requirements:

1. Proposed methods for actuating erosion and siltation control including 1 inch equals 40 feet (1"=40') scale plans indicating location of erosion control devices and siltation basins.
2. List of proposed materials including manufacturer's product data, in accordance with Division 32 - EARTHWORK and Division 33 - EXTERIOR IMPROVEMENTS.
3. Schedule of erosion control program indicating specific dates from implementing programs in each major area of Work.

PART 2 - PRODUCTS (Not Used)

PART 3 - EXECUTION (Not Used)

End of Section

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Section 01 41 00

REGULATORY REQUIREMENTS

PART 1 - GENERAL

1.1 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.

1.2 APPLICABLE CODES AND REGULATIONS

A. All work shall be performed in accordance with the latest version, by DATE OF ISSUE for Contract Documents, current on date of Owner-Contractor Agreement, except as indicated otherwise, of all applicable codes including the following:

1. Massachusetts State Building Code, Seventh edition, as amended.
2. Massachusetts State Energy Code: Commonwealth of Massachusetts Regulation 780 CMR Chapter 13.
3. Massachusetts Fuel, Gas, and Plumbing Code.
4. Massachusetts Electrical Code (2005 National Electrical Code, with Massachusetts amendments from 527 CMR 12.00).
5. Massachusetts Fire Prevention Regulations (527 CMR).
6. Commonwealth of Massachusetts Regulation 521 CMR: *Architectural Access Board*, effective 2/23/96, as amended.
7. Commonwealth of Massachusetts Regulation CMR 38:00 - *Regulations For Governing School Building Assistance Act*, Chapter 645, 603.
8. City of Newton Zoning Regulations / Ordinance , as amended.
9. United States Occupational Safety and Health Administration (OSHA): Standard Nº. 29-CFR-1926.59 - HAZARD COMMUNICATION STANDARD.
10. United States Department of Justice, Nº 28 CFR Part 36 - AMERICANS WITH DISABILITIES ACT, (Public Law 101-336).

B. Publication Dates: Where the date of issue of a code or regulation is not specified, comply with the standard in effect as of date of Contract Documents, or as otherwise required by authorities having jurisdiction.

1.3 WAGE RATE COMPLIANCE

A. The General Contractor is responsible to ensure that the rate per hour to be paid to mechanics, apprentices, teamsters, laborers and other workers employed on the Work shall not be less than the approved wage rates applicable to this project. A legible copy of the approved rates, along with equal opportunity requirements, shall be posted on a weatherproof bulletin board outside the field office and be clearly visible for review by all workers.

PART 2 - PRODUCTS (Not Used)

PART 3 - EXECUTION (Not Used)

End of Section

Section 01 41 17

UTILITIES NOTIFICATION

PART 1 – GENERAL

1.1 GENERAL PROVISIONS

A. Comply with all regulations and laws concerning excavation, demolition, or explosive work and be advised of utility notification requirements under Chapter 82, Section 40 of the Massachusetts General Laws.

1.2 ADMINISTRATIVE AUTHORITY

A. Notification of utilities within the Commonwealth is performed through the Utilities Underground Plant Damage Prevention System, commonly referred to as “Dig Safe”.

1.3 REGULATORY REQUIREMENTS

A. Contractors must notify “Dig Safe” by telephone before performing any earth moving operations including: digging, trenching, boring, site demolition, excavation, backfilling, grading, or explosive work in all public ways and private property.

B. This notification must be made at least 72 hours (excluding weekends and holidays) prior to the Work described above, but not more than 30 calendar days before commencement of the contemplated Work. Notification shall occur between 6:00 AM to 6:00 PM local time from Monday to Friday, except in cases of emergency.

1. The toll free phone number is: **1-888-344-7233**. (1-888-DIG-SAFE)
2. Provide the following information:
   a. Municipality.
   b. Location of work.
   c. Intersecting street.
   d. Type of work.
   e. Starting date and time of work.
   f. Name and title of caller.
   g. Phone number of caller.
   h. Best time for “Dig Safe” to return calls.
   i. Company name of General Contractor.
   j. Company name of sub-contractor performing subgrade work.

C. Member utilities of the Utilities Underground Plant Damage Prevention System are required to respond to the notice within 72 hours from the time said notice is received by designating at the locus the location of pipes, mains, wires, or conduits.

1. Locations of underground utilities will be marked by spray paint or stakes. Marks will be color coded with additional descriptions of letters and arrows as required.

D. Do not commence work until “Dig Safe” has been properly notified and has responded as described above.

E. Subsequently notify “Dig Safe” of unanticipated additional blasting required after the initial notification to “Dig Safe” has been made. Do not perform the additional blasting work in less than 4 hours following the subsequent notification.

1.4 PROTECTION

A. The Contractor is fully responsible for protection of the utility location markings, wherever these occur, on or off-site.

B. Perform Work in such a manner, and with reasonable precautions taken to avoid damage to utilities under the surface in said areas of work. Immediately notify any known or suspected damage to underground utilities to the owner of such utilities.

PART 2 - PRODUCTS (Not Used)

PART 3 - EXECUTION (Not Used)

End of Section

Section 01 42 00

REFERENCES

PART 1 - GENERAL

1.1 SECTION INCLUDES

A. Abbreviations and Acronyms.

B. Definitions

C. Reference Standards.

1.2 ABBREVIATIONS AND ACRONYMS

A. The following list of common abbreviations are referenced in individual specification sections. This list is provided for convenience to the Contractor and is not intended to define all abbreviations use in the Contract Documents.

1. Abbreviations for contract and specifications.

DCAM	Massachusetts Division of Capital Asset Management
DOE	Massachusetts Department of Education
IEQ	Indoor Environmental Quality
MEPA	Massachusetts Environmental Protection Agency
MGL	Massachusetts General Laws
MHD	Massachusetts Highway Department (Mass Highway)
NIC	Not in Contract
OFCI	Owner Furnished, Contractor Installed
OFI	Owner Furnished and Installed

2. Abbreviations for measurements and quantities.

C	Celsius
cm	Centimeter
F	Fahrenheit
Hrs	Hours
Kg	Kilogram
L	Liter
M	meter
m^2 or SM	square meter
m^3 or CM	cubic meter
mm	Millimeter
Mths	Months
psi	Pounds per square inch
t	ton

1.3 DEFINITIONS

A. Definitions of contracting parties (Owner, and Architect): Refer to Section 01 10 00 – PROJECT SUMMARY.

B. Definitions for terms utilized in the Contract Documents:

1. "As necessary," "as directed," "when directed," "satisfactory," "good and sufficient," "approved," or other general qualifying terms are used on the Drawings: These terms are deemed to be followed by the words, "in the opinion of the Architect," or "by the Architect," as the case may be."
2. “Addenda”: written or graphic instruments issued prior to the execution of the Contract which modify or interpret the Bidding Documents, including the Drawings and Specifications, by additions, deletions, clarifications or corrections.
3. “Approval," "approved, “approved equal," "or equal," or "other approved" means as approved by the Architect."
4. The term “Day”: is defined as the following:
   a. The term “calendar day” is a full 24 hour period, starting from 12 AM (midnight), and includes all weekends and legal holidays.
   b. The term “working day” shall mean any calendar day except Saturdays, Sundays, and legal holidays at the place of the building.
   c. Where the term “day” is used without the adjective of “calendar” or “working”, it shall mean “calendar day”.
5. Furnish and Install” or “Provide”: items identified shall be furnished and installed under this Contract. The term “Furnish”, when used separately, shall mean that the items referred to shall be furnished, only. Similarly the term “install”, when used separately, shall mean that the items referred to shall be installed, only.
6. “Knowledge,” “recognize” and “discover,” their respective derivatives and similar terms in the Contract Documents, as used in reference to the Contractor, shall be interpreted to mean that which the Contractor knows (or should know), recognizes (or should recognize) and discovers (or should discover) in exercising the care, skill and diligence required by the Contract Documents. Analogously, the expression “reasonably inferable” and similar terms in the Contract Documents shall be interpreted to mean reasonably inferable by a Contractor familiar with the Project and exercising the care, skill and diligence required of the contractor by the Contract Documents.
7. “Not in Contract” or “N.I.C.”: equipment, furnishings, or other materials not included as a part of this Contract.
8. “Product”: materials, systems and equipment.

1.4 REFERENCE STANDARDS

A. For products or workmanship specified by association, trade, or Federal Standards, comply with requirements of the standard, except when more rigid requirements are specified or are required by applicable codes.

B. Conform to reference standard by DATE OF ISSUE for Contract Documents, current on date of Owner-Contractor Agreement.

C. Should specified reference standards conflict with Contract Documents, request clarification from Architect before proceeding.

D. The contractual relationship to the parties to the Contract shall not be altered from the Contract Documents by mention or inference otherwise in any reference document.

E. Schedule of References

1. Listed below are abbreviations for the names and titles of trade association names, federal government agencies and similar organizations which are referenced in the

individual specification sections. The addresses and phone numbers provided are for the Contractor's convenience and are believed to be current and accurate, however addresses and phone numbers frequently change, and no assurance is made on their accuracy:

AA	Aluminum Association 900 19th Street N.W., Suite 300 Washington, DC 20006 www.aluminum.com
AAMA	American Architectural Manufacturer's Association 1827 Walden Office Sq., Suite 104 Schaumburg, IL 60173-4268 www.aamanet.org
AASHTO	American Assoc. of State Highway & Transportation Officials 444 N. Capitol Street NW, Suite 249 Washington, DC 20001 www.aashto.org
ACI	American Concrete Institute, International 38800 Country Club Drive, Farmington Hills, Michigan 48331 www.aci-int.org
AFPA	American Forest & Paper Association (Formerly NFPA National Forest Products Association) 1111 19th St. N.W., Suite 800, Washington, DC 20036 www.afandpa.org
AGAI	American Galvanizers Association Inc. 12200 E.Lliff Ave, Suite 204, Aurora, CO 80014-1252 www.galvanizeit.org
AIA	American Institute of Architects 1735 New York Avenue, N.W., Washington, DC 20006-5292 www.aia.org
AISC	American Institute of Steel Construction 1 E. Wacher Dr., Suite 3100, Chicago,IL 60601-2001 www.aisc.org
AMCA	Air Movement and Control Association 30 W. University Drive, Arlington Heights, IL 60004-1893 www.amca.org
ANSI	American National Standards Institute 11 W. 42nd Street, 13 Floor, New York, NY 10036 www.ansi.org
APA	APA - The Engineered Wood Association (formerly APA - American Plywood Association) P.O. Box 11700, Tacoma, WA 98411-0070 www.apawood.org
ARI	Air-Conditioning and Refrigeration Institute 4301 N. Fairfax Dr., Suite 425, Arlington, VA 22203 www.ari.org
ARMA	Asphalt Roofing Manufacturers Association 6000 Executive Blvd., Suite 201, Rockville, MD 20852-3803 www.asphaultroofing.org
ASCA	Architectural Spray Coaters Association 230 West Wells Street, Suite 311, Milwaukee WI 53203 www.aecinfo.com
ASCE	American Society of Civil Engineers 1015 15th St. N.W., Washington, DC 20005 www.asce.org
ASHRAE	American Society of Heating, Refrigerating, and Air-Conditioning Engineers 1791 Tullie Circle NE, Atlanta GA.30329 www.ashrae.org

ASME	American Society of Mechanical Engineers 345 East 47th Street, New York, NY 10017-2392 www.asme.org
ASTM	American Society for Testing and Materials 100 Barr Harbor Drive, West Conshohocken, PA 19428 www.astm,.org
AWPA	American Wood Preservers' Association P.O. Box 286, Woodstock, MD 21163-0286 www.awpa.com
AWPI	American Wood Preservers' Institution 1945 Old Gallows Rd., Suite 150, Vienna, VA 22182 www.oas.org
AWS	American Welding Society 550 LeJeune Road, N.W., Miami, FL 33126 www.aws.org
BHMA	Builders Hardware Manufacturers Association, Inc. 355 Lexington Ave., 17 Floor New York, NY 10017 www.buildershardware.com
CRSI	Concrete Reinforcing Steel Institute 933 N. Plum Grove Road, Schaumburg, IL 60173-4758 www.crsi.org
DHI	Door and Hardware Institute 14170 Newbrook Dr., Chantilly, VA 22021-2223 www.dhi.org
FM	Factory Mutual Engineering & Research Corp. 1151 Boston-Providence Turnpike Norwood, MA 02062 www.fmglobal.com
MCAA	Mason Contractors Association of America 1910 S. Highland Ave. Suite 101, Lombard, IL 60148 www.masoncontractors.org
MIL	Military Specifications and Standards Naval Publications and Forms Center 5801 Tabor Avenue, Philadelphia, PA 19120 www.milspec.com
NAAMM	National Association of Architectural Metal Manufacturers 8 South Michigan Avenue, Suite 1000, Chicago, IL 60603 www.naamm.org
NCMA	National Concrete Masonry Association 2302 Horse Pen Road, Herndon, VA 20171-3499 www.ncma.org
NEBB	National Environmental Balancing Bureau 8575 Government Circle, Gaithersburg, MD 20877-4121 www.nebb.org
NEMA	National Electrical Manufacturers' Association 1300 N. 17th St., Suite 1846, Rosslyn, VA 22209 www.nema.org
NFPA	National Fire Protection Association 1 Battery March Park, PO Box 9101, Quincy, MA 02269 www.nfpa.org
NRCA	National Roofing Contractors Association O'Hare International Center 10255 W. Higgins Road, Suite 600, Rosemont, IL 60018-5607 www.nrca.net

PCA	Portland Cement Association 5420 Old Orchard Road, Skokie, IL 60077-1083 www.cement.org
PS	Product Standard U. S. Department of Commerce www.omg.org
SDI	Steel Deck Institute P.O. Box 25, Fox River Grove, IL 60021-0025 www.sdi.org
SDI	Steel Door Institute 30200 Detroit Road, Cleveland, OH 44145-1967 www.steeldoor.org
SMACNA	Sheet Metal and Air Conditioning Contractors' National Association 4201 Lafayette Center Dr., Chantilly, VA 22022-1209 www.smacnapa.org
SPIB	Southern Pine Inspection Bureau 4709 Scenic Highway, Pensacola, FL 32504-9094 www.spib.org
SSMA	Steel Stud Manufacturer's Association 8 South Michigan Avenue, Chicago IL 60603 www.ssma.com
SSPC	The Society for Protective Coatings 40 24th Street, 6th Floor, Pittsburgh PA 15222-4623 www.sspc.org
SWRI	Sealant, Waterproofing & Restoration Institute 2841 Main Street, Suite 585, Kansas City, MO 64108 www.swrionline.org
UL	Underwriters' Laboratories, Inc. 333 Pfingston Road, Northbrook, IL 60602 www.ul.com

PART 2 - PRODUCTS (Not Used)

PART 3 - EXECUTION (Not Used)

End of Section

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Section 01 45 00

QUALITY CONTROL

PART 1 - GENERAL

1.1 SECTION INCLUDES

A. General quality assurance and control of installation.

B. Site safety, worker safety and training.

C. Source quality control.

D. Field samples and mock-ups.

E. Testing laboratory and inspection services.

F. Manufacturer's field services and reports.

G. Field quality control, Owner's right for confirmation.

1.2 GENERAL QUALITY ASSURANCE AND CONTROL OF INSTALLATION

A. Monitor quality control over suppliers, manufacturers, products, services, site conditions, and workmanship, to produce Work of specified quality.

B. Comply fully with manufacturers' instructions, including performance of each step in sequence. Notify Architect when manufacturers' instructions conflict with the provisions and requirements of the Contract Documents; obtain clarification before proceeding with the work affected by the conflict.

C. Comply with specified standards as a minimum quality for the Work except when more stringent tolerances, codes, or specified requirements indicate high standards or more precise workmanship.

D. Perform work by persons qualified to produce workmanship of specified quality.

E. Secure products in place with positive anchorage devices designed and sized to withstand stresses, vibration, physical distortion or disfigurement.

1.3 SITE SAFETY, WORKER SAFETY AND TRAINING

A. General: The Contractor (and his Subcontractors) shall, at all times, exercise reasonable precautions for the safety of all persons. All rules, regulations, and laws concerning safety that are in effect at the work site, and in particular, all applicable regulations of the Occupational Safety and Health Administration (OSHA) of the U.S. Government, in addition to specified requirements shall be complied with in all respects.

1. Contractor's responsibility for safety shall apply continuously twenty four (24) hours per Day during the term of this Contract and is not limited to normal working hours.

B. Contractor's safety program: Prior to commencement of the Work, the Contractor shall develop and implement a Safety and Health Plan to comply with the Occupational Safety and Health Administration (OSHA) standards for the Construction Industry and all other applicable Federal, State, local laws and regulations. Contractors Safety and Health Plan, and included

health and safety procedures and policies, shall be submitted to the Architect and Owner's Representative within fifteen (15) Days after the date of Notice to Proceed and in no event later than commencement of the Work, whichever occurs first.

1. Perform pre planning to ensure access Is provided to Fire Department for all areas of the work site throughout the duration of the Contract. The Contractor shall provide the Fire Department site access maps, updated regularly, to reflect changes in the layout of the work site and shall notify the Fire Department when each update is made
2. Post and maintain, at prominent locations throughout the Project site, emergency telephone numbers and shall insure that all personnel on site are continuously aware of this information.
3. Ensure safe access to the Work for the Owner, Architect, Architect's consultants, their designated representatives, and all others charged with inspection, testing and monitoring of the Work, and visitors to the site. The Contractor shall furnish site visitors with safety equipment, test equipment, safety apparel and instructions that are required to insure their safety on site, and In the performance of their duties related to the Work of this Contract

C. 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 (OSHA) that is at least 10 hours in duration. The OSHA training and certification course shall occur at the time each employee begins work. Furnish documentation to Owner and Architect, for each employee documenting successful completion of the OHSA safety training and certification course. Submit with the first certified payroll report. Comply fully with all laws and regulations applicable to awards made subject to Massachusetts General Laws (MGL) Chapter 149, Section 44A.

1.4 SOURCE QUALITY CONTROL

A. Manufacturer Qualifications: A firm experienced in manufacturing products or systems similar to those indicated for this Project and with a record of successful in-service performance, as well as sufficient production capacity to produce required units.

B. Fabricator Qualifications: A firm experienced in producing products similar to those indicated for this Project and with a record of successful in-service performance, as well as sufficient production capacity to produce required units.

C. Product Labeling: Attach label from agency approved by authority having jurisdiction for products, assemblies, and systems required to be labeled by applicable code(s).

1. Label Information: Include manufacturer's or fabricator's identification, approved agency identification, and the following information, as applicable, on each label.
   a. Model number.
   b. Serial number.
   c. Performance characteristics.

1.5 FIELD SAMPLES

A. Install field samples demonstrating quality level for the Work, at the site as required by individual specifications Sections for review and acceptance by Architect. Remove field samples prior to date of Final Inspection, or as directed.

1.6 MOCK-UPS

A. Where requested by Architect, or as specified in individual specification sections, assemble and erect specified items, with specified attachment and anchorage devices, flashings, seals, and finishes. Remove mock-up assemblies prior to date of Final Inspection, or as directed.

B. Mock-ups, when approved by the Architect/Engineer, will be used as datum for comparison with the remainder of the Work for the purposes of acceptance or rejection.

C. Demolish and remove from site prior to requesting inspection for certification of Substantial Completion, all Mock-ups which are not permitted to remain as part of the finished work.

1.7 TESTING LABORATORY AND INSPECTION SERVICES

A. Owner will appoint, employ, and pay services of an independent firm to perform inspection and testing and other services specified in individual specification Sections and as required by the Architect.

B. Cooperate with independent firm; furnish samples of materials, design mix, equipment, tools, storage and assistance as requested.

1. Notify Architect and independent firm 48 hours prior to expected time for operations requiring services.
2. Make arrangements with independent firm and pay for additional samples and tests required for Contractor's use.

C. Retesting required because of non-conformance to specified requirements shall be performed by the same independent firm on instructions by the Architect. Payment for retesting will be charged to the Contractor by deducting inspection or testing charges from the Contract Sum.

1.8 MANUFACTURER’S FIELD SERVICES AND REPORTS

A. When called for by individual Specification Sections, provide at no additional cost to the Owner, manufacturers’ or product suppliers’ qualified staff personnel, to observe site conditions, start-up of equipment, adjusting and balancing of equipment, conditions of surfaces and installation, quality of workmanship, and as specified under the various Sections.

1. Individuals shall report all observations, site decisions, and instructions given to applicators or installers. Immediately notify Architect of any circumstances which are supplemental, or contrary to, manufacturer's written instructions.
2. Submit full report within 30 calendar days from observed site conditions to Architect for review.

1.9 FIELD QUALITY CONTROL

A. The Owner reserves the right to take samples and perform, at random, tests of approved materials delivered to the job site to verify compliance of actual materials with specifications.

PART 2 - PRODUCTS (Not Used)

PART 3 - EXECUTION (Not Used)

End of Section

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Section 01 50 00

TEMPORARY FACILITIES AND CONTROLS

PART 1 - GENERAL

1.1 SUMMARY

A. Requirements for temporary facilities and controls.

1.2 GENERAL REQUIREMENTS

A. The General Contractor shall provide and maintain all temporary facilities, controls, and construction aids as specified here-in, until they are replaced by permanent work, or until Project Substantial Completion, as appropriate.

1. Temporary facilities removed from the Project shall remain the property of the Contractor, except as otherwise specified.

B. Except where specifically noted otherwise, cost or use charges for temporary facilities, utility services, controls, and construction aids and similar items specified in this Section or as required to perform the Work, are not chargeable to the Awarding Authority or Architect, and will not be accepted as a basis of claims for a Change Order.

C. Establish and initiate use of each temporary facility at time first reasonably required for proper performance of the Work. Terminate use and remove facilities at earliest reasonable time when they are no longer needed, or when permanent facilities have, with authorized use, replaced the temporary facilities.

1. Locate temporary facilities where they will serve Project adequately and result in minimum interference with performance of the Work.

1.3 SUBMITTALS

A. Submit the following under provisions of Section 01 33 00 - SUBMITTAL PROCEDURES:

1. Reports of tests, inspections, meter readings and similar procedures performed on temporary utilities.
2. Schedule showing implementation and termination of each temporary utility within 15 days of commencement of the Work.
3. Shop drawings:
   a. Temporary signage.
   b. Site Plan: Show temporary facilities, utility hookups, staging areas, and parking areas for construction personnel.

1.4 REFERENCES

A. Comply with applicable requirements of the following standards and those others referenced in this Section, under the provisions of Section 01 42 00 - REFERENCES. Where these standards conflict with other specified requirements, the most restrictive requirements shall govern.

1. ANSI A 10 - Safety Requirements for Construction and Demolition.
2. NFPA 70 - National Electrical Code.
3. NFPA 241 - Building Construction and Demolition Operations.

1.5 TEMPORARY WEATHER PROTECTION

A. Weather Protection Standards: The following weather protection standards pursuant to Chapter 597 of the Acts of 1980, modifying Sections 44F and G of Chapter 149 of the General Laws, are hereby incorporated into this specification, and shall be considered supplementary to the temporary heating and temporary enclosure requirements specified elsewhere in this Section and in individual specification Sections.

1. Limitation of Weather Protection Standards: Under the provisions of Chapter 149, Section 44F(1) and Section 44G, Para. D, of the Massachusetts General Laws (MGL), General Contractors are required to provide weather protection to allow building construction to be carried on between the dates of November 1 to March 31 (inclusive).
   a. These standards do not require enclosures for heat for operations that are not economically feasible to protect in the judgment of the Awarding Authority; including for example, site work, excavation, pile driving, steel erection, erection of certain exterior panels, roofing and the similar construction elements.
2. Definition of Weather Protection: “Weather Protection” means temporary protection of work which may be adversely affected by moisture, cold, heat, and wind by the use of temporary covers, enclosures, and heat. Maintain at least the minimum temperatures specific. Comply with specific requirements which are specified within individual Specification Sections.
   a. Temperature at the working surface shall be at least forty degrees Fahrenheit (40 degrees F). This provision does not supersede any specific greater requirements for methods of construction of curing of materials.
3. General Contractors Responsibilities:
   a. The General Contractor shall furnish and install all “weather protection” Both (exterior and interior) during the time period from November 1 to March 31 (inclusive). The General Contractor is responsible to ensure that protection is provided for the building INTERIOR and all materials and equipment from weather at all times (year round).
   b. At completion of work, the General Contractor shall remove temporary weather protection and restore all surfaces to first class condition.
4. Filed Subcontractors Responsibilities: Individual Filed Sub-Contractors are responsible for all tarpaulins and similar protective measures necessary to cover scaffolding for inclement weather conditions during NON-WINTER months. NON-WINTER period is from April 1 to October 31 (inclusive).
5. Proposed Plan: The General Contractor shall within 30 calendar days after Award of Contract, submit three copies of a typewritten proposed plan for “Weather Protection” and obtain the Architect’s and Owner’s written approval.
6. Reporting Requirements:
   a. Within thirty calendar days after Contract award, the General Contractor shall submit in writing to the Owner for approval, three copies of its proposed plan for weather protection.
   b. The General Contractor shall furnish and install accurate Fahrenheit thermometers at places designated by the Owner to determine whether the required temperature is being maintained.
7. Weather protection materials, equipment, and the installation thereof, shall comply with all the safety rules and regulations including provisions for adequate ventilation and fire protection devices.

8. Use of Permanent Heating System(s): The General Contractor may choose, if the Owner approves, to use the permanent heating system for temporary heat after the building is enclosed and the system has been tested and is ready to operate.
    a. The General Contractor shall thoroughly clean and restore to first class condition, acceptable to the Owner, all portions of the permanent heating system that are used for heating during construction.
    b. Use of the permanent heating system for weather protection shall not affect any heating system guarantee that may be due to the Owner; such guarantee shall begin to run only when the Owner accepts the building.

B. Additional weather protection requirements: The General Contractor is responsible to ensure that the protection is provided by for the building interior and all materials and equipment from weather at all times (year round).
1. Where removal of existing roofing, roof sheathing, windows, doors, and other items is necessary to accomplish work, have materials and workmen ready to provide adequate and approve temporary covering of exposed areas.
2. Temporary coverings shall be attended as necessary to insure effectiveness and to prevent displacement.
3. Contractor shall repair or replace all elements of the building damaged by failure to properly protect them from the weather to the satisfaction of the Architect at no additional cost to the Owner.

1.6 TEMPORARY UTILITIES, GENERAL REQUIREMENTS

A. General Installation: Install temporary utility service(s), or connect to existing service(s) as indicated, and as specified. Comply with all applicable laws, regulations, and requirements of authorities having jurisdiction.

B. Tests and Inspections: Arrange for authorities having jurisdiction to test and inspect each temporary utility before use. Obtain required certifications and permits.

1.7 TEMPORARY UTILITIES, ELECTRICITY

A. Temporary electricity: The Owner will pay for electrical energy required for temporary light and power. The Contractor is required to hire an electrician licensed where project is located to provide temporary feeders of sufficient capacity from the facility's power lines, at the point coordinated with the Owner, to furnish electric light and power requirements for the work, while under construction.
1. Metering: The Owner reserves the right to require separate metering and for the Contractor to pay for electricity used, if, in the Owner's opinion, electricity is being wasted.
2. Electric power service: Use of existing electric power service will be permitted, as long as equipment is sufficient for Contractor's needs and is maintained in a condition acceptable to Owner. Provide additional weatherproof, grounded electric power service and distribution system of sufficient size, capacity, and power characteristics as required to furnish temporary electricity for construction operations. Include meters, transformers, overload protected disconnects, automatic ground-fault interrupters and main distribution switch gear.
    a. Connect temporary service to Owner's existing power source, as directed by Owner.

b. Heavy electrical loads such as welding and other equipment with similar special power requirements must be powered by individual installers using portable electric generators at each users own cost.

1) Except as otherwise specifically provided, all additional costs resulting from such use shall be borne by the Contractor.

3. Distribution: A grounded receptacle (outlet) for an extension cord shall be provided by the Electrical Filed-Subcontractor within one hundred (100) feet of any part of the building. Individual users are responsible for their own work lamps and extension cords.

1.8 TEMPORARY UTILITIES, LIGHTING

A. Temporary lighting: The Electrical Sub-Contractor shall provide lighting with local switching to fulfill security requirements and provide illumination for construction operations and traffic conditions. Maintain lighting, replace broken lamps and provide routine repairs.

1. Temporary lighting shall be based on the following requirements:

a. Rooms or spaces under 250 square feet: Two 100 watt lamps.

b. Rooms or spaces over 250 square feet and under 500 square feet: Four 100 watt lamps.

c. Rooms or spaces 500 square feet and over: Two 200 watt lamps for spaces 500 to 1000 square feet, and two 200-watt lamps for every additional 1000 square feet or fraction thereof.

d. Provide sufficient additional fixtures and lamps to insure proper lighting in stairwells, corridors and passage areas.

2. Lamps: The Electrical Sub-contractor shall furnish and install all lamps, both initial and all required replacements until the date of Substantial Completion.

3. Use of Permanent lighting fixtures.

a. Permanent building lighting may be utilized during construction.

b. Permanent lighting fixtures which have been used during Construction shall be thoroughly cleaned by the Electrical Subcontractor.

c. Immediately prior to the Architect's inspection for Substantial Completion the Electrical Sub-contractor is required to replace all lamps, which are broken, burned out or are producing reduced light output (darkened).

B. Protective night lighting is required at all times (24 hours a day, seven days a week). General Contractor is required to arrange for adequate outdoor lighting to illuminate staging, stockpiles, trenches, dangerous projections, excavations and similar conditions and as additionally required to protect the safety of workmen, other personnel, and the public and as an aid in the protection against theft and vandalism.

1. Shield lighting to protect overflow beyond Contract limits, protect neighbors from night light overflow.

1.9 TEMPORARY UTILITIES, TELEPHONE

A. Temporary telephone service: Provide telephone service at time of project mobilization, and pay all costs for installation, maintenance, and removal. The General Contractor shall pay service charges for local calls; toll charges shall be paid by party who places call. Service and equipment required includes the following:

1. For Contractor's Field Office

a. Cellular (mobile) phone service for Contractor's Superintendent, continuously maintained until Project Substantial Completion.

b. Other instruments at the option of the Contractor, or as additionally required by Authorities having jurisdiction.

1.10 TEMPORARY UTILITIES, WATER

A. Temporary water: Contractor is permitted to use existing hose bib(s). Awarding Authority will pay for water necessary for the Work; exercise measures to conserve water.

1. Protect piping and fittings against freezing.

1.11 TEMPORARY HEATING AND COOLING

A. Temporary heat: Provide heat for curing or drying of completed installations or protection of installed construction from adverse effects of low temperatures or high humidity. Provide vented self-contained liquid propane gas or fuel oil heaters with individual space thermostatic control, UL approved and acceptable to local fire department. Use of gasoline-burning space heaters, open flame, or salamander type units is prohibited.

1. Vent heaters directly to outside air, in areas where concrete is less than 15 days old.
2. In enclosed areas, maintain a minimum temperature of 50 degrees Fahrenheit; provide higher temperatures where required by individual specification sections. General Contractor is required to provide enclosures necessary to maintain specified temporary heat.

1.12 TEMPORARY VENTILATION AND HUMIDITY CONTROL

A. General:

1. Humidity Control: Monitor and regulate relative humidity as required for the installation of all interior products. Relative humidity shall be maintained within the limits set by manufacturers of all interior materials and equipment. Refer to individual specification sections in Divisions 6, 8, 9, 10, 11 and 12 for additional environmental requirements.
   a. Contractor shall enclose interior work areas, protect from weather, and maintain specified temperature and humidity prior to commencement of construction activities relating to interior finishes.
2. Ventilate enclosed areas to assist cure of materials, to dissipate humidity, and to prevent accumulation of dust, fumes, vapors, or gases. Extend and supplement equipment with temporary fan units as required to maintain clean air for construction operations.

B. Monitor Humidity: Provide Hygrometer to measure temperature and relative humidity in each construction area.

1. Provide dehumidifier(s), as required to maintain humidity of enclosed areas below 70 percent. Humidity level shall be maintained in all areas where interior finish work is being performed, and all areas where interior finishes has been completed.
2. Provide fans as specified herein, and as required to eliminate significant variation in humidity levels within enclosed spaces.

C. Temporary Construction Ventilation: Contractor shall maintain sufficient temporary ventilation of areas where materials are being used that emit VOC's and maintain ventilation continuously during installation and until emissions dissipate after installation. If continuous ventilation is not possible via the building's HVAC system(s) then Contractor shall supply ventilation via open windows and temporary fans.

1. Vent all areas directly to outside. Areas shall not be vented to other enclosed areas.

2. During dust producing activities (e.g. drywall installation and finishing) Contractor shall turn off ventilation system and protect openings in supply and return HVAC system from dust infiltration. Provide temporary ventilation as required.

1.13 FIELD OFFICES AND SHEDS

A. General: Designated existing exterior areas may be used for field offices and for storage.

1. Availability: Provide offices ready for occupancy within 15 days after date fixed in Notice to Proceed.
2. Field offices: Provide furnished, insulated, weathertight, office(s) which shall be portable or mobile building(s), or buildings constructed with floors raised above ground, securely fixed to foundations, with steps and landings at entrance doors.
   a. Securely support trailer on temporary masonry or preservative treated wood piers and not on trailer wheels. Anchor trailer to prevent overturning due to wind or other causes.
3. Location: The location of the field office(s) and storage areas for equipment and materials shall be upon cleared portions of the job site or areas to be cleared, and shall require review and written acceptance of the Architect/Engineer. Submit plans showing field office and storage facilities for equipment and materials for acceptance by the Architect.
   a. Offices and sheds located within the construction area, or within 30 feet of building lines shall be of noncombustible construction. Comply with requirements of NFPA 241.
   b. Construction of offices shall have sound insulation adequate to exclude sounds of routine construction activities and reduce server noise to less than 70 dB.
   c. Access to trailer shall conform to Massachusetts Regulation 521 CMR - Architectural Access Board.
4. General:
   a. Contractor shall provide periodic cleaning and maintenance of field offices and storage areas.
   b. Provide air conditioning and heating to maintain a temperature range of 65 to 78 degrees F.
   c. Provide sufficient lighting for 50 foot candles at desk top level over 100 percent of floor area.

B. Contractor's field office(s): Provide habitable office(s) or space, of size to accommodate personnel, include as a minimum the following:

1. Size: Contractor field office shall be not less than 8 by 24 foot long office trailer. Sectioning of trailer shall be as required by Contractor. Each section of trailer shall have direct access to an exterior locking door and a communicating door.
2. Furnishings:
   a. Conference table and chairs to seat at least 8 persons;
   b. Racks and files for Contract Documents, submittals and Project Record Documents.
3. Outdoor weather thermometer.
4. Hard-hats for site visitors.
5. Duplex convenience outlets, at least one per wall.
6. Telephone service as specified herein above.

7. Other equipment and furniture as the Contractor deems necessary.

C. Storage and fabrication sheds: Provide as required, sheds, equipped to accommodate materials and equipment involved.

1. Subcontractor's are responsible for their own storage facilities, coordinate locations.

D. Maintain approach walks to field office and storage/fabrication sheds free of mud, water, and snow.

E. When permanent facilities are enclosed with operable utilities, relocate offices and storage into building, with written agreement of Owner, and remove temporary buildings.

1.14 SANITARY FACILITIES

A. Sanitary facilities: Provide self-contained single-occupant chemical toilet units, wash facilities and drinking water fixtures.

1. Existing facilities located in the building may not be used by the Contractor's personnel.
2. Locate sanitary facilities within the fenced construction zone.
3. Permanent facilities located in completed work may not be used by the Contractor's personnel.

B. Provide toilet tissue, paper towels, paper cups, cleaning compounds and similar materials.

C. Maintain facilities, through-out term of construction, and keep clean, provide covered waste containers for used material.

1.15 CANTEEN SERVICES

A. Canteen vehicles must access the worksite at predetermined times coordinated with the Owner, and are limited to service within the construction site only.

1.16 FIRST AID AND FIRE EXTINGUISHERS

A. First aid supplies: Comply with governing regulations.

B. Fire extinguishers: Provide and maintain on site, adequate fire extinguishers UL rated for A-B-C type fires. Provide red-painted plywood standards for each extinguisher. Additionally provide a dry chemical fire extinguisher at each location where welding, torch cutting and other similar hazardous work is in progress.

1. At welding and heat cutting work: Provide not less than a Multi-purpose dry chemical type (mono amonium phosphate) fire extinguisher,20 pound capacity, multi-purpose rated "2A, 1220B:C".

1.17 CONSTRUCTION AIDS - TEMPORARY HOISTS AND CRANES

A. Hoisting equipment and machinery: Furnish all hoisting equipment, crane services and lift machinery required to perform the Work of this Contract, except that required by Filed-subcontractors. Install, operate and maintain in safe condition.

1. Do not charge applicators and installers for these services during normal working hours.
2. Filed sub-contractors are responsible for their own hoisting equipment, crane services and lift machinery required to perform the Work of their respective trade.

1.18 CONSTRUCTION AIDS - SCAFFOLDING, PLATFORMS, STAGING, CHUTES

A. Provide all ladders, ramps, runways, platforms, railings, chutes, and other mounted or installed construction aids as specified herein and as required to facilitate the Work. Furnish and erect construction aids and maintain in safe condition for the use of all subcontractors, installers and applicators.

B. Furnish and erect scaffolds, staging, and maintain in safe condition, dismantle when no longer required. The General Contractor and Filed Sub-contractors shall provide scaffolds, staging, and other similar raised platforms, required to access the Work, per the following guidelines:

1. Scaffolds and staging shall be erected and maintained in safe condition, dismantle when no longer required.

a. General Contractor is responsible to provide, maintain and remove when no longer required, all tarpaulins and enclosures necessary to cover scaffolding (including that furnished by Filed Subcontractor) to maintain specified temporary heat as specified herein under Article entitled “TEMPORARY WEATHER PROTECTION” from the dates of November 1 to March 31.

2. Scaffolding required for used by Filed Sub-contractors shall be furnished, erected, maintained, and dismantled, by the Filed Trade requiring such scaffolding.

a. Each Filed Sub-contractor is responsible to provide, maintain and remove at dismantling, all tarpaulins and similar protective measures necessary to cover scaffolding for inclement weather conditions and as additionally required for dust control.

3. Scaffolding of any height, required for used by installers and applicators of non-filed trades, shall be furnished, erected, and maintained by the General Contractor.

4. Enclose all exterior scaffolding outside of the construction fence with 8 foot height plywood enclosure at end of each work day to prohibit access to the scaffolding by unauthorized individuals.

C. Ladders, temporary stairs, platforms and railings, shall comply with OSHA guidelines.

1. Provide and maintain temporary stairs until permanent stairs are in place and functional. When permanent stairs are erected, provide temporary railings and guards. Protect permanent stairs with temporary covers and protective treads.

2. Portable ladders and mobile platforms of all required heights, shall be provided by individual users.

1.19 VEHICULAR ACCESS AND PARKING

A. Provide and maintain access to fire hydrants free of obstructions. Provide unimpeded access for emergency vehicles. Maintain 20 foot width driveways with turning space between and around combustible materials.

B. Snow and ice removal: Maintain all vehicular and pedestrian access roads and walkways free from ice and snow during the winter season for the duration of the Project.

C. Vehicular Parking: On-site parking spaces will be made available for the Contractor’s use, however the on-site parking will not be sufficient for all of the Contractor’s and subcontractor’s employees.

1. Arrange for off-site parking areas to accommodate construction personnel with Owner.

2. Parking on public streets: The Contractor’s personnel are fully responsible to abide by all municipal laws and regulations for on street and public parking. The Contractor and

its personnel are additionally fully responsible for all costs incurred by the Contractor or its personnel for parking.

1.20 DUST CONTROL

A. Provide positive means to prevent air-borne dust from dispersing into atmosphere.

1. Take all necessary measures and provide equipment and materials to minimize dust from rising and blowing across the site and also to control surface water throughout the operation so that it does not run onto paved ways without being filtered. Control all dust created by construction operations and movement of construction vehicles, both on site and on paved ways.

2. During the progress of the work, maintain the areas of construction activities including sweeping and sprinkling of streets as necessary. Provide and use calcium chloride for more effective dust control, when deemed necessary by regulatory agencies, without additional cost to the Owner.

1.21 NOISE CONTROL

A. Develop and maintain a noise-abatement program and enforce strict discipline over all personnel to keep noise to a minimum.

B. Execute construction work by methods and by use of equipment which will reduce excess noise.

1. Equip air compressors with silencers, and power equipment with mufflers.

2. Manage vehicular traffic and scheduling to reduce noise

C. Interior work involving cutting, drilling, hammering or noise generating procedures shall be completed during times schedule with the Owner in advance.

1.22 TEMPORARY BARRICADES

A. Provide barriers and barricades to prevent unauthorized entry to construction areas.

1. Comply with standards and code requirements for erection of barricades, where required provide lighting, including flashing lights.

2. Paint with appropriate colors, graphics and warning signs to inform personnel and the public of the hazard being protected against.

3. Provide special barriers necessary to protect entrances and areas around building and to prevent persons from coming in contact with material or construction operations.

B. Provide temporary enclosures, as required, for protection of existing facilities and new construction from exposure to weather, other construction operations and similar activities. Where heat is needed and the building envelope is incomplete, provide enclosures where there is no other provision for containment of heat.

1. Provide doors with self-closing hardware and locks.

C. Provide temporary roofing as needed to maintain the building water tight.

1.23 TEMPORARY FENCES

A. Construction fence: Provide a 8 foot high commercial grade chain link fence around construction site; equip with vehicular and pedestrian gates and locks.

1. Relocation of all fences and gates as required due to construction phasing. Relocations shall be provide at no additional cost to the Owner.

B. Fence, General: Fence shall be industrial-grade, heavy-duty construction: Galvanized fabric with galvanized frame.

1. Chain link fabric shall be made of coated-steel, 9 gage (0.148 inch) core wire woven in 2-inch uniform mesh, height (roll width) to suit fence height, with bottom selvage knuckled, top selvage twisted, with woven fabric having a minimum breaking strength of 1290 pounds.

   a. Privacy slats: Vinyl strips, sized to fit fabric weave, color as selected by Architect from manufacturer's full available range.

2. Framework: Posts and rails shall be sized as detailed on the drawings , Type 1 seamless steel pipe, ASTM A-120, standard weight schedule 40, hydrostatic testing waived.

3. Gate Posts: Standard weight pipe 2-7/8 inches OD nominal weight, 5.79 pounds per foot.

4. Gate Frames: 2 inches OD standard weight pipe, 2.73 pounds. per foot with heavy malleable iron or pressed steel corner fittings securely riveted. Fabric to match the fence shall be installed in the frame by means of tension bars and hook bolts. Each frame to be equipped with 3/8 inches diameter adjustable truss rods.

5. Bottom hinges to be ball and socket type designed to carry the weight of the gate on the post footing. Upper hinge to be wrap around adjustable type. All gates to be equipped for padlocking and with semi-automatic outer catches to secure gates in opened position.

6. Fittings: Pressed steel or malleable iron, hot-dipped galvanized conforming to the requirements of ASTM A153. Tie wires shall be minimum nine-gage galvanized wire,. Attachment bolts shall be galvanized.

7. Post Settings: Driven into ground. Temporary concrete bases may be considered where fencing is scheduled for relocation.

1.24 POLLUTION CONTROL

A. Provide methods, means, and facilities required to prevent contamination of soil, water, or atmosphere by, the discharge of noxious substances from construction operations.

1. Comply with all applicable Federal, State, County, and municipal laws regarding pollution.

2. Prevent pollution of streams, lakes, or reservoirs with fuels, oils, bitumens, calcium chloride, acids, waste products, effluents, chemicals or other harmful substances. Prevent from such substances from entering storm drains and sanitary sewers.

B. Provide equipment and personnel, perform emergency measures required to contain any spillage and to remove contaminated soils or liquids.

1. Excavate and legally dispose of any contaminated earth off-site, and replace with suitable compacted fill and topsoil.

1.25 EROSION AND SEDIMENT CONTROL

A. General: Comply with requirements with Division 2 – Site Construction and as specified herein. The more stringent requirements shall apply.

1. Obtain all required permits from authorities having jurisdiction regarding erosion control and silt fence.

B. Water control:

1. Grade site to drain, where exterior work has disturbed existing grades, protect site from puddling or running water.
2. Do not allow water to accumulate in excavations, maintain free from water until all backfilling operations have been completed.
   a. Remove water from excavations to prevent undercutting of in place structures, and soil changes detrimental to the stability of subgrades and footings.
   b. Keep the utility system trenches free of water until pipe joint material has hardened.
3. Provide and maintain pumps, sumps, suction and discharge lines, and other dewatering system components necessary to convey the water away from excavations.
4. Dispose of water from excavations conforming to applicable regulations, ordinances and as directed by Owner. Dispose of water in such a manner that will not damage existing property or structures, construction work completed or in progress. Dewatering operations shall not impede foot or vehicular traffic surfaces; nor cause endangerment to the public health.
   a. Filter all water pumped or discharged from the trench or excavation prior to discharge into a receiving water or drainage system.
   b. Filter water through baled hay, a vegetative filter strip or a vegetated channel to trap sediment occurring as a result of the construction operations. The vegetated channel shall be constructed such that the discharge flow rate shall not exceed a velocity of more than 1 foot per second. The sediment shall be cleared from the channel periodically.

C. Erosion and sediment control: Provide an erosion and sediment control program for minimizing erosion and siltation during the term of construction.

1.26 FIRE PREVENTION MEASURES

A. The Contractor shall take all necessary precautions for the prevention of fire during construction. Install and maintain temporary fire protection facilities of the types needed to protect against reasonably predictable and controllable fire losses. Maintain unobstructed access to fire extinguishers, fire hydrants, temporary fire protection facilities, stairways, and other access routes. Ascertain and comply with requirements of Project insurance carrier, local fire department and the state fire marshal.
   1. Maintain the area within contract limits orderly and clean.
      a. Remove combustible rubbish promptly from the site and when required, store combustible materials in containers in fire-safe locations.
   2. Maintain clear access to exits from within the building.
   3. Smoking is not permitted in the building or adjacent areas.

B. Establish procedures for fire protection for welding, cutting and open torch work, and other potentially hazardous operations. Obtain permission from local authorities having jurisdiction for such work as required by law. Provide special fire extinguishers at welding and torch cutting work.
   1. The Contractor will assign personnel to inspect all construction areas at the end of each day's work for fire hazards prior to lock-up.

C. Provide for outside storage of gas tanks, sufficiently clear of any structure. Promptly remove welding and cutting equipment from the building when no longer required. Do not store welding or cutting materials within the building when work is not being performed.

D. Permanent fire protection system may be activated to meet these requirements. Replace fusible link heads and other expended or discharged components at time of Substantial Completion.

1.27 SECURITY MEASURES

A. Protect Work, existing premises and Owner's operations from theft, vandalism, and unauthorized entry. Maintain security program throughout construction period until Owner occupancy precludes the need for Contractor security.

1. General contractor is responsible for security of site during construction, including, prevention of illegal trespassing, unauthorized entry, theft and vandalism. All losses and damages which occur are the full responsibility of the General Contractor, who shall bear all costs incurred.

1.28 PROJECT IDENTIFICATION AND TEMPORARY SIGNAGE

A. General: Signs other than those specified herein are not permitted, except those required by law or expressly authorized by the Awarding Authority .

1. At all times during the project, signage must clearly direct occupants and the general public in the safe use of the building. Signs must clearly indicate areas of no admittance, and further must clearly define and direct users to building entries, exits, and other important destinations.

a. All such interim signage must be painted by a professional sign painter on 3/4-inch medium density overlay plywood with letters no less than 3 inches in height.

b. Coordinate required signage with Architect/Engineer.

B. Signage at perimeter of construction site: Provide clear and visible warning signage with appropriate language such as: "Prohibited Access – Hard Hat Only – No Admittance – Authorized personnel Only".

1.29 REMOVAL OF TEMPORARY UTILITIES, CONTROLS, AND FACILITIES

A. Remove temporary materials and construction prior to Substantial Completion.

1. Do not remove erosion control devices until after all disturbed earth has been paved or vegetated.

B. Remove underground work and compacted materials to a depth of 2 feet; fill and grade site as specified.

C. Restore existing facilities used during construction to original conditions. Restore permanent facilities used during construction to specified condition.

D. Clean and repair damage caused by installation or use of temporary work.

PART 2 - PRODUCTS (Not Used)

PART 3 - EXECUTION (Not Used)

End of Section

Section 01 60 00

PRODUCT REQUIREMENTS

PART 1 - GENERAL

1.1 SECTION INCLUDES

A. Definition of Terms

B. Basic product requirements.

C. General environmental requirements for products.

D. Owner furnished products.

E. Product delivery and handling requirements.

F. Product storage and protection requirements.

1.2 RELATED SECTIONS

A. Section 01 25 00 –SUBSTITUTION PROCEDURES:

1. Product options.
2. Product substitution procedures.

1.3 DEFINITION OF TERMS

A. “Products” is defined as new material, machinery, components, equipment, fixtures, and systems used in the Work. Products do not include machinery and equipment used for preparation, fabrication, conveying and erection of the Work. Products may also include existing materials or components required for re-use.

B. "Materials" are products that are shaped, cut, worked, mixed, finished, refined or otherwise fabricated, processed, or installed to form a part of the Work.

C. "Equipment" is a product with operational parts, whether motorized or manually operated, that requires service connections such as wiring or piping.

D. Definitions in this article are not intended to negate the meaning of other terms used in Contract Documents, including "specialties", "systems", "structure", "finishes", "accessories", "furnishings", "special construction", and similar terms, which are self-explanatory and have recognized meanings in the construction industry.

1.4 BASIC PRODUCT REQUIREMENTS

A. General Product Requirements: Provide products that comply with the Contract Documents, that are undamaged and, unless otherwise indicated, that are new at time of installation.

B. To the fullest extent possible, provide products of the same kind, from a single source.

C. Provide interchangeable components of the same manufacturer, for similar components.

D. When the Contractor has the option of selecting two or more products, ensure that products selected shall be compatible with products previously installed or approved.

E. Provide all products complete with all accessories, trim, finish, safety guards and other devices and details needed for a complete installation and for the intended use and effect.

F. Galvanic Corrosion: Install materials in manner which will effectively isolate dissimilar metals which may potential for galvanic corrosion. Use non-absorptive dielectric material, isolation coatings, or other protective isolator approved by Architect.

G. Fasteners, Anchors, and Connections: Engineer and provide all fasteners, anchors, and connections needed to safely, securely, and appropriately permanently secure all Work in place.

1. The Contractor is solely responsible for the capacity, suitability, adequacy, and safety of all welded, fastened and anchored connections.

H. Permanent Labels and Nameplates:

1. Restrictions:

a. Do not provide labels, nameplates, or trademarks which are not required by code, or regulations.

b. Do not provide labels, nameplates or trademarks when individual specification sections specifically exclude them.

c. Do not expose manufacturers, suppliers, or installer's name, logo, or trade names on normally visible surfaces.

2. Location for required labels: Required labels, approval plates and stamps shall be located on a concealed surface, or where required for observation after installation on accessible non-conspicuous surface.

3. Data Plates: Provide permanent data plate on each item of service-connected or power-operated equipment.

a. Data Plate Information: Include manufacturer, model, serial number, date of manufacture, capacity, ratings, power requirements, and all other similar essential data.

b. Locate data plates on easily accessible surface that is inconspicuous in occupied spaces.

1.5 GENERAL ENVIRONMENTAL REQUIREMENTS FOR PRODUCTS

A. General: Prohibit the use of or incorporation into the work of materials which contain toxic, hazardous and harmful materials.

1. Hazardous materials: Defined as pesticides, biocides, and carcinogens as listed by recognized authorities, such as the Environmental Protection Agency (EPA), the International Agency for Research on Cancer (IARC) or regulated under OSHA Hazard Communication Standard, 29 CFR 1910.1200.

2. Harmful materials: Defined as materials which contain the presence of chemical, physical, or biological elements or agents which adversely affect human health or welfare; unfavorably alter ecological balances; or degrade the utility of the environment for aesthetic, cultural, or historical purposes.

3. Owner restricted materials: Defined as all products to which the Owner has a reasonable objection because of its content, composition, properties, or characteristics.

B. Vapors, Gases, Fumes, Odors:

1. General: Comply with all state and federal VOC requirements. Where ever possible use non-VOC materials.

a. Limit use of products to the greatest extent possible which have "off-gassing", fumes, flammability, and other harmful characteristics.
   1) Prohibit use of products which contain substances that contribute significantly to the production of photochemical smog, tropospheric ozone, or poor indoor-air quality.
b. Limit use of ozone-depleting compounds to the greatest extent possible. An ozone-depleting compound is any compound with an ozone-depletion potential greater than 0.01 (CFC 11 = 1).
c. Use organic and biodegradable cleaners to the greatest extent possible.

2. Do not install, use for installation, and use for cleaning those materials which may produce objectionable (to Owner and public) vapors, gases, fumes, odors, or similar conditions.
3. Do not install or use products which may have possible chemical or biological reactions with other on-site materials.

C. Toxicity of prefabricated wood products (composite wood and agrifiber products): Products shall contain no added urea-formaldehyde resins.
   1. Laminating adhesives used to fabricate on-site and shop-applied composite wood and agrifiber assemblies shall contain no added urea-formaldehyde resins.

D. Adhesives: Provide adhesives approved by the manufacturer's of the products being adhered which are Low-VOC or non-VOC, non-flammable, water-proof after cured, odor free.

E. Interior Paints: Provide products that comply with specified VOC limits, refer to Section 09 91 00 – PAINTING for additional requirements.

F. Sealants: Provide products that comply with specified VOC limits. Refer to Section 07 92 00 – JOINT SEALANTS for additional requirements.

G. Material Safety Data Sheets (MSDS): Obtain and maintain on-site record data sheets for each product brought onto the Site.
   1. Maintain an organized file of Material Safety Data Sheets at the job-site for quick reference.
   2. Furnish MSDS for all finishes, paints, coatings, curing compounds, sealers, adhesives, mastics, waterproofing, dampproofing, sealants, cleaning chemicals, carpets, upholstery, fabrics and all similar products.

1.6 OWNER FURNISHED PRODUCTS

A. Owner Furnished Products: As provided in the General Conditions, the Owner will provide products by others under a separate agreements.
   1. Owner’s responsibilities regarding Owner furnished products:
      a. Arrange for and deliver Owner reviewed shop drawings, product data, and samples to Contractor.
      b. Arrange and pay for product delivery to site.
      c. On delivery, inspect products jointly with Contractor.
      d. Submit claims for transportation damage, and replace damaged, defective, or deficient items.
      e. Arrange for manufacturers’ warranties, inspections, and service agreements.
   2. Contractor’s responsibilities regarding Owner furnished products:

a. Review Owner reviewed shop drawings, product data, and samples to Contractor.
b. Handle, store, and provide temporary protection.
c. Repair or replace items damaged after receipt.
d. Provide protection of installed work.
e. When not installed under this Contract, the Contractor shall coordinate Owner installed work with interfacing work of this Contract. The Contractor shall provide temporary protection and final cleaning of Owner installed products, except as directed otherwise.

3. Items noted in Drawings as “Not in Contract” or “N.I.C.”, identify work or products which either exist, or are furnished by Owner; such work requires coordination with the Work of this Contract and may even require installation by this Contractor.

B. The Contractor has coordinating responsibility for Testing laboratory services as identified under Section 01 45 00 – QUALITY CONTROL and as specified under individual specification sections.

1.7 PRODUCT DELIVERY AND HANDLING REQUIREMENTS

A. Transport and handle products in accordance with manufacturer’s instructions and as specified in individual specification sections.

1. Ductwork: All ductwork shall be sealed from time of manufacturer, with seals intact upon delivery to construction site, and remain so, until ready for installation. Contractor is jointly responsible with HVAC&R subcontractor to ensure ducts are properly sealed and maintained.

a. Store ductwork in clean dry conditions and keep sealed while it is stored.

B. Schedule deliveries to avoid delays in installation of products, to minimize long-term storage, to prevent overcrowding of construction . Coordinate with installation to ensure minimum holding time for items that are flammable, hazardous, easily damaged, or sensitive to deterioration, theft and other losses.

C. Promptly inspect shipments to assure that products comply with requirements, quantities are correct, and products are undamaged.

D. Provide equipment and personnel to handle and store products by methods to prevent soiling, disfigurement, or damage.

1.8 PRODUCT STORAGE AND PROTECTION REQUIREMENTS

A. Store and protect products in accordance with manufacturer’s instructions and as specified in individual specification sections.

1. Provide all necessary equipment and personnel to store products by methods to prevent soiling, disfigurement and damage.
2. Store and protect products with seals and labels intact and legible.

B. For exterior storage of fabricated products, place on sloped supports, above ground.

C. Provide off-site storage and protection when site does not permit on-site storage or protection.

1. Cover products subject to deterioration with impervious sheet covering. Provide ventilation to avoid condensation.
2. Store sensitive products in weather-tight, climate controlled enclosures.

D. Store loose granular materials on solid flat surfaces in a well-drained area; prevent mixing with foreign matter.

E. Arrange storage of products to permit access for inspection. Periodically inspect to assure products are undamaged and are maintained under specified conditions.

F. Store heavy materials in locations and in a manner that will not damage or disfigure existing, or new construction.

1.9 MOLD PROTECTION

A. General:

1. Keep building materials dry to prevent the growth of mold and bacteria, including, but not limited to: gypsum wallboard, wood, porous insulation, paper, and fabric.
2. Cover materials to prevent rain damage, and if resting on the ground, use spacers to allow air to circulate between the ground and the materials.
3. Thoroughly dry all water damaged materials within 24 hours from time of moisture damage. Materials that have been damp or wet for more than 24 hours shall be jointly reviewed by General Contractor and Architect, or Owner's Project Representative to determine whether damp/wet materials need to be disposed.
   a. Review moisture damaged materials for signs of mold and mildew, including any with moisture stains, from the site and properly dispose of them.
   b. Replace water damaged and moldy materials with new, undamaged materials.

PART 2 - PRODUCTS (Not Used)

PART 3 - EXECUTION (Not Used)

End of Section

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Section 01 73 00

EXECUTION

PART 1 - GENERAL

1.1 SECTION INCLUDES

A. Examination of existing conditions and acceptance of conditions.

B. Project preparation.

C. Surveying and field engineering.

D. Execution of the Work.

E. Cutting and patching of in-place work

F. Cleaning.

G. Protecting installed work.

1.2 RELATED SECTIONS

A. Section 01 10 00 - SUMMARY: Work performed by Owner or under separate contract(s).

1.3 EXAMINATION OF AND ACCEPTANCE OF EXISTING CONDITIONS

A. The Contractor, its subcontractors and Filed-Subcontractors shall inform themselves of existing conditions before submitting his bid, and shall be fully responsible for carrying out all work required to completely and properly execute the work of the Contract, regardless of the conditions encountered in the actual work. No claim for extra compensation or extension of time will be allowed on account of actual conditions inconsistent with those assumed, except those conditions described in the General Conditions.

B. Prior to commencement of selective demolition work, inspect areas in which work will be performed. Photograph existing damage to structure surfaces, equipment, or to surrounding properties which could be misconstrued as damage resulting from selective demolition work; file with Architect prior to starting work.

1.4 SURVEYING AND FIELD ENGINEERING

A. Employ a Land Surveyor or Professional Engineer registered in the Commonwealth of Massachusetts and acceptable to the Architect.

1. Submit evidence of Surveyor's Errors and Omissions (E&O) Insurance coverage in the form of an Insurance Certificate.

B. Submittals.

1. Submit name, address, and telephone number of at least three proposed Land Surveyors and obtain Architect's acceptance before starting survey work.
2. On request, submit documentation verifying accuracy of survey work.
3. Submit a copy of registered site drawing and certificate signed by the Land Surveyor, that the elevations and locations of the Work are in conformance with the Contract Documents.

C. Examination.
   1. Verify locations of survey control points prior to starting work.
   2. Promptly notify Architect/Engineer of any discrepancies discovered.

D. Survey Reference Points.
   1. Contractor shall locate and protect survey control and reference points.
   2. Control datum for survey is that established by Owner provided Survey.
   3. Protect survey control points prior to starting site work; preserve permanent reference points during construction.
   4. Promptly report to Architect/Engineer the loss or destruction of any reference point or relocation required because of changes in grades or other reasons.
   5. Replace dislocated survey control points based on original survey control. Make no changes without prior written notice to the Architect.

E. Survey Requirements.
   1. Provide field engineering services. Utilize recognized engineering survey practices.
   2. Prior to construction, verify the location and invert elevation at points of connection of sanitary sewer, storm sewer and water service piping.
      a. The existence and location of underground utilities and construction indicated on Drawings as existing are not guaranteed. Before beginning sitework, verify the existence and location of underground utilities and other construction.
   3. Establish elevations, lines and levels. Locate and lay out by instrumentation and similar appropriate means:
      a. Site improvements including pavements; stakes for grading, fill and topsoil placement; utility locations, slopes, and invert elevations.
      b. Grid or axis for structures.
      c. Building foundation, column locations, and ground floor elevations.
   4. Periodically verify layouts by same means.

F. Project Record Documents.
   1. As-built survey, progress submissions: Surveyor shall develop an as-built survey for the work-in-place. Copies of survey shall be submitted along with request for payments for foundation work, site utilities and paving work.
   2. Surveyor's log: Maintain a complete and accurate surveyor's log of control and other surveys, as required by Owner and authorities having jurisdiction. Make this log available for reference.

1.5 PROTECTION OF ADJACENT ELEMENTS

A. Protect installed Work and provide special protection where called for in individual specification Sections.

B. Protect existing facilities and adjacent properties from damage from construction and demolition operations. Provide temporary and removable protection for installed products and occupied areas.

C. Protect finished floors, stairs, and other surfaces from traffic, dirt, wear, damage, or movement of heavy objects, by protecting with durable sheet materials. Coordinate with requirements under individual specification sections.

D. Prohibit traffic or storage upon waterproofed or roofed surfaces. If traffic or activity is necessary, obtain recommendations for protection from waterproofing or roofing material manufacturer.

E. Protect all existing landscape areas [not indicated to be cleared]. Do not deface, injure, or destroy trees or other plant life. Do not remove or cut trees or other plant life, without authorization from the Owner. Do not attach any anchorages, ropes, cables or guys to any trees scheduled to remain.

1. Prohibit traffic from landscaped areas.

F. Protect non-owned vehicles, stored materials, site and structures from damage.

G. Refer to respective Sections for other particular protection requirements.

1.6 PROTECTION OF INTERIOR CONCRETE SLABS

A. No satisfactory chemical or cleaning procedure is available to remove petroleum stains from the concrete surface. Prevention is therefore essential for areas scheduled to receive concrete stains and sealers, specified under Division 3.

1. All hydraulic powered equipment must be diapered to avoid staining of in-place concrete.
2. No trade will park vehicles on the inside slab. If necessary to complete their scope of work, drop cloths will be placed under vehicles at all times.
3. No pipe cutting machine will be used on the inside floor slabs.
4. Steel will not be placed on interior slabs to avoid rust staining.

1.7 EXECUTION REQUIREMENTS FOR INSTALLATION, APPLICATION AND ERECTION

A. Inspection of conditions: The Installer of each component shall inspect the substrate and conditions under which Work is performed. Do not proceed until unsatisfactory conditions have been corrected.

B. Resource Efficiency of Materials:

1. Use construction practices such as material reduction and dimensional planning that maximize efficient use of resources and materials.
   a. Recheck measurements and dimensions, before starting installation.
2. Provide materials that utilize recycled content to maximum degree possible without being detrimental to product performance or indoor air quality.
3. Where possible and feasible, provide for non-destructive removal and re-use of materials after their service life in this building.

C. Manufacturer's instructions: Comply with manufacturer's installation instructions and recommendations, to the extent that they are more stringent than requirements in Contract Documents.

D. Inspect material immediately upon delivery and again prior to installation Reject damaged and defective items.

E. Install each component during weather conditions and project status that will ensure the best results. Isolate each part from incompatible material as necessary to prevent deterioration.

F. Coordinate temporary enclosures with inspections and tests, to minimize uncovering completed construction for that purpose.

G. Limiting exposures: Supervise operations to ensure that no part of construction, completed or in progress, is subject to harmful or deleterious exposure.

H. Provide attachment and connection devices and methods necessary for securing each construction element. Secure each construction element true to line and level. Allow for expansion and building movement.

I. Visual effects: Provide uniform joint widths in exposed Work. Arrange joints to obtain the best effect. Refer questionable choices to the Architect for decision.

J. Mounting heights: Where mounting heights are not indicated, review heights with Architect, prior to commencement of Work.

K. Cleaning and protection: During handling and installation, clean and protect construction in progress and adjoining materials in place. Apply protective covering where required to ensure protection from damage or deterioration at Substantial Completion.

L. Clean and maintain completed construction as often as necessary through the construction period. Adjust and lubricate operable components to ensure operability without damaging effects.

1.8 CUTTING AND PATCHING OF IN-PLACE WORK

A. Scope: General contractor is responsible for coordination and quality of all cutting and patching work. Cutting and patching of the Work includes, but is not limited to:

1. All cutting, altering, patching, and fitting as necessary for the Work to comply with the Contract Documents.
   a. Make all products and their components of the Work fit together properly.
   b. Fully integrate all cutting and patching, to present the visual appearance of an entire, completed, and unified project in compliance with the Contract Documents.
2. Provide openings in elements of the Work, and the patching of same, for penetrations required by all trades, including but not limited to mechanical, plumbing, fire protection and electrical work.
   a. Individual filed sub-trades are responsible for designated types of coring and drilling penetrations for piping, conduit, ducts and other penetrations.
3. Uncover work to provide for installing, inspecting, or both, of ill-timed work;
4. Remove and replace work not conforming to requirements of the Contract Documents or as otherwise determined to be defective.
5. Patch and match all surfaces and products disturbed or damaged.
6. Remove samples of in-place construction as specified for testing.

B. Structural elements: Do not cut and patch structural elements in a manner that would reduce the load-carrying capacity or load deflection ratio. Always obtain written approval of the cutting and patching proposal before cutting and patching structural elements.

1. Do not drill through structural beams, slabs or columns. Core drilling through concrete block walls and stair platforms must be approved by the Architect.
2. Where cutting and patching involves adding reinforcement to structural elements, submit details and engineering calculations showing integration of reinforcement with the structure.

C. Exposed elements: Employ appropriate tradesperson to perform cutting and patching for weather exposed and moisture resistant elements, and sight exposed surfaces.

D. Penetrating elements: Fit work tight to pipes, sleeves, ducts, conduit, and other penetrations through surfaces. At penetrations of fire rated walls, partitions, ceiling or floor construction, completely seal voids with fire rated materials in accordance to applicable codes and regulations, and compatible to surrounding construction.

E. Visual requirements: Do not cut and patch construction exposed on the exterior or in occupied spaces, in a manner that would, in the Architect's opinion, reduce the building's aesthetic qualities, or result in visual evidence of cutting and patching. Remove and replace Work cut and patched in a visually unsatisfactory manner.

F. Operational and safety limitations: Do not cut and patch operating elements or safety components in a manner that would reduce their capacity to perform as intended, or would increase maintenance, or decrease operational life safety of the building when occupied.

G. General requirements of cutting and patching:

1. Submit written proposals to perform cutting and patching when cutting work affects the following:
   a. Structural integrity of any element in the project.
   b. Integrity of weather-exposed or moisture-resistant elements.
   c. Aesthetic and visual qualities of exposed-to-view elements.
   d. Work of Owner or work performed under separate Contract.
2. Cutting: Cut in-place construction using methods least likely to damage elements of as-built construction.
3. Coring and Drilling of holes incidental to work of individual sections shall be performed by the trade requiring the penetration, except as follows. The General Contractor is responsible for performing the following:
   a. Coring and Drilling of holes greater than 8 inches in diameter in concrete decks and slabs.
   b. Core drilling in exterior wall and roof surfaces leading to, or from, the outside of the Building.
   c. Coordination of all coring and drilling and resultant patches necessary for the completion of this Contract and for the quality and appearance of all patch Work in exposed-to-view finished materials.
4. Refinish surfaces to match adjacent finish. For continuous surfaces, refinish to nearest intersection or natural break; for assemblies, refinish entire unit.

1.9 PROGRESS CLEANING AND DISPOSAL OF WASTE MATERIALS

A. General: Maintain site in a clean and orderly condition. Maintain work and surrounding areas free of waste materials, debris, and rubbish; remove from site on a on-going basis through-out the term of construction.

1. Adjacent Areas: Keep adjacent areas, neighboring properties, public ways, and all nearby areas clean and free of construction debris and dirt including wind blown debris.
2. Filed Sub-bid Subcontractors are responsible for clean-up and removal of their own rubbish, debris, shipping materials and waste materials through-out the term of their work.

B. Control accumulation of waste materials and rubbish; periodically dispose of off-site. The General Contractor shall bear all costs, including fees resulting from such disposal.

C. Conduct cleaning and disposal operations to comply with local ordinances and anti-pollution laws.
   1. Do not burn or bury rubbish and waste materials on site.
   2. Do not dispose of volatile wastes such as mineral spirits, oil, or paint thinner in storm or sanitary drains.
   3. Do not dispose of wastes into streams or waterways.
   4. Comply with requirements of authorities having jurisdiction including, without limitation, requirements related to fire prevention, rodents, pests, vermin, waste storage, waste trucking, waste removal, waste disposal, street cleaning, truck tire cleaning, and other requirements.

D. Clean interior areas prior to start of finish work and maintain areas free of dust and other contaminants during finishing operations.

E. Maintain project in accordance with all local, Commonwealth of Massachusetts, and Federal Regulatory Requirements.

F. Store volatile wastes in covered metal containers, and remove from premises daily.

G. Prevent accumulation of wastes which create hazardous conditions.

H. Provide adequate ventilation during use of volatile or noxious substances.
   1. Remove debris and rubbish from pipe chases, plenums, attics, crawl spaces, and other closed or remote spaces, prior to enclosing the space.
   2. Broom and vacuum clean interior areas prior to start of surface finishing, and continue cleaning to eliminate dust.

I. Use only those materials which will not create hazards to health or property and which will not damage surfaces.

J. Use only those cleaning materials and methods recommended by manufacturer of surface material to be cleaned.

K. Execute cleaning to ensure that the buildings, the sites, and adjacent properties are maintained free from accumulations of waste materials and rubbish and windblown debris, resulting from construction operations.

L. Provide on-site containers (dumpsters) for collection and containment of, waste materials, debris and rubbish.

M. General Contractor shall provide on-site containers (dumpsters) for collection and containment of, waste materials, debris and rubbish.
   1. Trash Barrels and Containers: Use containers with tightly fitting lids. Use only steel containers and lids when there is any evidence of rodent or pest activity.

N. Remove waste materials, debris, and rubbish from site at least once weekly, and dispose off-site. Comply with NFPA 241 for removal of combustible waste.

O. Handle material in a controlled manner with as few handlings as possible. Do not drop or throw materials from heights.

P. Schedule cleaning operations so that dust and other contaminants resulting from cleaning process will not damage surrounding surfaces.

1.10 SITE MAINTENANCE AND CLEANING

A. Maintain traffic and parking areas in a sound condition, free of excavated material, construction equipment, products, mud, snow, and ice.

1. Provide means of removing mud from vehicle wheels before entering public streets and Owner's parking areas and access.

B. Maintain existing and permanent paved areas used for construction.

1. If any street or private way shall be rendered unsafe by the Contractors operations, the Contractor shall make such repairs or provide such temporary ways or guards as shall be acceptable to the governing authority.
2. Promptly repair breaks, potholes, low areas, standing water, and other deficiencies, to maintain paving and drainage in original, or specified, condition.

1.11 FINAL CLEANING

A. Scheduling: Perform final cleaning immediately prior to the Architect's review of the project for issue of the Certificate of Substantial Completion.

1. Re-clean all surfaces, materials and products of the Work immediately prior to Owner's occupancy of the Project.

a. Should the Owner occupy any portion of the Work prior to completion of the Contract, the responsibilities for interim and final cleaning shall be in accordance with the General Conditions.

B. Qualifications: Commercial cleaning firm, with a minimum of 3 years experience specializing in the post-construction cleaning of facilities.

C. Protection: During the operation of final cleaning, protect surrounding materials and finishes against undue damage by the exercise of reasonable care and precautions. Clean, or repair all products and surfaces which are soiled or otherwise damaged by Work of this Section, to match original profiles and finishes. Materials and finishes which cannot be cleaned, or repaired shall be removed and replaced with new work in conformance with the Contract Documents.

D. General cleaning requirements:

1. Remove from the job site all tools, surplus materials, equipment, scrap, debris, and waste.
2. Remove all advertising matter and temporary instructional material from exposed surfaces throughout.
3. Use only methods and cleaning materials which are compatible with and as recommended by the manufacturer of the material being cleaned.
4. Finished surfaces: Remove paint smears, spots, marks, dirt, mud and dust and similar disfigurement created by the Work, from all exposed to view existing or new interior and exterior finished surfaces.
5. Polished surfaces: Apply the polish recommended by the manufacturer of the material being polished.
6. Cleaning Materials: Only non-hazardous cleaning materials shall be used in the final cleanup.

E. Exterior building surfaces:

1. Visually inspect exterior surfaces and remove all traces of soil, waste materials, smudges, and other foreign matter.
2. Remove all traces of splashed materials from adjacent surfaces.
3. If necessary to achieve a uniform degree of cleanliness, hose down the exterior of the structure.
4. In the event of stubborn stains not removable with water, the Architect may require light sandblasting or other cleaning at no additional cost to the Owner.
5. Concrete: Clean exposed concrete free of all foreign matter. If, in the opinion of the Architect, further cleaning of specific areas is required, they shall be scrubbed with water or other cleaning agents. Acid cleaners shall not be used, except as may otherwise specifically permitted in the trade sections.

F. Bright metal: Clean metal surfaces, hardware, fixtures, appliances, equipment, and similar items free of all foreign matter. As required, lightly scrub specific stains with clean water, mild soap, and soft rags, thoroughly rinsed and wiped with clean, soft white rags. Do not use abrasive cleaners.

G. Hardware: Clean and polish finished hardware, remove marks, stains, scratches and blemishes.

H. Site: Sweep exterior paved surfaces broom clean; rake clean unpaved surfaces.

I. Equipment: Thoroughly clean all items of mechanical equipment; remove excess oils and grease from exposed surfaces.
   1. Clean permanent filters and replace disposable filters if ventilating units were operated during construction.
   2. Clean ducts, blowers and coils, if units were operated without filters during construction.

PART 2 - PRODUCTS (Not Used)

PART 3 - EXECUTION (Not Used)

End of Section

Section 01 75 00

STARTING AND ADJUSTING

PART 1 - GENERAL

1.1 SECTION INCLUDES

A. Testing, adjusting, and balancing.

B. Operation, maintenance, and service.

1.2 TESTING, ADJUSTING, AND BALANCING

A. General: Adjust operating products and equipment to ensure smooth and unhindered operation.

1. Contractor is advised that testing and balancing agents may be required during commissioning activities as specified in as may be additionally directed by Architect/Engineer.

