

ELIZABETHTOWN FIRE DISTRICT



Fire Station Addition Woodruff Street, Elizabethtown, NY

PROJECT MANUAL

AES PROJECT NO. 4027

August 22, 2014

REVISED March 6, 2015

SET NO. _____

THE ARCHITECT CERTIFIES THAT TO THE BEST OF HIS KNOWLEDGE, INFORMATION, AND BELIEF; THE PLANS AND SPECIFICATIONS ARE IN CONFORMANCE WITH APPLICABLE REQUIREMENTS OF THE NEW YORK STATE UNIFORM FIRE PROTECTION AND BUILDING CODES.

PROJECT ENGINEER

PROJECT ARCHITECT



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ELIZABETHTOWN FIRE DISTRICT
FIRE STATION ADDITION
AES PROJECT NO. 4027

DOCUMENT 000110

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DOCUMENT 001116

INVITATION TO BID

Project: **Fire Station Addition**
Owner: **Elizabethtown Fire District**
Architect: **Architecture, Engineering, and Land Surveying Northeast, PLLC (AES Northeast)**
10-12 City Hall Place
Plattsburgh, NY 12901
Date: March 6, 2015

The Elizabethtown Fire District will receive bids, under seal, for the Fire Station Addition project located on Woodruff Street in Elizabethtown, New York. The Owner will receive Bids at the Essex County Purchasing Office located at 7551 Court Street, Elizabethtown, NY 12932 until **2:00 P.M. local standard time on Tuesday, the 31st day of March, 2015**, for the following project:

Description: Approximately 1,152 sq. ft. one story truck bay addition to existing Fire Station. Addition includes site, HVAC, electrical and plumbing work.

The project will be bid and awarded as a single-prime contract for General Construction (GC).

The Owner requires the Project to be completed in (120) calendar days from date of Notice to Proceed.

Contractors are required to pay construction workers New York State Prevailing Wages, included herewith.

Compact Disc (CD) Bidding Documents for a Stipulated Price single-prime contract may be obtained from the office of the Architect/Engineer upon receipt of a non-refundable deposit, by cash or check, in the amount of \$25 for one CD.

Documents can only be obtained by Bidders. Others may view the Bid Documents at the office of the Architect/Engineer.

Bidders will be required to provide Bid security in the form of a Bid Bond or certified check in the amount of a sum no less than 5 percent of the Bid Sum. The contractors will be required to provide 100% performance and payment bonds.

The Elizabethtown Fire District is exempt from sales tax.

Submit your Bid on the Bid Form provided.

A Pre-Bid conference will be held on **Tuesday, March 17, 2015 at 2:00 P.M.** to allow contractor's the opportunity to examine the work site.

Your Bid will be required to be submitted under a condition of irrevocability for a period of (45) days after submission.

The Owner reserves the right to accept or reject any or all Bids.

END OF DOCUMENT

ELIZABETHTOWN FIRE DISTRICT
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DOCUMENT 002114

INSTRUCTIONS TO BIDDERS - AIA

1.1 SUMMARY

- A. Document Includes:
 - 1. Instructions to Bidders.
 - 2. Site examination.
 - 3. Prebid conference.
- B. Related Documents:
 - 1. Document 001116 - Invitation to Bid.
 - 2. Document 004113 - Bid Form.
 - 3. Document 004300 - Procurement Form Supplements.
 - 4. Document 007313 - Supplementary Conditions – AIA.

1.2 INSTRUCTIONS TO BIDDERS

- A. These Instructions to Bidders amend or supplement AIA Document A701-1997 - Instructions to Bidders and other provisions of Bidding Documents and Contract Documents.

1.3 SITE EXAMINATION

- A. Examine the Project site before submitting a Bid.
- B. A visit to Project site has been arranged for Bidders at **2:00 P.M. on Tuesday, March 17, 2015.**

1.4 PREBID CONFERENCE

- A. A Bidders conference is scheduled for **2:00 P.M. on Tuesday, March 17, 2015** at the location of project site.
- B. Prime contractors and major subcontract Bidders are invited to attend.
- C. Representatives of the Owner and Architect/Engineer will be in attendance.
- D. Summarized minutes of this meeting will be circulated to known Bidders. These minutes will form part of Contract Documents, if included in an addendum.
- E. Information relevant to Bidding Documents will be issued by Addendum.

END OF DOCUMENT

Request for Clarification of Bid Documents

“RFC”

Instruction: Complete this form and FAX it to AES Northeast at (518) 561-1990; or email your request to jennabreyette@aesnortheast.com.

Today's Date _____

Contractor's Company Name and Address:

Contractor's Phone No.: _____

Contractor's Fax No.: _____

Drawing No. and Detail: _____

Specification Section: _____

Contract this Contractor is bidding (i.e. GC, W, M, P, E, SA, GPR)

Question or description of item needing clarification:

Name of Person asking question: _____



AIA[®] Document A701[™] – 1997

Instructions to Bidders

for the following PROJECT:

(Name and location or address)

Elizabethtown Fire District
Fire Station Addition
Wodruff Street
Elizabethtown, NY 12932

THE OWNER:

(Name, legal status and address)

Elizabethtown Fire District
PO Box 457, Woodruff Street
Elizabethtown, NY 12932

THE ARCHITECT:

(Name, legal status and address)

Architecture, Engineering, and Land Surveying Northeast, PLLC
10-12 City Hall Place
Plattsburgh, New York 12901

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ADDITIONS AND DELETIONS:

The author of this document has added information needed for its completion. The author may also have revised the text of the original AIA standard form.

A vertical line in the left margin of this document indicates where the author has added necessary information and where the author has added to or deleted from the original AIA text.

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

ARTICLE 1 DEFINITIONS

§ 1.1 Bidding Documents include the Bidding Requirements and the proposed Contract Documents. The Bidding Requirements consist of the Advertisement or Invitation to Bid, Instructions to Bidders, Supplementary Instructions to Bidders, the bid form, and other sample bidding and contract forms. The proposed Contract Documents consist of the form of Agreement between the Owner and Contractor, Conditions of the Contract (General, Supplementary and other Conditions), Drawings, Specifications and all Addenda issued prior to execution of the Contract.

§ 1.2 Definitions set forth in the General Conditions of the Contract for Construction, AIA Document A201, or in other Contract Documents are applicable to the Bidding Documents.

§ 1.3 Addenda are written or graphic instruments issued by the Architect prior to the execution of the Contract which modify or interpret the Bidding Documents by additions, deletions, clarifications or corrections.

§ 1.4 A Bid is a complete and properly executed proposal to do the Work for the sums stipulated therein, submitted in accordance with the Bidding Documents.

§ 1.5 The Base Bid is the sum stated in the Bid for which the Bidder offers to perform the Work described in the Bidding Documents as the base, to which Work may be added or from which Work may be deleted for sums stated in Alternate Bids.

§ 1.6 An Alternate Bid (or Alternate) is an amount stated in the Bid to be added to or deducted from the amount of the Base Bid if the corresponding change in the Work, as described in the Bidding Documents, is accepted.

§ 1.7 A Unit Price is an amount stated in the Bid as a price per unit of measurement for materials, equipment or services or a portion of the Work as described in the Bidding Documents.

§ 1.8 A Bidder is a person or entity who submits a Bid and who meets the requirements set forth in the Bidding Documents.

§ 1.9 A Sub-bidder is a person or entity who submits a bid to a Bidder for materials, equipment or labor for a portion of the Work.

ARTICLE 2 BIDDER'S REPRESENTATIONS

§ 2.1 The Bidder by making a Bid represents that:

§ 2.1.1 The Bidder has read and understands the Bidding Documents or Contract Documents, to the extent that such documentation relates to the Work for which the Bid is submitted, and for other portions of the Project, if any, being bid concurrently or presently under construction.

§ 2.1.2 The Bid is made in compliance with the Bidding Documents.

§ 2.1.3 The Bidder has visited the site, become familiar with local conditions under which the Work is to be performed and has correlated the Bidder's personal observations with the requirements of the proposed Contract Documents.

§ 2.1.4 The Bid is based upon the materials, equipment and systems required by the Bidding Documents without exception.

ARTICLE 3 BIDDING DOCUMENTS

§ 3.1 COPIES

§ 3.1.1 Bidders may obtain complete sets of the Bidding Documents from the issuing office designated in the Advertisement or Invitation to Bid in the number and for the deposit sum, if any, stated therein. The deposit will be refunded to Bidders who submit a bona fide Bid and return the Bidding Documents in good condition within ten days after receipt of Bids. The cost of replacement of missing or damaged documents will be deducted from the deposit. A Bidder receiving a Contract award may retain the Bidding Documents and the Bidder's deposit will be refunded.

§ 3.1.2 Bidding Documents will not be issued directly to Sub-bidders unless specifically offered in the Advertisement or Invitation to Bid, or in supplementary instructions to bidders.

§ 3.1.3 Bidders shall use complete sets of Bidding Documents in preparing Bids; neither the Owner nor Architect assumes responsibility for errors or misinterpretations resulting from the use of incomplete sets of Bidding Documents.

§ 3.1.4 The Owner and Architect may make copies of the Bidding Documents available on the above terms for the purpose of obtaining Bids on the Work. No license or grant of use is conferred by issuance of copies of the Bidding Documents.