B. Contractor will employ services of an independent firm to perform testing, adjusting and balancing. Submit to Owner at least three qualified testing firms for Owner's review and acceptance.

C. The independent firm will perform services specified under Division 21 - Fire Suppression, Division 22 - Plumbing, and Division 23 - Heating, Ventilating, and Air Conditioning.

D. Reports will be submitted by the independent firm to the Architect/Engineer indicating observations and results of tests and indicating compliance or non-compliance with specified requirements and with the requirements of the Contract Documents.

1.3 AIR QUALITY TESTING

A. Air quality testing: The Owner reserves the right to employ the services of an independent testing agency to perform air quality testing. Testing will occur prior to Contractor's request for inspection for Substantial Completion. The intent of testing is to certify that the building is "Clear" of airborne contaminants.

1.4 OPERATION, MAINTENANCE, AND SERVICE

A. Coordinate schedule for start-up of various equipment and systems.

B. Notify Architect/Engineer and Owner 7 days prior to start-up of each item.

C. Verify that each piece of equipment or system has been checked for proper lubrication, drive rotation, belt tension, control sequence, or other conditions which may cause damage.

D. Verify that tests, meter readings, and specified electrical characteristics agree with those required by the equipment or system manufacturer.

E. Verify wiring and support components for equipment are complete and tested.

F. Execute start-up under supervision of responsible Contractors' personnel in accordance with manufacturers' instructions.

G. Submit a written report in accordance with Section 01 77 00 - CLOSEOUT PROCEDURES that equipment or system has been properly installed and is functioning correctly.

PART 2 - PRODUCTS (Not Used)

PART 3 - EXECUTION (Not Used)

End of Section

Section 01 77 00

CLOSEOUT PROCEDURES

PART 1 - GENERAL

1.1 SECTION INCLUDES

A. Closeout procedures.

B. Conferences occurring after Substantial Completion.

1.2 CLOSEOUT PROCEDURES - SUBSTANTIAL COMPLETION

A. Prior to requesting inspection for certification of Substantial Completion, complete the following:

1. On Application for Payment, show 100 percent completion for portions of work claimed as substantially complete.
   a. Submit list of incomplete items (Punch List), value of incomplete work, and reasons work is not complete.
2. Obtain evidence of compliance with requirements of governmental agencies having jurisdiction including, but not necessarily limited to:
   a. Certificate of Final Inspections, “signed off” by authorities having jurisdiction.
   b. Certificate of Occupancy.
3. Submission of product and installation warranties, workmanship bonds, maintenance agreements, installer certifications and similar documents specified in individual sections.
4. Submission of test/adjust/balance reports.
5. Change-over permanent locks and transmit keys to the Owner.
6. Remove temporary facilities and services that are no longer required.
7. Remove mock-ups, field samples and similar items.
8. Complete Final Cleaning, including repair and restoration, or replacement of damaged Work.
9. Remove surplus materials, rubbish and similar elements.
10. Application for reduction of retainage.
11. Consent of Surety.
12. Advise the Owner of the change-over in security provisions.
13. Notification of shifting insurance coverage.

B. Within 2 weeks after receipt of the notice of Substantial Completion from the Contractor, the Architect will inspect to determine status of completion.

1. Should the Architect determine that the Work is not substantially complete:
   a. The Architect will notify the Contractor in writing, stating the reasons therefore.
   b. The Contractor shall remedy the deficiencies and send a second written notice of Substantial Completion to the Architect, requesting re-inspection.

C. When the Architect concurs that the Work is substantially complete:

1. The Architect will prepare AIA Document G 704 - CERTIFICATE OF SUBSTANTIAL COMPLETION, in accordance with the requirements of the GENERAL CONDITIONS and SUPPLEMENTARY CONDITIONS, accompanied by the Contractor's list of items to be completed or corrected, as verified by the Architect.
2. The Architect will submit the Certificate to the Owner, and to the Contractor, for their written acceptance of the responsibilities assigned to them in the Certificate.

1.3 CLOSEOUT PROCEDURES - FINAL ACCEPTANCE

A. Prior to requesting inspection for certification of Final Acceptance and final payment, perform the following:
1. Completion of incomplete Work. Submit a copy of the final inspection list stating that each item has been completed or otherwise resolved for acceptance.
2. Prove that all taxes, fees and similar legal obligations have been paid.
3. Submit final payment requests with release of all liens, and supporting documentation.
4. Provide written assurances that all unsettled claims are in the process of and will be resolved.
5. Submit updated final statement, including accounting for final additional changes to the Contract Sum. Show additional Contract Sum, additions and deductions, previous Change Orders, total adjusted Contract Sum, previous payments and Contract Sum due.
6. Submit consent of surety to Final Payment.
7. Submit evidence of continuing insurance coverage complying with insurance requirements.
8. Remove remaining temporary facilities and services.
9. Deliver to Owner and obtain receipts for:
   a. Operation and Maintenance Manuals for items so listed in individual Sections of the Specifications, and for other items when so directed by the Architect.
   b. Warranties and bonds specified in individual Sections of the Specifications.
   c. Spare parts and materials extra stock.
   d. List of subcontractors, service organizations, and principal vendors, including names, addresses, and telephone numbers where they can be reached for emergency service at all times including nights weekends, and holidays.
10. Submit Certification stating Work has been inspected for compliance with the Contract Documents.
11. Submit Certification stating equipment and systems have been tested in presence of Owner’s representative and are fully operational.
12. Submit Certification stating that Work is 100 percent complete and ready for final inspection.

B. Within 2 weeks after receipt of the request for Final Acceptance from the Contractor, the Architect will inspect to determine status of completion.
1. Should the Architect determine that the Work is incomplete or defective:
   a. The Architect will notify the Contractor in writing, stating the reasons listing the incomplete or defective work.
   b. The Contractor shall take immediate steps to remedy the deficiencies and send a second written notice of request for Final Acceptance to the Architect.

c. Costs relative to the Architects re-inspection due to failure of Work to comply with claims made by the Contractor, will be compensated by the Owner, who will deduct the amount of such compensation from the Final Payment due to the Contractor.

C. After the Architect finds the Work acceptable, the Architect will review the Final Close-out submittals.

D. Application for Final Payment: Submit Application for Final Payment in accordance with procedures and requirements of the General Conditions and Supplementary Conditions.

1. The Architect will prepare a Final Change Order, reflecting approved adjustments to the Contract Sum not previously made by other Change Orders.

1.4 CONFERENCES AFTER SUBSTANTIAL COMPLETION

A. The Owner reserves the right to call for conferences commencing with the date of Substantial Completion and continuing for one year thereafter, for purposes of inspecting the Work and to plan correction of any deficiencies or failures discovered during this period.

1. Attendance is required by Contractor's Project Manager, Architect, and each applicator, installer, and supplier as the Owner may direct or the Contractor may wish to have present. All representatives attending such meetings shall be the same persons, or shall have the same powers and authority, as those attending progress meetings occurring prior to the Date of Substantial Completion.

PART 2 - PRODUCTS (Not Used)

PART 3 - EXECUTION (Not Used)

End of Section

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Section 01 78 00

CLOSEOUT SUBMITTALS

PART 1 - GENERAL

1.1 SECTION INCLUDES

A. Project record documents.

B. Record Project Manual.

C. Operation and maintenance data, preventive maintenance instructions.

D. Product warranties and bonds.

E. Maintenance contracts.

F. Spare parts and maintenance materials.

1.2 PROJECT RECORD DOCUMENTS

A. General: Record documents shall reflect actual “as-built” condition and the products installed. Include all changes and deviations from original Contract Documents, and incorporate information from:

1. Original Contract Documents.
2. Addenda.
3. Change orders.
4. Construction change directives.
5. Field directives, and instructions from the Owner, Architect or regulatory authorities having jurisdiction.

B. Project Record Documents include, but are not limited to:

1. Record Project Manual.
2. Project record drawings (as-builts).
3. Final Site Survey.
4. Operation and maintenance data, preventive maintenance instructions.
5. Materials and finishes manual.
6. Product warranties and bonds.
7. Maintenance contracts.
8. Record of all test reports and inspections.
9. Wall charts and data such as valve diagrams, electrical panel board directories, and similar information.

C. Labeling and identification of Record Documents

1. Clearly label all record documents with name of Project and the words “Record Document”.
2. Date progressive entries of information as appropriate.
3. Date Record Documents with the final submission date.

1.3 SUBMITTAL QUANTITY REQUIREMENTS

A. Furnish Architect with the following quantities of each submittal:
   1. Operation and maintenance data, preventive maintenance instructions: 4 bound copies.
   2. Product warranties and bonds: 2 copies
   3. Maintenance contracts: 2 copies
   4. Record of all test reports and inspections: 4 copies.

1.4 PROJECT RECORD DRAWINGS

A. The General Contractor is responsible to maintain a clean, undamaged set of blue or black line white-prints of Contract Drawings and shop drawings for preparing the record drawings.
   1. Record Drawings shall be provided for mechanical trades work only

B. Do not use Record Documents for construction purposes; protect from loss in a secure location. Mark-up these drawings to show clearly and completely the actual installation reflecting all changes made in the Work during construction.
   1. Mark whichever drawing is most capable of showing conditions accurately.
   2. Record all variations and deviations to the Contract Documents, including changes made to schedules, details, and all architectural changes to structure, exterior enclosure, interior partitions and ceilings.
   3. Record new information that is important to the Owner, but was not shown on the Contract Drawings or shop drawings.
   4. Give particular attention to concealed elements that would be difficult to measure and record at a later date.

C. The mechanical and electrical trades shall be responsible to the Contractor to keep the record documents for their portions of the work marked currently to record all changes in the mechanical and electrical work made during construction.

D. The Architect may periodically inspect these record drawings, and their proper maintenance may be a condition precedent to approval of applications for periodic payments.

E. Deliver all Project Record Documents, shop drawings, product data, and samples to the Architect for the Owner's use, upon completion of the Work and prior to request for Final Acceptance of the Work.

F. In addition at the completion of the work, the General Contractor is responsible for the preparation and submittal of neat, clean well drafted, and complete record drawings, at no additional costs to the Owner. These reproducible Project Record Documents shall be transmitted to the Architect as a condition precedent to final payment, and include documents prepared by the mechanical and electrical trades.

1.5 OPERATION AND MAINTENANCE MANUALS

A. General: Coordinate content and submission requirements of operation and maintenance manuals with Owner's Commissioning Agent.

B. Prepare data in the form of an instructional manual. Furnish manuals which contain all of the following groups of equipment:
   1. Utilities and plumbing systems.
   2. Heating, ventilation and air conditioning system.

3. Electrical systems.

C. Furnish bound and properly identified Manuals prior to request for Final Acceptance.

1. Manuals shall be in 8-1/2 by 11 inch pages and bound in three “D ring” capacity binders with durable plastic covers. Internally subdivide the binder contents with permanent page dividers.
   a. Arrange content by section number and systems, process flow, under section numbers and sequence as listed in the Table of Contents of this Project Manual.
   b. Drawings: Preferable 11 inches in height bound in with text with reinforced punched binder tab. Fold drawings larger than 8-1/2 by 11 inches to size of text pages. Provide a drawing pocket for Drawings larger than 11 by 17 inches; locate pocket inside rear cover or bound in with text.
2. Each manual shall include the same following minimum information:
   a. Table of Contents.
   b. Directory of Contractor, subcontractors, and major equipment supplies listing addresses, phone numbers and appropriate emergency phone numbers.
      1) Include local sources of supplies and replacement parts.
   c. Directory of Architect and consultants listing addresses and phone numbers.
   d. Operation and maintenance instructions. Provide schematic diagrams of control systems, circuit directories for each electric panel and charts showing the tagging of all valves.
   e. Air and water test and balancing reports.
   f. Maintenance and cleaning instructions for finishes.
   g. Product and manufacturer's Certificates.
   h. Photocopies of all extended warranties and bonds.
3. Submit one copy of completed volume in final form 21 days prior to Final Inspection. This copy will be returned after final inspection with Architect's comments; Revise and submit all volumes to Owner.

D. For each item of equipment, include description of equipment, component parts and accessories. Identify function, normal operating characteristics, and limiting conditions. Include performance curves, with engineering data and tests, and complete nomenclature and commercial number of replaceable parts. Additionally provide the following for each item:

1. Panelboard circuit directories: Provide electrical service characteristics, controls and communications.
2. Include color coded wiring diagrams as installed.
3. Operating procedures: Include start-up, break-in, and routine normal operating instructions and sequences. Include regulation, control, stopping, shut-down, and emergency instructions. Include summer, winter, and any special operating instructions.
4. Maintenance requirements: Include routine procedures and guide for trouble-shooting; disassembly, repair, and re-assembly instructions; alignment, adjusting, balancing, and checking instructions.
   a. Maintenance drawings: Supplement product data to illustrate relation of component parts of equipment and systems, to show control and flow diagrams. Do not use project Record Documents as maintenance drawings.
5. Provide servicing and lubrication schedule, and list of lubricants required.
6. Include manufacturer’s printed operation and maintenance instructions.

7. Include sequence of operation by controls manufacturer.
8. Provide control diagrams by controls manufacturer as installed.
9. Provide Contractor's coordination drawings, with color coded piping diagrams as installed.
10. Provide charts of valve tag numbers, with location and function of each valve, keyed to flow and control diagrams.
11. Provide original manufacturer's parts (OEM) list, illustrations assembly drawings, and diagrams required for maintenance.
    a. Provide list of original manufacturer's spare parts (OEM), current prices, and recommended quantities to be maintained in storage.
    b. Include local source of supplies and replacement parts, and any other data pertinent for procurement procedures.
12. Additional requirements: As specified in individual specification Sections.

E. Standards:
1. Measurements: Provide all measurements in U.S. standard units such as feet and inches, pounds, and cfm; provide additional measurements in the "International System of Units" (SI).
2. Abbreviations: Provide complete nomenclature of all parts of all equipment; include part numbers of all replaceable parts.

1.6 PRODUCT WARRANTIES AND BONDS

A. Categories of Specific Warranties: Warranties on the work are in several categories, including those of General Conditions, and including (but not necessarily limited to) the following specific categories related to individual units of work specified in sections of Divisions 2 through 50 of these Specifications:
1. Special Project Warranty (Guaranty): A warranty specifically written and signed by contractor for a defined portion of the work; and, where required, countersigned by subcontractor, installer, manufacturer or other entity engaged by Contractor.
2. Specified Product Warranty: A warranty which is required by Contract Documents, to be provided for a manufactured product incorporated into the work; regardless of whether manufacturer has published a similar warranty without regard for specific incorporation of product into the work, or has written and executed a special project warranty as a direct result of Contract Document requirements.
3. Coincidental Product Warranty: A warranty not specifically required by Contract Documents (other than as specified in this Section), but which is available on a product incorporated into the work, by virtue of the fact that manufacturer or product has published warranty in connection with purchases and use of product without regard for specific applications except as otherwise limited by terms of warranty.

B. Refer to individual section of Divisions 2 through 50 for the determination of units of work which are required to be specifically or individually warranted, and for the specific requirements and terms of those warranties (or guarantees).

C. General Limitations: It is recognized that specific warranties are intended primarily to protect Owner against failure of the work to perform as required, and against deficient, defective, and faulty materials and workmanship, regardless of sources. Except as otherwise indicated, specific warranties do not cover failures in the work which result from: 1) Unusual and abnormal phenomena of the elements, 2) The Owner's misuse, maltreatment or improper

maintenance of the work, 3) Vandalism after time of substantial completion, or 4) Insurrection or acts of aggression, including war.

1. Disclaimers and Limitations: Manufacturer's disclaimers and limitations on product warranties do not relieve the Contractor of the warranty on the Work that incorporates the products, nor does it relieve suppliers, manufacturers, and subcontractors required to countersign special warranties with the Contractor.

D. Related Damages and Losses: In connection with Contractor's correction of warranted work which has failed, remove and replace other work of project which has been damaged as a result of such failure, or must be removed and replaced to provide access for correction of warranted work.

1. Consequential Damages: Except as otherwise indicated or required by governing regulations, special project warranties and product warranties are not extended to cover damage to building contents (other than work of Contract) which occurs as a result of failure of warranted work.

E. Reinstatement of Warranty Period: Except as otherwise indicated, when work covered by a special project warranty or product warranty has failed and has been corrected by replacement or restoration, reinstate warranty by written endorsement for the following time period, starting on date of acceptance of replaced or restored work.

1. A period of time ending upon date original warranty would have expired if there had been no failure, but not less than half of original warranty period of time.

F. Replacement Cost, Obligations: Except as otherwise indicated, costs of replacing or restoring failing warranted units or products is Contractor's obligation, without regard for whether Owner has already benefited from use through a portion of anticipated useful service lives.

G. Rejection of Warranties: Owner reserves the right, at time of substantial completion or thereafter, to reject coincidental product warranties submitted by Contractor, which in opinion of Owner tend to detract from or confuse interpretation of requirements of Contract Documents.

H. Contractor's Procurement Obligations: Do not purchase, subcontract for, or allow others to purchase or sub-subcontract for material or units of work for project where a special project warranty, certification or similar commitment is required, until it has been determined that entities required to countersign such commitments are willing to do so.

I. Specific Warranty Forms: Where a special project warranty (guaranty) or specified product warranty is required, prepare a written document to contain terms and appropriate identification, ready for execution by required parties. Submit draft to Owner (through Architect) for approval prior to final executions.

1.7 SPARE PARTS AND MAINTENANCE MATERIALS

A. Provide products, spare parts, maintenance and extra materials in quantities specified in individual specification Sections.

B. Deliver materials to on-site location designated by the Owner; obtain receipt.

PART 2 - PRODUCTS (Not Used)

PART 3 - EXECUTION (Not Used)

End of Section

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Section 01 79 00

DEMONSTRATION AND TRAINING

PART 1 - GENERAL

1.1 SECTION INCLUDES

A. Demonstrating equipment.

B. Instruction and training of owner's personnel.

1.2 DEMONSTRATING EQUIPMENT

A. Demonstrate operation and maintenance of Products to Owner's personnel 2 weeks prior to date of Substantial Completion.

B. For equipment or systems requiring seasonal operation, perform demonstration for other season within six months.

C. Utilize operation and maintenance manuals as basis for instruction. Review contents of manual with Owners' personnel in detail to explain all aspects of operation and maintenance.

D. Demonstrate start-up, operation, control, adjustment, trouble-shooting, servicing, maintenance, and shutdown of each item of equipment at agreed-upon times, at equipment location.

E. Prepare and insert additional data in operations and maintenance manuals specified under Section 01 78 00 - CLOSEOUT SUBMITTALS when need for additional data becomes apparent during instruction.

1.3 INSTRUCTION AND TRAINING OF OWNER'S PERSONNEL

A. Before final inspection, instruct Owner's designated personnel in operation, adjustment, and maintenance of products, equipment, and systems, at agreed upon times.

B. For equipment requiring seasonal operation, perform instructions for other seasons within six months .

C. Use operation and maintenance manuals as basis for instruction. Review contents of manual with personnel in detail to explain all aspects of operation and maintenance.

D. Prepare and insert additional data in Operation and Maintenance Manual when need for such data becomes apparent during instruction.

PART 2 - PRODUCTS (Not Used)

PART 3 - EXECUTION (Not Used)

End of Section

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Section 03 05 13

CONCRETE SEALERS

PART 1 - GENERAL

1.1 SECTION INCLUDES

A. Furnish and install concrete sealers/coatings on exposed-to-view concrete floors where shown and as scheduled on the Drawings

1.2 RELATED REQUIREMENTS

A. Section 03 30 00 - CAST-IN-PLACE CONCRETE:

1. Placing, finishing and curing of concrete slabs.

1.3 REFERENCES

A. Comply with applicable requirements of the following standards and those others referenced in this Section, under the provisions of Section 01 42 00 - REFERENCES. Where these standards conflict with other specified requirements, the most restrictive requirements shall govern.

1. ASTM C156 – Water Retention by Liquid Membrane-Forming Curing Compounds for Concrete.
2. ASTM C309 – Liquid Membrane-Forming Compounds for Curing Concrete.
3. ASTM C1315 - Liquid Membrane-Forming Compounds, having Special Properties for Curing and Sealing Concrete

1.4 SUBMITTALS

A. Submit the following under provisions of Section 01 33 00 - SUBMITTAL PROCEDURES:

1. Literature: Manufacturer's product data sheets, specifications, performance data, physical properties, material compositions, and application instructions for all finishing products to be applied hereunder
   a. Include certification of data indicating Volatile Organic Compound (VOC) content of all coatings.
2. Samples of each level of slip resistance, aggregate, and pattern available in the specified products from the proposed manufacturer.

1.5 QUALITY ASSURANCE

A. Use an applicator approved by the manufacturer, experienced in the approved materials, and who are completely familiar with the specified requirements and the methods needed for proper performance of the work of this Section.

1.6 ENVIRONMENTAL CONDITIONS

A. Work shall be done only under optimum conditions as recommended by manufacturer. Surfaces over which sealer is to be applied shall be completely dry (minimum 30 days since concrete placement) and thoroughly clean. Maximum moisture content is 8 percent. Substrate and ambient temperature shall be between 60 and 90 degrees Fahrenheit (15 to 32 degrees Celsius).

1.7 PRODUCT HANDLING

A. Deliver materials to the job site and store in their original unopened containers with all labels intact and legible at time of use. Store in strict accordance with the manufacturer's recommendations.

PART 2 - PRODUCTS

2.1 MATERIALS

A. Transparent single component water-based high solids acrylic sealer and dustproofer having a minimum of 27 percent non-yellowing styrene-acrylic copolymer solids, and Fugitive Dye, complying with ASTM C309 type 1D.

1. Dayton-Superior, Miamisburg OH, product “Safe Cure & Seal:30% (J-19)”.
2. Nox-Crete Inc., Omaha NE, product “Cure & Seal 300E”.
3. L&M Construction Chemicals Inc., Omaha NE, product “Dress & Seal WB30”.
4. BASF Construction Chemicals, LLC. (Sonneborne), Shakopee MN, product “Kure-N-Seal 30”.

PART 3 - EXECUTION

3.1 SURFACE PREPARATION

A. Upon acceptance of completed existing surfaces, thoroughly remove all dust and debris by sweeping or vacuum cleaning.

B. Remove laitance, curing sealers, existing adhesives and other foreign matter from concrete surfaces with necessary techniques such as shot blasting, Muriatic acid etching, surface freezing and power scarification.

C. Surface preparation required if a curing compound has been applied to substrate surfaces.

1. Thoroughly etch concrete surfaces using well mixed solution consisting of two parts by volume water diluted with one part by volume 30 percent commercial grade hydrochloric acid at a rate of one quart per ten square feet. Apply evenly to thoroughly saturated areas and scrub into surfaces using stiff-bristled broom. Allow solution to activate undisturbed for not less than five minutes or for duration of boiling effect.
2. Thoroughly remove etching solution by washing down surfaces with clean water; flooded at least three separate times at a rate of two gallons per ten square feet; thoroughly remove all contaminates that may be engrained or latent in surfaces.
3. Perform a test application of a square foot in three locations, such as beneath casework. Allow to set for 72 hours, and test adhesion as recommended by the manufacturer.

3.2 APPLICATION

A. Apply sealer with manufacturer’s recommended sprayer, at recommended rate of 400 square feet per gallon. Apply second coat when sealer is dry to touch. Allow sealer to cure undisturbed for a minimum period of 6 hours. Maintain temperature at 60 degrees Fahrenheit minimum until floor surfacing has completely dry.

End of Section

Section 03 30 00

CAST-IN-PLACE CONCRETE

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

A. General Conditions, Supplementary Conditions and applicable parts of Division 1 form a part of this Specification and the Contractor shall consult them in detail for instructions.

B. The Drawings on which this Contract is based are listed in Section 04 20 00 - UNIT MASONRY. Consult all Drawings, note all conditions that may affect the Work and care for same in executing the Contract.

1.2 SUMMARY

A. The Work to be performed under this Section shall include furnishing all labor, materials and equipment to complete concrete, reinforcing steel and cement finish work as shown on the Drawings or herein specified, or both, without limiting the generality thereof. The following major items of work included are listed to be furnished and installed.

1. Pile cap foundations.
2. Foundation walls and grade beams.
3. Structural slabs.

B. Related Sections include the following:

A. Section 01 45 00 - QUALITY CONTROL: Perform testing of masonry, mortar and grout specified herein.

B. Section 01 45 29 - TESTING LABORATORY SERVICES: Perform testing of masonry, mortar and grout specified herein.

C. Section 31 66 14 - HELICAL PILES.

D. Section 04 20 00 - UNIT MASONRY.

1.3 DEFINITIONS

A. Cementitious Materials: Portland cement alone or in combination with one or more of the following: blended hydraulic cement, fly ash and other pozzolans, ground granulated blast-furnace slag, and silica fume; subject to compliance with requirements.

1.4 SUBMITTALS

A. Product Data: For each type of product indicated.

B. Design Mixtures: For each concrete mixture. Submit alternate design mixtures when characteristics of materials, Project conditions, weather, test results, or other circumstances warrant adjustments.

1. Indicate amounts of mixing water to be withheld for later addition at Project site.

C. Steel Reinforcement Shop Drawings: Placing drawings that detail fabrication, bending, and placement. Include bar sizes, lengths, material, grade, bar schedules, stirrup spacing, bent bar diagrams, bar arrangement, splices and laps, mechanical connections, tie spacing, hoop spacing, and supports for concrete reinforcement.

D. Material Test Reports: For the following, from a qualified testing agency, indicating compliance with requirements:
1. Aggregates. Include service record data indicating absence of deleterious expansion of concrete due to alkali aggregate reactivity.

E. Material Certificates: For each of the following, signed by manufacturers:

1. Cementitious materials.
2. Admixtures.
3. Steel reinforcement and accessories.
4. Curing compounds.
5. Floor and slab treatments.
6. Vapor retarders.
7. Semirigid joint filler.
8. Joint-filler strips.
9. Repair materials.

F. Minutes of preinstallation conference.

1.5 QUALITY ASSURANCE

A. Installer Qualifications: A qualified installer who employs on Project personnel qualified as ACI-certified Flatwork Technician and Finisher and a supervisor who is an ACI-certified Concrete Flatwork Technician.

B. Manufacturer Qualifications: A firm experienced in manufacturing ready-mixed concrete products and that complies with ASTM C 94/C 94M requirements for production facilities and equipment.

1. Manufacturer certified according to NRMCA's "Certification of Ready Mixed Concrete Production Facilities."

C. Source Limitations: Obtain each type or class of cementitious material of the same brand from the same manufacturer's plant, obtain aggregate from one source, and obtain admixtures through one source from a single manufacturer.

D. ACI Publications: Comply with the following unless modified by requirements in the Contract Documents:
1. ACI 301, "Specification for Structural Concrete," Sections 1 through 5.
2. ACI 117, "Specifications for Tolerances for Concrete Construction and Materials."

1.6 DELIVERY, STORAGE, AND HANDLING

A. Steel Reinforcement: Deliver, store, and handle steel reinforcement to prevent bending and damage.

PART 2 - PRODUCTS

2.1 MANUFACTURERS

A. In other Part 2 articles where titles below introduce lists, the following requirements apply to product selection:

1. Available Products: Subject to compliance with requirements, products that may be incorporated into the Work include, but are not limited to, products specified.
2. Available Manufacturers: Subject to compliance with requirements, manufacturers offering products that may be incorporated into the Work include, but are not limited to, manufacturers specified.

2.2 FORM-FACING MATERIALS

A. Smooth-Formed Finished Concrete: Form-facing panels that will provide continuous, true, and smooth concrete surfaces. Furnish in largest practicable sizes to minimize number of joints.

1. Plywood, metal, or other approved panel materials.

a. High-density overlay, Class 1 or better.
b. Medium-density overlay, Class 1 or better; mill-release agent treated and edge sealed.

B. Rough-Formed Finished Concrete: Plywood, lumber, metal, or another approved material. Provide lumber dressed on at least two edges and one side for tight fit.

C. Forms for Cylindrical Columns, Pedestals, and Supports: Metal, or glass-fiber-reinforced plastic, that will produce surfaces with gradual or abrupt irregularities not exceeding specified formwork surface class. Provide units with sufficient wall thickness to resist plastic concrete loads without detrimental deformation.

D. Chamfer Strips: Wood, metal, PVC, or rubber strips, 3/4 by 3/4 inch, minimum.

E. Form-Release Agent: Commercially formulated form-release agent that will not bond with, stain, or adversely affect concrete surfaces and will not impair subsequent treatments of concrete surfaces.

1. Formulate form-release agent with rust inhibitor for steel form-facing materials.

F. Form Ties: Factory-fabricated, removable or snap-off metal or glass-fiber-reinforced plastic form ties designed to resist lateral pressure of fresh concrete on forms and to prevent spalling of concrete on removal.

1. Furnish units that will leave no corrodible metal closer than 1 inch to the plane of exposed concrete surface.
2. Furnish ties that, when removed, will leave holes no larger than 1 inch in diameter in concrete surface.
3. Furnish ties with integral water-barrier plates to walls indicated to receive dampproofing or waterproofing.

2.3 STEEL REINFORCEMENT

A. Reinforcing Bars: ASTM A 615/A 615M, Grade 60, deformed.

B. Deformed-Steel Wire: ASTM A 496.

C. Plain-Steel Welded Wire Reinforcement: ASTM A 185, plain, fabricated from as-drawn steel wire into flat sheets.

2.4 REINFORCEMENT ACCESSORIES

A. Epoxy Repair Coating: Liquid, two-part, epoxy repair coating; compatible with epoxy coating on reinforcement and complying with ASTM A 775/A 775M.

B. Bar Supports: Bolsters, chairs, spacers, and other devices for spacing, supporting, and fastening reinforcing bars and welded wire reinforcement in place. Manufacture bar supports from steel wire, plastic, or precast concrete according to CRSI's "Manual of Standard Practice," of greater compressive strength than concrete and as follows:

1. For concrete surfaces exposed to view where legs of wire bar supports contact forms, use CRSI Class 1 plastic-protected steel wire or CRSI Class 2 stainless-steel bar supports.
2. For epoxy-coated reinforcement, use epoxy-coated or other dielectric-polymer-coated wire bar supports.
3. For zinc-coated reinforcement, use galvanized wire or dielectric-polymer-coated wire bar supports.

2.5 CONCRETE MATERIALS

A. Cementitious Material: Use the following cementitious materials, of the same type, brand, and source, throughout Project:

1. Portland Cement: ASTM C 150, Type I/II, gray. Supplement with the following**:**
   a. Ground Granulated Blast-Furnace Slag: ASTM C 989, Grade 100 or 120.

2. Blended Hydraulic Cement: ASTM C 595

B. Normal-Weight Aggregates: ASTM C 33, Class 3S coarse aggregate or better, graded. Provide aggregates from a single source.

1. Maximum Coarse-Aggregate Size: 3/4 inch nominal.
2. Fine Aggregate: Free of materials with deleterious reactivity to alkali in cement.

C. Water: ASTM C 94/C 94M and potable.

2.6 ADMIXTURES

A. Air-Entraining Admixture: ASTM C 260.

B. Chemical Admixtures: Provide admixtures certified by manufacturer to be compatible with other admixtures and that will not contribute water-soluble chloride ions exceeding those permitted in hardened concrete. Do not use calcium chloride or admixtures containing calcium chloride.

1. Water-Reducing Admixture: ASTM C 494/C 494M, Type A.
2. Retarding Admixture: ASTM C 494/C 494M, Type B.
3. Water-Reducing and Retarding Admixture: ASTM C 494/C 494M, Type D.
4. High-Range, Water-Reducing Admixture: ASTM C 494/C 494M, Type F.
5. High-Range, Water-Reducing and Retarding Admixture: ASTM C 494/C 494M, Type G.
6. Plasticizing and Retarding Admixture: ASTM C 1017/C 1017M, Type II.

C. Set-Accelerating Corrosion-Inhibiting Admixture: Commercially formulated, anodic inhibitor or mixed cathodic and anodic inhibitor; capable of forming a protective barrier and minimizing chloride reactions with steel reinforcement in concrete and complying with ASTM C 494/C 494M, Type C.

1. Available Products:

a. Boral Material Technologies, Inc.; Boral BCN.
b. Euclid Chemical Company (The); Eucon CIA.
c. Grace Construction Products, W. R. Grace & Co.; DCI.
d. Master Builders, Inc.; Rheocrete CNI.
e. Sika Corporation; Sika CNI.

D. Non-Set-Accelerating Corrosion-Inhibiting Admixture: Commercially formulated, non-set-accelerating, anodic inhibitor or mixed cathodic and anodic inhibitor; capable of forming a protective barrier and minimizing chloride reactions with steel reinforcement in concrete.

1. Available Products:

a. Axim Concrete Technologies; Catexol 1000CI.
b. Boral Material Technologies, Inc.; Boral BCN2.
c. Cortec Corporation; MCI 2000.
d. Grace Construction Products, W. R. Grace & Co.; DCI-S.
e. Master Builders, Inc.; Rheocrete 222+.
f. Sika Corporation; FerroGard-901.

2.7 VAPOR RETARDERS

A. Plastic Vapor Retarder: ASTM E 1745, Class A. Include manufacturer's recommended adhesive or pressure-sensitive tape.

1. Available Products:

a. Fortifiber Corporation; Moistop Ultra A.
b. Raven Industries Inc.; Vapor Block 10.
c. Reef Industries, Inc.; Griffolyn Type-105.

B. Fine-Graded Granular Material: Clean mixture of crushed stone, crushed gravel, and manufactured or natural sand; ASTM D 448, Size 10, with 100 percent passing a 3/8-inch sieve, 10 to 30 percent passing a No. 100 sieve, and at least 5 percent passing No. 200 sieve; complying with deleterious substance limits of ASTM C 33 for fine aggregates.

2.8 FLOOR AND SLAB TREATMENTS

A. Penetrating Liquid Floor Treatment:

1. Available Products:
   a. Euclid Chemical Company (The); Euco Guard 100.
   b. Symons Corporation, a Dayton Superior Company; Silane 40%.

2.9 CURING MATERIALS

A. Evaporation Retarder: Waterborne, monomolecular film forming, manufactured for application to fresh concrete.

1. Available Products:

   a. Axim Concrete Technologies; Cimfilm.
   b. Burke by Edoco; BurkeFilm.
   c. ChemMasters; Spray-Film.
   d. Conspec Marketing & Manufacturing Co., Inc., a Dayton Superior Company; Aquafilm.
   e. Dayton Superior Corporation; Sure Film.
   f. Euclid Chemical Company (The); Eucobar.
   g. Kaufman Products, Inc.; Vapor Aid.
   h. Lambert Corporation; Lambco Skin.
   i. L&M Construction Chemicals, Inc.; E-Con.
   j. MBT Protection and Repair, Div. of ChemRex; Confilm.
   k. Meadows, W. R., Inc.; Sealtight Evapre.
   l. Metalcrete Industries; Waterhold.
   m. Nox-Crete Products Group, Kinsman Corporation; Monofilm.
   n. Sika Corporation, Inc.; SikaFilm.
   o. Symons Corporation, a Dayton Superior Company; Finishing Aid.
   p. Unitex; Pro-Film.
   q. US Mix Products Company; US Spec Monofilm ER.
   r. Vexcon Chemicals, Inc.; Certi-Vex EnvioAssist.

B. Absorptive Cover: AASHTO M 182, Class 2, burlap cloth made from jute or kenaf, weighing approximately 9 oz./sq. yd. when dry.

C. Moisture-Retaining Cover: ASTM C 171, polyethylene film or white burlap-polyethylene sheet.

D. Water: Potable.

E. Clear, Waterborne, Membrane-Forming Curing Compound: ASTM C 309, Type 1, Class B, dissipating.

1. Available Products:

a. Anti-Hydro International, Inc.; AH Curing Compound #2 DR WB.
b. Burke by Edoco; Aqua Resin Cure.
c. ChemMasters; Safe-Cure Clear.
d. Conspec Marketing & Manufacturing Co., Inc., a Dayton Superior Company; W.B. Resin Cure.
e. Dayton Superior Corporation; Day Chem Rez Cure (J-11-W).
f. Euclid Chemical Company (The); Kurez DR VOX.
g. Kaufman Products, Inc.; Thinfilm 420.
h. Lambert Corporation; Aqua Kure-Clear.
i. L&M Construction Chemicals, Inc.; L&M Cure R.
j. Meadows, W. R., Inc.; 1100 Clear.
k. Nox-Crete Products Group, Kinsman Corporation; Resin Cure E.
l. Symons Corporation, a Dayton Superior Company; Resi-Chem Clear Cure.
m. Tamms Industries, Inc.; Horncure WB 30.
n. Unitex; Hydro Cure 309.
o. US Mix Products Company; US Spec Maxcure Resin Clear.
p. Vexcon Chemicals, Inc.; Certi-Vex Enviocure 100.

2.10 FLOOR SEALANT

A. Penetrating siloxane sealer containing minimum 15% solids.

1. Available Products:

a. Euclid Chemical Company; Euco-Gard 200.
b. Curecrete Distribution; Ashford Formula.
c. Dayton Superior Corporation; Silane 40.
d. Lambert Corporation; Waterban 90

2.11 RELATED MATERIALS

A. Expansion- and Isolation-Joint-Filler Strips: ASTM D 1751, asphalt-saturated cellulosic fiber.

B. Semirigid Joint Filler: Two-component, semirigid, 100 percent solids, epoxy resin with a Type A shore durometer hardness of 80 per ASTM D 2240.

C. Bonding Agent: ASTM C 1059, Type II, non-redispersible, acrylic emulsion or styrene butadiene.

D. Epoxy Bonding Adhesive: ASTM C 881, two-component epoxy resin, capable of humid curing and bonding to damp surfaces, of class suitable for application temperature and of grade to suit requirements, and as follows:

1. Types I and II, non-load bearing or Types IV and V, load bearing, for bonding hardened or freshly mixed concrete to hardened concrete.

2.12 REPAIR MATERIALS

A. Repair Underlayment: Cement-based, polymer-modified, self-leveling product that can be applied in thicknesses from 1/8 inch and that can be feathered at edges to match adjacent floor elevations.

1. Cement Binder: ASTM C 150, portland cement or hydraulic or blended hydraulic cement as defined in ASTM C 219.
2. Primer: Product of underlayment manufacturer recommended for substrate, conditions, and application.
3. Aggregate: Well-graded, washed gravel, 1/8 to 1/4 inch or coarse sand as recommended by underlayment manufacturer.
4. Compressive Strength: Not less than 4100 psi at 28 days when tested according to ASTM C 109/C 109M.

B. Repair Overlayment: Cement-based, polymer-modified, self-leveling product that can be applied in thicknesses from 1/8 inch and that can be feathered at edges to match adjacent floor elevations.

1. Cement Binder: ASTM C 150, portland cement or hydraulic or blended hydraulic cement as defined in ASTM C 219.
2. Primer: Product of topping manufacturer recommended for substrate, conditions, and application.
3. Aggregate: Well-graded, washed gravel, 1/8 to 1/4 inch or coarse sand as recommended by topping manufacturer.
4. Compressive Strength: Not less than 5000 psi at 28 days when tested according to ASTM C 109/C 109M.

2.13 CONCRETE MIXTURES, GENERAL

A. Prepare design mixtures for each type and strength of concrete, proportioned on the basis of laboratory trial mixture or field test data, or both, according to ACI 301.

1. Use a qualified independent testing agency for preparing and reporting proposed mixture designs based on laboratory trial mixtures.

B. Cementitious Materials: Limit percentage, by weight, of cementitious materials other than portland cement in concrete as follows:
1. Ground Granulated Blast-Furnace Slag: 25 percent.

C. Limit water-soluble, chloride-ion content in hardened concrete to 0.06 percent by weight of cement.

D. Admixtures: Use admixtures according to manufacturer's written instructions.

1. Use water-reducing, high-range water-reducing, or plasticizing admixture in concrete, as required, for placement and workability.
2. Use water-reducing and retarding admixture when required by high temperatures, low humidity, or other adverse placement conditions.

3. Use water-reducing admixture in pumped concrete, concrete for heavy-use industrial slabs and parking structure slabs, concrete required to be watertight, and concrete with a water-cementitious materials ratio below 0.50.
4. Use corrosion-inhibiting admixture in concrete mixtures where indicated.

2.14 CONCRETE MIXTURES FOR BUILDING ELEMENTS

A. Pile Caps and Perimeter Grade Beams: Proportion normal-weight concrete mixture as follows:

1. Minimum Compressive Strength: 3000 psi at 28 days.
2. Maximum Water-Cementitious Materials Ratio: 0.50.
3. Slump Limit: 4 inches for concrete with verified slump of 2 to 4 inches before adding high-range water-reducing admixture or plasticizing admixture, plus or minus 1 inch.
4. Air Content: 5-1/2 percent, plus or minus 1.5 percent at point of delivery.

B. Structural Slabs: Proportion normal-weight concrete mixture as follows:

1. Minimum Compressive Strength: 4000 psi at 28 days.
2. Minimum Cementitious Materials Content: 520 lb/cu. yd..
3. Slump Limit: 4 inches, plus or minus 1 inch.
4. Air Content – Parking Surfaces and Exterior Slabs on Grade: 6 percent, plus or minus 1.5 percent at point of delivery for 3/4-inch nominal maximum aggregate size.
5. Air Content – Interior Slabs: Do not allow air content of troweled finished floors to exceed 3 percent.

2.15 FABRICATING REINFORCEMENT

A. Fabricate steel reinforcement according to CRSI's "Manual of Standard Practice."

2.16 CONCRETE MIXING

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

1. When air temperature is between 85 and 90 deg F, reduce mixing and delivery time from 1-1/2 hours to 75 minutes; when air temperature is above 90 deg F, reduce mixing and delivery time to 60 minutes.

PART 3 - EXECUTION

3.1 FORMWORK

A. Design, erect, shore, brace, and maintain formwork, according to ACI 301, to support vertical, lateral, static, and dynamic loads, and construction loads that might be applied, until structure can support such loads.

B. Construct formwork so concrete members and structures are of size, shape, alignment, elevation, and position indicated, within tolerance limits of ACI 117.

C. Limit concrete surface irregularities, designated by ACI 347R as abrupt or gradual, as follows:

1. Class A, 1/8 inch for smooth-formed finished surfaces.
2. Class B, 1/4 inch for rough-formed finished surfaces.

D. Construct forms tight enough to prevent loss of concrete mortar.

E. Fabricate forms for easy removal without hammering or prying against concrete surfaces. Provide crush or wrecking plates where stripping may damage cast concrete surfaces. Provide top forms for inclined surfaces steeper than 1.5 horizontal to 1 vertical.

1. Install keyways, reglets, recesses, and the like, for easy removal.
2. Do not use rust-stained steel form-facing material.

F. Set edge forms, bulkheads, and intermediate screed strips for slabs to achieve required elevations and slopes in finished concrete surfaces. Provide and secure units to support screed strips; use strike-off templates or compacting-type screeds.

G. Provide temporary openings for cleanouts and inspection ports where interior area of formwork is inaccessible. Close openings with panels tightly fitted to forms and securely braced to prevent loss of concrete mortar. Locate temporary openings in forms at inconspicuous locations.

H. Chamfer exterior corners and edges of permanently exposed concrete.

I. Form openings, chases, offsets, sinkages, keyways, reglets, blocking, screeds, and bulkheads required in the Work. Determine sizes and locations from trades providing such items.

J. Clean forms and adjacent surfaces to receive concrete. Remove chips, wood, sawdust, dirt, and other debris just before placing concrete.

K. Retighten forms and bracing before placing concrete, as required, to prevent mortar leaks and maintain proper alignment.

L. Coat contact surfaces of forms with form-release agent, according to manufacturer's written instructions, before placing reinforcement.

3.2 EMBEDDED ITEMS

A. Place and secure anchorage devices and other embedded items required for adjoining work that is attached to or supported by cast-in-place concrete. Use setting drawings, templates, diagrams, instructions, and directions furnished with items to be embedded.

3.3 REMOVING AND REUSING FORMS

A. General: Formwork for sides of beams, walls, columns, and similar parts of the Work that does not support weight of concrete may be removed after cumulatively curing at not less than 50

deg F for 24 hours after placing concrete, if concrete is hard enough to not be damaged by form-removal operations and curing and protection operations are maintained.

B. Clean and repair surfaces of forms to be reused in the Work. Split, frayed, delaminated, or otherwise damaged form-facing material will not be acceptable for exposed surfaces. Apply new form-release agent.

C. When forms are reused, clean surfaces, remove fins and laitance, and tighten to close joints. Align and secure joints to avoid offsets. Do not use patched forms for exposed concrete surfaces unless approved by Architect.

3.4 VAPOR RETARDERS

A. Plastic Vapor Retarders: Place, protect, and repair vapor retarders according to ASTM E 1643 and manufacturer's written instructions.

1. Lap joints 12 inches and seal with manufacturer's recommended tape.

B. Granular Course: Cover vapor retarder with fine-graded granular material, moisten, and compact with mechanical equipment to elevation tolerances of plus 0 inch or minus 3/4 inch.

3.5 STEEL REINFORCEMENT

A. General: Comply with CRSI's "Manual of Standard Practice" for placing reinforcement.

1. Do not cut or puncture vapor retarder. Repair damage and reseal vapor retarder before placing concrete.

B. Clean reinforcement of loose rust and mill scale, earth, ice, and other foreign materials that would reduce bond to concrete.

C. Accurately position, support, and secure reinforcement against displacement. Locate and support reinforcement with bar supports to maintain minimum concrete cover. Do not tack weld crossing reinforcing bars.

D. Set wire ties with ends directed into concrete, not toward exposed concrete surfaces.

E. Install welded wire reinforcement in longest practicable lengths on bar supports spaced to minimize sagging. Lap edges and ends of adjoining sheets at least one mesh spacing. Offset laps of adjoining sheet widths to prevent continuous laps in either direction. Lace overlaps with wire.

3.6 JOINTS

A. General: Construct joints true to line with faces perpendicular to surface plane of concrete.

B. Construction Joints: Install so strength and appearance of concrete are not impaired, at locations indicated or as approved by Architect.

1. Place joints perpendicular to main reinforcement. Continue reinforcement across construction joints, unless otherwise indicated. Do not continue reinforcement through sides of strip placements of floors and slabs.
2. Form keyed joints as indicated. Embed keys at least 1-1/2 inches into concrete.
3. Locate joints for beams, slabs, joists, and girders in the middle third of spans. Offset joints in girders a minimum distance of twice the beam width from a beam-girder intersection.
4. Locate horizontal joints in walls and columns at underside of floors, slabs, beams, and girders and at the top of footings or floor slabs.
5. Space vertical joints in walls as indicated. Locate joints beside piers integral with walls, near corners, and in concealed locations where possible.
6. Use a bonding agent at locations where fresh concrete is placed against hardened or partially hardened concrete surfaces.
7. Use epoxy-bonding adhesive at locations where fresh concrete is placed against hardened or partially hardened concrete surfaces.

C. Doweled Joints: Install dowel bars and support assemblies at joints where indicated. Lubricate or asphalt coat one-half of dowel length to prevent concrete bonding to one side of joint.

3.7 CONCRETE PLACEMENT

A. Before placing concrete, verify that installation of formwork, reinforcement, and embedded items is complete and that required inspections have been performed.

B. Do not add water to concrete during delivery, at Project site, or during placement unless approved by Architect.

1. Do not add water to concrete after adding high-range water-reducing admixtures to mixture.

C. Deposit concrete continuously in one layer or in horizontal layers of such thickness that no new concrete will be placed on concrete that has hardened enough to cause seams or planes of weakness. If a section cannot be placed continuously, provide construction joints as indicated. Deposit concrete to avoid segregation.

1. Deposit concrete in horizontal layers of depth to not exceed formwork design pressures and in a manner to avoid inclined construction joints.
2. Consolidate placed concrete with mechanical vibrating equipment according to ACI 301.
3. Do not use vibrators to transport concrete inside forms. Insert and withdraw vibrators vertically at uniformly spaced locations to rapidly penetrate placed layer and at least 6 inches into preceding layer. Do not insert vibrators into lower layers of concrete that have begun to lose plasticity. At each insertion, limit duration of vibration to time necessary to consolidate concrete and complete embedment of reinforcement and other embedded items without causing mixture constituents to segregate.

D. Deposit and consolidate concrete for floors and slabs in a continuous operation, within limits of construction joints, until placement of a panel or section is complete.

1. Consolidate concrete during placement operations so concrete is thoroughly worked around reinforcement and other embedded items and into corners.
2. Maintain reinforcement in position on chairs during concrete placement.
3. Screed slab surfaces with a straightedge and strike off to correct elevations.

4. Slope surfaces uniformly to drains where required.
5. Begin initial floating using bull floats or darbies to form a uniform and open-textured surface plane, before excess bleedwater appears on the surface. Do not further disturb slab surfaces before starting finishing operations.

E. Cold-Weather Placement: Comply with ACI 306.1 and as follows. Protect concrete work from physical damage or reduced strength that could be caused by frost, freezing actions, or low temperatures.

1. When average high and low temperature is expected to fall below 40 deg F for three successive days, maintain delivered concrete mixture temperature within the temperature range required by ACI 301.
2. Do not use frozen materials or materials containing ice or snow. Do not place concrete on frozen subgrade or on subgrade containing frozen materials.
3. Do not use calcium chloride, salt, or other materials containing antifreeze agents or chemical accelerators unless otherwise specified and approved in mixture designs.

F. Hot-Weather Placement: Comply with ACI 301 and as follows:

1. Maintain concrete temperature below 90 deg F at time of placement. Chilled mixing water or chopped ice may be used to control temperature, provided water equivalent of ice is calculated to total amount of mixing water. Using liquid nitrogen to cool concrete is Contractor's option.
2. Fog-spray forms, steel reinforcement, and subgrade just before placing concrete. Keep subgrade uniformly moist without standing water, soft spots, or dry areas.

3.8 FINISHING FORMED SURFACES

A. Rough-Formed Finish: As-cast concrete texture imparted by form-facing material with tie holes and defects repaired and patched. Remove fins and other projections that exceed specified limits on formed-surface irregularities.

1. Apply to concrete surfaces not exposed to public view.

B. Smooth-Formed Finish: As-cast concrete texture imparted by form-facing material, arranged in an orderly and symmetrical manner with a minimum of seams. Repair and patch tie holes and defects. Remove fins and other projections that exceed specified limits on formed-surface irregularities.

1. Apply to concrete surfaces exposed to public view or to receive a rubbed finish.

C. Rubbed Finish: Apply the following to smooth-formed finished as-cast concrete where indicated:

1. Smooth-Rubbed Finish: Not later than one day after form removal, moisten concrete surfaces and rub with carborundum brick or another abrasive until producing a uniform color and texture. Do not apply cement grout other than that created by the rubbing process.

D. Related Unformed Surfaces: At tops of walls, horizontal offsets, and similar unformed surfaces adjacent to formed surfaces, strike off smooth and finish with a texture matching adjacent formed

surfaces. Continue final surface treatment of formed surfaces uniformly across adjacent unformed surfaces, unless otherwise indicated.

3.9 FINISHING FLOORS AND SLABS

A. General: Comply with ACI 302.1R recommendations for screeding, restraightening, and finishing operations for concrete surfaces. Do not wet concrete surfaces.

B. Scratch Finish: While still plastic, texture concrete surface that has been screeded and bull-floated or darbied. Use stiff brushes, brooms, or rakes to produce a profile amplitude of 1/4 inch in 1 direction.

1. Apply scratch finish to surfaces to receive mortar setting beds or equipment pads.

C. Float Finish: Consolidate surface with power-driven floats or by hand floating if area is small or inaccessible to power driven floats. Restraighten, cut down high spots, and fill low spots. Repeat float passes and restraightening until surface is left with a uniform, smooth, granular texture.

1. Apply float finish to surfaces to receive trowel finish.

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

1. Apply a trowel finish to surfaces exposed to view or to be covered with resilient flooring, carpet, ceramic or quarry tile set over a cleavage membrane, paint, or another thin-film-finish coating system.
2. Finish surfaces to the following tolerances, according to ASTM E 1155, for a randomly trafficked floor surface:

E. Broom Finish: Apply a broom finish to exterior concrete platforms, steps, and ramps, and elsewhere as indicated.

1. Immediately after float finishing, slightly roughen trafficked surface by brooming with fiber-bristle broom perpendicular to main traffic route. Coordinate required final finish with Architect before application.

3.10 MISCELLANEOUS CONCRETE ITEMS

A. Filling In: Fill in holes and openings left in concrete structures, unless otherwise indicated, after work of other trades is in place. Mix, place, and cure concrete, as specified, to blend with in-place construction. Provide other miscellaneous concrete filling indicated or required to complete the Work.

B. Curbs: Provide monolithic finish to interior curbs by stripping forms while concrete is still green and by steel-troweling surfaces to a hard, dense finish with corners, intersections, and terminations slightly rounded.

3.11 CONCRETE PROTECTING AND CURING

A. General: Protect freshly placed concrete from premature drying and excessive cold or hot temperatures. Comply with ACI 306.1 for cold-weather protection and ACI 301 for hot-weather protection during curing.

B. Evaporation Retarder: Apply evaporation retarder to unformed concrete surfaces if hot, dry, or windy conditions cause moisture loss approaching 0.2 lb/sq. ft. x h before and during finishing operations. Apply according to manufacturer's written instructions after placing, screeding, and bull floating or darbying concrete, but before float finishing.

C. Formed Surfaces: Cure formed concrete surfaces, including underside of beams, supported slabs, and other similar surfaces. If forms remain during curing period, moist cure after loosening forms. If removing forms before end of curing period, continue curing for the remainder of the curing period.

D. Unformed Surfaces: Begin curing immediately after finishing concrete. Cure unformed surfaces, including floors and slabs, concrete floor toppings, and other surfaces.

E. Cure concrete according to ACI 308.1, by one or a combination of the following methods:

1. Moisture Curing: Keep surfaces continuously moist for not less than seven days with the following materials:

   a. Water.
   b. Continuous water-fog spray.
   c. Absorptive cover, water saturated, and kept continuously wet. Cover concrete surfaces and edges with 12-inch lap over adjacent absorptive covers.

2. Moisture-Retaining-Cover Curing: Cover concrete surfaces with moisture-retaining cover for curing concrete, placed in widest practicable width, with sides and ends lapped at least 12 inches, and sealed by waterproof tape or adhesive. Cure for not less than seven days. Immediately repair any holes or tears during curing period using cover material and waterproof tape.

   a. Moisture cure or use moisture-retaining covers to cure concrete surfaces to receive floor coverings.
   b. Moisture cure or use moisture-retaining covers to cure concrete surfaces to receive penetrating liquid floor treatments.
   c. Cure concrete surfaces to receive floor coverings with either a moisture-retaining cover or a curing compound that the manufacturer certifies will not interfere with bonding of floor covering used on Project..

3. Curing Compound: Apply uniformly in continuous operation by power spray or roller according to manufacturer's written instructions. Recoat areas subjected to heavy rainfall within three hours after initial application. Maintain continuity of coating and repair damage during curing period.

   a. After curing period has elapsed, remove curing compound without damaging concrete surfaces by method recommended by curing compound manufacturer unless manufacturer certifies curing compound will not interfere with bonding of floor covering used on Project.

4. Curing and Sealing Compound: Apply uniformly to floors and slabs indicated in a continuous operation by power spray or roller according to manufacturer's written instructions. Recoat areas subjected to heavy rainfall within three hours after initial application. Repeat process 24 hours later and apply a second coat. Maintain continuity of coating and repair damage during curing period.

3.12 LIQUID FLOOR TREATMENTS

A. Penetrating Liquid Floor Treatment: Prepare, apply, and finish penetrating liquid floor treatment according to manufacturer's written instructions.

1. Remove curing compounds, sealers, oil, dirt, laitance, and other contaminants and complete surface repairs.
2. Apply in accordance with manufacturer’s written instructions.

3.13 JOINT FILLING

A. Prepare, clean, and install joint filler according to manufacturer's written instructions.

1. Defer joint filling until concrete has aged at least six month(s). Do not fill joints until construction traffic has permanently ceased.

B. Remove dirt, debris, saw cuttings, curing compounds, and sealers from joints; leave contact faces of joint clean and dry.

C. Install semirigid joint filler full depth in saw-cut joints and at least 2 inches deep in formed joints. Overfill joint and trim joint filler flush with top of joint after hardening.

3.14 CONCRETE SURFACE REPAIRS

A. Defective Concrete: Repair and patch defective areas when approved by Architect. Remove and replace concrete that cannot be repaired and patched to Architect's approval.

B. Patching Mortar: Mix dry-pack patching mortar, consisting of one part portland cement to two and one-half parts fine aggregate passing a No. 16 sieve, using only enough water for handling and placing.

C. Repairing Formed Surfaces: Surface defects include color and texture irregularities, cracks, spalls, air bubbles, honeycombs, rock pockets, fins and other projections on the surface, and stains and other discolorations that cannot be removed by cleaning.

1. Immediately after form removal, cut out honeycombs, rock pockets, and voids more than 1/2 inch in any dimension in solid concrete, but not less than 1 inch in depth. Make edges of cuts perpendicular to concrete surface. Clean, dampen with water, and brush-coat holes and voids with bonding agent. Fill and compact with patching mortar before bonding agent has dried. Fill form-tie voids with patching mortar or cone plugs secured in place with bonding agent.
2. Repair defects on surfaces exposed to view by blending white portland cement and standard portland cement so that, when dry, patching mortar will match surrounding color.

Patch a test area at inconspicuous locations to verify mixture and color match before proceeding with patching. Compact mortar in place and strike off slightly higher than surrounding surface.

3. Repair defects on concealed formed surfaces that affect concrete's durability and structural performance as determined by Architect.

D. Repairing Unformed Surfaces: Test unformed surfaces, such as floors and slabs, for finish and verify surface tolerances specified for each surface. Correct low and high areas. Test surfaces sloped to drain for trueness of slope and smoothness; use a sloped template.

1. Repair finished surfaces containing defects. Surface defects include spalls, popouts, honeycombs, rock pockets, crazing and cracks in excess of 0.01 inch wide or that penetrate to reinforcement or completely through unreinforced sections regardless of width, and other objectionable conditions.
2. After concrete has cured at least 14 days, correct high areas by grinding.
3. Correct localized low areas during or immediately after completing surface finishing operations by cutting out low areas and replacing with patching mortar. Finish repaired areas to blend into adjacent concrete.
4. Correct other low areas scheduled to receive floor coverings with a repair underlayment. Prepare, mix, and apply repair underlayment and primer according to manufacturer's written instructions to produce a smooth, uniform, plane, and level surface. Feather edges to match adjacent floor elevations.
5. Correct other low areas scheduled to remain exposed with a repair topping. Cut out low areas to ensure a minimum repair topping depth of 1/4 inch to match adjacent floor elevations. Prepare, mix, and apply repair topping and primer according to manufacturer's written instructions to produce a smooth, uniform, plane, and level surface.
6. Repair defective areas, except random cracks and single holes 1 inch or less in diameter, by cutting out and replacing with fresh concrete. Remove defective areas with clean, square cuts and expose steel reinforcement with at least a 3/4-inch clearance all around. Dampen concrete surfaces in contact with patching concrete and apply bonding agent. Mix patching concrete of same materials and mixture as original concrete except without coarse aggregate. Place, compact, and finish to blend with adjacent finished concrete. Cure in same manner as adjacent concrete.
7. Repair random cracks and single holes 1 inch or less in diameter with patching mortar. Groove top of cracks and cut out holes to sound concrete and clean off dust, dirt, and loose particles. Dampen cleaned concrete surfaces and apply bonding agent. Place patching mortar before bonding agent has dried. Compact patching mortar and finish to match adjacent concrete. Keep patched area continuously moist for at least 72 hours.

E. Perform structural repairs of concrete, subject to Architect's approval, using epoxy adhesive and patching mortar.

F. Repair materials and installation not specified above may be used, subject to Architect's approval.

3.15 FIELD QUALITY CONTROL

A. Testing and Inspecting: Owner will engage a special inspector and qualified testing and inspecting agency to perform field tests and inspections and prepare test reports.

B. Inspections:

1. Steel reinforcement placement.
2. Verification of use of required design mixture.
3. Concrete placement, including conveying and depositing.
4. Curing procedures and maintenance of curing temperature.
5. Verification of concrete strength before removal of shores and forms from beams and slabs.

C. Concrete Tests: Testing of composite samples of fresh concrete obtained according to ASTM C 172 shall be performed according to the following requirements:

1. Testing Frequency: Obtain one composite sample for each day's pour of each concrete mixture exceeding 5 cu. yd., but less than 25 cu. yd., plus one set for each additional or fraction thereof.

    a. When frequency of testing will provide fewer than five compressive-strength tests for each concrete mixture, testing shall be conducted from at least five randomly selected batches or from each batch if fewer than five are used.

2. Slump: ASTM C 143/C 143M; one test at point of placement for each composite sample, but not less than one test for each day's pour of each concrete mixture. Perform additional tests when concrete consistency appears to change.
3. Air Content: ASTM C 231, pressure method, for normal-weight concrete; one test for each composite sample, but not less than one test for each day's pour of each concrete mixture.
4. Concrete Temperature: ASTM C 1064/C 1064M; one test hourly when air temperature is 40 deg F and below and when 80 deg F and above, and one test for each composite sample.
5. Compression Test Specimens: ASTM C 31/C 31M.

    a. Cast and laboratory cure two sets of two standard cylinder specimens for each composite sample.

6. Compressive-Strength Tests: ASTM C 39/C 39M; test one set of two laboratory-cured specimens at 7 days and one set of two specimens at 28 days.

    a. Test one set of two field-cured specimens at 7 days and one set of two specimens at 28 days.
    b. A compressive-strength test shall be the average compressive strength from a set of two specimens obtained from same composite sample and tested at age indicated.

D. Measure floor and slab flatness and levelness according to ASTM E 1155 within 48 hours of finishing.

END OF SECTION

Section 04 20 00

UNIT MASONRY
(FILED SUB-BID REQUIRED)

PART 1 - GENERAL

1.1 GENERAL PROVISIONS

A. The BIDDING REQUIREMENTS, CONTRACT FORMS, and CONTRACT CONDITIONS as listed in the Table of Contents, and applicable parts of Division 1 - GENERAL REQUIREMENTS, shall be included in and made a part of this Section.

B. Work of this Section requires Filed Sub-Bids and is governed by the provisions of the Massachusetts General Laws (MGL), Public Bidding Law - Chapter 149, Sections 44A to 44J inclusive, as amended, and applicable Sections of the MGL, Public Contract Law - Chapter 30.

C. The work to be completed by the Filed Subcontractor for the work of this Section is shown on the following listed Drawings:

Architectural Drawings: CS1, A1 and A2
Structural Drawings: S101, S102, S200 and S201
Plumbing Drawings: P1.0
HVAC Drawings: M1.1, M2.1, and M3.1
Electrical Drawings: E0.0, E1.0, and E2.0

1. Examine all Drawings and all other Sections of the Specifications for requirements therein affecting the work of this Section. The listing of Contract Drawings above does not limit Filed Subcontractor's responsibility to determine full extent of work of this Section as required by all Drawings listed in the Drawing List on the Drawing Title Sheet, as modified by Addenda.
2. Refer to Section 01 23 00 - ALTERNATES, for alternates, which may affect the scope of Work of this Section.

D. Sub-Bids for work under this Section shall be for the complete work and shall be filed in a sealed envelope with the Awarding Authority at a time and place as stipulated in ADVERTISEMENT TO BID and INSTRUCTIONS TO BIDDERS.

1. The following shall appear on the upper left hand corner of the envelope:

NAME OF SUB-BIDDER: _____
SUB-BID FOR TRADE: MASONRY.

2. Each Sub-Bid submittal for work under this Section shall be on forms furnished by Awarding Authority, as bound herein, accompanied with the required bid deposit in compliance with MGL Chapter 149 Section 44B in the amount of 5 percent of Filed Sub-Bid.

E. Sub Sub-Bid Requirements: NONE REQUIRED UNDER THIS SECTION.

1.2 SUMMARY

A. Furnish and install:

1. Concrete masonry unit construction for exterior wall and interior partitions.

2. Grout fill for hollow metal steel frames, elevator hoistway frames, and wherever ties or anchorage items occur, and as further indicated in the Drawings.
3. Reinforcing, ties, anchors, and other metal accessories, for anchoring unit masonry together and to other materials.
4. Compressible joint fillers for control joints in unit masonry work and joints with structural steel.
5. Built-in masonry flashing.
6. Control joints in concrete masonry.

B. Place, install and build-in, as work progresses, the following products and materials furnished under the indicated Sections:

1. Anchor bolts, wood blocking, and anchorage items furnished or set by other trades as specified in individual Sections.
2. Steel lintels furnished by Section 05 50 00 - METAL FABRICATIONS.
3. Access door frames furnished by Section 08 31 00 - ACCESS DOORS AND PANELS or by section requiring the same.

C. Build-into place as work progresses, the following products and materials furnished under the indicated Sections:

1. Hollow metal door and window frames set-in-place by Section 06 10 00 - ROUGH CARPENTRY, and furnished by Section 08 11 13 - HOLLOW METAL DOORS AND FRAMES.

D. Clean and point exposed to view surface masonry.

1.3 EXAMINATION OF SITE AND DOCUMENTS

A. Bidders are expected to examine and to be thoroughly familiar with all contract documents and with the conditions under which work will be carried out. The Awarding Authority (Owner) will not be responsible for errors, omissions and/or charges for extra work arising from General Contractor's or Filed Subcontractor's failure to familiarize themselves with the Contract Documents or existing conditions. By submitting a bid, the Bidder agrees and warrants that he has had the opportunity to examine the site and the Contract Documents, that he is familiar with the conditions and requirements of both and where they require, in any part of the work a given result to be produced, that the Contract Documents are adequate and that he will produce the required results.

B. Pre-Bid Conference: Bidders are strongly encouraged to attend the Pre-Bid conference; refer to ADVERTISEMENT FOR BIDS for time and date.

1.4 RELATED REQUIREMENTS

A. Section 01 45 00 - QUALITY CONTROL: Perform testing of masonry, mortar and grout specified herein.

B. Section 01 45 29 - TESTING LABORATORY SERVICES: Perform testing of masonry, mortar and grout specified herein.

C. Section 03 30 00 - CAST-IN-PLACE CONCRETE: Concrete foundation work, walls and slabs.

D. Section 05 40 00 - COLD-FORMED STEEL FRAMING: Structural light gage metal framing for support of roofing.

E. Section 06 10 00 - ROUGH CARPENTRY: Setting and temporary bracing of hollow metal frames occurring in masonry, and removal of temporary centering when frames have been built into the masonry.

F. Section 07 62 00 - SHEET METAL FLASHING AND TRIM: Counter flashings and cap flashing at roof.

G. Section 07 92 00 - JOINT SEALANTS: Sealant, caulking materials, and compressible joint bead back-up, in conjunction with masonry work.

H. Section 08 11 13 - HOLLOW METAL DOORS AND FRAMES.

I. Section 09 91 00 - PAINTING: Plaster finish over concrete masonry units.

1.5 REFERENCES

A. Comply with applicable requirements of the following standards and those others referenced in this Section, under the provisions of Section 01 42 00 - REFERENCES. Where these standards conflict with other specified requirements, the most restrictive requirements shall govern.

1. American Concrete Institute (ACI) and American Society of Civil Engineers (ASCE): ACI 530.1/ASCE 6 - “Specifications for Masonry Structures”
2. ASTM A 82 - Steel Web, Plain, for Concrete Reinforcement.
3. ASTM A 123 - Zinc (Hot-Dip Galvanized) Coating on Iron and Steel Products.
4. ASTM A 153 - Zinc Coating (Hot-Dip) on Iron and Steel Hardware.
5. ASTM A 497 - Welded Wire Fabric; Deformed, for Concrete Reinforcement.
6. ASTM A 615 - Deformed and Plain Billet-Steel Bar for Concrete Reinforcement.
7. ASTM A 641 - Zinc-Coated (Galvanized) Carbon Steel Wire.
8. ASTM B 117 - Salt Spray (Fog) Testing.
9. ASTM B 633 - Electrodeposited Coatings of Zinc on Iron and Steel.
10. ASTM C 5 - Quicklime for Structural Purposes.
11. ASTM C 90 - Load-Bearing Concrete Masonry Units.
12. ASTM C129 - Non-Load Bearing Concrete Masonry Units.
13. ASTM C 140 - Method of Sampling and Testing Concrete Masonry Units.
14. ASTM C 144 - Aggregate for Masonry Mortar.
15. ASTM C 150 - Portland Cement.
16. ASTM C 207 - Hydrated Lime for Masonry Purposes.
17. ASTM C 270 - Mortar for Unit Masonry.
18. ASTM C 387 - Packaged, Dry, Combined Materials, for Mortar and Concrete.
19. ASTM C 404 - Aggregates for Masonry Grout.
20. ASTM C 476 - Grout for Masonry
21. ASTM C 595 - Blended Hydraulic Cement.
22. ASTM C 744 - Prefaced Concrete and Calcium Silicate Masonry Units.
23. ASTM C 778 – Specification for Standard Sand.
24. ASTM C 780 - Preconstruction and Construction Evaluation of Mortars for Plain and Reinforced Unit Masonry.

25. ASTM C 954 - Steel Drill Screws for the Application of Gypsum Board or Metal Plaster Bases to Steel Studs.
26. ASTM C 1019 - Method of Sampling and Testing Grout.
27. ASTM C 1072 - Method for Measurement of Masonry Flexural Bond Strength.
28. ASTM C 1329 – Standard Specification for Mortar Cement.
29. ASTM C 1357 – Test Methods for Evaluating Masonry Bond Strength.
30. ASTM D 2000 - Classification System for Rubber Products.
31. ASTM D 2287 - Nonrigid Vinyl Chloride Polymer and Copolymer Molding and Extrusion Compounds.
32. ASTM E 119 - Fire Tests of Building Construction and Materials.
33. ASTM E 488 - Strength of Anchors in Concrete and Masonry Elements.
34. ASTM E 518 - Test Method for Flexural Bond Strength of Masonry.
35. American National Standards Institute Building Code requirements.
36. MCAA – Hot and Cold Weather Masonry Construction.

B. The following reference materials are hereby made a part of this Section by reference thereto:
1. UL Fire Resistance Directory.
2. IMI: Masonry Construction Guide Manual.
3. PCA, “Concrete Masonry Handbook”.
4. NCMA applicable TEK Bulletins.
5. NCMA TEK Bulletin Nº. 45 - Removal of Stains from Concrete Masonry Walls.

1.6 SUBMITTALS

A. Submit the following under provisions of Section 01 33 00 - SUBMITTAL PROCEDURES:
1. Literature: Manufacturer’s product data sheets, specifications, performance data, physical properties for each item furnished hereunder.
2. Material certificates: Provide for the following, signed by manufacturer and Contractor certifying that each material complies with requirements.
   a. Each different cement product required for mortar and grout, including name of manufacturer, brand, type, and weight slips at time of delivery.
   b. Each material and grade indicated for reinforcing bars.
   c. Each type and size of joint reinforcement.
   d. Each type and size of anchors, ties, and metal accessories.
3. Material test reports from a qualified independent laboratory employed and paid by Contractor indicating and interpreting test results relative to compliance of the following proposed masonry materials with requirements indicated:
   a. Mortar complying with the property requirements of, and factory-tested in accordance with ASTM C 270.
   b. Grout mixes: Include description of type and proportions of grout ingredients.
   c. Masonry units; report for tests performed within the previous six months.
4. Shop drawings:
   a. Provide elevations of masonry work showing jointing patterns and coursing; indicate locations of expansion and control joints.

5. Verification samples (submit if requested by Architect):
   a. Samples of each masonry accessory or anchorage item required.
   b. Mortar Components.
   c. Concrete masonry units.

1.7 QUALITY ASSURANCE

A. Single-source responsibility for concrete masonry units: Obtain concrete masonry units for the project from a single manufacturer.

B. Single source responsibility for prepackaged mortar materials: Obtain masonry cement or masonry mortar from a single manufacturer. Where colored mortar is required provide batch tickets confirming all materials are from a single production run to ensure uniformity of the mix.

C. Inspection, Testing, and Quality Control: A program of Inspection and Testing of structural masonry work will be established by the Structural Engineer of Record (SER) who will direct the implementation of tests as carried out by an independent testing agency. All costs for inspection and testing will be borne by the Owner.

1.8 DELIVERY, STORAGE, AND HANDLING

A. General: Do not deliver cement, lime, and similar perishable materials to the site until suitable storage is available. Store such materials in weatherproof structures, and ensure that materials are in perfectly fresh condition when brought for use. Protect masonry units and manufactured products of all types from wetting by rain or snow, and keep covered when not in use.

B. Masonry Face Units: Handle all masonry units carefully in transit and on the site, so as to keep units whole, with edges sharp, and faces clean and undamaged. Deliver all masonry units on pallets; or handle units individually, and properly stack same.

C. Aggregates: Deliver, store and handle aggregate materials so as to prevent contamination with earth or other foreign materials.
   1. Store cement, lime and similar products under cover and from direct contact with earth or floor slabs.

D. Manufactured items: Deliver manufactured products in original containers plainly marked with product identification and manufacturer's name.
   1. Store metal accessories and the like under cover and from direct contact with ground, and in manner to prevent rust.

E. Damaged material: Remove any damaged or contaminated materials from job site immediately, including materials in broken packages, packages containing water marks, or which show other evidence of damage, unless Architect specifically authorizes correction thereof and usage on project.

1.9 ENVIRONMENTAL CONDITIONS

A. Hot and cold weather requirements shall be in accordance with the recommendations of the Masonry Industry Council as contained in the document "*HOT AND COLD WEATHER MASONRY CONSTRUCTION*" published by the MCAA (Masonry Contractor's Association of America). Enforcement for these requirements shall take place under the following conditions which modify those in the referenced document.

1. The recommended hot weather requirements for 100 degrees Fahrenheit (37.8 degrees Celsius) shall be enforced for this project when ambient temperatures are above 90 degrees Fahrenheit (32.2 degrees Celsius) under all wind conditions including zero velocity.
2. Cold weather requirements shall be enforced when ambient temperatures fall below 40 degrees Fahrenheit (4.4 degrees Celsius).

1.10 SEQUENCING

A. Coordinate work of this Filed Subcontract with that of other trades, affecting or affected by this work, and cooperate with the other trades as is necessary to assure the steady progress of work.

B. Do not order or deliver any materials until all submittals, required in the listed Specification Sections included as part of this Filed Subcontract, have been received and approved by the Architect.

C. Before proceeding with installation work, inspect all project conditions and all work of other trades to assure that all such conditions and work are suitable to satisfactorily receive the work of this Section and notify the Architect in writing of any which are not. Do not proceed further until corrective work has been completed or waived.

1.11 COORDINATION

A. Coordinate work of this Subcontract with that of other trades, affecting or affected by this work, and cooperate with the other trades as is necessary to assure the steady progress of work.

B. Coordinate work with that of other trades which require placement and building-in of, as work progresses, anchor bolts, wood blocking, hollow metal frames, and anchorage items.

C. Examine all Drawings as to requirements for the accommodation of work of other trades. Provide all required recesses, chases, slots, and cutouts. Place anchors, bolts, sleeves and other items occurring in the masonry work. Take every precaution to minimize future cutting and patching. Closely coordinate the location and placement of such items.

PART 2 - PRODUCTS

2.1 SCAFFOLDS AND STAGING

A. General: Filed Subcontractors shall obtain required permits for, and provide scaffolds, staging, and other similar raised platforms, required to access their Work as specified in Section 01 50 00 - TEMPORARY FACILITIES AND CONTROLS and herein.

1. Scaffolding and staging required for use by this Filed Subcontractor pursuant to requirements of Section 01 50 00 - TEMPORARY FACILITIES AND CONTROLS shall be furnished, erected, maintained in a safe condition, and dismantled when no longer required, by this Filed Sub-Trade requiring such scaffolding.
2. Each Filed Subcontractor is responsible to provide, maintain and remove at dismantling, all tarpaulins and similar protective measures necessary to cover scaffolding for inclement weather conditions other than those required to be provided, maintained and removed by the General Contractor pursuant to MGL (Refer to Section 01 50 00 - TEMPORARY FACILITIES AND CONTROLS and as additionally required for dust control).

3. Furnishing portable ladders and mobile platforms of all required heights, which may be necessary to perform the work of this trade, are the responsibility this Filed Subcontractor.
4. Enclose all exterior scaffolding outside of the construction fence with 8-foot high plywood enclosure at end of each work day to prohibit access to the scaffolding by unauthorized individuals.

2.2 HOISTING MACHINERY AND EQUIPMENT

A. All hoisting equipment, rigging equipment, crane services and lift machinery required for the work by this Filed Subcontractor shall be furnished, installed, operated and maintained in safe conditions by this Filed Subcontractor, as referenced under Section 01 50 00 - TEMPORARY FACILITIES AND CONTROLS.

2.3 CONCRETE MASONRY UNITS

A. Exterior walls and interior load-bearing walls: Load bearing hollow and solid, normal weight concrete masonry units: Conform to ASTM C90, Type 1, Class 1, normal weight, 2-core, 58 percent solid (2 hour fire resistant construction):
   1. Plain-faced units of nominal thickness indicated on the Drawings, nominal 8 by 16 inch face dimension with light gray color and uniform medium-fine texture, sound, true to plane and line, and free from chips, cracks, and other defects.
      a. Recycled content: Use maximum available percentage of recycled materials. Concrete masonry units incorporated into the work shall contain not less than 3 percent of recycled content.
   2. Aggregate: sand and gravel: conform to ASTM C 33.
   3. Minimum allowable compressive strength for an individual unit of not less than 1700 psi (net area); and not less than 1,900 psi. (net area) for average of 3 units; when tested in accordance with ASTM C 140.
   4. Oven dry density: 125 pounds per cubic foot.
   5. Moisture content for average of 3 units, when delivered, not exceeding 35 percent of the total absorption, when tested in accordance with ASTM C 140.

B. Interior non-load bearing partitions: Non-loadbearing concrete masonry units: Conform to ASTM C129, Type 1, normal weight:
   1. Plain-faced units of nominal thickness indicated on the Drawings, nominal 8 by 16 inch face dimension with light gray color and uniform medium-fine texture, sound, true to plane and line, and free from chips, cracks, and other defects.
      a. Wythes:
         1) 4 inch wythe block: 3 core regular, 76 percent solid, having wall thickness not less than of 1.00 inch.
         2) 6 inch wythe block: 2 core regular, 56 percent solid, having wall thickness not less than of 1.00 inch.
         3) 8 inch wythe block: 2 core regular, 53 percent solid, having wall thickness not less than of 1.25 inch.
      b. Recycled content: Use maximum available percentage of recycled materials. Concrete masonry units incorporated into the work shall contain not less than 3 percent of recycled content.
   2. Aggregate: sand and gravel: conform to ASTM C 33.

3. Minimum allowable compressive strength for an individual unit of not less than 500 psi (net area); and not less than 600 psi. (net area) for average of 3 units; when tested in accordance with ASTM C 140.
4. Oven dry density: 125 pounds per cubic foot.
5. Moisture content for average of 3 units, when delivered, not exceeding 35 percent of the total absorption, when tested in accordance with ASTM C 140.
6. Provide units clearly labeled as non-load-bearing.

C. Concrete masonry grout (lintel) blocks: Open end high strength concrete masonry units and slot type strength concrete masonry units for use at reinforced concrete masonry construction where indicated on the Drawings. Conform to all requirements specified above for standard concrete masonry units, and the following additional requirements:

1. Plain-faced units of nominal thickness indicated on the Drawings, nominal 8 by 16 inch face dimension with light gray color and uniform medium-fine texture, sound, true to plane and line, and free from chips, cracks, and other defects.

2.4 MORTAR

A. Prepackaged mortar (ready mix)

1. General: complying with ASTM C 1142, factory blended consisting of:
   a. Portland cement: Comply with ASTM C 150, Type I.
   b. Hydrated lime: Type S, complying with ASTM C 207.
   c. Aggregate: Provide clean, sharp, well graded aggregate free from injurious amounts of dust, lumps, shale, alkali, surface coatings, and organic matter, and complying with ASTM C144.
   d. Admixtures: Prepackaged mortar mixes contain manufacturer's own proprietary admixtures, additional field admixtures are strictly prohibited.
   e. Water: Provide water free from deleterious amounts of acids, alkalis, and organic materials. Water shall be potable.
   f. Pigments: Chemically inert synthetic iron oxide pigments, lightfast, weather resistant, complying with ASTM C-979.
      1) Mortar Color: As selected by Architect from manufacturer's full range of standard colors.

B. Mortar types:

1. Mortar for exterior walls and interior load bearing walls: ASTM C 270 type M or S, using the property specification.
2. Mortar for interior non-load bearing partitions: ASTM C 270 type N using the property specification.

2.5 GROUT MIXES

A. Prepackaged grout (ready mix) complying with ASTM C 1107, or site-mixed Portland cement grout complying with ASTM C 476 may be used.

B. Grout for setting equipment, anchor bolts, elevator guide rails, structural steel elements and miscellaneous metals: Non-metallic high-strength controlled expansion grout of flowable consistency, having a compressive strength of 6,500 pounds per square inch (44.8 MPa) at 28 days; slump 8 to 10 inches.

1. Five Star Products, Inc., Fairfield CT, product "Five Star Grout".

2. L&M Construction Chemicals, Omaha NE, Product: “Crystex”.
3. Master Builders, Cleveland, OH., product “Masterflow 713”.
4. Sika Corporation, Lyndhurst, NJ., product “SikaGrout 212”.
5. Sonneborn Building Products, Minneapolis, MN., product “Sonogrout 10K”.
6. Symons Corporation, DesPlaines, IL., product “Symons Multi Purpose Grout”.

C. Grout for engineered masonry (core fill): Course grout having a compressive strength of 2,000 to 2,250 pounds per square inch (13.8 to 15.5 MPa) at 28 days; slump 8 to 10 inches.

D. Grout for bond beams and lintels: Fine grout having a compressive strength of 2,500 to 3,000 pounds per square inch (17.2 to 20.6 MPa) at 28 days; slump 8 to 10 inches.

2.6 REINFORCEMENT AND ANCHORAGE MATERIALS

A. Single wythe longitudinal reinforcement for concrete masonry unit walls and partitions: in overall width 1-5/8 inches less than the overall wall thickness, as manufactured by Dur-O-Wal, Hohmann, AA Wire, or approved equal.
   1. Interior partitions: Truss design, 9 gage ASTM A 641 class 1 galvanized wire.
   2. Exterior partitions: Truss design, 9 gage ASTM A 641 class 3 hot dipped galvanized wire.
   3. Provide preformed reinforcing sections at intersections of masonry walls and partitions, and whenever walls and partitions change direction.

B. Reinforcing steel, additional to rods which are embedded in concrete: Solid steel reinforcing bars, conforming to ASTM A 615, Grade 60, hot dipped galvanized in accordance with ASTM 123, B2 finish, of sizes indicated on the Drawings.

2.7 FLASHING MATERIALS

A. Concealed through-wall flashing: Copper-fabric flashing consisting of 5 ounce (per square foot) sheet copper permanently bonded with a proprietary rubber based adhesive, between two layers of ‘red’ fiberglass fabric weighing not less than 0.3 oz/ft2/layer with a minimum of 10x20 threads per inch, equal to York Manufacturing, Inc., Sanford ME, product “York Multi-Flash 500”.
   1. Acceptable manufacturers:
      a. Advance Building Products, Inc., Springvale ME.
      b. Phoenix Building Products, Inc., Meza, AR.
      c. Sandell Manufacturing Company, Inc., Amsterdam NY.
      d. York Manufacturing, Inc., Sanford ME.
   2. Not acceptable as equal: Copper-fabric flashing bonded between two layers of ductile asphalt impregnated woven fiberglass fabric.

B. Lap sealant for concealed flashing [also scheduled in Section 079200 as Joint Sealer Type PE (Polyether]: Low modulus type, Single-component non-sagging gun-grade, low-odor, neutral curing polyether, sealant, conforming to FS TT-S-000227E, Type II, Class A, and ASTM C 920, Type S, Class 25, Grade NS, use NT, T, M, G, A and O with a minimum movement capability of ±100 percent, equal to the following:
   1. STS Coatings, Inc., product: “GreatSeal PE-150” Sealant.
   2. Chem Link Inc., Schoolcraft, MI., product: “MetaLink”.
   3. Sonneborn Building Products Inc., Minneapolis MN.; product, “Sonolastic 150”.

4. York Manufacturing, Inc., Sanford ME., product: “PE-150 Liquid Tape”.

2.8 ACCESSORIES

A. Compressible filler: Closed cell polyvinyl chloride; oversized 50 percent to joint width; self-expanding, continuous in length, and in width to fill the joint to a point 3/4 inch back from each face of wall or partition.

B. Compressible filler for joints at tops of non-load bearing masonry partitions, and for expansion joints in masonry walls: Closed cell Neoprene or PVC foam board, soft grade, 25 percent thicker than joint width, continuous in length, and in width to fill the joint to a point 3/4 inch back from each face of wall or partition.

C. Premolded control joints for concrete masonry construction: Solid rubber of profile as indicated (to maintain lateral stability of wall), 60-80 shore A hardness.

D. Building paper (to maintain joints open for subsequent application of sealant and backer rod): Nº. 15 asphalt saturated felt.

E. Weeps: 3/8 inch outside diameter, minimum 3-1/2 inches long polyethylene hollow tubes, with stainless steel mesh screen insert and cotton wick.

1. Dur-O-Wall model 1005.
2. Hohmann & Barnard model number 341.
3. Wire-bond model 3600.

F. Cleaning solution: Non-acidic, not harmful to masonry work or adjacent materials.

2.9 SCAFFOLDS AND STAGING

A. General: Filed Subcontractors shall obtain required permits for, and provide scaffolds, staging, and other similar raised platforms, required to access their Work as specified in Section 01 50 00 - TEMPORARY FACILITIES AND CONTROLS and herein.

1. Scaffolding and staging required for use by this Filed Subcontractor pursuant to requirements of Section 01 50 00 - TEMPORARY FACILITIES AND CONTROLS shall be furnished, erected, maintained in a safe condition, and dismantled when no longer required, by this Filed Sub-Trade requiring such scaffolding.
2. Each Filed Subcontractor is responsible to provide, maintain and remove at dismantling, all tarpaulins and similar protective measures necessary to cover scaffolding for inclement weather conditions other than those required to be provided, maintained and removed by the General Contractor pursuant to MGL (Refer to Section 01 50 00 - TEMPORARY FACILITIES AND CONTROLS and as additionally required for dust control).
3. Furnishing portable ladders and mobile platforms of all required heights, which may be necessary to perform the work of this trade, are the responsibility this Filed Subcontractor.

2.10 HOISTING MACHINERY AND EQUIPMENT

A. All hoisting equipment, rigging equipment, crane services and lift machinery required for the work by this Filed Subcontractor shall be furnished, installed, operated and maintained in safe conditions by this Filed Subcontractor, as referenced under Section 01 50 00 - TEMPORARY FACILITIES AND CONTROLS.

2.11 MIXING MORTARS AND GROUT

A. General: Mix mortar and grout in accordance with the requirements of ASTM C270, and ASTM C476 as applicable.

1. Control batching procedure to ensure proper proportions by measuring materials by volume. Amount of mixing water and mortar consistency shall be controlled by mason.
2. Control batch sizes to allow for use within manufacturer's recommended pot life.
3. Retempering will be permitted only within the first two hours of initial mix or shorter times as directed by manufacturers.
4. Discard all mortar and grout which exceeds the time limits allowed by the manufacturer. Discard mortar that has partially set.

B. Maintain sand uniformly damp immediately before mixing process.

C. Add mortar color and admixtures in accordance with manufacturer's instructions. Provide uniformity of mix and coloration.

D. Do not use anti-freeze compounds to lower the freezing point of mortar or grout.

E. Pouring grout shall be fluid consistency (as fluid as possible for pouring without separation of constituent parts).

2.12 SOURCE QUALITY CONTROL

A. Preconstruction testing: Except for testing by the Contractor, required as part of this Section, or Section 01 45 29 – TESTING LABORATORY SERVICES, the Owner will employ and pay a qualified independent testing laboratory to perform the following preconstruction testing indicated as well as other inspecting and testing services required by referenced unit masonry standard or indicated herein for source quality control:

1. Concrete Masonry Unit Tests: For each different concrete masonry unit indicated, units will be tested for strength, absorption, and moisture content per ASTM C 140.
2. Mortar composition and properties will be field evaluated per ASTM C 780 for compressive strength, consistency, mortar aggregate ratio, water content, air content, and splitting tensil strength.
3. Grout compressive strength will be tested per ASTM C 1019 for compressive strength and slump.

PART 3 - EXECUTION

3.1 EXAMINATION

A. Verify that field conditions are acceptable and are ready to receive the work of this Section.

B. Verify built-in and other items provided by separate Sections of the work are properly sized and located.

C. Verify foundations supporting masonry are constructed within tolerances required by code.

D. Beginning of installation means acceptance of site conditions.

3.2 PREPARATION

A. Direct and coordinate placement of metal anchors supplied to other Sections.

B. Foundations:

1. Do not commence installation until foundations are clean, rough, and level.
2. Sandblast the foundation tops, if necessary, and remove all laitance and foreign material.
3. Verify that the foundation elevation is such that the bed joint thickness shall not vary from specified thickness, and that the foundation edge is true to line with masonry not projecting over more than 1/4”.

C. Provide temporary bracing during installation of masonry work. Maintain in place until building structure provides permanent bracing.

D. Protect surfaces of windows, door frames, louvers and vents as well as similar finish products with painted and integral finishes from mortar droppings and stains.

3.3 INSTALLATION - GENERAL

A. Build chases and recesses as shown or required to accommodate items specified in this and other Sections of the Specifications. Provide not less than 8 inches of masonry between chase recess and jamb of openings and between adjacent chases and recesses.

B. Leave openings for equipment to be installed before completion of masonry. After installation of equipment, complete masonry to match construction immediately adjacent to the opening.

C. Establish lines, levels and coursing indicated. Protect from displacement.

D. Maintain masonry courses to uniform dimension. Form vertical and horizontal joints of uniform thickness.

E. Isolate masonry partitions from vertical structural framing and where indicated on the Drawings. Maintain joints free from mortar, ready to receive sealant and joint bead back-up.

F. Provide compressible filler at tops of interior masonry partitions abutting structural above.

3.4 COURSING, BONDS AND JOINTS

A. Coursing, joints and bond pattern: Running bond except as otherwise indicated on the Drawings.

B. Joints:

1. Exposed to view masonry: except as specified below, fill all joints with mortar, strike off flush, and when mortar is thumb print hard tool joints with a non-staining tool. Joints shall be free of drying crack.
   a. Horizontal joints
      1) Exterior joints at concrete masonry units: Rake joints, brush clean, point with mortar to a flat cut joint. When thumbprint hard, the joints and beds shall be tooled with a round jointer having a diameter 1/8 inch larger than the width of the joint
      2) Interior joints (all): Tool joints flush.
   b. Vertical joints (all): Tool joints concave.
2. Concealed from view masonry, including masonry which will be concealed by flashings and similar materials: Fill joints with mortar and strike joints flush. Concave tool exterior joints below grade.

3.5 CONTROL JOINTS

A. Locate control joints where shown on Drawings, at corners adjacent to openings in masonry, changes in wall height and intersections with structural walls as approved by Architect.

1. Do not continue horizontal joint reinforcement through control joints.

B. Form vertical control joints with a sheet building paper bond breaker fitted to one side of the hollow contour end of the block unit. Fill the resultant core with grout fill. Rake joint at exposed unit faces for placement of backer rod and sealant.

1. Size control joints in accordance with the requirements of Section 07 92 00 - JOINT SEALANTS.

3.6 LAYING MASONRY - GENERAL

A. Build the masonry walls and partitions in the various combinations and thickness as indicated on the Drawings.

B. Erect all masonry work in compliance with the line and level tolerances specified herein. Hold uniform joint sizes. Correct, or replace, as directed by the Architect, non-conforming masonry work at no additional cost to the Contract.

C. Lay out coursing before setting to minimize cutting closures or jumping bond, Avoid the use of less-than-half-size units.

D. Laying masonry units:

1. Lay masonry units in full bed of mortar, with full head joints; uniformly joint with other work.
2. Lay hollow masonry units with face shell bedding on head and bed joints.
3. Buttering corners of joints or excessive furrowing of mortar joints are not permitted.
4. Interlock intersections and external corners.
5. Cut all exposed masonry with a motor-driven carborundum blade saw to ensure straight and clean, unchipped edges.
   a. Lay no unit having chipped edges or face defects where such unit would be exposed to view. Remove any such unit, if installed, and replace with an undamaged unit, and bear all costs therefore.
6. Do not spread any more mortar than can be covered before surface of mortar has begun to dry.
7. Do not shift or tap masonry units after mortar has achieved initial set. Where adjustment must be made, remove entirely, clean off mortar, and reset with fresh mortar.
8. Except for cleaning down and repointing, finish all masonry as the walls and partitions are carried up.

E. Build-in reinforcement and anchorage items as the work progresses, grouting for secure anchorage.

1. Where steel reinforcing rods have been cast into concrete slabs, and left with upturned ends, carefully place masonry units down over the upturned ends of the rods, and fill cells of masonry units with specified grout.
2. Embed prefabricated horizontal joint reinforcing as the work progresses, with a minimum cover of 5/8” (16 mm) on exterior face of walls and 1/2” (13 mm) at other locations. Lap units not less than 6” (152 mm) at ends. Use prefabricated L and T units to provide continuity at corners and intersections. Cut and bend units as recommended by

manufacturer for continuity at returns, offsets, column fireproofing, pipe enclosures and other special conditions.

F. Except as indicated otherwise, isolate masonry from overhead structure:
   1. Isolate masonry partitions from vertical structural framing members with a control joint.
   2. Isolate top joint of masonry partitions from horizontal structural framing members and slabs, decks or blocking with compressible joint filler.

G. Provide control joints at 30 feet on center maximum spacing, and keep clean of mortar droppings.

H. Provide complete protection against breakage and weather damage to all masonry work, including substantial wood boxing around door jambs, over the tops of walls and wherever necessary to protect work at all stages of completion. Protect masonry when not roofed over, at all times when masons are not working on the walls. Apply tarpaulins or waterproof paper, properly weighted, or nailed, to assure their remaining in place to protect masonry from all possible hazards.

I. Point and fill all holes and cracks in new mortar joints with additional fresh mortar; do not merely spread adjacent mortar over defect or use dead mortar droppings. Do all pointing while mortar is still soft and plastic. If hardened, chisel defect out and refill solidly with fresh additional mortar, and tool or rake joints as specified herein.

J. Protect all masonry from rain prior to, and during the installation thereof. If the temperature is in excess of 80 degrees Fahrenheit at time of installation, lightly moisten contact surfaces of masonry units by brushing with water.

K. Cold/Hot Weather Procedures: No masonry work shall be laid in temperatures below 40 degrees Fahrenheit without the submittal to and review by the Architect of cold weather procedures.
   1. In ambient temperatures below 40 degrees Fahrenheit make provisions to adequately protect the masonry materials and the finished work from frost, including heating of masonry materials.
      a. Heat enclosed work areas as necessary to adequately protect the work of this Filed Sub-Bid. Such additional temporary heat and protection measures required is in addition to the protection furnished by General Contractor under provisions of Section 01 50 00 - TEMPORARY FACILITIES AND CONSTRUCTION, which occurs from November 1st to March 31st.
   2. No frozen work shall be built upon nor shall anti-freeze admixtures be permitted in the mortar mix.
   3. Any completed work found to be affected by frost shall be taken down and rebuilt at no additional expense to the Owner.

3.7 FLASHING

A. Provide and build-in through-wall flashings at lintels, heads and sills of openings and infill openings. Additionally provide flashing where indicated on the Drawings, as specified herein and all conditions which may be considered similar to those indicated on the Drawings.
   1. Install through-wall flashing allowing approximately 3 inches of flashing material to extend beyond the face of the masonry veneer. Remove woven fiberglass fabric from each side of underlying copper flashing and hem to 45 degree edge extending beyond face of masonry. Ensure through-wall flashing is in proper position in wythe without forming pockets.

2. Extend flashing to back up wall, turn up a minimum of 8 inches and terminate as follows:
   a. Masonry - terminate into horizontal joint of masonry, extending to 1/2” of interior face of wall, turning back 1” on itself.
   b. Metal stud and gypsum sheathing - terminate behind sheathing, securing top edge of flashing to face of stud with 1/2” type S-12 low profile head screws.
3. Form end dams at horizontal terminations; turn flashing, fold and seal (not cut) at corners, bends and interruptions. Seal watertight using flashing manufacturer’s recommended adhesive and sealer.
4. Carry head flashing 6” beyond both ends of lintels. At steel lintels, apply a heavy bed coat of compatible adhesive mastic and embed thru-wall flashing in the mastic before laying brick.
5. Seal all punctures with an elastic cement mastic recommended by flashing manufacturer.

B. Build-in counter flashing as indicated in the Drawings and as specified herein.
1. Clean surface of masonry smooth and free from projections that might puncture or otherwise damage flashing membrane.
2. Carefully fit flashing around projections, neatly fold and bed in mastic or mortar so as to direct moisture to the outside. Form flashing to required profiles without wrinkles or buckles and install in such a manner as to direct moisture to the outside.

3.8 WEEP HOLES

A. Provide weep holes in head joints in first course of veneer immediately above all through-wall flashing, shelf angles, lintels and bottoms of walls.

B. Install weep hole tube/rope in head joint, provide 24 inch, or greater, lengths.
1. Space weep holes:
   a. In concrete masonry: 32 inches on center maximum

C. Keep weep holes and area above flashing free of mortar droppings.

3.9 MASONRY WITH GROUTED CELLS

A. Lay masonry units with core cells vertically aligned and clear of mortar and unobstructed.

B. Place mortar in masonry unit bed joints back 1/4 inch from edge of unit grout spaces, bevel back and upward. Permit mortar to cure 7 calendar days before placing grout.

C. Refer to the Drawings for locations where vertical steel reinforcing rods will be required in masonry walls. Reinforce masonry unit cores with reinforcement bars and grout.

D. Retain vertical reinforcement in position at top and bottom of cells and at intervals not exceeding 192 bar diameters. Splice reinforcement in accordance with Division 3 - Concrete.

E. Wet masonry unit surfaces in contact with grout just prior to grout placement.

F. Grout spaces less than 2 inches in width with fine grout using low lift grouting techniques. Grout spaces 2 inches or greater in width with course grout using high or low grouting techniques.

G. When grouting is stopped for more than one hour, terminate grout 1-1/2 inch below top of upper masonry unit to form a positive key for subsequent grout placement.

H. Low lift grouting: Place first lift of grout to a height of three concrete masonry unit courses, and rod for grout consolidation. Place subsequent lifts in 8 inch increments and rod for grout consolidation.

I. High lift grouting:
   1. Provide cleanout opening no less than 4 inches high at the bottom of each cell to be grouted by cutting one face shell of masonry unit.
   2. Clean out masonry cells with compressed air, remove debris.
   3. Request inspection of the cells and cavities. Allow 3 working days notice.
   4. After cleaning and cell inspection, seal openings with masonry units.
   5. Pump grout into spaces. Maintain water content in grout to intended slump without aggregate segregation..
   6. Limit grout lift to 60 inches and rod for consolidation. Wait between 30 and 60 minutes before placing next lift.

3.10 BUILDING-IN WORK

A. As work progresses install built-in metal door and glazed frames, fabricated metal frames, window frames, wood nailing strips, anchor bolts, plates and other items to be built-in the work.

B. Install built-in items plumb and level; take care not to distort alignment of such items.

C. Bed anchors of metal frames in adjacent mortar joints. Fill frame voids solid with grout except where joints are indicated to receive caulking and sealant. Fill adjacent masonry cores with grout minimum 12 inches from framed openings.
   1. Rake joints to receive sealant to a uniform depth of 3/4 inch for installation of caulking and sealant.

D. Do not build-in organic materials subject to deterioration.

3.11 BUILDING-IN LINTELS

A. Install reinforced masonry lintels over all openings in lieu of steel lintels.
   1. Refer to structural drawings for lintel reinforcing requirements.
   2. Do not splice reinforcing bars.
   3. Support and secure reinforcing bars from displacement. Maintain position with 1/2 inch of dimensioned position.
   4. Place and consolidate grout fill without displacing reinforcing.
   5. Allow masonry lintels to attain specified strength before removing temporary supports.

B. Where not detailed otherwise, maintain 8 inches minimum bearings for reinforced masonry lintels on each side of opening:

3.12 REINFORCEMENT AND ANCHORAGE

A. Reinforce horizontal joints with continuous masonry joint reinforcement, spaced 16 inches vertically commencing one course above supporting concrete slab.

B. Place masonry joint reinforcement in first and second horizontal joint above and below openings. Extend 16 inches each side of opening.

C. Place joint reinforcement in first and second joint below top of walls.

D. Lap joint reinforcement ends minimum 6 inches .

E. Install preformed units (or optional field-formed units) at corners, reveals, and offsets in exterior masonry, at intersections of all masonry walls and partitions, and wherever walls and partitions change directions.

F. Do not bridge control and expansion joints in the wall system.

G. Support and secure reinforcing bars from displacement. Maintain position within 1/2 inch of dimensioned position.

3.13 FIELD QUALITY CONTROL

A. Field inspection will be performed under the provisions of Division 1 – GENERAL REQUIREMENTS (Section 01 45 00 - QUALITY CONTROL, or Section 01 45 29 – TESTING LABORATORY SERVICES, as applicable).

B. Unit Strength Method: For exterior wall and interior load-bearing wall construction, masonry prisms will be tested per the Unit Strength Method.

1. Concrete masonry units shall conform to ASTM C55 or ASTM C90 and be sampled and tested in accordance with ASTM C140.
2. Thickness of bed joints shall not exceed 5/8”.
3. Grout conforms to ASTM C476.
4. Determine compressive strength of grout in accordance with ASTM C1019.

C. Evaluation of Quality Control tests: In absence of other indications of noncompliance with requirements, masonry will be considered satisfactory if results from source quality control tests comply with minimum requirements indicated.

3.14 PROTECTION OF WORK

A. Loading: Do not apply loading for at least 12 hours after building exterior (load bearing) masonry walls. Do not apply concentrated loads for at least 3 days after building masonry columns, walls or partitions.

B. Protection of Masonry: During erection, cover tops of walls, projections, and sills with waterproof sheeting at end of each day’s work. Cover partially completed masonry when construction is not in progress.

1. Extend cover a minimum of 24 inches down both sides and hold cover securely in place.
2. Where one wythe of multi-wythe masonry walls is completed in advance of other wythes, secure cover a minimum of 24 inches down face next to un-constructed wythe and hold cover in place.

C. Stain prevention: Provide protection and prevent grout, mortar, and soil from staining the face of exposed masonry and building finishes. Protect base of walls from rain-splashed mud and mortar splatter.

1. Remove immediately all grout, mortar, and soil that come in contact with such masonry.

3.15 TOLERANCES

A. Maximum variation from true surface level for exposed to view walls and partitions:

1. Unit-to-unit tolerance: 1/16 inch.
2. Surface, overall tolerance: 1/4 inch in 10 feet in any direction and 1/2 inch in 20 feet or more.
   a. Where both faces of single wythe wall or partition will be exposed to view, request and obtain decision from the Architect as to which face will be required to conform to the specified surface level tolerance.

B. Maximum variation from plumb: For lines and surfaces of walls do not exceed 1/4 inch in 10 feet, 3/8 inch in any story up to 20 feet maximum. At expansion joints and other conspicuous lines, do not exceed 1/4 inch in 20 feet.

C. Maximum variation from level: For lines of sills, tops of walls and other conspicuous lines, do not exceed 1/8 inch in 3 feet, or 1/4 inch in 10 feet and 1/2 inch in 30 feet.

D. Maximum variation of linear building line: For position shown in plan relating to columns, walls and partitions, do not exceed 1/2 inch in 20 feet or 3/4 inch in 40 feet.

E. Maximum variation in specified height: 1/2 inch per story.

F. Maximum variation of joint thickness: 1/8 inch in 3 feet.

3.16 CLEANING

A. Progress Cleaning:
   1. General: Maintain site free of waste materials, debris, and rubbish resulting from the work of this Section.
      a. Remove from work areas surplus and waste materials resulting from the work of this Section. Remove on a continual on-going basis through-out the term of construction.
   2. During the progress of the work, keep the exposed surfaces of masonry clean at all times, and protected against damage. As each segment of the masonry is erected, dry-brush the surfaces free from mortar spots and droppings.

B. Prior to performing the final cleaning work, examine all face joints in exposed masonry to locate cracks, holes or other defects in the mortar; and point up all such defects and fill with mortar as specified herein. Where necessary, in the opinion of the Architect, cut out defective joints in masonry and replace with new materials, exercising extreme care to match original work.

C. At a time approved by the Architect, perform final cleaning operations on all masonry as specified herein .
   1. Perform the final cleaning work only when the ambient temperature is above 40 degrees Fahrenheit, and rising.
   2. Do not use wire brushes or other abrasive tools in the cleaning operations.
   3. Perform final cleaning operations from the top down. If masonry cleaning work is performed after windows, doors, frames, and other work has been installed, provide complete protection for said items; be fully responsible for any damage due to the cleaning operations.
   4. Remove large mortar particles by hand with wooden paddles and non-metallic scrape hoes or chisels.
   5. Perform final cleaning of masonry units by scrubbing with stiff bristle fiber brushes and clear water, changing the water frequently.

D. Provide suitable protective coverings for all other surfaces and materials during the final cleaning procedures, and bear full responsibility for correcting any damage caused by these operations, to the satisfaction of the Architect.

End of Section

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Section 05 40 00

COLD-FORMED STEEL FRAMING

PART 1 - GENERAL

1.01 RELATED DOCUMENTS

A. General Conditions, Supplementary Conditions and applicable parts of Division 1 form a part of this Specification and the Contractor shall consult them in detail for instructions.

B. The Drawings on which this Contract is based are listed in Section 04 20 00 - UNIT MASONRY. Consult all Drawings, note all conditions that may affect the Work and care for same in executing the Contract.

1.02 SCOPE

A. The Work of this Section consists of all light gauge steel framing and related items, as indicated on the Drawings and as specified herein, including, but not limited to, the following:

1. Exterior light gauge steel roof framing, light gauge steel ceiling and soffit framing, complete with cross-bridging, and including bracing and bracketing to the building structure, complete in all respects, including runner tracks, headers, sills, and other components required, all as indicated.

2. Hot-rolled steel clip angles at light gauge steel framing where adjoining parallel, offset wall framing occurs.

3. Anchorage system for securing to building structure.

4. All shop and field welding required for proper connecting, and for securing light gauge steel framing to the adjoining construction.

5. Touch-up painting of all shop and field welds.

1.03 RELATED WORK UNDER OTHER SECTIONS

A. The following items of related Work are specified and included in other Sections of the Specifications.

1. Section 01 45 00 - QUALITY CONTROL: Perform testing of masonry, mortar and grout specified herein.

2. Section 01 45 29 - TESTING LABORATORY SERVICES: Perform testing of masonry, mortar and grout specified herein.

3. Section 03 30 00 - CAST-IN-PLACE CONCRETE: Concrete floors.

4. Section 04 20 00 - UNIT MASONRY: Reinforced load-bearing masonry.

1.04 SUBMITTALS

A. Submit the following in accordance with Section 01 33 00:

1. Shop Drawings and Design Computations:

a. Submit for Architect's review complete shop drawings and structural design computations of all work of this Section based on, and closely following, the layouts and details on the Drawings. The shop drawings and structural design computations must be sufficient, when taken in conjunction with this specification to provide the complete basis for the fabrication and installation of this Work of this Section.

b. The shop Drawings shall show complete elevations, plans, and section of all installations, including complete large scale details of all typical and special conditions of construction; clearly indicating materials, sizes, shapes, skeletons, gauges, thicknesses, and finishes of all members; and clearly indicating all materials and methods used in the connection and anchoring of the Work: design, locations, and spacing of all shop and field welds; design of bracing and bracketing; anchorage; support framing; installation tolerances; electrolytic isolation; and all other pertinent details.

c. The structural design computations shall provide a complete structural analysis of all typical and special conditions of construction, including anchors and fastening devices, and shall certify the various conditions, as designed, as conforming to the governing building code, with specific added statement that seismic, wind load and snow load forces have been taken into full account.

d. This Contractor shall engage the services of a professional engineer registered in the Commonwealth of Massachusetts to prepare and/or review all shop Drawings and structural design computations specified herein, who shall, upon completion, stamp them with his professional seal. The shop drawings and structural design computations, with the he engineer's seal affixed thereto, shall be submitted to Architect for review.

1. Said engineer shall provide periodic inspections and a final affidavit certifying compliance of all construction.

2. Samples: Submit representative samples of all steel framing components to Architect for approval.

3. Product Data: Submit complete manufacturer's product data of all light gauge steel framing materials and accessories to Architect for approval, consisting of complete product description and specifications, and other technical data required for complete product and product use information.

4. Certification: Furnish a certified statement that galvanizing complies fully with this Specification.

5. Certification: Furnish proof of welder's certifications with American Welding Society, or equivalent.

6. Do not order materials or begin fabrication or installation until Architect's processing of submittals has been completed.

1.05 QUALITY ASSURANCE

A. Reference Standards: All work of this Section shall comply with the governing laws and building code and all applicable provisions of the following standards:

1. "Manual of Steel Construction:, American Institute of steel Construction (AISC).

2. "Specification for the Design, Fabrication and Erection of Structural steel for Buildings", American Institute of Steel Construction (AISC).

3. "Code for Standard Practice for Steel Buildings and Bridges", American Institute for Steel Construction (AISC).

4. "Code for Arc and gas Welding in Building Construction", American Welding Society (AWS).

5. "Specifications for the Design of Cold Formed Steel Structural Members", American Iron and Steel Institute.

6. "Painting Manual" volumes 1 and 2, of the Steel Structures Painting Council.

B. The services of an independent Testing Agency, selected and paid for as specified under quality Control Section, will be secured for the checking of light gauge steel framing work, working under the supervision of the Architect and his Structural Engineer.

C. Materials and workmanship, including welding and anchoring, shall be subject to inspection and testing in mill, shop, and/or field by the Architect and/or Testing Agency. Such inspection and testing shall not relieve the General Contractor of his responsibility to provide his own inspection, testing, quality control and to furnish materials and workmanship in accordance with the requirement of the Contract Documents.

D. Any material or workmanship which is rejected by the Architect and or the Testing Agency in mill, shop, or field, shall be replaced promptly by the General Contractor the satisfaction of the Architect and/or the Testing Agency, and at the General Contractor's expense.

E. Acceptance of work in shop shall not prevent the final rejection of work at the job site, even after erection, if work if found to be defective in any way.

1.06 QUALIFICATION OF WELDERS

A. Employ only welders who qualify for the work they are to do by tests as prescribed in the "Standard Code" for Arc and Gas Welding in Building Construction" of the American Welding Society, and shall submit certification of such qualifications to the Architect prior to beginning of this work.

B. Certificates of qualification of welders from a recognized agency whose test procedures and requirements are at least equal to those of the American Welding Society may be acceptable to the Architect.

C. Costs of certifying and/or qualifying of welders shall be borne by the General Contractor.

1.07 COORDINATION

A. Examine all Drawings as to the requirements for accommodations and/or the installation of work of other trades and provide holes and connections as required for such work and for site assembly of metal work. Holes shall be drilled or punched and reamed in the shop. Show sizes and locations of all such holes on the shop drawings.

1.08 PRODUCT DELIVERY, STORAGE AND HANDLING

A. All manufactured materials shall be delivered to site in original packages or containers bearing manufacturer's labels and product identification.

B. Protect materials against dampness. Store off the floor, under cover, away from sweating walls and other damp surfaces, and adequately protected against damage from all sources.

1.9 PRODUCT DELIVERY, STORAGE AND HANDLING

A. All manufactured materials shall be delivered to site in original packages or containers bearing manufacturer's labels and product identification.

B. Protect materials against dampness. Store off the floor, under cover, away from sweating walls and other damp surfaces, and adequately protected against damage from all sources.

1.10 GUARANTEE

A. In addition to the specific guarantee requirements of the General Conditions and Supplementary General Conditions, the General Contractor shall obtain in the Owner's name and standard written manufacturer's guarantee of all materials furnished under this Section where such guarantees are offered in the manufacturer's published product data. All these guarantees shall be in addition to, and not in lieu of, other liabilities which the General Contractor may have by law or other provision of the Contract Documents.

PART 2 - PRODUCTS

2.01 LIGHT GAUGE STEEL FRAMING SYSTEM

A. Manufacturer: Light gauge steel framing components shall be by a single manufacturer, equal to products of Bostwick Steel Framing Co., Chicago Metallic Corp., Dietrich Industries, Inc., Inryco Architectural Products, Marino Industries, or United States Gypsum Co., as approved by Architect.

B. All materials shall be new, free form defects marring strength, durability, or appearance, and of best commercial quality for the purpose used. Take necessary measurements in field to assure exact fit of all components.

C. Steel Framing System: Shall be a complete framing system, consisting of cold rolled studs, joists, outriggers, etc., formed from steel, or gauge (s) indicated on the approved shop drawings, conforming to ASTM A570, with a minimum yield stress of 50 KSI. The system shall include all steel channel head and sill runner track, steel lateral bridging, steel jack studs, anchors and fastening devices, welding supplies and accessories, and other items, all as required for a complete installation. All steel members shall be hot-dip galvanized in accordance with ASTM A525, G60.

D. Minimum gauge for framing members shall be 18 ga. All tracks shall have a minimum flange height of 1-1/4 in.

E. Hot Rolled Steel Members: Provide all steel clip angles required for clipping framing members together at light gauge steel framing where adjoining parallel, offset wall framing occurs, as indicted on the approved shop drawings. Steel shall conform to ASTM A36, of sizes and configurations indicated on the Drawings.

1. All hot-rolled steel members, and all bolts, nuts, washers, deflection tracks and other related ferrous metal items used therewith, shall be hot-dip galvanized by dipping into a bath of molten zinc to which at 0.5% nickel and other state of the art alloys have been added.

2. Hot-dip galvanizing process shall comply with ASTM A123, A153, A385, and A386 as applicable. After galvanizing, processed items shall be straightened to remove all warpage and distortion caused by the process.

3. Furnish a certified statement that galvanizing complies fully with this Specification.

F. Refer to the structural drawings for design criteria.

2.02 SILL SEALER

A. Sill Sealer: Dow Chemical Co. “Styrofoam” sill seal foam gasket, 1/4 inch thick by width of stud.

B. Place sealer between concrete and light gauge steel runner and at other locations indicated on the drawings.

PART 3 - EXECUTION

3.01 INSTALLATION

A. Fabricate and install light gauge steel framing, and related items, in conformance with the submittals specified hereinbefore, including shop drawings, structural computations, and the printed material and workmanship standards of the manufacturer of the light gauge steel framing materials, in addition to the applicable provisions of the above-referenced Quality Assurance Standards. Tolerances shall conform to AISC tolerance standards for steel work except as otherwise shown on the approved shop drawings.

B. Anchoring: In general, all attachment of light gauge steel framing members and related items to one another to adjoining steel work shall be by welding; and connections to concrete and masonry materials shall be by driven fasteners and/or expansion bolts, all of appropriate type and adequate capacity, all ad described on the approved shop drawings and structural computations.

C. Welding: Welding details shall be designed by the registered professional engineer specified hereinabove, and shown on the approved shop drawings. Execute all welding in accordance with AISC and AWS reference standards specified above, by electric are method and with covered electrodes, except as may be otherwise indicated on the approved shop drawings.

3.02 PROTECTION AND CLEANING

A. During erection of the light gauge steel framing work, protect the work of other trades against damage or staining by the exercise of reasonable care and precautions. Repair or replace any work so damaged.

B. Upon completion of this work, remove all rubbish, debris, and tools from the work and leave the premises broom clean.

END OF SECTION

Section 06 10 00

ROUGH CARPENTRY

PART 1 - GENERAL

1.1 SUMMARY

A. The work of this Section consists of rough carpentry where shown on the Drawings, as specified herein, and as required for a complete and proper installation. Work includes, but is not limited to the following.

B. Furnish and install the following:

1. Pressure preservative treated wood plates for light gage metal framing.
2. Fire retardant treated plywood backer panels for mounting of electrical panelboards, telephone/data backboards, HVAC and fire control equipment and other equipment.
3. Roof sheathing.
4. Walkways in attic spaces.
5. Various wood blockings, edgings, nailers, curbs, cants, grounds, furring, sheathing, framing members including wood preservative, as required for receipt of various finishes and surfacing materials, not described herein above.
6. Rough installation hardware, including bolts, screws, spikes, nails, clips, and connection assemblies, as needed for installation of the rough carpentry work.

C. Install the following furnished under the designated Sections:

1. Metal door frames furnished under Section 08 11 13 - HOLLOW METAL DOORS AND FRAMES.
   a. Place frames and erect in correct positions within specified tolerances. Additionally provide temporary bracing at locations where frames are indicated to be built-into masonry. Section 04 20 00 - UNIT MASONRY shall grout frames and “build-into” into masonry work.
2. Concealed anchorage devices for handicap handrails in toilet rooms: Section 10 28 13 - TOILET ACCESSORIES.

D. Coordinate work of this Section with the work of the various trades responsible for applying finish materials and other items to rough carpentry work. Furnish and install furring, blocking, and shims, and other usual items of normal rough carpentry work as required by the various trades for the proper completion of the project.

1. The applicable requirements specified in Part 1 - GENERAL and Part 3 - EXECUTION of the individual specification sections furnishing materials to be installed under this Section, shall be included in and made a part of this Section.

E. No attempt is made in this Section to list all elements of rough carpentry required on this project or to describe how each element will be installed. It is the responsibility of the Contractor to determine for itself the scope and nature of the work required for a complete installation from the information provided herein and in the Drawings.

1.2 RELATED REQUIREMENTS

A. Section 04 20 00 - UNIT MASONRY: Building-into masonry hollow metal door frames, placed and braced under this Section 06 10 00 - ROUGH CARPENTRY.

B. Section 06 20 00 - FINISH CARPENTRY: Wood exterior trim.

C. Section 07 62 00 - SHEET METAL FLASHING AND TRIM: Flashing, and miscellaneous sheet metal work.

D. Section 08 11 13 - HOLLOW METAL DOORS AND FRAMES: Furnishing hollow metal framing.

E. Section 09 22 16 - NON-STRUCTURAL METAL FRAMING: Metal framing for drywall construction work.

F. Section 09 29 00 - GYPSUM BOARD: Wall board construction work, having taped and compounded joint finish.

G. Section 09 91 00 - PAINTING: Applied primer and finish coatings to exposed to view rough carpentry work.

H. Section 10 28 13 - TOILET ACCESSORIES: Providing anchorage devices and mounting templates for toilet accessories.

I. Division 26 - ELECTRICAL: Providing and mounting electrical panels and equipment.

1.3 REFERENCES

A. Comply with applicable requirements of the following standards and those others referenced in this Section, under the provisions of Section 01 42 00 - REFERENCES. Where these standards conflict with other specified requirements, the most restrictive requirements shall govern.

1. APA - applicable grades and specifications.
2. APA PRB-108 Performance Standards and Policies for Structural-Use Panels..
3. ANSI A250.11 (formerly SDI 105) - Recommended Erection Instructions for Steel Doors and Frames.
4. ASTM D 3201 - Test Method for Hygroscopic Properties of Fire-Retardant Wood.
5. AWPA Standards and references for preservative treated wood including Standards UC1, UC2, UC3A, UC3B, UC4A, and P5
6. AWPA Standard UCFA – Fire Protection as Required by Codes Above Ground Interior Construction.
7. AWPA Standard UCFB – Fire Protection as Required by Codes Above Ground Exterior Construction.
8. AWPA M4 – Care Of Preservative Treated Wood Products.
9. NER-643: ACQ Preserve® and ACQ Preserve Plus® Wood Preservative Treatment, ICBO Evaluation Service.
10. MIL L-1914OE - Lumber and Plywood, Fire Retardant Treated.
11. SDI 122 - Installation and Troubleshooting Guide for Standard Steel Doors and Frames.
12. SPIB Grading Rules, current edition.
13. UL - Building Materials Directory
14. US. Department of Commerce Voluntary Product Standard PS1 for Construction and Industrial Plywood.
15. US. Department of Commerce Voluntary Product Standard PS2 for Wood-Based Structural-Use Panels.

16. US. Department of Commerce Voluntary Product Standard PS-20 - American Softwood Lumber Standard.
17. U.S. Department of Commerce Simplified Practice Recommendation R-16, for sizes and use classifications of lumber
18. American Lumber Standards Committee, National Lumber Grades Authority for Canadian Lumber, and applicable grading rules and standards of the various lumber associations whose species are being used for grades specified.

1.4 ADMINISTRATIVE REQUIREMENTS

A. Coordination:

1. Coordinate the work of this Section with the respective trades responsible for locating anchorages installed into blocking which is provided under this Section.
2. Coordinate work of this Section with the work of the various trades responsible for applying finish materials and other items to rough carpentry work, and ensure that the work performed hereunder is acceptable to such trades for the installation of their work.

1.5 SUBMITTALS

A. Information and Review Submittals: Submit the following under provisions of Section 01 33 00 - SUBMITTAL PROCEDURES:

1. Product Data: Manufacturer's product data sheets, specifications, performance data, physical properties and installation instructions for products specified herein.
2. Certifications:
   a. Written certification from the respective treatment plants indicating types of wood preservative treatment and fire-retardant treatment used, treatments method, applications instructions, and conformance to the requirements specified herein.
      1) Provide certification that fire retardant treatment materials do not contain ammonium phosphate.
      2) Provide report from ICC Evaluation Service on fire retardant treated wood flame spreading, strength, corrosion and hygroscopic properties.
      3) Provide report from ICC Evaluation Service on pressure preservative treated wood strength, corrosion, anti-fungi, and anti-insect properties.

1.6 QUALITY ASSURANCE

A. General: Notify the Architect where conflicts apply between referenced standards and existing materials, and existing methods of construction.

1. All lumber shall:
   a. Be new, dressed four sides (S4S), clear and free from warping and other defects.
   b. Have a moisture content not exceeding 19 percent when delivered to the project.
   c. Be in accordance with the grading rules of the lumber manufacturer's association under whose jurisdiction the lumber is produced and bear the mark of grade and mill identification.

B. Certifications:

1. Plywood: Conform to the requirements of Product Standard PS-1, and bear applicable APA grade trademarks.
   a. Plywood for electrical boards treated for retardance, meet Class I or a flame spread rating of 25 or less and bear U.L. label "Classified FRS".

1.7 DELIVERY, STORAGE AND HANDLING

A. Delivery and Acceptance Requirements:

B. Store all materials in an elevated dry location, protected by waterproof coverings.

PART 2 - PRODUCTS

2.1 BOARD AND SHEET MATERIALS

A. Framing lumber for plates: No. 2 Spruce/Pine/Fir (SPF), or No. 2 Southern Pine, Grade-stamped S-Dry or other surface dried wood species, Number 2 grade or better having a minimum bending stress Fb of 775 PSI (890 PSI repetitive) and modulus of elasticity E not less than 1100 KSI.

B. Lumber for blocking, nailers and curbs as indicated or required: Hem-Fir, Douglas Fir, Eastern Spruce, Eastern Hemlock, or Southern Pine, surfaced dried stud or utility grade. Wood members shall be of sizes indicated on the Drawings or of the same size as the members being braced.

1. For blocking and nailers used for attachment of other construction, select and cut lumber to eliminate knots and other defects that will interfere with attachment of other work.
2. For furring strips for installing plywood or hardboard paneling, select boards with no knots capable of producing bent-over nails and damage to paneling.

C. Furring: Nominal 1 by 3 inches or 1 by 4 inches Douglas Fir, Eastern Spruce, Eastern Hemlock, or Southern Pine, surfaced dried construction grade.

D. Plywood and sheet products:

1. For roof sheathing: 3/4 inch (19.1 mm) thick having a minimum span rating 48/24, APA RATED SHEATHING, STRUCTURAL 1, exposure durability classified, EXPOSURE 1, touch-sanded.
2. For electric panel board mountings and similar uses: APA graded B-D INT, Group 2 species, touch-sanded, fire-retardant treated, 3/4 inch thick, except as otherwise indicated on the Drawings.

2.2 WOOD TREATMENTS

A. Treated wood products shall be produced by a single treatment plant, fully licensed by the chemical manufacturers, and conforming to the requirements specified herein.

1. Toxicity and Environmental Quality:
   a. Products containing chromium will not be permitted.
   b. Products containing arsenic will not be permitted.
   c. Fire-retardant-treated wood products shall be free of halogens, sulfates, ammonium phosphate and formaldehyde.
2. Dye wood or otherwise color code all treated wood at treatment plant to clearly distinguish the different treatments in the field.
3. Kiln dry all treated lumber and plywood to the following maximum moisture content after treatment.
   a. Lumber: 19 percent.
   b. Plywood 15 percent.

c. Discard pieces with defects which might impair quality of work.

4. Quality marks: Each piece of lumber and plywood shall be permanently affixed with a quality mark, containing the following information:
   a. Identification of the inspection agency.
   b. Standard to which material was treated.
   c. Identification of the treating plant.
   d. Fire retardant treated wood shall include: stamp signifying a FR-S rating
   e. Preservative treated wood shall include: Retention and end use for which product is suitable.

B. Fire retardant treated wood. Designated as “FRTW”
1. Chemical Manufacturer: Subject to compliance with the requirements specified herein, Products which may be incorporated in the work include:
   a. Hickson Corporation, product, “Dricon”.
   b. Osmose, Inc., Griffin GA., product “FirePro”.
   c. Hoover Treated Wood Products, Inc., product “PyroGuard”.
   d. Viance, LLC., Charlotte, NC, product: “D-Blaze FRT”.
2. Fire retardant treated wood shall comply with the following requirements:
   a. All fire-retardant lumber and plywood must have an Underwriters Laboratories stamp signifying a FR-S rating certifying a 25 or less flame spread and smoke developed value, when tested in accordance to ASTM E-84, or UBC Standard No. 42-1.
   b. Corrosion rates: Less than one mil per year for carbon steel, galvanized steel, aluminum, copper and red brass in contact with the fire retardant treated wood when tested in accordance with Federal Specification MIL-L-19140E Paragraph 4.6.5.2.
   c. The fire retardant treated wood must have an equilibrium moisture content of not more than 25 percent when tested in accordance with ASTM D 3201 procedures at 95 percent relative humidity and 80 degrees Fahrenheit.
   d. Fire retardant chemical: Registered for use as a wood preservative by the U.S. Environmental Protection Agency.
   e. Testing: Fire performance and strength properties for both lumber and plywood, of the fire retardant treated wood shall be recognized by issuance of a ICC Evaluation Service Report. Fire retardant chemical must not damage the middle lammella of the wood structure when exposed to 170 degrees Fahrenheit and 90 percent relative humidity for 23 days.

C. Pressure preservative treated wood. Designated as “PT”
1. Chemical Manufacturer: Subject to compliance with the requirements specified herein, Products which may be incorporated in the work include:
   a. Osmose, Inc., Griffin GA., product “NatureWood”.
   b. Universal Forest Products, Inc., Grand Rapids MI., product “ProWood ACQ”.
   c. Viance, LLC., Charlotte, NC., product “Preserve”
2. Treatment: Ammoniacal Copper Quaternary Compound (ACQ), arsenic-free and chromium-free chemical “ACQ Preservative” in accordance with AWPA Standards. Apply the preservative in a closed cylinder by pressure process in accordance with AWPA Standard C15.

a. Minimum preservative retention for floor plates, framing, lumber and plywood above ground use: 0.25 pounds per cubic foot (4.0 kg/m^3) of ACQ chemical, in accordance with AWPA UC1, UC2, UC3A, and UC3B, or NER-643 as appropriate.

b. Minimum preservative retention for framing, lumber and plywood in contact with water, ground, concrete and masonry: 0.40 pounds per cubic foot (6.4 kg/m^3) of ACQ chemical, in accordance with AWPA UC4A, UC4B, UC4C, or NER-643 as appropriate.

c. Minimum preservative retention for lumber and plywood in permanent wood foundations: 0.60 pounds per cubic foot (9.6 kg/m^3) of ACQ chemical, in accordance with AWPA UC4B, or NER-643.

3. Fixation of Chemical: Treated wood shall not be shipped from treatment plant until fixation of the preservative has occurred in the wood.

2.3 ACCESSORIES

A. Adhesives:

1. General: Provide adhesives approved which are Low-VOC or non-VOC, non-flammable, water-proof after cured, odor free.
2. Adhesive for lamination and fabrication of wood and plywood items: Exterior adhesives containing no urea formaldehydes.
3. Adhesive for subfloors and underlayment: High strength, waterproof and non-freezing adhesive complying with AFG-01 “Frozen Lumber Test” and ASTM 3498.

B. Nails (interior and exterior): Galvanized common nails, of size and type to suit application and as required by state and local building codes.

C. Screws:

1. For pressure preservative treated wood: Flat head stainless steel, wood screws, of the appropriate sizes. Aluminum and coated metals are prohibited.
2. For general application (non-pressure preservative treated wood): Flat head hard aluminum, or stainless steel, wood screws, of the appropriate sizes.

D. Anchor bolts, expansion bolts and lag screws: Hot-dipped galvanized steel, of the following types:

1. For lumber having actual thickness of 1-1/2 inches or greater to masonry and concrete: Anchor bolts or expansion bolts, as most applicable for the specific receiving surface material, 3/8-inch minimum diameter, spaced as shown on drawings, and staggered as far as practicable. Countersink all bolt heads, and provide head washers of matching material.
2. For lumber having actual thickness of greater than 7/8-inch but less than 1-1/2 inches to masonry and concrete: Anchor bolts or expansion bolts, as most applicable for the specific receiving surface material, at least 1/4-inch diameter of the most appropriate lengths for the specific application, spaced as shown, and staggered as far as practicable. Countersink all bolt heads, and provide head washers of matching material.
3. For lumber having actual thickness of 7/8-inch and less: Anchor bolts or expansion bolts, at least 1/4-inch in diameter; or screws, of the most appropriate sizes; in lengths most suitable for the specific application, countersunk, spaced, and staggered.

E. Building paper: ASTM D 226, Non-perforated, No. 15 (73 kg/sq m) asphalt-saturated building felt.

PART 3 - EXECUTION

3.1 PREPARATION

A. All materials shall be inspected before use, with all checked, split and otherwise deficient stock rejected, or used only for miscellaneous blocking, furring or other incidental use. The Contractor shall be responsible for replacing all lumber which, due to warpage, twist, splitting, or checking, results in unsatisfactory work. Such replacement shall be required at any time, whether before or after application of finish material under other Sections.

B. Verify exact locations of toilet accessories, door stops and similar items with Architect prior to installation of blocking for accessories.

3.2 INSTALLATION - GENERAL

A. Closely coordinate the installation of the rough carpentry work with the work of other trades responsible for the installation of interfacing or overlaying materials, so as not to delay the work of the related trades.

B. Erect all rough carpentry work plumb, level, and true with tight, close fitting joints, securely attached and braced to surrounding construction, all in a first class workmanlike manner. Counterbore for bolt heads, nuts, and washers where required to avoid interference with other materials. Bear complete responsibility for structural integrity, connections, and anchorage of all rough carpentry work.

1. Place horizontal members flat, crown side up.

C. Make provisions for erection loads, and for sufficient temporary bracing to maintain structure safe, plumb, and in true alignment until completion of erection and installation of permanent bracing.

D. Use as long lengths as practicable for wood nailers, blockings, and curbs, to minimize number of joints, and attach the members with the types, and spacing, of fasteners specified herein.

E. Install blocking, grounds and furring, as required for proper attachment of the work of other trades, in accordance with the requirements provided by the respective related trades.

1. Spacing for furring and strapping shall not exceed 16 inches on center.

F. Field cuts of fire retardant treated lumber: Do not rip or mill fire retardant treated lumber. Only end cuts, drilling holes and joining cuts are permitted.

G. Field cuts of ACQ pressure-treated lumber: Apply solution of copper naphthenate containing a minimum of 2 percent metallic copper in-solution, in accordance with AWPA standard M4. Brush liberally all cuts and holes.

H. Install concealed from view plywood with specified fasteners spaced not more than 10 inches on centers.

I. Install fire-treated plywood backer boards with counter-sunk galvanized fasteners, of specified sizes, spaced not more than 12 inches on centers.

3.3 INSTALLATION - ATTIC WALKWAYS

A. Provide attic walkways over ceiling joists of 1x lumber, leading from all attic access hatches to each service location for equipment in attic or roof construction spaces and to each fire

division of the attic. Install on blocking to clear insulation, allowing a 1 inch air space between insulation and walkway.

3.4 INSTALLATION - ROOF SHEATHING AND DECKING

A. Install plywood decking, in accordance with APA installation standards, using Number 8 screws, spaced as required on structural drawings. If not indicated, screw fasten at 6 inches on centers around panel edges, and 12 inches on centers over framing, throughout the remainder of the panel.

1. Secure sheets perpendicular to roof framing with end joints staggered and ends over firm bearing.

3.5 INSTALLATION - ROOF NAILERS AND BLOCKING

A. General: Provide anchorage for nailers as required for roof and edging to obtain FM Class A/I-90 rating, coordinate requirements with Section 07 53 23 - EPDM ROOFING.

1. Secure nailers and blocking to metal deck with electro-galvanized screws at not greater than 12 inch on center spacing, extending a minimum of 3/4-inch below deck.
2. Secure nailers and blocking to wood substrates with electro-galvanized screws at not greater than 12 inch on center spacing, extending a minimum of 1-1/2 inch into board substrates and 3/4 inches into sheet materials.

B. When building up layers of nailers and blocking, fully secure each layer to at least the one below, alternating location of fasteners, spacing at 12 inches on center. Provide fasteners in lengths to penetrate through more than one substrate layer of blocking. Stagger locations of butt ends of boards, such that no two joints are “lined up”.

C. Ensure finished height of nailers is same as top surface of roof insulation within 1/4-inch, plus or minus.

3.6 INSTALLATION – EQUIPMENT BACKBOARDS

A. Provide panel mounting backboards for HVAC, Fire Prevention, Electrical and telephone/data equipment. Fabricate panels using fire-retardant treated 3/4 inch thick panels mounted to fire-retardant treated 2 by 4’s. Provide a nominal space of 3-1/2 inches behind panels to permit wiring.

3.7 INSTALLATION - METAL DOOR FRAMES

A. Place in position all steel frames, furnished under Section 08 11 13 - HOLLOW METAL DOORS AND FRAMES, in accordance with the approved shop drawings and frame schedule.

1. During the installation of metal door frames, after the manufacturer’s steel spreader bar has been removed, install wood spreaders at door opening, carefully dimensioned to permit square, true installation of door frames and doors.
2. Spreaders and bracing shall remain in place until doors are installed.

B. Coordinate installation of frames with the various trades installing abutting wall construction for anchor placement.

1. Place, erect and level all frames into correct scheduled locations, including those in masonry partitions.
2. Provide temporary spreaders and bracing for door frames to be installed into masonry partitions. Maintain frame position with temporary bracing until frames are built-into-place under Division 4 - MASONRY.

C. Coordinate installation of frames with installation of hardware under Section 06 20 00 - FINISH CARPENTRY and as furnished under Section 08 71 00 - DOOR HARDWARE.

D. Install frames in accordance with the manufacturer's recommendations, ANSI/SDI-100, SDI-105, and the Door Hardware Institute (DHI) recommendations.

1. Provide rigid temporary bracing for frames as required to ensure maintenance of positioning, and remove only after frames have been permanently anchored.
2. Secure frames, occurring in existing masonry, with expansion bolts and sleeves.
3. Where exposed fastener heads occur in frames, fill with automotive body filler and sand smooth.

3.8 TOLERANCES

A. Framing members: Maximum deviation more than 1/4 inch in 10 feet from true or plumb position.

B. Door frames: Maximum diagonal distortion 1/16 inch measured with straight edge, corner to corner.

3.9 SCHEDULES

A. Wood treatment schedule:

1. Pressure preservative treat all concealed or exposed-to-view:
   a. Lumber and plywood which comes in contact with concrete, masonry, or earth.
   b. Lumber and plywood nailers, blocking and curbing directly related to roofing, flashing, roof hatches, and roof accessories.
   c. Lumber and plywood rough-bucks, blocking and nailers directly related to louvers and doors.
2. Fire retardant treat all equipment backer boards, additionally provide fire retardant treated lumber and plywood where indicated or noted on Drawings.

End of Section

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Section 06 20 00

FINISH CARPENTRY

PART 1 - GENERAL

1.1 SECTION INCLUDES

A. Furnish and install:

1. Cellular PVC exterior trim.
2. Preformed vinyl soffits.

B. Install the following furnished under the designated Sections:

1. Steel doors furnished by Section 08 11 13 - HOLLOW METAL DOORS AND FRAMES.
2. Door hardware, thresholds, weatherstripping, seals and gaskets furnished by Section 08 71 00 - DOOR HARDWARE.

C. Backprime all interior window stools, and all wood which comes in contact with cementitious and masonry materials

D. No attempt is made in this Section to list all elements of finish carpentry required on this project or to describe how each element will be installed. It is the responsibility of the Contractor to determine for itself the scope and nature of the work required for a complete installation from the information provided herein and in the Drawings.

1.2 RELATED REQUIREMENTS

A. Section 06 10 00 - ROUGH CARPENTRY: Wood blocking, plates, nailers, backer boards, and roof sheathing.

B. Section 07 31 13 - ASPHALT SHINGLES: shingle roofing.

C. Section 07 92 00 - JOINT SEALANTS: Sealant and backing materials.

D. Section 08 11 13 - HOLLOW METAL DOORS AND FRAMES: Furnishing hollow metal doors.

E. Section 08 71 00 - DOOR HARDWARE: Furnishing finish hardware, weatherstripping, thresholds, seals and gaskets for installation under this Section 06 20 00.

F. Section 09 91 00 - PAINTING: Field applied primer and finish coatings.

1.3 REFERENCES

A. Comply with applicable requirements of the following standards and those others referenced in this Section, under the provisions of Section 01 42 00 - REFERENCES.

1. ANSI A250.11 (formerly SDI 105) - Recommended Erection Instructions for Steel Doors and Frames.
2. SDI 122 - Installation and Troubleshooting Guide for Standard Steel Doors and Frames.

1.4 SUBMITTALS

A. Submit the following under provisions of Section 01 33 00 - SUBMITTAL PROCEDURES:

1. Literature: Manufacturer's product data sheets, specifications, performance data, installation instructions for hardware, adhesives and accessories furnished hereunder.
2. Shop drawings:
   a. Large scale design details, minimum 1-1/2 inch to one foot scale, showing profiles, jointing and fastening methods; and complete installation details.

1.5 SEQUENCING AND SCHEDULING

A. Coordinate the work of this Section with the respective trades responsible for installing interfacing work, and ensure that the work performed hereunder is acceptable to such trades for the installation of their work.

PART 2 – PRODUCTS

2.1 CELLULAR PVC TRIM

A. Expanded rigid poly vinyl chloride with a small-cell microstructure, in profiles indicated, and complying with the following:
   1. Density: Minimum of 0.50 g/cc per ASTM D792.
   2. Water absorption: Less than 1 per cent per ASTM D570.
   3. Hardness: At least 50 per ASTM D2240 (Shore D).
   4. Flexural strength: At least 3,300 psi per ASTM D790.
   5. Tensile strength: At least 2,200 psi per ASTM D638.

B. Acceptable manufacturers include the following:
   1. New England Specialty Lumber Inc, W. Springfield MA, product: “Nels-Tek 600”.
   2. Vycom Corporation, Moosic PA, product: “Azek”.
   3. CertainTeed Corp., Valley Forge, PA, product “Restoration Millwork”.
   4. Wolfpac Technologies, Inc., Aliquippa, PA, product: “Versatex”.
   5. Fypon, Ltd., Archbold, OH, product “Cellular PVC Trim”.

2.2 VINYL SOFFITS

A. Polyvinyl Chloride: Provide siding materials made of PVC resin with cell classification of 13344-B, as defined by ASTM D 1784, meeting or exceeding the following properties:
   1. Impact strength: 2.20 ft-lbs per inch at test temperature of 73 degrees F., and 1.30 ft-lbs per inch at test temperature of 32 degrees F, per ASTM D 4226.
   2. Tensile strength: 7,344 psi.
   3. Flexural modulus of elasticity in tension: 455,750 psi.
   4. Deflection temperature under load of 264 psi: 168 degrees F.
   5. Coefficient of expansion: 0.000034 in/in/degree F.
   6. Chemical resistance: Excellent.

B. Vinyl soffit board:
   1. Style: Beaded style Panel, triple 4 inch panels, .039 inches nominal thickness, matte finish.
      a. Invisibly vented type, with 1.2 sq. inches free air space per square foot of soffit at eaves.

C. Subject to compliance with the requirements specified herein, manufacturers offering products which may be incorporated in the work include, but are not limited to, the following:
   1. Wolverine Technologies, Valley Forge PA.
   2. Mastic Home Exteriors by PlyGem, Kansas City, MO.
   3. Alside, Akron, OH

2.3 ACCESSORIES AND HARDWARE

A. Nails: 6d and 8d stainless steel.
   1. Nails for interior trim items: coated or galvanized finish nails, except as otherwise specified herein.

B. Provide cellular PVC trim adhesive at joints as recommended by the trim manufacturer.

PART 3 - EXECUTION

3.1 EXAMINATION

A. Verify adequacy of blocking, backing and support framing for all finish carpentry work.

B. Beginning of installation means acceptance of site conditions.

3.2 INSTALLATION – GENERAL CARPENTRY

A. Dress and sand woodwork until free from machine and tool marks, abrasions, raised grain, or other defects that will show through the finish on surfaces exposed to view. Wherever possible, carry out sanding on a shop belt sander, not in the field. Sandpaper field joints and leave in perfect condition for finishing.

B. Make a minimum of splices and joints in running trim, and where such splices and joints occur, fasten securely, with all exposed surfaces having smooth, continuous planes. Stagger joints in adjacent or relate members. Use scarf joints for end-to-end joints.

C. Scribe and cut work to fit adjoining work closely. Refinish cut surfaces in prefinished items.

D. All nails in finished work shall be blind nailed wherever possible. Nail trim with finish nails only, set using appropriate nailpunch and fill with matching wood filler. Sand smooth wood filler. Do not fasten trim with screws or bolts unless otherwise directed, or is to be subsequently covered with smaller trim.

E. Work shall be properly framed, closely fitted and accurately set to the required lines and levels and shall be rigidly secured in place. Shim as required using concealed shims to achieve specified tolerances.

3.3 INSTALLATION - PREFABRICATED PRODUCTS

A. Do not commence installation of products until immediately adjacent surfaces have been completely installed and finished.

B. Perform installation work in accordance with the approved shop drawings and the manufacturer's installation instructions.

C. Install products absolutely level and in true line, with units securely anchored to the surrounding construction.

D. Remove all tape and other packing materials; thoroughly clean and polish all exterior and interior surfaces.

E. Touch-up all scratches and other surface defects, using same materials and colors as shop finish.

3.4 INSTALLATION - DOORS AND HARDWARE

A. Install doors in accordance with the manufacturer's recommendations, ANSI/SDI-100, ANSI A250.11, and the Door Hardware Institute recommendations.

B. Install hardware in accordance with manufacturer's instructions and requirements of referenced organizations, and the requirements of Section 08 71 00 - DOOR HARDWARE.

1. Use the templates provided by hardware item manufacturer.
2. Mount hardware units at heights indicated in the following applicable publications, except as specifically indicated or required to comply with the governing regulations.
   a. Conform to ANSI 117.1 for positioning requirements for the handicapped.
   b. “Recommended Locations for Builders Hardware for Standard Steel Doors and Frames” by the Door and Hardware Institute (DHI.)
   c. WDMA Industry Standard I.S.1.7, “Hardware Locations for Wood Flush Doors”.
3. Installation of hardware shall comply with NFPA 80 and NFPA 101 requirements
4. Prefit hardware before finish is applied, remove and reinstall after finish is completed. Install hardware so that parts operate smoothly, close tightly and do not rattle.
5. Drill and countersink units which are not factory-prepared for anchorage fasteners. Space fasteners and anchors in accordance with industry standards.

C. Set thresholds for exterior doors in full bed of butyl-rubber or polyisobutylene mastic sealant, forming tight seal between threshold and surface to which set. Securely and permanently anchor thresholds, using countersunk non-ferrous screws to match color of thresholds (stainless steel screws at aluminum thresholds).

D. Tools for maintenance: All special tools packaged with hardware items shall be saved, tagged/identified as to product use, and turned over to the Owner upon completion of the Work.

E. Clean adjacent surfaces soiled by hardware installation.

F. Prior to Final Inspection make final check and adjustment of all hardware, clean operating items as necessary to restore proper function and finish of hardware.

3.5 TOLERANCES

A. Maximum variation for wood work from true position of 1/8 inch in 8 feet for plumb and level and with a maximum of 1/16 inch offsets in adjoining surfaces intended to be flush.

B. Maximum variation for doors and frames: Maximum diagonal distortion 1/16 inch measured with straight edge, corner to corner.

3.6 ADJUSTING

A. Adjust doors for smooth and balanced movement.

End of Section

Section 07 26 00

VAPOR RETARDERS

PART 1 – GENERAL

1.1 SUMMARY

A. The work of this Section consists of vapor retarders (vapor barriers) where shown on the Drawings, as specified herein, and as required for a complete and proper installation. Work includes, but is not limited to the following.

B. Furnish and install the following:

1. Sheet membrane vapor barriers (vapor retarders) under concrete slabs-on-grade including seam tape, and pipe boots.

1.2 RELATED REQUIREMENTS

A. Section 03 30 00 – CAST-IN-PLACE CONCRETE: Concrete slabs on grade.

1.3 REFERENCES

A. Reference Standards: Comply with applicable requirements of the following standards and those others referenced in this Section, under the provisions of Section 01 42 00 - REFERENCES. Where these standards conflict with other specified requirements, the most restrictive requirements shall govern.

1. ASTM D 570 - Water Absorption of Plastics.
2. ASTM D 1004 - Initial Tear Resistance of Plastic Film and Sheeting.
3. ASTM D 1622 - Apparent Density of Rigid Cellular Plastics.
4. ASTM D 1938 - Tear Propagation Resistance of Plastic Film and Thin Sheeting by a Single-Tear Method.
5. ASTM D 2842 - Water Absorption of Rigid Cellular Plastics.
6. ASTM D 2582 - Puncture-Propagation Tear Resistance of Plastic Film and Thin Sheeting.
7. ASTM D 2856 - Open Cell Content of rigid Cellular Plastics by Air Pycnometer.
8. ASTM E 136 - Behavior of Materials in a Vertical Tube Furnace at 750ºC.
9. ASTM E 154 - Water Vapor Retarders Used in Contact with Earth Under Concrete Slabs, on Walls, or as Ground Cover
10. ASTM E 1643 - Standard Practice for Selection, Design, Installation, and Inspection of Water Vapor Retarders Used in Contact with Earth or Granular Fill Under Concrete Slabs.
11. ASTM E 1745 - Plastic Vapor Retarders Used in Contact with Soil or Granular fill under Concrete Slabs
12. ASTM E 84 - Surface Burning Characteristics of Building Materials.
13. ASTM E 96 - Water Vapor Transmission of Materials.

B. General References The following reference materials are hereby made a part of this Section by reference thereto:

1. ACI 302.1R Vapor Barrier Component (plastic membrane) is not less than 10 mils thick.

2. NFPA 701 - Fire Tests for Flame Resistant Textiles and Films
3. All applicable federal, state and municipal codes, laws and regulations for thermal insulation and vapor barriers.

1.4 ADMINISTRATIVE REQUIREMENTS

A. Coordination:
1. General: Coordinate the work of this Section with the respective trades responsible for installing interfacing and adjoining work for proper sequence of installation, and ensure that the work performed hereunder is acceptable to such trades for the installation of their work.

B. Sequencing: Coordinate work of this section with related work.

1.5 SUBMITTALS

A. Information and Review Submittals: Submit the following under provisions of Section 01 33 00 - SUBMITTAL PROCEDURES:
1. Product Data: Manufacturer's product data sheets, specifications, performance data, physical properties for each item furnished hereunder.
2. Manufacturer’s Instructions: Manufacturer’s installation instructions for placement, seaming and pipe boot installation.

1.6 DELIVERY, STORAGE AND HANDLING

A. Delivery and Acceptance Requirements:
1. Do not deliver items to the site, until all specified submittals have been submitted to, and approved by, the Architect.
2. Deliver materials in original packages, containers or bundles bearing brand name and identification of manufacturer or supplier.

B. Storage and Handling Requirements:
1. Store and handle materials following manufacturer's recommended procedures, and in accordance with material safety data sheets.
2. Store materials under cover and in manner to keep them dry, protected from weather, direct sunlight and damage from construction traffic and other causes.

PART 2 - PRODUCTS

2.1 UNDER SLAB VAPOR BARRIERS

A. Manufacturers:
1. Specified Product: To establish a standard of quality, design and function desired, Drawings and specifications have been based on Stego Industries LLC company, Product: “Stego Wrap (10 mil)”.
2. Acceptable manufacturers: Subject to compliance with the requirements specified herein, products which may be incorporated in the work include, but are not limited to, the following:
   a. Stego Industries LLC, San Juan Capistrano, CA, product: “Stego Wrap (10 mil)”.
   b. W.R. Meadows, Hampshire, IL, product: “No. 723 Perminator (10 mil)”.
   c. Reef Industries, Houston, TX, product “Griffolyn: 10 Mil Green®”.

B. Under slab vapor barrier :

1. Vapor barrier must have the following qualities.

a. Minimum thickness: 10 mils.

b. Permeance complying with ACI 302.2R.

c. Permeance after conditioning when tested in accordance with ASTM E 1745 (where applicable): Less than 0.01 perms (gr/ft^2/hr/in-Hg).

d. Water vapor barrier tested by ASTM E-1745: Meets or exceeds Class A.