§ 3.2 INTERPRETATION OR CORRECTION OF BIDDING DOCUMENTS

§ 3.2.1 The Bidder shall carefully study and compare the Bidding Documents with each other, and with other work being bid concurrently or presently under construction to the extent that it relates to the Work for which the Bid is submitted, shall examine the site and local conditions, and shall at once report to the Architect errors, inconsistencies or ambiguities discovered.

§ 3.2.2 Bidders and Sub-bidders requiring clarification or interpretation of the Bidding Documents shall make a written request which shall reach the Architect at least seven days prior to the date for receipt of Bids.

§ 3.2.3 Interpretations, corrections and changes of the Bidding Documents will be made by Addendum. Interpretations, corrections and changes of the Bidding Documents made in any other manner will not be binding, and Bidders shall not rely upon them.

§ 3.3 SUBSTITUTIONS

§ 3.3.1 The materials, products and equipment described in the Bidding Documents establish a standard of required function, dimension, appearance and quality to be met by any proposed substitution.

§ 3.3.2 No substitution will be considered prior to receipt of Bids unless written request for approval has been received by the Architect at least ten days prior to the date for receipt of Bids. Such requests shall include the name of the material or equipment for which it is to be substituted and a complete description of the proposed substitution including drawings, performance and test data, and other information necessary for an evaluation. A statement setting forth changes in other materials, equipment or other portions of the Work, including changes in the work of other contracts that incorporation of the proposed substitution would require, shall be included. The burden of proof of the merit of the proposed substitution is upon the proposer. The Architect's decision of approval or disapproval of a proposed substitution shall be final.

§ 3.3.3 If the Architect approves a proposed substitution prior to receipt of Bids, such approval will be set forth in an Addendum. Bidders shall not rely upon approvals made in any other manner.

§ 3.3.4 No substitutions will be considered after the Contract award unless specifically provided for in the Contract Documents.

§ 3.4 ADDENDA

§ 3.4.1 Addenda will be transmitted to all who are known by the issuing office to have received a complete set of Bidding Documents.

§ 3.4.2 Copies of Addenda will be made available for inspection wherever Bidding Documents are on file for that purpose.

§ 3.4.3 Addenda will be issued no later than four days prior to the date for receipt of Bids except an Addendum withdrawing the request for Bids or one which includes postponement of the date for receipt of Bids.

§ 3.4.4 Each Bidder shall ascertain prior to submitting a Bid that the Bidder has received all Addenda issued, and the Bidder shall acknowledge their receipt in the Bid.

ARTICLE 4 BIDDING PROCEDURES

§ 4.1 PREPARATION OF BIDS

§ 4.1.1 Bids shall be submitted on the forms included with the Bidding Documents.

§ 4.1.2 All blanks on the bid form shall be legibly executed in a non-erasable medium.

§ 4.1.3 Sums shall be expressed in both words and figures. In case of discrepancy, the amount written in words shall govern.

§ 4.1.4 Interlineations, alterations and erasures must be initialed by the signer of the Bid.

§ 4.1.5 All requested Alternates shall be bid. If no change in the Base Bid is required, enter "No Change."

§ 4.1.6 Where two or more Bids for designated portions of the Work have been requested, the Bidder may, without forfeiture of the bid security, state the Bidder's refusal to accept award of less than the combination of Bids stipulated by the Bidder. The Bidder shall make no additional stipulations on the bid form nor qualify the Bid in any other manner.

§ 4.1.7 Each copy of the Bid shall state the legal name of the Bidder and the nature of legal form of the Bidder. The Bidder shall provide evidence of legal authority to perform within the jurisdiction of the Work. Each copy shall be signed by the person or persons legally authorized to bind the Bidder to a contract. A Bid by a corporation shall further give the state of incorporation and have the corporate seal affixed. A Bid submitted by an agent shall have a current power of attorney attached certifying the agent's authority to bind the Bidder.

§ 4.2 BID SECURITY

§ 4.2.1 Each Bid shall be accompanied by a bid security in the form and amount required if so stipulated in the Instructions to Bidders. The Bidder pledges to enter into a Contract with the Owner on the terms stated in the Bid and will, if required, furnish bonds covering the faithful performance of the Contract and payment of all obligations arising thereunder. Should the Bidder refuse to enter into such Contract or fail to furnish such bonds if required, the amount of the bid security shall be forfeited to the Owner as liquidated damages, not as a penalty. The amount of the bid security shall not be forfeited to the Owner in the event the Owner fails to comply with Section 6.2.

§ 4.2.2 If a surety bond is required, it shall be written on AIA Document A310, Bid Bond, unless otherwise provided in the Bidding Documents, and the attorney-in-fact who executes the bond on behalf of the surety shall affix to the bond a certified and current copy of the power of attorney.

§ 4.2.3 The Owner will have the right to retain the bid security of Bidders to whom an award is being considered until either (a) the Contract has been executed and bonds, if required, have been furnished, or (b) the specified time has elapsed so that Bids may be withdrawn or (c) all Bids have been rejected.

§ 4.3 SUBMISSION OF BIDS

§ 4.3.1 All copies of the Bid, the bid security, if any, and any other documents required to be submitted with the Bid shall be enclosed in a sealed opaque envelope. The envelope shall be addressed to the party receiving the Bids and shall be identified with the Project name, the Bidder's name and address and, if applicable, the designated portion of the Work for which the Bid is submitted. If the Bid is sent by mail, the sealed envelope shall be enclosed in a separate mailing envelope with the notation "SEALED BID ENCLOSED" on the face thereof.

§ 4.3.2 Bids shall be deposited at the designated location prior to the time and date for receipt of Bids. Bids received after the time and date for receipt of Bids will be returned unopened.

§ 4.3.3 The Bidder shall assume full responsibility for timely delivery at the location designated for receipt of Bids.

§ 4.3.4 Oral, telephonic, telegraphic, facsimile or other electronically transmitted bids will not be considered.

§ 4.4 MODIFICATION OR WITHDRAWAL OF BID

§ 4.4.1 A Bid may not be modified, withdrawn or canceled by the Bidder during the stipulated time period following the time and date designated for the receipt of Bids, and each Bidder so agrees in submitting a Bid.

§ 4.4.2 Prior to the time and date designated for receipt of Bids, a Bid submitted may be modified or withdrawn by notice to the party receiving Bids at the place designated for receipt of Bids. Such notice shall be in writing over the

signature of the Bidder. Written confirmation over the signature of the Bidder shall be received, and date- and time-stamped by the receiving party on or before the date and time set for receipt of Bids. A change shall be so worded as not to reveal the amount of the original Bid.

§ 4.4.3 Withdrawn Bids may be resubmitted up to the date and time designated for the receipt of Bids provided that they are then fully in conformance with these Instructions to Bidders.

§ 4.4.4 Bid security, if required, shall be in an amount sufficient for the Bid as resubmitted.

ARTICLE 5 CONSIDERATION OF BIDS

§ 5.1 OPENING OF BIDS

At the discretion of the Owner, if stipulated in the Advertisement or Invitation to Bid, the properly identified Bids received on time will be publicly opened and will be read aloud. An abstract of the Bids may be made available to Bidders.

§ 5.2 REJECTION OF BIDS

The Owner shall have the right to reject any or all Bids. A Bid not accompanied by a required bid security or by other data required by the Bidding Documents, or a Bid which is in any way incomplete or irregular is subject to rejection.

§ 5.3 ACCEPTANCE OF BID (AWARD)

§ 5.3.1 It is the intent of the Owner to award a Contract to the lowest qualified Bidder provided the Bid has been submitted in accordance with the requirements of the Bidding Documents and does not exceed the funds available. The Owner shall have the right to waive informalities and irregularities in a Bid received and to accept the Bid which, in the Owner's judgment, is in the Owner's own best interests.

§ 5.3.2 The Owner shall have the right to accept Alternates in any order or combination, unless otherwise specifically provided in the Bidding Documents, and to determine the low Bidder on the basis of the sum of the Base Bid and Alternates accepted.

ARTICLE 6 POST-BID INFORMATION

§ 6.1 CONTRACTOR'S QUALIFICATION STATEMENT

Bidders to whom award of a Contract is under consideration shall submit to the Architect, upon request, a properly executed AIA Document A305, Contractor's Qualification Statement, unless such a Statement has been previously required and submitted as a prerequisite to the issuance of Bidding Documents.

§ 6.2 OWNER'S FINANCIAL CAPABILITY

The Owner shall, at the request of the Bidder to whom award of a Contract is under consideration and no later than seven days prior to the expiration of the time for withdrawal of Bids, furnish to the Bidder reasonable evidence that financial arrangements have been made to fulfill the Owner's obligations under the Contract. Unless such reasonable evidence is furnished, the Bidder will not be required to execute the Agreement between the Owner and Contractor.

§ 6.3 SUBMITTALS

§ 6.3.1 The Bidder shall, as soon as practicable or as stipulated in the Bidding Documents, after notification of selection for the award of a Contract, furnish to the Owner through the Architect in writing:

- .1 a designation of the Work to be performed with the Bidder's own forces;
- .2 names of the manufacturers, products, and the suppliers of principal items or systems of materials and equipment proposed for the Work; and
- .3 names of persons or entities (including those who are to furnish materials or equipment fabricated to a special design) proposed for the principal portions of the Work.