2.2 ACCESSORIES

A. General: Tape, adhesives and fasteners required for the proper and complete installation for work of this Section shall be as recommended by each respective manufacturers of each type of vapor barrier.

B. Air seal boot: PVC or EDPM premolded pipe and seal for penetrations at ceiling vapor barrier.

C. Seam Tape: High Density Polyethylene Tape or HDPE Tape as recommended by vapor barrier manufacturer, with pressure sensitive adhesive. Minimum width 4 inches.

D. Pipe Boots: Construct pipe boots from vapor barrier material and pressure sensitive tape per manufacturer's instructions.

PART 3 - EXECUTION

3.1 PREPARATION

A. Ensure that subsoil is approved by Architect.

B. Level and tamp or roll aggregate, sand or tamped earth base.

3.2 INSTALLATION - BELOW-SLAB VAPOR BARRIERS/RETARDERS

A. General: Install Vapor Barrier in accordance with manufacturer's instructions and ASTM E 1643–98. Place vapor barrier beneath all floor slabs

B. Unroll Vapor Barrier with the longest dimension parallel with the direction of the pour.

C. Lap Vapor Barrier over footings and seal to foundation walls.

D. Overlap joints a minimum of six inches with top lap in direction of spreading concrete. Turn up double layer at slab edges abutting walls. Seal with manufacturer's tape.

E. Seal all penetrations (including pipes, reinforcing steel, and permanent utilities) with manufacturer's pipe boot or vapor barriers recommended detail.

F. Do not puncture vapor barrier. No punctures or unsealed penetrations are permitted.

G. Repair damaged areas by cutting patches of vapor barrier, overlapping damaged area 6 inches and taping all four sides with tape.

End of Section

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Section 07 31 13

ASPHALT SHINGLES

PART 1 - GENERAL

1.1 SUMMARY

A. Furnish and install:
   1. Asphalt shingle roof.
   2. Moisture shedding underlayment, eave, valley and ridge protection.
   3. Miscellaneous field-formed metal flashings required for the work of this Section.

B. Install the following furnished under Section 07 62 00 - Sheet Metal Flashing and Trim:
   1. Aluminum eave drip edge, factory finished.
   2. Aluminum water (rain) diverters.

1.2 RELATED REQUIREMENTS

A. Section 06 10 00 – ROUGH CARPENTRY: roof sheathing.

B. Section 06 20 00 – FINISH CARPENTRY: Cellular PVC trim.

C. Section 07 62 00 – SHEET METAL FLASHING AND TRIM: Furnishing aluminum drip edge and rain diverters for installation under this Section.

D. Section 08 90 00 – LOUVERS AND VENTS: Providing gable louvers.

E. Division 22 – PLUMBING: Plumbing vents.

1.3 REFERENCES

A. Reference Standards: Comply with applicable requirements of the following standards and those others referenced in this Section, under the provisions of Section 01 42 00 – REFERENCES . Where these standards conflict with other specified requirements, the most restrictive requirements shall govern.
   1. ASTM D 226 - Asphalt Saturate Felt used in Roofing and Waterproofing.
   2. ASTM D 228 - Method of Testing Asphalt Roll Roofing, Cap Sheets and Shingles.
   3. ASTM D 2178 - Asphalt Impregnated Glass (felt) Mat used in Roofing and Waterproofing.
   4. ASTM D 2822 - Asphalt Roof Cement.
   5. ASTM D 3018 - Class A Asphalt Shingles Surfaced with Mineral Granules.
   6. ASTM D 3161 - Standard Test Method for Wind-Resistance of Asphalt Shingles (Fan-Induced Method).
   7. ASTM D 3462 - Standard Specification for Asphalt Shingles Made from Glass Felt and Surfaced with Mineral Granules.
   8. ASTM E 108 - Standard Test Methods for Fire Tests of Roof Coverings.
   9. UL 580 - Tests for Wind Uplift Resistance of Roof Assemblies.
   10. UL 790 - Tests for Fire Resistance of Roof Covering Materials.

B. The following reference materials are hereby made a part of this Section by reference thereto:

1. ARMA (Asphalt Roofing Manufacturers Association) - Residential Asphalt Roofing Manual, latest edition.
2. NRCA - Steep Roofing Manual, latest edition.

1.4 SUBMITTALS

A. Information and Review Submittals: Submit the following under provisions of Section 01 33 00 - SUBMITTAL PROCEDURES:

1. Literature: Manufacturer's product data sheets, specifications, performance data, physical properties for each item furnished hereunder. Include manufacturer's installation instructions indicating preparation required and installation procedures.
2. Sample warranty: Provide sample copies of manufacturers' actual warranties for materials furnished under this Section, clearly defining all terms, conditions, and time periods for the coverage thereof.
3. Selection Samples: Roofing shingles for color selection.
4. Certificates: Provide Certificate of Compliance from an independent laboratory indicating that the asphalt fiber glass shingles made in normal production meet or exceed the requirements of the following:
   a. ASTM E 108/UL 790 Class A Fire Resistance.
   b. ASTM D 3161/UL 997 Wind Resistance.
   c. ASTM D 3462.

B. Closeout Submittals: Submit the following under provisions of Section 01 78 00 - CLOSEOUT SUBMITTALS:

1. Manufacturer’s warranties: Include coverage of materials and installation.

1.5 QUALITY ASSURANCE

A. Roofing applicator, with a minimum of 3 years documented experience demonstrating previously successful work of the type specified herein.

B. Perform work in accordance with NRCA Steep Roofing Manual.

1.6 DELIVERY, STORAGE AND HANDLING

A. Store all materials in accordance with the manufacturer’s recommendations. Store rolled goods on clean, raised platforms. Store other materials in dry areas, protected from water and direct sunlight.

B. Damaged material: Remove any damaged or contaminated materials from job site immediately, including materials in broken packages, or show other evidence of damage, unless Architect specifically authorizes correction thereof and usage on project.

1.7 ENVIRONMENTAL CONDITIONS

A. Do not install eave edge protection and roofing materials when ambient temperatures are below 45 degrees Fahrenheit.

1.8 WARRANTY

A. Furnish shingle manufacturer's **30** year limited product warranty under provisions of Section 01 78 00 - CLOSEOUT SUBMITTALS .

1.9 EXTRA MATERIALS

A. Deliver to Owner 160 extra shingles (equal to 2 roofing squares, 200 square feet) of color and type installed.

PART 2 – PRODUCTS

2.1 ROOFING MATERIALS

A. Acceptable Manufacturers: Subject to compliance with the requirements specified herein, the following roofing products which may be incorporated in the work include:

1. Certainteed Corporation, Valley Forge, PA.
2. GAF-Elk Corporation, Wayne NJ.
3. Owens-Corning Fiberglas Corp, Toledo OH.

B. Asphalt shingles: UL Class 'A' and wind resistant label Self-sealing, laminated, mineral granule surfaced, glass fiber mat base shingle roofing, in color as selected by Architect, conforming to ASTM specifications: D 3018 Type I and D 3462, having a minimum weight of 425 pounds per roofing square and furnished with a limited lifetime manufacturers product warranty up to 110 miles per hour (ASTM D 3161, Class F). Acceptable products include the following:

1. GAF-Elk Corporation, product "Timberline Ultra".
2. GAF-Elk Corporation, product "Prestique Lifetime".
3. Certainteed Corporation, product "Grand Manor".

C. Ridge tiles: Furnish manufacturer's nominal 12 by 12 inch compatible hip and ridge shingles in color match roof shingles.

D. Underlayment: ASTM D 226, Non-perforated, No. 15 (73 kg/sq m) asphalt-saturated building felt.

2.2 PROTECTION MEMBRANE

A. Membrane for ice-dam and wind-blown rain protection: Sheet barrier of rubberized membrane bonded to sheet polyethylene, minimum 40 mil (1.13 mm), one total thickness, with strippable treated release paper; having the following minimal characteristics:

1. Minimum tensile strength (tested in accordance with ASTM D 412, Die C modified) of 250 pounds per square inch.
2. Minimum elongation to ultimate failure of 250 percent, and unaffected pliability when tested per ASTM D 146 over 180 degree bend at minus 25 degrees Fahrenheit (-32ºC.).
3. Minimum adhesion of 3 pounds per inch width (528 N/m), tested per ASTM D903 to plywood.
4. Maximum permeance when tested in accordance with ASTM D96, 0.05 perms ($2.9 ng/m^2 sPa$).
5. Subject to conformance with the above requirements, acceptable products include the following:

a. W.R. Grace Company, Cambridge MA., product "Ice & Water Shield".
   1) Manufacturer's recommended primer is required: Grace product "Perm-A-Barrier WB Primer".

b. Carlisle Coatings and Waterproofing Inc., Wylie, TX., product "WIP 400".
   1) Manufacturer's recommended primer is required for application at temperatures below 40 degrees F. and for substrates recommended by manufacturer: Carlisle product "CCW-702".

c. Polyguard Products Inc., Ennis TX., product "Polyguard Deck Guard".
   1) Manufacturer's recommended primer is required for application at temperatures below 40 degrees F. and for substrates recommended by manufacturer: Polyguard product "Polyguard Liquid Adhesive".

2.3 ACCESSORIES

A. Metal for field-formed flashings related to asphalt roofing: FS QQ-A-250d sheet aluminum, mill finish, 0.050 inch thick.

B. Nails, to install roofing: Standard round wire shingle type, hot dipped zinc coated steel, minimum 13/64 inch head diameter and 0.080 inch shank diameter, of sufficient length to penetrate through roof sheathing.

C. Nails, to install flashing: Standard round wire roofing type, hot dipped zinc coated steel, minimum 19/64 inch head diameter and 0.104 inch shank diameter, of sufficient length to penetrate 1/2 inch into wood substrate.

D. Tape, plastic cement, fibrated lap cement, bituminous paint or other accessories required for the proper and complete installation for Work shall be as recommended by roofing manufacturer and eave protection manufacturer.

PART 3 - EXECUTION

3.1 EXAMINATION

A. Verify that roof penetrations and plumbing stacks are in place and flashed to deck surface.

B. Verify deck surfaces are dry, free of ridges, warps, or voids. Roofing installer shall report in writing to the Contractor with copy to Architect, any condition which might adversely affect installation. Proceed with Work of this Section when defects have been corrected and installation conditions are satisfactory.

C. Beginning of installation means acceptance of substrate and site conditions.

3.2 PREPARATION

A. During the operation of work of this Section, protect surrounding materials and finishes against undue soilage and damage by the exercise of reasonable care and precautions. Protect from spillage of roofing materials and prevent materials from entering and clogging drains and conductors.

B. Clean, or repair all surfaces which are soiled or otherwise damaged byWork of this Section, to match indicated profiles and specified finishes. Materials and finishes which cannot be cleaned, or repaired shall be removed and replaced with new work in conformance with the Contract Documents.

C. Fill knot holes and surface cracks with latex filler at areas of bonded eave protection.

D. Broom clean deck surfaces under eave and underlayment.

3.3 INSTALLATION OF PROTECTION MEMBRANE

A. Preparation:

1. New substrate: Remove all dust, dirt, loose nails and other protrusions from the deck/sheathing.
2. Concrete substrate: Prime surfaces with manufacturer’s recommended water-based primer.

B. General: Apply protection membrane in accordance with manufacturer's instructions, starting application at low point and working upwards. At ridges and valley, start a center and work outwards. Lap sides a minimum of 3-1/2 inches (90 mm) and lap ends 6 inches (150 mm).

1. Refer to Roof Plan on Drawings for extent of protection membrane.

3.4 INSTALLATION OF UNDERLAYMENT

A. Place on ply of underlayment over area not protected by eave protection, with ends and edges weather lapped a minimum of 4 inches. Stagger end laps of each consecutive layer. Nail in place.

B. Install protective underlayment perpendicular to slope of roof and weather lap a minimum of 4 inches over eave protection.

C. Weather lap and seal watertight with plastic cement, items projecting through or mounted on roof.

3.5 INSTALLATION OF METAL FLASHINGS

A. Weather lap joints a minimum of 2 inches and seal weather tight with plastic cement.

B. Secure flange with nails spaced 6 inches on center, conceal fastenings.

C. Flash and seal work projecting through or mounted on roofing with plastic cement, weather tight.

3.6 INSTALLATION OF ASPHALT SHINGLES

A. General: Install shingles in accordance with manufacturer's written instructions and NRCA - Steep Roofing Manual, latest edition.

B. Install shingles over building felt, with 5 inch exposure and 2 inch headlap. Provide 4 nails per shingle, nails shall be 3/4 inch length so as not to protrude through roof sheathing.

1. Place shingles in straight coursing pattern.
2. Project first course of shingles 1/2 inch behind edge of aluminum eave drip edge..
3. Install rain diverters above all doors and walkways.
4. Coordinate installation of roof mounted components or work projecting through roof with weather tight placement of counter flashings.
5. Install ridge cap shingles over ridge vent as recommended by vent manufacturer, and trim shingles flush with edge of vent.
6. Ensure roofing shingles cover protection membrane at valleys; protection membrane is not a permanent weathering surface.

7. Complete installation to provide weather tight service.

3.7 CLEANING

A. Upon completion of the work of this Section in any given area, remove tools, equipment and all rubbish and debris from the work areas and on-grade areas below; leave in broom-clean condition.

End of Section

Section 07 62 00

SHEET METAL FLASHING AND TRIM

PART 1 - GENERAL

1.1 SUMMARY

A. Furnish the following for installation under Section 07 31 13 – ASPHALT SHINGLES:

1. Aluminum eave drip edge.
2. Aluminum water diverters.

1.2 RELATED REQUIREMENTS

A. Section 06 10 00 – ROUGH CARPENTRY: roof sheathing.

B. Section 06 20 00 – FINISH CARPENTRY: Cellular PVC trim.

C. Section 07 31 13 - ASPHALT SHINGLES: Installing aluminum drip edge and rain diverters furnished under this Section.

D. Section 08 90 00 – LOUVERS AND VENTS: Providing gable louvers.

E. Division 22 – PLUMBING: Plumbing vents.

1.3 REFERENCES

A. Reference Standards: Comply with applicable requirements of the following standards and those others referenced in this Section, under the provisions of Section 01 42 00 – REFERENCES. Where these standards conflict with other specified requirements, the most restrictive requirements shall govern.

1. ASTM B 209 - Specification for Aluminum Alloy, Sheet and Plate.
2. FS QQ-A-250d - Aluminum and Aluminum Alloy, Plate and Sheet.

B. The following reference materials are hereby made a part of this Section by reference thereto:

1. SMACNA - Architectural Sheet Metal Manual, referred to herein as “Sheet Metal Manual”.
2. NRCA - Roofing and Waterproofing Manual.

1.4 SUBMITTALS

A. Information and Review Submittals: Submit the following under provisions of Section 01 33 00 - SUBMITTAL PROCEDURES:

1. Literature: Manufacturer's data sheets for each metal type and accessories furnished hereunder, include material specifications, performance data, physical properties and finishes.
2. Shop drawings:
   a. Fully dimensioned large scale design details showing material profiles, splices, flashing terminations and other jointing details, fastening methods and installation details. Indicate material type, sizes, and weights or gages. Indicate extent of adjacent work specified under other Sections of the Specifications.

3. Selection Samples:
   a. Metal sample chips, indicating Manufacturer's full range of finish colors for factory finishes available for selection by Architect.

1.5 DELIVERY, STORAGE AND HANDLING

A. Store preformed material to prevent twisting, bending, or abrasion, and to provide ventilation. Slope metal sheets to ensure drainage.

B. Prevent contact with materials during storage which may cause discoloration, staining, or damage.

1.6 SEQUENCING AND SCHEDULING

A. Coordinate the installation of flashings and sheet metal work with the various trades responsible for installing interfacing materials, and install the work at appropriate times so as not to delay the progress of related work.

PART 2 - PRODUCTS

2.1 MATERIALS

A. Aluminum Flashings: FS QQ-A-250d sheet aluminum.
   1. Termite Shield: mill finish, 0.080 inch thick.
   2. Water diverters at asphalt shingle roofing, mill finish, 0.050 inch thick.
   3. Eave drip edge at asphalt shingle roofing: mill finish, 0.050 inch thick.
   4. Prefabricated pre-finished aluminum hip roofing at bays: 0.050 inch thick having coil-coated polyvinylidene fluoride enamel (PVDF) finish in color as selected by Architect from manufacturer’s standard range of colors.

2.2 FABRICATION

A. General:
   1. Form flashings and sheet metal fabrications as required, or to profiles indicated on the Drawings, to protect materials from physical damage and shed water.
   2. Form sections square and accurate to profile, in maximum possible lengths, free from distortion or defects detrimental to appearance or performance. To the greatest extent applicable, fabricate sheet metal components in shop, and thoroughly clean all joints on both sides of the sheet metal work.
   3. Fabricate cleats and starter strips of same material as sheet.
   4. Form pieces in longest practical lengths, with flat lock seams. Hem exposed edges on underside 1/4 inch, miter and seam corners.
   5. Fabricate corners from one piece with minimum 18 inch long legs, solder for rigidity, seal with sealant.

B. Gable-end Drip Edge: coil-coated aluminum strip flashing, fabricated in accordance with SMACNA Architectural Sheet Metal Manual, Figure 4-23C.

C. Eave Drip Edge: coil-coated aluminum strip flashing, fabricated in accordance with SMACNA Architectural Sheet Metal Manual, Figure 4-23D.

D. Water diverter: Mill finish aluminum strip flashing, fabricated in accordance with SMACNA Architectural Sheet Metal Manual, Figure 1-22.

2.3 FINISHES

A. Aluminum hip roofing at bays: Coil coated polyvinylidene fluoride enamel (PVDF) finish system equal to PPG Industries, Product: “Duranar”, applied as follows, in the selected colors.

1. Prime all surfaces with a corrosion resistant, epoxy-based primer compatible with finish coating, minimum 2.0 mils dry film thickness, fully oven-cured.
2. Provide a finish coating of polyvinylidene fluoride enamel on all exposed surfaces, including all exposed screws, fastenings, etc., with a minimum coating of 1.0 to 1.3 mills. dry film thickness.
3. Provide a clear top coating of polyvinylidene fluoride enamel on all exposed surfaces, including all exposed screws, fastenings, etc., with a minimum coating of 1.0 to 1.3 mills. dry film thickness.
4. Ensure that all coatings, proposed to be applied hereunder, are compatible with the receiving substrate material for each condition, thoroughly clean, and treat aluminum by chromate process.

PART 3 - EXECUTION

3.1 EXAMINATION

A. Verify roof openings, curbs, pipes, sleeves, ducts, or vents through roof are solidly set, cant strips and reglets in place and nailing strips located.

B. Beginning of work shall constitute acceptance of the conditions of the surfaces to which this work is to be applied.

3.2 PREPARATION

A. Field measure site conditions prior to fabrication.

B. Install starter and edge strips, and cleats before starting installation.

C. Install surface mounted reglets true to lines and levels. Seal top of reglets with sealant.

D. Insert flashings into reglets to form tight fit. Secure in place with plastic wedges at maximum of 8 inches on center. Seal flashings into reglets with sealant.

E. Secure flashings in place using concealed fasteners. Use exposed fasteners only where permitted.

F. Cleat and seam all joints. Apply plastic cement compound between metal flashings and felt flashings, asphalt shingle roofing or asphalt roll roofing.

G. Fit flashings tight in place. Make corners square, surfaces true and straight in planes, and lines accurate to profiles.

H. During the installation of work of this Section, protect the work of other trades against undue soilage and damage by the exercise of reasonable care and precautions. Repair or replace any work so damaged and soiled.

3.3 FLASHING INSTALLATION - GENERAL

A. Except as otherwise shown on the reviewed shop drawings or specified herein, the workmanship of sheet metal work, method for forming joints anchoring, cleating, provisions for thermal movement, etc., shall conform to the standard details and recommendations of the sheet metal producer and those of producer organizations and research institutions and associations concerning the sheet metal used, in addition to the standards and details set forth in the referenced materials specified this Section.

B. Face nailing will not be permitted, concealed cleating or other concealed method must be used to attach sheet metal work to structure.

C. Ensure that fastenings do not exceed 8 inches on centers. Use flat head fasteners throughout, and seal all fastener heads after installation thereof.

D. Fill all slip joints and overlapping surfaces in the assembly with specified sealant material, removing all excess sealant material from the prefinished surfaces immediately, to prevent staining the finish.

3.4 CLEANING

A. Daily clean work areas by sweeping and disposing of debris.

B. Upon completion of the work of this Section in any given area, remove tools, equipment and all rubbish and debris from the work area; leave area in broom-clean condition.

End of Section

Section 07 92 00

JOINT SEALANTS

PART 1 - GENERAL

1.1 SUMMARY

A. General: The work of this Section consists of sealants and backing materials where shown on the Drawings, as specified herein, and as required for a complete and proper installation.

1. This Section specifies general requirements, definition of joint sealer types, and application requirements for sealant work specified within other individual specification sections.

B. Prepare sealant substrate surfaces.

C. Furnish and install sealant and backing materials.

1.2 RELATED REQUIREMENTS

A. Section 04 20 00 - UNIT MASONRY.

B. Section 06 10 00 - ROUGH CARPENTRY.

C. Section 07 31 13 - ASPHALT SHINGLES: Sealant used in conjunction with the installation of shingle roofing.

D. Section 09 29 00 - GYPSUM BOARD: Application of concealed acoustical sealant used in conjunction with gypsum board work at abutting surfaces (perimeter of partitions and walls).

E. Section 09 91 00 - PAINTING: Caulks used in preparation of applied finish coatings.

1.3 REFERENCES

A. The standards referenced herein are included to establish recognized quality only. Equivalent quality and testing standards will be acceptable, subject to their timely submission, review and acceptance by the Architect.

B. Comply with applicable requirements of the following standards and those others referenced in this Section, under the provisions of Section 01 42 00 - REFERENCES. Where these standards conflict with other specified requirements, the most restrictive requirements shall govern.

1. ASTM C 717 - Terms Relating to Building Seals and Sealants.
2. ASTM C 790 - Use of Latex Sealing Compounds
3. ASTM C 804 - Use of Solvent-Release Type Sealants.
4. ASTM C 834 - Latex Sealing Compounds.
5. ASTM C 919 - Use of Sealants in Acoustical Applications.
6. ASTM C 920 - Elastomeric Joint Sealants.
7. ASTM C 962 - Use of Elastomeric Joint Sealants.
8. ASTM C 1085 - Butyl Rubber Based Solvent Release Sealants.
9. ASTM C 1193 - Guide for Use of Joint Sealants.

10. ASTM D 1056 - Flexible Cellular Materials - Sponge or Expanded Rubber.
11. FS TT-S-001543A - Sealing Compound, Silicone Rubber Base.
12. FS TT-S-001657 - Sealing Compound, Single Component, Butyl Rubber Based, solvent Release Type.

C. The following reference materials are hereby made a part of this Section by reference thereto:
   1. SWRI – Sealant and Caulking Guide Specification.

1.4 SUBMITTALS

A. Information and Review Submittals: Submit the following under provisions of Section 01 33 00 - SUBMITTAL PROCEDURES:
   1. Product Data: Manufacturer's product data sheets, specifications, performance data, chemical and physical properties and installation instructions for each item furnished hereunder.
   2. Selection Samples: Sample card indicating Manufacturer's full range of colors available for selection by Architect.
   3. Verification Samples: 12 inch long samples of sealant for verification of color, installed where directed by Architect.
   4. Certificates: Manufacturer's certification that the Products supplied meet or exceed specified requirements.
   5. Test and Evaluation Reports:
      a. Compatibility and adhesion test reports: Test reports from sealant manufacturer indicating that sealant proposed for use have been tested for compatibility and adhesion with actual samples of substrates to be used on this project. Include sealant manufacturer’s interpretation of test results, and recommendations for primers and substrate preparation specific to this Project.
   6. Sustainable Design Submittals:
      a. Include certification of data indicating Volatile Organic Compound (VOC) content of all joint sealants.

B. Closeout Submittals: Submit the following under provisions of Section 01 78 00 - CLOSEOUT SUBMITTALS.
   1. Bonds and Warranty Documentation: Manufacturer’s standard Warranties and Guarantees.

1.5 QUALITY ASSURANCE

A. General: Notify the Architect where conflicts apply between referenced standards and existing materials, and existing methods of construction.

B. Sole Source: Obtain products required for the Work of this Section from a single manufacturer, or from manufacturers recommended by the prime manufacturer of gypsum board.

1.6 DELIVERY, STORAGE AND HANDLING

A. Each container and package must bear an unbroken seal, test number and label of the manufacturer upon delivery to the site. Failure to comply with these requirements shall be sufficient cause for rejection of the material in question, by the Architect and his requiring its

removal from the site. New material conforming to said requirements, shall be promptly furnished at no additional cost to the Contract.

1.7 SITE CONDITIONS

A. Do not install single component solvent curing sealant in enclosed building spaces.

B. Environmental Requirements: Maintain temperature and humidity recommended by the sealant manufacturer during and 24 hours after installation. Do not proceed with installation of joint sealers under the following conditions:

1. When ambient and substrate temperature conditions are below 40 degrees F.
2. When joint substrates are wet due to rain, frost, condensation, or other causes.

C. Do not proceed with installation of joint sealers until contaminates capable of interfering with their adhesion are removed from substrates.

1.8 WARRANTY

A. Provide 5 year warranty under provisions of Section 01 78 00 - CLOSEOUT SUBMITTALS. Warranty shall include coverage of installed sealant and accessories which fail to achieve air tight and watertight seal, exhibit loss of adhesion or cohesion, or do not cure.

PART 2 - PRODUCTS

2.1 MANUFACTURERS

A. Specified Manufacturers and Products: To establish a standard of quality, design and function desired, Drawings and specifications have been based on the products specified under this section for each individual sealant type, for the applications scheduled at the end of Section, and as may be additionally identified on the Drawings.

B. Acceptable Manufacturers: Subject to compliance with the requirements specified herein, manufacturers offering products which may be incorporated in the work include the following, or approved equal:

1. Dow Corning Corporation, Midland MI.
2. General Electric Company (GE Silicones) Waterford NY.
3. Pecora Corporation, Harleysville PA.
4. Sika Corp, Lyndhurst NJ.
5. BASF Construction Chemicals, Shakopee MN.
6. Tremco, Inc., Beachwood OH.
7. United States Gypsum Company, Chicago IL.

2.2 SEALANT MATERIALS

A. Sealant Materials, General Requirements:

1. Only use sealant and primers that comply with the following limits for VOC content:
   a. Architectural Sealants: 250 g/L.
   b. Roofing Sealants: 450 g/L.
   c. Roadway Sealants: 250 g/L.
   d. Sealant primer: 250 g/L.

2. Sealants containing aromatic solvents, fibrous talc, formaldehyde, halogenated solvents, mercury, lead, cadmium, chromium and their compounds, are not permitted.

B. Joint Sealer Type AA (Acrylic acoustical): One component acrylic latex, permanently elastic, non-staining, non-shrinking, non-migrating and paintable.

1. Tremco, Beachwood OH.; product, “Acoustical Sealant”.
2. United States Gypsum Company, Chicago IL.; product “USG Acoustical Sealant”.
3. Pecora Corporation, Harleysville PA.; product “ AC-20 FTR”.

C. Joint Sealer Type AP (Acrylic painters caulk): One component acrylic latex caulking compound, conforming to FS 19-TP-21M and ASTM C 834, paintable within 24 hours after application, with a minimum movement capability of ±12.5 percent, equal to one of the following:

1. Sonneborn Building Products Inc., Minneapolis MN.; product, “Sonolac”.
2. Tremco, Beachwood OH.; product, “Tremflex 834”.
3. Bostik; product, “Chem-Calk 600”.
4. Pecora Corporation, Harleysville PA.; product “ AC-20+”.

D. Joint Sealer Type B (Butyl): Gun-grade modified butyl and polyisobutylene sealant, conforming to FS TT-S-001657, Type I, and ASTM C-834, with a movement capability of ±10 percent or better and a Shore A hardness of 24 to 28, equal to one of the following:

1. Tremco, Beachwood OH.; product, “Butyl Sealant”.
2. Pecora Corporation, Harleysville PA.; product “BC-158”.

E. Joint Sealer Type PE (Polyether): Low modulus type, Single-component non-sagging gun-grade, low-odor, neutral curing polyether, sealant, conforming to FS TT-S-000227E, Type II, Class A, and ASTM C 920, Type S, Class 25, Grade NS, use NT, T, M, G, A and O with a minimum movement capability of ±100 percent, equal to the following:

1. STS Coatings, Inc., product: “GreatSeal PE-150” Sealant.
2. Chem Link Inc., Schoolcraft, MI., product: “MetaLink”.
3. Sonneborn Building Products Inc., Minneapolis MN.; product, “Sonolastic 150”.
4. York Manufacturing, Inc., Sanford ME., product: “PE-150 Liquid Tape”.

F. Joint Sealer Type SE (Silicone, Exterior construction): One-part low modulus, moisture curing, synthetic rubber sealant, having a useful life expectancy of at least 20 years, conforming to ASTM C 920, Type S, NS, Class 25, FS TT-S-001543A, Type, Class A with a minimum movement capability of +100 percent and -50 percent, equal to the following:

1. Dow Corning Corporation, Midland MI.; product, “790”.
2. General Electric Company (GE Silicones) Waterford NY.; product, “SilPruf LM”.
3. Sika Corp, Lyndhurst NJ.; product, “Sika Sil-C 990”.
4. Tremco, Beachwood OH.; product, “Spectrem 1”.

2.3 ACCESSORIES

A. Compressible joint bead back-up: Compressible closed cell polyethylene, extruded polyolefin or polyurethane foam rod complying with ASTM C 1330, Type C, 1/3 greater in diameter than width of joint. Shape and size of compressible back-up shall be as recommended by manufacturer for the specific condition used. Provide one of the following, or equal.

1. Nomaco, Inc., Zebulon, NC, product “Green Rod”.

2. Industrial Thermo Polymers Ltd., Brampton, Ontario CN, product “ITP Standard Backer Rod”.
3. BASF Sonneborn Building Products Inc., Minneapolis MN, product "Sonolastic Closed Cell Backer Rod".
4. W.R. Meadows Inc., Hampshire, IL, product “Sealtight Kool-Rod”.

B. Primers: Furnish and install joint primers of the types, and to the extent, recommended by the respective sealant manufacturers for the specific joint materials and joint function.

C. Bond-breaker tape, and temporary masking tape: Of types as recommended by the manufacturer of the specific sealant and caulking material used at each application, and completely free from contaminants which would adversely affect the sealant and caulking materials.

PART 3 - EXECUTION

3.1 EXAMINATION

A. Examine joints indicated to receive joint sealants, with Installer present, for compliance with requirements for joint configuration, installation tolerances, and other conditions affecting joint-sealant performance.

B. Proceed with installation only after unsatisfactory conditions have been corrected.

3.2 PREPARATION

A. General:
1. Weather conditions must be dry and of the temperature, as recommended by sealant manufacturer, during application operations.
2. Surface receiving work of this section must be absolutely dry and dust free. All joints receiving sealant/caulking materials and primers shall be subject to the approval of the sealant manufacturer for proper use of specified materials.

B. Thoroughly clean all joints, removing all loose mortar, oil, grease, dust, frost, and other foreign materials that will prevent proper adhesion of primers and sealant materials.
1. Clean ferrous metals of all rust and coatings by wire brush, grinding or sandblasting. Remove oil, grease and protective coatings with cleaners recommended by sealant manufacturer.

C. Prime joint substrates**,** as recommended in writing by joint-sealant manufacturer**,** as based on preconstruction joint-sealant-substrate tests or as based upon prior experience. Apply primer to comply with joint-sealant manufacturer's written instructions. Confine primers to areas of joint-sealant bond; do not allow spillage or migration onto adjoining surfaces.

D. Verify that joint backing and release tapes are compatible with sealant.

E. Perform preparation in accordance with ASTM C 804 and C 790 for solvent and latex base solvents, respectively.

3.3 INSTALLATION

A. Install joint bead back-up in all joints in excess of 5/8-inch depth, and joints that have no back-up therein, placing the joint bead in the joint in a manner that will assure a constant depth 1/8 inch greater than the sealant and caulking material depth tolerances.

1. Set beads into joints continuously, by slightly stretching during placement, to permit compression against sides of joint, without surface wrinkles or buckles.
2. Do not stretch back-up material into joints.

B. Install bond breaker in joints where shown in the Drawings and wherever recommended by the sealant manufacturer to prevent bond of the sealant to surfaces where such bond might impair the Work.

C. Apply masking tape or other precautions to prevent migration or spillage of materials onto adjoining surfaces.

D. Apply latex caulking materials into joints in accordance with manufacturer's instructions, using mechanical or power caulking gun equipped with nozzle of appropriate size, with sufficient pressure to completely fill the joints.

1. The depth of sealant and caulking materials shall be in accordance with manufacturer's recommendations for the specific joint function, but in no case exceed 1/2-inch in depth, nor less than 1/4-inch, regardless of the joint width.
2. Maintain the outer edge of the sealant and caulking materials, where side faces of joints are in the same plane, back 1/8-inch from the faces.
3. Apply sealant in continuous beads without open joints, voids or air pockets so as to provide a watertight and airtight seal for the entire joint length.
4. After placement of the sealant and caulking materials, concave-tool the surfaces to uniform density, using a water-wet tool. Do not use detergents or soapy water for the tooling operations.
5. Remove the temporary masking tape immediately after tooling, and before the sealant or caulking material has taken initial set.

E. Take care not to block-off weep tubes or any through wall opening constructed to allow weeping of accumulated water.

3.4 CLEANING

A. Clean all surfaces of adjacent surfaces which have been marked or soiled by the work of this Section, removing all excess sealant and caulking materials with solvents which will not damage the surfaces in any way.

3.5 PROTECTION

A. During the operation of sealant work, protect the work of other trades against undue soilage and damage by the exercise of reasonable care and precautions. Repair or replace any work so damaged and soiled.

3.6 SCHEDULE

A. General: Seal joints indicated and all interior and exterior joints, seams, and intersections between dissimilar materials.

B. Sealant Colors:

1. Colors for Sealant Types “SE”: As selected by the Architect from manufacturer’s standard colors.
2. Color for Sealant Types “AA” and “AP”: White.
3. Color for Sealant Type “B”: Black.

4. In concealed installation, and in partially or fully exposed installation where so approved by the Architect, standard gray or black sealant may be used.

C. Exterior joints (Listed by primary building material abutting sealant joints):

1. Exterior Masonry:

Joint Condition	Sealant Type
a. Masonry to masonry, expansion and control joints:	SE
b. Masonry to abutting concrete:	SE
c. Masonry to abutting non-porous materials (painted metals, anodized aluminum, mill finished aluminum, PVC, glass, and similar materials):	SE
d. Masonry to all items which penetrate exterior masonry walls, including, but not necessarily limited to, door frames, louver frames, pipes, vents, and similar items:	SE

2. Exterior Metal:

Joint Condition	Sealant Type
a. Metal to metal:	SE

3. Exterior wood and plastic:

Joint Condition	Sealant Type
a. Cellular PVC to Cellular PVC:	P1 or SP

D. Interior joints (Listed by primary building material abutting sealant joints):

1. Interior Masonry:
* Includes interior side of exterior masonry walls.

Joint Condition	Sealant Type
a. Masonry to masonry control joints*:	SE
b. Masonry* to gypsum board:	SE
c. Masonry to all items which penetrate masonry walls, including, but not necessarily limited to, window frames, door frames, louver frames, and similar items:	SE
d. Masonry to all pipes, conduit and vents which penetrate non-rated masonry walls*:	SE

2. Gypsum Board:

Joint Condition	Sealant Type
a. Gypsum board to metal or wood trim:	AP
b. Gypsum board to abutting surfaces at exposed tops and bottoms partitions and walls:	AA
c. Gypsum board to masonry:	SE
d. Gypsum board to interior door and window frames, penetrating conduits and piping, light-fixtures, electrical cover plates, building specialty items, ductwork, grilles, supply diffusers, faucets, piping, escutcheon plates and similar items:	AP

End of Section

Section 08 11 13

HOLLOW METAL DOORS AND FRAMES

PART 1 - GENERAL

1.1 SUMMARY

A. Furnish the following products to be installed under the designated Sections:

1. Flush steel doors, complete with internal reinforcing, hardware cut-outs; and ; installed by Section 06 20 00 - FINISH CARPENTRY.
2. Hollow metal frames for doors, , complete with internal reinforcing; installed under Section 06 10 00 - ROUGH CARPENTRY.

1.2 RELATED REQUIREMENTS

A. Section 04 20 00 - UNIT MASONRY: Building-into masonry hollow metal door frames, placed and braced under Section 06 10 00 - Rough Carpentry.

B. Section 06 10 00 - ROUGH CARPENTRY:

1. Wood blocking, and nailers.
2. Installation of hollow metal door frames.
3. Placement and temporary bracing of hollow metal frames built-into masonry.

C. Section 06 20 00 - FINISH CARPENTRY: PVC cellular trim; installation of doors and hardware.

D. Section 07 92 00 - JOINT SEALERS.

E. Section 08 71 00 - DOOR HARDWARE: Furnishing finish hardware, and installation templates for hardware cut-outs and reinforcing.

F. Section 09 29 00 - GYPSUM BOARD: Gypsum grout fill for hollow metal frames occurring in gypsum drywall assemblies.

G. Building-in of frame anchors to wall and partition construction: By trade responsible for wall and partition erection.

1.3 REFERENCES

A. Comply with applicable requirements of the following standards and those others referenced in this Section, under the provisions of Section 01 42 00 - REFERENCES. Where these standards conflict with other specified requirements, the most restrictive requirements shall govern.

1. ANSI A 117.1 - Specifications for Making Buildings and Facilities Accessible to and Usable by Physically Handicapped People.
2. ANSI/SDI A250.4 - Test Procedure and Acceptance Criteria for Physical Endurance for Steel Doors, Frames, Frame Anchors and Hardware Reinforcing.
3. ANSI A250.8 (formerly SDI 100) - Recommended Specifications for Standard Steel Doors and Frames.
4. ASTM E 152 - Methods of Fire Tests of Door Assemblies.
5. ASTM A 109 - Steel, Strip, Carbon, Cold Rolled.

6. ASTM A 415 - Specification for Hot-Rolled Carbon Steel Sheets, Commercial.
7. ASTM A 568 - Steel, Carbon and High Strength Low Alloy Hot Rolled Strip, and Cold Rolled Sheet.
8. ASTM A 653 Structural Quality Grade 37 (A 653M), Steel Sheet, Zinc-Coated, (galvanized) by the Hot-Dip Process.
9. ASTM A 924 - General Requirements for Steel Sheet, Metallic-Coated by the Hot-Dip Process.
10. ASTM A 1008 - Steel Sheet, Cold Rolled, Carbon, Structural, High-Strength Low-Alloy with Improved Formability.
11. SDI 111 Series (111A-111F): Recommended Details, Steel Doors and Frames.
12. SDI 117-93: Manufacturing Tolerances for Standard Steel Doors and Frames.
13. NFPA publication 80 - Fire Doors and Windows.
14. UL publication 10B - Fire Tests of Door Assemblies.
15. All applicable federal, state and municipal codes, laws and regulations for exits.

1.4 SUBMITTALS

A. Submit the following under provisions of Section 01 33 00 - SUBMITTAL PROCEDURES:

1. Literature: Manufacturer's product data sheets, specifications, for doors, frames and shop applied finishes.
2. Certification: Manufacturer's written certification stating that doors, frames, and all related items to be furnished hereunder, meet or exceed the requirements specified under this Section; that specified galvanized and shop priming has been performed.
3. Shop drawings: A complete schedule of doors and frames, to be furnished hereunder, coordinated with the door and frame schedule contained in the Contract Drawings. Large scale details of each type door and frame construction, indicating all gages, cut-outs for glazing in doors, reinforcing, and anchorage.

1.5 SEQUENCING AND SCHEDULING

A. Coordinate the work of this Section with the respective trades responsible for furnishing hardware and installing doors and frames.

B. Ensure that the work performed hereunder is coordinated with issued templates authorized by the hardware supplier.

C. Do not fabricate doors or frames before receiving a copy of the approved hardware schedule, submitted by the hardware supplier, reviewed by the Contractor and accepted by the Architect. Verify that issued templates are coordinated with the approved schedule; immediately notify the Architect, in writing, of any conflicts.

1.6 DELIVERY, STORAGE, AND HANDLING

A. Prior to shipping, identify each frame and door with a removable metal or plastic label which corresponds with door schedule identifying opening number and location.

B. Deliver doors and frames boxed or crated to provide protection during transit and job storage.

C. Inspect doors and frames upon delivery for damage. Minor damage may be repaired provided the refinished items are equal in respects to new work and acceptable to the Architect; otherwise remove and replace damaged items.

D. Store doors and frames at the building site upright and under cover. Place the units on wood dunnage and cover in a manner that will prevent rust and damage.

PART 2 - PRODUCTS

2.1 MANUFACTURERS

A. Acceptable Manufacturers: Subject to compliance with the requirements specified herein, manufacturers offering products which may be incorporated in the work include the following, or approved equal:

1. Amweld Building Products, Inc., (A Division of Amweld International, LLC), Coppell TX.
2. Ceco Door Products (A Division of Assa Abloy Group Company), Milan TN.
3. Curries Company A Division of Assa Abloy Group Company), Mason City IA.
4. Essex Industries, Inc. New Haven CT.
5. Republic Doors and Frames, McKenzie TN.
6. Steelcraft (A Division of Ingersoll-Rand Company), Cincinnati OH.

B. Unless otherwise specifically accepted by Architect, all doors and frames shall be of one manufacturer.

2.2 DOORS

A. General: Refer to the Drawings for design of doors, sizes, glazing cut-outs in doors, and details.

B. Construction: Full flush commercial type, 1-3/4 inches thick, unless noted otherwise, meeting or exceeding the materials, gages, construction, and testing requirements of the referenced ANSI and SDI publications.

1. Core Construction: Manufacturer's standard polystyrene or polyurethane, core.
2. Insulated Doors: At all exterior doors, fabricate doors with R-value of not less than 3.8 when tested according to ASTM C 1363.

C. Exterior Doors: ANSI 250.8, Level 4, Model 2 (Seamless), ANSI A250.4 Physical Performance Level A, (Maximum Duty) having 14-gage, 0.071 inch thick (1.78 mm) galvanized steel faces, with a minimum R factor of 14.

D. Hardware reinforcing: Welded in place steel reinforcement, hot rolled pickled and oiled steel per ASTM A569, with the following minimum gages:

1. Hinges, 8 gage, minimum 0.152 inch (3.8 mm) thick.
2. Kick plates, 18 gage, minimum 0.042 inch (1.0 mm) thick.
3. Closers, locks, and all other hardware: 10 gage, minimum 0.123 inch (3.1 mm) thick.
4. Locations for reinforcing shall be determined from information and templates provided under Section 08 71 00 - DOOR HARDWARE.

E. Fabrication

1. Fabricate exposed faces of door panels from cold-rolled steel only.
2. Fabricate concealed stiffeners, reinforcement, edge channels, louvers and moldings from either cold-rolled or hot-rolled steel (at manufacturer's option).
3. Fabricate doors with hardware reinforcement welded in place.
4. Attach fire rated label to each door unit.

5. Close top and bottom edge of exterior doors with flush end closure. Seal joints watertight.

2.3 HOLLOW METAL FRAMES

A. General: Refer to the Drawings for various types of frames, sizes, and profiles, and other characteristics of frames and related items.

1. Frame type: Shop welded frames with mitered joints arc-welded, reinforced and ground smooth.

B. Materials for frames, reinforcement, anchors, anchor clips and related items: commercial grade cold-rolled steel conforming to ASTM A109 or commercial grade hot-rolled and pickled steel conforming to ASTM A415.

1. Frame gage:
   a. Exterior frames: 14-gage, 0.067 inch thick (1.7 mm), with a zinc coating supplied by the hot-dip process conforming to ASTM A653, Grade 37, with coating applied in accordance with A 924.
2. Hinge, lock and strike reinforcement: 7 gage (4.4 mm) thick.
3. Door closer reinforcement: 12 gage, minimum 0.093 inch (2.3 mm) thick.
4. Floor clips: 3/16 inch (4.8 mm) thick (Custom extra heavy clips required).
5. Splice plates or channels: same gage as door frame.
6. Mortar guards: 26 gage, minimum 0.016 inch (0.4 mm) thick.

C. Frame construction:

1. Shop-fabricate frames as whole single units per door opening, except when frame size is too large to ship as a single unit. Oversized frames may be shipped in large sections as practicable for field assembly with concealed splice plates or channels.
2. Frame corner construction: As specified in paragraph A, above.
3. Reinforcements, stiffeners, and base angle clips: Welded to interior surfaces of frames to provide a stable base and so as to not interfere with installation of hardware.
4. Provide mortar boxes, welded to frame, at back of hardware cut-outs where mortar or other materials may obstruct hardware operation.
5. Appearance of finished frames: Strong, rigid, completely free from warp and buckle, with miters well-formed and in true alignment, and with surfaces smooth and free from defects of any kind.

D. Anchorage:

1. Anchors for frames in masonry walls: Adjustable, T-shaped, positively engaging the retainers on both flanges of each jamb member, when placed. The stem of the anchors shall be 2 inches wide by 12 gage, minimum, corrugated or perforated for mortar bond, and extend 10 inches into the masonry, unless otherwise indicated.
2. Anchorage points (additional anchorage required): Provide not less than 4 anchors, clips, or bolts, per jamb, as applicable.

2.4 FABRICATION TOLERANCES

A. Maximum variation for doors and frames: Maximum diagonal distortion 1/16 inch measured with straight edge, corner to corner.

2.5 FACTORY FINISHING

A. Preparation: Pressure-sand all surfaces of all doors, frames, accessory items, anchors, and related items, to remove blemishes and foreign matter and provide paint grip. Spot-fill imperfections with metallic filler, and sand smooth. Thoroughly clean the surfaces by applying hot or cold phosphate treatment standard with the manufacturer.

B. Following cleaning apply one dip or spray coat of rust-inhibitive metallic oxide, zinc chromate, or synthetic resin primer to all surfaces, including those which will be concealed after erection. Bake, or oven dry, the primer at time and temperature recommended by the manufacturer for developing maximum hardness and resistance to abrasion.

PART 3 - EXECUTION

3.1 ERECTION AND INSTALLATION

A. Installation of frames and doors, including all accessories and related items furnished hereunder, will be performed under Section 06 10 00 - ROUGH CARPENTRY, and Section 06 20 00 - FINISH CARPENTRY.

1. Section 06 10 00 - ROUGH CARPENTRY shall place frames in correct position within specified tolerances, and provide temporary bracing at locations where frames are indicated to be built-into masonry. Section 04 20 00 - UNIT MASONRY shall build and grout frames into masonry work.

B. Final installation of loosely-attached glazing stops will be performed under Section 08 80 00 - GLAZING.

End of Section

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Section 08 16 16

FIBERGLASS DOORS

PART 1 - GENERAL

1.1 SECTION INCLUDES:

A. Furnish for installation pre-hung fiberglass doors with insulated metal frames under Section 06 20 00 - FINISH CARPENTRY:

1. Doors with laminated wood stiles and rails, polyurethane core, glass fiber reinforced polyester faces.
2. Insulated metal frames.

1.2 RELATED SECTIONS

A. Section 06 10 00 - ROUGH CARPENTRY: Wood framing, blocking, and nailers.

B. Section 06 20 00 - FINISH CARPENTRY:

1. Installation of doors and hardware.

C. Section 08 71 00 - DOOR HARDWARE: Furnishing finish hardware, and installation templates for hardware cut-outs.

1.3 SUBMITTALS

A. Submit the following under provisions of Section 01 33 00 - SUBMITTAL PROCEDURES:

1. Literature: Manufacturer's product data sheets and specifications for all products provided.
2. Warranty: Provide sample copies of manufacturers' actual warranties for all materials to be furnished under this Section, clearly defining all terms, conditions, and time periods for the coverage thereof.
3. Shop drawings: A complete schedule of doors to be furnished hereunder, coordinated with the door schedule contained in the Contract Drawings. Large scale details of each type door and frame construction, indicating all materials, reinforcing, anchorage, and cut-outs for glazing in doors.

PART 2 - PRODUCTS

2.1 MANUFACTURERS

A. Specified manufacturer: To establish a level of quality and visual characteristics desired, Drawings and Specifications are based on Therma-Tru Doors, Maumee, OH product: “Smooth Star”, factory pre-hung units with frame.

B. Acceptable Manufacturers: Subject to compliance with the requirements specified herein, manufacturers offering products which may be incorporated in the work include the following, or approved equal:

1. Therma-Tru Doors, Maumee, OH
2. Jeld-Wen Inc, Klamath Falls OR.
3. Masonite North America, Tampa PL.
4. Peachtree Doors and Windows, Mosinee WI.

2.2 GLASS FIBER DOORS

A. General: Refer to the Drawings for design of doors, sizes, glazing cut-outs in doors, and details.

B. Door Description:

1. Thickness: 1-3/4 inches.
2. Stiles and rails: solid hardwood solid hardwood rail and stile reinforcement at door bottom rail and lockset rail.
3. Core filler: Polyurethane, foamed-in-place.
4. Face sheets: Glass fiber reinforced polyester faces bonded to stiles, rails, and core.
   a. Simulated wood grain: Species as selected by the Architect.
5. Hardware reinforcing: Manufacturer's standard wood blocking.
6. Sill: 6-9/16 inches wide equal to Therma-Tru "Public Access" with thermal break.

2.3 DOOR FRAMES:

A. General: Refer to the Drawings for frame sizes and profiles.

B. Frame Description:

1. Shop assembled frames with joints arc-welded, and reinforced, 16-gage, 0.053 inch thick (1.3 mm), with a zinc coating supplied by the hot-dip process conforming to ASTM A653, Grade 37, with coating applied in accordance with A 924.
2. Hardware reinforcement in manufacturer's standard gages.
3. Insulation: Polyurethane, foamed-in-place.

PART 3 - EXECUTION

3.1 INSTALLATION

A. Installation of fiberglass doors and frames, including all accessories and related items furnished hereunder, will be performed under Section 06 20 00 - FINISH CARPENTRY.

End of Section

Section 08 31 00

ACCESS DOORS AND PANELS

PART 1 - GENERAL

1.1 SUMMARY

A. Fire resistive rated and non-rated access panels and frames, as specified under this Section, furnished by Sections requiring the same and installed under the following Sections:

1. Section 09 29 00 - GYPSUM BOARD: Installation of access panels into drywall ceiling assemblies.
2. Section 04 20 00 – UNIT MASONRY: Installation of access panels into masonry walls.

1.2 RELATED REQUIREMENTS

A. Section 09 29 00 - GYPSUM BOARD: Installation of access panels into drywall ceiling assemblies.

B. Section 04 20 00 – UNIT MASONRY: Installation of access panels into masonry walls.

C. Division 22 - PLUMBING: Furnishing access panels required for plumbing systems.

D. Division 26 - ELECTRICAL: Furnishing access panels required for electrical systems.

1.3 SUBMITTALS

A. Submit the following under provisions of Section 01 33 00 - SUBMITTAL PROCEDURES:

1. Literature: Manufacturer's product data sheets, specifications and installation instructions.
2. Schedule: Submit Schedule of all access panels to be furnished hereunder, indicating locations for each size and type of access door.
   a. The Contractor is responsible to ensure that all of the types/styles of panels and frames specified herein can be furnished by the manufacturer submitted.
   b. Prior to submitting schedule, coordinate with the work of Division 22 - PLUMBING, Division 23 - HEATING, VENTILATING AND AIR CONDITIONING and Division 26 - ELECTRICAL and meet with the Architect to determine exact quantities and locations required for the installation of access panels.
3. Shop drawings: Large scale details of access doors, indicating all sizes, gages and thickness; provide complete installation details, coordinated to the specific receiving conditions.

1.4 DELIVERY, STORAGE AND HANDLING

A. Do not deliver access doors to the site, until all specified submittals have been submitted to, and approved by, the Architect.

B. Store access door units inside, under cover, and in manner to keep them dry, protected from weather, direct sunlight, surface contamination, corrosion and damage from construction traffic and other causes.

PART 2 - PRODUCTS

2.1 MANUFACTURERS

A. Acceptable Manufacturers: Subject to compliance with the requirements specified herein, manufacturers offering products which may be incorporated in the work include the following, or approved equal:

1. Acudor Products Inc., Cedar Grove, NJ
2. Cesco Products, North Brooklyn Park MN.
3. J.L. Industries, Bloomington MN.
4. Karp Associates Inc., Maspeth NY.
5. Miami-Carey Corp., Monroe OH.
6. Nystrom Products Company, Minneapolis MN.
7. Milcor, Inc. Lima OH.
8. Larson Manufacturing Co., Brookings SD.
9. Williams Brothers Corporation of America, Front Royal, VA.

B. Single Source: All work of this Section shall be produced by a single manufacturer, unless otherwise approved by the Architect.

2.2 ACCESS PANELS - GENERAL

A. Access panels scheduled for placement in masonry: Furnish with masonry anchors attached to unit frames at factory.

B. Keying: All access panels shall be keyed alike; furnish Owner with 6 keys.

1. Special consideration and attention shall be given to the fabrication lead time required, allow a minimum of 6 weeks after delivery of the required mortised locks to the access panel manufacturer.

2.3 ACCESS PANELS - FOR NON- RATED CONSTRUCTION

A. For non-rated wall and ceiling surfaces (security type panels, where indicated): Flush panel door type meeting the following requirements:

1. Frame type:
   a. For masonry partitions: 12 gage Type 304 stainless steel flanged frame, with flange exposed to view 1 inch or less, equal to:
      1) Acudor MS-7000 series.
      2) Karp DSB-123SD-MS series.
      3) Nystrom MT series.
      4) Williams WB series.
   b. For gypsum board ceilings: 12 gage galvanized bonderized steel frame, with 22 gage galvanized steel drywall bead.
      1) Nystrom MW series.
2. Door: Flush panel door as follows:
   a. Typical all wall types, except tile: 12 gage galvanized bonderized steel
   b. For tiled walls: 12 gage type 304 stainless steel.
3. Hinge: Flush continuous piano hinge with stainless steel pin.

4. Lock: Latch bolt operated by (factory prepared to receive, site installed) 1-1/8 inch mortise cylinder lock furnished under Section 08 71 00 - DOOR HARDWARE.
5. Emergency latch release: For ceiling panels accessible from the back, provide an interior latch release mechanism to permit panel to be opened from back (interior side) of panel.

2.4 FACTORY FINISHING

A. Panel assemblies fabricated from stainless steel: Nº. 4 satin finish.

B. Panel assemblies fabricated from galvanized bonderized steel: Baked on rust inhibitive gray primer finish.

PART 3 - EXECUTION

3.1 EXAMINATION

A. Inspect all surfaces and verify that they are in proper condition to receive the work of this Section. Verify that prepared openings are ready to receive the work of this Section and opening dimensions are as indicated on the shop drawings. Verify that all blocking is set in place and secure.

B. Beginning of installation means acceptance of project conditions.

3.2 INSTALLATION

A. Install access panels in accordance with manufacturer's instructions and direction from authorities having jurisdiction. Install miscellaneous specialties absolutely level and in true line, with units securely anchored to the surrounding construction.

B. Test each door and latching device, and make adjustments required to ensure a bind-free operation and proper latching.

End of Section

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Section 08 33 13

COILING COUNTER DOORS

PART 1 - GENERAL

1.1 SECTION INCLUDES

A. Furnish and install manually-operated aluminum coiling counter shutters, complete with guides, counter sills, operating hardware and mechanisms, coil housings, and all related items.

1.2 RELATED SECTIONS

A. Section 06 10 00 - ROUGH CARPENTRY: Wood blocking.

B. Section 06 20 00 - FINISH CARPENTRY: Installation of cylinder locks.

C. Section 08 71 00 - DOOR HARDWARE: Furnishing cylinders for coiling counter shutter.

1.3 SUBMITTALS

A. Submit the following under provisions of Section 01 33 00 - SUBMITTAL PROCEDURES:

1. Literature: Manufacturer's product data sheets and specifications.
2. Manufacturer's installation instructions. Indicate installation sequence and procedures, adjustment and alignment procedures and lubrication instructions.
3. Maintenance Data: Lubrication requirements and frequency, periodic adjustments required.
4. Shop drawings: Fully-dimensioned, large scale details of each type door and grille construction, tracks, guides, counterbalancing and operating mechanisms, hood enclosures, and related items; with complete installation details reflecting actual site conditions.

B. Submit manufacturer’s standard warranties under provisions of Section 01 78 00 - CLOSEOUT SUBMITTALS.

PART 2 - PRODUCTS

2.1 COILING COUNTER DOOR (SHUTTER)

A. Acceptable Manufacturers: Subject to compliance with the requirements specified herein, manufacturers offering products which may be incorporated in the work include the following, or approved equal:

1. Raynor Garage Doors, Dixon IL.
2. Overhead Door Corporation, Inc., Lewisville TX.
3. Atlas Door Corporation, Edison, NJ.
4. Cornell Iron Works, Inc., Mountaintop, PA.

B. Coiling counter shutter: To establish a standard of quality, design and function desired, Drawings and specifications have been based on Raynor Garage Doors, Dixon IL: Model CA” with extruded aluminum guides:

C. Curtain:

1. Slats: Interlocking flat-faced extruded alloy 6063-T5 aluminum slats, having a thickness of not less than 0.05 inch thick.
2. Bottom slat: Extruded alloy 6063-T5 aluminum provided with recessed flush type lifting handles. Provide extruded vinyl astragal.

D. Counterbalance: Oil tempered helical torsion springs, housed in 4-1/2 inch diameter structural steel pipe barrel having a minimum wall thickness of 0.120 inches. Deflection of pipe under full load shall not exceed 0.03 inches per foot of span. Fit end of barrel assembly with plug disc to facilitate access to counterbalance assembly.

E. Brackets: Minimum 10 gage hot-dipped formed galvanized steel, for supporting barrel, counterbalance mechanism, and hood, with a high factor of safety.

F. Hood: Formed 0.04 inch thick aluminum, with rolled edges to prevent deflection.

G. Guides: Continuous, vertical mounted extruded alloy 6063-T5 aluminum. Provide guides with wool pile strip inserts on both sides of curtain. to seal against interior and exterior faces of curtain.

H. Locks: Slide bolt lock, internally located within bottom slat. with interior cylinder designed to accommodate cylinders provided by Section 08 71 00 - Door Hardware.

I. Finish: Aluminum guides, slats, bottom bar and hoods to be clear anodized 204-R1 finish.

PART 3 - EXECUTION

3.1 INSTALLATION

A. Perform installation in accordance with the approved shop drawings and the recommendations of the manufacturer. Set entire assembly including doors, guides, and hardware, plumb and true to line, to assure smooth operation.

1. Maximum variation from plumb or level: 1/16 inch.
2. Maximum variation in longitudinal or diagonal warp: 1/8 inch per 10 foot straight edge.

B. Adjust counter shutter, locking hardware and operating assembly as required to ensure a smooth operation without binding.

3.2 CLEANING

A. Remove all protective films and coverings from assembly components, and clean doors and guides. Remove tools, equipment and all rubbish and debris from the work area, caused by the work of this Section; leave area in broom-clean condition.

End of Section

Section 08 33 23

OVERHEAD COILING DOORS

PART 1 - GENERAL

1.1 SECTION INCLUDES

A. Furnish and install manually operated (hand crank) coiling door assemblies, complete with all related items, including but limited to:

1. Insulated aluminum slat doors
2. Tracks.
3. Clip angles.
4. Guides.
5. Coil housing.
6. Weather seals.

1.2 RELATED SECTIONS

A. Section 04 20 00 - UNIT MASONRY: Concrete block wall.

B. Section 06 10 00 - ROUGH CARPENTRY: Wood blocking.

C. Section 07 92 00 - JOINT SEALANTS: Perimeter sealant and backup materials

D. Section 08 71 00 - DOOR HARDWARE: Furnishing cylinders for coiling door[s].

1.3 REFERENCES

A. Comply with applicable requirements of the following standards and those others referenced in this Section, under the provisions of Section 01 42 00 - REFERENCES. Where these standards conflict with other specified requirements, the most restrictive requirements shall govern.

1. ANSI/UL 325 - Door, Drapery, Gate, Louver, and Window Operators and Systems.

1.4 SYSTEM DESCRIPTION

A. Design coiling door assembly to withstand wind/suction load of 20 psf, without undue deflection or damage to door or assembly.

1.5 SUBMITTALS

A. Submit the following under provisions of Section 01 33 00 - SUBMITTAL PROCEDURES:

1. Literature: Manufacturer's product data sheets, specifications, and performance data.
2. Manufacturer's installation instructions. Indicate installation sequence and procedures, adjustment and alignment procedures and lubrication instructions.
3. Maintenance Data: Lubrication requirements and frequency, periodic adjustments required.
4. Warranty: Provide sample copies of manufacturers' actual warranties for all materials to be furnished under this Section, clearly defining all terms, conditions, and time periods for the coverage thereof.

5. Shop drawings: Fully-dimensioned, large scale details of each type door construction, tracks, guides, counterbalancing and operating mechanisms, electrical characteristics, hood enclosures, and related items; with complete installation details reflecting actual site conditions for each location.

1.6 QUALIFICATIONS

A. Installer, with a minimum of 3 years documented experience demonstrating previously successful work of the type specified herein, and approved by product manufacturer.

1.7 SEQUENCING AND SCHEDULING

A. Coordinate the work of this Section with the respective trades responsible for installing interfacing work, and ensure that the work performed hereunder is acceptable to such trades for the installation of their work.

1.8 WARRANTY

A. Provide 5 year warranty under provisions of Section 01 78 00 - CLOSEOUT SUBMITTALS. Warranty shall include materials and workmanship, satisfactory operation, and contain any limitations of items specified herein.

1.9 MAINTENANCE

A. Provide Installers maintenance contract under provisions of Section 01 78 00 - CLOSEOUT SUBMITTALS, commencing on Date of Substantial Completion and extending for a period of one year. Maintenance contract shall include the following:

1. Emergency callback service for the doors.
2. Annual examinations of the installation during regular working hours by trained employees of the door manufacturer.
3. All necessary adjusting, greasing, and oiling.
4. Cleaning supplies and parts necessary to keep the equipment in proper operation, except any parts needed due to misuse, accident, or neglect caused by others.

B. Repair work shall be carried out only by the door installer's personnel, using only standard parts furnished by the door manufacturer. Maintenance shall be carried out directly by the installer and shall not be assigned or transferred to any agent.

PART 2 - PRODUCTS

2.1 MANUFACTURERS

A. Specified Manufacturer: To establish a standard of quality, design and function desired, Drawings and specifications have been based on the products of Overhead Door Corporation, Inc., Product: “Stormtite 625 Series”.

B. Acceptable Manufacturers: Subject to compliance with the requirements specified herein, manufacturers offering products which may be incorporated in the work include the following, or approved equal:

1. Overhead Door Corporation, Inc., Lewisville TX.
2. Atlas Door Corporation, Edison, NJ.
3. Cornell Iron Works, Inc., Mountaintop, PA.
4. Raynor Garage Doors, Dixon IL.

2.2 INSULATED COILING DOOR COMPONENTS

A. Curtain: Interlocking, roll formed, insulated slats with endlocks attached at each end of alternate slats to prevent lateral movement.

1. Aluminum slats: Interlocking flat-faced insulated slats, sandwich slat construction with:

a. Minimum 0.040 inch thick exterior face and 0.024 inch thick interior face, sandwich construction, nominal 2-5/8 inches high by a minimum of 3/4 inch thick.

b. Insulated core of foamed in place CFC-free 2.2 pound density polyurethane insulation, without voids. Insulation to provide curtain assembly with a minimum “U” factor of 0.13, and an “R” value of 7.7 as calculated per ASHRAE standards.

2. Endlocks: Continuous molded, high strength nylon riveted to both ends of alternating slats.

3. Bottom bar: Slat fitted with two 1/8 inch thick (minimum) angles to provide reinforcement and positive contact with floor in closed position, equipped with compressible vinyl coated safety/weather edge.

B. Counterbalance: Oil tempered helical torsion springs, housed in steel tube or pipe barrel, supporting the curtain designed for a 50,000 cycle life with a deflection not exceeding 0.03 inch per foot of width, equipped with ball or roller bearings, and adjustable by means of external tension wheel.

C. Brackets: Minimum 3/16-inch thick steel plate, for supporting barrel, counterbalance mechanism, and hood, with a high factor of safety.

D. Hood: 24 gage, minimum, aluminum, beaded, and flanged to prevent deflection with intermediate supports as required. Equip hood with internal neoprene/rayon baffle weatherseal.

E. Guides: Continuous, vertical mounted galvanized, formed from three 3/16 inch thick angles. Provide guides with vinyl weather strips to seal against interior and exterior faces of curtain. Provide windlock bars per manufacturer’s standard.

F. Locks: Pin tumble single unit mechanism, installed on each jamb, and designed to accommodate cylinders provided by Section 08710 - DOOR HARDWARE.

2.3 ACCESSORIES

A. Brackets and support clips: Provide guide rail, counterbalance shaft assembly, and hood supports as required for a complete assembly, finish of supports to match products being supported.

2.4 FABRICATION

A. Do not fabricate doors until all specified submittals have been submitted to, and approved by, the Architect.

2.5 SHOP FINISH

A. Finish for coiling doors:

1. Slats, bottom bar, guides and hood: Phosphate treatment followed by baked-on polyester powder coat, minimum 2.5 mils (0.065 mm) cured film thickness; ASTM D-3363 pencil hardness: H or better.

a. Color as selected by Architect from manufacturer's standard color range.

PART 3 - EXECUTION

3.1 EXAMINATION

A. Inspect all surfaces and verify that they are in proper condition to receive the work of this Section. Verify that field measurements are as indicated on reviewed and approved shop drawings.

B. Beginning of installation means acceptance of existing project conditions.

3.2 INSTALLATION

A. Perform installation of all items furnished hereunder, except as otherwise specified, in accordance with the approved shop drawings and the recommendations of the manufacturer.

B. Set entire assembly including doors, guides, and hardware, plumb and true to line, to assure smooth operation. Brace guides internally to provide a completely rigid installation. Attach jambs with not less than 3/8 inch steel bolts spaced not more than 30 inches apart.

C. Coordinate installation of sealant and backing materials at frame perimeter of coiling overhead door with Section 07 92 00 - JOINT SEALANTS.

3.3 TOLERANCES

A. Maintain dimensional tolerances and alignment with adjacent work. Maximum variation from plumb or level: 1/16 inch. Maximum variation in longitudinal or diagonal warp: 1/8 inch per 10 foot straight edge.

3.4 ADJUSTING

A. Adjust doors, hardware and operating assembly as required to ensure a smooth operation without binding.

3.5 CLEANING

A. Remove all protective films and coverings from assembly components, and clean doors and guides.

End of Section

Section 08 71 00

DOOR HARDWARE

PART 1 - GENERAL

1.01 PROVISIONS INCLUDED

A. The general provisions of the Contract, including General and Supplementary Conditions and Division 1- General Requirements, apply to work specified in this Section.

1.02 SUMMARY OF WORK

A. This section specifies hardware for doors, including electro-mechanical and electronic hardware. Furnish and install hardware for doors except as listed below as “related work” or otherwise noted on door schedule or Drawings.

B. Lock cylinders for aluminum entrance doors is specified in this Section.

C. Related Work Specified in Other Sections:
1. Hollow Metal Doors and Frames: Section 08 11 13
2. Painting: Section 09 91 00

1.03 REFERENCED STANDARDS

A. National Fire Protection Association (NFPA):
1. NFPA-80 Fire Doors and Other Openings Protective
2. NFPA-101 Life Safety Code

B. Door and Hardware Institute (DHI)
1. DHI Installation Guide (1986 Edition)
2. DHI Keying Terminology (1989 Edition)

C. ANSI/BHMA Standards

D. Massachusetts State Building Code, 780 CMR

E. MAAB: Rules and Regulations of the Massachusetts Architectural Access Board.

F. ANSI A117.1 – Accessible and Usable Buildings and Facilities

1.04 SUBMITTALS

A. Hardware Schedules and Product Data: Submit 6 copies of a typed hardware schedule including catalog cuts in the scheduling format recommended by DHI. The Architect’s approval will not relieve the contractor of the responsibility of providing required hardware needed to complete the project.

B. Samples: Upon request from the Architect, submit 1 sample of each proposed hardware item to be used in this project. Samples remain the property of the supplier and will be returned after completion of the project.

C. Furnish templates needed by door and frame manufacturer to enable proper machining for the required template hardware.

D. Supply a complete keying schedule for approval by Architect. This should be done after keying meeting has been held with owner's representative. Submit this keying schedule using the reference manual from DHI.

E. Closeout Submittals: Furnish the following for inclusion in the Owner's Operation and Maintenance Manual, specified in Section 01 77 00. Place in a binder as specified in Section 01 77 00.
1. A final copy of the approved and as-built hardware schedule.
2. A final copy of the approved keying schedule.
3. Catalog cuts for each item used in the project.
4. Parts list and numbers for each item used.
5. Maintenance instructions for all items.

1.05 QUALITY ASSURANCE

A. Manufacturer's model numbers listed in sets are to establish the standard of quality. Similar items by manufacturers other than those listed that conform to this quality standard may be accepted upon prior approval by Architect provided required data and physical samples are submitted in accordance with Section 01 63 00.

B. Hardware supplier must be engaged in regularly contracting work and be staffed to expedite the work. The firm shall have been furnishing finish hardware on similar projects in the vicinity of this project for no less than five years. The firm shall also employ a certified Architectural Hardware Consultant (AHC) to inspect periodically and direct detailing, setting, applying of architectural grade finish hardware. This person shall be a member in good standing in the Door and Hardware Institute and be part of the accreditation program. Same individual shall apply their seal to schedules and documentation.

1.06 DELIVERY, STORAGE AND HANDLING

A. Hardware shall be delivered to the job site in the manufacturer's original packages, marked to correspond with the approved hardware schedule door numbers.

B. Provide a clean, dry, locked and lighted room with shelves exclusively used to store hardware.

C. A delivery document shall be signed by both the distributor representative and an authorized representative of the contractor after verification of the quantities delivered.

1.07 WARRANTIES

A. Supply written manufacturer's warranties, agreeing to repair of replace door hardware which is defective in manufacture or installation, or which fails to operate in accordance with the specifications during the warranty period. Warranty periods shall be as follows:
1. Door Closers: 10 years from date of Substantial Completion.
2. Locks: 5 years from the date of Substantial Completion.
3. Hinges continuous type: Life of the installation.
4 Other hardware items: 1 year from the date of Substantial Completion.

1.08 MAINTENANCE MATERIALS

A. Fasteners: Furnish 12 extra screws or fasteners of each type size and of the same finish used in this project.

B. Exit Devices: Furnish two complete devices with exterior trim, one rim and one vertical rod.

C. Closers: Furnish four chassis and covers but one arm of every type used on this project.

D. Locksets: Furnish two secure classroom function locks.

E. Hinges: Furnish one geared hinge each type used and six heavy weight ball bearing hinges of same size and finish as used on this project.

PART 2 – PRODUCTS

2.01 MANUFACTURERS

A.	Continuous Geared Hinges	Roton/Hager	St Louis, MO
		Bommer	Landrum, SC
		Pemko	Ventura, CA
B.	Locks/Latches	Hager Companies	St Louis, MO
		Corbin/Russwin	Berlin, CT
		Sargent	New Haven, CT
		Schlage	San Francisco, CA
C.	Door Closing Devices	Hager Companies	St Louis, MO
		Norton Door Controls	Charlotte, NC
		Corbin/Russwin	Berlin, CT
		Sargent	New Haven, CT
		LCN	Princeton, IL
D.	Door Push/Pulls	Hager Companies	St Louis, MO
		Rockwood	Rockwood, IL
		Don Jo	Sterling, MA
E.	Protection Plates	Hager Companies	St Louis, MO
		Rockwood	Rockwod, IL
		Ives	New Haven, CT
F.	Stops	Hager Companies	St Louis, MO
		Rockwood	Rockwood, IL
		Ives	New Haven, CT
G.	Thresholds & Gasketing	Hager Companies	St Louis, MO
		National Guard	Memphis, TN
		Pemko	Memphis, TN

2.02 MATERIALS

A. Continuous geared hinges: Continuous geared hinges shall be manufactured by the same manufacturer of 6063-T6 anodized aluminum non-handed manufactured of three interlocking components. Door leaf and jamb leaf shall be geared together for the entire length of the hinge and joined by a cover channel. Use concealed leafs; surface applied leafs are NOT acceptable. Unexposed working metal surfaces shall be coated with TFE dry lubricant. Vertical door load shall be carried on a minimum of 32 Lubriloy RLR bearings through a full 180degree opening. Piano type hinges are NOT acceptable. Provide a minimum of 54 flat head, under cut, self-drilling fasteners at all hinges. Provide UL ratings as required in sets also provide a Lifetime Warranty on geared hinges. Electrify them as listed in sets and provide

proper mortar boxes. Subject to compliance to this specification provide continuous geared hinges from one of the following manufacturers:
1. Roton/Hager, 780 - 224HD or as listed in sets.
2. Bommer, FM 83 HD series.
3. Pemko, CFM 83 HD series.

B. Locks/Latches: Provide mortise locks/latches from the manufacturer that conform to ANSI/BHMA standard A156.13 series 1000 Operational Grade 1 and Security Grade 2. Provide KNURLING on levers when required by code. Provide curved lip strikes. Electrify locks as required in sets, power supply shall be from same Mfg to keep the proper warrantee.
1. Hager 3800 series with Withnell trim design.
2. Corbin/Russwin, ML2000 series with NSA trim.
3. Sargent, 8200 series with LNL trim.
4. Schlage, L9000 series with 06A trim.

C. Door Closer: Provide surface mounted door closers from the same manufacturers as listed below that comply with ANSI/BHMA A156.4 grade 1 standard C02011or C02021, and will have a minimum ten (10) year written warranty. Provide mounting brackets as required for proper installation. Provide BF, CLP, J, DA, ST, UNITROL, ELECTRIFIED options as listed in sets. Install closing devices away from public view when possible.
1. Hager 5200 series
2. Norton, 7500 series.
3. Sargent, 281 or 351 series.
4. Corbin/Russwin, DC2000 series.
5. LCN, 4000 series.

D. Push/Pulls: Provide solid stainless steel pulls that comply with ANSI/BHMA A156.6 standard J401, and will be 1” inch in diameter with 8” inches on-center with a .050 thick back plate 4” x 16” minimum width and height. They shall also be cut for cylinders as listed in sets.
1. Hager, H 33G x 120L as listed in sets.
2. Rockwood, equal to above.
3. Don Jo, equal to above.