§ 6.3.2 The Bidder will be required to establish to the satisfaction of the Architect and Owner the reliability and responsibility of the persons or entities proposed to furnish and perform the Work described in the Bidding Documents.

§ 6.3.3 Prior to the execution of the Contract, the Architect will notify the Bidder in writing if either the Owner or Architect, after due investigation, has reasonable objection to a person or entity proposed by the Bidder. If the Owner or Architect has reasonable objection to a proposed person or entity, the Bidder may, at the Bidder's option, (1)

withdraw the Bid or (2) submit an acceptable substitute person or entity with an adjustment in the Base Bid or Alternate Bid to cover the difference in cost occasioned by such substitution. The Owner may accept the adjusted bid price or disqualify the Bidder. In the event of either withdrawal or disqualification, bid security will not be forfeited.

§ 6.3.4 Persons and entities proposed by the Bidder and to whom the Owner and Architect have made no reasonable objection must be used on the Work for which they were proposed and shall not be changed except with the written consent of the Owner and Architect.

ARTICLE 7 PERFORMANCE BOND AND PAYMENT BOND

§ 7.1 BOND REQUIREMENTS

§ 7.1.1 If stipulated in the Bidding Documents, the Bidder shall furnish bonds covering the faithful performance of the Contract and payment of all obligations arising thereunder. Bonds may be secured through the Bidder's usual sources.

§ 7.1.2 If the furnishing of such bonds is stipulated in the Bidding Documents, the cost shall be included in the Bid. If the furnishing of such bonds is required after receipt of bids and before execution of the Contract, the cost of such bonds shall be added to the Bid in determining the Contract Sum.

§ 7.1.3 If the Owner requires that bonds be secured from other than the Bidder's usual sources, changes in cost will be adjusted as provided in the Contract Documents.

§ 7.2 TIME OF DELIVERY AND FORM OF BONDS

§ 7.2.1 The Bidder shall deliver the required bonds to the Owner not later than three days following the date of execution of the Contract. If the Work is to be commenced prior thereto in response to a letter of intent, the Bidder shall, prior to commencement of the Work, submit evidence satisfactory to the Owner that such bonds will be furnished and delivered in accordance with this Section 7.2.1.

§ 7.2.2 Unless otherwise provided, the bonds shall be written on AIA Document A312, Performance Bond and Payment Bond. Both bonds shall be written in the amount of the Contract Sum.

§ 7.2.3 The bonds shall be dated on or after the date of the Contract.

§ 7.2.4 The Bidder shall require the attorney-in-fact who executes the required bonds on behalf of the surety to affix thereto a certified and current copy of the power of attorney.

ARTICLE 8 FORM OF AGREEMENT BETWEEN OWNER AND CONTRACTOR

Unless otherwise required in the Bidding Documents, the Agreement for the Work will be written on AIA Document A101, Standard Form of Agreement Between Owner and Contractor Where the Basis of Payment Is a Stipulated Sum.

ELIZABETHTOWN FIRE DISTRICT
FIRE STATION ADDITION
AES PROJECT NO. 4027

DOCUMENT 004113

BID FORM - STIPULATED SUM

To: **Elizabethtown Fire District**
Project: **Fire Station Addition**
Date:
Submitted by:
(full name)
(full address)
.....

1.1 OFFER

Having examined the Place of The Work and all matters referred to in the Instructions to Bidders, Bid Documents and Contract Documents prepared by, Architect/Engineer for the above mentioned project, we the undersigned, hereby offer to enter into a Contract to perform the Work for the Contract Sum of:

A. Base Bid:

\$..... dollars and no cents, in lawful money of the United States of America.
(Numerical)

\$.....
(Written)

+ **Contingency Allowance** **\$10,000.00 (Ten Thousand Dollars)**

Total: Base Bid Plus Allowance \$..... dollars, in lawful money of the United States of America.
(numerical)

\$.....dollars and no cents.
(written)

Alternate No. 1 (DEDUCT): Change from masonry walls and bar joist roof framing to light gauge metal framed walls and rafters:

\$..... dollars and no cents, in lawful money of the United States of America.
(Numerical)

\$.....
(Written)

Alternate No. 2 (ADD): Gravel driveway on North East side of Fire Station:

\$..... dollars and no cents, in lawful money of the United States of America.
(Numerical)

\$.....
(Written)

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Alternate No. 3 (ADD): Entrance pad, foundation, and footing for new main door:

\$..... dollars and no cents, in lawful money of the United States of America.
(Numerical)

\$.....
(Written)

Alternate No. 4 (ADD): (2) Aluminum windows and (2) new openings in existing masonry wall:

\$..... dollars and no cents, in lawful money of the United States of America.
(Numerical)

\$.....
(Written)

Alternate No. 5 (ADD): Domestic cold water piping, (2) hose stations, and (2) wall hydrants:

\$..... dollars and no cents, in lawful money of the United States of America.
(Numerical)

\$.....
(Written)

Alternate No. 6 (ADD): Vehicle Exhaust System:

\$..... dollars and no cents, in lawful money of the United States of America.
(Numerical)

\$.....
(Written)

Alternate No. 7 (ADD): New lighting in existing bays (in kind replacement of existing HID's):

\$..... dollars and no cents, in lawful money of the United States of America.
(Numerical)

\$.....
(Written)

We have included the bid security as required by the Instruction to Bidders.

All applicable federal taxes are included and State of New York taxes are included in the Bid Sum.

All Contingency Allowances described in Section 012000 - Price and Payment Procedures are included in the Bid Sum.

1.2 ACCEPTANCE

This offer shall be open to acceptance and is irrevocable for forty five days from the bid closing date.

ELIZABETHTOWN FIRE DISTRICT
FIRE STATION ADDITION
AES PROJECT NO. 4027

If this bid is accepted by the Owner within the time period stated above, we will:

- Execute the Agreement within seven days of receipt of Notice of Award.
- Furnish the required bonds within seven days of receipt of Notice of Award in the form described in Supplementary Conditions.
- Commence work within seven days after written Notice to Proceed.

If this bid is accepted within the time stated, and we fail to commence the Work or we fail to provide the required bonds, the security deposit shall be forfeited as damages to the Owner by reason of our failure, limited in amount to the lesser of the face value of the security deposit or the difference between this bid and the bid upon which a Contract is signed.

In the event our bid is not accepted within the time stated above, the required security deposit will be returned to the undersigned, in accordance with the provisions of the Instructions to Bidders; unless a mutually satisfactory arrangement is made for its retention and validity for an extended period of time.

1.3 CONTRACT TIME

If this Bid is accepted, we will:

- Complete the Work in one hundred twenty (120) calendar days from Notice to Proceed.

1.4 CHANGES TO THE WORK

When the Architect/Engineer establishes that the method of valuation for Changes in the Work will be net cost plus a percentage fee in accordance with General Conditions, our percentage fee shall be:

..... percent overhead and profit on the net cost of our own Work;

..... percent on the gross cost of work done by any Subcontractor.

On work deleted from the Contract, our credit to the Owner shall be the Architect/Engineer approved net cost plus..... of the overhead and profit percentage noted above.

1.5 ADDENDA

The following Addenda have been received. The modifications to the Bid Documents noted below have been considered and all costs are included in the Bid Sum.

Addendum #..... Dated.....

Addendum #..... Dated.....

Addendum #..... Dated.....

Addendum #..... Dated.....

ELIZABETHTOWN FIRE DISTRICT
FIRE STATION ADDITION
AES PROJECT NO. 4027

1.6 APPENDICES

The following documents are attached to and made a condition of the Bid:

Bid security in form of.....
Document 004300 including appendices.

1.7 BID FORM SIGNATURES

The Corporate Seal of

.....
(Bidder - print the full name of your firm)

was hereunto affixed in the presence of:

.....
(Authorized signing officer Title)

(Seal)

.....
(Authorized signing officer Title)

(Seal)

If the Bid is a joint venture or partnership, add additional forms of execution for each member of the joint venture in the appropriate form or forms as above.

END OF DOCUMENT

ELIZABETHTOWN FIRE DISTRICT
FIRE STATION ADDITION
AES PROJECT NO. 4027

AFFADAVIT OF NON-COLLUSION

By submission of this bid, each bidder and each person signing on behalf of any bidder certifies, and in the case of a joint bid, each party thereto certifies as to its own organization, under penalty of perjury, that to the best of knowledge and belief:

1. The prices in this bid have been arrived at independently without collusion, consultation, communication or agreement, for the purpose of restricting competition, as to any matter relating to such prices with any other bidder or with any other competitor; and
2. Unless otherwise required by law, the prices which have been quoted in this bid have not been knowingly disclosed by the bidder and will not knowingly be disclosed by the bidder prior to the opening, directly or indirectly, to any other bidder or to any competitor; and
3. No attempt has been made by the bidder or will be made to induce any other persons, partnership or corporation to submit or not to submit a bid for the purpose of restricting competition.

SIGNATURE

TITLE

NAME OF FIRM/CO./CORP.

AREA CODE & TELEPHONE NO.