E. Protection plates: Provide kick, armor and mop plates from one of the listed manufacturer that conforms to ANSI 156.6 standard J102 or J103. Thickness shall be .050 and have beveled edges. Height of protection plates shall be as listed in sets. The width of the kick plates shall be less -2" inches for single doors and less - 1" inch for pairs of doors. Mop plates shall be less -1" inch for singles and less - 1/2" inch for pairs. Fasteners shall be countersunk, regardless of how they are listed in sets.
1. Hager, 193 S series or as listed in sets.
2. Rockwood, .050 thick materials.
3. Ives, 8400 series.
4. Don Jo, .050 min thickness.

F. Door Stops: Provide doorstops from one of the listed manufacturer that conforms to ANSI 156.16 grade 1. Furnish floor stops, with risers if needed, only when wall stops are not practical. Provide adequate internal wall blocking for wall stops.
1. Hager, 236 W, 269F stops, as listed.
2. Rockwood, equal to above
3. Ives, equal to above

G. Thresholds, weather-stripping, gasketing and miscellaneous items; Provide perimeter gasketing, door bottoms, thresholds, astragals, etc, from one on the listed manufacturers that

conforms with ANSI/BHMA A156.22 standard. Provide a latch protector equal to Hager 341D when listed in sets.

1. Thresholds: (Where shown on drawings provide expansion or other needed cover plates equal to Hager 626S x proper width and fasteners, see details on drawings).
   a. Hager, 626S as listed in sets.
   b. National Guard, equal to above
   c. Pemko, equal to above

2. Door sweeps for exterior openings:
   a. Hager, 802S as listed in sets.
   b. National Guard, 110 series
   c. Pemko, 332 series

2.03 FINISHES

A. Conform to ANSI/BHMA A156.18 Standard for architectural finishes, use brushed chrome 626 or 652 (US26D), brush stainless steel 630 (US32D) or 689 (AL/CLR), as listed in sets.

2.04 KEYING

A. Cylinders and Keying: Provide construction keying for the project.
   1. Cylinders: Exterior High Security type equal to the Medeco.
      a. Grade 1. UL437
      b. Number of Pins: seven pin system.
      c. Cores: Fixed Core
   2. Cylinders: Interior Openings, 7 pin Restricted System shall be Interchangable Cores (IC).
   3. Keying System:
      a. Construction cylinders shall be keyed alike.
      b. Keys:
         1) CMK - Masters: 12
         2) GMK – 6
         3) MK – 6 per section or department
         4) Change keys: 3 per keyed cylinder
         5) Control keys: 3

B. Provide (6) extra keyed cores and tag them maintenance.

C. Provide keyed cylinders, compatible with locks furnished by other specialty door/gate/grille type manufacturers listed in other Sections of this project, see plans for locations and quantities.

2.05 KEY CONTROL

A. Provide a complete lockable "Key Control System" cabinet as manufactured by one of the listed manufacturers. Include all components for expansion of 50 % of building capacity. Provide lock manufacturer's standard software program for key control.
   1. MMF Industries
   2. Telkee
   3. Lund

PART 3 - EXECUTION

3.01 EXAMINATION

A. Installer shall examine doors, frames and existing finish hardware conditions under which the work is to be performed and notify the Architect in writing of any detrimental conditions to the proper completion of the installation. Do not proceed until unsatisfactory conditions have been corrected. Starting the Work means the installer has accepted substrates and existing conditions and the responsibility.

3.02 INSTALLATION

A. Comply with manufacturer's installation instructions. Install door-closing devices away from public view when possible.

B. Mount the finish hardware at the recommended location listed in DHI' s document on installation, except where required by law.

C. Install surface closers and overhead stops with trough bolts and grommet nuts.

D. Install closers away from public view and tampering.

3.03 ADJUSTING AND CLEANING

A. At completion of installation, hardware shall be left clean and free from disfigurement. Make final adjustments to closing devices after HVAC system has been activated and balanced. Where hardware is found defective or not in conformance with the specifications, repair or replace as instructed by the Designer.

3.04 PROTECTION

A. Provide proper protection of hardware items until the Architect accepts the project as complete and the building is being turned over to the owner.

3.05 FIELD QUALITY CONTROL

A. After final installation and adjustments are made, provide for the manufacturers representative of each major group of hardware to determine if their products were installed according to their recommended guidelines and the approved hardware schedules. This task shall be supervised by a certified AHC chosen by the Designer. This Individual shall provide a written report confirming that the hardware has been installed properly and that it is operating as intended.

3.06 HARDWARE SETS

A. Text in brackets are prompts for information which is to be determined by the hardware supplier and shown on the hardware schedule.

HW # 1 Single, exterior service doors
Door # 102, 103A, 103B, 104

1 Geared hinge 780-224HD x [full height of door] x CLR
1 Mortise lock 3881 WTN x US32D
1 Latch protector 341D x US32D (use at RB doors)
1 Surface door closer 5200 x AL
1 Heavy duty floor stop 269F
1 Protection plate 193S x 10” high x [proper width] x US32D
1 Threshold 626S x 6” x [proper length] x C
1 Set of weather-stripping 802S B x [perimeter of opening] x AL
1 Door sweep 802S B x [width of door leaf] x AL

HW # 2 Single, exterior multi-user washroom doors
Doors # 100, 101

1 Geared hinge 780-224HD x [full height of door] x CLR
1 Mortise deadlock 3863 x US32D
1 Set of push pull 33G 4” x 16 x 120L 4” x 16” x CFC x US32D
1 Surface door closer 5200 x AL
1 Wall stop 236W x US32D
1 Protection plate 193S x 10” high x [proper width] x US32D
1 Threshold 626S x 6” x [proper length] x C
1 Set of weather-stripping 802S B x [perimeter of opening] x AL
1 Door sweep 802S B x [width of door leaf] x AL

END OF SECTION 08 71 00

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Section 08 90 00

LOUVERS AND VENTS

PART 1 - GENERAL

1.1 SECTION INCLUDES

A. Furnish and install the following:

1. Prefinished aluminum exterior fixed louvers, complete with aluminum wire mesh bird screens, and related items, for indicated locations.

1.2 RELATED SECTIONS

A. Section 07 72 00 - ROOF ACCESSORIES:

1. UL listed prefabricated heat and smoke vent.
2. Elevator vent structure.

B. Section 07 92 00 - JOINT SEALANTS: Providing perimeter sealant and backing materials.

C. Division 23 - HEATING, VENTILATING AND AIR CONDITIONING:

1. Blank-off plates on back side of louvers.

1.3 REFERENCES

A. Comply with applicable requirements of the following standards and those others referenced in this Section, under the provisions of Section 01 42 00 - REFERENCES. Where these standards conflict with other specified requirements, the most restrictive requirements shall govern.

1. AAMA 2605 - Specification for High Performance Organic Coatings on Architectural Extrusions and Panels.
2. ASCA 96 - Voluntary Specification for Performance of Organic Coatings on Architectural Aluminum Curtainwall, Extrusions and Miscellaneous Aluminum Components.
3. AMCA Standard 500-L - Laboratory Methods of Testing Louvers for Rating.
4. AMCA Publication 501, "Application Manual for Air Louvers".
5. ASTM B 209 - Aluminum-Alloy Sheet and Plate.
6. ASTM B 221 - Aluminum-Alloy Extruded Bars, Rods, Wire, Shapes, and Tubes.

1.4 SUBMITTALS

A. Submit the following under provisions of Section 01 33 00 - SUBMITTAL PROCEDURES:

1. Literature: Manufacturer's product data sheets, specifications, performance data, physical properties for each type of louver and related components furnished hereunder.
2. Manufacturer's sample warranties for louvers and finishes.
3. Schedule: Schedule of all louvers to be furnished hereunder, indicating locations for each size and type of louver, and locations and sizes of blank off panels
4. Shop drawings:
   a. Elevation drawings.

b. Large scale details of louver and blank off panel construction, indicating all sizes, gages, and thickness; large scale details of bird screens and accessory items; and complete installation details, coordinated to the specific receiving conditions. All details bearing dimensions of actual measurements taken at the project.

5. Samples:

a. Sample card indicating Manufacturer's full range of colors available for selection by Architect.

b. 12 inch long finish samples of louver frame showing each type material finish and color selected specified.

1.5 QUALITY ASSURANCES

A. Perform work in accordance with AMCA Certification for louvers. Mark units with AMCA Certified Ratings Seal.

1.6 DELIVERY, STORAGE AND HANDLING

A. Store all materials in an elevated dry location, protected by waterproof coverings

1.7 WARRANTY

A. Provide the following warranties under provisions of Section 01 78 00 - CLOSEOUT SUBMITTALS:

1. Louver manufacturer's standard warranty.
2. 10 year warranty on louver finish which shall include covering the applied finish against defects, including color fading, chipping, crazing, pitting, and delamination.
3. 10 year warranty on polyvinylidene fluoride enamel finish which shall include covering the applied finish against defects, including color fading, chipping, crazing, pitting, and delamination.

PART 2 - PRODUCTS

2.1 MANUFACTURERS

A. Specified Manufacturer: To establish a standard of quality, design and function desired, Drawings and specifications have been based on Airolite Company LLC, Schofield, WI.

B. Acceptable Manufacturers: Subject to compliance with the requirements specified herein, manufacturers offering products which may be incorporated in the work include the following, or approved equal:

1. Airolite Company LLC, Schofield, WI.
2. Construction Specialties, Inc., Cranford NJ.
3. Industrial Louvers, Inc., Delano MN.
4. Cesco Products, Minneapolis MN.
5. Empco Inc., Dallas TX

C. Acceptable Substitutions: The products specified herein establish standards of quality, design and function desired. Under provisions of Massachusetts General Laws, Chapter 149, other equal products not named herein, may be considered for acceptance as an equal by the Architect upon submission of complete product information as described in Section 01 25 13 - PRODUCT SUBSTITUTION PROCEDURES. Further additional information may be requested by the Architect for determination that the proposed product substitution is fully equal to the

specified product(s). There is no guarantee that proposed substitutions will be approved, and the Contractor is hereby directed not to order any materials until said approval(s) are received in writing.

1. Requesting substations is at the Contractor's own risk, with regard to uncompensated delays of the Project. Time is required for sufficient review and additional requests for information. Delays of work which result from substitution reviews and resubmissions are not grounds for additional time or cost change orders, and will not be considered by the Awarding Authority.

2.2 ARCHITECTURAL LOUVERS

A. Louvers at Roof Gable: Custom fabricated triangular shaped nominal 2 inch deep narrow profile architectural louvers in the arrangements and dimensions shown on the Drawings. Louvers shall be stationary horizontal inverted "v" blade louvers. rated to resist water penetration under wind-driven rain conditions. Airolite model Nº. SCH201, or approved equal in compliance with specified requirements.

1. Nominal Louver depth: 2 inches (50.8 mm).
2. Framing: Heads, sills, jambs and mullions to be one piece structural members of 6063-T5 alloy minimum 0.063 inch (1.60 mm) thick.
3. Blades: inverted "v" blade design with a center hook, minimum 0.063 inch (1.60 mm) thick.
   a. Fabricate louver with close-fitting, field made splice joints in blades designed to permit expansion and contraction without deforming blades or framework and with mullions recessed from front edges of blades so blades have continuous appearance.
4. Screens: manufacturer's bird and insect screens secured, within a extruded aluminum frame, factory installed on interior side of louver.
5. Performance criteria:
   a. Tested per AMCA Standard 500-L for Water Penetration Test for Wind Driven Rain and meeting the following test criteria as a minimum:
      1) Effectiveness Rating, at 29 mph exterior wind velocity and rain fall rate of 3 inches per hour: Not less than 99.5 percent.
      2) Core Ventilation, at 29 mph exterior wind velocity and rain fall rate of 3 inches per hour: 189 mph.
      3) Effectiveness Rating, at 50 mph exterior wind velocity and rain fall rate of 8 inches per hour: Not less than 99.7 percent.
      4) Core Ventilation, at 50 mph exterior wind velocity and rain fall rate of 8 inches per hour: 0 mph.
   b. Minimum Free Area:
      1) 39 percent (As determined in accordance with AMCA Standard 500, and certified by AMCA Standard 511).
      2) 6.20 square feet (4 by 4 foot test unit)
   c. Free Area Velocity at beginning point of water penetration: 914 FPM (4.64 m/s).
      1) Water penetration shall not exceed 0.01 ounces of water per square foot of free area at a velocity of 1106 FPM when tested per AMCA Standard 500.
   d. Air volume delivered at beginning point of water penetration: 5,667 CFM.
   e. Pressure Drop at beginning point of water penetration: 0.198 inches water.
   f. Design louver to sustain a wind load of not less than 25 pounds per square foot.

B. Provide permanent and removable louver units or panels, as indicated on Drawings or as otherwise required by mechanical systems.

2.3 ACCESSORIES

A. Fasteners and Anchors: Stainless steel type.

B. Primer: Zinc chromate, alkyd type.

C. Flashings: Of same material as louver frame.

D. Perimeter sealant and backing materials provided under Section 07 92 00 - JOINT SEALANTS.

2.4 FACTORY FINISHING

A. Shop-applied Polyvinylidene Fluoride (PVDF) resin based, high performance thermoplastic organic coating conforming to AAMA 2605, NAAMM - Metal Finishes Manual, and the following:

1. Resin base of 70 percent PVDF by weight, Atochem North America, Inc., product “Kynar 500” or Ausimont USA. product “Hylar 5000 “.
2. Finish Coating shall be manufactured as one of the following products:
   a. Akzo Chemical; product “Trinar”.
   b. Glidden Company; product “Nubelar”.
   c. Morton International; product “Fluoroceram”.
   d. P.P.G. Industries Inc.; product “Duranar”.
   e. Valspar Corp., product: “Fluropon”.
3. Surface Preparation: Properly clean aluminum with inhibited chemical cleaner and pretreat with acid chromate-fluoride-phosphate conversion coating, in accordance with Aluminum Association method AA-C12C42.
4. Shop-prime all surfaces with a corrosion resistant, epoxy-based primer compatible with finish coating, averaging 0.2 to 0.4 mils dry film thickness, fully oven-cured.
5. Shop finish with one color coat, of polyvinylidene fluoride enamel minimum 1.0 to 0.80 mil dry film thickness on all exposed surfaces, including all exposed screws, fastenings, etc.
6. Total system dry film thickness: 1.2 mils.
7. Color and Appearance: Color shall be from paint manufacturer's available library of non-exotic colors and shall match color sample furnished by Architect.

B. Concealed Steel Items: Galvanized in accordance with ASTM A386 to 2.0 ounces per square foot.

C. Apply one coat of bituminous paint to concealed aluminum surfaces in contact with cementitious or dissimilar materials.

PART 3 - EXECUTION

3.1 EXAMINATION

A. Inspect all surfaces and verify that they are in proper condition to receive the work of this Section. Verify that prepared openings and flashings are ready to receive the work of this

Section and opening dimensions are as indicated on the shop drawings. Verify that all blocking and nailers are set in place and secure.

B. Beginning of installation means acceptance of existing project conditions.

3.2 INSTALLATION

A. Install louver assembly in accordance with manufacturer's instructions. Erect louvers plumb and level, free of warp or twist. Maintain dimensional tolerances, aligning with adjacent work.

1. Install flashings and align louver assembly to ensure moisture shed from flashings and diversion of moisture to exterior.
2. Secure louvers in opening framing with removable fasteners or hinged for maintenance purposes.
3. Install bird and insect screen and frame to interior of louver. Hinge screens for access.

B. No permanent exposed to view labels of any kind will be permitted to remain on the louvers or frames.

3.3 TOLERANCES

A. Maximum Variation from Level or Plumb: 0.06 inches every 3 feet non-cumulative or 0.5 inches per 100 feet, whichever is less.

3.4 CLEANING AND TOUCH UP

A. Upon completion of the work of this Section in any given area, remove tools, equipment and all rubbish and debris from the work area; leave area in broom-clean condition.

B. Remove excess sealant by solvent acceptable to sealant manufacturer. All exposed edges of sealant and gaskets shall be left smooth, uniform in line, and with edges neatly struck.

C. Remove protective material from prefinished aluminum surfaces. Wash down exposed surfaces free of dirt, handling marks, packing tapes, and foreign matter, using a solution of mild detergent in warm water, applied with soft, clean wiping cloths. Take care to remove dirt from corners. Wipe surfaces clean.

D. Touch-up all scratches, abrasions, and other defects in the prefinished metal surfaces with shop-coat finish material, supplied with the various items to be furnished hereunder.

End of Section

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Section 09 22 16

NON-STRUCTURAL METAL FRAMING

PART 1 - GENERAL

1.1 SUMMARY

A. The work of this Section consists of non-load bearing metal framing for ceilings and soffits, where shown on the Drawings, as specified herein, and as required for a complete and proper installation. Work includes, but is not limited to the following.

B. Furnish and install:

1. Metal ceiling and soffit framing, including hanger attachments, wire hangers, and screwable metal tee grid system.

1.2 RELATED REQUIREMENTS

A. Section 06 10 00 - ROUGH CARPENTRY: Wood blocking.

B. Section 08 31 00 - ACCESS DOORS AND PANELS: Shop primed access panels, occurring in partitions and walls.

C. Section 09 29 00 - GYPSUM BOARD: Gypsum board, applied over metal framing installed by this Section 09 22 16 including: gypsum board, and related trim components.

D. Division 23 - HEATING, VENTILATING AND AIR CONDITIONING: Supply and return air registers.

E. Division 26 - ELECTRICAL: Independent hangers for suspended lighting fixtures.

1.3 REFERENCES

A. Reference Standards: Comply with applicable requirements of the following standards and those others referenced in this Section, under the provisions of Section 01 42 00 - REFERENCES. Where these standards conflict with other specified requirements, the most restrictive requirements shall govern.

1. ASTM C 525 - General Requirements for Steel Sheet, Zinc-Coated (Galvanized) by the Hot-Dip Process..
2. ASTM C 645 - Non-Load Bearing Steel Studs, Runners, and Rigid Furring Channels for Screw Application of Gypsum Board.
3. ASTM C 646 - Steel Drill Screws for the Application of Gypsum Sheet Material to Light Gage Steel Studs.
4. ASTM C 754 - Installation of Steel Framing Members to Receive Screw-Attached Gypsum Wallboard.
5. ASTM E 90 - Method of Laboratory Measurement of Airborne Sound Transmission Loss of Building Partitions.
6. ASTM E 119 - Fire Tests of Building Construction and Materials.
7. GA 203 - Installation of Screw-Type Steel Framing Members to Receive Gypsum board.

1.4 ADMINISTRATIVE REQUIREMENTS

A. Coordination:

1. Coordinate the work of this Section with the respective trades responsible for installing interfacing work, and ensure that the work performed hereunder is acceptable to such trades for the installation of their work
2. Work of this Section shall be closely coordinated with the work of Section 09 29 00 - GYPSUM BOARD to assure the steady progress of the Contract.

1.5 SUBMITTALS

A. Information and Review Submittals: Submit the following under provisions of Section 01 33 00 - SUBMITTAL PROCEDURES:

1. Product Data: Manufacturer's product data sheets, specifications, performance data, physical properties for each item furnished hereunder.

1.6 QUALITY ASSURANCE

A. General: Notify the Architect where conflicts apply between referenced standards and existing materials, and existing methods of construction.

B. Sole Source: Obtain products required for the Work of this Section from a single manufacturer.

1.7 DELIVERY, STORAGE AND HANDLING

A. Delivery and Acceptance Requirements:

1. Do not deliver items to the site, until all specified submittals have been submitted to, and approved by, the Architect.

B. Storage and Handling Requirements:

1. Store and handle materials following manufacturer's recommended procedures, and in accordance with material safety data sheets.
2. Protect materials from damage due to moisture, surface contamination, corrosion and damage from construction operations and other causes.

PART 2 - PRODUCTS

2.1 CEILING AND SOFFIT SUSPENSION MATERIALS

A. Hanger attachments: Galvanized steel hanger eyes, of size and capacity to safely sustain a live load of at least 150 pounds per hanger attachment.

B. Hangers: 8 gage monel wire.

C. Grid system for direct attachment of gypsum board: Comprised of double web main furring tees, 1 1/2 inches high by 1-3/8 inches flange face by 0.020 inch thick; double web cross tees, 1 1/2 inches high by 15/16 inch flange face by 0.020 inch thick; 0.020 inch thick wall channels, with 1 1/2 inches interior web height; and all splices, clips, and related items. Provide Underwriters Laboratories Label fire-rated assemblies for locations requiring fire-rated ceilings and soffits

1. Chicago Metallic Corporation, Chicago IL., product “system 640 Furring System”.
2. Armstrong World Industries, Inc., Lancaster, PA., product “Drywall Furring System”.
3. USG Corporation, Chicago IL., product “USG Drywall Furring System” with DGLW tees.

2.2 ACCESSORIES

A. Metal sheet plate bracing, where indicated: galvanized sheet 0.0312 inch thickness (20 gage).

B. Fasteners:

1. Expansion-type fasteners for securing vertical concrete and masonry surfaces.
2. Concrete stub nails for securing runners to concrete.
3. Nº.7 by 7/16 inch Pan head self-drilling screw to attach metal framing components.

PART 3 – EXECUTION

3.1 INSTALLATION, QUALITY STANDARDS

A. General: Perform erection procedures for the various gypsum board system conditions, except as otherwise specified, as set forth in GA 201, GA 206, the written instructions of gypsum board manufacturer, together with the additional requirements specified herein and as indicated on the Drawings.

3.2 INSTALLATION - CEILING SUSPENSION SYSTEM

A. Coordinate layout and installation of suspension system components for suspended ceilings with other work supported by, or penetrating work of this section. Re-adjust ceiling suspension system, prior to the installation of the gypsum board and after installation of mechanical and electrical equipment and fixtures by the respective trades.

B. Install all components of concealed grid system in accordance with the manufacturer's instructions, with current ASTM C 636 requirements, with design and installation of suspended grid system safely sustaining a membrane loading of at least 7.9 pounds per square foot.

C. Install hangers not more than 24 inches on centers over locations of main tee members. Install hanger wires to hanger attachment with triple twists. Install additional wires as required to provide support for main tees, at intervals not exceeding four feet, wherever main tees must be interrupted in order to install other work and at all other locations as may be directed by the Architect.

D. Install main tees parallel to long dimension of the area, at spacing not to exceed 48 inches on-center. Secure with hanger wire as the work progresses. Install cross tees as recommended by the system manufacturer, except spacing shall not exceed16 inches on-center.

3.3 TOLERANCES

A. Install partition and ceiling framing and furring with a maximum variation from true flatness of 1/8 inch per 10 feet, noncumulative.

End of Section

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Section 09 29 00

GYPSUM BOARD

PART 1 - GENERAL

1.1 SUMMARY

A. The work of this Section consists of gypsum board (drywall) and trim finishes for ceilings, and soffits, where shown on the Drawings, as specified herein, and as required for a complete and proper installation.

B. Furnish and install:

1. Taped, compounded and sanded abuse resistant gypsum board ceiling finishes.
2. All trim and accessory components related to gypsum board work.
3. Joint sealant and backing at perimeter of gypsum board ceilings.

C. Install access panels occurring in gypsum board work furnished by Section 08 31 00 - ACCESS DOORS AND PANELS, and by trades requiring the same.

1.2 RELATED REQUIREMENTS

A. Section 05 40 00 - COLD-FORMED METAL FRAMING: Load bearing framing.

B. Section 06 10 00 - ROUGH CARPENTRY:

1. Supplemental wood framing and blocking supporting gypsum board.
2. Installation of metal door frames in gypsum board work.

C. Section 06 20 00 - FINISH CARPENTRY: Interior wood trim.

D. Section 08 11 13 - HOLLOW METAL DOORS AND FRAMES: Furnishing steel door frames.

E. Section 08 31 00 - ACCESS DOORS AND PANELS, and by trades requiring the same: Shop primed access panels, occurring in partitions and walls.

F. Section 09 22 16 - NON-STRUCTURAL METAL FRAMING: Suspended ceiling framing system.

G. Section 09 91 00 - PAINTING: Applied finish coatings.

H. Division 23 - HEATING, VENTILATING AND AIR CONDITIONING: Supply and return air registers.

I. Division 26 - ELECTRICAL: Independent hangers for suspended lighting fixtures.

1.3 REFERENCES

A. Reference Standards: Comply with applicable requirements of the following standards and those others referenced in this Section, under the provisions of Section 01 42 00 - REFERENCES. Where these standards conflict with other specified requirements, the most restrictive requirements shall govern.

1. ASTM C 475 - Joint Treatment Materials for Gypsum Wallboard Construction.
2. ASTM C 754 - Installation of Steel Framing Members to Receive Screw-Attached Gypsum Board.

3. ASTM C 919 - Use of Sealants in Acoustical Applications.
4. ASTM C 1002 - Steel Self-Piercing Tapping Screws for the Application of Gypsum Panel Products or Metal Plaster Bases to Wood Studs or Steel Studs.
5. ASTM C 1047 - Accessories for Gypsum wall board and veneer base.
6. ASTM C 1396 - Gypsum Wallboard.
7. ASTM E 90 - Method of Laboratory Measurement of Airborne Sound Transmission Loss of Building Partitions.
8. ASTM E 119 - Fire Tests of Building Construction and Materials.
9. GA 201 - Gypsum Board for Walls and Ceilings.
10. GA 214 - Recommended Specifications for Levels of Gypsum Board Finish.
11. GA 216 - Recommended Specifications for the Application and Finishing of Gypsum Board.
12. GA 220 - Recommended Specifications for Gypsum Board Winter Related Job Problems.
13. UL - Fire Resistance Directory.
14. UL 723 - Tests for Surface Burning Characteristics of Building Materials.
15. All applicable federal, state and municipal codes, laws and regulations for fire rated assemblies.

1.4 ADMINISTRATIVE REQUIREMENTS

A. Coordination:

1. General: Coordinate the work of this Section with the respective trades responsible for installing interfacing and adjoining work for proper sequence of installation, and ensure that the work performed hereunder is acceptable to such trades for the installation of their work.
2. Work of this Section shall be closely coordinated with the work of Section 09 22 16 - NON-STRUCTURAL METAL FRAMING, to assure the steady progress of the Contract.

B. Sequencing:

1. Do not install gypsum board until all pipes, ducts, conduits, and other such items which are to be enclosed thereby, have been permanently installed, inspected and approved.

1.5 SUBMITTALS

A. Information and Review Submittals: Submit the following under provisions of Section 01 33 00 - SUBMITTAL PROCEDURES:

1. Product Data: Manufacturer's product data sheets, specifications, performance data, physical properties for each item furnished hereunder.
2. Shop Drawings:
   a. Details of any special conditions associated with fireproofing.
   b. Mark-up a set of blackline interior elevations indicate corrections to grid layout and provide dimensioning showing locations of all proposed control joints and expansion joints.
      1) Provide interior elevation drawings for interior elevations which are not included as part of the Contract Drawing set.

1.6 QUALITY ASSURANCE

A. General: Notify the Architect where conflicts apply between referenced standards and existing materials, and existing methods of construction.

B. Sole Source: Obtain products required for the Work of this Section from a single manufacturer, or from manufacturers recommended by the prime manufacturer of gypsum board.

1.7 DELIVERY, STORAGE AND HANDLING

A. Delivery and Acceptance Requirements:

1. Do not deliver items to the site, until all specified submittals have been submitted to, and approved by, the Architect.
2. Deliver materials in original packages, containers or bundles bearing brand name and identification of manufacturer or supplier.

B. Storage and Handling Requirements:

1. Store materials inside, under cover and in manner to keep them dry, protected from weather, direct sunlight, surface contamination, corrosion and damage from construction traffic and other causes.
   a. Neatly stack board materials flat to prevent sagging.
2. Handle board materials so to prevent damage to edges, ends and surfaces.
3. Protect trim, accessories and corner beads from being bent or damaged.

1.8 SITE CONDITIONS

A. Environmental Conditions: In accordance with GA 216, maintain minimum ambient temperature of 50 degrees Fahrenheit 48 hours before, during taping and compounding, and until completely dry thereafter.

PART 2 - PRODUCTS

2.1 MANUFACTURERS

A. Acceptable Manufacturers: Subject to compliance with the requirements specified herein, manufacturers offering products which may be incorporated in the work include the following, or approved equal:

1. Gypsum board products:
   a. United States Gypsum Company, Chicago IL. (USG).
   b. National Gypsum Company, Gold Bond Products Division, Charlotte NC. (Gold Bond).
   c. G-P Gypsum Corporation, Atlanta GA.
   d. Lafarge Corporation, Hendron VA.
2. Joint Sealants:
   a. Tremco, Beachwood OH.
   b. United States Gypsum Company, Chicago IL.
   c. Pecora Corporation, Harleysville PA.

B. The design and details as shown on the Drawings and the model numbers specified herein are to establish the standards of design and quality and not to limit competition.

2.2 BOARD MATERIALS

A. Abuse resistant gypsum board (ARGB): Impact resistant UL type FRX fire resistance type, ASTM C-1278 board 5/8 inch thick with tapered edges and of lengths to minimize end joints. Board shall consist of an exposed face of gypsum and cellulose fibers, an unexposed face having glass fiber-mesh scrim embedded in gypsum and cellulose fibers, and a perlite core.

1. Performance properties:

a. Surface abrasion: 0.087 inch, when tested in accordance with ASTM D4777 with 25 pound added weight, 50 abrasion cycles.

b. Surface indentation: 0.14 inch, when tested in accordance with ASTM D5420 with 72 in-lb drop energy.

c. Soft body impact, when tested in accordance with ASTM E695:

1) Surface failure: 180 ft-lb.

2) Deformation failure: 240 ft-lb, with L/240 deflection.

d. Penetration failure: More than 300 ft-lb.

e. Hard body impact, when tested in accordance with swinging ram apparatus: 99ft-lb.

2.3 ACCESSORIES

A. Paper faced trim accessories for use with Abuse Resistant Gypsum Board:

1. Corner beads (at outside corners): Paper-faced galvanized steel sheet for finishing with joint compound conforming with ASTM C-1047, equal USG product “Sheetrock” Brand Paper-Faced Metal Corner Bead.

a. Provide curved-edge cornerbead with notched or flexible flanges at curved openings.

2. Casing beads: Paper-faced galvanized steel sheet for finishing with joint compound conforming with ASTM C-1047, equal to USG product “Sheetrock” Brand Paper-Faced Metal Beads and Trims.

a. LC-Bead (J-Bead): Use at exposed panel edges.

b. L-Bead: Use where indicated

c. U-Bead: Use where indicated.

3. Control joints: Solid zinc “V-shaped control joint, having 3/32 inch thick perforated grounds, equal to USG Control Joint No. 093.

B. Tapes and compound:

1. Joint tape: Nominal 2 inch wide, high strength, cross-fibered paper drywall tape.

2. Joint Compound for setting tape: ‘Speed-setting type compound’, field mixed equal to USG “Durabond 20” or Gold bond “Stay Smooth 30”.

3. Joint Compound for finishing: field mixed joint compound equal to USG “Durabond 90” and Gold bond “Stay Smooth 90”, or factory pre-mixed compound equal to USG “Ready-Mixed Joint Compound” and Gold Bond “All Purpose Compound”.

C. Fasteners:

1. Type S, bugle head screws complying with ASTM C 1002, stainless steel, or zinc-dichromate-coated, for applying gypsum board to metal framing, ceiling grid system, and furring channels.

a. Not less than 1 inch long for single layer gypsum board.

2. Type W, bugle head screws complying with ASTM C 1002, stainless steel, or zinc-dichromate-coated, for applying gypsum board to wood blocking.
   a. Not less than 1-1/4 inch [31mm] long for single layer gypsum board
3. Type S-12, stainless steel, or zinc-dichromate-coated, fine thread self-drilling screws complying with ASTM C 1002,for applying gypsum board to light gage metal framing.
   a. Not less than 1 inch [25 mm] long for 1/2 inch thick single layer gypsum board.
   b. Not less than 1-1/4 inch [31mm] long for 5/8 inch thick single layer gypsum board.

D. Ceiling buttons, perforated type, 1 inch diameter, for use at multiple layered gypsum board ceiling systems.

E. Joint Sealers (interior acoustical sealant type): One component acrylic latex, permanently elastic, non-staining, non-shrinking, non-migrating and paintable. Acceptable products include the following, or approved equal.
   1. Tremco, Beachwood OH.; product, “Acoustical Sealant”.
   2. United States Gypsum Company, Chicago IL.; product “USG Acoustical Sealant”.
   3. Pecora Corporation, Harleysville PA.; product “ AC-20 FTR”.

F. Primer/Sealer: Provide manufacturer’s recommended spray applied, high build, vinyl acrylic latex based coating equal to United States Gypsum Company “Tuff-Hide”.

2.4 SOURCE QUALITY CONTROL

A. Obtain gypsum board products from a single manufacturer, or from manufacturers recommended by the prime manufacturer of gypsum boards.

PART 3 - EXECUTION

3.1 EXAMINATION

A. Verify that all items which are to be enclosed by Work of this Section, have been permanently installed, inspected and approved.

B. Inspect framing and other substrates; verify that they are in proper condition to receive the work of this Section.

C. Beginning of installation means acceptance of existing substrate and site conditions.

3.2 PREPARATION

A. During the operation of gypsum board work, protect all wood, metal, glass, flooring, and other finished materials against undue soilage and damage by the exercise of reasonable care and precautions. Repair or replace any work so damaged and soiled.

3.3 INSTALLATION - GENERAL

A. General: Perform erection procedures for the various gypsum board system conditions, except as otherwise specified, as set forth in GA 201, GA 216,GA 220, the written instructions of gypsum board manufacturer, together with the additional requirements specified herein and as indicated on the Drawings.

B. Where fire-resistive rated assemblies are indicated, erect gypsum board systems in strict accordance with the manufacturers' UL listed test constructions for the required fire rating on each specific assembly.

3.4 INSTALLATION OF GYPSUM BOARD

A. Screw fasten only, gypsum board to framing and furring, with ends and edges occurring over firm bearing. At all door jambs screw fasten gypsum panels 8 inches on center to both box studs

1. Erect ceiling gypsum boards to meet UL requirements, where applicable, stagger end joints over supports. Secure gypsum board with fasteners inserted through ceiling buttons; anchor fasteners directly to framing or suspended support system.

B. Wherever items penetrate the gypsum board surfaces, use extra care in cutting the gypsum board to ensure a uniformly-dimensioned joint between the penetrating item and the gypsum board, and fill joints with specified sealant material. Verify the expected deflection factor of the penetrating members, and cut the gypsum accordingly, to prevent damage thereto from the deflecting members.

3.5 APPLICATION OF ACOUSTICAL SEALANT

A. General: Install sealant and backing in accordance with the recommendations of ASTM C-919 and sealant manufacturer’s recommendations.

1. Perform preparation in accordance with C-790. Thoroughly clean all joints, removing all loose mortar, oil, grease, dust, frost, and other foreign materials that will prevent proper adhesion of primers and sealant materials.
2. If so recommended and furnished by the specific sealant manufacturer, apply primer to all joint surfaces, taking care not to stain adjacent surfaces.

B. Seal all partition perimeters prior to taping or compounding. Where perimeters are edged with metal trim, apply sealant and backing material between trim and dissimilar material.

C. Seal all penetrations. Penetrations to receive sealant include electrical boxes, plumbing, heating and air conditioning ducts, telephone, intercom hookups and similar items.

1. Install joint bead back-up in all joints in excess of 5/8-inch depth, and joints that have no back-up therein, placing the joint bead in the joint in a manner that will assure a constant depth 1/8 inch greater than the sealant and caulking material depth tolerances.
   a. Set beads into joints continuously, by slightly stretching during placement, to permit compression against sides of joint, without surface wrinkles or buckles.
   b. Do not stretch back-up material into joints.
   c. Install bond breaker wherever recommended by the sealant manufacturer to prevent bond of the sealant to surfaces where such bond might impair the Work.
2. Apply sealant in continuous beads without open joints, voids or air pockets
   a. The depth of sealant and caulking materials shall be in accordance with manufacturer's recommendations for the specific joint function, but in no case exceed 1/2-inch in depth, nor less than 1/4-inch, regardless of the joint width.
3. Remove the temporary masking tape immediately after tooling, and before the sealant or caulking material has taken initial set.

3.6 APPLICATION OF JOINT TREATMENT

A. Install joint tape at all joints where gypsum boards abut and where boards form internal corners, whether or not such joints will be concealed from view.

B. Apply compound to all joints, edges, corners, fastener head depressions and abrasions in the surfaces, whether or not such conditions will be concealed from view. Sand completely smooth all compound surfaces, which will be exposed to view, and leave ready to receive applied coatings or finish.

C. Provide the minimum levels of gypsum board finishes as defined by the Gypsum Association recommended specifications GA-214 and GA-216, per the following:

1. At surfaces scheduled to receive painted finishes: Level 5.
2. Provide primer sealer over entire surface of abuse resistant gypsum ceilings to a dry film thickness of 9-12 mils. Touch up sand surfaces prior to application of paint finishes.

3.7 TOLERANCES

A. Maximum variation for gypsum board ceilings from true flatness: 1/8 inch per 10 feet, noncumulative.

3.8 CLEANING

A. Daily clean work areas by sweeping and disposing of debris, scraps, and deposits of compound and gypsum fill.

B. After completion of the work of this Section, remove equipment, and clean all wall, partition, and floor areas free from deposits of gypsum fill, and other materials installed under this Section.

End of Section

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Section 09 91 00

PAINTING

PART 1 - GENERAL

1.1 SECTION INCLUDES

A. Summary: This Section consists of painting work where shown on the Drawings, as specified herein, and as required for a complete and proper installation. Painting work includes, but is not limited to the surface preparation and application of coated finishes, and subsequent touch-up, of interior and exterior items and surfaces as indicated on the Contract Drawings and as scheduled herein.

1. No attempt is made in this Section to list all surfaces, fixtures and equipment requiring painting on this project. It is the responsibility of the Subcontractor to determine for itself the scope and nature of the Work required for a complete installation from the information provided herein and in the Drawings.

B. Surfaces and Materials: In general, without limiting the generality thereof, the following surfaces, fixtures and equipment require a painted finish:

1. Exterior and interior concrete masonry unit walls
2. Gypsum board ceilings.
3. Metal doors and frames.
4. Exterior cellular PVC trim.
5. Exposed to view sprinkler piping.
6. Exposed to view electrical conduit and raceways.
7. Access panels and frames.

C. DO NOT PAINT the following surfaces and materials.

1. Concealed from view surfaces, except as indicated otherwise in the Contract Documents or as specified herein.
2. Chrome or nickel plating, stainless steel, bronze, brass.
3. Aluminum other than mill finished or factory primed.
4. Factory finished mechanical and electrical equipment, pumps, machinery and similar items which occur in mechanical, storage or equipment rooms or areas.
5. Factory finished materials, specialties, and accessories unless otherwise specified.
6. Fire resistant testing and certification labels, code required labels, safety warning labels, performance rating plates, nomenclature plates, identification plates, and similar other labels.

1.2 RELATED SECTIONS

A. Section 03 30 00 - CAST-IN-PLACE CONCRETE: Concrete slab on grade.

B. Section 04 20 00 - UNIT MASONRY: Concrete masonry partitions.

C. Section 07 92 00 - JOINT SEALANTS: Requirements for sealant and backing materials.

D. Section 08 11 13 - HOLLOW METAL DOORS AND FRAMES: Shop priming of metal frames and steel doors.

E. Section 08 31 00 - ACCESS DOORS AND PANELS, and by trades requiring the same: Shop primed access panels, occurring in partitions and walls.

F. Section 09 29 00 - GYPSUM BOARD: Drywall partitions, ceilings and soffits, including joint treatment and sanding.

G. Division 22 - PLUMBING: Prefinished items such as plumbing fixtures, sprinkler heads, convectors, anemostates and similar surfaces and materials.

H. Division 26 - ELECTRICAL: Prefinished items such as light fixtures, switch gear, electrical distribution cabinets and similar surfaces and materials.

I. Respective sections: Factory-finishing of mechanical, plumbing, fire protection and electrical equipment.

1.3 EXAMINATION OF SITE AND DOCUMENTS

A. Bidders are expected to examine and to be thoroughly familiar with all contract documents and with the conditions under which work will be carried out. The Awarding Authority (Owner) will not be responsible for errors, omissions and/or charges for extra work arising from General Contractor's or Filed Subcontractor's failure to familiarize themselves with the Contract Documents or existing conditions. By submitting a bid, the Bidder agrees and warrants that he has had the opportunity to examine the site and the Contract Documents, that he is familiar with the conditions and requirements of both and where they require, in any part of the work a given result to be produced, that the Contract Documents are adequate and that he will produce the required results.

B. Pre-Bid Conference: Bidders are strongly encouraged to attend the Pre-Bid conference; refer to ADVERTISEMENT FOR BIDS for time and date.

1.4 REFERENCES

A. Comply with applicable requirements of the following standards and those others referenced in this Section, under the provisions of Section 01 42 00 - REFERENCES. Where these standards conflict with other specified requirements, the most restrictive requirements shall govern.

1. ANSI/ASTM D 16 - Definitions of Terms Relating to Paint, Varnish, Lacquer, and Related Products.
2. ASTM D 2016 - Test Method for Moisture Content of Wood.
3. All applicable federal, state and municipal codes, laws and regulations for flammability and smoke generation of interior finishes.

1.5 DEFINITIONS

A. "Paint" includes coating systems materials, primers, emulsions, enamels, stains, sealers and fillers, and other applied materials specified herein, whether used as prime, intermediate or finish coats.

B. Sheen: Specular gloss readings in accordance with ASTM D52

1. Flat: less than 5 (measured at 85 degrees)
2. Eggshell: 5 – 20 (measured at 60 degrees)
3. Satin: 15-35 (measured at 60 degrees)
4. Low Luster: 25 – 35 (measured at 60 degrees)

5. Semi-Gloss: 30 -65 (measured at 60 degrees)
6. Gloss: 65 or more (measured at 60 degrees)

1.6 SUBMITTALS

A. Submit the following under provisions of Section 01 33 00 - SUBMITTAL PROCEDURES:
1. Literature: Manufacturer's product data sheets, specifications, performance data, physical properties, material compositions, and application instructions for all finishing products to be applied hereunder.
a. Include certification of data indicating Volatile Organic Compound (VOC) content of all paint materials.
2. Samples:
a. Manufacturer's color selector for custom mixed colors for Architect's color scheduling.
b. Opaque coatings: Two 9 x 12 inch finished samples on hardboard of each color scheduled in each finish for review and approval. Identify boards with finish type, color mix number and scheduled substrate surfaces or materials.
c. Transparent finishes and stains: Two 9 x 12 inch finished samples on same species of solid wood and plywood to be furnished under Section 06 20 00 - FINISH CARPENTRY, of each color scheduled in each finish for review and approval. Identify boards with finish type, color mix number and scheduled substrate surfaces or materials.

B. Submit the following under provisions of Section 01 78 00 - CLOSEOUT SUBMITTALS:
1. Color chips: After final approval of all colors and tints by the Architect, submit to the Owner, color chips of all coatings used, with manufacturer's name and mix designation of the coating for the purpose of future re-ordering of coatings. Color chips shall be at least six (6) square inches in size, for each color and tint.

1.7 QUALITY ASSURANCE

A. Single source responsibility: Provide primers and other undercoat paint produced by same manufacturer as finish coats. Use only thinners approved by paint manufacturer, and use only within recommended limits.

B. Environmental Requirements for Volatile Chemicals:
1. For interior applications use paints and coatings that comply with the following limits for VOC content when calculated according to 40 CFR 59, Subpart D (EPA method 24) and the following chemical restrictions:
a. Flat Paints and Coatings: VOC not more than 50 g/L.
b. Non-Flat Paints and Coatings: VOC not more than 150 g/L.
c. Anti-Corrosive Coatings: VOC not more than 250 g/L.
d. Clear wood finishes:
1) Varnishes: VOC not more than 350 g/L.
2) Lacquer: VOC not more than 550 g/L
e. Floor coatings: VOC not more than 100 g/L
f. Sealers:
1) Waterproofing sealers: VOC not more than 250 g/L.
2) Sanding sealers: VOC not more than 275 g/L.

3) All other sealers: VOC not more than 200 g/L.

g. Stains: VOC not more than 250 g/L.

2. Do not use water based paints formulated with aromatic hydrocarbons (organic solvent with a benzene ring in its molecular structure), formaldehyde, halogenated solvents, mercury or mercury compounds, or tinted with pigments of lead, cadmium, chromium VI and their oxides. Water based paints shall be low VOC and shall have a flash point of 61 degrees C or greater.

3. Where it is necessary to use solvent-based paints, with less than 1.0 percent by weight total aromatic compounds (hydrocarbon compounds containing one or more benzene rings).

4. The following shall be low VOC and not be formulated with aromatic hydrocarbons (organic solvent with a benzene ring in its molecular structure).

   a. High performance water based acrylic coatings.

   b. Pigmented acrylic sealers.

   c. Catalyzed epoxy coatings.

   d. High performance silicone grafted epoxy coatings.

5. Restricted Components: Paints and coatings used on this Project shall not contain any of the following compounds. (Excluded from this restriction are residual quantities of naturally occurring elements and chlorinated organics which are found in chlorinated water supplies; contaminate levels shall be below that of the National Primary Drinking Water Standard):

   a. 1,2-dichlorobenzene

   b. Alkylphenol ethoxylates (APEs)

   c. Formaldehyde-donors

   d. Heavy metals, including lead, mercury, cadmium, hexavalent chromium and antimony in the elemental form or compounds

   e. Phthalates

   f. Triphenyl tins (TPT) and tributyl tins (TBT).

1.8 FIELD SAMPLES

A. Provide field samples under provisions of Section 01 45 00 - QUALITY CONTROL for purpose of verifying selected colors.

B. Paint on-site sample areas, minimum 40 square feet, illustrating selected color, and tint.

C. Locate samples where directed. The Contractor shall provide in the base Contract, a total amount of samples equal to one sample per room.

D. Accepted samples may not remain as part of the work.

1.9 DELIVERY, STORAGE AND HANDLING

A. Deliver products to site in sealed and labeled containers; container labeling shall include manufacturer's name, type of paint, color mix designation, expected coverage, surface preparation instructions, instructions for mixing and reducing, drying time, and clean-up recommendations.

B. Store materials, conforming with applicable codes and fire regulations, in designated spaces. Keep storage area secure when direct access is not required or when not performing work

under this Section. Take precautionary measures to prevent fire hazards and spontaneous combustion, maintain a dry-chemical type fire extinguisher in all areas where materials of this Section are being stored or used.

C. Store paint materials in a well ventilated area at minimum ambient temperature of 45 degrees Fahrenheit and a maximum of 90 degrees Fahrenheit.

D. Do not use the sanitary system for mixing or disposal of refuse material. Carry water to mixing rooms and dump waste material in a suitable refuse receptacle. Remove oily rags and waste each day.

1.10 PROJECT CONDITIONS

A. Provide continuous ventilation and heating facilities to maintain surface and ambient temperatures above 45 degrees Fahrenheit for 24 hours before, during and 48 hours after application of finishes, unless required otherwise by manufacturer's instructions.

B. Do not apply exterior coatings during rain or snow, or when relative humidity is above 50 percent unless required otherwise by manufacturer's instructions.

C. Apply paints and finishes above minimum temperature conditions in strict accordance with manufacturer's instructions.

D. Provide sufficient lighting to maintain 80 foot-candles measured mid-height at substrate surface.

1.11 SEQUENCING AND SCHEDULING

A. The applicator of work specified herein is responsible to ensure that all paints, enamels, and coatings, proposed to be applied hereunder, are compatible with coatings used for shop-primed items and items which have been prime-coated under the work of other trades.

B. Immediately notify the Architect in writing of conditions which may require a change in the specifications of this Section before proceeding with the work. Failure to do so, in a timely fashion, so as not to interfere with the schedule of work of this Contract, shall be construed as acceptance of the coatings specified. Perform all corrective measures, at no cost to the Owner, for any defects in the work, resulting from the use of such materials.

C. Painting work should be scheduled so as to minimize touch-ups. Interior painting is to be without flashmarks. Should flashmarks occur due to touch-ups, the Contractor shall be required to redo the entire surrounding wall surface.

D. Do not order materials until all required schedules have been properly submitted, reviewed by the Contractor and Approved by Architect.

PART 2 - PRODUCTS

2.1 MANUFACTURERS

A. Acceptable Manufacturers: Subject to compliance with the requirements specified herein, manufacturers offering products which may be incorporated in the work include the following, or approved equal:

1. Paints and finishing materials:

a. Benjamin Moore & Company, Montvale, NJ.

b. California Paints, Andover MA.

c. Duron Paints, Beltsville MD.
d. Conlux Paint, Edison NJ.
e. Akzo Nobel Paints, LLC, Glidden Professional, Strongsville, OH.
f. Akzo Nobel Paints, LLC, Devoe High Performance Coatings, Strongsville, OH.
g. Pittsburgh Paints / PPG Industries, Inc., Pittsburgh PA.
h. Pratt & Lambert Inc., Buffalo, NY.
i. Sherwin Williams, Cleveland OH.

2. Caulking
   a. Pecora Corporation, Harleysville PA.
   b. Sonneborn Building Products Inc., Minneapolis MN.
   c. Tremco, Beachwood OH.

2.2 MATERIALS

A. Coatings: Ready mixed, except for field catalyzed coatings with good flow and brushing properties; capable of drying or curing free of streaks or sags. Color pigments shall be processed to a soft paste consistency, capable of being readily and uniformly dispersed to a homogeneous coating. Provide best quality grade, where manufacturer makes more than one grade of any material specified.

B. Joint sealant for fill of minor cracks in plaster prior to painting: One component acrylic latex caulking compound, conforming to FS 19-TP-21M and ASTM C 834, paintable within 24 hours after application, with a minimum movement capability of ±12.5 percent, equal to one of the following:
   1. Pecora, product “ AC-20+”.
   2. Sonneborn Building Products Inc., product, “Sonolac”.
   3. Tremco, product, “Trimflex 834”.

2.3 ACCESSORIES

A. Accessory materials: other materials not specifically indicated, but are required to achieve the finishes specified of commercial quality.

B. Cleaning Materials:
   1. Tri-Sodium Phosphate (TSP) substitute products:
      a. Savogran, Norwood MA, products “TSP-PF”, or “Liquid TSP Substitute”.
      b. Custom Building Products, Seal Beach, CA., product “Custom T.S.P. Substitute”.
      c. DAP Inc., Baltimore MD., product “T.S.P. Substitute Heavy Duty Cleaner”.

PART 3 - EXECUTION

3.1 EXAMINATION

A. Inspect all surfaces and verify that they are in proper condition to receive the work of this Section. Notify Contractor of any condition that may potentially affect proper application of coatings.

B. Measure moisture content of surfaces, do not apply finishes unless moisture content of surfaces are below the following maximums:

1. Gypsum board and joint treatment: 12 percent.
2. Masonry or concrete: 12 percent.

C. Beginning Work of this Section means acceptance of substrate surfaces and site conditions.

3.2 PREPARATION

A. Furnish and lay suitable drop cloths in all areas where coating work is being done to protect floors and all other surfaces from damage during the work. Protect adjoining surfaces with painters mask tape.

B. Prior to preparing surfaces or finishing, remove all finish hardware for painting doors and frames, except hinges and locks on exterior door; remove electrical plates, light fixture trim and fittings. Re-install hardware and other removed items after painted surfaces are thoroughly dry.

C. Mix coatings thoroughly, unless otherwise directed by the manufacturer of the specific coating used, to ensure uniformity of color and mass. Strain previously opened coatings to remove skins, lumps, and other foreign matter prior to painting.

D. Thin or reduce materials only as recommended by the specific material manufacturer, and only with the approval of the Architect.

E. Impervious surfaces: Remove mildew by scrubbing with solution of tri-sodium phosphate and bleach. Rinse with clean water and allow surface to thoroughly dry.

F. Concrete and unit masonry surfaces scheduled to receive paint finish:
1. Remove all loose scale and mortar, dirt, salt or alkali powder and other surface contaminates, using a detergent expressly formulated for cleaning of concrete and masonry.
2. Remove oil and grease with a solution of tri-sodium phosphate.
3. Remove stains caused by weathering corroding metals with a solution of sodium metasilicate after thoroughly wetting with water.
4. Thoroughly rinse the cleaned surfaces with clear water, and allow the surfaces to completely dry, allow a minimum of 4 hours before commencing application of coatings.

G. Uncoated steel and iron surfaces:
1. Remove grease, scale, dirt, rust, and all foreign materials, down to bright metal by wire brushing, scraping, sanding, or sandblasting where heavy coatings of scale are evident.
2. Wash steel with solvent, apply a treatment of phosphoric acid solution, ensuring weld joints, bolts and nuts are similarly cleaned.
3. Spot prime after repairs with alkyd base metal primer product of the finish coating manufacturer.

H. Shop primed steel surfaces:
1. Remove rust, blistered and defective shop prime paint, and all foreign materials, down to bright metal by wire brushing, scraping, sanding, or commercial paint remover. Feather edges to make touch-up patches inconspicuous.
2. Remove all grease or dirt with mineral spirits.
3. Spot prime bare metal with alkyd base metal primer product of the finish coating manufacturer. Seal top and bottom edges of metals doors with primer.

I. New galvanized surfaces: Remove surface contamination and oils and wash with solvent. Apply coat of etching primer.

J. Aluminum surfaces scheduled for paint finish:
   1. Remove surface contamination by steam or high pressure water.
   2. Remove oxidation with acid etch and solvent washing.
   3. Apply etching primer immediately following cleaning.

K. New cellular PVC exterior trim to receive paint finish:
   1. Exterior PVC trim: If recommended by manufacturer, lightly sand surfaces and remove all sanding dust and foreign materials. Fill minor dents and defects with sealant Type P1 as specified in Section 07 92 00 - JOINT SEALANTS.

L. Gypsum board surfaces: Fill minor defects with latex based spackle. Spot-seal all compound surfaces and repair areas in gypsum board, with specified first coat material before application of the first coat.

3.3 APPLICATION

A. Apply all materials in strict accordance with the approved manufacturer's printed instruction, and in accordance with the best trade practices. Each coat shall be reviewed and approved by the Architect before succeeding coats are applied.

B. Do not apply successive coating until the preceding coat is thoroughly dry, and in no case in less than 24 hours after the preceding coat.

C. Number of coats is indicated under Painting Schedules. Number of coats is indicated as a minimum number to be applied over scheduled substrates. An additional coat or coats may be required for proper color coverage of substrate as determined by the Architect, at no additional cost to the Owner. Examples of these conditions include, but are not limited to:
   1. Dark colored substrates may require an additional primer or intermediate coat to stabilize color, if final applied top-coat color is light.
   2. Pre-finished or pre-primed products may require an additional field applied coat to stabilize the shop/factory applied base color prior to application of top-coat finishes.
   3. Dark color top coat finishes may require additional finish coat over white or light colored substrates to obtain correct color density.

D. Apply each coat to a uniform finish; Apply primer and first coat of slightly lighter in color tint than the scheduled color of the final coat.

E. Sand lightly between coats to achieve required finish and remove sanding dust prior to applying succeeding coat.

F. Where clear finishes are required, tint fillers to match wood. Work fillers into the grain before set. Wipe excess from surface.

3.4 APPLICATION – CONCRETE MASONRY

A. Apply epoxy block filler to concrete masonry partitions at maximum rate allowed by coating manufacturer. Apply by airless spray followed by back rolling to force material into voids. Use a squeegee to remove excess material prior to initial set, and provide a smooth surface texture. After initial set, touch-up and fill apparent voids and holidays with fresh material.

3.5 CLEANING

A. Upon completion of the work in each area, remove all coating splatters from glass, prefinished surfaces, bright metals, and from other surfaces that have not been painted or finished hereunder. Do not use abrasive paper or abrasive cleaner on any prefinished surface or bright metal. Remove all materials and debris; leave work area in a clean condition.

3.6 PROTECTION AND TOUCH-UP

A. During painting work, protect the work of other trades against undue soilage and damage by the exercise of reasonable care and precautions. Properly clean, repair or replace any work so damaged and soiled.

B. Protect all painted and finished surfaces against damage until the date of final acceptance of the work. The Architect will conduct a final review of all work performed hereunder. Re-coat or touch-up, all scratches and other blemishes on surfaces, and as directed by the Architect, any areas found which do not comply with the requirements of this Section, and bear all costs therefore.

C. Any re-coating or touch-up work, required after the work of this Section has been reviewed and accepted by the Architect, will be paid for by the Contractor.

3.7 PAINTING SCHEDULE

A. Colors: The Architect will furnish a schedule of colors for each area and surface. Tinting and matching shall be to the satisfaction of the Architect. No limit is placed on the number of colors that may be required, or the number of colors in any one room, area, or surface. Premium paints of deep-hued, bright, pigment intensive, accent and primary colors may be scheduled for up to 25 percent of all interior and exterior surfaces without additional cost to the Owner.

1. Colors of priming coats (and body coats where specified) shall be lighter in tint than those of finish coat.
2. Colorants: Pure, non-fading pigments, mildew-proof, ultra-violet resistant, finely ground in approved medium; and be limeproof, when used in coatings to be applied on masonry, concrete, plaster, and gypsum board surfaces.

B. Interior GYPSUM BOARD (drywall) ceilings to receive epoxy finish:

1. One coat of sealer,
   a. California: “Prime Choice ASAP Primer”, Nº. 50300.
   b. Glidden Professional: Gripper Primer Nº. 3210.
   c. Moore: “SuperSpec Primer”, Nº. 253.
   d. Pittsburgh: “Speedhide Interior Quick Drying Latex Sealer”, 6-2 Series.
   e. Sherwin-Williams: "PrepRite 200 Interior Latex Primer", B28 W200 Series.
   f. Tnemec: PVA 51-792 Sealer.
2. Two coats of semi-gloss Water Based Acrylic-Epoxy Coatings (3 mils DFT each coat).
   a. California: No equivalent.
   b. Devoe Coatings: “Tru-Glaze-WB” 4418 Waterborne Acrylic Epoxy Coating.
   c. Moore: “Industrial Acrylic Epoxy Enamel”, Nºs. P43/P44.
   d. Pittsburgh: “Pitt-Glaze Water Based Acrylic Epoxy Enamels”, 16 Series.
   e. Sherwin-Williams: "Water Based Catalyzed Epoxy" B70/B60V15 Series.

f. Tnemec: “Tneme-Tufcoat”, Nº. 112.

C. Interior CONCRETE MASONRY walls and partitions to receive epoxy finish paint:

a. California: “Mason-Cote 100% Acrylic Latex Block Filler”, Nº. 3751.
b. International “Interlac 895” at 55 to 75 square feet per gallon.
c. Devoe Coatings (wet areas): Tru-Glaze-WB 4015 Waterborne Epoxy Block Filler.
d. Devoe Coatings (dry areas): Bloxfil 4000 Heavy Duty Acrylic Block Filler.
e. Moore: “Latex Block Filler”, Nº. P88.
f. Pittsburgh: “Speedhide Int/Ext Acrylic Masonry Block Filler”, 6-15 Series.
g. Sherwin-Williams: "PrepRite Int. Ext Block Filler”, B25-W25 Series.
h. Tnemec “Series 130 - Envirofill” at 55 to 75 square feet per gallon.

2. Two coats epoxy paint.

a. California: “Tile-Cote Polyamide Epoxy”, Nº. 12.
b. International “Intergard 735 WB”.
c. Devoe Coatings: Tru-Glaze-WB 4428 Waterborne Epoxy Gloss Coating.
d. Moore: “Industrial Acrylic Epoxy Enamel”, Nºs. P43/P44.
e. Pittsburgh: “Pitt-Glaze Water Based Acrylic Epoxy Enamels”, 16 Series.
f. Sherwin-Williams: "Water Based Catalyzed Epoxy", B70/B60V15 Series.
g. Tnemec “Series 113 - High-Build Tneme Tufcoat”.

D. Interior METAL, FERROUS, to receive semi-gloss finish: (includes galvanized metal doors and frames):

1. One coat of rust prohibitive primer for unfinished metal surfaces, and touch up bare metal at shop primed, existing and previously coated surfaces:

a. California: “Rust-Stop DTM Primer/Finish”, Nº. 1061.
b. Devoe Coatings: Devflex 4020PF DTM Primer and Flat Finish.
c. Moore: “Acrylic Metal Primer”, Nº. P04.
d. Pittsburgh: “Pitt-Tech DTM Primer/Finish 100% Acrylic”, 90-709/712 Series
e. Sherwin-Williams: "DTM Acrylic Primer Finish", B66 W1 Series.

2. Two coats acrylic semi-gloss enamel:

a. California: “Rust-Stop DTM Primer/Finish”, Nº. 1061.
b. Devoe Coatings: Devflex 4216HP High Performance Waterborne Acrylic Semi-Gloss Enamel.
c. Moore: “Super Spec HP DTM Semi-Gloss Enamel”, Nº. P29.
d. Pittsburgh: “Pitt-Tech Plus High Performance, Semi -Gloss DTM Industrial Enamel”, 90-1210 Series.
e. Sherwin-Williams: “Sher-Cryl HPA Semi-Gloss”, B66 Series.

E. Exterior CONCRETE and CONCRETE MASONRY, walls scheduled for painted finish:

1. One coat block primer.

a. California: “Mason-Cote Block Filler”, Nº. 3751.
b. Glidden Professional: Concrete Coatings Block Filler Interior/Exterior Nº. 3010.
c. Moore: “Superspec Latex Block Filler”, 160 Series.

d. Pittsburgh: “Speedhide Exterior Latex Masonry Block Filler”, 6-15 Series.
e. Sherwin-Williams: "Loxon Ext. Masonry Acrylic Primer", B25 W300.

2. Two coats 100-percent-acrylic semi-gloss paint:
   a. California: “2010 Acrylic Latex Exterior Satin Gloss”, Nº. 402.
   b. Glidden Professional: Fortis 450 Exterior Nº. 6207V.
   c. Moore: “Aura Exterior Semi-Gloss”, Nº. 632.
   d. Pittsburgh: “Manor Hall Timeless – Semi-Gloss”, 73-510 Series.
   e. Sherwin-Williams: No equivalent.

F. Exterior METAL, FERROUS, bare metal or shop primed:
1. One coat rust inhibitive primer. (touch up bare metal at existing and shop primed surfaces).
   a. California: “Larcoloid Primer, Nº. 21150.
   b. Devoe Coatings: Devguard 4160 Multi-Purpose Tank & Structural Primer.
   c. Moore: “Universal Metal Primer” Nº. P07.
   d. Pittsburgh: “Speedhide Industrial Rust Inhibitive Primers”, 7-852 Series .
   e. Sherwin-Williams: "Kem Kromik Universal Metal Primer", B50Z Series.
2. Two coats acrylic gloss enamel:
   a. California: “Larcoloid Acrylic”, Nº. 511.
   b. Devoe Coatings: Devflex 4208QD Waterborne Gloss Enamel.
   c. Moore: “Acrylic Gloss Enamel”, Nº. P28
   d. Pittsburgh: “Pitt-Tech DTM Exterior Waterborne High Gloss Enamel”, 90-300 Series.
   e. Sherwin-Williams: "DTM Acrylic Gloss", B66 Series

G. Exterior cellular PVC TRIM, new:
1. One coat latex primer:
   a. California: “Trouble-Shooter Acrylic Latex Primer”, Nº. 45100.
   b. Glidden Professional: Stain Stomper Exterior Primer Sealer Nº. 2110.
   c. Moore: “Moore Fresh Start”, Nº. 023.
   d. Pittsburgh: “Seal Grip WB Acrylic Primer”, 17-921 Series.
   e. Sherwin-Williams: “A100 Exterior Latex Wood Primer”, B42W41 Series.
2. Two coats latex satin paint:
   a. California: “Acrylic Latex House Paint”, Nº. 471.
   b. Glidden Professional: Ultra-Hide 150 Exterior Satin Nº. 2412V.
   c. Moore: “Superspec Exterior Satin Finish”, 184 Series.
   d. Pittsburgh: “Speedhide Exterior Acrylic Satin”, 6-2045 Series.
   e. Sherwin-Williams: "A-100 Exterior Latex Satin House and Trim Paint” A82 Series.

End of Section

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Section 10 21 13

TOILET COMPARTMENTS

PART 1 - GENERAL

1.1 SUMMARY

A. Furnish and install:

1. Floor/wall mounted phenolic toilet partitions with overhead bracing.
2. Urinal screens, matching toilet partition design and finish.

1.2 RELATED REQUIREMENTS

A. Section 10 28 13 - TOILET ACCESSORIES: Furnishing templates, providing and installing toilet accessories surface mounted to toilet compartments, and integral with compartments.

1.3 REFERENCES

A. Comply with applicable requirements of the following standards and those others referenced in this Section, under the provisions of Section 01 42 00 - REFERENCES. Where these standards conflict with other specified requirements, the most restrictive requirements shall govern.

1. ANSI A 117.1 - Specifications for Making Buildings and Facilities Accessible to and Usable by Physically Handicapped People.
2. ASTM A 167 - Stainless and Heat Resisting Chrominum-Nickel Steel Plate, Sheet and strip.

1.4 SUBMITTALS

A. Submit the following under provisions of Section 01 33 00 - SUBMITTAL PROCEDURES:

1. Literature: Manufacturer's product data sheets, specifications, and manufacturer's warranty for each item furnished hereunder. Include information panel construction, hardware, and accessories.
2. Shop drawings:
   a. 1/2 inch scale dimensioned plans and elevations of each toilet room condition showing toilet compartment and urinal screen layout.
   b. Large scale design details of showing attachment clips and brackets; and complete installation details.
3. Samples:
   a. Selection samples: Manufacturer's full range of color chips, for selection by the Architect; up to two-color combinations for doors and partitions may be selected in each area.
   b. Verification samples: 6 inch square samples of each color and finish on same substrate to be used in Work, for color verification after selections have been made.

1.5 FIELD MEASUREMENTS

A. Take field measurements before preparation of shop drawings and fabrication, where possible, to ensure proper fitting of Work.

B. Allow for adjustments within specified tolerances wherever taking of field measurements before fabrication might delay Work.

1.6 REGULATORY REQUIRMENTS

A. Partition Fire Resistance Rating (flame spread): NFPA, Class “B” / UL Class “B”

1.7 SEQUENCING AND SCHEDULING

A. Coordinate the work of this Section with the respective trades responsible for installing inserts and anchorages furnished by this Section; make arrangements for delivery, receipt and installation of inserts and anchorages to prevent delay of the Work.

1.8 WARRANTY

A. Furnish the following manufacturer’s warranties under provisions of Section 01 78 00 - CLOSEOUT SUBMITTALS. Manufacturer's warranties are in addition to, and not in lieu of, other liabilities which the Contractor may have by law or other provisions of the Contract Documents.

1. Manufacturer's written warranty, for a minimum period of 10 years from date of Substantial Completion. Warranty shall cover panel, pilaster and door material and manufacturing workmanship against defects, including delamination of surfacing, corrosion and breakage.

PART 2 - PRODUCTS

2.1 MANUFACTURERS AND MODELS

A. Toilet compartments: Flush type, floor mounted, overhead braced, of standard height and depth, except for sizes of handicapped compartments, which shall be as indicated on the Drawings. Acceptable models are the following, or approved equal:

1. Accurate Partition Corp., Lyons IL. , series “Black-core Phenolic”.
2. Bobrick Washroom Equipment, Inc., Clifton Park NY., series “1082.67”.
3. General Partitions Manufacturing Corp., Deer Park NY., series “40”.
4. Global Steel Products Corporation, Deer Park NY., style “Floor Anchored/Overhead Braced”.
5. Knickerbocker Partition Corporation, Freeport NY., series “Metropolitan”.
6. Metpar Corporation, Westbury, NY., series “xxx”.
7. Sanymetal (Crane Plumbing Company), Somerset KY., “Sanyphenolic” series, model “Academy”.

B. Urinal screens: Flush type, 42 inch high, 18 inches deep matching construction and finish of toilet partitions, with wall attachment and floor post support. Acceptable models are the following, or approved equal:

1. Accurate Partition, “Floor Anchored Black-core Phenolic”.
2. Bobrick Washroom Equipment, Inc., Clifton Park NY. , series “1081”.
3. General Partitions series “FSH-1”.
4. Global type “Post supported”.
5. Knickerbocker series “PS”.
6. Metpar type “PF”.

7. Sanymetal type “BX”.

2.2 FABRICATION

A. Pilasters (stiles) and doors: 3/4 inch [19 mm] thick, solid phenolic (black) core with integrally bonded decorative “matte finish” melamine surface on both sides, in color(s) selected by Architect from available range. Laminated surfaces are not acceptable.

1. Door widths; except as otherwise indicated, provide the following widths:

a. Standard stalls, 24 inches.

b. Handicapped accessible stalls, 34 inches or greater.

2. Pilasters (stiles) shall run full height, floor to overhead bracing with secure attachment at both ends.

3. Pilasters: Pilasters that are adjacent to doors shall be rabbeted on the vertical edge next to the door to provide for a sightless condition between the door and the pilaster.

B. Panels: 1/2 inch [13 mm] thick, of same material and finish as pilasters and doors.

C. Head rails: Hollow extruded aluminum tube with anti-grip top having wall thickness of not less than 0.125 inches; with cast aluminum or stainless socket brackets. Provide corner brackets, wall brackets and end caps as required.

D. Pilaster floor and ceiling shoes: 4 inches high formed stainless steel with satin finish.

E. Hardware and fittings: Type 302/304 stainless steel, except as specified otherwise.

1. Door hinges: Gravity type self-closing hinge fabricated from 14 gage type 302/304 cast stainless steel with a satin finish. Hinge shall be fully adjustable up to 360 degrees, with a type 302/304 stainless steel pivot pin.

2. Door latch with nylon slides. Door keeper, one piece 14 gage stainless steel.

3. Door stop: 14 gage stainless steel. Plated Zamac door stops are not acceptable.

4. Panel to stile connection: Full panel height “U” shape stainless steel channel.

5. Panel to wall connection: Full panel height “U” shape stainless steel channel or “Double T” shape extruded aluminum channel, clear anodized.

2.3 ACCESSORIES

A. Equip all doors with combination coat hook and bumper.

B. Anchorages and Fasteners: Through-bolted stainless steel with theft-resistant heads. Chrome plated steel or brass are not acceptable.

PART 3 - EXECUTION

3.1 EXAMINATION

A. Inspect all surfaces and verify that they are in proper condition to receive the work of this Section.

B. Verify correct spacing of plumbing fixtures.

C. Ensure wall blocking is coordinated with location of anchors before commencing with installation.

D. Beginning of installation means acceptance of existing conditions.

3.2 INSTALLATION - GENERAL

A. Comply with manufacturer's recommended procedures and installation sequence, and as specified herein.

B. Install pilasters, partitions, urinal screens, and doors rigid, straight, plumb and level. Maintain 3/8 to 1/2 inch space between wall and panels and between wall and end pilasters.

C. Set pilaster units with anchorages having minimum 2 inches penetration into structural floor, unless otherwise recommended by partition manufacturer.

D. Attach panel brackets securely to walls using anchor devices.

E. Anchor urinal screen panels to walls with two panel brackets and tube vertical upright anchored to floor.

F. Provide adjustment for floor variations with screw jack through steel saddles integral with pilaster. Conceal floor fastenings with pilaster shoes.

G. Hang door and adjust so tops of doors are level with tops of pilasters when doors are in closed position.

H. Ensure that all holes in partitions, as required for attachment of related items, are accurately located and drilled, in accordance with the templates furnished by the accessory manufacturer. Conceal all evidence of drilling, cutting, and fitting in the finished work.

I. No permanent exposed to view labels of any kind will be permitted to remain on the partitions, urinal screens, headrails, or doors.

3.3 FIELD QUALITY CONTROL

A. Ensure that all work is free from dents, tool marks, warpage, buckle, open joints, or other defects. Protect compartments during erection, and after erection, and until final approval of the entire project by the Architect.

3.4 ADJUSTMENT

A. Adjust and align hardware to provide a uniform clearance at vertical edges of doors not to exceed 3/16 inch.

B. Adjust hinges to locate doors in partial-open position (approximately 30 degrees open) when unlatched. Return outswing doors to closed position.

C. Test operation of movable parts, and make all adjustments necessary to ensure proper operation.

3.5 CLEANING

A. Upon completion of the installation, remove all evidence of tapes and other packing materials; touch-up all scratches and surface defects and thoroughly clean and polish all exposed to view surfaces.

B. Provide protection as necessary to prevent damage during remainder of construction period.

End of Section

Section 10 28 13

TOILET ACCESSORIES

PART 1 - GENERAL

1.1 SUMMARY

A. Furnish and install toilet, bath and custodial accessories.

B. Furnish concealed anchorage devices for handicap handrails for installation under Section 06 10 00 - ROUGH CARPENTRY.

C. Furnish toilet and bath accessory templates, to locate anchorage reinforcement, to trades responsible.

1.2 RELATED REQUIREMENTS

A. Section 06 10 00 - ROUGH CARPENTRY: Wood blocking.

B. Section 10 21 13 - TOILET COMPARTMENTS.

1.3 REFERENCES

A. Comply with applicable requirements of the following standards and those others referenced in this Section, under the provisions of Section 01 42 00 - REFERENCES. Where these standards conflict with other specified requirements, the most restrictive requirements shall govern.

1. ANSI A 117.1 - Specifications for Making Buildings and Facilities Accessible To and Usable by Physically Handicapped People.
2. ASTM A 123 - Zinc Coatings on Products Fabricated from Rolled, Pressed, and Forged Steel, Shapes, Plates, Bars and Strips.
3. ASTM A 167 - Stainless and Heat-Resisting Chromium-Nickel Steel, Plate, Sheet and Strip.
4. ASTM A 269 - Seamless and Welded Austenitic Stainless Steel Tubing for General Service.
5. ASTM A 366 - Steel, Carbon, Cold-Rolled Sheet, Commercial Quality.
6. ASTM A 386 - Zinc Coating on Assembled Steel Products.
7. ASTM B 456 - Electrodeposited Coatings of Copper Plus Nickel Plus Chromium and Nickel Plus Chromium.

1.4 SUBMITTALS

A. Submit the following under provisions of Section 01 33 00 - SUBMITTAL PROCEDURES:

1. Literature: Manufacturer's product data sheets, for each item furnished hereunder.
2. Schedule: Complete schedule, indicating types, quantity, and model numbers of accessories for each location in which the accessories will be installed.
3. Selection samples: Sample color chips indicating each manufacturer's full range of colors available for selection by Architect.
4. Verification samples: Complete units, as requested by Architect.

1.5 REGULATORY REQUIREMENTS

A. Conform to applicable codes and accessibility regulations, and comply with ANSI A 117.1 for installation of work.

1.6 DELIVERY, STORAGE AND HANDLING

A. Deliver materials in original packages, containers or bundles bearing brand name, identification of manufacturer or supplier and item identification number corresponding with approved schedule.

B. Store materials inside, under cover, and in manner to keep them dry, protected from weather, surface contamination, corrosion and damage from construction traffic and other causes.

1.7 SEQUENCING AND SCHEDULING

A. Coordinate the work of this Section with placement of internal wall reinforcement and reinforcement of toilet partitions to receive anchor attachments.

1.8 WARRANTY

A. Deliver to the Owner upon completion of the work of this Section, applicable manufacturer's standard warranties.

PART 2 - PRODUCTS

2.1 MANUFACTURERS

A. Acceptable Manufactures and models: To establish a standard of quality, design, function desired, and appearance, Drawings and specifications have been based on manufacturers and model numbers specified herein below. Manufacturers offering products which may be considered as equal include the following:

1. A&J Washroom Accessories, Inc., (A&J) New Windsor NY.
2. American Specialties, Inc. (ASI), Yonkers NY.
3. Bobrick Washroom Equipment, Inc. (Bobrick), Clifton Park NY.
4. Bradley Corporation / Washroom Accessories Division, (Bradley) Menomonee Falls, WI.
5. Meek Manufacturing Company, Inc., Fort Smith AR.

B. Grab bars (of lengths and configurations as indicated on Drawings): Stainless steel, minimum wall thickness 18 gage (Stub's gage), with non-slip knurled, peened or striated surface.

1. Grab bars: 1-1/4 inch diameter with satin finished ends, concealed 1/8 inch thick mounting flange with snap-on cover, equal to:
   a. A&J model Nº. UG2.
   b. ASI series 3700.
   c. Bobrick series B-5806.
   d. Bradley series 832.

C. Mirrors: channel framed, framed: 18 inches wide by 36 inches high, having the following:

1. Frame: one piece 1/2 by 1/2 by 1/2 inch type 430 stainless steel channel frame, with continuous integral stiffener on all sides.
   a. Exposed finish: Brushed satin.

2. Mirror glass: 1/4 inch thick glass, ASTM C 1048 complying with Class 1 clear, quality q3 glazing select, conforming to ANSI Z97.1, with Class 1, standard commercial quality, electro-copper back-plating with a protective finish.
    a. Mirror corrosion resistant backing shall have minimum 10 year warranty.
3. Back: Mirror back shall be protected by full-size, shock-absorbing, water-resistant, non-abrasive 1/8" (3-mm) thick polyethylene padding. Galvanized steel backing shall have integral brackets for concealed mounting.
4. Acceptable models:
    a. A&J model Nº. U711.
    b. ASI model Nº. 0620-B.
    c. Bobrick model Nº. B-165.
    d. Bradley model Nº. 781.
    e. Meek model Nº. 1510.Mop and broom holders: Surface mounted, nominal 34 inch long stainless steel unit with 18 gage 8 inch deep continuous shelf, 4 stainless hooks and 3 mop/broom holders, anti-slip spring loaded, rubber cam mop holders, capable of holding 7/8 to 1-1/4 inch diameter handles.
1. A&J model Nº. UJ45A.
2. ASI model Nº. 1308-3.
3. Bobrick model Nº. B-239-34.
4. Bradley model Nº. 9933.

E. Sanitary napkin disposal: Surface mounted feminine napkin disposal unit, fabricated of type 304 stainless steel, with one piece cover.
1. A&J, model Nº. U591.
2. ASI model Nº. 0852.
3. Bobrick Contura Series B-254.
4. Bradley model Nº. 4781-15.

F. Sanitary napkin vendor: Surface mounted, stainless steel. napkin/tampon vendor. Cabinet, flange and door type 304 stainless steel.
1. Mechanism pull knobs shall require less than five pounds of force (22.2 N) and be operable to comply with ADA Accessibility Guidelines (ADAAG).
2. Coin operation: Equip with double coin mechanism for 50 cents. Mechanism handle turns.
    a. A&J model Nº. U526-SM-50 (having capacity of 30 sanitary napkins and 27 tampons).
    b. ASI model Nº. 0864-50 (having capacity of 30 sanitary napkins and 27 tampons).
    c. Bobrick model Nº. B-2800x2-50. (having capacity of 31 sanitary napkins and 22 tampons).
    d. Bradley model Nº. 4017-11-43 (having capacity of 30 sanitary napkins and 27 tampons).

G. Soap dispensers: Surface mounted for viscous free flowing soaps, with lockable 40 fluid ounce stainless steel container, and corrosion resistant all purpose valve for liquid soaps, lotions and detergents which will operate with less than 5 pounds of force.
1. A&J model Nº. U126.

2. ASI model Nº. 0347.
3. Bobrick model Nº. B-2111.
4. Bradley model Nº. 6562.

H. Toilet tissue dispenser: double roll type: surface-mounted dispenser with cast aluminum bracket, molded and extruded uncontrolled dispensing ABS spindles, vandelproof keyed locking mechanism, able to accommodate two 2000 sheet rolls.

1. A&J model Nº. U806-NC.
2. ASI model Nº. 0264-1A2.
3. Bobrick model Nº. B-2740.
4. Bradley model Nº. 5241-50.

I. Surface paper towel and waste receptacle: Surface mounted stainless steel paper towel dispenser and waste receptacle. Paper towel dispenser shall dispense 600 C-fold or 800 multifold paper towels without any additional adapters. Waste receptacle shall be furnished with removable, leak-proof, rigid molded plastic waste container. Minimum capacity: 3.7 gallons.

1. A&J model Nº. 602-SM (having waste capacity of 4.0 gallons)
2. ASI model Nº. 6467-9 (having waste capacity of 4.5 gallons).
3. Bobrick model Nº. B-380349 (having waste capacity of 3.8 gallons).
4. Bradley model Nº. 2027-11. (having waste capacity of 3.7 gallons).

2.2 LOCKS

A. General: All locks shall be keyed alike. Provide four (4) keys, for lockable accessories, to the Owner.

2.3 INSTALLATION ACCESSORIES

A. Fasteners, screws, and bolts: Type 304 stainless, tamperproof.

B. Expansion shields: Fiber, lead or rubber as recommended by accessory manufacturer for component and substrate.

2.4 FABRICATION

A. Form exposed surfaces from single sheet of stock, free of joints. Form surfaces flat without distortion, scratches or dents. Weld and grind smooth joints of fabricated components.

B. Back paint components where contact is made with building finishes to prevent electrolysis.

C. Shop assemble components and package complete with anchors and fittings. Hot dip galvanize exposed and painted ferrous metal and fastening devices. Provide steel anchor plates, adapters, and anchor components for installation.

2.5 FACTORY FINISHING

A. Ferrous metals: Clean and treat, spray apply one coat of baked-on rust and moisture-resistant primer, followed by two coats of baked-on synthetic enamel, in selected colors. Ensure that finish coating is uniform in color intensity and degree of gloss, throughout.

B. Chrome/Nickel Plating: ASTM 456, Type SC2, satin finish.

C. Stainless steel: Number 4 satin finish, except as otherwise specified above under the Article entitled “Toilet Accessories”.

PART 3 - EXECUTION

3.1 PREPARATION

A. Provide templates and rough-in measurements as required. Deliver inserts and rough-in frames to site at appropriate times for building-in by other trades

B. Coordinate with trades responsible for providing receiving surfaces on which accessories will be installed.

C. Exact locations of accessories within each room or area shall be as directed by the Architect.

3.2 INSTALLATION

A. Perform installation work in accordance with the approved shop drawings and the manufacturer's installation instructions.

B. Install toilet accessories absolutely level and in true line, securely and rigidly anchored with theft proof fasteners of the size and type most appropriate for the specific receiving surface, concealing the fasteners as far as practicable.

3.3 ADJUSTING

A. Replace units which cannot be adjusted to operate freely and smoothly as intended for the application made.

3.4 CLEANING

A. Remove all protective films and coverings from accessories, and clean and polish each piece. Remove all rubbish, packing materials, and debris, caused by the work of this Section.

End of Section

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SECTION 22 00 00

PLUMBING

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SECTION 22 00 00

PLUMBING
(FILED SUB-BID REQUIRED)

PART 1 - GENERAL

1.1 GENERAL PROVISIONS

A. The BIDDING REQUIREMENTS, CONTRACT FORMS, and Contract Conditions as listed in the Table of Contents, and applicable parts of Division 1 - GENERAL REQUIREMENTS, shall be included in and made a part of this Section.

B. Work of this Section requires Filed Sub-Bids and is governed by the provisions of the Massachusetts General Laws (MGL), Public Bidding Law - Chapter 149, Sections 44A to 44J inclusive, as amended, and applicable Sections of the MGL, Public Contract Law - Chapter 30.

C. The work to be completed by the Filed Subcontractor for the work of this Section is shown on the following listed Drawings:

C1, A1, A2, S101, S102, S200, S201, M1.1, M2.1, E0.0, E1.0, P1.0

1. Examine all Drawings and all other Sections of the Specifications for requirements therein affecting the work of this Section. The listing of Contract Drawings above does not limit Filed Subcontractor's responsibility to determine full extent of work of this Section as required by all Drawings listed in the Drawing List on the Drawing Title Sheet, as modified by Addenda.

2. Refer to Section 01 23 00 - ALTERNATES, for alternates, which may affect the scope of Work of this Section.

D. Sub-Bids for work under this Section shall be for the complete work and shall be filed in a sealed envelope with the Awarding Authority at a time and place as stipulated in ADVERTISEMENT TO BID and INSTRUCTIONS TO BIDDERS.

1. The following shall appear on the upper left hand corner of the envelope:

NAME OF SUB-BIDDER: _____
SUB-BID FOR TRADE: PLUMBING.

2. Each Sub-Bid submittal for work under this Section shall be on forms furnished by Awarding Authority, as bound herein, accompanied with the required bid deposit in compliance with MGL Chapter 149 Section 44B in the amount of 5 percent of Filed Sub-Bid.

E. Sub Sub-Bid Requirements:

1. Sub Sub-Bid Requirements: List in Paragraph E of the "Sub Bid Form" the name and bid price of each person, firm or corporation performing each class of work or part thereof for which the Section of the Specifications for the Sub-Trade requires such listing, provided that, in the absence of a contrary provision in the Specifications, any Sub Bidder may, without listing any bid price, list his own

name in said Paragraph E for each such class of work or part thereof and perform that work with persons on his own payroll, if such Sub Bidder, after Sub Bid openings, shows to the satisfaction of the Awarding Authority, that he does customarily perform such class of work or the part thereof with persons on his own payroll and is qualified to do so. This Section of the Specifications requires that the following class(es) of work shall be listed in Paragraph E under the conditions herein.

CLASS OF WORK	REFERENCE SECTION
Plumbing Insulation	22 00 00 – 2.4

1.2 EXAMINATION OF SITE AND DOCUMENTS

A. Bidders are expected to examine and to be thoroughly familiar with all contract documents and with the conditions under which work will be carried out. The Awarding Authority (Owner) will not be responsible for errors, omissions and/or charges for extra work arising from General Contractor's or Filed Subcontractor's failure to familiarize themselves with the Contract Documents or existing conditions. By submitting a bid, the Bidder agrees and warrants that he has had the opportunity to examine the site and the Contract Documents, that he is familiar with the conditions and requirements of both and where they require, in any part of the work a given result to be produced, that the Contract Documents are adequate and that he will produce the required results.

B. Pre-Bid Conference: Bidders are strongly encouraged to attend the Pre-Bid conference; refer to ADVERTISEMENT FOR BIDS for time and date.

1.3 REFERENCES

A. Conditions of the Contract and Division 1, General Requirements apply to work of this Section. Where paragraphs conflict with similar paragraphs of Division 1, requirements of this section shall prevail.

B. The attention of this contractor is directed to Part 1, Paragraph 3.1 of this Section which contains instructions for commissioning of equipment and systems.

C. Examine Drawings and other Sections of Specifications for requirements that affect work of this Section.

D. Drawings: Work specifically required under this Section includes all plumbing work shown on or required by Contract Drawings as follows: P1.0, M2.1, E1.0, all architectural, and civil drawings.

1.4 APPROVALS

A. Obtain necessary approvals from authorities with jurisdiction, as required to perform work in accordance legal requirements and specification, drawings, addenda and change orders all of which are part of contract documents.

1.5 SCOPE

A. Work shall include, but not be limited to, the following:

1. Domestic water piping system
2. Exterior water service piping for domestic water beginning 10’-0” outside exterior

wall of the building
3. Domestic water heater
4. Interior sanitary drainage system extended to a point 10'-0" outside the interior face of the foundation wall of the building.
5. Plumbing fixtures and trim
6. Floor drains
7. Hose bibbs
8. Insulation
9. Valves
10. Water hammer arresters
11. Fitting unions, flanges and couplings
12. Flashing of floor drains
13. Hangers, plates and inserts
14. Cleaning, testing and disinfection of piping systems
15. All supplementary steel for piping and equipment support
16. Guarantees
17. Drilling for installation of inserts
18. Vibration insulation and flexible connections
19. Core drilling
20. Installation of toilet accessories
21. Fire seal of all penetrations in floors and walls to the rating of the barrier

B. Furnish following items for installation under other Sections:

1. Access panels
2. Starters

1.6 WORK BY OTHERS

A. The following work is not included in this section and shall be performed under other sections:

1. Cutting, coring, drilling and patching of holes and openings for plumbing work shall be performed by the General Contractor when the largest dimension of the opening exceeds 16 inches. Refer to Cutting and Patching section.
2. Painting, except as specified.
3. Power wiring for equipment.

1.7 CODES, STANDARDS, AND AUTHORITIES

A. Perform work in accordance with rules, regulations, standards, codes, ordinances, and laws of local and federal governments, and other authorities with lawful jurisdiction, and be responsible for compliance therewith.

B. Material and equipment shall be Underwriters Laboratories, UL-listed and ASME-approved, as applicable for service intended.

C. Conform to applicable code for installation of backflow prevention devices. Provide certificate of compliance from authority having jurisdiction indicating approval of installation of backflow prevention devices.

D. All required permits and inspection certificates shall be obtained and made available at the completion of the work. Refer to instruction to Bidders section regarding waiver of municipal fees.

1.8 GUARANTEE

A. Guarantee work of this section in writing for one year from date of final acceptance by Owner.

1.9 SUBMITTALS

A. Definitions

1. Shop Drawings are information prepared by the Contractor to illustrate portions of the work in more detail than shown in the Contract Documents.

2. Coordination Drawings are detailed, large-scale layout Shop Drawings showing HVAC, Electrical, Plumbing and Fire Protection work superimposed in order to identify conflicts and ensure inter-coordination of Mechanical, Electrical, Architectural, Structural and other work.

B. Submittal Cover Sheet

1. Shop Drawings shall be submitted according to specification section with a separate cover sheet completed for each product, rather than one cover sheet for multiple products, whether or not supplied by one manufacturer or vendor.

C. Submittal Procedures and Format

1. Review submittal packages for compliance with the Contract Documents and then submit to Architect for review.

2. Provide additional copies of reviewed shop drawings as required for full distribution.

3. Shop Drawings showing layouts of systems shall contain sufficient plans, elevations, sections, details and schematics to describe work clearly. They shall be ¼" = 1'-0" scale unless specified otherwise. Sheet metal shop drawings shall be 3/8" = 1'-0" and shall indicate work of other sections where interferences are possible. Provide larger scale details as necessary. Sheet metal drawings shall show elements of Architects reflected ceiling plan, exposed ductwork, walls, and partitions, diffusers, registers, grilles, fire dampers, sleeves and other aspects of construction as necessary for coordination.

4. ALL FIREWALLS AND SMOKE PARTIONS MUST BE HIGHLIGHTED ON THE SHEET METAL DRAWINGS FOR APPROPRIATE COORDINATION.

5. Shop drawings showing manufacturer's product data shall contain detailed dimensional drawings, accurate and complete description of construction materials, manufacturer's published performance characteristics and capacity ratings (performance data, alone, is not acceptable), electrical requirements and wiring diagrams. Drawings shall clearly indicate location (terminal block or wire number), voltage and function for all field terminations, and other information necessary to demonstrate compliance with all requirements of Contract Documents.

6. Provide shop drawing submittals showing details of piping connections to all equipment. If connection details are not submitted and connections are found to be installed incorrectly in the field, this contractor shall reinstall them within the original

contract price.

D. Acceptable Manufacturers

1. Alternate Manufacturers are acceptable only if, as a minimum, they:

a. Meet all performance criteria listed in the schedules and outlined in the specification.

b. Have identical operating characteristics to those called for in the specification.

c. Fit within the available space it was designed for, including space for maintenance and component removal, with no modification to either space or the product. Clearances to walls, ceilings and other equipment shall be at least equal to those shown on the design drawings.

d. Products must adhere to all architectural considerations including, but not limited to: being of the same color as the product scheduled or specified, fitting within architectural enclosures and details, and for diffusers, lighting and plumbing fixtures-being the same size and of the same physical appearance as schedule or specified products.

E. Deviations

1. Concerning deviations other than substitutions, proposed deviations from Contract Documents shall be requested individually in writing whether deviations result from field conditions, standard shop practice, or other cause. Submit letter with transmittal of Shop Drawings, which flags the deviation to the attention of the Architect.

2. Without letters flagging the deviation to the Architect, it is possible that the Architect may not notice such deviation or may not realize its ramifications. Therefore, if such letters are not submitted to the Architect, the contractor shall hold the Architect and his consultants harmless for any and all adverse consequences resulting from the deviations being implemented. This shall apply regardless of whether the Architect has reviewed or approved shop drawings containing the deviation, and will be strictly enforced.

3. Approval of proposed deviations, if any, will be made at the discretion of the Architect.

F. Responsibility

1. Intent of Submittal review is to check for capacity, rating, and certain construction features. Contractor shall ensure that work meets requirements of Contract Documents regarding information that pertains to fabrication processes or means, methods, techniques, sequences and procedures of construction; and for coordination of work of this and other Sections. Work shall comply with submittals marked “REVIEWED” to extent that they agree with Contract Documents. Submittal review shall not diminish responsibility under this Contract for dimensional coordination, quantities, installation, wiring, supports and access for service, nor shop drawing errors or deviations from requirements of Contract Documents. The Architect’s noting of some errors while overlooking others will not excuse the

contractor from proceeding in error. Contract Documents requirements are not limited, waived nor superseded in any way by review.

2. Inform subcontractors, manufacturers, suppliers, etc. Of scope and limited nature of review process and enforce compliance with contract documents.

G. Schedule: Incorporate shop drawing review period into construction schedule so that work is not delayed. Contractor shall assume full responsibility for delays caused by not incorporating the following shop drawing review time requirements into his project schedule. Working days listed reference the time in the Engineer's office. It does not include transmittal time for review each time shop drawing is submitted or resubmitted.

H. List of Proposed Equipment and Materials

1. Within four weeks after Award of Contract and before ordering materials or equipment, submit complete list of proposed materials and equipment and indicate manufacturer's names and addresses. No consideration will be given to partial lists submitted out of sequence.

I. Material and equipment requiring Shop Drawing Submittals shall include, but not be limited to:

1. Plumbing fixtures and trim
2. Water heaters
3. Floor drains
4. Hose bibbs and wall hydrants
5. Piping
6. Fittings, unions, flanges and couplings
7. Insulation
8. Sleeve packing
9. Valves
10. Water hammer arresters
11. Hangers, plates and inserts
12. Vibration isolation and flexible connections
13. Access panels
14. Fire rated penetration assemblies indicating ASTM E814 (UL 1479) classification for the application involved. Submittals of individual components or products (i.e., mortars or sealants) without detailed installation drawings shall be rejected as incomplete as incomplete submittals.

1.10 REFERENCES

A. ASME B16.1 - Cast Iron Pipe Flanges and Flanged Fittings Class 25, 125, 250 and 800.

B. ASME B16.3 - Malleable Iron Threaded Fittings.

C. ASME B16.4 - Cast Iron Threaded Fittings Class 125 and 250.

D. ASME B16.18 - Cast Copper Alloy Solder Joint Pressure Fittings.

E. ASME B16.22 - Wrought Copper and Bronze Solder Joint Pressure Fittings.

F. ASME B16.23 - Cast Copper Alloy Solder Joint Drainage Fittings - DWV.

G. ASME B16.26 - Cast Bronze Fittings for Flared Copper Tubes.

H. ASME B16.29 - Wrought Copper and Wrought Copper Alloy Solder Joint Drainage Fittings - DWV.

I. ASME B31.9 - Building Service Piping.

J. ASME SEC IV - Construction of Heating Boilers.

K. ASME SEC IX - Welding and Brazing Qualifications.

L. ASTM A47 - Ferritic Malleable Iron Castings (ASTM A47M - Ferritic Malleable Iron Castings [Metric]).

M. ASTM A74 - Cast Iron Soil Pipe and Fittings.

N. ASTM A234/A234M - Pipe Fittings of Wrought Carbon Steel and Alloy Steel for Moderate and Elevated Temperatures.

O. ASTM B32 - Solder Metal.

P. ASTM B42 - Seamless Copper Pipe.

Q. ASTM B43 - Seamless Red Brass Pipe.

R. ASTM B68 - Seamless Copper Tube (ASTM B68M - Seamless Copper Tube).
S. ASTM B75 - Seamless Copper Tube (ASTM B75M - Seamless Copper Tube).

T. ASTM B88 - Seamless Copper Water Tube (ASTM B88M - Seamless Copper Water Tube).

U. ASTM B251 - Wrought Seamless Copper and Copper-Alloy Tube (ASTM B251M - Wrought Seamless Copper and Copper-Alloy Tube).

V. ASTM B280 - Seamless Copper Tube for Air Conditioning and Refrigeration Field Service.

W. ASTM B302 - Threadless Copper Pipe (TP).

X. ASTM B306 - Copper Drainage Tube (DWV).

Y. ASTM C564 - Rubber Gaskets for Cast Iron Soil Pipe and Fittings.

Z. ASTM E814 - Fire Tests of Through-Penetration Fire Stops.

AA. ASTM F708 - Design and Installation of Rigid Pipe Hangers.

BB. AWWA C651 - Disinfecting Water Mains.

CC. CISPI 301 - Cast Iron Soil Pipe and Fittings for Hubless Cast Iron Sanitary Systems.

DD. CISPI 310 - Joints for Hubless Cast Iron Sanitary Systems.

EE. NCPWB - Procedure Specifications for Pipe Welding.

FF. UL 1479 - Fire Tests of Through-Penetration Fire stops.

GG. ASME A112.6.1 - Supports for Off-the-Floor Plumbing Fixtures for Public Use.

HH. ASME A112.18.1 - Finished and Rough Brass Plumbing Fixture Fittings.

II. ASME A112.19.2 - Vitreous China Plumbing Fixtures.

JJ. ASME A112.19.3 - Stainless Steel Plumbing Fixtures.

KK. ASME A112.19.5 - Trim for Water-Closet Bowls, Tanks, and Urinals.

LL. NFPA 70 - National Electrical Code.

1.11 DELIVERY, STORAGE, AND PROTECTION

A. Accept fixtures and equipment 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.

1.12 SEQUENCING

A. Coordinate work of this Filed Subcontract with that of other trades, affecting or affected by this work, and cooperate with the other trades as is necessary to assure the steady progress of work.

B. Do not order or deliver any materials until all submittals, required in the listed Specification Sections included as part of this Filed Subcontract, have been received and approved by the Architect.

C. Before proceeding with installation work, inspect all project conditions and all work of other trades to assure that all such conditions and work are suitable to satisfactorily receive the work of this Section and notify the Architect in writing of any which are not. Do not proceed further until corrective work has been completed or waived.

PART 2 - PRODUCTS

2.1 SCAFFOLDS AND STAGING

A. General: Filed Subcontractors shall obtain required permits for, and provide scaffolds, staging, and other similar raised platforms, required to access their Work as specified in Section 01 50 00 - TEMPORARY FACILITIES AND CONTROLS and herein.

1. Scaffolding and staging required for use by this Filed Subcontractor pursuant to requirements of Section 01 50 00 - TEMPORARY FACILITIES AND CONTROLS shall be furnished, erected, maintained in a safe condition, and dismantled when no longer required, by this Filed Sub-Trade requiring such scaffolding.

2. Each Filed Subcontractor is responsible to provide, maintain and remove at dismantling, all tarpaulins and similar protective measures necessary to cover scaffolding for inclement weather conditions other than those required to be provided, maintained and removed by the General Contractor pursuant to MGL (Refer to Section 01 50 00 - TEMPORARY FACILITIES AND CONTROLS and as additionally required for dust control).

3. Furnishing portable ladders and mobile platforms of all required heights, which may be necessary to perform the work of this trade, are the responsibility this Filed Subcontractor.

4. Enclose all exterior scaffolding outside of the construction fence with 8-foot high plywood enclosure at end of each work day to prohibit access to the scaffolding by unauthorized individuals.

2.2 HOISTING MACHINERY AND EQUIPMENT

A. All hoisting equipment, rigging equipment, crane services and lift machinery required for the work by this Filed Subcontractor shall be furnished, installed, operated and maintained in safe conditions by this Filed Subcontractor, as referenced under Section 01 50 00 - TEMPORARY FACILITIES AND CONTROLS.

2.3 PIPE MATERIALS

A.	Service:	Above ground hot and cold water.
	Pipe Material:	Type L copper tubing, hard temper.
	Fitting Material:	Wrought copper or bronze solder joints with 95-5 lead free solder.
B.	Service:	Below grade water piping 3” and smaller.
	Pipe Material:	Type K copper with bituminous coating.
	Fitting Material:	Copper brazed joints BcuP filler alloy.
C.	Service:	Above ground sanitary waste and vent.
	Pipe Material:	Cast iron no-hub soil pipe conforming to CS301-72.
	Fitting Material:	Cast iron, cast brass, or wrought copper drainage fittings.
	Pipe Joint:	Screwed, soldered, or heavy 4- band duty steel band coupling with neoprene gasket.
D.	Service:	Below ground sanitary waste and vent within the building.
	Pipe Material:	Service weight cast iron hub-end soil pipe, asphalt or coal- tar pitch coated.

Pipe Joint: Caulked with lead and oakum or neoprene gaskets. Provide supports for underground piping.

2.4 INSULATION

A. Insulation shall be Owens-Corning, Certain-Teed or Manville.

B. Insulation shall be installed by insulation firm regularly specializing in this work with employees particularly skilled therein. No covering applied by plumber's helpers will be acceptable.

C. Insulation installation shall meet manufacturer's recommendations. No insulation shall be applied until piping has passed tests as required by authorities that have jurisdiction.

D. Insulation, jackets and adhesives shall be flame retardant and shall have ASTM E-84 fire hazard ratings of 25 flame spread, 50 smoke developed and 50 fuel contributed.

E. Cold and hot water supply piping shall be insulated with heavy density fiberglass with self-sealing lap and service jacket (ASJ). Continuous vapor barrier shall be maintained.

F. Fittings and valves shall be insulated with insulating cement applied to thickness equal to that of adjoining pipe insulation and shall be covered with glass cloth jacket. Fittings may be insulated with two layers of pre-cut fiberglass blanket insulation jacketed with preformed PVC covers instead of insulating cement and cloth jacket. Insulation thickness shall be 1 inch on hot water, ½ inch on cold water. Use of staples and/or tacks will not be permitted.

2.5 VALVES

A. Shut-off valves 2 inch and smaller shall be Apollo series 82-100/200, 3 piece full port, bronze body with TFE seats and chrome plated ball, 2 ½" and larger, class 125, cast iron body, epoxy coated, full port, flanged ends, stainless steel ball and stem. 2" and smaller shall be bottom loaded pressure stem rated at 600

2.6 PIPE IDENTIFICATION

A. Piping, except piping within inaccessible chases, shall be identified with semi-rigid plastic identification markers equal to setmark pipe markers with arrows that show direction of flow. Marker backgrounds shall be color coded with clearly printed legend to identify contents of pipe as required by scheme for the identification of piping systems (ANSI A13.1-1975). Setmark type SNA markers shall be used on overall diameters through 5 inches. Markers shall be located next to each valve, at each branch, at each pipe passage through walls (both sides), and on all horizontal piping at 20-foot intervals maximum.

2.7 PIPE SUPPORTS

A. Provide adjustable clevis hangers for hanger sizes 4" and larger and cast brass split-ring hinged hangers or band type hangers for smaller. Support piping from building structure to maintain required grade and pitch of pipe lines, prevent vibration, secure piping in place, and provide for expansion and contraction. Hangers on all insulted pipe shall be clevis type.

B. Provide vertical brackets and guides for horizontal piping where it is racked along walls. Trapeze hangers may be used where conditions permit. Provide all necessary pipe clips, anchors and sundries for proper alignment and support of piping system. Hangers for

copper piping shall be coated for dielectric isolation. Hangers for PVC, polypropylene, and other plastic piping shall be extended V-shape, with angle iron pipe supports as necessary.

C. Hanger rods shall have machine threads. Beam clamps, concrete inserts, and expansion shields shall be provided as required. No ramset or short shields will be allowed.

D. Hanger spacing shall meet requirements of state and local plumbing codes. In no case, shall horizontal piping be supported at intervals greater than 10'-0".

E. Horizontal piping shall be suspended from building structure by mild steel rod connecting pipe hanger to inserts, beam clamps, angle brackets, and lag screws as required by Building Construction in accordance with the following:

Rod Size	Pipe Size
3/8"	½" to 2"
½"	2 ½" to 4"
5/8"	5" to 12"

F. Hangers on insulated lines shall be sized to fit the outside diameter of pipe insulation. Provide hangers for insulated piping with 12" long, 18 gauge galvanized insulation shields.

G. Hangers on glass drain lines for acid waste and vent drainage system shall be spaced 8' on centers and at all changes in direction. Insert felt or tape padding between hanger and pipe. Hangers with factory-applied plastic cover are hereby authorized.

H. Piping at equipment and control valves shall be supported to prevent strains or distortions in connected equipment and control valves. Piping at equipment shall be supported to allow for removal of equipment, valves, and accessories with a minimum of dismantling and without requiring additional support after these items are removed.

I. Piping installed under this Section shall be independently supported from building structure by means of beam attachments and not from piping, ductwork, or conduit of other trades. Supplementary steel, including factory-fabricated channels, required to meet the requirements specified herein, shall be provided by the Plumbing Contractor.

J. Maximum spacing of hangers on runs of steel, copper, or brass pipe shall be as follows:

1. Schedule – Hanger Spacing in Feet/Pipe Material

Pipe Size (inches)	Steel (feet)	Copper or Brass (feet)
½ to 1	7	5
1 ¼	10	6
1 ½	10	8
2-8	10	10

K. Maximum spacing of hangers on no hub cast iron soil pipe and acid resisting pipe shall be 5' and hangers shall be provided at all changes in direction. Hanger rods to support piping from the structure or supplementary steel shall not exceed 4' in total length. Where pipe support assemblies exceed 4' in total length, Plumbing Contractor shall provide factory-fabricated channels and associated accessories.

L. All underground piping shall be supported from slab.

M. Hangers in areas exposed to weather or in unheated spaces shall be provided with a shop coat of rust inhibited paint. Hanger rods shall be hot dip galvanized.

2.8 SLEEVES INSERTS, FIRE STOPPING, AND ESCUTCHEONS

A. All pipes passing through floors, walls, or partitions shall be provided with sleeves having an internal diameter one inch larger than the outside diameter of the pipe. Pipe Sleeve Materials:

1. Sleeves through floors and through exterior, structural and fire-rated construction shall be hot-dipped galvanized Schedule 40 steel pipe. Sleeves shall extend 1" above finished floor.

2. Sleeves through partitions and non-fire rated construction shall be 26 gauge galvanized steel with lock longitudinal seams or approved plastic pipe.

3. Provide waterproofing membrane locking devices at floors. Provide 150 lb. slip-on welding flanges at exterior wall penetrations.

B. Fire stop penetration seals in fire-rated construction shall be products of STI SpecSeal, 3M, Proset Systems Firefill, or Dow and shall be installed in accordance with the latest requirements of ASTM E814 (UL 1479). Fire stop penetration sealants for non-metallic and insulated piping shall be intumescent (STI SpecSeal Series 100 Sealant, or SpecSeal Collar, or approved equal). Provide mineral fibre board, matting or putty for damming and forming. Finish seals flush to wall surface and fill gaps with silicone adhesive sealant caulking (Dow 96-081 RTV or approved equal). Provide 1" thick ceramic fibre board on both sides of penetrations in 2- and 3-hour rated walls and floors less than 8" thick.

C. Packing for sleeves that do not require maintenance of fire rating shall be oakum, silicate foam, ceramic fibre, or mineral fibre with approved sealant. Pack or foam to within one inch of both wall surfaces. Seal penetration packing with approved caulking and paintable waterproof mastic surface finish or silicone caulking

D. Waterproof Pipe Penetrations

1. Sleeves through outside walls shall be provided with pipe to wall penetration closures equal to Link-Seal Thunderline Corporation. Seals shall be mechanical type of interlocking rubber links shaped to fill space between pipe and sleeve. Links shall be assembled with bolts to form a belt around the pipe with pressure plate under each bolt head and nut. After seal assembly is positioned, tightening of bolts will provide watertight seal. This contractor shall determine the required inside diameter of each individual sleeve before ordering, fabricating, or installing. The inside diameter of each sleeve shall be sized as recommended by the manufacturer to fit the pipe and Link-Seal to assure a watertight joint.

2. Prefabricated modular sleeves shall be Mason Industries (SWS) or approved equal stiffened galvanized steel sleeves with preformed closed-cell elastomeric seal (non-fire-rated) or preformed mineral fiber or silicone foam seal (fire-rated).

3. Provide waterproof 1" single ring set in silicone and bolted to floor or wall at chipped and drilled penetrations of existing slabs on grade and existing walls below grade.

E. Inserts shall be individual or strip type of pressed steel construction with accommodation for removable nuts and threaded rods up to ¾ inch diameter, permitting lateral adjustment. Individual inserts shall have an opening at the top to allow reinforcing rods up to ½ inch diameter to be passed through the insert body. Strip inserts shall have attached rods with hooked ends to allow fastening to reinforcing rods.

F. Unless otherwise specified herein, escutcheons shall be cast brass chrome plated and provided with a set screw to properly hold escutcheon in place.

2.9 APPLICATION

A. Use grooved mechanical couplings and fasteners only in accessible locations.

B. Install unions downstream of valves and at equipment or apparatus connections.

C. Install brass male adapters each side of valves in copper piped system. Solder adapters to pipe.

D. Install ball valves for shut-off and to isolate equipment, part of systems, or vertical risers.

2.10 SLEEVES

A. Provide sleeves for piping through firewalls or smoke partitions. Provide approved packing between sleeves and piping to provide fire stop. Sleeves shall be 22 gauge or heavier steel.

2.11 ACCESS PANELS

A. All access panels shall be provided by GC. However, the Plumbing Contractor shall inform GC what sizes and locations are required

2.12 ERECTION TOLERANCES

A. Establish invert elevations, slopes for drainage to 1/4 or 1/8 inch per foot minimum. Maintain gradients.

B. Slope water piping minimum 0.25 percent and arrange to drain at low points.

2.13 SCHEDULES

A. Pipe Hanger Spacing: Metal Piping:

1. Pipe size: ½ to 1-1/4 inches:

a. Maximum hanger spacing: 6.5 ft.
b. Hanger rod diameter: 3/8 inches.

2. Pipe size: 1-1/2 to 2 inches:

a. Maximum hanger spacing: 10 ft.
b. Hanger rod diameter: 3/8 inch.

3. Pipe size: 2-1/2 to 3 inches:

a. Maximum hanger spacing: 10 ft.
b. Hanger rod diameter: ½ inch.

4. Pipe size: 4 to 6 inches:

a. Maximum hanger spacing: 10 ft.
b. Hanger rod diameter: 5/8 inch.

2.14 PLUMBING FIXTURES AND EQUIPMENT

A. Plumbing fixtures and equipment shall be as shown on the drawings or approved equal

B. Products Requiring Electrical Connection: Listed and classified by Underwriters Laboratories Inc., as suitable for the purpose specified and indicated.

C. Accept fixtures and equipment on site in factory packaging. Inspect for damage.

D. Protect installed fixtures from damage by securing areas and by leaving factory packaging in place to protect fixtures and prevent use.

E. All exposed piping to be chrome plated.

F. Insulate exposed hot water and waste piping located below handicapped sinks.

2.15 WATER HAMMER ARRESTERS

A. Provide water hammer arresters at fixtures with automatic solenoid or cylinder operated valves, automatic flush valves quick-closing valves, or solenoid valves.

B. Fixtures and equipment in battery installation may use single water hammer arrester properly sized for connected load.

C. Provide proper access to water hammer arresters in chases, utilizing a minimum 12” x 12” access panel furnished and installed by this contractor.

D. Water hammer arresters shall be installed in accordance with manufacturer’s recommendations and not less than one installed per core piping hot system and core cold system. Arresters shall be equal to J.R. Smith Hydrotrol Series 5000, Zurn Series 1700 or Josam Series 75000.

E. Water hammer arresters shall be all stainless-steel construction with nesting type bellows contained within casing having sufficient displacement volume to dissipate the calculated kinetic energy in the piping system.

PART 3 - EXECUTION

3.1 TESTING, ADJUSTING, AND BALANCING

A. Provide testing of plumbing systems as specified and as required by authorities with jurisdiction including Owner and Architect.

B. Before date of acceptance, furnish Architect with certificates of testing and inspection for plumbing systems indicating approval of authorities with jurisdiction and conformance with requirements of contract documents.

C. Test sanitary piping to at least 10 feet head for 2 hours.

D. Test water piping to 150 psi for 2 hours.

3.2 PIPING PREPARATION

A. Ream pipe and tube ends. Remove burrs.

B. Remove scale and dirt, on inside and outside, before assembly.

C. Prepare piping connections to equipment with flanges or unions.

3.3 INSTALLATION

A. Install in accordance with manufacturer's instructions.

B. Install products in accordance with manufacturer's instructions. Fixture Heights: Install fixtures to heights above finished floor as directed by the Architect.

C. Extend cleanouts to finished floor or wall surface. Lubricate threaded cleanout plugs with mixture of graphite and linseed oil. Ensure clearance at cleanout for rodding of drainage system.

D. Encase exterior cleanouts in concrete flush with grade.

E. Install floor cleanouts at elevation to accommodate finished floor.

F. Verify that walls and floor finishes are prepared and ready for installation of fixtures.

G. Verify that electric power is available and of the correct characteristics.

H. Confirm that millwork is constructed with adequate provision for the installation of counter top lavatories and sinks.

I. Rough-in fixture piping connections in accordance with minimum sizes indicated in fixture rough-in schedule for particular fixtures.

J. Install each fixture with trap, easily removable for servicing and cleaning.

K. Provide chrome plated rigid or flexible supplies to fixtures with loose key stops, reducers, and escutcheons.

L. Install components level and plumb.

M. Install and secure fixtures in place with wall carriers and bolts.

N. Seal fixtures to wall and floor surfaces with sealant, and color to match fixture.

O. Provide non-conducting dielectric connections wherever jointing dissimilar metals.

P. Route piping in orderly manner and maintain gradient. Route parallel and perpendicular to walls.

Q. Install piping to maintain headroom, conserve space, and not interfere with use of space.

R. Group piping whenever practical at common elevations.

S. Install piping to allow for expansion and contraction without stressing pipe, joints, or connected equipment.

T. Provide clearance in hangers and from structure and other equipment for installation of insulation and access to valves and fittings.

U. Provide access where valves and fittings are not exposed.

V. Establish elevations of buried water piping outside the building to ensure not less than 5 ft of cover and buried sanitary piping outside not less than 3 ft. of cover.

W. Install vent piping penetrating roofed areas to maintain integrity of roof assembly.

X. Where pipe support members are welded to structural building framing, scrape, brush clean, and apply one coat of zinc rich primer to welding.

Y. Prepare exposed, unfinished pipe, fittings, supports, and accessories ready for finish painting.

Z. Excavate in accordance with Earthwork specification section.

AA. Backfill in accordance with Earthwork specification section.

BB. Install bell and spigot pipe with bell end upstream.

CC. Install valves with stems upright or horizontal, not inverted.

DD. Install water piping to ASME B31.9.

EE. Sleeve pipes passing through partitions, walls and floors.

FF. Inserts

1. Provide inserts for placement in concrete formwork.

2. Provide inserts for suspending hangers from reinforced concrete slabs and sides of reinforced concrete beams.

3. Provide hooked rod to concrete reinforcement section for inserts carrying pipe over 4 inches.

4. Where concrete slabs form finished ceiling, locate inserts flush with slab surface.

5. Where inserts are omitted, drill through concrete slab from below and provide through-bolt with recessed square steel plate and nut recessed into and grouted flush with slab.

GG. Pipe Hangers and Supports

1. Install in accordance with ASTM B31.9 ASTM F708.

2. Support horizontal piping as scheduled.

3. Install hangers to provide minimum ½ inch space between finished covering and adjacent work.

4. Place hangers within 12 inches of each horizontal elbow.

5. Use hangers with 1-1/2 inch minimum vertical adjustment. Design hangers for pipe movement without disengagement of supported pipe.

6. Support riser piping independently of connected horizontal piping.

7. Where several pipes can be installed in parallel and at same elevation, provide multiple or trapeze hangers.

8. Provide copper plated hangers and supports for copper piping.

9. Prime coat exposed steel hangers and supports. Hangers and supports located in crawl spaces, pipe shafts, and suspended ceiling spaces are not considered exposed.

10. Provide hangers adjacent to motor driven equipment with vibration isolation.

11. Support cast iron drainage piping at every joint.

12. Seismic Requirements

a. All components of the plumbing systems in the building shall be designed and constructed to resist seismic forces as determined in accordance with the provisions of:

1) 780 CMR 1612.7
2) BOCA
3) SMACNA guidelines for seismic restraint of mechanical system.

3.4 DISINFECTION OF DOMESTIC WATER PIPING SYSTEM

A. Prior to starting work, verify system is complete, flushed and clean.

B. Ensure PH. of water to be treated is between 7.4 and 7.6 by adding alkali (caustic soda or soda ash) or acid (hydrochloric).

C. Inject disinfectant, free chlorine in liquid, powder, tablet or gas form, throughout system to obtain 50 to 80 mg/L residual.

D. Bleed water from outlets to ensure distribution and test for disinfectant residual at minimum 15 percent of outlets.

E. Maintain disinfectant in system for 24 hours.

F. If final disinfectant residual tests less than 25 mg/L, repeat treatment.

G. Flush disinfectant from system until residual equal to that of incoming water or 1.0 mg/L.

H. Take samples no sooner than 24 hours after flushing, from 5 percent of outlets and from water entry, and analyze in accordance with AWWA C651.

3.5 INTERFACE WITH OTHER PRODUCTS

A. Review millwork shop drawings. Confirm location and size of fixtures and openings before rough in and installation.

3.6 ADJUSTING

A. Adjust stops or valves for intended water flow rate to fixtures without splashing, noise, or overflow.

3.7 CLEANING

A. Clean plumbing fixtures and equipment.

3.8 PROTECTION OF FINISHED WORK

A. Do not permit use of fixtures.

3.9 INTERPRETATION OF THE DRAWINGS AND SPECIFICATIONS

A. As used in the drawings and specifications for this work, certain non-technical words shall be understood to have specific meanings as follows regardless of indications to the contrary in the general conditions or other documents governing the work.

"Furnish" Purchase and deliver to the project site complete with every necessary appurtenance and support, all as part of this work. Purchasing shall include payment of all sales taxes and other surcharges as may be required to assure that purchased items are free of all liens, claims or encumbrances.

"Install" Unload at the delivery point at the site and perform every operation necessary to establish secure mounting and correct operation at the proper location in the project, all as part of this work.

"Provide" "Furnish" and "Install".

"New" Manufactured within the past two years and never before used.

B. Except where modified by a specific notation to the contrary, it shall be understood that the indication and/or description of any item in the drawings or specifications for this work carries with it the instruction to furnish, install and connect the items as part of the work, regardless of whether or not this instruction is explicitly stated.

C. To the extent that they govern the basic work, the specifications also govern change order work.

D. No exclusion from, or limitation in, the symbolism used on the drawings for this work or the language used in the specifications for this work shall be interpreted as a reason for omitting the appurtenances or accessories necessary to complete any required system or item of equipment.

E. The drawings for this work utilize symbols and schematic diagrams which have no dimensional significance. The work shall, therefore, be installed to fulfill the diagrammatic intent expressed on the drawings, but in conformity with the dimensions indicated on the final working drawings; field layouts and shop drawings of all trades.

F. Certain details appear on the drawings for this work which are specific with regard to the dimensions and positioning of the work. These are intended only for general information purposes. They do not obviate field coordination for individual items of the indicated work.

G. Information as to general construction and architectural features and finishes shall be derived from structural and architectural drawings and specifications only.

H. The use of words in the singular shall not be considered as limiting where other indications denote that more than one item is referred.

3.10 COORDINATION

A. Work shall be performed in cooperation with other trades on the project and so scheduled as to allow speedy and efficient completion of the project.

B. This Contractor shall furnish to other trades advance information on locations and sizes of all frames, boxes, sleeves, and openings needed for his own work, and also furnish information and shop drawings necessary to permit trades affected by this Contractor's work to install their work properly and without delay.

C. Where there is evidence that work of this Contractor will interfere with the work of other trades, this Contractor shall assist in working out space conditions to make satisfactory adjustments.

D. This Contractor shall, with the approval of the Engineer and without extra cost to the Owner, make modifications in his work as required by structural interferences. This Contractor shall pay all expenses to the General Contractor for additional openings, or relocating or enlarging existing openings through concrete floors, walls, beams and roof required for this work, which was not properly coordinated.

E. If this Contractor installs his work before coordinating with other trades so as to cause interference with the work such trades, he shall make all necessary changes in his work to correct the conditions without extra cost to the Owner.

F. This Contractor shall visit the site to ascertain and apprise himself of the actual field conditions under which the work has to be performed. All work shown on the drawings is diagrammatic in nature and their actual location and elevation shall be verified in the field. Any deviations necessary as a result of field interferences shall be brought to the attention of the Engineer and resolved expeditiously, at no additional cost to the Owner.

G. The Contractor shall protect all materials and work of other trades form damage that may

be caused by his work and shall be responsible for repairing any damages without extra cost to the Owner.

H. Sleeves, inserts, anchor bolts and similar items set into the masonry structure or the work of other trades shall be furnished and installed by this Contractor. This Contractor shall be responsible for all such items necessary to hanged or support his equipment.

I. When, in order to accommodate this Contractor's work, finished materials and work of other trades must be cut or fitted in the shop this Contractor shall furnish the necessary drawings for transmittal to the trades whose materials must be cut or fitted.

J. Cutting, coring, drilling and patching of holes and openings for the work of the sub-trade shall be performed by the particular subcontractor when the largest dimension of the opening is 16 inches or less. If the largest dimension of the opening exceeds 16 inches, the General Contractor shall perform the cutting and patching for the work of the sub-contractor. See Section 01 73 29 for more information.

K. All refuse shall be placed in dumpsters provided by the General Contractor

L. All work shall be installed so that parts requiring periodic inspection, operation, maintenance and repair are readily accessible. Minor deviation from the drawings may be made to accomplish this, but changes of substantial magnitude shall not be made prior to written approval from the Engineer.

3.11 TAGS, VALVES EQUIPMENT, AND INSTRUMENTS

A. Upon completion of work, attach engraved laminated plastic tags to all valves, and instrumentation. Equipment shall bear a stamped stainless tag. Tags shall have black characters on white face, consecutively numbered and prefixed with letter P for general valves.

B. Embossed or engraved aluminum or brass tags may be substituted if desired. Tags shall be at least 1/8” thick.

C. Tags shall be at least 1” diameter with numerals at least 3/8” high and attached by S hooks and chains.

D. Nameplates, catalog numbers and rating identifications shall be securely attached to electrical and mechanical equipment with screws or rivets. Adhesives or cements will not be permitted.

END OF SECTION

SECTION 23 00 00

HEATING, VENTLATION AND AIR CONDITIONING

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SECTION 23 00 00

HEATING, VENTLATION AND AIR CONDITIONING

PART 1 - GENERAL

1.1 GENERAL CONDITIONS

A. All sections of Division I General Condition requirements shall hereby be made part of this section of the specification.

B. Examine all drawings and all other sections of the specification for the requirements for the work of this section.

C. All work shown in the drawings and specifications shall be included under the base bid, except where there is specific reference to exclusion and incorporation in other quotations.

D. HVAC work is indicated diagrammatically. Exact locations of all components shall be determined in the field and by actual building conditions. Equipment or ducts interfering with other installations shall be relocated as required at no additional cost to the owner.

1.2 DESCRIPTION OF WORK

A. The HVAC scope for this project includes generally, but is not limited to the following:

1. Low pressure ductwork distribution systems
2. Ductwork insulation systems
3. Exhaust fans
4. Rigging
5. Testing and balancing – Air systems
6. Fan Controls

1.3 CODES, PERMITS, AND INSPECTIONS

A. All work shall meet or exceed the latest requirements of all national, state, country municipal and other authorities exercising jurisdiction over construction work of the project.

B. All required inspection certificates shall be obtained, paid for, and made available at the completion of the work. Municipal permit and inspection fees are waived although all applicable permits and inspections are required.

C. Any portion of the work, which is not subject to the approval of an authority having jurisdiction, shall be governed by the applicable sections of the overall National Fire Protection Association.

D. Installation procedures, methods, and conditions shall comply with the latest requirements of the Federal Occupational Safety and Health Act (OSHA).

1.4 GUARANTEES AND CERTIFICATIONS

A. The HVAC contractor shall guarantee work in writing for one year from date of final

acceptance against defects in materials, workmanship and installation. The HVAC contractor shall correct defective work at no additional cost to the owner and provide equipment warranties to the owner in full force. Provide five-year warranty for compressors. See product specification paragraphs for more information on warranties.

B. Certification shall be submitted attesting to the fact that specified performance criteria are met by all items of heating and air conditioning equipment.

1.5 SHOP DRAWINGS AND OTHER INFORMATION REQUIRED

A. Prior to purchasing any equipment or materials, six (6) copies of complete submittals shall be submitted for review, including the following minimum information:

1. Drawings, dimensions, and weights.

2. Minimum clearances for proper operation and service.

3. Minimum performance data as required by the drawings and specifications. Submitted information shall include symbols shown on drawing EF-1, RTU-1, etc.). The purpose of showing the symbols is identification which specified product is submitted for review. Without proper symbols indicated, the submittals will not be reviewed.

B. Prior to assembling or installing the work, the following shall be submitted for review:

1. Scale drawings showing all piping and duct runs with sizes and elevations shown on composite drawings with indication of coordination with other trades. This submission shall consist of 3 paper prints. If requested by General Contractor, AutoCad files of MEP/FP drawings will be made available for a cost of $50.00 per drawing. Files will be made available after General Contractor signs a WB&A disclaimer provided by WB&A.

2. Catalog information, factory assembly drawings and field installation drawings as required for a complete explanation and description of all items of equipment.

Note: The HVAC contractor shall provide a duplicate copy of the operating manuals for all controls, a duplicate copy of the maintenance manuals for all equipment and controls, and reduced scale drawings showing the HVAC distribution system.

1.6 SEPARATION OF WORK BETWEEN TRADES

A. The following items shall be furnished and installed by the HVAC contractor:

1. Motors for mechanical equipment
2. Controls for mechanical equipment
3. Hoisting and rigging
4. Fastenings and supports
5. Oil opening flashing
6. Field touch up painting of damaged shop coats
7. Rubbish removal

B. The following items shall be furnished and installed by other trades:

1. Cutting of openings in floor, walls and roof

2. Louvers in outside walls and roof vents
3. Enclosure/shafts of ducts
4. Piping enclosures
5. Concrete pads for equipment
6. Power for HVAC equipment

C. The Heating, Ventilating and air Conditioning Trade is required to supply all necessary supervision and coordination information to any other trades who are to supply work to accommodate the Heating, Ventilating and Air Conditioning installations.

1.7 EQUIPMENT AND MATERIALS

A. All equipment and materials shall be new and without blemish or defect.

B. It is the intent of these specifications that wherever a manufacturer of a product is specified, and the terms “other approved” or “or approved equal” or “equal” are used, the substituted item must conform in all respects to the specified item.

C. Substituted equipment or optional equipment where permitted and approved, must conform to space requirements. Any substituted equipment that cannot meet space requirements, whether approved or not, shall be replaced at the Contractor's expense. Any modifications of related systems as a result of substitutions shall be made at the Contractor's expense.

1.8 INTERPRETATION OF THE DRAWINGS AND SPECIFICATIONS

A. As used in the drawings and specifications for this work, certain non-technical words shall be understood to have specific meanings as follows regardless of indications to the contrary in the general conditions or other documents governing the work.

“Furnish” Purchase and deliver to the project site complete with every necessary appurtenance and support, all as part of this work. Purchasing shall include payment of all sales taxes and other surcharges as may be required to assure that purchased items are free of all liens, claims or encumbrances.

“Install” Unload at the delivery point at the site and perform every operation necessary to establish secure mounting and correct operation at the proper location in the project, all as part of this work.

“Provide” “Furnish” and “Install”.

“New” Manufactured within the past two years and never before used.

B. Except where modified by a specific notation to the contrary, it shall be understood that the indication and/or description of any item in the drawings or specifications for this work carries with it the instruction to furnish, install and connect the items as part of the work, regardless of whether or not this instruction is explicitly stated.

C. To the extent that they govern the basic work, the specifications also govern change order work.

D. No exclusion from, or limitation in, the symbolism used on the drawings for this work or the language used in the specifications for this work shall be interpreted as a reason for

omitting the appurtenances or accessories necessary to complete any required system or item of equipment.

E. The drawings for this work utilize symbols and schematic diagrams which have no dimensional significance. The work shall, therefore, be installed to fulfill the diagrammatic intent expressed on the drawings, but in conformity with the dimensions indicated on the final working drawings; field layouts and shop drawings of all trades.

F. Certain details appear on the drawings for this work which are specific with regard to the dimensions and positioning of the work. These are intended only for general information purposes. They do not obviate field coordination for individual items of the indicated work.

G. Information as to general construction and architectural features and finishes shall be derived from structural and architectural drawings and specifications only.

H. The use of words in the singular shall not be considered as limiting where other indications denote that more than one item is referred to.

1.9 COORDINATION

A. Work shall be performed in cooperation with other trades on the project and so scheduled as to allow speedy and efficient completion of the project.

B. This Contractor shall furnish to other trades advance information on locations and sizes of all frames, boxes, sleeves, and openings needed for his own work, and also furnish information and shop drawings necessary to permit trades affected by this Contractor's work to install their work properly and without delay.

C. Where there is evidence that work of this Contractor will interfere with the work of other trades, this Contractor shall assist in working out space conditions to make satisfactory adjustments.

D. This Contractor shall, with the approval of the Engineer and without extra cost to the Owner, make modifications in his work as required by structural interference. This Contractor shall pay all expenses to the General Contractor for additional openings, or relocating or enlarging existing openings through concrete floors, walls, beams and roof required for this work which was not properly coordinated.

E. If this Contractor installs his work before coordinating with other trades so as to cause interference with the work such trades, he shall make all necessary changes in his work to correct the conditions without extra cost to the Owner.

F. This Contractor shall visit the site to ascertain and apprise himself of the actual field conditions under which the work has to be performed. All work shown on the drawings is diagrammatic in nature and their actual location and elevation shall be verified in the field. Any deviations necessary as a result of field interferences shall be brought to the attention of the Engineer and resolved expeditiously, at no additional cost to the Owner.

G. The Contractor shall protect all materials and work of other trades form damage that may be caused by his work and shall be responsible for repairing any damages without extra cost to the Owner.

H. Sleeves, inserts, anchor bolts and similar items set into the masonry structure or the work

of other trades shall be furnished and installed by this Contractor. This Contractor shall be responsible for all such items necessary to hanged or support his equipment.

I. When, in order to accommodate this Contractor's work, finished materials and work of other trades must be cut or fitted in the shop this Contractor shall furnish the necessary drawings for transmittal to the trades whose materials must be cut or fitted.

Cutting, coring, drilling and patching of holes and openings for the work of sub-trades shall be performed by the particular subcontractor when the largest dimension of the opening is 16 inches or less. If the largest dimension of the opening exceeds 16 inches, the General Contractor shall perform the cutting and patching for the work of the subcontractor. See Section 01 73 29 for Cutting and Patching.

J. All work shall be installed so that parts requiring periodic inspection, operation, maintenance and repair are readily accessible. Minor deviation from the drawings may be made to accomplish this, but changes of substantial magnitude shall not be made prior to written approval from the Engineer. The contractor shall determine locations of all access panels required for the project. Locations shall be coordinated with the General Contractor and approved by the Architect. Access panels shall be furnished by HVAC trade and installed by General Contractor.

1.10 SEQUENCING

A. Coordinate work of this Filed Subcontract with that of other trades, affecting or affected by this work, and cooperate with the other trades as is necessary to assure the steady progress of work.

B. Do not order or deliver any materials until all submittals, required in the listed Specification Sections included as part of this Filed Subcontract, have been received and approved by the Architect.

C. Before proceeding with installation work, inspect all project conditions and all work of other trades to assure that all such conditions and work are suitable to satisfactorily receive the work of this Section and notify the Architect in writing of any which are not. Do not proceed further until corrective work has been completed or waived.

PART 2 - PRODUCTS

2.1 SCAFFOLDS AND STAGING

A. General: Filed Subcontractors shall obtain required permits for, and provide scaffolds, staging, and other similar raised platforms, required to access their Work as specified in Section 01 50 00 - TEMPORARY FACILITIES AND CONTROLS and herein.

1. Scaffolding and staging required for use by this Filed Subcontractor pursuant to requirements of Section 01 50 00 - TEMPORARY FACILITIES AND CONTROLS shall be furnished, erected, maintained in a safe condition, and dismantled when no longer required, by this Filed Sub-Trade requiring such scaffolding.

2. Each Filed Subcontractor is responsible to provide, maintain and remove at dismantling, all tarpaulins and similar protective measures necessary to cover scaffolding for inclement weather conditions other than those required to be provided, maintained and removed by the General Contractor pursuant to MGL (Refer to Section 01 50 00 - TEMPORARY FACILITIES AND CONTROLS and as additionally required for dust control).

3. Furnishing portable ladders and mobile platforms of all required heights, which may be necessary to perform the work of this trade, are the responsibility this Filed Subcontractor.

4. Enclose all exterior scaffolding outside of the construction fence with 8-foot high plywood enclosure at end of each work day to prohibit access to the scaffolding by unauthorized individuals.

2.2 HOISTING MACHINERY AND EQUIPMENT

A. All hoisting equipment, rigging equipment, crane services and lift machinery required for the work by this Filed Subcontractor shall be furnished, installed, operated and maintained in safe conditions by this Filed Subcontractor, as referenced under Section 01 50 00 - TEMPORARY FACILITIES AND CONTROLS.

2.3 SHEET METAL DUCTWORK

A. Reference Standards

1. Material, construction and installation shall meet requirements of most recent editions of the following standards and references, except for more stringent requirements specified or shown on Drawings:

Standard	As Applicable to
SMACNA HVAC Duct Construction Standards (Metal and Flexible)	Sheet Metal Ductwork; Duct Liners; Adhesives; Fasteners; Flexible Ductwork.
SMACNA HVAC Air Duct Leakage Test Manual	Duct Leakage Testing
NFPA 90A	Fire Dampers; Fire Resistance Standards for Ducts and Liners

B. General

1. Provide supporting and hanging devices necessary to attach entire HVAC system including ductwork and equipment, and to prevent vibration.

2. Provide vertical and horizontal supports as required by codes to meet minimum applicable earthquake resistance standards.

3. Ductwork shall be free from vibration under all conditions of operation.

4. Dimensions shown on Drawings for lined ductwork are net inside dimensions. Increase ductwork to accommodate lining requirements.

5. Pipe or conduit crossing duct:

   a. No pipe, conduit, hanger, Architectural element nor structural member shall pass through duct without Architect's written approval.

   b. Where it is impossible to re-route pipe or conduit and when written approval has been obtained, increase duct size to maintain constant cross-sectional area at point of interference. Provide streamlined enclosure for pipe or conduit, as illustrated in SMACNA.

6. When making offsets and transformations necessary to accommodate structural conditions, preserve full cross-sectional area of ductwork shown on Drawings.

7. Ductwork Construction

   a. All ductwork systems shall be constructed and sealed in accordance with SMACNA standards for the specified pressure-velocity classifications.

   b. Ductwork systems shall have pressure-velocity classifications as follows:

Duct System	Material	SMACNA Pressure Class	Press	SMACNA Seal Class	Velocity (FPM)	Method of Construction
Supply ductwork for low pressure systems	Galvanized Steel	2”	Pos	B	<2500	
Exhaust air ductwork for low pressure systems	Galvanized Steel	2”	Neg	B	<2500	

8. Ducts required to be continuously welded and with all penetrations sealed (damper rods, access doors, etc.) shall be liquid-tight and shall be airtight. The leakage test shall yield a zero leak rate. All welding shall use inert gas shielding with filler rod equal to or exceeding the base metal properties.

9. Support

   a. Space hangers as required by SMACNA (8 ft max) for horizontal duct on 8 ft. centers, unless concentrated loadings require closer spacing.
   b. Support vertical duct on each floor or slab it penetrates.
   c. Supports for ductwork and equipment shall be galvanized unless specified otherwise.

10. Connections

    a. Connect inlets and outlets of heat recovery units and fans to ductwork with flexible connections unless fan has vibration isolator mounts inside unit with flexible connections.
    b. Indoors, flexible connections shall be neoprene-coated fibrous glass fire retardant fabric, by Ventfabrics, or Durodyne. Outdoors, flexible connections shall be Dupont hypalon-coated fibrous glass fire-, weather-, and UV-resistant by Ventfabrics or Durodyne.
    c. Secure flexible connections tightly to air handlers with metal bands. Bands shall be same material as duct construction.
    d. Connections from trunk to branch ducts shall be as detailed on Drawings.

11. Construction

    a. No sharp metal edges shall extend into air streams.
    b. Install drive slips on air-leaving side of duct with sheet metal screws on 6" centers.
    c. Spin in collars shall NOT be used.

12. Joints

    a. Longitudinal lock seams shall be double-locked and flattened to make tight joints.
    b. Make transverse joints, field connections, collar attachments and flexible connections to ducts and equipment with sheet metal screws or bolts and nuts. Do not use rivets and staples.

13. Prefabricated Transverse Duct Joints

    a. Transverse joints in galvanized sheet metal ductwork may be made with galvanized gasketed frame and angle duct joint system by Ductmate, TDF, TDC, or approved equal. Angles shall be at least 20 gauge. Prefabricated transverse duct joints shall not be used for duct 16 GA. and heavier, nor for duct 23 GA. or lighter.

    b. Secure angles to duct with screws (using clutched arbor) or spot-welds spaced as recommended by manufacturer for duct pressure class.

14. Elbows and Bends

    a. Elbows and bends for rectangular ducts shall have centerline radius of 1.5 times duct width wherever possible. Elbows for grease exhaust shall be full radius. Turning vanes and mitered elbows are not allowed in grease ducts.

    b. Where centerline radius is less than 1.5 times duct width (on supply, return and exhaust ductwork), elbows shall be radius throat with radius heel and full length splitter vanes when required. When centerline radius (r) divided by the duct width (w) is less than 1.5, provide the following number of splitter vanes: r/w between 1.49 and 0.7 = 1; r/w between

0.69 and 0.6 = 2; r/w between 0.59 and 0.55 = 3. Minimum inside radius (not centerline) shall be 2". Install vanes in accordance with SMACNA.

c. For round ductwork provide stamped elbows, with centerline radii equal to 1-1/2 times duct diameter, or gored elbows as follows:

Elbow Angle	No. of Gores
0 –36	2
37 –72	3
73 –90	5

15. Access Panels/Doors

a. Provide proper pressure and leakage rated, gasketed, duct mounted access panels/doors. In insulated ducts, access doors shall be insulated double wall. Gauges of door materials, no. of hinges, no. and type of door locks shall be as required by the SMACNA Duct Construction Standards. Unhinged doors shall be chained to frame with a minimum length of 6" to prevent loss of door. Door metal shall be the same as the attached duct material. The minimum sizes are:

Fire dampers - 12" x 12", or larger.
Automatic control dampers - 6" x 6" minimum.
Manual volume dampers 2 sf and larger - 6" x 6" minimum.
At additional locations indicated on drawings, or specified elsewhere - 12" x 12" minimum.
Flow measuring stations - 12" x 12" or larger.

Provide, as an alternate, access door for all supply air ductwork upstream and downstream of each elbow and tee and at intervals of approximately 40 ft. to allow maximum reach of 20 ft. in straight horizontal runs for cleaning - 24" x 24" unless duct size is smaller in which case largest size possible shall be used (min. 6" x 6").

b. Access doors are not shown on the drawings, but shall be provided in accordance with the above.

16. Extractors shall have adjusting rod and locknut on outside of duct.

17. Connections to roof fans:

a. Shall be at least 22 ga. galvanized steel soldered watertight.
b. Solder side seams at least 12" up from bottom.
c. Provide suitable dielectric gaskets to join dissimilar materials.

18. Plenums and connections to louvers:

a. Shall be 18 ga. minimum cross-broken and properly reinforced with galvanized angle irons to SMACNA requirements.
b. Shall have bottom and corner seams soldered watertight at least 12" up from bottom.
c. Shall have neoprene gaskets or other non-corrosible material to make connections to louvers watertight.

d. Shall pitch connection back towards the louver. Provide half-coupling drain connection at bottom of plenum unless noted otherwise. Pipe drain to nearest floor drain.

e. Shall have unused portions of louvers blocked-off with sheet metal; sealed air- and water-tight; insulated with 2" thick 6-lb. density rigid or board insulation.

19. Flexible Ductwork

a. Flexible ductwork, connecting to uninsulated or unlined duct, shall be vinyl coated fiberglass cloth 0.0057" minimum thickness, 25 strands per inch minimum thread count with corrosion-resistant helical wire reinforcement. Flex duct shall be U.L. rated for 12" W.C. positive pressure, 2" W.C. negative pressure with a maximum velocity of 4000 FPM. Flexduct must be listed as a Class 1 Connector according to UL 181 and shall meet the requirements of NFPA 90A - maximum ASTM E-84 fire hazard rating shall be 25 flame spread, 50 fuel contributed and 50 smoke developed. Uninsulated flexible duct shall be equivalent to Flexmaster Type 4.

b. Flexible duct connected to insulated or lined duct shall be insulated with 1-1/2", 1/2 lb. density fiberglass insulation and flame retardant (UL Listed) vapor barrier, meeting ASTM E-84 rating.

c. Submittals shall include data on core, in addition to other data listed above required to ensure that submitted product meets the requirements of these specifications.

d. If flexduct other than the models listed above is submitted, a sample of the flex shall be submitted to the Architect. The Architect shall have sole discretion in determining whether the submitted flex is equivalent to that of the named above.

e. Flexible duct shall be airtight, triple lock mechanically spiral formed with spiral corrugation. Material shall be 3003 zero temper aluminum, .0065" minimum thickness.

f. Provide sealing compound and metal draw bands for installation. See further paragraphs in this specification, and details for other installation requirements.

C. Flexible Duct

1. Provide supports at manufacturer's recommended intervals. Sag shall not exceed ½" per foot of spacing between supports. Ducts shall not exceed 6 feet long and shall be used for straight run only, no offsets or turns.

2. Hanger and saddle in contact with flexible duct shall be wide enough to prevent restriction of internal duct diameter when weight of supported section rests on hanger or saddle material.

3. Factory installed suspension systems integral to flexible duct are acceptable as alternative hanging method when manufacturers recommended procedures are followed.

4. Collars to which flexible ducts are attached shall be at least 2" long. Sleeves for joining sections of flexible duct shall be at least 4" long.

5. Apply sealing compound to metallic surface at connection of flexible duct with sheet metal ducts, collars and mixing boxes. Slip flexible ductwork over sealing compound. Complete seal with ½" wide, commercially made metal draw bands.

D. Fire Dampers

1. Fire Dampers shall be installed in the Ductwork where indicated on the drawings and required by the code and local authorities. See architect's construction documents to identify fire-rated walls and floors.

2. Fire Dampers shall be constructed and installed with visible fusible links in accordance with the requirements of the National Board of Fire Underwriters and the Underwriters.

3. Inspection Authorities having jurisdiction in the locality. Fire Dampers shall be Buckley Model 150A or 150B (vertical or horizontal) as manufactured by Buckley Associates (781-878-5000) Sheet Metal Workers Local 17 or approved equal.

4. Dampers shall meet National Fire Protection Association requirements as outlined in the current N.F.P.A. bulletin 90-A. Dampers shall bear the Underwriters' label. Dampers shall be installed with metal sleeves and framing angles. All Dampers shall be installed in accordance with the means by which they were U.L. tested.

5. Free area must equal or exceed that of the specified product.

6. If additional wall or/and ceiling/floor framing for damper installation is required coordinate framing installation with GC.

7. HVAC contractor shall coordinate fire damper access panel locations with general contractor.

E. Volume Dampers

1. Note: Volume dampers may not be shown on Drawings, but dampers shall be provided as necessary for system balancing and as required by this specification.

2. Provide manual adjustable volume dampers, with extended mount indicating and locking quadrants:

   a. On each supply, return and exhaust duct take-off.
   b. At each take-off to register, grille or diffuser (these are not shown on the drawings). Volume damper shall be as far away from diffuser or grille as possible for system balancing.

3. Dampers shall be ½" smaller in both dimensions or 1" smaller diameter than size of duct in which they are installed; e.g., use 23-½" by 23-½" damper for 24" square duct.

4. Dampers larger than 12" in height shall be opposed multi-blade.

5. Damper blades shall be two gauges heavier than adjoining ductwork, and shall be riveted to supporting rods. Hem over edges parallel to rods.

6. Brackets shall be galvanized metal, secured to ductwork with sheet metal screw with locking quadrant arms (see seal class section for additional requirements). Provide 2" handle extension for all dampers on externally insulated ductwork.

F. Motorized Dampers

1. Control dampers meeting the following specifications shall be furnished and installed where shown on plans and/or as described.

2. Dampers shall consist of: a 16-gage galvanized steel channel frame with 5 in. depth; airfoil shaped, galvanized steel double skin construction blades (14-gage equivalent thickness); blades shall be completely symmetrical relative to their axle pivot point, presenting identical resistance to airflow in either direction or pressure on either side of the damper; 1/2 in. diameter plated steel axles turning in synthetic (acetal) sleeve bearings; silicone blade seals; flexible stainless steel jamb seals; and external (out of the airstream) blade-to-blade linkage.

3. Damper manufacturer's printed application and performance data including pressure, velocity and temperature limitations shall be submitted for approval showing damper suitable for pressures to 8 in. water gage, velocities to 4000 fpm and temperatures to 250°F. Testing and ratings to b e in accordance with AMCA Standard 500-D. Basis of design is Greenheck model VCD-33.

4. Damper air leakage shall not be greater than 3 cfm/sq. ft. @ 1 in. water gage.

5. Testing and ratings shall be per AMCA Standard 500-D.

G. Diffusers, Registers and Grilles

1. Provide steel diffusers, registers and grilles for supply, return and exhaust outlets, of size, type and design shown on Drawings. Acceptable manufacturers shall be Titus, Metalaire, Nailor, or approved equal.

2. Equipment shall be tested and rated per ASHRAE 91-70.

3. Equipment shall handle air quantities at operating velocities:

   a. With maximum diffusion within space supplied or exhausted.
   b. Without objectionable air movement as determined by Architect.
   c. With sound pressure level not to exceed NC 30 or as specified on Drawings.

4. Supply, return and exhaust outlets shall have opposed blade volume dampers operable from front.

5. Supply registers shall have two sets of directional control blades.

6. Diffusers within same room or area shall be of same type and style to provide Architectural uniformity.

7. Surface mount diffusers, registers and grilles shall be furnished with gaskets and

installed with faces set level and plumb, tightly against mounting surface.

8. Finish shall be as directed by Architect.

9. Coordinate diffusers, registers and grilles with ceiling and wall construction. Refer to Architectural Drawings for exact lengths and for framing and mitering arrangements that may differ from those shown on HVAC Drawings.

H. Ceiling diffusers for mounting in fire-rated floor ceiling assemblies

1. The products shall be classified by Underwriters' Laboratories for use in fire-rated floor/ceiling and or roof/ceiling assemblies with up to a 3 hour rating.

2. The discharge pattern shall be 4-way horizontal and shall be adjusted by dropping the perforated face and rotating the pattern deflectors. Removable face shall have spring clips for easy access to the damper.

3. The perforated face shall have 3/16" (5) diameter holes on 1/4" (6) staggered centers.

4. The finish shall be AW Appliance white.

5. Each diffuser shall be provided with a volume damper accessible for diffuser face for air volume adjustment.

2.4 FLEXIBLE CONNECTIONS

A. All fan and air supply unit connections, both at inlet and discharge shall be made with flexible material so as to prohibit the transfer of vibration from fans to ductwork connecting thereto, without air leakage. The material between the clamps shall have sufficient slack so as to prevent tearing due to fan movement.

B. The flexible connections shall be a maximum of 12" long and held in place with heavy metal bands, securely attached, to prevent any leakage at the connection points.

C. Flexible connections shall be fabricated from approved flame proved fabric conforming to 90A of the NFPA Asbestos cloth is not permitted.

2.5 ESCUTCHEONS AND DUCT COLLARS

A. Provide adjustable escutcheons on exposed piping that passes through finished floors, walls and ceilings. Escutcheons shall be chromium-plated cast brass, sized to cover sleeve opening and to accommodate pipe and insulation.

B. Provide 4" wide 20 gauge galvanized sheet metal collars at sleeves and prepared openings, sized to cover entire duct penetration including sleeve and seal, and to accommodate duct and insulation as necessary. Edges shall have milled lips ground smooth. Paint to match finish of duct or as directed by Architect.

2.6 INSULATION FOR SHEET METAL

A. Note that ductwork and casings, which are acoustically lined, as described elsewhere, need not be insulated on the exterior.

B. The exception to the above is that acoustically lined ductwork above roof shall be insulated on the exterior.

C. Insulate sheet metal as follows:

1. All low pressure supply ductwork to diffusers, grilles, and registers Type D-1.

2. Medium pressure ductwork shall be insulated with insulation type D-1.

3. Sheet metal plenums behind louvers containing all or a percentage of outside air on inlet side of air handling units and ventilation fans - two inch Type D-2.

4. Outdoor ducts whether acoustically lined or not shall be insulated with Type D-2 and then weather proofed.

5. Exhaust air duct from automatic dampers to discharge louvers (including sheet metal plenums behind louvers) Type D-2.

D. Type D-1 Flexible Duct Insulation With Vapor Barrier

1. Flexible duct insulation shall be R5 glass fiber with a maximum K factor of 0.29 at 75 degrees F mean temperature, with reinforced foil-faced, flame resistant kraft vapor barrier.

2. Insulation shall be secured with duct adhesive. All joints shall be sealed by adhering a 2” sealing lap at all joints with vapor barrier adhesive or 3” strips of vapor barrier jacket applied with vapor barrier adhesive. Insulation shall then be fastened with 16 gauge copper-clad wire or fiberglass cord on 12” centers. On ducts over 24” wide, welded pins and clips shall be used on the underside.

3. Exposed round shall have a white vinyl reinforced foil vapor barrier. Application same except wires shall be omitted and blanket shall be secured by stapling 2” longitudinal lap. Staples shall be coated with vapor barrier coating.

E. Type D-2 Rigid Duct Insulation With Vapor Barrier

1. Rigid duct insulation shall be R8 glass fiber with maximum K factor of .24 at 75 degrees F mean temperature with vapor barrier facing.