STREET ADDRESS

DATE

CITY/STATE/ZIP CODE

END OF DOCUMENT

ELIZABETHTOWN FIRE DISTRICT
FIRE STATION ADDITION
AES PROJECT NO. 4027

RESOLUTION – FOR CORPORATE BIDDERS ONLY

Resolved that _____ be (Individual)
authorized to sign and submit the bid or proposal of this corporation for the following
project _____ and to include in
such bid or proposal the certificate as to non-collusion required by Section 103-D of the
General Municipal Law as the act and deed of such corporation and for any inaccuracies
or misstatements in such certificate this corporate bidder shall be liable under the
penalties of perjury.

The foregoing is a true and correct copy of the resolution adopted by _____
_____ Corporation at a meeting of its Board of Directors held on
the _____ Day of _____, 20____ and is still in force and effect on this
_____ Day of
_____, 20____.

Secretary

(Seal of Corporation)

END OF DOCUMENT

RESOLUTION – FOR CORPORATE BIDDERS ONLY
RCB

ELIZABETHTOWN FIRE DISTRICT
FIRE STATION ADDITION
AES PROJECT NO. 4027

DOCUMENT 004300

BID FORM SUPPLEMENTS

To: Elizabethtown Fire District

Project: Fire Station Addition

Date:

Submitted by:

(full name)

(full address)

.....

In accordance with Document 002114 and Document 004113, we include the Appendices to Bid Form Supplements listed below. The information provided shall be considered an integral part of the Bid Form.

The following Appendices are attached to this document:

Appendix A - List of Subcontractors: Include names of all major Subcontractors and portions of the Work each Subcontractor will perform.

Appendix B - Cost Breakdown: Includes Bid Sum segmented into portions as requested.

BID FORM SUPPLEMENTS SIGNATURES

The Corporate Seal of

.....
(Bidder - print the full name of your firm)

was hereunto affixed in the presence of:

.....
(Authorized signing officer Title)

(Seal)

.....
(Authorized signing officer Title)

(Seal)

ELIZABETHTOWN FIRE DISTRICT
FIRE STATION ADDITION
AES PROJECT NO. 4027

APPENDIX A - LIST OF SUBCONTRACTORS

Herewith is the list of subcontractors referenced in the bid submitted by:

(Bidder).....

To (Owner)

Dated..... and which is an integral part of the Bid Form.

The following work will be performed (or provided) by subcontractors and coordinated by us:

WORK / TRADE	NAME

ELIZABETHTOWN FIRE DISTRICT
 FIRE STATION ADDITION
 AES PROJECT NO. 4027

APPENDIX B - COST BREAKDOWN

The following is a cost breakdown referenced in the bid submitted by:

(Bidder).....

To (Owner)

Dated..... and which is an integral part of the Bid Form.

ITEM OF WORK	VALUE Overhead & Profit Included
Division 00 – Procurement & Contracting Requirements	\$
Division 01 – General Requirements	\$
Division 02 – Existing Conditions	\$
Division 03 – Concrete	\$
Division 04 – Masonry	\$
Division 05 – Metals	\$
Division 06 – Wood, Plastics, and Composites	\$
Division 07 – Thermal and Moisture Protection	\$
Division 08 – Openings	\$
Division 09 – Finishes	\$
Division 10 – Specialties	\$
Division 22 – Plumbing	\$
Division 23 – Heating, Ventilating, and Air Conditioning (HVAC)	\$
Division 26 – Electrical	\$
Division 28 – Electronic Safety and Security	\$
Division 31 – Earthwork	\$
Division 32 – Exterior Improvements	\$

END OF DOCUMENT

ELIZABETHTOWN FIRE DISTRICT
FIRE STATION ADDITION
AES PROJECT NO. 4027

DOCUMENT 005214

AGREEMENT FORM - AIA STIPULATED SUM

1.1 SUMMARY

A. Document Includes:

1. Agreement.

B. Related Documents:

1. Document 007214 - General Conditions - AIA Stipulated Sum.
2. Document 007313 - Supplementary Conditions - AIA.

1.2 AGREEMENT

- A. AIA Document A101-2007, Standard Form of Agreement Between Owner and Contractor Where the Basis of Payment is a Stipulated Sum, forms the basis of Agreement between the Owner and Contractor.

END OF DOCUMENT

DRAFT AIA® Document A101™ - 2007

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

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

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

«Elizabethtown Fire District»« »
«PO Box 457, Woodruff Street
Elizabethtown, NY 12932»
«Telephone Number: (518) 873-9821»
« »

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

« »« »
« »
« »
« »

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

«Elizabethtown Fire District»
«Wodruff Street
Elizabethtown, NY 12932»
«Fire Station Addition
AES Project No. 4027»

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

«Architecture, Engineering, and Land Surveying Northeast, PLLC»« »
«10-12 City Hall Place
Plattsburgh, New York 12901»
«Telephone Number: (518) 561-1598»
«Fax Number: (518) 561-1990»

The Owner and Contractor agree as follows.

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

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

AIA Document A201™-2007, General Conditions of the Contract for Construction, is adopted in this document by reference. Do not use with other general conditions unless this document is modified.

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

TABLE OF ARTICLES

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

ARTICLE 1 THE CONTRACT DOCUMENTS

The Contract Documents consist of this Agreement, Conditions of the Contract (General, Supplementary and other Conditions), Drawings, Specifications, Addenda issued prior to execution of this Agreement, other documents listed in this Agreement and Modifications issued after execution of this Agreement, all of which form the Contract, and are as fully a part of the Contract as if attached to this Agreement or repeated herein. The Contract represents the entire and integrated agreement between the parties hereto and supersedes prior negotiations, representations or agreements, either written or oral. An enumeration of the Contract Documents, other than a Modification, appears in Article 9.

ARTICLE 2 THE WORK OF THIS CONTRACT

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

ARTICLE 3 DATE OF COMMENCEMENT AND SUBSTANTIAL COMPLETION

§ 3.1 The date of commencement of the Work shall be the date of this Agreement unless a different date is stated below or provision is made for the date to be fixed in a notice to proceed issued by the Owner.
(Insert the date of commencement if it differs from the date of this Agreement or, if applicable, state that the date will be fixed in a notice to proceed.)

« »

If, prior to the commencement of the Work, the Owner requires time to file mortgages and other security interests, the Owner's time requirement shall be as follows:

« »

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

§ 3.3 The Contractor shall achieve Substantial Completion of the entire Work not later than « » (« ») days from the date of commencement, or as follows:

(Insert number of calendar days. Alternatively, a calendar date may be used when coordinated with the date of commencement. If appropriate, insert requirements for earlier Substantial Completion of certain portions of the Work.)

« »

Portion of Work

Substantial Completion Date

, subject to adjustments of this Contract Time as provided in the Contract Documents.
(Insert provisions, if any, for liquidated damages relating to failure to achieve Substantial Completion on time or for bonus payments for early completion of the Work.)

« »

ARTICLE 4 CONTRACT SUM

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

§ 4.2 The Contract Sum is based upon the following alternates, if any, which are described in the Contract Documents and are hereby accepted by the Owner:

(State the numbers or other identification of accepted alternates. If the bidding or proposal documents permit the Owner to accept other alternates subsequent to the execution of this Agreement, attach a schedule of such other alternates showing the amount for each and the date when that amount expires.)

« »

§ 4.3 Unit prices, if any:

(Identify and state the unit price; state quantity limitations, if any, to which the unit price will be applicable.)

Item	Units and Limitations	Price Per Unit (\$0.00)
------	-----------------------	-------------------------

§ 4.4 Allowances included in the Contract Sum, if any:

(Identify allowance and state exclusions, if any, from the allowance price.)

Item	Price
------	-------

ARTICLE 5 PAYMENTS

§ 5.1 PROGRESS PAYMENTS

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

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

« »

§ 5.1.3 Provided that an Application for Payment is received by the Architect not later than the « » day of a month, the Owner shall make payment of the certified amount to the Contractor not later than the « » day of the « » month. If an Application for Payment is received by the Architect after the application date fixed above, payment shall be made by the Owner not later than « » (« ») days after the Architect receives the Application for Payment.
(Federal, state or local laws may require payment within a certain period of time.)

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

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

§ 5.1.6 Subject to other provisions of the Contract Documents, the amount of each progress payment shall be computed as follows:

- .1 Take that portion of the Contract Sum properly allocable to completed Work as determined by multiplying the percentage completion of each portion of the Work by the share of the Contract Sum allocated to that portion of the Work in the schedule of values, less retainage of « » percent (« » %). Pending final determination of cost to the Owner of changes in the Work, amounts not in dispute shall be included as provided in Section 7.3.9 of AIA Document A201™–2007, General Conditions of the Contract for Construction;
- .2 Add that portion of the Contract Sum properly allocable to materials and equipment delivered and suitably stored at the site for subsequent incorporation in the completed construction (or, if approved in advance by the Owner, suitably stored off the site at a location agreed upon in writing), less retainage of « » percent (« » %);
- .3 Subtract the aggregate of previous payments made by the Owner; and
- .4 Subtract amounts, if any, for which the Architect has withheld or nullified a Certificate for Payment as provided in Section 9.5 of AIA Document A201–2007.

§ 5.1.7 The progress payment amount determined in accordance with Section 5.1.6 shall be further modified under the following circumstances:

- .1 Add, upon Substantial Completion of the Work, a sum sufficient to increase the total payments to the full amount of the Contract Sum, less such amounts as the Architect shall determine for incomplete Work, retainage applicable to such work and unsettled claims; and
(Section 9.8.5 of AIA Document A201–2007 requires release of applicable retainage upon Substantial Completion of Work with consent of surety, if any.)
- .2 Add, if final completion of the Work is thereafter materially delayed through no fault of the Contractor, any additional amounts payable in accordance with Section 9.10.3 of AIA Document A201–2007.