2. Insulation shall be impaled over welded pins applied to duct surface on 12” to 18” centers. Use a minimum of two rows of fasteners on each side of duct. Secure insulation with suitable speed washers or clips firmly embedded into insulation.

3. All joints and voids in the insulation shall be filled with Mineral Wool Cement. All joints, speed washers and breaks in the vapor barrier shall be sealed with 3” wide strips of the vapor barrier facing adhered with vapor barrier adhesive.

4. Exposed ductwork shall have a white reinforced foil vapor barrier facing. Care shall be taken in sealing joints, speed washers, etc. with matching strips of vapor barrier to insure good appearance.

2.7 MOTORS, STARTERS, AND WIRING

A. Provide motors and controls, step-down transformers and furnish starters for HVAC

equipment, except units served by MCC provided under Section 26 00 00, ELECTRICAL. Provide control and other related wiring including interlocks. Power wiring (to panel boards, disconnect switches, starters and motors) will be provided under Section 26 00 00, ELECTRICAL. Starters that are not integral to equipment will be installed and wired under Section 26 00 00, Electrical, and furnished under this Section 23 00 00.

B. Unless otherwise specified, motors shall be NEMA Design B, constant speed, self-ventilated squirrel cage induction. Motors shall have 1.15 service factor unless totally enclosed. Motors shall have Class B insulation.

C. All motors shall be high or premium efficiency type. They shall conform to NEMA Standard MG-1-12.53a and shall have their efficiencies determined in accordance with IEEE Standard 112 Method B. The NEMA nominal efficiency shall be listed on the motor nameplate. Minimum nominal efficiencies shall be as follows:

Size (HP)	Nominal Efficiency (Min.)
1 - 3	84%
5 - 7-1/2	88.5%
10 - 25	90%
30 - 100	93%

D. Starters that require interlocks or remote control shall be magnetic with HAND-OFF-AUTOMATIC switch in cover. Provide magnetic starters as necessary, with auxiliary contacts, buttons and switches in required configurations. Refer to paragraph AUTOMATIC TEMPERATURE CONTROLS and to Control Drawings for interlock requirements. Starters shall be by single manufacturer: Cutler-Hammer, Clark, Arrow Hart or Square D.

1. Each 3-phase, 60 Hz motor shall be provided with magnetic starter with either ON-OFF push button or hand-off-automatic switch.

2. Other motors shall be provided with a manual starter with ON-OFF switch.

3. Control relay for each starter shall be for operation on 120 V, single

4. Provide inverse time limit overload and under voltage protection in each leg and with pilot lights. Provide red and green On-Off pilot lights.

5. Provide nameplates with engraved white lettering to designate area and equipment served.

6. Starters for refrigeration machines shall be furnished by unit manufacturer.

7. Provide starters for two-speed motors with deceleration relay.

2.8 VIBRATION CONTROL AND SEISMIC RESTRAINT

A. Description

1. General: Provide all necessary labor and materials as required.

2. Intent

a. All mechanical equipment, piping, and ductwork shall be mounted on vibration isolators to prevent the transmission of vibration and mechanically transmitted sound to the building structure. Vibration isolators shall be selected in accordance with the weight distribution so as to produce reasonably uniform deflections.

b. All isolators and isolation materials shall be of the same manufacturer and shall be certified by the manufacturer.

c. It is the intent of the seismic portion of this specification to keep all mechanical and electrical building system components in place during a seismic event.

d. All such systems must be installed in strict accordance with seismic codes, component manufacturer's, and building construction standards. Whenever a conflict occurs between the manufacturer's or construction standards, the most stringent shall apply.

e. This specification is considered to be minimum requirements for seismic consideration and is not intended as a substitute for legislated, more stringent, national, state or local construction requirements (i.e. California Title 24, California OSHPD, Canadian Building Codes, or other requirements).

f. Any variance or non-compliance with these specification requirements shall be corrected by the contractor in an approved manner.

3. The work in this section includes, but is not limited to the following:

a. Vibration isolation for piping, ductwork and equipment.

b. Equipment isolation bases.

c. Flexible piping connections.

d. Seismic restraints for isolated equipment.

e. Seismic restraints for non-isolated equipment.

f. All mechanical and electrical systems. Equipment buried underground is excluded but entry of services through the foundation wall is included. Equipment referred to below is typical. (Equipment not listed is still included in this specification).

4. Definitions

a. All systems involved with and/or connected to emergency power supply including all generators, transfer switches, transformers, and all flow paths to fire protection and/or emergency lighting systems.

b. Positive Attachment

A positive attachment is defined as a cast-in anchor, a drill-in wedge anchor, a double sided beam clamp loaded perpendicular to a beam, or

a welded or bolted connection to structure. Single sided "C" type beam clamps for support rods of overhead piping, ductwork, etc. are not acceptable as seismic anchor points.

c. Transverse Bracing

Restraint(s) applied to limit motion perpendicular to the centerline of the pipe, duct or conduit.

d. Longitudinal Bracing

Restraint(s) applied to limit motion parallel to the centerline of the pipe, duct or conduit.

B. Submittal and Data Requirements

1. The manufacturer of vibration isolation and seismic restraints shall provide submittals for products as follows:

a. Descriptive Data

1) Catalog cuts or data sheets on vibration isolators and specific restraints detailing compliance with the specification.
2) Detailed schedules of flexible and rigidly mounted equipment, showing vibration isolators and seismic restraints by referencing numbered descriptive drawings.

b. Shop Drawings

1) Submit fabrication details for equipment bases including dimensions, structural member sizes and support point locations.
2) Provide all details of suspension and support for ceiling hung equipment.
3) Where walls, floors, slabs or supplementary steel work are used for seismic restraint locations, details of acceptable attachment methods for ducts, conduit and pipe must be included and approved before the condition is accepted for installation. Restraint manufacturers' submittals must include spacing, static loads and seismic loads at all attachment and support points.
4) Provide specific details of seismic restraints and anchors; include number, size and locations for each piece of equipment.

C. Code and Standards Requirements

1. Typical Applicable Codes, Standards, and Categories:

a. BOCA 96 with an effective peak acceleration coefficient of 0.15.

b. Massachusetts State Building Code Version 6.0 chapter 16, section 1612.7.

c. Seismic hazard exposure group of I, II, III and seismic performance category of C, D.

D. Manufacturers Responsibility

1. Manufacturer of vibration isolation and seismic control equipment shall have the following responsibilities:

   a. Determine vibration isolation and seismic restraint sizes and locations.

   b. Provide vibration isolation and seismic restraints.

   c. Provide calculations and materials if required for restraint of un-isolated equipment.

   d. Provide installation instructions, drawings and trained field supervision to insure proper installation and performance.

E. Related Work

1. Supplementary Support Steel:

   a. Contractor shall supply supplementary support steel for all equipment, piping, ductwork, etc., including roof mounted equipment.

2. Attachments:

   a. Contractor shall supply restraint attachment plates cast into housekeeping pads, concrete inserts, double sided beam clamps, etc. in accordance with the requirements of the vibration vendor's calculations.

F. Intent

1. All vibration isolators and seismic restraints described in this section shall be the product of a single manufacturer. Mason Industry's products are the basis of these specifications; products of other manufacturers are acceptable provided their systems strictly comply with the specification.

2. For the purposes of this project, failure is defined as the discontinuance of any attachment point between equipment or structure, vertical permanent deformation greater than 1/8 inch and/or horizontal permanent deformation greater that 1/4 inch.

G. Product Descriptions

1. Vibration Isolators and Seismic Restraints.

   a. Specification:

   b. Two layers of 3/4" thick neoprene pad consisting of 2" square waffle modules separated horizontally by a 1 6 gauge galvanized shim. Load distribution plates shall be used as required. Pads shall be Type Super "W" as manufactured by Mason Industries, Inc.

   c. Bridge-bearing neoprene mountings shall have a minimum static deflection of 0.2" and all directional seismic capability. The mount shall consist of a ductile iron casting containing two separated and opposing

molded neoprene elements. The elements shall prevent the central threaded sleeve and attachment bolt from contacting the casting during normal operation. The shock absorbing neoprene materials shall be compounded to bridge-bearing specifications. Mountings shall have an Anchorage Pre-approval "R" Number from OSHPD in the State of California verifying the maximum certified horizontal and vertical load ratings. Mountings shall be Type BR as manufactured by Mason Industries, Inc.

d. Sheet metal panels shall be bolted to the walls or supporting structure by assemblies consisting of a neoprene bushing cushioned between 2 steel sleeves. The outer sleeve prevents the sheet metal from cutting into the neoprene. Enlarge panel holes as required. Neoprene elements pass over the bushing to cushion the back panel horizontally. A steel disc covers the inside neoprene element and the inner steel sleeve is elongated to act as a stop so tightening the anchor bolts does not interfere with panel isolation in 3 planes. Bushing assemblies can be applied to the ends of steel cross members where applicable. All neoprene shall be bridge bearing quality. Bushing assemblies shall be type PB as manufactured by Mason Industries, Inc.

e. A one (1) piece molded bridge bearing neoprene washer/bushing. The bushing shall surround the anchor bolt and have a flat washer face to avoid metal to metal contact. Neoprene bushings shall be type HG as manufactured by Mason Industries, Inc.

f. Spring isolators shall be free standing and laterally stable without any housing and complete with a molded neoprene cup or 1/4" neoprene acoustical friction pad between the base-plate and the support. All mountings shall have leveling bolts that must be rigidly bolted to the equipment. Spring diameters shall be no less than 0.8 of the compressed height of the spring at rated load. Springs shall have a minimum additional travel to solid equal to 50% of the rated deflection. Submittals shall include spring diameters, deflection, compressed spring height and solid spring height. Mountings shall be Type SLF as manufactured by Mason Industries, Inc.

g. Restrained spring mountings shall have an SLF mounting as described in Specification 5, within a rigid housing that includes vertical limit stops to prevent spring extension when weight is removed. The housing shall serve as blocking during erection. A steel spacer shall be removed after adjustment. Installed and operating heights are equal. A minimum clearance of 1/2" shall be maintained around restraining bolts and between the housing and the spring so as not to interfere with the spring action. Limit stops shall be out of contact during normal operation. Since housings will be bolted or welded in position there must be an internal isolation pad. Housing shall be designed to resist all seismic forces. Mountings shall have Anchorage Pre-approval "R" Number from OSHPD in the state of California certifying the maximum certified horizontal and vertical load ratings. Mountings shall be SLR as manufactured by Mason Industries, Inc.

h. Spring mountings as in specification 5 built into ductile iron or steel housing to provide all directional seismic snubbing. The snubber shall

be adjustable vertically and allow a maximum of 1/4 inch travel in all directions before contacting the resilient snubbing collars. Mountings shall have an Anchorage Pre-approval "R" number from OSHPD in the State of California verifying the maximum certified horizontal and vertical load ratings. Mountings shall be SSLFH as manufactured by Mason Industries, Inc.

i. Air springs shall be manufactured with upper and lower steel sections connected by a replaceable flexible nylon reinforced neoprene element. Air spring configuration shall be multiple bellows to achieve a maximum natural frequency of 3 Hz. Air Springs shall be designed for a burst pressure that is a minimum of three times the published maximum operating pressure. All air spring systems shall be connected to either the building control air or a supplementary air supply and equipped with three leveling valves to maintain leveling within plus or minus 1/8". Submittals shall include natural frequency, load and damping tests performed by an independent lab or acoustician. Air Springs shall be Type MT and leveling valves Type LV as manufactured by Mason Industries, Inc.

j. Restrained air spring mountings shall have an MT air spring as described in Specification 8, within a rigid housing that includes vertical limit stops to prevent air spring extension when weight is removed. The housing shall serve as blocking during erection. A steel spacer shall be removed after adjustment. Installed and operating heights are equal. A minimum clearance of 1/2" shall be maintained around restraining bolts and between the housing and the air spring so as not to interfere with the air spring action. Limit stops shall be out of contact during normal operation. Housing shall be designed to resist all seismic forces. Mountings shall be SLR-MT as manufactured by Mason Industries, Inc.

k. Hangers shall consist of rigid steel frames containing minimum 1 1/4" thick neoprene elements at the top and a steel spring with general characteristics as in specification 5 seated in a steel washer reinforced neoprene cup on the bottom. The neoprene element and the cup shall have neoprene bushings projecting through the steel box. To maintain stability the boxes shall not be articulated as clevis hangers nor the neoprene element stacked on top of the spring. Spring diameters and hanger box lower hole sizes shall be large enough to permit the hanger rod to swing through a 30° arc from side to side be fore contacting the rod bushing and short circuiting the spring. Submittals shall include a hanger drawing showing the 30° capability. Hangers shall be type 30° as manufactured by Mason Industries, Inc.

l. Hangers shall be as described in specifications 10, but they shall be pre-compressed and locked at the rated deflection by means of a resilient seismic upstop to keep the piping or equipment at a fixed elevation during installation. The hangers shall be designed with a release mechanism to free the spring after the installation is complete and the hanger is subjected to its full load. Deflection shall be clearly indicated by means of a scale. Submittals shall include a drawing of the hanger showing the 30° capability. Hangers shall be type PC30N as manufactured by Mason Industries, Inc.

m. Seismic Cable Restraints shall consist of galvanized steel aircraft cables sized to resist seismic loads with a minimum safety factor of two and arranged to provide all-directional restraint. Cable end connections shall be steel assemblies that swivel to final installation angle and utilize two clamping bolts to provide proper cable engagement. Cables must not be allowed to bend across sharp edges. Cable assemblies shall have an Anchorage Pre-approval "R" Number from OSHPD in the State of California verifying the maximum certified load ratings. Cable assemblies shall be Type SCB at the ceiling and at the clevis bolt, SCBH between the hanger rod nut and the clevis or SCBV if clamped to a beam all as manufactured by Mason Industries, Inc.

n. Seismic solid braces shall consist of steel angles or channels to resist seismic loads with a minimum safety factor of 2 and arranged to provide all directional restraint. Seismic solid brace end connectors shall be steel assemblies that swivel to the final installation angle and utilize two through bolts to provide proper attachment. Seismic solid brace assembly shall have anchorage pre-approval "R" number from OSHPD in the state of California verifying the maximum certified load ratings. Solid seismic brace assemblies shall be type SSB as manufactured by Mason Industries, Inc.

o. Note: Specifications 12 - 14 apply to trapeze as well as clevis hanger locations. At trapeze anchor locations piping must be shackled to the trapeze. Specifications apply to hanging equipment as well.

p. Steel angles, sized to prevent buckling, shall be clamped to pipe or equipment rods utilizing a minimum of three ductile iron clamps at each restraint location when required. Welding of support rods is not acceptable. Rod clamp assemblies shall have an Anchorage Pre-approval "R" Number from OSHPD in the State of California. Rod clamp assemblies shall be Type SRC as manufactured by Mason Industries, Inc.

q. Pipe clevis cross bolt braces are required in all restraint locations. They shall be special purpose performed channels deep enough to be held in place by bolts passing over the cross bolt. Clevis cross braces shall have an Anchorage Pre-approval "R" Number from OSHPD in the State of California. Clevis cross brace shall be type CCB as manufactured by Mason Industries, Inc.

r. All-directional seismic snubbers shall consist of interlocking steel members restrained by a one-piece molded neoprene bushing of bridge bearing neoprene. Bushing shall be replaceable and a minimum of 1/4 inch thick. Rated loading shall not exceed 1,000 psi. A minimum air gap of 1/8 inch shall be incorporated in the snubber design in all directions before contact is made between the rigid and resilient surfaces. Snubber end caps shall be removable to allow inspection of internal clearances. Neoprene bushings shall be rotated to insure no short circuits exist before systems are activated. Snubbers shall have an Anchorage Pre-approval "R" Number from OSHPD in the State of California verifying the maximum certified horizontal and vertical load ratings. Snubber shall be Type Z-1 225 as manufactured by Mason Industries, Inc.

s. All directional seismic snubbers shall consist of interlocking steel members restrained by shock absorbent rubber materials compounded to bridge bearing specifications. Elastomeric materials shall be replaceable and a minimum of 3/4" thick. Rated loadings shall not exceed 1,000 psi. Snubbers shall be manufactured with an air gap between hard and resilient material of not less than 1/8" nor more that 1/4". Snubbers shall be installed with factory set clearances. The capacity of the seismic snubber at 3/8" deflection shall be equal or greater than the load assigned to the mounting grouping controlled by the snubber multiplied by the applicable "G" force. Submittals shall include the load deflection curves up to 1/2" deflection in the x, **y** and z planes. Snubbers shall have an anchorage pre-approval "R" number from OSHPD in the state of California verifying the maximum certified horizontal and vertical load ratings. Snubbers shall be series Z-101 1 as manufactured by Mason Industries, Inc.

t. Stud wedge anchors shall be manufactured from full diameter wire, not from undersized wire that is "rolled up" to create the thread. The stud anchor shall also have a safety shoulder which fully supports the wedge ring under load. The stud anchors shall have an evaluation report number from the I.C.B.0 Evaluation Service, Inc. verifying its allowable loads. Drill-in stud wedge anchors shall be type SAS as manufactured by Mason Industries, Inc.

u. Female wedge anchors are preferred in floor locations so isolators or equipment can be slid into place after the anchors are installed. Anchors shall be manufactured from full diameter wire, and shall have a safety shoulder to fully support the wedge ring under load. Female wedge anchors shall have an evaluation report number from the I.C.B.0 Evaluation Service, Inc. verifying to its allowable loads. Drill-in female wedge anchors shall be type SAB as manufactured by Mason Industries, Inc.

v. Vibration isolation manufacturer shall furnish integral structural steel bases. Rectangular bases are preferred for all equipment. Centrifugal refrigeration machines and pump bases may be T or L shaped where space is a problem. Pump bases for split case pump shall include supports for suction and discharge elbows. All perimeter members shall be steel beams with a minimum depth equal to 1/10 of the longest dimension of the base. Base depth need not exceed 14' provided that the deflection and misalignment is kept within acceptable limits as determined by the manufacturer. Height saving brackets shall be employed in all mounting locations to provide a base clearance of 1 ". Bases shall be type WF as manufactured by Mason Industries, Inc.

w. Vibration isolation manufacturer shall furnish rectangular steel concrete pouring forms for floating and inertia foundations. Bases for split case pumps shall be large enough to provide for suction and discharge elbows. Bases shall be a minimum of 1/1 2 of the longest dimension of the base but not less than 6". The base depth need not exceed 1 2" unless specifically recommended by the base manufacturer for mass or rigidity. Forms shall include minimum concrete reinforcing consisting of 1/2" bars welded in place on 6" centers running both ways in a layer 1 1/2" above the bottom. Forms shall be furnished with steel templates to

hold the anchor bolts sleeves and anchors while concrete is being poured. Height saving brackets shall be employed in all mounting locations to maintain a 1 " clearance below the base. Wooden formed bases leaving a concrete rather than a steel finish are not acceptable. Base shall be type BMK or K as manufactured by Mason Industries, Inc.

x. Curb mounted rooftop equipment shall be mounted on spring isolation curbs. The lower member shall consist of a sheet metal Z section containing adjustable and removable steel springs that support the upper floating section. The upper frame must provide continuous support for the equipment and must be captive so as to resiliently resist wind and seismic forces. All directional neoprene snubber bushings shall be a minimum of 1/4" thick. Steel springs shall be laterally stable and rest on 1/4" thick neoprene acoustical pads. Hardware must be plated and the springs provided with a rust resistant finish. The curbs waterproofing shall consist of a continuous galvanized flexible counter flashing nailed over the lower curbs waterproofing and joined at the corners by EPDM bellows. All spring locations shall have access ports with removable waterproof covers. Lower curbs shall have provision for 2" of insulation. The roof curbs shall be built to seismically contain the rooftop unit. The unit must be solidly fastened to the top floating rail, and the lower Z section anchored to the roof structure. Curb shall have anchorage pre-approval "R" from OSHPD in the state of California attesting to the maximum certified horizontal and vertical load ratings. Curb shall be type RSC as manufactured by Mason Industries, Inc.

y. Flexible spherical expansion joints shall employ peroxide cured EPDM in the covers, liners and Dacron tire cord friction ring. Solid steel rings shall be used within the raised face rubber ends to prevent pullout. Flexible cable bead wire is not acceptable. Sizes 2" and larger shall have two spheres reinforced with a ring between spheres to maintain shape and complete with split ductile iron or steel flanges with hooked or similar interlocks. Sizes 16' to 24" may be single sphere. Sizes 3/4" to 1 1/2" may have threaded bolted flange assemblies, one sphere and cable retention. 14" and smaller connectors shall be rated at 250 psi up to 190°F. with a uniform drop in allowable pressure to 190 psi at 250°F. 16" and larger connectors are rated 180 psi at 190°F and 135 psi at 250°F. Safety factors to burst and flange pullout shall be a minimum of 3/1. All joints must have permanent markings verifying a 5 minute factory test at twice the rated pressure. Concentric reducers to the above specifications may be substituted for equal ended expansion joints.

z. Expansion joints shall be installed in piping gaps equal to the length of the expansion joints under pressure. Control rods need only be used in unanchored piping locations where the manufacturer determines the installation exceeds the pressure requirement without control rods, as control rods are not desirable in seismic work. If control rods are used, they must have 1/2" thick Neoprene washer bushings large enough in area to take the thrust at 1000 psi maximum on the washer area. Expansion joints shall be installed on the equipment side of the shut off valves.

aa. Submittals shall include two test reports by independent consultants showing minimum reductions of 20 DB in vibration accelerations and 10

DB in sound pressure levels at typical blade passage frequencies on this or a similar product by the same manufacturer. All expansion joints shall be installed on the equipment side of the shut off valves. Expansion joints shall be SAFEFLEX SFDEJ, SFEJ, SFDCR or SFU and Control Rods CR as manufactured by Mason Industries, Inc.

bb. Flexible stainless steel hose shall have stainless steel braid and carbon steel fittings. Sizes 3" and larger shall be flanged. Smaller sizes shall have male nipples. Minimum lengths shall be as tabulated:

Flanged		Male Nipples	
3 x 14	10 x 26	½ x 9	1-½ x 13
4 x 15	12 x 28	¾ x 10	2 x 14
5 x 19	14 x 30	1 x 11	2-1/2 x 18
6 x 20	16 x 32	1-1/4 x 12	
8 x 22			

cc. Hoses shall be installed on the equipment side of the shut-off valves horizontally and parallel to the equipment shafts wherever possible. Hoses shall be type BSS as manufactured by Mason Industries, Inc.

dd. All-directional acoustical pipe anchor, consisting of two sizes of steel tubing separated by a minimum 1/2" thick 60 durometer neoprene. Vertical restraint shall be provided by similar material arranged to prevent vertical travel in either direction. Allowable loads on the isolation material should not exceed 500 psi and the design shall be balanced for equal resistance in any direction. All-directional anchors shall be type ADA as manufactured by Mason Industries, Inc.

ee. Pipe guides shall consist of a telescopic arrangement of two sizes of steel tubing separated by a minimum 1/2" thickness of 60 durometer neoprene. The height of the guides shall be preset with a shear pin to allow vertical motion due to pipe expansion or contraction. Shear pin shall be removable and reinsertable to allow for selection of pipe movement. Guides shall be capable of + 1 5/8" motion, or to meet location requirements. Pipe guides shall be type VSG as manufactured by Mason Industries, Inc.

ff. Split Wall Seals consist of two bolted pipe halves with minimum 3/4" thick neoprene sponge bonded to the inner faces. The seal shall be tightened around the pipe to eliminate clearance between the inner sponge face and the piping. Concrete may be packed around the seal to make it integral with the floor, wall or ceiling if the seal is not already in place around the pipe prior to the construction of the building member. Seals shall project a minimum of I" past either face of the wall. Where temperatures exceed 240°F., 10# density fiberglass may be used in lieu of the sponge. Seals shall be Type SWS as manufactured by Mason Industries, Inc.

gg. The horizontal thrust restraint shall consist of a spring element in series with a neoprene molded cup as described in specification 5 with the same deflection as specified for the mountings or hangers. The spring element shall be designed so it can be preset for thrust at the factory and

adjusted in the field to allow for a maximum of 1/4" movement at start and stop. The assembly shall be furnished with 1 rod and angle brackets for attachment to both the equipment and the duct work or the equipment and the structure. Horizontal restraints shall be attached at the centerline of thrust and symmetrical on either side of the unit. Horizontal thrust restraints shall be type WBI/WBD as manufactured by Mason Industries, Inc.

2.9 IN-LINE EXHUAST FANS (DUCT MOUNTED)

A. Duct mounted exhaust fans shall be of centrifugal belt driven in-line type. The fan housing shall be of the square design constructed of heavy gauge galvanized steel and shall include square duct mounting collars.

B. Fan construction shall include two removable access panels located perpendicular to the motor mounting panel. The access panels must be of sufficient size to permit easy access to all interior components.

C. The fan wheel shall be centrifugal backward inclined, constructed of aluminum and shall include a wheel cone carefully matched to the inlet cone for precise running tolerances. Wheels shall be statically and dynamically balanced.

D. Motors shall be heavy duty ball bearing type, carefully matched to the fan load and furnished at the specified voltage, phase and enclosure. Motors and drives shall be mounted out of the airstream.

E. Precision ground and polished fan shafts shall be mounted in permanently sealed, lubricated pillow block ball bearings. Bearings shall be selected for a minimum (L10) life in excess of 100,000 hours at maximum cataloged operating speed.

F. Drives shall be sized for a minimum of 150% of driven horsepower. Pulleys shall be of the fully machined cast iron type, keyed and securely attached to the wheel and motor shafts.

G. Motor pulleys shall be adjustable for system balancing. A NEMA 1 disconnect switch shall be provided as standard, except with explosion resistant motors, where disconnects are optional. Factory wiring shall be provided from motor to the handy box.

H. All fans shall bear the AMCA Certified Ratings Seal for both sound and air performance.

I. Each fan shall bear a permanently affixed manufacturer's nameplate containing the model number and individual serial number for future identification.

J. Fans shall be manufactured by Greenheck or approved equal.

2.10 SEQUENCE OF OPERATION

A. Exhaust Fans (EF-1 & SF-1)

1. The supply & exhaust fans shall be energized and de-energized by a wall mounted on/off controller.

2. The fans associated motorized dampers shall be energized (or opened) when their associated fan is energized by a signal from their controllers.

PART 3 - EXECUTION

3.1 DEMOLITION

A. General

1. The Contractor shall completely familiarize himself with all existing building and site conditions and limitations which may have a bearing on the operations herein specified, and shall include all work required to complete the project as shown on the drawings and be required by the specifications. No extra compensation will be allowed for unforeseen conditions that can be determined from a careful examination of the site, building, drawings and specifications.

2. Items of value which are not indicated to be returned to the Owner shall become the property of the Contractor. Storage or sale of the items on the project site is prohibited.

3. Protection: Ensure the safe passage of persons in and around the building during demolition. Prevent injury to persons and damage to property. Provide adequate shoring and bracing to prevent collapse. Immediately repair damaged property to the condition before being damaged. Take effective measures to prevent windblown dust.

4. Utilities: Maintain all utilities except those requiring removal or relocation. Keep utilities in service and protect from damage. Do not interrupt utilities serving used areas without first obtaining permission from the utility company and the Owner. Provide temporary services as required.

B. Regulators Requirements

Strictly comply with applicable codes, regulations and requirements of authority having jurisdiction.

C. Handling of Materials

Remove salvage and debris from the site as it accumulates. Do not store, sell, burn, or otherwise dispose of debris on site. Remove all materials in such manner as to prevent spillage. Keep all pavements and areas adjacent to and leading from the site, clean and free of mud, dirt, and debris at all times.

D. Inspections

Prior to commencement of selective demolition work, inspect areas in which work will be performed. Photograph existing conditions to structure surfaces, equipment or to surrounding properties which could be misconstructed as damage resulting from selective demolition work; file with Owner's Representative prior to starting work.

E. Transfer of Responsibility and Disposition of Materials

Upon receipt of notice to proceed with the work, the tile to all materials for demolition shall be vested in the Contractor whereupon the Owner will not be responsible for the condition, loss, or damage to said property.

F. Disposal of Demolished Materials

Remove unused fixture and all piping servicing fixture including abandoned piping not associated with said fixture. Remove piping back to the next live branch will not obstruct the new work. Transport and legally dispose of materials off site.

G. Clean-Up and Repair

1. Upon completion of demolition work, remove tools, equipment and demolished materials from site. Remove protections and leave interior areas broom clean.

2. Repair demolition performed in excess of that required. Return structures and surfaces to remain in condition existing prior to commencement of selective demolition work. Repair adjacent construction or surfaces soiled or damaged by selective demolition work.

3.2 INSTALLATION OF DUCTWORK INSULATION

A. Install insulation products in accordance with manufacturer's written instructions, and in accordance with recognized industry practices to ensure that insulation serves its intended purpose.

B. Install insulation materials with smooth and even surfaces.

C. Clean and dry ductwork prior to insulating. Butt insulation joints firmly together to ensure complete and tight fit over surfaces to be covered.

D. Maintain integrity of vapor-barrier on ductwork insulation, and protect it to prevent puncture and other damage.

E. Extend ductwork insulation without interruption through walls, floors and similar ductwork penetrations, except where otherwise indicated.

F. Lined Ductwork

1. Except as otherwise indicated, omit insulation on ductwork where internal insulation or sound absorbing linings have been installed.

G. Ductwork Exposed to Weather

1. Protect outdoor insulation from weather by installing outdoor protective finish or jacketing as recommended by manufacturer.

H. Corner Angles

1. Except for oven and hood exhaust duct insulation, install corner angles on external corners of insulation on ductwork to exposed finished spaces before covering with jacketing.

3.3 SYSTEM TESTING, ADJUSTING, AND BALANCING

A. Summary

1. Testing, adjusting and balancing (TAB) of the air conditioning systems and related ancillary equipment will be performed by an impartial technically qualified TAB firm.

2. The firm shall be capable of performing the services specified at the location of the facility described within the time specified, of preparing and submitting the detailed report of the actual field work performed, and following up the basic work as may be required.

B. Qualifications

1. The Firm shall be one which is organized to provide professional services of this specified type in the State of Massachusetts.

2. The Firm shall have operated a minimum of five (5) years under its current Firm name, and shall be in good standing with the State of Massachusetts. The firm shall submit their full incorporated name, Charter Number and Taxpayer's I.D. Number for proper verification of the firm's status.

3. The Firm shall be capable of providing a performance bond, by a bonding company licensed to do business in the State of RI, if determined by the Owner that such a bond is required. The amount of the bond which may be required shall be equal to the cost of the proposal submitted, or in the case of more than one proposal, the sum of all such proposals and any awarded work in progress.

4. All personnel used on the job site shall be either professional engineers or engineering technicians, who shall have been permanent, full time employees of the firm for a minimum of six (6) months prior to the start of work for this specific project.

C. References

1. AABC - National Standards for Testing and Balancing Heating, Ventilating, and Air Conditioning Systems, Fifth Edition 1989.

2. ASHRAE - 1991 HVAC Applications Chapter 34: Testing, Adjusting and Balancing.

3. ANSI/ASHRAE Standard 111-1988 - Practices for Measurement, Testing, Adjusting and Balancing of Buildings, Heating, Ventilation, Air Conditioning and Refrigeration Systems.

D. Documents

1. The TAB firm shall, as a requirement of the TAB contract, arrange with the Architect / Owner / Engineer to compile one set of mechanical, specifications, all pertinent change orders, and the following:

   a. One complete set of Drawings less the structural sheets.
   b. One set of mechanical floor plans of the conditioned spaces. These Drawings shall be ozalid type (blue or black on light background) reproductions to facilitate marking.

2. Approved submittal data on equipment installed, and related changes as required to accomplish the test procedures outlined in Paragraphs 1.06 through 1.10 of this Specification will be available through the Construction Supervisor.

E. Responsibilities of the Tab Firm

1. The TAB personnel shall check, adjust, and balance the components of the air conditioning system which will result in optimal noise, temperature, and airflow conditions in the conditioned spaces of the building while the equipment of the system is operating economically. This is intended to be accomplished after the system components are installed and operating as provided for in the contract documents. It is the responsibility of the Mechanical Contractor to place the equipment into service.

F. Final Air Balance

1. General: When systems are complete and ready for operation, the TAB Consultant will perform a final air balance for all air systems and record the results. The outside, supply, exhaust and return air volume for each air handling unit, supply fan and exhaust fan and the supply, exhaust or return air volume for each distribution device shall be adjusted to within +5% of the value shown on the drawings. Air handling unit and fan volumes shall be adjusted by changing fan speed and adjusting volume dampers associated with the unit. Air distribution device volume shall be adjusted using the spin-in tap damper for flexible duct connected devices and the device OBD for duct connected devices. Air distribution devices shall be balanced with air patterns as specified. Duct volume dampers shall be adjusted to provide air volume to branch ducts. The general scope of balancing by the TAB Consultant will include, but is not limited to, the following:

   a. Filters: Check air filters and filter media and balance only system with essentially clean filters and filter media. The Contractor shall install new filters and filter media prior to the final air balance.

   b. Blower Speed: Measure RPM at each fan or blower to design requirements. Where a speed adjustment is required, the Contractor shall make any required changes.

   c. Ampere Readings: Measure and record full load amperes for motors.

   d. Static Pressure: Static pressure gains or losses shall be measured across each supply fan, cooling coil, heating coil, return air fan, air handling unit filter and exhaust fan. These readings shall be measured and recorded for this report at the furthest air device or terminal unit from the air handler supplying that device. Static pressure readings shall also be provided for systems which do not perform as designed.

   e. Equipment Air Flow: Adjust and record exhaust, return, outside and supply air CFM (s) and temperatures, as applicable, at each fan, blower and coil.

   f. Outlet Air Flow: Adjust each exhaust inlet and supply diffuser, register and grille to within +5% of design air CFM. Include all terminal points of air supply and all points of exhaust. Note: For Labs and Rooms that are negative exhaust air flow shall be set to design +10% and supply to design -5%. Positive areas will have opposite tolerances.

   g. Pitot Tube Traverses: For use in future troubleshooting by maintenance personnel, all exhaust ducts, main supply ducts and return ducts shall have air velocity and volume measured and recorded by the traverse

method. Locations of these traverse test stations shall be described on the sheet containing the data.

G. Testing of Temperature Control Systems

1. In the process of performing the TAB work, the TAB Agency shall:

a. Work with the temperature control contractor to ensure the most effective total system operation within the design limitations, and to obtain mutual understanding of intended control performance.

b. Verify that all control devices are properly connected.

c. Verify that all dampers, valves and other controlled devices are operated by the intended controller.

d. Verify that all dampers and valves are in the position indicated by the controller (open, closed or modulating).

e. Observe the calibration of all controllers.

f. Observe the locations of all thermostats for potential erratic operation from outside influences such as sunlight, drafts or cold walls.

g. Observe the locations of all sensors to determine whether their position will allow them to sense only the intended temperatures or pressures of the media. Control Contractor will relocate as deemed necessary by the TAB Agency.

h. Verify that the sequence of operation for any control mode is in accordance with approved shop drawings and specifications. Verify that no simultaneous heating and cooling occurs.

i. Verify that all controller setpoints meet the design intent.

j. Check all dampers for free travel.

k. Verify the operation of all interlock systems.

l. Perform variable volume system verification to assure the system and its components track with changes from full flow to minimum flow.

H. Reports

1. The activities described in this section shall culminate in a report to be provided in quadruplicate (4) individually bound. Neatly type and arrange data. Include with the data the date tested, personnel present, weather conditions, nameplate record of test instrument and list all measurements taken after all corrections are made to the system. Record all failures and corrective action taken to remedy incorrect situation. The intent of the final report is to provide a reference of actual operating conditions for the Owner's operations personnel.

2. All measurements and recorded readings (of air, water, electricity, etc.) that appear in the reports must have been made onsite by the permanently employed

technicians or engineers of the firm.

3. At the option of the Construction Supervisor, all data sheets tabulated each day by TAB personnel shall be submitted for initial by the Construction Inspector. Those work sheets so initialed, or copies thereof, shall be presented as a supplement to the final TAB report.

4. Submit reports on forms approved by the Owner & Engineer which will include the following information as a minimum:

   a. Title Page

      1) Company Name
      2) Company Address
      3) Company telephone number
      4) Project name
      5) Project location
      6) Project Manager
      7) Project Engineer
      8) Project Contractor
      9) Project Identification Number

   b. Instrument List

      1) Instrument
      2) Manufacturer
      3) Model
      4) Serial Number
      5) Range
      6) Calibration date
      7) What test instrument was used for

   c. Fan Data (Supply and Exhaust)

      1) Location
      2) Manufacturer
      3) Model
      4) Air flow, specified and actual
      5) Total static pressure (total external), specified and actual
      6) Inlet pressure
      7) Discharge pressure fan RPM

   d. Electric Motors

      1) Manufacturer
      2) HP/BHP
      3) Phase, voltage, amperage, nameplate, actual
      4) RPM
      5) Service factor
      6) Starter size, heater elements, rating

   e. Air Distribution Test Sheet

      1) Air terminal number

2) Room number/location
3) Terminal type
4) Terminal size
5) Area factor
6) Design velocity
7) Design air flow
8) Test (final) velocity
9) Test (final) air flow

3.4 CLEANING AND PROTECTING

A. It shall be this trade's responsibility to store his materials in a manner that will maintain an orderly clean appearance. If stored on-site in open or unprotected areas, all equipment and material shall be kept off the ground by means of pallets or racks, and covered with tarpaulins.

3.5 VIBRATION CONTROL AND SEISMIC RESTRAINT

A. General

1. All vibration isolators and seismic restraint systems must be installed in strict accordance with the manufacturers written instructions and all certified submittal data. At the completion of all construction work the vibration and seismic device supplier shall inspect all installations and provided a written report of installation compliance to the engineer of record.

2. Installation of vibration isolators and seismic restraints must not cause any change of position of equipment, piping or duct work resulting in stresses or misalignment.

3. No rigid connections between equipment and the building structure shall be made that degrades the noise and vibration control system herein specified.

4. The contractor shall not install any equipment, piping, duct or conduit which makes rigid connections with the building unless isolation is not specified. "Building" includes, but is not limited to, slabs, beams, columns, studs and walls.

5. Coordinate work with other trades to avoid rigid contact with the building.

6. Any conflicts with other trades which will result in rigid contact with equipment or piping due to inadequate space or other unforeseen conditions should be brought to the architects/engineers attention prior to installation. Corrective work necessitated by conflicts after installation shall be at the responsible contractor’s expense.

7. Bring to the architects/engineers attention any discrepancies between the specifications and the field conditions or changes required due to specific equipment selection, prior to installation. Corrective work necessitated by discrepancies after installation shall be at the responsible contractor’s expense.

8. Correct, at no additional cost, all installations which are deemed defective in workmanship and materials at the contractor’s expense.

9. Overstressing of the building structure must not occur because of overhead

support of equipment. Contractor must submit loads to the structural engineer of record for approval. Generally bracing may occur from:

a. Flanges of structural beams.
b. Upper truss cords in bar joist construction.
c. Cast in place inserts or wedge type drill-in concrete anchors.

END OF SECTION

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SECTION 26 00 00

ELECTRICAL

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SECTION 26 00 00

ELECTRICAL

(FILED SUB-BID REQUIRED)

PART 1 - GENERAL

1.1 GENERAL REQUIREMENTS

A. Attention is directed to the CONTRACT AND GENERAL CONDITIONS and all Sections within DIVISION 1 - GENERAL REQUIREMENTS, which are hereby made a part of this Section and Specifications.

1.2 FILING OF SUB-BIDS REQUIREMENTS

A. General: The work of this Section is stipulated as a Filed Sub-Bid under Paragraph D, Item 2 of the Form for General Bid.

B. Requirements for Submitting Sub-Bids: Sub-Bids for the work of this Section shall be for the complete work and filed in a sealed envelope with the Awarding Authority in strict compliance with and before the date and time indicated in the Bid Advertisement, Instructions to Bidders, Notice to Contractors, and other documents contained in Part A of Contract Documents. The following information shall appear on the outside upper left corner of the sealed sub-bid envelope:

1. Name of Sub-Bidder.

2. Name of Project as it appears in the Contract Documents.

3. Sub-Bid for Section 260000 - ELECTRICAL

C. Form of Sub-Bid: Sub-Bids submitted for work under this Section shall be on a copy of the "Form for Sub-Bid" furnished by the Awarding Authority, as required by Section 44F of Chapter 149 of the General Laws as amended. The time and place for submission of Sub-bids are set forth in the Invitation for Bids and Advertisement.

D. Sub Sub-Bid Requirements:

1. Sub bidder's attention is directed to Massachusetts G.L. Chapter 149 Section 44F, as amended, which provides in part as follows:

2. Each sub bidder shall list in Paragraph E of the "Form for Sub bids" the name and bid price of each person, firm or corporation performing each class of work or part thereof for which the Section of the Specifications for that sub trade requires such listing, provided that, in the absence of a contrary provision in the

Specifications, any sub bidder may, without listing any bid price, list his own name or part thereof and perform that work with persons on his own payroll, if such sub bidders, after sub bid openings, shows to the satisfaction of the Awarding Authority that he does customarily perform such class of work with persons on his own payroll and is qualified to do so. This Section of the Specifications requires that the following classes of work shall be listed in Paragraph E under the conditions indicated herein.

CLASSES OF WORK

Electrical 260000

E. Documents Applicable to the Work of this Section:

1. Part A of the Contract Documents (Contract Forms and Requirements).

2. Division 1 of the Technical Specifications (Part B).

3. Technical Specifications (Part C):

a. This Section 260000 - ELECTRICAL

4. Drawings: Work specifically required under this Section includes all Electrical work shown on or required by Contract Drawings as follows:

CS	Cover Sheet
C1	Site Plan
A1	Floor Plan / Reflected Ceiling Plan / Roof Plan
A2	Sections / Elevations
S101	Foundation Plan & Sections
S102	Ceiling/Roof Framing Plans
S200	General Notes & Quality Assurance Plan
S201	Typical Details
M1.1	Schedules, Details, Legend & General Notes
M2.1	Mechanical New Work Floor Plan
P0.1	Plumbing Plan, Legend, Schedule and Specification
E0.0	Electrical Legend and General Notes
E1.0	Electrical Lighting and Power Floor Plans
E2.0	Electrical Risers, Schedules, and Details

1.3 SCOPE

A. Provide all labor, materials, tools and equipment for the installation of the complete and fully operational electrical system as shown on the drawings and as specified herein.

B. The work includes, but is not limited to the following:

1. Secondary electric service including secondary service entrance raceways, cables, conduit bushings and grounding.
2. Feeders, branch circuit wiring and raceways.
3. Conduit, wire, boxes, fittings, hangers and supports.
4. Switches, receptacles, dimmers, special purpose outlets and wall plates.

5. Safety disconnects switches, non-fused and fused with fuses.
6. Lighting system including lamps, lenses, ballasts, devices, controls and exit signs.
7. System grounding.
8. Power connections to all plumbing, mechanical, kitchen equipment, and any other equipment that requires power.
9. Nameplates on all electrical equipment and components.
10. Temporary light, power and panel for use during construction.
11. Seal penetrations between foundation floors and walls with fire retardant material.
12. Obtain all permits and associated fees.
13. Testing of all electrical systems.
14. Access panels (furnish only).
15. Coordination between electrical and other trades.
16. All other systems hereinafter specified or indicated on the Contract Drawings, complete, leaving ready an electrical system in perfect operating condition.

1.4 DEFINITIONS

A. As used in this Section, “provide” means “furnish and install” and “POS” means “Provided Under Other Sections”.

B. As used in the drawings and specifications for electrical work, certain non-technical words shall be understood to have specific meanings as follows regardless of indications to the contrary in the general conditions or other documents governing the electrical work.

“Furnish” Purchase and deliver to the project site complete with every necessary appurtenance and support, all as part of this work. Purchasing shall include payment of all sales taxes and other surcharges as may be required to assure that purchased items are free of all liens, claims or encumbrances.

“Install” Unload at the delivery point at the site and perform every operation necessary to establish secure mounting and correct operation at the proper location in the project, all as part of this work.

“Provide” “Furnish” and “Install”.

“New” Manufactured within the past two years and never before used.

C. Except where modified by a specific notation to the contrary, it shall be understood that the indication and/or description of any electrical item in the drawings or specifications for electrical work carries with it the instruction to furnish, install and connect the item as part of the electrical work, regardless of whether or not this instruction is explicitly stated.

D. It shall be understood that the specifications and drawings for electrical work are complimentary and are to be taken together for a complete interpretation of the electrical work except that indications on the drawings, which refer to an individual element of work, take precedence over the specifications where they conflict with same.

1.5 WORK BY OTHERS

A. The following is related work specified elsewhere:

1. HVAC Equipment including providing individual motor starters, adjustable frequency drives, control wiring, variable speed switches and devices shall be provided by HVAC contractor.

2. Temperature control wiring by HVAC contractor.

3. Charges for power consumed by the temporary light and power system for construction will be paid by the General Contractor.

4. Access panels, where required, are furnished by the General Contractor and coordinated with this section.

5. Trenching, backfilling, sod or hydro seeding. (Coordinate with General Contractor).

1.6 CODES, PERMITS, AND STANDARDS

A. Provide all permits and licenses. Obtain and pay all certificates of inspection as required by regulatory agencies and submit for approval.

B. All materials and equipment shall be new and designed, constructed, installed and tested in accordance with the specification and the following standards:

1. Massachusetts Electrical Code (MEC)
2. National Electrical Code (NEC)
3. Occupational Safety and Health Act (OSHA)
4. National Fire Protection Association (NFPA)
5. Underwriters Laboratory (UL)
6. American National Standards Institute (ANSI)
7. National Electrical Manufacturers Association (NEMA)
8. Americans with Disabilities Act (ADA)
9. National Electric Safety Code (NESC)
10. NEC Article 110 – Flash Protection
11. Massachusetts Building Code

1.7 PROTECTION AND CLEANING

A. All electrical equipment and devices in the existing building in which the electrical work is to be done under Contract, shall be protected from damages, scratches, paint, cement, etc. until the work is completed.

B. Where electrical equipment and/or devices are indicated to be abandoned and the Owner elects to salvage specific items, said items should be delivered to storage on site at a location designated by the Owner.

C. Exposed surfaces of electrical equipment & lighting fixtures shall be cleaned upon completion of the work.

D. All debris and material resulting from electrical work shall be removed from the property each and every day and shall be disposed of in a legal manner. Workspace shall be left clean as electrical work is completed.

E. Damages to covers and trims of electrical equipment shall be repaired and painted with

touch-up paint supplied by the equipment manufacturer to the satisfaction of the owner's designated representative or the Architect or the equipment shall be replaced with new.

1.8 SHOP DRAWINGS

A. Definitions

1. Shop Drawings are information prepared by the Contractor to illustrate portions of the work in more detail than shown in the Contract Documents.

2. Coordination Drawings are detailed, large-scale layout Shop Drawings showing HVAC, Electrical, Plumbing and Fire Protection work superimposed in order to identify conflicts and ensure inter-coordination of Mechanical, Electrical, Architectural, Structural and other work.

B. Submittal Cover Sheet

1. Shop Drawings shall be submitted according to specification section with a separate cover sheet completed for each product, rather than one cover sheet for multiple products, whether or not supplied by one manufacturer or vendor.

C. Submittal Procedures and Format

1. Review submittal packages for compliance with the Contract Documents and then submit to Architect for review.

2. Provide additional copies of reviewed shop drawings as required for full distribution.

3. Shop Drawings showing layouts of systems shall contain sufficient plans, elevations, sections, details and schematics to describe work clearly. They shall be ¼" = 1' –0" scale unless specified otherwise. Sheet metal shop drawings shall be 3/8" = 1' –0 and shall indicate work of other sections where interferences are possible. Provide larger scale details as necessary. Sheet metal drawings shall show elements of Architects reflected ceiling plan, exposed ductwork, walls and partitions, diffusers, registers, grilles, fire dampers, sleeves and other aspects of construction as necessary for coordination.

4. ALL FIREWALLS AND SMOKE PARTIONS MUST BE HIGHLIGHTED ON THE SHEET METAL DRAWINGS FOR APPROPRIATE COORDINATION.

5. Shop drawings showing manufacturer's product data shall contain detailed dimensional drawings, accurate and complete description of construction materials, manufacturer's published performance characteristics and capacity ratings (performance data, alone, is not acceptable), electrical requirements and wiring diagrams. Drawings shall clearly indicate location (terminal block or wire number), voltage and function for all field terminations, and other information necessary to demonstrate compliance with all requirements of Contract Documents.

D. Acceptable Manufacturers

1. Alternate Manufacturers are acceptable only if, as a minimum, they:

a. Meet all performance criteria listed in the schedules and outlined in the

specification.

b. Have identical operating characteristics to those called for in the specification.

c. Fit within the available space it was designed for, including space for maintenance and component removal, with no modification to either space or the product. Clearances to walls, ceilings and other equipment shall be at least equal to those shown on the design drawings.

d. For rooftop mounted equipment and for equipment mounted in areas where structural matters are a consideration, the products must have a weight no greater than the product listed in the schedules or specifications.

e. Products must adhere to all architectural considerations including, but not limited to: being of the same color as the product scheduled or specified, fitting within architectural enclosures and details, and for diffusers, lighting and plumbing fixtures-being the same size and of the same physical appearance as schedule or specified products.

E. Deviations

1. Concerning deviations other than substitutions, proposed deviations from Contract Documents shall be requested individually in writing whether deviations result from field conditions, standard shop practice, or other cause. Submit letter with transmittal of Shop Drawings, which flags the deviation to the attention of the Architect.

2. Without letters flagging the deviation to the Architect, it is possible that the Architect may not notice such deviation or may not realize its ramifications. Therefore, if such letters are not submitted to the Architect, the contractor shall hold the Architect and his consultants harmless for any and all adverse consequences resulting from the deviations being implemented. This shall apply regardless of whether the Architect has reviewed or approved shop drawings containing the deviation, and will be strictly enforced.

3. Approval of proposed deviations, if any, will be made at the discretion of the Architect.

F. Responsibility

1. Intent of Submittal review is to check for capacity, rating, and certain construction features. Contractor shall ensure that work meets requirements of Contract Documents regarding information that pertains to fabrication processes or means, methods, techniques, sequences and procedures of construction; and for coordination of work of this and other Sections. Work shall comply with submittals marked “REVIEWED” to extent that they agree with Contract Documents. Submittal review shall not diminish responsibility under this Contract for dimensional coordination, quantities, installation, wiring, supports and access for service, nor shop drawing errors or deviations from requirements of Contract Documents. The Architect’s noting of some errors while overlooking others will not excuse the contractor from proceeding in error. Contract Documents requirements are not limited, waived nor superseded in any way by review.

2. INFORM SUBCONTRACTORS, MANUFACURERS, SUPPLIERS, ETC. OF SCOPE AND LIMITED NATURE OF REVIEW PROCESS AND ENFORCE COMPLIANCE WITH CONTRACT DOCUMENTS.

G. Schedule: Incorporate shop drawing review period into construction schedule so that work is not delayed. Contractor shall assume full responsibility for delays caused by not incorporating the following shop drawing review time requirements into his project schedule. Working days listed reference the time in the Engineer's office. It does not include transmittal time for review each time shop drawing is submitted or resubmitted.

H. List of Proposed Equipment and Materials

1. Within four weeks after Award of Contract and before ordering materials or equipment, submit complete list of proposed materials and equipment and indicate manufacturer's names and addresses. No consideration will be given to partial lists submitted out of sequence.

I. Submit shop drawings (6 bound sets) for the following:

1. Panelboards
2. Circuit breakers and enclosures
3. Disconnect Switches
4. Conduit, wire, feeders, cables and branch circuit wiring
5. Manual motor starters
6. Wire ways, outlet boxes, covers
7. Switches, dimmers, receptacles, special purpose devices and plates
8. Lighting fixtures and lamps

1.9 CONTINUITY OF SERVICES

A. Work under this section includes new work and work on existing systems within existing building. Perform such work so as not to interfere with the Owners operation. Where work necessitates interruption of service(s), schedule outages with the Owner and Engineer and perform the work at such time(s) as they shall direct.

1.10 RECORD DRAWINGS

A. For the duration of the contract, the Electrical Contractor shall maintain a complete set of contract drawings. All completed work and all deviations from the contract documents shall be recorded clearly and accurately. Record drawings shall be turned over to the Owner upon completion of the work.

B. Electronic files are available to facilitate the preparation of Record Drawings. These files are solely for use of the Electrical Contractor and may not be a full representation of the Scope of work. These files are available from Wozny/Barbar & Associates, Inc. at a cost of $25.00 per drawing file.

1.11 COORDINATION

A. It shall be the responsibility of the Electrical Contractor to coordinate with all other trades and parties to avoid conflicts. No additional charges will be approved due to LACK OF COORDINATION OR FIELD VERIFICATION OF THE EXISTING CONDITIONS.

B. It shall be the responsibility of the Electrical Contractor to coordinate with all final

connections of equipment with all sub-consultants including but not limited to plumbing, fire protection, mechanical, kitchen, pool, communication and security equipment and all other systems.

C. Refer to Architectural door hardware schedule for location of all low voltage devices.

1.12 SERVICE CHARACTERISTICS

A. Secondary Building Voltage (Field House) - Low Level: 120/240 volt, 1 phase, 2 wire, 60 Hz (Field House and LNFR Building)

B. Secondary Building Voltage (Maintenance Building) - Low Level: 120/208 volt, 3 phase, 4 wire, 60 Hz (Maintenance Building)

C. All equipment and wiring shall be suitable for the applied voltage.

1.13 TEMPORARY FACILITIES

A. The Electrical Contractor shall provide, at his own expense, his own field office. Furnish all tools, equipment, scaffolding and temporary construction required for the execution of the electrical work.

B. All scaffolding and other temporary construction shall be rigidly built in accordance with all local, state and federal requirements, and shall be removed from the premises upon completion of the work.

C. The Electrical Contractor shall provide all transformers, plywood, panel boards, wiring and other electrical equipment to support the needs of temporary light and power. Utilize new service entrance conduits for temporary power requirements where practical.

D. The Electrical Contractor shall coordinate with the General Contractor, the utility company and include all costs associated with the installation of telephones for the construction period. Include telephone service for all construction trailers.

1.14 COORDINATION DRAWINGS

A. Before materials are purchased or work begun, the Electrical Contractor shall prepare coordination drawings showing the size and location of electrical equipment and conduit runs and other equipment related to the electrical work.

B. Coordination drawings are for the General Contractor's and the Engineer's use during construction and shall not be construed as replacing any shop, as built or record drawings required elsewhere in this Contract Document.

1.15 OPERATING INSTRUCTIONS AND MAINTENANCE MANUALS

A. Instruct to the Owner's satisfaction such persons as the Owner designates, in the proper operation and maintenance of the systems and their parts.

B. Furnish operating and maintenance manuals and forward same to the Engineer for transmittal to the Owner.

C. Operating instructions shall be specific for each system and shall include copies of posted specific instructions.

D. For maintenance purposes, provide Shop Drawings, parts lists, specifications and manufacturer's maintenance bulletins for each piece of equipment.

E. Provide name, address and telephone number of the manufacturer's representative and service company for each piece of equipment so that service or spare parts can be readily obtained.

1.16 WORKMANSHIP

A. The entire work installed in this Specification and as shown on the drawings shall be constructed and finished in every respect in a workmanlike and complete manner. It is the responsibility of the Electrical Contractor to install complete systems. All such parts as required completing the systems in accordance with the best trade practice and the satisfaction of the Owner's Engineer shall be installed.

B. Obtain detailed information from the manufacturers of apparatus as to the proper method of installing and connecting equipment. Obtain all information from the General Contractor and other Subcontractors, which may be necessary to facilitate work and the completion of the whole project.

C. Remove daily, all rubbish and debris and all refuse from workmen's lunches and at completion remove all his surplus materials, and leave in clean condition acceptable to the Owner's Engineer.

1.17 EXAMINATION OF SITE AND CONTRACT DOCUMENTS

A. Before submitting prices or beginning work, thoroughly make an examination of the site.

B. No claim for extra compensation will be recognized if difficulties are encountered which an examination of site conditions prior to executing contract would have revealed.

C. These specifications along with contract documents describe the electrical systems. The Electrical Contractor is required to provide complete and operating systems for all equipment mentioned.

D. Electrical equipment required for the successful operation of any of the particular types of Owner's equipment mentioned shall be furnished and installed.

E. Be responsible for all materials delivered to the site in connection with the work and pay all charges for cartage, scaffolds, planking, rigging and erecting. Take every precaution necessary to protect equipment and installation in addition to plugging and protecting open ends of all pipes, outlet boxes, panel boxes, and junction boxes. All equipment shall be stored in a clean dry place to preserve the quality of material being used. Equipment and/or materials damaged during construction shall be replaced at no additional cost to the Owner. Any scaffolding over 8'-0" in height will be supplied by the General Contractor.

F. All materials and equipment required by this Specification shall be new, clean and free from defects at the time of installation. The Manufacturer and Underwriter's label shall appear on all material and equipment unless otherwise approved, in writing, by Owner.

1.18 SUBSTITUTION OF MATERIALS OR EQUIPMENT

A. If the Electrical Contractor wishes to use materials or equipment other than those specifically designated herein, as being equal to those so specifically designated: BEFORE PURCHASING AND/OR FABRICATION, he shall submit the proposed substitution in accordance with the requirements of the General Conditions, and the decision of whether or not it is equal to that specified shall be determined by the owner.

B. Unless requests for substitution are made in accordance with the above instructions and the instructions of the General Conditions, supported by sufficient proof of equality, the successful Contractor will be required to furnish specifically named items designated under the base bid.

C. If the apparatus or materials substituted for those specified necessitate changes or additional connections, piping supports or construction: same shall be provided and the Electrical Contractor shall assume the cost and the entire responsibility thereto.

D. The Electrical Contractor shall coordinate with the HVAC, Plumbing and Fire Protection Contractors with regard to feeder, raceway, and circuit breaker and disconnect switch sizes. If a substitution of HVAC, Plumbing and Fire Protection equipment is proposed by a Subcontractor, it shall become the responsibility of that Subcontractor to coordinate with the Electrical Contractor any and all changes with regard to feeder, raceway, and circuit breaker and disconnect switch sizes. The shop drawings shall clearly indicate what changes are required and any additional costs associated with this change. If coordination does not occur, the Subcontractor proposing the change shall be responsible for all costs that occur due to the substitution.

E. Whenever the Contractor secures approval for changing any items and such change involves a corresponding change or adjustment in any adjacent or related item, the responsibility for making the required change, or seeing that it is made, rests with the Contractor. The cost of these changes and/or adjustments shall be paid for by the Contractor unless it is otherwise agreed, in writing, at the time the change is approved. The acceptance of any change will not, in any way, relieve the Contractor from full compliance with the Contract Documents.

1.19 PERMITS, LAWS, ORDINANCES & CODES

A. The Electrical Contractor shall give all necessary notices, obtain all permits, and pay all taxes, fees and other costs in connection with his work; file all necessary plans, prepare all necessary documents and obtain all necessary approvals of state authorities, all local, town, city or county departments having jurisdiction; obtain all required certificates of inspection for his work.

B. The Electrical Contractor shall include in the work, without extra cost to the Owner, any labor, materials, services, apparatus, drawings in addition to the drawings prepared by the Project Engineer and Documents, in order to comply with all applicable laws, ordinances, rules and regulations whether or not shown on the drawings and/or specified.

1.20 DAMAGE TO OTHER WORK

A. Each Contractor shall be held responsible for and shall pay for all damage to other work caused by his work or workmen.

B. Repairing of such damage shall be done by the General Contractor or Contractors who installed the work and so directed by the Owner's Engineer.

1.21 GUARANTEE

A. Attention is directed to provisions of the General Conditions and Special Conditions regarding guarantees and warranties for work under this Contract.

B. Electrical Contractor's guarantees shall be the same as the General Contractors.

C. All material, items of equipment and workmanship furnished under this section shall carry for this standard warranty against all defects in material and workmanship. Any fault due to defective or improper material, equipment, workmanship or design which may develop shall be made good, forthwith, by and at the expense of the Electrical Contractor, including all other damage done to areas, materials and other systems resulting from this failure.

D. Electrical Contractor shall guarantee that all elements of the systems are of sufficient capacity to meet the specified performance requirements as set forth herein or as indicated.

E. Upon receipt of notice from the Owner of failure of any part of the systems or equipment during the guarantee period, the affected part or parts shall be replaced by the Electrical Contractor at no additional cost to the Owner.

F. Furnish, before the final payment is made, a written guarantee covering the above requirements.

1.22 INSTALLATION REQUIREMENTS

A. The arrangement of all electrical work shown on the drawings is diagrammatic only and indicates the minimum requirements of the work. Conditions at the building including actual measurements shall determine the details of the installation. All work shall be laid out and installed so as to require the least amount of cutting and patching.

B. Check the Architectural plans and specifications before ordering any material and equipment. Any discrepancies shall be brought to the attention of the Architect for his determination prior to proceeding with the work.

1.23 TYPCAL DETAILS

A. Typical details where shown on the drawings shall apply to each and every item of the project where such items are applicable. They are not repeated in full on the drawings, which in many cases are diagrammatic only, but with the intention that such details shall be incorporated in full. Any alternate method proposed for use by the Contractor shall have the prior approval of the Architect.

1.24 TYPCAL PART PLANS

A. Typical part plan where shown on the drawings shall apply to each and every item of the project where such items are applicable. They are not repeated in full on the drawings, which in many cases are diagrammatic only, but with the intention that such details shall be incorporated in full. Any alternate method proposed for use by the Contractor shall have the prior approval of the Architect.

B. Where typical part plans are shown on the drawings, it is the Contractor’s responsibility to

install all wiring devices in accordance with State and National Codes. Where Architectural deviations occur, additional devices will be required and shall be the responsibility of the Contractor to confirm wall layouts with the latest Architectural floor plans.

1.25 SLEEVES, INSERTS

A. Furnish and install all sleeves, inserts, anchor bolts and similar items to be set into masonry or concrete, as required for mechanical and electrical work. Internal diameter of sleeve shall be 2" larger than the outside diameter of the pipe or insulation covered line passing through it.

1.26 CORING, DRILLING

A. Core, cut and/or drill all small holes 4.5" diameter or less in walls and floors required for the installation of sleeves and supports for the electrical work.

1.27 ACCESSIBILITY

A. Install all work such that parts requiring periodic inspection, operation, maintenance and repair are readily accessible.

B. Furnish all access panels appropriate to particular conditions, to be installed by trades having responsibility for the construction of actual walls, floors or ceilings at required locations.

1.28 TOOLS AND EQUIPMENT

A. Provide all tools and equipment required for the fabrication and installation of the mechanical and electrical equipment at the site.

1.29 PORTABLE AND DETACHABLE PARTS

A. Contractors shall retain in their possession all portable and/or detachable parts and portions of materials, devices, equipment etc. necessary for the proper operation and maintenance of the mechanical and electrical systems until final completion of the work, at which time they shall be handed over to the Owners.

1.30 RECORD DRAWINGS, PROJECT CLOSEOUT

A. As work progresses and for the duration of Contract, maintain a complete and separate set of prints of Contract Drawings at job site at all times. Record work completed and all changes from original Contract Drawings clearly and accurately including work installed as a modification or addition to the original design. Work shall be updated on a weekly basis and shall be made available for review by Architect. Failure to perform this work shall be reason for withholding requisition payments. In addition, take photographs of all concealed equipment in gypsum board ceilings, shafts, and other concealed, inaccessible work. At completion of work, make copies of photographs with written explanation on back. These shall become part of Record Documents.

B. At completion of work prepare a complete set of record drawings on diskette in the latest AutoCAD® Release 12 or higher format showing all systems as actually installed, including all fire alarm and electrical circuitry. The design tracings will be made available

for the electrical contractor's copying, at his expense, into mylar reproducibles to serve as backgrounds for the drawings. The quantity of design tracings which are made available shall in no way be interpreted as setting a limit to the number of drawings necessary to show the required information. The Electrical Contractor's professional draftsperson shall transfer changes to mylars; submit mylars and three sets of prints to Architect for comments as to compliance with this section.

C. THE ARCHITECT WILL NOT CERTIFY THE ACCURACY OF THE RECORD DRAWINGS - THIS IS THE SOLE RESPONSIBILITY OF THE ELECTRICAL CONTRACTOR.

D. This trade shall submit the record set for approval by the fire and building departments in a form acceptable to the departments, when required by the jurisdiction.

E. Drawings shall show record condition of details, sections, riser diagrams, control changes and corrections to schedules. Schedules shall show actual manufacturer and make and model numbers of final equipment installation.

F. Refer to SECTION 01 77 00 – CLOSEOUT PROCEDURES sections

1.31 QUALITY ASSURANCE

A. The requirements of the State Building Code and local regulations establish the minimum acceptable quality of workmanship and materials, and all work shall conform thereto unless more stringent requirements are indicated or specified herein.

B. All work shall comply with the latest editions of the codes as referenced herein.

C. Follow manufacturer's directions for articles furnished, in addition to directions shown on drawings or specified herein.

D. Protect all work, materials, and equipment from damage during process of work. Replace all damaged or defective work, materials and equipment without additional cost to Owner.

E. All equipment and materials for permanent installation shall be the products of recognized manufacturers and shall be new.

F. Equipment and materials shall:

1. Where normally subject to Underwriters Laboratory Inc. listing or labeling services, be so listed or labeled.

2. Be without blemish or defect.

3. Not be used for temporary light and power purposes.

4. Be in accordance with the latest applicable NEMA standards.

5. By products which will meet with the acceptance of all authorities having jurisdiction over the work. Where such acceptance is contingent upon having the products examined, tested and certified by Underwriters or other recognized testing laboratory, the product shall be so examined, tested and certified.

G. Except for conduit, conduit fittings, outlet boxes, wire and cable, all items of equipment or

material of one generic type shall be the product of one manufacturer throughout.

H. For items which are to be installed but not purchased as part of the electrical work, the electrical work shall include:

1. The coordination of their delivery.

2. Their unloading from delivery trucks driven into any point on the property line at grade level.

3. Their safe handling and field storage up to the time of permanent placement in the project.

4. The correction of any damage, defacement or corrosion to which they may have been subjected. Replacement if necessary shall be coordinated with Contractor who originally purchased the item.

5. Their field make-up and internal wiring as may be necessary for their proper operation.

6. Their mounting in place including the purchase and installation of all dunnage, supporting members, and fastenings necessary to adapt them to architectural and structural conditions.

7. Their connection to building wiring including the purchase and installation of all termination junction boxes necessary to adapt and connect them to this wiring. Included also shall be the purchase and installation of any substitute lugs or other wiring terminations as may be necessary to adapt their terminals to the building wiring as called for and to the connection methods set forth in these specifications.

I. Items which are to be installed but not purchased as part of the electric work shall be carefully examined upon delivery to the project. Claims that any of these items have been received in such condition that their installation will require procedures beyond the reasonable scope of the electric work will be considered only if presented in writing within one week of the date of delivery to the project of the items in question. The electric work includes all procedures, regardless of how extensive, necessary to put into satisfactory operation, all items for which no claims have been submitted as outlined above.

1.32 DELIVERY, STORAGE, AND HANDLING

A. All materials for the work of this section shall be delivered, stored and handled so as to preclude damage of any nature. Manufactured materials shall be delivered and stored in their original containers, plainly marked with the products' and manufacturer's name. Materials in broken containers or in packages showing watermarks or other evidence of damage shall not be used and shall be removed from the site.

1.33 TEMPORARY POWER AND LIGHTING

A. The Electrical Subcontractor shall furnish and install feeders of sufficient size from the Utility Company's power lines for the electric light and power requirements for the building while under construction and until the permanent feeders and related equipment have been installed and are in operation. Temporary lighting shall be based on a minimum of providing at least one 100 watt incandescent lamp for each 1,000 square feet of floor area. Sufficient wiring, lamps, and outlets shall be installed to insure proper lighting in all

rooms, space, stairwells, and corridors. Minimum sized lamp used shall be 100 watt. Where higher lighting intensities are required by Federal or State Standards of Laws or otherwise specified, the above specified wattage shall be increased to provide these increased intensities. Refer to SECTION 01 50 00 – TEMPORARY FACILITIES AND CONTROLS.

B. All necessary transformers, meters, cables, panelboards, switches, temporary lamp replacements and accessories required for the temporary light and power installation shall be provided by the Electrical Subcontractor.

C. The Electrical Subcontractor shall provide and maintain on each floor of the building, a feeder or feeders of sufficient capacity for the requirements of the entire floor and he shall provide a sufficient number of outlets, located at convenient points, so that extension cords of not over 50 ft. in length will reach all work requiring temporary light or power.

D. The Electrical Subcontractor shall install and maintain the wiring and accessories for the offices of the General Contractor and the Clerk of the Works as specified in the contract form.

E. All temporary electrical work shall meet the requirements of the National Electrical Code Article 305 Temporary Wiring, the Local Utility Company, and all Federal Standards and Laws.

F. All temporary wiring and accessories thereto installed by the Electrical Subcontractor shall be removed after their purposes have been served.

G. The General Contractor will pay for the cost of electric energy consumed by himself and by all of his Subcontractors, unless otherwise indicated.

H. All lamps installed in permanent lighting fixtures and used for lighting during construction shall be replaced by the Electrical Subcontractor just prior to date of Use and Occupancy or Final Acceptance.

I. Provide all temporary lighting and power required above during the normal working hours of the project or a total of ten (10) hours per normal working day; Saturdays, Sundays and legal holidays are excluded. The ten hours per day shall include manning the temporary power and lighting 2 hour before and 2 hour after a normal eight (8) hour working day. In addition to the above, provide and maintain, to the satisfaction of the local authorities having jurisdiction, all temporary lighting and power that may be required for safety purposes. The Electrical Subcontractor will be compensated by the General Contractor for any additional standby time, materials or equipment required by the General Contractor or other Subcontractors beyond the normal working hours, as defined above.

1.34 STAGING AND SCAFFOLDING

A. Provide staging and scaffolding for all the work of this section complying with Division 1 requirements.

1.35 EXTRA MATERIALS

A. Furnish extra materials described in following product specification sections that match products installed, are packaged with protective covering for storage, and are identified with labels clearly describing contents.

B. Spare Parts

1. The Contractor shall carry in his bid a unit price to furnish and install additional wiring as required by the local Authority Having Jurisdiction during the final Inspectors walk-thru. Bid shall include all associated wire, conduit and backboxes.

2. Any unused devices shall be turned over to the Owner or a credit shall be given as directed by the Owner.

PART 2 - PRODUCTS

2.1 GENERAL

A. All materials and equipment necessary to make the installation complete in every detail shall be furnished and installed under this contract whether or not specifically specified herein. All materials and equipment shall be new. The Electrical Contractor shall include all wiring for mechanical, plumbing and fire protection systems, wiring protection systems and wiring for all equipment specified.

B. It is the intent of the Specifications that one manufacturer be selected, not a combination, for any particular system. For example, all wire of one manufacturer, all switches of one manufacturer, etc., except specific material classifications in which delivery time becomes a problem the Owner's Engineer may; give specific exemption from the requirements.

C. Where materials, equipment, apparatus or other products are specified by manufacturer, brand name, type or catalog number, such designation is to establish standards of performance, quality, type and style.

2.2 ELECTRIC SERVICE

A. The building will be served by an underground feeder. The electric service will be supplied from an existing site panel.

B. The Electrical Contractor shall include in his bid the following work:

1. All required grounding.

2. All associated utility back charges associated with the installation of the new electric service. The contractor shall credit any portion of the back charges not assessed by the utility company.

2.3 PULL BOXES, WIREWAYS, AND CHANNELS

A. Pull boxes shall be code gauge galvanized steel with screw covers to match. Pull boxes and wire ways shall be as shown on Drawings and/or as required by NEC and/or job conditions, with steel barriers separating systems.

B. Wire ways shall be galvanized steel, manufactured standard sections and fittings, with combination hinged and screw covers.

C. Steel channel supports shall be minimum 1-5/8 inch mold strip with minimum .105 inch wall thickness, Unistrut P1000, Kindorf, Husky Products, or equal.

2.4 RACEWAYS

A. Electric metallic tubing (EMT) shall be electro galvanized or sheradized steel. Tubing shall be as manufactured by Pyle National, Allied Tube and Conduit Corp., Wheatland Tube Company or equal.

B. All EMT shall be a minimum of 3/4" including branch circuits for lighting, power, data and telephone systems.

C. Intermediate metal conduit (IMC) shall be used where subject to damage.

D. Flexible metal conduit shall be galvanized steel with separate copper grounding conductor. Liquid-tight flexible metal conduit shall be similar, but with extruded moisture and oil proof outer jacket of polyvinyl chloride plastic. Flexible metal conduit less than 6-feet long may be used to connect all lighting fixtures. Motors and other equipment may be connected in length; not exceeding 18 inches. Liquidtight flexible metal conduit shall be used for all mechanical equipment or other rotating equipment subjected to moisture.

E. PVC schedule 40 conduit shall be used for all underground wiring. Use galvanized steel sweeps and stub-ups.

F. Couplings and connectors for electrical metallic tubing shall be galvanized steel compression type.

G. Steel support rods or support bolts for conduits shall be 1/8" diameter for each inch or fraction thereof of diameter of conduit size, but no rod or bolt shall be less than 1/4" in diameter.

H. Conduit ends shall be cut square and reamed to remove burrs and sharp edges. Offsets and bends for changes in elevation of exposed conduit runs shall be made at walls or beams and not in open spaces between walls or beams. Conduits shall be routed so as not to interfere with the operation or maintenance of any equipment. The entire job shall be done in a neat and workmanlike manner, as approved by the Engineer. Steel supports or racks shall be galvanized steel channel and fittings, Unistrut, Kindorf, Husky Products Company, or equal.

I. Conduits shall be routed in the field so as to be coordinated with the building structure. Exposed conduit shall be run in straight lines parallel to walls, beams and columns and with right angle bends and threaded conduit fittings.

J. For 20 ampere branch circuit wiring furnish and install the number of individual conduits required to limit the number of conductors in each conduit to a number which will not require derating to a value below 100 percent of the current rating of the circuit over current protective device.

2.5 WIRE AND CABLE

A. All wire and cable shall be copper, minimum of #12 AWG solid unless otherwise noted. All wire and cable located totally within an apartment, condominium or townhouse and approved by Architect/Engineer/Owner, shall be copper, minimum of #14 AWG solid that serve 15A devices, unless otherwise noted.

B. Provide single conductor wire and cable with 600V insulation. Wire size #8 AWG and larger shall be stranded. Wire of size smaller than #8 AWG shall be solid. Conductors shall be soft drawn copper with conductivity of not less than 98% of ANSI Standard for annealed copper.

C. Wire and cable shall be Type THWN-THHN building wire, 600V, rated for 75 degrees C. in wet locations and 90 degrees C. in dry locations.

D. Flexible metal clad cable Type MC with green equipment ground may be used in areas above hung ceilings and in wall partitions where allowed by code. MC Cable shall be

manufactured by AFC or equal.

E. For branch circuit wiring totally within an apartment, use non-metal sheath cable (type NM) as permitted by local authorities.