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

(If it is intended, prior to Substantial Completion of the entire Work, to reduce or limit the retainage resulting from the percentages inserted in Sections 5.1.6.1 and 5.1.6.2 above, and this is not explained elsewhere in the Contract Documents, insert here provisions for such reduction or limitation.)

« »

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

§ 5.2 FINAL PAYMENT

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

- .1 the Contractor has fully performed the Contract except for the Contractor's responsibility to correct Work as provided in Section 12.2.2 of AIA Document A201–2007, and to satisfy other requirements, if any, which extend beyond final payment; and
- .2 a final Certificate for Payment has been issued by the Architect.

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

« »

ARTICLE 6 DISPUTE RESOLUTION

§ 6.1 INITIAL DECISION MAKER

The Architect will serve as Initial Decision Maker pursuant to Section 15.2 of AIA Document A201–2007, unless the parties appoint below another individual, not a party to this Agreement, to serve as Initial Decision Maker.

(If the parties mutually agree, insert the name, address and other contact information of the Initial Decision Maker, if other than the Architect.)

<< >>
<< >>
<< >>
<< >>

§ 6.2 BINDING DISPUTE RESOLUTION

For any Claim subject to, but not resolved by, mediation pursuant to Section 15.3 of AIA Document A201–2007, the method of binding dispute resolution shall be as follows:

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

[] Arbitration pursuant to Section 15.4 of AIA Document A201–2007

[] Litigation in a court of competent jurisdiction

[] Other (Specify)

<< >>

ARTICLE 7 TERMINATION OR SUSPENSION

§ 7.1 The Contract may be terminated by the Owner or the Contractor as provided in Article 14 of AIA Document A201–2007.

§ 7.2 The Work may be suspended by the Owner as provided in Article 14 of AIA Document A201–2007.

ARTICLE 8 MISCELLANEOUS PROVISIONS

§ 8.1 Where reference is made in this Agreement to a provision of AIA Document A201–2007 or another Contract Document, the reference refers to that provision as amended or supplemented by other provisions of the Contract Documents.

§ 8.2 Payments due and unpaid under the Contract shall bear interest from the date payment is due at the rate stated below, or in the absence thereof, at the legal rate prevailing from time to time at the place where the Project is located.

(Insert rate of interest agreed upon, if any.)

<< >> % << >>

§ 8.3 The Owner’s representative:
(Name, address and other information)

«Michael Doyle»
«PO Box 457, Woodruff Street
Elizabethtown, NY 12932»

<< >>
<< >>
<< >>
<< >>

§ 8.4 The Contractor’s representative:
(Name, address and other information)

<< >>
<< >>
<< >>

<< >>
<< >>
<< >>

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

§ 8.6 Other provisions:

<< >>

ARTICLE 9 ENUMERATION OF CONTRACT DOCUMENTS

§ 9.1 The Contract Documents, except for Modifications issued after execution of this Agreement, are enumerated in the sections below.

§ 9.1.1 The Agreement is this executed AIA Document A101–2007, Standard Form of Agreement Between Owner and Contractor.

§ 9.1.2 The General Conditions are AIA Document A201–2007, General Conditions of the Contract for Construction.

§ 9.1.3 The Supplementary and other Conditions of the Contract:

Document	Title	Date	Pages

§ 9.1.4 The Specifications:
(Either list the Specifications here or refer to an exhibit attached to this Agreement.)

<< >>

Section	Title	Date	Pages

§ 9.1.5 The Drawings:
(Either list the Drawings here or refer to an exhibit attached to this Agreement.)

<< >>

Number	Title	Date

§ 9.1.6 The Addenda, if any:

Number	Date	Pages

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

§ 9.1.7 Additional documents, if any, forming part of the Contract Documents:

- 1 AIA Document E201™–2007, Digital Data Protocol Exhibit, if completed by the parties, or the following:

<< >>

- 2 Other documents, if any, listed below:
(List here any additional documents that are intended to form part of the Contract Documents. AIA Document A201–2007 provides that bidding requirements such as advertisement or invitation to bid,

Instructions to Bidders, sample forms and the Contractor's bid are not part of the Contract Documents unless enumerated in this Agreement. They should be listed here only if intended to be part of the Contract Documents.)

« »

ARTICLE 10 INSURANCE AND BONDS

The Contractor shall purchase and maintain insurance and provide bonds as set forth in Article 11 of AIA Document A201–2007.

(State bonding requirements, if any, and limits of liability for insurance required in Article 11 of AIA Document A201–2007.)

Type of insurance or bond

Limit of liability or bond amount (\$0.00)

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

OWNER *(Signature)*

«Michael Doyle», Chairman»

(Printed name and title)

CONTRACTOR *(Signature)*

« »« »

(Printed name and title)

ELIZABETHTOWN FIRE DISTRICT
FIRE STATION ADDITION
AES PROJECT NO. 4027

DOCUMENT 007214

GENERAL CONDITIONS - AIA STIPULATED SUM

1.1 SUMMARY

A. Document Includes:

1. General Conditions.

B. Related Documents:

1. Document 005214 - Agreement Form - AIA Stipulated Sum.
2. Document 007313 - Supplementary Conditions - AIA.

1.2 GENERAL CONDITIONS

- A. AIA Document A201-2001, General Conditions of the Contract for Construction, is the General Conditions of the Contract.

1.3 SUPPLEMENTARY CONDITIONS

- A. Refer to Document 007313 for modifications to General Conditions.

END OF DOCUMENT



AIA[®] Document A201[™] – 2007

General Conditions of the Contract for Construction

for the following PROJECT:

(Name and location or address)

Elizabethtown Fire District
Wodruff Street
Elizabethtown, NY 12932

THE OWNER:

(Name, legal status and address)

Elizabethtown Fire District
PO Box 457, Woodruff Street
Elizabethtown, NY 12932

THE ARCHITECT:

(Name, legal status and address)

Architecture, Engineering, and Land Surveying Northeast, PLLC
10-12 City Hall Place
Plattsburgh, New York 12901

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ADDITIONS AND DELETIONS:

The author of this document has added information needed for its completion. The author may also have revised the text of the original AIA standard form.

A vertical line in the left margin of this document indicates where the author has added necessary information and where the author has added to or deleted from the original AIA text.

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

Init.

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ARTICLE 1 GENERAL PROVISIONS

§ 1.1 BASIC DEFINITIONS

§ 1.1.1 THE CONTRACT DOCUMENTS

The Contract Documents are enumerated in the Agreement between the Owner and Contractor (hereinafter the Agreement) and consist of the Agreement, Conditions of the Contract (General, Supplementary and other Conditions), Drawings, Specifications, Addenda issued prior to execution of the Contract, other documents listed in the Agreement and Modifications issued after execution of the Contract. A Modification is (1) a written amendment to the Contract signed by both parties, (2) a Change Order, (3) a Construction Change Directive or (4) a written order for a minor change in the Work issued by the Architect. Unless specifically enumerated in the Agreement, the Contract Documents do not include the advertisement or invitation to bid, Instructions to Bidders, sample forms, other information furnished by the Owner in anticipation of receiving bids or proposals, the Contractor's bid or proposal, or portions of Addenda relating to bidding requirements.

§ 1.1.2 THE CONTRACT

The Contract Documents form the Contract for Construction. The Contract represents the entire and integrated agreement between the parties hereto and supersedes prior negotiations, representations or agreements, either written or oral. The Contract may be amended or modified only by a Modification. The Contract Documents shall not be construed to create a contractual relationship of any kind (1) between the Contractor and the Architect or the Architect's consultants, (2) between the Owner and a Subcontractor or a Sub-subcontractor, (3) between the Owner and the Architect or the Architect's consultants or (4) between any persons or entities other than the Owner and the Contractor. The Architect shall, however, be entitled to performance and enforcement of obligations under the Contract intended to facilitate performance of the Architect's duties.

§ 1.1.3 THE WORK

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

§ 1.1.4 THE PROJECT

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

§ 1.1.5 THE DRAWINGS

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

§ 1.1.6 THE SPECIFICATIONS

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

§ 1.1.7 INSTRUMENTS OF SERVICE

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

§ 1.1.8 INITIAL DECISION MAKER

The Initial Decision Maker is the person identified in the Agreement to render initial decisions on Claims in accordance with Section 15.2 and certify termination of the Agreement under Section 14.2.2.

§ 1.2 CORRELATION AND INTENT OF THE CONTRACT DOCUMENTS

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

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

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

§ 1.3 CAPITALIZATION

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

§ 1.4 INTERPRETATION

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

§ 1.5 OWNERSHIP AND USE OF DRAWINGS, SPECIFICATIONS AND OTHER INSTRUMENTS OF SERVICE

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

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

§ 1.6 TRANSMISSION OF DATA IN DIGITAL FORM

If the parties intend to transmit Instruments of Service or any other information or documentation in digital form, they shall endeavor to establish necessary protocols governing such transmissions, unless otherwise already provided in the Agreement or the Contract Documents.

ARTICLE 2 OWNER

§ 2.1 GENERAL

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

§ 2.1.2 The Owner shall furnish to the Contractor within fifteen days after receipt of a written request, information necessary and relevant for the Contractor to evaluate, give notice of or enforce mechanic's lien rights. Such information shall include a correct statement of the record legal title to the property on which the Project is located, usually referred to as the site, and the Owner's interest therein.

§ 2.2 INFORMATION AND SERVICES REQUIRED OF THE OWNER

§ 2.2.1 Prior to commencement of the Work, the Contractor may request in writing that the Owner provide reasonable evidence that the Owner has made financial arrangements to fulfill the Owner's obligations under the Contract. Thereafter, the Contractor may only request such evidence if (1) the Owner fails to make payments to the Contractor as the Contract Documents require; (2) a change in the Work materially changes the Contract Sum; or (3) the Contractor identifies in writing a reasonable concern regarding the Owner's ability to make payment when due. The Owner shall furnish such evidence as a condition precedent to commencement or continuation of the Work or the

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portion of the Work affected by a material change. After the Owner furnishes the evidence, the Owner shall not materially vary such financial arrangements without prior notice to the Contractor.

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

§ 2.2.3 The Owner shall furnish surveys describing physical characteristics, legal limitations and utility locations for the site of the Project, and a legal description of the site. The Contractor shall be entitled to rely on the accuracy of information furnished by the Owner but shall exercise proper precautions relating to the safe performance of the Work.

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

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

§ 2.3 OWNER'S RIGHT TO STOP THE WORK

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

§ 2.4 OWNER'S RIGHT TO CARRY OUT THE WORK

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

ARTICLE 3 CONTRACTOR

§ 3.1 GENERAL

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

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

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

§ 3.2 REVIEW OF CONTRACT DOCUMENTS AND FIELD CONDITIONS BY CONTRACTOR

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

§ 3.2.2 Because the Contract Documents are complementary, the Contractor shall, before starting each portion of the Work, carefully study and compare the various Contract Documents relative to that portion of the Work, as well as the information furnished by the Owner pursuant to Section 2.2.3, shall take field measurements of any existing conditions related to that portion of the Work, and shall observe any conditions at the site affecting it. These obligations are for the purpose of facilitating coordination and construction by the Contractor and are not for the purpose of discovering errors, omissions, or inconsistencies in the Contract Documents; however, the Contractor shall promptly report to the Architect any errors, inconsistencies or omissions discovered by or made known to the Contractor as a request for information in such form as the Architect may require. It is recognized that the Contractor's review is made in the Contractor's capacity as a contractor and not as a licensed design professional, unless otherwise specifically provided in the Contract Documents.

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

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

§ 3.3 SUPERVISION AND CONSTRUCTION PROCEDURES

§ 3.3.1 The Contractor shall supervise and direct the Work, using the Contractor's best skill and attention. The Contractor shall be solely responsible for, and have control over, construction means, methods, techniques, sequences and procedures and for coordinating all portions of the Work under the Contract, unless the Contract Documents give other specific instructions concerning these matters. If the Contract Documents give specific instructions concerning construction means, methods, techniques, sequences or procedures, the Contractor shall evaluate the jobsite safety thereof and, except as stated below, shall be fully and solely responsible for the jobsite safety of such means, methods, techniques, sequences or procedures. If the Contractor determines that such means, methods, techniques, sequences or procedures may not be safe, the Contractor shall give timely written notice to the Owner and Architect and shall not proceed with that portion of the Work without further written instructions from the Architect. If the Contractor is then instructed to proceed with the required means, methods, techniques, sequences or procedures without acceptance of changes proposed by the Contractor, the Owner shall be solely responsible for any loss or damage arising solely from those Owner-required means, methods, techniques, sequences or procedures.

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

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

§ 3.4 LABOR AND MATERIALS

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

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

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

§ 3.5 WARRANTY

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

§ 3.6 TAXES

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

§ 3.7 PERMITS, FEES, NOTICES AND COMPLIANCE WITH LAWS

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

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

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

§ 3.7.4 **Concealed or Unknown Conditions.** If the Contractor encounters conditions at the site that are (1) subsurface or otherwise concealed physical conditions that differ materially from those indicated in the Contract Documents or (2) unknown physical conditions of an unusual nature, that differ materially from those ordinarily found to exist and generally recognized as inherent in construction activities of the character provided for in the Contract Documents, the Contractor shall promptly provide notice to the Owner and the Architect before conditions are disturbed and in no event later than 21 days after first observance of the conditions. The Architect will promptly investigate such conditions and, if the Architect determines that they differ materially and cause an increase or decrease in the Contractor's cost of, or time required for, performance of any part of the Work, will recommend an equitable adjustment in the Contract Sum or Contract Time, or both. If the Architect determines that the conditions at the site are not materially different from those indicated in the Contract Documents and that no change in the terms of the Contract is justified, the Architect shall promptly notify the Owner and Contractor in writing, stating the reasons. If either party disputes the Architect's determination or recommendation, that party may proceed as provided in Article 15.

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

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§ 3.8 ALLOWANCES

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

§ 3.8.2 Unless otherwise provided in the Contract Documents,

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

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

§ 3.9 SUPERINTENDENT

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

§ 3.9.2 The Contractor, as soon as practicable after award of the Contract, shall furnish in writing to the Owner through the Architect the name and qualifications of a proposed superintendent. The Architect may reply within 14 days to the Contractor in writing stating (1) whether the Owner or the Architect has reasonable objection to the proposed superintendent or (2) that the Architect requires additional time to review. Failure of the Architect to reply within the 14 day period shall constitute notice of no reasonable objection.

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

§ 3.10 CONTRACTOR'S CONSTRUCTION SCHEDULES

§ 3.10.1 The Contractor, promptly after being awarded the Contract, shall prepare and submit for the Owner's and Architect's information a Contractor's construction schedule for the Work. The schedule shall not exceed time limits current under the Contract Documents, shall be revised at appropriate intervals as required by the conditions of the Work and Project, shall be related to the entire Project to the extent required by the Contract Documents, and shall provide for expeditious and practicable execution of the Work.

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

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

§ 3.11 DOCUMENTS AND SAMPLES AT THE SITE

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

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§ 3.12 SHOP DRAWINGS, PRODUCT DATA AND SAMPLES

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

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

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

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

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

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

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

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

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

§ 3.12.10 The Contractor shall not be required to provide professional services that constitute the practice of architecture or engineering unless such services are specifically required by the Contract Documents for a portion of the Work or unless the Contractor needs to provide such services in order to carry out the Contractor's responsibilities for construction means, methods, techniques, sequences and procedures. The Contractor shall not be required to provide professional services in violation of applicable law. If professional design services or certifications by a design professional related to systems, materials or equipment are specifically required of the Contractor by the Contract Documents, the Owner and the Architect will specify all performance and design criteria that such services must satisfy. The Contractor shall cause such services or certifications to be provided by a properly licensed design professional, whose signature and seal shall appear on all drawings, calculations, specifications, certifications, Shop Drawings and other submittals prepared by such professional. Shop Drawings and other submittals related to the Work designed or certified by such professional, if prepared by others, shall bear such professional's written approval when submitted to the Architect. The Owner and the Architect shall be entitled to rely upon the adequacy, accuracy and

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completeness of the services, certifications and approvals performed or provided by such design professionals, provided the Owner and Architect have specified to the Contractor all performance and design criteria that such services must satisfy. Pursuant to this Section 3.12.10, the Architect will review, approve or take other appropriate action on submittals only for the limited purpose of checking for conformance with information given and the design concept expressed in the Contract Documents. The Contractor shall not be responsible for the adequacy of the performance and design criteria specified in the Contract Documents.

§ 3.13 USE OF SITE

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

§ 3.14 CUTTING AND PATCHING

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

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

§ 3.15 CLEANING UP

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

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

§ 3.16 ACCESS TO WORK

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

§ 3.17 ROYALTIES, PATENTS AND COPYRIGHTS

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

§ 3.18 INDEMNIFICATION

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

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

ARTICLE 4 ARCHITECT

§ 4.1 GENERAL

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

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

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

§ 4.2 ADMINISTRATION OF THE CONTRACT

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

§ 4.2.2 The Architect will visit the site at intervals appropriate to the stage of construction, or as otherwise agreed with the Owner, to become generally familiar with the progress and quality of the portion of the Work completed, and to determine in general if the Work observed is being performed in a manner indicating that the Work, when fully completed, will be in accordance with the Contract Documents. However, the Architect will not be required to make exhaustive or continuous on-site inspections to check the quality or quantity of the Work. The Architect will not have control over, charge of, or responsibility for, the construction means, methods, techniques, sequences or procedures, or for the safety precautions and programs in connection with the Work, since these are solely the Contractor's rights and responsibilities under the Contract Documents, except as provided in Section 3.3.1.

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

§ 4.2.4 COMMUNICATIONS FACILITATING CONTRACT ADMINISTRATION

Except as otherwise provided in the Contract Documents or when direct communications have been specially authorized, the Owner and Contractor shall endeavor to communicate with each other through the Architect about matters arising out of or relating to the Contract. Communications by and with the Architect's consultants shall be through the Architect. Communications by and with Subcontractors and material suppliers shall be through the Contractor. Communications by and with separate contractors shall be through the Owner.