F. Wire and cable shall be manufactured by Phelps Dodge Copper Products Corp., General Cable Co., Triangle Conduit and Cable Co., AFC/ A Monogram Co. or equal.

G. Feeders to HVAC equipment and to the elevator shall be copper conductors unless otherwise permitted by the equipment manufacturer.

2.6 WIRING DEVICES

A. Available manufacturers: subject to compliance with requirements, manufacturers offering products that may be incorporated in the Work included, but not limited, to the following:

1. Wiring Devices:

a. Pass and Seymour/legrand
b. Bryant Electric
c. Cooper Industries
d. Hubbell
e. Leviton

B. Wiring devices and components shall be designed, manufactured, tested and installed to comply with FPA 70 (National Electrical Code), UL Standards: UL498 receptacles; UL20 switches; UL508 industrial control equipment; UL 943 ground fault circuit interrupters (2003 revision); and, UL 1449 surge suppressor; NEMA standards, state and local codes and requirements of authorities having jurisdiction. Federal specifications apply to certain receptacles (WC596) and switches (WS896). Furnish and install Federal Specification grade wiring devices, complete with all accessories as indicated on the drawings and as specified hereunder.

C. Color

1. As determined by Architect, except as otherwise indicated or required by code.

D. Duplex receptacles shall be Construction Grade Federal Specification rated for 125 volts, 20 amperes unless otherwise indicated on contract drawings and conform to WC596 standards. Receptacles shall have wire bundling clamps on all terminals including ground; terminal screws shall be #10. A full wrap-around steel bridge strap shall be provided with locking finger tabs to secure the face.

1. Pass & Seymour: CRB5362
2. Hubbell: CR5352
3. Leviton 5362S

E. Duplex receptacles with ground fault circuit interrupter characteristics shall be rated for 125 volts, 20 amperes with 20 ampere feed through amperes unless otherwise indicated on contract drawings, and shall conform to the revised 2003 UL 943 standard. All receptacles shall have “SafeLock” protection that will disconnect power to the receptacle if critical components are damaged and ground fault protection is lost. All receptacles shall have “trip indicator” light to identify a tripped condition. All receptacles in

bathrooms/toilets, within 6' 0" of sink locations, exterior outlets, utility vault, in wet areas, etc. shall be ground fault type whether indicated on the drawings or not. Provide weatherproof While-in-Use covers for exterior outlets.

1. Pass & Seymour: 2094
2. Cooper: XGF20
3. Leviton: 8898

F. Locking Receptacles shall be impact resistant with NEMA configuration number clearly marked on the face. Boss diameter (1.55") shall be the same for both 20 and 30 receptacles. Bridge/mounting strap shall be one piece, no riveted ground spring. Contact spring shall be one piece, no rivets, for superior heat rise resistance. Shall be capable of back or side wiring and capable of accepting #8 AWG wire.

1. Pass & Seymour: L520R
2. Hubbell: HBL2310
3. Leviton: 2310

G. Receptacles, Industrial Heavy Duty: Conform to NEMA Standard PK4 – "Plugs, Receptacles, and Cable Connectors of the Pin and Sleeve type for Industrial use."

H. Receptacles in Hazardous (Classified) locations: Comply with NEMA Standard FB11 - "Plugs, Receptacles, and Connectors of the Pin and Sleeve type for Hazardous Locations" and UL Standard 1010 – "Receptacles – Plug combinations for use in Hazardous (Classified) Locations."

I. Toggle switches shall be full sized, heavy duty AC type rated for 120/277 volts, 20 amperes and comply with Federal Specification WS 896. Mounting strap shall be one-piece nickel plated steel with integral ground. Terminals shall external screw-pressure plate back and side wired to accept # 14 - #10 AWG wire. Contacts shall be silver alloy.

J. Combination Switch and Receptacle: Both devices in a single gang configuration with removable tab connector that permits separate or common feed connection.

1. Switch: 15 amp, 120/277 volt
2. Receptacle: NEMA Configuration 5-15R.

K. Snap Switches in Hazardous (Classified) Locations: Comply with UL Standard 894 "Switches for use in Hazardous (Classified) Locations."

L. Pendant Cord/Connector Devices: Matching, Locking Type, Plug and Plug Receptacle Body Connector, NEMA L5-20P, L5-20R and L5-20C, Heavy Duty Grade.

1. Bodies: Nylon with screw-open cable-gripping jaws, and provision for attaching external cable grip.

2. External Cable Grip: Woven wire mesh type made of high strength galvanized steel wire strand and matched to cable diameter and with attachment provision designed for the corresponding connector.

M. Cord and Plug Sets: Match voltage, current ratings and number of conductors to requirements of equipment being connected.

1. Cord: Rubber insulated, stranded copper connectors, with type SOW-A jacket.

Grounding conductor has green insulation. Ampacity is equipment rating plus 30% minimum.

2. Plug: Male configuration with nylon body and integral cable clamping jaws. Match to cord and to receptacle type intended for connection.

N. All wiring devices shall be installed in accordance with NEC Article 210 and 406.

O. In all areas specified in NEC 210.52 (Dwelling Unit Receptacle Outlets), all 125-volt, single phase, 15- and 20- ampere receptacles shall be listed tamper resistant receptacles.

2.7 WIRING DEVICE PLATES

A. All normal power wiring device plates shall be stainless steel, type 302/304:

1. Pass & Seymour: SS Series
2. Hubbell: S Series
3. Leviton: 84000-40 Series

B. Device plate screws shall be of the same color finish as the device plate.

2.8 OUTLET BOXES AND ACCESSORIES

A. Provide galvanized sheet steel outlet boxes for all outlets unless otherwise noted.

B. Fixture outlet boxes shall have 3/8" solid male fixture studs and auxiliary fixture stems shall be supported from 3/8" male fixture studs.

C. All outlet boxes for concealed work shall be galvanized, stamped steel; those for fixtures, furnished with a fixture stud.

D. Outlet boxes shall be of size and type to accommodate (1) structural conditions; (2) size and number of raceways, conductors or cables entering and (3) devices or fixtures for which required.

E. Install blank plates on all outlet boxes, in which no apparatus is installed, which do not integrally provide a cover for the box.

F. Special care shall be taken to set all boxes correctly square and true with the building finish.

G. Outlet boxes and accessories shall be as manufactured by Steel City, Appleton, Raco or equal.

2.9 PANELBOARDS

A. Provide dead front lighting and power panel boards, with proper voltage and ampere rating as indicated. Panel boards shall be surface or flush mounted as specified in the panel schedules.

B. Provide bolt-on, molded case, circuit breakers with thermal - magnetic trips. Multiple pole breakers shall be single handle, common trip. Provide handle locks for emergency lighting circuits, fire alarm, security and other similar breakers. Main breakers shall be

vertically mounted, separate from breakers.

C. Provide copper bus bars and full size insulated neutral bus. Panel buswork shall be rated to carry, as minimum, ampere rating of over current device that serves panel. Panels with see-thru bussing shall not be used. Provide anti-turn, solderless lugs suitable for copper wire.

D. Provide insulated, isolated ground bus for all isolated ground panelboards that serve computer equipment and or as indicated on floor plans.

E. Provide fully rated circuit breakers equal to short circuit interrupting current available.

F. All circuit breakers in branch panels shall be coordinated for short circuit withstand and localizing a short circuit per NEC 240-12 without fuses.

G. All branch circuits that supply 125-volt, single phase, 15- and 20- ampere outlets installed in the dwelling units shall be protected by an arc-fault circuit interrupter listed to provide protection of the entire branch circuit. All branch circuit breakers feeding heat pumps and mechanical equipment shall be HACR rated.

H. Panel boards shall be manufactured by General Electric, Square D, Cutler Hammer or Siemens.

2.10 NAMEPLATES

A. Nameplates consisting of black plastic with white center, lettering to be 1/4" high, engraved through to white layer and properly fastened with brass screws shall be provided for the following equipment:

1. All panel boards and distribution equipment.
2. Terminal cabinets.
3. Junction boxes larger than 4-11/16".

2.11 DISCONNECT SWITCHES

A. All safety switches shall be NEMA Type HD and Underwriters' Laboratories listed.

B. All switches shall have switch blades which are fully visible in of OFF position with the door open. All current carrying parts shall be plated through electrolytic processed to resist corrosion and promote cool operation.

C. Switches shall be quick-make and quick-break such that, during normal operation of the switch, the operation of the contacts shall be not capable of being restrained by the operating handle after the closing or opening action of the contacts has started. The handle and mechanism shall be an integral part of the box, not the cover, with positive padlocking provisions in the OFF position.

D. Switches shall be furnished in NEMA 1 general purpose enclosures unless NEMA 3R (raintight) or NEMA 4 as required by environment. Enclosures shall be of code gauge (UL 98) sheet steel (NEMA 1) or code gauge phosphate treatment and gray baked enamel finish.

E. Switches shall be horsepower rated for 600 volts AC and all switches shall be fused type with dual element fuses.

F. Safety switches shall be Square D Class 3130 or approved equal as manufactured by General Electric or Cutler Hammer.

2.12 FUSES

A. Fuses shall be non-renewable type, UL Class J up to 600 amp, and Class L over 600 amp. Fuses shall be current limiting type with a minimum interrupting rating of 200,000 rms amp.

B. Fuses shall not be used in any switchboards or panel boards unless adequate A.C. rated circuit breakers are not available.

C. Fuses shall be manufactured by Bussman, Gould Shawmut, Little Fuse or equal.

2.13 GROUNDING REQUIREMENTS

A. Ground all systems and equipment in accordance with best industry practice, the requirements of NFPA 70.

B. The ground bus of the main switchboard shall be connected to the main grounding electrode specified below by means of insulated conductors run in conduit.

C. The main grounding electrode shall be an accessible point on the nearest metallic main water service pipe. Connection shall be made on the street side of the main valve utilizing a ground clamp of a type specifically manufactured for the purpose. Bonding jumpers shall be provided around the water meters and around insulating joints and/or sections.

D. Establish a ground bonding connection from the effectively grounded structural building steel to each cold water mains entering the building. Each bonding connection shall consist of insulated conductors run in conduit.

E. The water pipe ground shall be supplemented by an additional electrode consisting of (3) buried 3/4" diameter by 10'-0" long copperweld ground rods spaced 10'-0" apart, and provided in sufficient quantity so as to have measured resistance to ground of not more than 10 ohms. Provide independent certification confirming this. Establish a bonding connection from the electrode consisting of green insulated conductors run in conduit and sized as indicated hereinafter for main and supply side of service bonding jumpers.

F. Provide grounding bonds between all metallic conduits of the light and power system which enter and leave cable chambers or other non-metallic cable pulling and splicing boxes. Accomplish this by equipping the conduits with bushings of the grounding type individually cross connected.

G. Bond metallic conduits containing grounding electrode conductors and main bonding conductors to the ground bus service enclosure and/or grounding electrode at both ends of each run utilizing grounding bushings and jumpers.

H. All qualify concrete-encased grounding electrodes shall be connected to the grounding system of the building in accordance with the requirements of the NEC.

I. Provide grounding bonds for all metallic conduits of the light and power system which terminate in pits below equipment for which a ground bus is specified. Accomplish this

by equipping the conduits with bushings of the grounding type connected individually to the ground bus.

J. Provide supplementary ground bonding where metallic conduits terminate at metal clad equipment (or at the metal pull box of equipment) for which a ground bus is specified. Accomplish this by equipping the conduits with bushings of the grounding type connected individually by means of jumpers to the ground bus. Exclude the jumpers where directed. This exclusion will be required where an isolated ground for electronic equipment is to be maintained.

K. Each grounding type bushing shall have the maximum ground wire accommodation available in standard manufacture for the particular conduit size. Connection to bushing shall be with wire of this maximum size.

L. Bonding conductors on the load side of the service device and equipment grounding conductors shall be sized in relation to the fuses or trip size of the overcurrent device supplying the circuit.

M. The central equipment for the fire protective alarm system and telephone system shall have its grounding terminal connected to the grounding electrode by means of a No. 6 green coded insulated conductor, run in 3/4" conduit. Utilize a ground clamp of a type specifically manufactured for the purpose.

N. Provide grounding bonds for all metal parts, including all metal parts of the electrical equipment associated with the water-circulating system of the pool, all metal parts of the pool structure, and all fixed metal parts, which include conduit and piping, metal door frames, and metal window frames, within 5 feet of the inside walls of the pool and not separated by a permanent barrier. All pool grounding shall be in accordance with Article 680 of the NEC, State Code or Local Code, whichever is the more stringent.

2.14 PHASING AND COLOR CODING

A. The insulation or covering of each wire or cable shall be color coded so as to provide for circuit identification as specified below:

120/208 V Circuits	Phase Circuits
Black	A
Red	B
Blue	C
White	Neutral
Green	Equipment Ground

B. Color coding shall be achieved by one of the following methods:

1. The insulation or covering shall be coded during manufacture by use of one of the following methods:

   a. Colored compounds.
   b. Colored coatings.

2. In sizes and insulation types where factory applied colors are not available, wires and cables shall be color coded by the application of colored plastic tapes in overlapping turns at all terminal points, and in all boxes in which splices are

made.

C. The same colored cable shall be connected to the same phase throughout the project.

D. In general, building load centers and panelboards shall be phased "A", "B", "C", left to right. The neutral, although it may be in different locations for different equipment, shall be identified.

2.15 MOLDED CASE CIRCUIT BREAKERS

A. Molded case type circuit breakers shall consist of manually operated quick-make quick-break mechanically trip free operating mechanisms for simultaneous operation of all poles, with contacts, arc interrupters and trip elements for each pole, all enclosed in molded phenolic plastic cases.

1. Their tripping units shall be of the "thermal magnetic" type having bimetallic elements for time delay overload protection and magnetic elements for short circuit protection.

2. They shall be manually operable by means of toggle type operating handles having "tripped" position midway between the "on-off" position.

3. They shall each be contained in an individual case enclosing only the number of poles required for the particular breaker.

4. All panels and individually mounted circuit breakers shall have short circuit ratings exceeding the available short circuit or the values indicated in the Power System Studies in this section by a factor of 1.2 with a minimum as follows:

a. 240V class panels/breakers

1) 10 kAIC where shown fed by a 150 kVA or less transformer
2) 22 kAIC where shown fed by a 300 kVA or less transformer

5. They shall be of the "bolted-in" type.

6. Where necessary, to accommodate other requirements, their frame sizes shall be increased to conform to such requirements, frame sizes being indicated only as a reference to the minimum acceptable interrupting ratings noted above.

7. Where single pole in trip sizes 20 amps or less, they shall be rated for switching duty.

8. They shall be equipped with 5 milliamp sensitivity ground fault interrupting features where so indicated.

B. They shall be manufactured by Square D, Cutler Hammer, or General Electric.

2.16 CARTRIDGE FUSES

A. Cartridge fuses shall be as follows:

1. Provide a complete set of fuses for each item of fusible type equipment. Fusible equipment furnished by other contractors will be complete with fuses.

2. Secondary system fuses, rated at 600 volts or less, shall be UL listed and constructed in conformance with the applicable standards set forth by NEMA and ANSI. All fuses of a particular class shall be of same manufacturer.

3. Regardless of actual fault current, they shall, at full recovery voltage, be capable of safely interrupting fault currents of 200,000 amperes RMS symmetrical or 340,000 amperes RMS asymmetrical, deliverable at the line side of the fuse.

4. Circuits 0-600 amperes shall be protected by the equal of Bussman "Low Peak" current limiting fuses, LPN-RK (250 volts), LPS-RK (600 volts), UL class RK-1.

5. Fuses shall be suitable for application to fuse gaps which reject other types of fusing.

6. Supply 10 per cent spare fuses of each size and type 60 amps and less. Supply three spare fuses for each size and type over 60 amps.

B. Cartridge fuses shall be manufactured by Bussman, Gould, or EFCO.

2.17 MOTOR CONTROLS

A. Motor Controls - Manual and Magnetic

1. Individually mounted magnetic starters shall be across-the-line type with thermal overload on each phase, single speed, two speed, or reduced voltage start as indicated. Check exact type of two speed or part winding motors to be furnished by other contractors, and provide proper starter.

2. Starters shall be of the replaceable contact double break type, of size and type required for particular motor horsepower and voltage. Minimum size starter to be size 1.

a. Starters shall have OL reset button, green pilot light to indicate "ON", and "HAND-OFF-AUTO" switch in cover. Pilot lights shall be push-to-test type.

b. Starters to have 120 volt control transformers with fused output being provided for those units operating on 277/480 volt system.

c. Provide proper rating of thermal overloads. Replace any overloads found to be of an incorrect rating. Provide a spare set of three thermal overloads for each starter.

d. Provide four (4) sets of auxiliary contacts of convertible type N.O. to N.C. for each starter.

e. Motor starters installed in dry locations shall have NEMA I enclosures. Those in wet locations shall have NEMA IV enclosures.

f. Acceptable Manufacturers:

1) Allan Bradley
2) General Electric
3) Cutler Hammer

4) Square D

3. Manual motor starters shall have pilot lights and shall be furnished with thermal overloads on each phase.

B. Motors: Each motor shall have disconnect switch and starter provided under this section. Starters which are a part of "factory assembled" control panel will be provided under section supplying equipment to be controlled but connected under this section.

1. Provide motor terminal boxes for each motor not furnished with same.

C. Disconnect Switches

1. Disconnect (safety) switches shall conform to industrial standards of NEMA, be UL listed and shall be heavy duty type, quick-make, quick-break type with interlocking cover mechanism and provisions for padlocking switch handle in "OFF" position. Three pole toggle switches are not acceptable as substitute for disconnect switches.

2. Disconnect switches shall be of fused or unfused type as indicated with number of disconnecting poles indicated. The grounded conductor shall not be switched. Switches shall be for use with current limiting fuses with rejection type fuse clips and those shall be horsepower rated.

3. Enclosures shall be of proper NEMA type for the intended location and shall be phosphate coated or equivalent code gauge galvanized sheet steel with gray baked enamel finish.

4. Acceptable Manufacturers:

a. General Electric
b. Cutler Hammer
c. Square D

D. Combination Starter

1. Provide combination starters where indicated on the plans.

E. Motor Control Circuitry

1. Except as noted below, select materials exactly as specified for feeders. Utilize No. 12 AWG THWN conductors throughout minimum.

2. Motor control circuit wires may be run in the same conduit as the wires of motor power circuits; however, exclude motor control wires from enclosures (other than motor starter enclosures) which contain power circuit overcurrent protection and switching devices; also from pull boxes and junction boxes containing the wires of main and submain feeders. Utilize auxiliary pull boxes to separate motor control wires from motor power circuit wires before the power circuit wires enter the items from which motor control wires are excluded.

3. Prior to installing any motor control circuitry for a particular motor, notify the Architect of any deviations between the control circuitry requirements of the trade supplying the motor and the indicated electric work.

2.18 LIGHTING FIXTURES

A. Furnish all labor, materials and equipment required for a complete installation of lighting equipment specified.

B. This Contractor shall assume all responsibility for the safe handling of all lighting fixtures, which are furnished under this Section and other accessories and lamps, until the final inspection has been made by the Owner's Engineer.

C. Special fittings and materials that may be required to support fixtures shall be supplied as well as supports or grounds required securing surface or pendant mounted fixtures on suspended ceilings unless otherwise noted. Where ductwork, pipes, type of building construction materials and structural framing members provide obstructions or difficult support means, hanger rods shall be used in association with horizontal sections of steel support channels in a manner approved by the Owner's Engineer. Steel support channels shall be Unistrut, Kindorf, Husky Products Co., or equal. The exact mounting height of all stem supported lighting fixtures shall be determined on the job, by the Owner's Engineer.

D. Ballasts for fluorescent fixtures shall be high power factor energy savings, electronic type. Multiple lamp ballasts shall be used whenever possible. Ballasts shall be of high power factor type. The proper ballast shall be furnished and installed for all lighting fixtures normally designed for operation with ballasts, whether or not such ballasts are specifically itemized on the Fixture Schedule.

E. Furnish and install a complete set of new lamps for all fixtures. Lamps used during the construction period shall be removed and replaced with new lamps. All fluorescent lamps to be warm white or approved equal. Lamps shall be Osram / Sylvania.

F. Fixtures, part or parts thereof (including lamps) determined to be defective upon completion of the electrical installation shall be replaced by the Electrical Contractor free of charge.

G. In addition to fixture supports, surface mounted lighting fixtures shall be secured to the surface to which they mount at a minimum to two points on each 4 foot length of fixture housing, as approved, to prevent rotation or movement of the fixture out of its square and level position of alignment.

H. This Contractor shall include all fixtures, wiring, hanging, uncrating, connecting up and making ready for operation. This Contractor shall include the cost of furnishing and installing all lamps for all fixtures under this Contract. All T-8 tubes for instant-start fixtures shall be General Electric, Phillips, Osram / Sylvania or equal. All lamps shall be U.L. approved.

I. All fluorescent fixtures installed in suspended ceilings shall be supported from the building structure by chains at either end of fixture.

J. All fixtures installed in insulated ceilings shall be IC rated. Coordinate with the Architects reflected ceiling plans.

K. All fixtures installed in rated ceilings shall be one or two hour rated. Coordinate with the Architects reflected ceiling plans for ceiling rating.

L. All lighting fixtures shall be individually supported from the structural slab or structural

building member. Fixtures will not be permitted to be supported from suspended ceiling or roof deck. Fixtures shall be supported in accordance with seismic requirements outlined in Massachusetts State Building Code Seventh Edition.

2.19 ACCESS PANELS

A. Access panels shall be provide for all electrical equipment which requires access by; Massachusetts Electric Code above hung ceilings or behind walls which are constructed of materials of the type which are not readily removable.

B. Access panels shall be furnished by the General Contractor and installed by the Electrical Contractor.

PART 3 - EXECUTION

3.1 SPECIAL COORDINATION INSTRUCTIONS

A. Coordination with the work of other trades is referred to within various parts of this Section of the Specifications. The following special instructions shall also be carefully noted:

1. Locations and mounting height of all wall outlets and lighting fixtures shall be as specified on the electrical, architectural drawings, and as required by the latest edition of national and local codes.

2. All feeder, branch circuit or auxiliary system wiring passing through pull boxes and/or being made up in panel boards shall be properly grouped, bound and tied together in a neat and orderly manner in keeping with the highest standards of the trade, with plastic cable ties.

3. All duplex convenience and power receptacles shall be mounted vertically with the grounding post to the bottom as the outlet is viewed from the front.

4. All miscellaneous hardware and support accessories, including support rods, nuts, bolts, screws and other such items shall be of a galvanized or cadmium plated finish, or of other approved rust-inhibiting coatings. Care should be taken that fixtures shall not be installed on both sides of existing or new building expansion joints.

5. The Electrical Contractor shall provide all materials, equipment and workmanship to provide for adequate protection of all electrical equipment during the course of construction of the project.

6. The Electrical Contractor shall furnish and install approved details for all insulation at terminal connection points for all electrical conducting materials, such as transformer terminals, terminal studs, and at any other special locations as directed by the Engineer and confirmed by the Owner.

7. The Electrical Contractor shall provide GFI rated and weatherproof rated equipment in damp or wet locations.

8. Coordination with local utility companies with the local utility companies and the local Fire Department is required. Electrical Contractor shall obtain all necessary permits and file all required applications and meet all utility company requirements.

9. Any outlet box shall not be mounted back to back on any wall of any rotating. Maintain the code clearances when boxes are mounted back to back.

3.2 COOPERATION AND WORK PROGRESS

A. The electrical work shall be carried on under the usual construction conditions, in conjunction with all other work at the site. The Electrical Contractor shall cooperate with the Engineer and all contractors and equipment suppliers working on the site coordinate the work and proceed in a manner so as not to delay the progress of the project.

B. The Electrical Contractor shall be responsible to coordinate the exact mounting

arrangement and location of equipment indicated on the drawings to allow for proper space requirements for equipment access, operation and maintenance.

C. It shall be the responsibility of the Electrical Contractor to coordinate the delivery of electrical equipment to the project prior to the time of installation or equipment.

3.3 INSTALLATION OF WIRING & CONDUIT

A. In general all conduits shall be run concealed unless otherwise indicated to be run exposed.

B. Exposed conduits shall be run parallel to or at right angles to the walls of the building and all bends shall be made with standard conduit ells or conduits bent to, not less than, the same radius. Horizontal runs of exposed conduits shall be close to ceiling beams, passing over water or other piping where possible and shall be supported by pipe straps or by other approved means, not more than 5' apart. Installation of exposed conduits in finished areas of the building shall be checked with the Engineers, Architect, and Owner for layout before installation to conform to the pattern of the structural members, and when completed, is to present the most obtrusive appearance possible. No exposed conduits will be permitted on walls or partitions in public areas.

C. In no place shall a conduit be run within 3" of hot water pipes or appliances, except where crossing is unavoidable and in that case, the conduit shall be kept at least 1" from covering or pipe crossed.

D. Conduits shall be supported on approved galvanized wall brackets, ceiling trapeze, strap hangers or pipe straps, secured by means of toggle bolts on hollow masonry units or expansion bolts in concrete or brick.

E. In general, no splices or joints will be permitted in either feeder or branches except at outlets or accessible junction boxes. No splices shall be made in security or fire alarm systems.

F. All splices in wire #8 AWG and smaller shall be standard pigtail, made mechanically tight and insulated with proper thickness of insulating tape. Wire splicing nuts as manufactured by; Minnesota Mining Company (Scotch Lock) or Ideal wire nuts shall be used, subject to the local wire inspector.

G. Wire #6 and larger shall be connected to panels and apparatus by means of approved lugs or connectors. Connectors shall be solderless type, sufficiently large to enclose all strands of the conductor and securely fastened.

H. Provide (3) 1-inch conduits from each electrical panel up to the nearest lay-in ceiling area.

3.4 INSTALLATION OF UNDERGROUND CONDUITS

A. The outside surface of circuitry which is to be embedded in cinder concrete shall be coated with asphaltum paint.

B. In runs of conduit or raceway including flexible limit the number of bends between cable access points to a total which does not exceed the maximum specified for the particular system. Where no such maximum is specified, limit the number to four right angle bends

or the equivalent thereof.

C. In each conduit or raceway assigned for the future pulling in of wires, include a nylon drag cord. In raceways 2" trade size and larger, the cord shall be pulled in utilizing a suitable brush, followed by an 85% diameter ball mandrel ahead of the cord in the pulling assembly. In the event that obstructions are encountered, which will not permit the drag cord to be installed, the blocked section of raceway shall be replaced and any cutting and patching of the structure involved in such replacement shall be included as part of the electric work.

D. Circuitry shall be arranged such that conductors of one feeder or circuitry carrying "going" current are not separated from conductors of the same feeder or circuitry carrying "return" current by any ferrous or other metal. Where not within raceways, all "going" and "return" current conductors of one feeder or circuit shall be laces together so as to minimize induction heating of adjacent metal components.

E. Sleeves used where circuitry is to penetrate waterproof slabs, decks and walls, shall be of a type selected to suite the water condition encountered in the field.

3.5 GROUNDING

A. The Electrical Contractor shall furnish and install all fittings, clamps, conduits and wire of proper size to make ground connections between all apparatus and conduit and the water piping as required by the latest edition of the Massachusetts Electrical Code. Ground wires shall be run in rigid conduit of size required by the National Electrical Code.

B. The equipment and materials required under this Section are included under Part 2.0 PRODUCTS.

C. Ground all systems and equipment in accordance with the best industry practice. Size all conductors per the latest addition of the NEC.

D. The ground bus of the main distribution switchboard and generator output panel board shall be connected to the main grounding electrode specified below by means of insulated conductors run in threaded steel conduit.

E. The main grounding electrode shall be an accessible point on the nearest metallic main water service pipe. Connection shall be made on the street side of the main valve utilizing exothermic welding. Bonding jumpers shall be provided around the water meters (If provided) and around insulating joints and/or sections.

F. The water pipe ground shall be supplemented by an additional "made" electrode consisting of buried 1" diameter by 10'-0" long copper weld ground rods space 6'-0" minimum apart, and provided in sufficient quantity so as to have a measured resistance to ground of not more than 25 ohms. Establish a bonding connection from the "made" electrode consisting of green insulated conductors run in threaded steel conduit to the cold water main.

G. Establish two ground-bonding connections from structural building steel from two different locations to the cold water mains entering the building.

H. Provide supplementary ground bonding where metallic conduits terminate at metal clad equipment (or at the metal pull box of equipment) for which a ground bus is specified.

Accomplish this by equipping the conduits with bushings of the grounding type connected individually by means of jumpers to the ground bus. Excluded the jumpers where directed. This exclusion will be required where an isolated ground for electronic equipment is to be maintained.

I. The central equipment for the fire protection alarm system shall have its grounding terminal connected to the nearest metallic cold water main by means of a #6 green coded insulated conductor, run in 3/4" threaded metallic conduit. Utilize a ground clamp of a type specifically manufactured for the purpose.

J. For each feeder or run of lighting and appliance branch circuitry include equipment and raceway grounding conductors run within the raceways. The indicated quantities of conductors do not include the ground wires.

K. Conductors utilized for grounding and bonding shall have type of insulation, comparable to the phase conductors, color coded green.

3.6 TEMPERATURE CONTROL WIRING

A. The temperature control system shall be installed by the Heating and Air Conditioning Contractor.

B. All electric wiring and wiring connections required for the installation of the temperature control system shall be provided by the Temperature Control Contractor.

C. Electrical Contractor shall provide 120-volt control power to all temperature control panels. Provide a 120V, 20A circuit from local 120V panel to a ceiling mounted junction box located in each mechanical space.

3.7 SLEEVES, INSERTS AND SUPPORTS

A. Furnish and install all inserts, conduit hangers, anchors and steel supports necessary for the support and installation of all electrical equipment.

B. Where openings are required in walls and floors for the passing of raceways the Electrical Contractor shall furnish the General Contractor with the necessary information regarding dimensions and locations so that he may install suitable concrete stops to provide these openings. Such openings shall be by the General Contractor in such a manner so as to interfere with the fireproof integrity of the building.

C. The Electrical Contractor will be held responsible for the location of the maintaining in proper position, sleeves, inserts and anchor bolts supplied and/or set in place by him. In the event that failure to do so required cutting and patching of finished work, such work shall be done at the Electrical Contractor's expense by the General Contractor.

3.8 FINAL INSPECTION AND TEST

A. Prior to test, feeders and branches shall be continuous from service contact point to each outlet include: all panels, feeders and devices. Test system free from short circuits and grounds with insulation resistances not less than outlines in the National Electrical Code. Provide testing equipment necessary and conduct test in presence of the Owner's representative.

B. Furnish all labor, material, instruments, supplies and services and bear all costs for the accomplishment of tests herein specified. Correct all defects appearing under test, repeat the tests until no defects are disclosed. Leave the equipment clean and ready for use.

C. The Electrical Contractor shall perform any test other than herein specified which may be specified by legal authorities or by agencies to whose requirements this work is to conform.

D. All equipment and material furnished by the Electrical Contractor shall operate under all conditions of load without objectionable noises or vibrations, which in the opinion of the Owner's Engineer, is objectionable. Where sound or vibration conditions arise which are considered objectionable by the Owner's Engineer, the Electrical Contractor shall eliminate it in a manner approved by the Owner's Engineer.

E. Final inspection and test report shall be provided for the following:

1. Testing of the emergency lighting system.
2. Testing of the impedance of the grounding system.
3. Testing of each outlet.
4. Testing of branch and feeder conductors for continuity.
5. Testing of panel boards to verify proper current balance and voltage.
6. Testing of motors, verifying proper current balance and voltage.
7. Testing, targeting and focusing of all adjustable lighting fixtures.
8. Ground fault coordination.
9. Fire alarm system.

3.9 BRANCH CIRCUITRY

A. For all lighting and appliance branch circuitry, raceway sizes shall conform to industry standard maximum permissible occupancy requirements except where these are exceeded by other requirements specified elsewhere.

B. Circuits shall be balanced on phases at their supply as evenly as possible.

C. Feeder connections shall be in the phase rotation which establishes proper operation for all equipment supplied.

D. Reduced size conductors indicated for any feeders shall be taken as their grounding conductors.

E. Feeders consisting of multiple cables and raceways shall be arranged such that each raceway of the feeder contains one cable for each leg and one neutral cable, if any.

F. For circuitry indicated as being protected at 20 Amps or less, abide by the following:

1. All 20 amp, 120/208 volt, 3 phase, 4 wire combined branch circuit homeruns shall be provided with a #8 AWG neutral conductor.

2. All 20 amp branch circuit shall be provided with separate control.

3. Minimum conductor size shall be No. 12 AWG copper.

4. Conductors operating at 120 volts extending in excess of 100 ft., or at 277 volts extending in excess of 200 ft., or the last outlet or fixture tap shall be No. 10

AWG copper throughout.

5. Lighting fixtures and receptacles shall not be connected to the same circuit.

6. Circuits shall be balanced on phases at their supply point as evenly as possible.

G. Type MC Cable Installation

1. Where cable is permitted under the products section, the installation of same shall be done in accordance with code and the following:

a. Cable shall be supported in accordance with code. Tie wire is not an acceptable means of support. Cable supports such as Caddy WMX-6, MX-3, and clamps such as Caddy 449 shall be used. Where cables are supported by the structure and only need securing in place, then ty-raps will be acceptable. Ty-raps are not acceptable as a means of support. All fittings, hangers, and clamps for support and termination of cables shall be of types specifically designed for use with cable, i.e., romex connectors not acceptable.

b. Armor of cable shall be removed with rotary cutter device equal to roto-split by Seatek co., not with hacksaw.

c. Use split "insuliner" sleeves at terminations.

3.10 REQUIREMENTS GOVERNING ELECTRICAL WORK IN DAMP OR WET LOCATIONS

A. Outlets and outlet size boxes shall be of galvanized cast ferrous metal only.

B. The finish of threaded steel conduit shall be galvanized only.

C. Wires for pulling into raceways for lighting and appliance branch circuitry shall be limited to "THWN".

D. Wires for pulling into raceways for feeders shall be limited to "THWN".

E. Plates for toggle switches and receptacles shall have gasketed snap shut covers suitable for wet locations while in use.

F. Final connections of flexible conduit shall be neoprene sheathed.

G. Apply one layer of half looped plastic electric insulating tape over wire nuts used for joining the conductors of wires.

H. Enclosures, junction boxes, pull boxes, cabinets, cabinet trims, wiring troughs and the like, shall be fabricated of galvanized sheet metal, shall conform to the following:

1. They shall be constructed with continuously welded joints and seams.
2. Their edges and weld spots shall be factory treated with cold galvanizing compound.
3. Their connection to circuitry shall be by means of watertight hub connectors with sealing rings.

I. Enclosures for individually mounted switching and overcurrent devices shall be NEMA Class IV weatherproof construction.

J. The covers, doors and plates and trims used in conjunction with all enclosures, pull boxes, outlet boxes, junction boxes, cabinets and the like shall be equipped with gaskets.

K. Panels shall be equipped with doors without exception.

L. The following shall be interpreted as damp or wet locations within building confines:

1. Spaces where any designations indicating weatherproof (WP) or vapor-proof appear on the drawings.
2. Below waterproofing in slabs applied directly on grade.
3. Spaces defined as wet or damp locations by article 100 of the National Electric Code.

3.11 UNDERGROUND CONDUIT BANKS

A. The electrical work required in conjunction with underground conduit banks shall include providing all conduits.

B. Conduits for underground banks shall be:

1. Trade diameter size as indicated but in no case less than one inch.

2. Polyvinyl chloride Schedule 40 (approved for encased burial) duct, rigid steel conduit for vertical elbows and straight sections used to penetrate equipment pads, building foundation walls and concrete slabs.

C. All conduits indicated as being incorporated into conduit banks unless specifically noted as rigid steel conduits shall be encased in a concrete envelope which accommodates the indicated configuration of conduits and which encompasses dimensions as follows:

1. Outside surfaces of conduits to outside surface of envelope where reinforcement of encasement is required - 6" minimum.

2. Outside surfaces of conduits to outside surface of envelope where no reinforcement of encasement is required - 3" minimum.

3. Spacing between centerlines of conduits assigned to different categories of use primary feeders, secondary feeders, communications, and signaling - 10-1/2" minimum.

4. Spacing between centerlines of conduits assigned to the same category of use - 7-1/2" minimum.

D. Reinforcement of the concrete encasement for conduit banks where required shall consist of No. 4 longitudinal reinforcing bars located 3" in from the outside surface of the envelope and spaced 6" on centers all around. No. 8 wire reinforcing hoops set 8" apart shall be used to tie the longitudinal bars together.

E. Install conduit in such a manner as to provide a minimum cover of 30 inches after final grading except the cover may be reduced to a minimum of 18 inches to:

1. Tie into existing work.
2. Pass over other underground utilities.
3. Pass over underground obstructions.

4. Assist in the avoidance of low points.

F. Increase the minimum cover where required by field conditions.

G. Lay conduit to avoid low points during run. Pitch at a minimum of three inches per 100 feet away from building.

H. Provide reinforcement for the concrete encasement of a conduit bank where:

1. It passes under or over other underground utilities.
2. It passes under or over underground obstructions.
3. Its cover is reduced to less than 30 inches.
4. It runs through foundation walls and other building construction.

I. Concrete encasement reinforcing shall extend in each case five feet beyond the points at which the determining conditions terminate.

J. Bends in conduit shall have minimum radii as follows:

1. For primary feeder 15'-0" except where specifically indicated otherwise or where turning up at termination point.
2. For primary feeder turning up at termination point - 4'-0".

K. Install conduit so that adjacent joints are staggered at least six inches from one another.

L. Offsets to accommodate field conditions shall be accomplished with two bends of not more than ten degrees each.

M. Plug both ends of all conduit stubs.

N. Seal the end of each conduit run terminating inside a building utilizing a water and gas-tight sealant manufactured specifically for the purpose. All conduits shall be water tight and tested prior to concrete pour.

O. After conduit has been installed with concrete encasement completed, clear each conduit of all obstructions and foreign matter by pulling a flexible mandrel (12" minimum length and a diameter 1/4" less than that of the conduit) and brush through it. In the event that obstructions are encountered in any conduit which will not permit the mandrel to pass, remove and replace the blocked section. Include in the electric work all excavation, backfilling, repair of concrete encasement and restoration of surface at grade involved in the conduit replacement.

P. Provide a nylon cord for the pulling of cable in each conduit in which no cable is to be installed as part of the electric work.

Q. The Electrical Subcontractor shall provide all insulated racks as required for proper support of all cables and wires.

R. Provide a continuous nylon warning tape above each full length of duct bank 12 inches below grade.

3.12 IDENTIFICATION AND TAGGING

A. Identify individually:

1. Each transformer.
2. Each panelboard.
3. Each switch and circuit breaker.
4. Each feeder, wire or cable of all systems.
5. Each switchboard.
6. Each end of nylon pullwire in empty conduit.
7. Each generator.
8. Each transfer switch.
9. Each outlet.

B. Each wire or cable in a feeder shall be identified at its terminal points of connection and in each pullbox, junction box and panel gutter through which it passes.

C. The nomenclature used to identify panelboards or load center shall designate the numbers assigned to them.

D. The nomenclature used to identify switches or circuit breakers shall:

1. Where they disconnect mains or services designate this fact.
2. Where they control feeders, designate the feeder number and the name of the load supplied.
3. Where they control lighting and appliance branch circuitry, designate the name of the space and the load supplied.

E. The nomenclature used to identify feeder wires and cables shall designate the feeder number.

F. Identification for panelboards or load centers shall be by means of engraved lamacoid nameplates showing 1/4" high white lettering on a black background fastened to the outside face of the front.

G. Identification for switches or circuit breakers shall be by means of the following:

1. Where individually enclosed -- engraved lamacoid nameplates showing 1/8" high white lettering on a black background fastened on the outside front face of the enclosure.
2. Where in panelboards or load centers without doors -- same as for individually enclosed.
3. Where in panelboards or load centers with doors -- typewritten directories mounted behind transparent plastic covers, in metal frames fastened on the inside face of the doors.

H. Identification for wires and cables shall be by means of wrap around "brady" type labels.

I. Device plates for local toggle switches, toggle switch type motor starters, pilot lights and the like, whose function is not readily apparent shall be engraved with 1/8" high letters suitably describing the equipment controlled or indicated.

J. These identification letters shall be stamped into the metal of the bus bars of each phase of the main busses of each switchboard and each panelboard. The letters shall be visible from at least one "normal posture" location without having to demount any current carrying or supporting elements.

K. Equip the front face of all switchboard pull boxes junction boxes and the like containing

cables, busing or devices operating in excess of 600 volts with enameled sheet metal "red on white" signs reading "DANGER--HIGH VOLTAGE."

L. Equip all electric closets and the like with enameled sheet metal "red on white" signs reading "Electrical Equipment Room -- No Storage Permitted." Signs shall be mounted at clearly visible locations within the rooms.

M. Provide a sign at the service entrance equipment room indicating the type and location of all on site emergency or standby power sources.

N. Identify each outlet box, junction box, and cabinet used in conjunction with empty raceway for wires of a future system by means of indelible markings on the inside denoting the system.

O. Prior to installing identifying tags and nameplates, submit their nomenclature for approval. Conform to all revisions issued by the Architect.

3.13 LIMITING NOISE PRODUCED BY ELECTRICAL INSTALLATION

A. Perform the following work, in accordance with field instructions issued by the Architect to assure that minimal noise is produced by electrical installations due to equipment furnished as part of the electrical work.

B. Check and tighten the fastenings of sheet metal plates, covers, doors and trims used in the enclosures of electrical equipment.

C. Remove and replace any individual device containing one or more magnetic flux path metallic cores (e.g., discharge lamp ballast, transformer, reactor, dimmer, solenoid) which is found to have a noise output exceeding that of other identical devices installed at the project.

3.14 SUPPORTS AND FASTENINGS

A. Support work in accordance with best industry standards and Mass. Electric Code.

B. Include supporting frames or racks for equipment, intended for vertical surface mounting, which is required in a free standing position.

C. Supporting frames or racks shall be of standard angle, standard channel or specialty support system steel members. They shall be rigidly bolted or welded together and adequately braced to form a substantial structure. Racks shall be of ample size to assure a workmanlike arrangement of all equipment mounted on them.

D. No work intended for exposed installation shall be mounted directly on any building surface. In such locations, flat bar members or spacers shall be used to create a minimum of 1/4" air space between the building surfaces and the work. Provide 3/4" thick exterior grade plywood painted with two coats of fire-retardant gray paint for mounting of panelboards.

E. Nothing (including outlet, pull and junction boxes and fittings) shall depend on electric conduits, raceways or cables for support.

F. Nothing shall rest on, or depend for support on, suspended ceiling media.

G. Support less than 2" trade size, vertically run, conduits at intervals no greater than 8 ft. Support such conduits, 2-1/2" trade size or larger, at intervals no greater than the story height, or 15 ft., whichever is smaller.

H. Where they are not embedded in concrete, support less than 1" trade size, horizontally run, conduits at intervals no greater than 7 ft. Support such conduits, 1" trade size or larger, at intervals no greater than 10 ft.

I. Support all lighting fixtures directly from structural slab, deck or framing member.

J. Where fixtures and ceilings are such as to require fixture support from ceiling openings frames, include in the electric work the members necessary to tie back the ceiling opening frames to ceiling suspension members or slabs so as to provide actual support for the fixtures noted above.

K. As a minimum procedure, in suspended ceilings support small runs of circuitry (e.g., conduit not in excess of 1 inch trade size) from ceiling suspension members as defined above. Support larger runs of circuitry directly from structural slabs, decks or framing members.

L. Fasten electric work to building structure in accordance with the best industry practice.

M. Floor mounted equipment shall not be held in place solely by its own dead weight. Include floor anchor fastenings in all cases.

N. For items which are shown as being ceiling mounted at locations where fastenings to the building construction element above is not possible, provide suitable auxiliary channel or angle iron bridging tying to building structural elements.

O. As a minimum procedure, where weight applied to the attachment points is 100 lbs. or less, fasten to concrete and solid masonry with bolts and expansion shields.

P. As a minimum procedure, where weight applied to building attachment points exceeds 100 lbs., but is 300 lbs. or less, conform to the following:

1. At field poured concrete slabs, utilize inserts with 20' minimum length slip-through steel rods, set transverse to reinforcing steel

3.15 SPLICING AND TERMINATING WIRES AND CABLES

A. Maintain all splices and joints in removable cover boxes or cabinets where they may be easily inspected.

B. Locate each completed conductor splice or joint in the outlet box, junction box, or pull box containing it, so that it is accessible from the removal cover side of the box.

C. Join solid conductors No. 8 AWG and smaller by securely twisting them together and soldering, or by using insulated coiled steel spring "wire nut" type connectors. Exclude "wire nuts" employing non-expandable springs. Terminate conductors No. 8 AWG and smaller by means of a neat and fast holding application of the conductors directly to the binding screws or terminals of the equipment or devices to be connected.

D. Join, tap and terminate stranded conductors No. 6 AWG and larger by means of solder

sleeves, taps; and lugs with applied solder or by means of bolted saddle type or pressure indent type connectors, taps and lugs. Exclude connectors and lugs of the types which apply set screws directly to conductors. Where equipment or devices are equipped with set screw type terminals which are impossible to change, replace the factory supplied set screws with a type having a ball bearing tip. Apply pressure indent type connectors, taps and lugs utilizing tools manufactured specifically for the purpose and having features preventing their release until the full pressure has been exerted on the lug or connector.

E. Except where wire nuts are used, build up insulation over conductor joints to a value, equal both in thickness and dielectric strength, to that of the factory applied conductor insulation. Insulation of conductor taps and joints shall be by means of half-lapped layers of rubber tape, with an outer layer of friction tape; by means of half-lapped layers of approved plastic electric insulating tape; or by means of split insulating casings manufactured specifically to insulate the particular connector and conductor, and fastened with stainless steel or non-metallic snaps or clips.

F. Exclude splicing procedures for neutral conductors in lighting and appliance branch circuitry which utilize device terminals as the splicing points.

G. Exclude joints or terminations utilizing solder in any conductors used for grounding or bonding purposes.

H. Exclude all but solder or pressure indent type joints in conductors used for signaling or communications purposes.

I. Lugs for conductors used to make phase leg connections on the line side of the main service overcurrent and switching device shall be of the limiter type.

3.16 PULLING WIRES INTO CONDUITS AND RACEWAYS

A. Delay pulling wires or cables in until the project has progressed to a point when general construction procedures are not liable to injure wires and cables, and when moisture is excluded from raceways.

B. Utilize nylon snakes or metallic fish tapes with ball type heads to set up for pulling. In raceways 2" trade size and larger, utilize a pulling assembly ahead of wires consisting of a suitable brush followed by a 3-1/2" diameter ball mandrel.

C. Leave sufficient slack on all runs of wire and cable to permit the secure connection of devices and equipment.

D. Include circular wedge-type cable supports for wires and cables at the top of any vertical raceway longer than 20 feet. Also include additional supports spaced at intervals which are no greater than 10'. Supports shall be located in accessible pull boxes. Supports shall be of a nondeteriorating insulating material manufactured specifically for the purpose.

E. Pulling lubricants shall be used. They shall be products manufactured specifically for the purpose.

F. Slack on wires and cables located in cabinets and pull boxes shall be formed and set in place in groupings corresponding to their occupancy of raceways. They shall also be arranged, with insulators and supports provided where necessary, such that cable shims or other such temporary expedients do not have to be left permanently in place to prevent

the wires and cables from shifting when covers or trims are removed.

3.17 REQUIREMENTS FOR THE INSTALLATION OF JUNCTION BOXES, OUTLET BOXES AND PULL BOXES

A. Flush wall mounted outlet boxes shall not be set back to back but shall be offset at least 24" horizontally regardless of any indication on the drawings.

B. Locate all boxes so that their removable covers are accessible without necessitating the removal of parts of permanent building structure, including piping, ductwork, and other permanent mechanical elements.

C. In conjunction with concealed circuitry, abide by one of the following instructions (as may be applicable to the conditions) in order to assure the aforementioned accessibility. (Not required for circuitry concealed by removable suspended ceiling tiles.)

1. For a small (outlet size) box on circuitry concealed in a partition or wall, locate box or fitting so that its removable cover side (or the face of any applied raised cover) penetrates through to within 1/8" a of the exposed surface of the building materials concealing the circuitry and apply a blank or device plate to suit the functional requirements.

2. For a large box on circuitry concealed in a partition, suspended ceiling, or wall, locate box totally hidden but with its removable cover directly behind an architectural access door or panel (included for the purpose, separate from the electric work) in the building construction which conceals the circuitry.

3. For a small (outlet size) box on circuitry concealed above and intended as an outlet for a surface mounted lighting fixture or other such electrical item, locate box so that its removable cover side penetrates through to the exposed surface of the building materials concealing the circuitry. Arrange the mounting of the lighting fixture or other item so that it completely covers the opening in the building construction caused by the box.

4. For a small (outlet size) box on circuitry concealed in a suspended ceiling, and intended as an outlet for a non-demountable type of recessed lighting fixtures or other such electrical items, locate box totally hidden but with its removable cover not more than one foot away from the building construction opening occupied by the demountable items.

D. Apply junction and pull boxes in accordance with the following:

1. Include pull boxes in long straight runs of raceway to assure that cables are not damaged when they are pulled in.

2. Include junction and pull boxes to assure a neat and workmanlike installation of raceways.

3. Include junction and pull boxes to fulfill requirements pertaining to the limitations to the number of bends permitted in raceway between cable access points, the accessibility of cable joints and splices, and the application of cable supports.

4. Include all required junction and pull boxes regardless of indications on the drawings (which, due to symbolic methods of notation, may omit to show some of them).

E. Apply outlet boxes in accordance with the following:

1. Unless noted below or otherwise specifically indicated, include a separate outlet box for each individual wiring device, lighting fixture and signal or communication system outlet component. Outlet boxes supplied attached to lighting fixtures shall not be used as replacements for the boxes specified herein.

2. A continuous row of fixtures of the end-to-end channel type, designed for "through wiring," and wired in accordance with the specification hereinafter pertaining to circuitry through a series of lighting fixtures, may be supplied through a single outlet box.

3. A series of separate fixtures, designed for "through wiring," spaced not more than 4' apart, and inter- connected with conduit or raceway and circuitry which is in accordance with the specifications hereinafter pertaining to circuitry through a series of lighting fixtures, may be supplied through a single outlet box.

4. Connection to recessed ceiling fixtures supplied with pigtails may be arranged so that more than one, but not more than four, such fixtures are connected into a single outlet box. When adopting this procedure:

   a. Utilize an outlet box no smaller than 5" square by 2-1/2" deep.
   b. Allow no fixture to be supplied from an outlet box in another room.

5. Multiple local switches indicated at a single location shall be gang mounted in a single outlet box.

6. Include all required outlet boxes regardless of indications on the drawings (which due to symbolic methods of notation, may omit to show some of them).

F. Install junction boxes, pull boxes and outlet boxes in accordance with the following:

1. Exclude surface mounted outlet boxes in conjunction with concealed circuitry.

2. Exclude unused circuitry openings in junction and pull boxes. In larger boxes each such opening shall be closed with a galvanized sheet steel plate fastened with a continuous weld all around. In small outlet type boxes, utilize plugs as specified for such boxes.

3. Close up all unused circuitry openings in outlet boxes. Unused openings in cast boxes shall be closed with approved cast metal threaded plugs. Unused openings in sheet metal boxes shall be closed with sheet metal knock-out plugs.

4. Outlet boxes for switches shall be located at the strike side of doors. Indicated door swings are subject to field change. Outlet boxes shall be located on the basis of final door swing arrangements.

5. Boxes and plaster covers for duplex receptacles shall be arranged for vertical mounting of the receptacle.

6. Equip outlet boxes used for devices which are connected to wires of systems supplied by more than one set of voltage characteristics with barriers to separate the different systems.

G. Barriers in junction and pull boxes of outlet size shall be of the same metal as the box.

H. Barriers in junction and pull boxes which are larger than outlet size shall be of the polyester resin fiberglass of adequate thickness for mechanical strength, but in no case less than 1/4" thick. Each barrier shall be mounted, without fastenings, between angle iron guides so that they may be readily removed.

3.18 LOCATING AND ROUTING OF CIRCUITRY

A. In general, all circuitry shall be run concealed except that it shall be run exposed where the following conditions occur:

1. Horizontally at the ceiling of permanently unfinished spaces which are not assigned to mechanical or electrical equipment.
2. Horizontally and vertically in mechanical equipment spaces.
3. Horizontally and vertically in electric equipment rooms.

B. Concealed circuitry shall be so located that building construction materials can be applied over its thickest elements without being subject to spalling or cracking.

C. All circuitry and raceways shall not be run within slabs. If for field conditions requires raceways to be embedded in field poured structural building construction concrete fill or slab shall conform to the following:

1. All proposed embedded raceways shall be indicated on plan and elevation and submitted to the Architect and Structural Engineer for review and written approval prior to installation. Any costs associated with the review and approval shall be borned by the Electrical Subcontractor.

2. They shall be run "single layer" with their outside surface no closer than 1" to any surface of the structural concrete.

3. They shall not be located in any configuration which places the outside surface of one closer than 3" to the outside surface of another, except at tees, crosses or other single level wide angle junction points.

4. Where crossovers or close grouping are unavoidable, circuitry shall be carefully field coordinated so as not to cause structural weakness.

5. Where turned up or down into a wall or partition they shall, before entering same, be routed parallel for a long enough distance to assure that no relocation of the wall or partition will be necessary to conceal the required bend.

6. They shall be routed in such a manner as to coordinate with the structural requirements of the building.

7. They shall be routed in accordance with field instructions issued by the Architect where such instructions differ from specifications set forth herein.

D. Circuitry run exposed shall be routed parallel to building walls and column lines.

E. Exposed circuitry located overhead shall be run in a completely accessible manner on the underside of all piping and ductwork.

F. Circuitry run in suspended ceilings shall be routed parallel to building walls, column lines, etc.

G. Circuitry shall be routed so as to prevent electric conductors from being subject to high ambient temperature. Minimum clearances from heated lines or surfaces shall be maintained as follows:

1.	Crossing where uninsulated	3"
2.	Crossing where insulated	1"
3.	Running parallel where uninsulated	36"
4.	Running parallel where insulated	6"

H. Circuitry shall not be run in elevator shafts, hoistways, and the like. Where outlets for trail cables, pit lights, run be level lights, and the like, are involved, only the "final connection" outlet boxes themselves shall be located within or open into, the confines of the shaft.

I. Circuitry for miscellaneous systems indicated without notation as to location and routing shall be run as per the requirements and notations governing the adjacent light and power circuitry.

END OF SECTION

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Section 31 66 14

HELICAL PILES

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

A. General Conditions, Supplementary Conditions and applicable parts of Division 1 form a part of this Specification and the Contractor shall consult them in detail for instructions.

B. The Drawings on which this Contract is based are listed in Section 04 20 00 - UNIT MASONRY. Consult all Drawings, note all conditions that may affect the Work and care for same in executing the Contract.

1.2 SUMMARY

A. The Work to be performed under this Section shall include furnishing all supervision, labor, materials and equipment to complete the installation of helical steel anchor piles as indicated on the drawings.

B. Related Sections include the following:

A. Section 01 45 00 - QUALITY CONTROL: Perform testing of masonry, mortar and grout specified herein.

B. Section 01 45 29 - TESTING LABORATORY SERVICES: Perform testing of masonry, mortar and grout specified herein.

C. Section 03 30 00 - CAST-IN-PLACE CONCRETE: Interface with concrete work.

1.3 SUBMITTALS

A. Product Data: For each type of product intended to be utilized in the installation.

B. Engineering data including the following, stamped by a registered professional engineer:

1. Pile layout with each pile indentified by a separate number.
2. Proposed cut-off elevation.
3. Description of lead section and extension if installed.
4. Design capacity of pile.
5. Minimum pile depth.
6. Calculations for installation requirements, including torque and anticipated depth.

C. Official Code Evaluation Report with assigned number for the helical piles.

D. As Built Information, stamped by a registered professional engineer.

1. Pile layout.
2. Elevation at each anchor tip.
3. Elevation of cut-off.
4. Description of lead section and extension installed.
5. Finished torque.
6. Distance, to the nearest ½", of the as-constructed location of the center of the pile in relation to its design location.
7. Name of installers representative who witnessed the installation.

E. Certification letter from installer stating the design capacity meets the requirements indicated on the drawings.

F. All pile installation operations shall be supervised by a registered professional engineer. The engineer shall keep a complete record of pile installation operations.

1.4 QUALITY ASSURANCE

A. Installation to be performed by a trained and/or certified contractor or dealer who has satisfied the certification requirements relating to the technical aspects of the project and installation techniques.

1.5 DELIVERY, STORAGE, AND HANDLING

A. Helical Pile Materials: Deliver, store, and handle helical piles to prevent bending and damage.

PART 2 - PRODUCTS

2.1 MANUFACTURERS

A. In other Part 2 articles where titles below introduce lists, the following requirements apply to product selection:

1. Available Products: Subject to compliance with requirements, products that may be incorporated into the Work include, but are not limited to, products specified.
2. Available Manufacturers: Subject to compliance with requirements, manufacturers offering products that may be incorporated into the Work include, but are not limited to, manufacturers specified.

2.2 MATERIALS

A. Helical Piles: Square or round galvanized steel shaft conforming to the International Building Code.

B. Foundation Lead Section: Square or round shaft with helical formed plates welded to it. The shaft shall be solid steel with ASTM A153 hot dipped galvanized coating. Helical sizes to be determined by the installer based on the required design capacity of the pile. The lead section unit is the load carrying element of the foundation that transfers the load to the soil.

C. Termination End: Square or round steel stock with hot-dipped galvanized coating. Each extension is to be provided with a means for coupling to the lead or to another extension. Provide proper hot-dipped galvanized bolts and nuts for each coupling.

D. All material shall be hot-dipped galvanized in accordance with ASTM A153. All galvanizing of welded areas shall be cleaned and coated with two coats of approved cold-formed galvanizing compound.

PART 3 - EXECUTION

3.1 INSTALLATION

A. Use equipment that will minimize environmental impact on the site.

B. Prior to installation, ensure that all underground services have been located, marked and indentified by the proper authorities.

C. Installation of all helical steel anchor piles shall be done under the supervision of a professional engineer retained by the installer.

D. Installation equipment shall be capable of installing helical piles with maximum torque capability. Installation units shall consist of rotary type, torque motor with forward and reverse capability. Installation equipment shall be in good working order and safe to operate.

E. Adapters shall be employed to safely connect the installation units to the helical steel piles.

F. Provide torque monitoring device as part of the installation unit or as a separate in-line device capable of recording torque or line pressure. Calibrated torque monitoring data should be made available for review by the project engineer. Torque shall be monitored during the entire installation.

3.2 INSTALLATION PROCEDURE

A. Installation of helical anchor piles shall begin in the vertical position. Throughout the installation, constant down pressure shall be maintained and torque shall be applied in a smooth, continuous manner. The rate of anchor pier rotation shall be in the range of 3 to 20 revolutions per minute.

1. If the minimum torque requirement has not been satisfied at the minimum depth, the installer shall continue installation using additional extension material until specified minimum torque level is obtained.
2. If the minimum torque rating has been satisfied prior to satisfying the minimum depth requirement, the installer shall continue installation to minimum depth requirement or terminate installation of maximum torque is recorded prior to reaching minimum depth.

3.3 BIDS

A. Helical steel anchor piles shall be driven to the specified minimum torque required to meet the specified design load.

B. If underground obstructions are encountered during installation, contractor shall remove and relocate the anchor pile. If the anchor pile is damaged and cannot be reused, additional pile shall be driven at a new location. The engineer shall provide the new location of the anchor pile.

C. Piles that are damaged due to mishandling during installation by the contractor shall be replaced with new piles at the contractor's expense.

D. When piles are installed out of design location without approval or out of plumb, and/or rejected by the professional engineer, the contractor shall without cost to the Owner, perform all extra work required to make the installation comply with the requirements of the project specification. This may require additional piers and/or increases or changes in the size and shape of the pier cap. The costs shall be borne by the contractor in addition to the new piers shall include all extra excavation, backfill formwork, reinforcing, concrete, equipment, redesign, structural calculations and drawing revisions.

END OF SECTION

Section 32 12 16

ASPHALT PAVING

PART 1 - GENERAL

1.1 SECTION INCLUDES

A. Cut and patch existing bituminous concrete paving.

1. Replacement of all existing bituminous pavements disturbed by the work of this Contract. Resurfacing will not be strictly limited to areas disturbed, when in judgment of the Architect an expansion of the work is necessary for proper restoration.

1.2 RELATED SECTIONS

A. Division 31 - EARTHWORK: Rough grading and compacted subbase for paving.

1.3 REFERENCE STANDARDS AND SPECIFICATIONS

A. Bituminous concrete shall be prepared, mixed, transported, placed, compacted and finished in accordance with the requirements set forth in the “Standard Specifications for Highways and Bridges”, latest edition, as published by the Commonwealth of Massachusetts, Department of Public Works. This document shall be hereby referred to as the “Standard Specifications”.

1.4 REFERENCES

A. Comply with applicable requirements of the following standards and those others referenced in this Section, under the provisions of Section 01 42 00 - REFERENCES.

1. ANSI/ASTM C 136 - Method of Sieve Analysis of Fine and Coarse Aggregates.
2. ASTM D 946 - Penetration-Graded Asphalt Cement for Use in Pavement Construction.
3. AI MS-2 - Mix Design Methods for Asphalt Concrete and Other Hot Mix Types.
4. AI MS-3 - Asphalt Plant Manual.
5. AI MS-8 - Asphalt Paving Manual.
6. AI MS-19 - Basic Asphalt Emulsion Manual.

1.5 SUBMITTALS

A. Submit the following under provisions of Section 01 30 00 - SUBMITTALS:

1. Mix: Job mix formula, listing quantities and pertinent ingredient properties.

1.6 QUALITY ASSURANCE

A. Installer specializing in applying the work of this Section with a minimum of 3 years documented experience.

B. Check surface areas for thickness of course and flatness at regular intervals. Repair, or remove and replace, irregularities exceeding the tolerances specified herein, or which retain water on surface.

1.7 LAYOUT AND GRADES

A. All lines and grade work not presently established at the site shall be laid out by a registered Land Surveyor employed by the Contractor.

1.8 PROJECT CONDITIONS

A. Do not apply prime and tack coats when temperature is below 50 degrees Fahrenheit, or when the temperature has fallen below 35 degrees Fahrenheit during the previous 12 hours to installation. Do not apply prime and tack coats when base is wet, contains an excess amount of moisture, or is frozen.

B. Apply asphalt concrete paving only when temperature is above 40 degrees Fahrenheit and when base is dry. Base course may be placed when air temperature is above 32 degrees Fahrenheit and is rising.

PART 2 - PRODUCTS

2.1 PAVING MATERIALS

A. Bituminous pavement shall be composed of locally available materials and aggregate gradations, and conform to the requirements of the Standard Specifications, for Class I Bituminous Concrete, Type I-1 in accordance with Section 460.

B. Bituminous cold patching materials shall conform to the requirements of the Standard Specifications.

2.2 ASPHALT MIX

A. Use dry material to avoid foaming. mix uniformly.

B. Binder course: Mix 4.5 to 5.5 percent of asphalt cement by weight in mixture in accordance with AASHTO T 195.

PART 3 - EXECUTION

3.1 EXAMINATION

A. Inspect all surfaces and verify that they are in proper condition to receive the work of this Section.

B. Beginning of installation means acceptance of existing substrate and site conditions.

3.2 PREPARATION

A. Lay gravel base to tolerances specified, layers shall be 6 inches thick, over repaired parking areas it shall be the depth of existing base course, but not less than 6 inches.

B. Do all necessary grading in addition to that specified under Division 31 - EARTHWORK to bring dense graded crushed stone to required grades and sections, after compaction, for asphalt paving.

C. Tamp traces of trenches, remove spongy or otherwise unsuitable material and replace with approved material. Loosen exceptional hard spots and recompact. Compact to form a firm and base of uniform bearing to requirements of the Standard Specifications.

1. Maintain sub-base in satisfactory condition and properly drained until surfaces are place.
2. Do not begin paving work until deficient substrate areas have been corrected and are ready to receive paving.

D. In areas where new pavement abuts existing pavement: Saw cut existing pavement in a straight line at a 45 degree angle to the vertical in such a manner that all existing loose or cracked areas of pavement are removed.

E. Recut the edges of pavement previously cut pavement which have become damaged during excavation and backfilling and grade the previously placed gravel base courses to the specified thickness.

F. Existing paved surfaces on which new pavement is to be placed shall be swept clean of all debris and loose materials.

G. All joints at existing paving and new top pavement surfaces shall be sealed with thin coat of bitumen and sand immediately before placing new pavement This is to include roadways, walkways, parking areas and any other paved areas encountered in the work of this Section.

H. Provide joints between successive days' work for continuous bond between adjoining work.

I. Remove loose material from compacted sub-base surface immediately before applying binder course.

3.3 CUTTING AND PATCHING AT TRENCHES AND MINOR EXCAVATION.

A. Cut existing paving by an approved mechanical means before any excavation is started to insure against unnecessary damage to pavement.

B. Backfill trenches with common fill as specified in Division 31 - EARTHWORK. Place in 6 inch layers and thoroughly compact to 95 percent of the maximum dry density by mechanical means.

C. Cold patch when direct by the Architect over backfilled trenches. Compact by mechanical tamping or approved wheel rolling methods to provide a compacted depth of 2 inches. Prior to placing the cold patch, the backfill shall be graded to provide a 1 inch crown.

D. Level the top surface of patched trenches with the existing pavements in a safe and satisfactory condition for vehicular use until the completion of the Work of this Contract or placement of permanent patching has been completed.

3.4 PLACING BITUMINUOUS CONCRETE MIX

A. General: Place asphalt concrete mixture on prepared surface, spread and strike-off. Spread mixture at minimum temperature of 225 degrees Fahrenheit. Place inaccessible and small areas by hand.

B. Place paving in two individual courses, binder course and top course, to required grade, cross-section, and compacted thicknesses as indicated in the Drawings, and to the specified tolerances.

1. In areas requiring build-up of multiple layers of paving over existing to meet indicated grading, Place in maximum loose lifts not to exceed 3 inches.

3.5 ROLLING

A. General: Begin rolling when mixture will bear roller weights without displacement or extruding pavement from position.

B. Compact mixture with hot hand tampers or vibrating plate compactors in areas inaccessible to rollers.

C. Breakdown Rolling: Accomplish breakdown or initial rolling immediately following rolling of joints and outside edge. Check surface after breakdown rolling, and repair displaced areas by loosening and filling, if required, with hot material.

D. Second Rolling: Follow breakdown rolling as soon as possible, while mixture is hot. Continue second rolling until mixture has been thoroughly compacted.

E. Finish Rolling: Perform finish rolling while mixture is still warm enough for removal of roller marks. Continue rolling with consecutive passes to achieve even and smooth finish, and until course has attained maximum density. Finish the surface smooth without cracks, ridges or depressions.

F. Protection: After final rolling, erect barricades do not permit vehicular traffic on pavement until it has cooled and hardened.

3.6 TOLERANCES

A. Compacted thickness:
   1. Binder course: Between 1/2-inch greater than, and 1/4-inch less than required thickness.
   2. Top course: Within 1/4-inch of required thickness, plus or minus.

B. Flatness: Variations in smoothness of surfaces shall be less than or equal to the following tolerances when tested with 10 foot straightedge applied parallel with, and at right angles to center line of paved area.
   1. Base course surface: 1/4-inch.
   2. Wearing course surface: 3/16-inch.

C. Variation from true elevation within 1/2-inch.

3.7 REPAIR PATCHING AND ABUTTING EXISTING PAVING

A. Existing pavement under state or local jurisdiction shall, if damaged or removed during the course of this project, be repaired or replaced under this Section of the Specifications in conformance with applicable codes, standards and practices.

B. Repair and replace existing paving areas damaged or removed during this Project. Workmanship and materials for such repair shall be as specified under this Section.

C. In areas where new pavement abuts existing pavement or where existing pavement requires patching due to removal of existing pavement for work under this Contract, paving work shall be as follows:
   1. Saw cut existing pavement in a straight line at a 45 degree angle to the vertical in such a manner that all existing loose or cracked areas of pavement are removed. Paint edges of existing pavement with a thin coat of bitumen immediately before placing new pavement.

2. Asphalt concrete pavement shall be installed as specified herein. Match existing paving course thickness; provide a smooth transition of surfaces.

End of Section

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Section 32 31 13

CHAIN LINK FENCES AND GATES

PART 1 - GENERAL

1.1 SECTION INCLUDES

A. Furnish and install the following:

1. Fence framework, fabric, and accessories.
2. Concrete foundation for posts.
3. Manual gates and related hardware.

1.2 RELATED SECTIONS

A. Section 03 30 00 - CAST-IN-PLACE CONCRETE: Concrete anchorage for posts.

1.3 REFERENCES

A. Comply with applicable requirements of the following standards and those others referenced in this Section, under the provisions of Section 01 42 00 - REFERENCES. Where these standards conflict with other specified requirements, the most restrictive requirements shall govern.

1. ASTM A 116 - Zinc-Coated (Galvanized) Steel Woven Wire Fence Fabric.
2. ASTM A 120 - Pipe, Steel, Black and Hot-Dipped Zinc Coated (Galvanized) Welded and Seamless, for Ordinary Uses.
3. ASTM A 123 - Zinc (Hot Dip Galvanized) Coatings on Iron and Steel Products.
4. ASTM A 153 - Zinc Coating (Hot-Dip) on Iron and Steel Hardware.
5. ASTM A 392 - Zinc-Coated Steel Chain-Link Fence Fabric.
6. ASTM A 569 - Steel, Carbon (0.15 Maximum Percent), Hot-Rolled Sheet and Strip and Commercial Quality.
7. ASTM C 94 - Ready-mixed Concrete.
8. ASTM F 567 - Installation of Chain-Link Fence.
9. ASTM F 573 - Residential Zinc-Coated Steel Chain Link Fence Fabric.
10. FS RR-F-191 - Fencing, Wire, and Post Metal (and Gates, Chain Link Fence Fabric, and Accessories).
11. CLFMI Product Manual.

1.4 SYSTEM DESCRIPTION

A. Fence Height: Match existing.

B. Line post spacing: At intervals not exceeding 10 feet.

1.5 SUBMITTALS

A. Submit the following under provisions of Section 01 33 00 - SUBMITTAL PROCEDURES:

1. Literature: Manufacturer's product data sheets, specifications, physical properties for each item furnished hereunder, including, but not limited to: fence fabric, posts, accessories, fittings and hardware.

2. Instructions: Manufacturer's installation instructions and post foundation anchor bolt templates.
3. Warranty: Provide sample copies of manufacturers' actual warranties for all materials to be furnished under this Section, clearly defining all terms, conditions, and time periods for the coverage thereof.
4. Shop drawings: Indicate plan layout, spacing of components, post foundation dimensions, hardware anchorage, and schedule of components.
5. Selection samples: Sample card indicating Manufacturer's full range of colors available for selection by Architect.
6. Verification samples: 12 x 12 inch samples of fence fabric, illustrating construction.

1.6 QUALITY ASSURANCE

A. Perform work in accordance with CLFMI - Product Manual and Manufacturer's recommendations.

1.7 QUALIFICATIONS

A. Manufacturer, with a minimum of 3 years documented experience demonstrating previously successful work of the type specified herein.

1.8 DELIVERY, STORAGE AND HANDLING

A. Do not deliver items to the site, until all specified submittals have been submitted to, and approved by, the Architect.

B. Store all materials in an elevated dry location, protected by waterproof coverings.

1.9 FIELD MEASUREMENTS

A. Take field measurements before preparation of shop drawings and fabrication, where possible, to ensure proper fitting of Work.

B. Allow for adjustments within specified tolerances wherever taking of field measurements before fabrication might delay Work.

1.10 WARRANTY

A. Provide 5 year warranty under provisions of Section 01 78 00 - CLOSEOUT SUBMITTALS:

PART 2 - PRODUCTS

2.1 COMPONENTS

A. General: Conform to CLFMI Product Manual.

B. Framing Components:
1. Line (intermediate) posts: 1.9 inch diameter, CLFMI classification type "I" round (ASTM A 120, schedule 40 steel pipe, hot-dipped galvanized in accordance with ASTM F 1093 - standard weight), one piece without joints.
2. Terminal and corner posts: 2.38 inch diameter, CLFMI classification type II round.
3. Gate posts: 2.38 inch diameter, CLFMI classification type II round.

4. Top and brace rail: 1.66 inch diameter, CLFMI classification type II round, with plain end and sleeve coupled.
5. Gate frame: 1.66 inch diameter CLFMI classification type II round, for fittings and truss rod fabrication.

C. Fabric: ASTM A 392 zinc coated steel wire fabric, Class 2 coated (weighing not less than 2 ounces per square foot of uncoated wire surface), CLFMI rated Standard Industrial, Heavy Residential, 9 gage 2 inch mesh size service.

D. Concrete: ASTM C 94, normal portland cement, 3000 psi strength at 28 days, 3 inch slump, 3/4 inch nominal sized coarse aggregate.

E. Tension wire: 6 gage thick steel, single strand.

F. Tie wire: Aluminum alloy steel wire.

2.2 ACCESSORIES

A. Caps: Cast steel galvanized, sized to post diameter, set screw retainer.

B. Fittings: Sleeves bands, clips, rail ends, tension bars, fasteners and fittings; steel.

C. Gate hardware: Mechanical keepers; two 180 degree gate hinges per leaf and hardware for padlock.

PART 3 - EXECUTION

3.1 EXAMINATION

A. Inspect all surfaces and verify that they are in proper condition to receive the work of this Section.

B. Beginning of installation means acceptance of existing project conditions.

3.2 INSTALLATION

A. Install framework, fabric, accessories and gates in accordance with ASTM F-567 and manufacturer's instructions.

B. Set intermediate, corner, gate and terminal posts plumb, in concrete footings with top of footing 6 inches below finish grade. Slope top of concrete for water runoff.

C. Line post footing depth below finish grade: 3 feet.

D. Corner, gate and terminal post footing depth below finish grade: 3 feet.

E. Brace each gate and corner post to adjacent line post with horizontal center brace rail [and diagonal truss rods]. Install brace rail, one bay from end and gate posts.

F. Provide top rail through line post tops and splice with 6 inch long rail sleeves.

G. Stretch fabric between terminal posts or at intervals of 100 feet maximum, whichever is less.

H. Position bottom of fabric 2 inches above finish grade.

I. Fasten fabric to top rail, line posts, braces, and bottom tension wire with tie wire at maximum 15 inches on centers.

J. Attach fabric to end, corner and gate posts with tension bars and tension bar clips.

K. Install bottom tension wire stretched taut between terminal posts.

L. Do not swing gate from building wall, provide gate posts.

3.3 TOLERANCES

A. Maximum variation from plumb or level: 1/4 inch.

B. Maximum offset from true dimensional alignment: 1 inch.

C. Components shall not infringe adjacent property lines.

3.4 TOUCH-UP

A. Galvanized finishes:

End of Section