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

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

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

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

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

§ 4.2.10 If the Owner and Architect agree, the Architect will provide one or more project representatives to assist in carrying out the Architect's responsibilities at the site. The duties, responsibilities and limitations of authority of such project representatives shall be as set forth in an exhibit to be incorporated in the Contract Documents.

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

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

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

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

ARTICLE 5 SUBCONTRACTORS

§ 5.1 DEFINITIONS

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

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

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

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

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

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

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

§ 5.3 SUBCONTRACTUAL RELATIONS

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

§ 5.4 CONTINGENT ASSIGNMENT OF SUBCONTRACTS

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

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

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

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

§ 5.4.3 Upon such assignment to the Owner under this Section 5.4, the Owner may further assign the subcontract to a successor contractor or other entity. If the Owner assigns the subcontract to a successor contractor or other entity, the

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Owner shall nevertheless remain legally responsible for all of the successor contractor's obligations under the subcontract.

ARTICLE 6 CONSTRUCTION BY OWNER OR BY SEPARATE CONTRACTORS

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

§ 6.1.1 The Owner reserves the right to perform construction or operations related to the Project with the Owner's own forces, and to award separate contracts in connection with other portions of the Project or other construction or operations on the site under Conditions of the Contract identical or substantially similar to these including those portions related to insurance and waiver of subrogation. If the Contractor claims that delay or additional cost is involved because of such action by the Owner, the Contractor shall make such Claim as provided in Article 15.

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

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

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

§ 6.2 MUTUAL RESPONSIBILITY

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

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

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

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

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

§ 6.3 OWNER'S RIGHT TO CLEAN UP

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

ARTICLE 7 CHANGES IN THE WORK

§ 7.1 GENERAL

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

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

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

§ 7.2 CHANGE ORDERS

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

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

§ 7.3 CONSTRUCTION CHANGE DIRECTIVES

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

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

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

- .1 Mutual acceptance of a lump sum properly itemized and supported by sufficient substantiating data to permit evaluation;
- .2 Unit prices stated in the Contract Documents or subsequently agreed upon;
- .3 Cost to be determined in a manner agreed upon by the parties and a mutually acceptable fixed or percentage fee; or
- .4 As provided in Section 7.3.7.

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

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

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

§ 7.3.7 If the Contractor does not respond promptly or disagrees with the method for adjustment in the Contract Sum, the Architect shall determine the method and the adjustment on the basis of reasonable expenditures and savings of those performing the Work attributable to the change, including, in case of an increase in the Contract Sum, an amount

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for overhead and profit as set forth in the Agreement, or if no such amount is set forth in the Agreement, a reasonable amount. In such case, and also under Section 7.3.3.3, the Contractor shall keep and present, in such form as the Architect may prescribe, an itemized accounting together with appropriate supporting data. Unless otherwise provided in the Contract Documents, costs for the purposes of this Section 7.3.7 shall be limited to the following:

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

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

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

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

§ 7.4 MINOR CHANGES IN THE WORK

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

ARTICLE 8 TIME

§ 8.1 DEFINITIONS

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

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

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

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

§ 8.2 PROGRESS AND COMPLETION

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

§ 8.2.2 The Contractor shall not knowingly, except by agreement or instruction of the Owner in writing, prematurely commence operations on the site or elsewhere prior to the effective date of insurance required by Article 11 to be furnished by the Contractor and Owner. The date of commencement of the Work shall not be changed by the effective date of such insurance.

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

§ 8.3 DELAYS AND EXTENSIONS OF TIME

§ 8.3.1 If the Contractor is delayed at any time in the commencement or progress of the Work by an act or neglect of the Owner or Architect, or of an employee of either, or of a separate contractor employed by the Owner; or by changes ordered in the Work; or by labor disputes, fire, unusual delay in deliveries, unavoidable casualties or other causes beyond the Contractor's control; or by delay authorized by the Owner pending mediation and arbitration; or by other causes that the Architect determines may justify delay, then the Contract Time shall be extended by Change Order for such reasonable time as the Architect may determine.

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

§ 8.3.3 This Section 8.3 does not preclude recovery of damages for delay by either party under other provisions of the Contract Documents.

ARTICLE 9 PAYMENTS AND COMPLETION

§ 9.1 CONTRACT SUM

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

§ 9.2 SCHEDULE OF VALUES

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

§ 9.3 APPLICATIONS FOR PAYMENT

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

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

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

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

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

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encumbrances in favor of the Contractor, Subcontractors, material suppliers, or other persons or entities making a claim by reason of having provided labor, materials and equipment relating to the Work.

§ 9.4 CERTIFICATES FOR PAYMENT

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

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

§ 9.5 DECISIONS TO WITHHOLD CERTIFICATION

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

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

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

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

§ 9.6 PROGRESS PAYMENTS

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

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

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

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

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

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

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

§ 9.7 FAILURE OF PAYMENT

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

§ 9.8 SUBSTANTIAL COMPLETION

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

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

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

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§ 9.8.4 When the Work or designated portion thereof is substantially complete, the Architect will prepare a Certificate of Substantial Completion that shall establish the date of Substantial Completion, shall establish responsibilities of the Owner and Contractor for security, maintenance, heat, utilities, damage to the Work and insurance, and shall fix the time within which the Contractor shall finish all items on the list accompanying the Certificate. Warranties required by the Contract Documents shall commence on the date of Substantial Completion of the Work or designated portion thereof unless otherwise provided in the Certificate of Substantial Completion.

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

§ 9.9 PARTIAL OCCUPANCY OR USE

§ 9.9.1 The Owner may occupy or use any completed or partially completed portion of the Work at any stage when such portion is designated by separate agreement with the Contractor, provided such occupancy or use is consented to by the insurer as required under Section 11.3.1.5 and authorized by public authorities having jurisdiction over the Project. Such partial occupancy or use may commence whether or not the portion is substantially complete, provided the Owner and Contractor have accepted in writing the responsibilities assigned to each of them for payments, retainage, if any, security, maintenance, heat, utilities, damage to the Work and insurance, and have agreed in writing concerning the period for correction of the Work and commencement of warranties required by the Contract Documents. When the Contractor considers a portion substantially complete, the Contractor shall prepare and submit a list to the Architect as provided under Section 9.8.2. Consent of the Contractor to partial occupancy or use shall not be unreasonably withheld. The stage of the progress of the Work shall be determined by written agreement between the Owner and Contractor or, if no agreement is reached, by decision of the Architect.

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

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

§ 9.10 FINAL COMPLETION AND FINAL PAYMENT

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

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

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

§ 9.10.4 The making of final payment shall constitute a waiver of Claims by the Owner except those arising from

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

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

ARTICLE 10 PROTECTION OF PERSONS AND PROPERTY

§ 10.1 SAFETY PRECAUTIONS AND PROGRAMS

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

§ 10.2 SAFETY OF PERSONS AND PROPERTY

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

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

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

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

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

§ 10.2.5 The Contractor shall promptly remedy damage and loss (other than damage or loss insured under property insurance required by the Contract Documents) to property referred to in Sections 10.2.1.2 and 10.2.1.3 caused in whole or in part by the Contractor, a Subcontractor, a Sub-subcontractor, or anyone directly or indirectly employed by any of them, or by anyone for whose acts they may be liable and for which the Contractor is responsible under Sections 10.2.1.2 and 10.2.1.3, except damage or loss attributable to acts or omissions of the Owner or Architect or anyone directly or indirectly employed by either of them, or by anyone for whose acts either of them may be liable, and not attributable to the fault or negligence of the Contractor. The foregoing obligations of the Contractor are in addition to the Contractor's obligations under Section 3.18.

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

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

§ 10.2.8 INJURY OR DAMAGE TO PERSON OR PROPERTY

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

§ 10.3 HAZARDOUS MATERIALS

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

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

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

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

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

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

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§ 10.4 EMERGENCIES

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

ARTICLE 11 INSURANCE AND BONDS

§ 11.1 CONTRACTOR'S LIABILITY INSURANCE

§ 11.1.1 The Contractor shall purchase from and maintain in a company or companies lawfully authorized to do business in the jurisdiction in which the Project is located such insurance as will protect the Contractor from claims set forth below which may arise out of or result from the Contractor's operations and completed operations under the Contract and for which the Contractor may be legally liable, whether such operations be by the Contractor or by a Subcontractor or by anyone directly or indirectly employed by any of them, or by anyone for whose acts any of them may be liable:

- .1 Claims under workers' compensation, disability benefit and other similar employee benefit acts that are applicable to the Work to be performed;
- .2 Claims for damages because of bodily injury, occupational sickness or disease, or death of the Contractor's employees;
- .3 Claims for damages because of bodily injury, sickness or disease, or death of any person other than the Contractor's employees;
- .4 Claims for damages insured by usual personal injury liability coverage;
- .5 Claims for damages, other than to the Work itself, because of injury to or destruction of tangible property, including loss of use resulting therefrom;
- .6 Claims for damages because of bodily injury, death of a person or property damage arising out of ownership, maintenance or use of a motor vehicle;
- .7 Claims for bodily injury or property damage arising out of completed operations; and
- .8 Claims involving contractual liability insurance applicable to the Contractor's obligations under Section 3.18.

§ 11.1.2 The insurance required by Section 11.1.1 shall be written for not less than limits of liability specified in the Contract Documents or required by law, whichever coverage is greater. Coverages, whether written on an occurrence or claims-made basis, shall be maintained without interruption from the date of commencement of the Work until the date of final payment and termination of any coverage required to be maintained after final payment, and, with respect to the Contractor's completed operations coverage, until the expiration of the period for correction of Work or for such other period for maintenance of completed operations coverage as specified in the Contract Documents.

§ 11.1.3 Certificates of insurance acceptable to the Owner shall be filed with the Owner prior to commencement of the Work and thereafter upon renewal or replacement of each required policy of insurance. These certificates and the insurance policies required by this Section 11.1 shall contain a provision that coverages afforded under the policies will not be canceled or allowed to expire until at least 30 days' prior written notice has been given to the Owner. An additional certificate evidencing continuation of liability coverage, including coverage for completed operations, shall be submitted with the final Application for Payment as required by Section 9.10.2 and thereafter upon renewal or replacement of such coverage until the expiration of the time required by Section 11.1.2. Information concerning reduction of coverage on account of revised limits or claims paid under the General Aggregate, or both, shall be furnished by the Contractor with reasonable promptness.

§ 11.1.4 The Contractor shall cause the commercial liability coverage required by the Contract Documents to include (1) the Owner, the Architect and the Architect's consultants as additional insureds for claims caused in whole or in part by the Contractor's negligent acts or omissions during the Contractor's operations; and (2) the Owner as an additional insured for claims caused in whole or in part by the Contractor's negligent acts or omissions during the Contractor's completed operations.

§ 11.2 OWNER'S LIABILITY INSURANCE

The Owner shall be responsible for purchasing and maintaining the Owner's usual liability insurance.

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§ 11.3 PROPERTY INSURANCE

§ 11.3.1 Unless otherwise provided, the Owner shall purchase and maintain, in a company or companies lawfully authorized to do business in the jurisdiction in which the Project is located, property insurance written on a builder's risk "all-risk" or equivalent policy form in the amount of the initial Contract Sum, plus value of subsequent Contract Modifications and cost of materials supplied or installed by others, comprising total value for the entire Project at the site on a replacement cost basis without optional deductibles. Such property insurance shall be maintained, unless otherwise provided in the Contract Documents or otherwise agreed in writing by all persons and entities who are beneficiaries of such insurance, until final payment has been made as provided in Section 9.10 or until no person or entity other than the Owner has an insurable interest in the property required by this Section 11.3 to be covered, whichever is later. This insurance shall include interests of the Owner, the Contractor, Subcontractors and Sub-subcontractors in the Project.

§ 11.3.1.1 Property insurance shall be on an "all-risk" or equivalent policy form and shall include, without limitation, insurance against the perils of fire (with extended coverage) and physical loss or damage including, without duplication of coverage, theft, vandalism, malicious mischief, collapse, earthquake, flood, windstorm, falsework, testing and startup, temporary buildings and debris removal including demolition occasioned by enforcement of any applicable legal requirements, and shall cover reasonable compensation for Architect's and Contractor's services and expenses required as a result of such insured loss.

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

§ 11.3.1.3 If the property insurance requires deductibles, the Owner shall pay costs not covered because of such deductibles.

§ 11.3.1.4 This property insurance shall cover portions of the Work stored off the site, and also portions of the Work in transit.

§ 11.3.1.5 Partial occupancy or use in accordance with Section 9.9 shall not commence until the insurance company or companies providing property insurance have consented to such partial occupancy or use by endorsement or otherwise. The Owner and the Contractor shall take reasonable steps to obtain consent of the insurance company or companies and shall, without mutual written consent, take no action with respect to partial occupancy or use that would cause cancellation, lapse or reduction of insurance.

§ 11.3.2 BOILER AND MACHINERY INSURANCE

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

§ 11.3.3 LOSS OF USE INSURANCE

The Owner, at the Owner's option, may purchase and maintain such insurance as will insure the Owner against loss of use of the Owner's property due to fire or other hazards, however caused. The Owner waives all rights of action against the Contractor for loss of use of the Owner's property, including consequential losses due to fire or other hazards however caused.

§ 11.3.4 If the Contractor requests in writing that insurance for risks other than those described herein or other special causes of loss be included in the property insurance policy, the Owner shall, if possible, include such insurance, and the cost thereof shall be charged to the Contractor by appropriate Change Order.

§ 11.3.5 If during the Project construction period the Owner insures properties, real or personal or both, at or adjacent to the site by property insurance under policies separate from those insuring the Project, or if after final payment

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property insurance is to be provided on the completed Project through a policy or policies other than those insuring the Project during the construction period, the Owner shall waive all rights in accordance with the terms of Section 11.3.7 for damages caused by fire or other causes of loss covered by this separate property insurance. All separate policies shall provide this waiver of subrogation by endorsement or otherwise.

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

§ 11.3.7 WAIVERS OF SUBROGATION

The Owner and Contractor waive all rights against (1) each other and any of their subcontractors, sub-subcontractors, agents and employees, each of the other, and (2) the Architect, Architect's consultants, separate contractors described in Article 6, if any, and any of their subcontractors, sub-subcontractors, agents and employees, for damages caused by fire or other causes of loss to the extent covered by property insurance obtained pursuant to this Section 11.3 or other property insurance applicable to the Work, except such rights as they have to proceeds of such insurance held by the Owner as fiduciary. The Owner or Contractor, as appropriate, shall require of the Architect, Architect's consultants, separate contractors described in Article 6, if any, and the subcontractors, sub-subcontractors, agents and employees of any of them, by appropriate agreements, written where legally required for validity, similar waivers each in favor of other parties enumerated herein. The policies shall provide such waivers of subrogation by endorsement or otherwise. A waiver of subrogation shall be effective as to a person or entity even though that person or entity would otherwise have a duty of indemnification, contractual or otherwise, did not pay the insurance premium directly or indirectly, and whether or not the person or entity had an insurable interest in the property damaged.

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

§ 11.3.9 If required in writing by a party in interest, the Owner as fiduciary shall, upon occurrence of an insured loss, give bond for proper performance of the Owner's duties. The cost of required bonds shall be charged against proceeds received as fiduciary. The Owner shall deposit in a separate account proceeds so received, which the Owner shall distribute in accordance with such agreement as the parties in interest may reach, or as determined in accordance with the method of binding dispute resolution selected in the Agreement between the Owner and Contractor. If after such loss no other special agreement is made and unless the Owner terminates the Contract for convenience, replacement of damaged property shall be performed by the Contractor after notification of a Change in the Work in accordance with Article 7.

§ 11.3.10 The Owner as fiduciary shall have power to adjust and settle a loss with insurers unless one of the parties in interest shall object in writing within five days after occurrence of loss to the Owner's exercise of this power; if such objection is made, the dispute shall be resolved in the manner selected by the Owner and Contractor as the method of binding dispute resolution in the Agreement. If the Owner and Contractor have selected arbitration as the method of binding dispute resolution, the Owner as fiduciary shall make settlement with insurers or, in the case of a dispute over distribution of insurance proceeds, in accordance with the directions of the arbitrators.

§ 11.4 PERFORMANCE BOND AND PAYMENT BOND

§ 11.4.1 The Owner shall have the right to require the Contractor to furnish bonds covering faithful performance of the Contract and payment of obligations arising thereunder as stipulated in bidding requirements or specifically required in the Contract Documents on the date of execution of the Contract.

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

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ARTICLE 12 UNCOVERING AND CORRECTION OF WORK

§ 12.1 UNCOVERING OF WORK

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

§ 12.1.2 If a portion of the Work has been covered that the Architect has not specifically requested to examine prior to its being covered, the Architect may request to see such Work and it shall be uncovered by the Contractor. If such Work is in accordance with the Contract Documents, costs of uncovering and replacement shall, by appropriate Change Order, be at the Owner's expense. If such Work is not in accordance with the Contract Documents, such costs and the cost of correction shall be at the Contractor's expense unless the condition was caused by the Owner or a separate contractor in which event the Owner shall be responsible for payment of such costs.

§ 12.2 CORRECTION OF WORK

§ 12.2.1 BEFORE OR AFTER SUBSTANTIAL COMPLETION

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

§ 12.2.2 AFTER SUBSTANTIAL COMPLETION

§ 12.2.2.1 In addition to the Contractor's obligations under Section 3.5, if, within one year after the date of Substantial Completion of the Work or designated portion thereof or after the date for commencement of warranties established under Section 9.9.1, or by terms of an applicable special warranty required by the Contract Documents, any of the Work is found to be not in accordance with the requirements of the Contract Documents, the Contractor shall correct it promptly after receipt of written notice from the Owner to do so unless the Owner has previously given the Contractor a written acceptance of such condition. The Owner shall give such notice promptly after discovery of the condition. During the one-year period for correction of Work, if the Owner fails to notify the Contractor and give the Contractor an opportunity to make the correction, the Owner waives the rights to require correction by the Contractor and to make a claim for breach of warranty. If the Contractor fails to correct nonconforming Work within a reasonable time during that period after receipt of notice from the Owner or Architect, the Owner may correct it in accordance with Section 2.4.

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

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

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

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

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

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§ 12.3 ACCEPTANCE OF NONCONFORMING WORK

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

ARTICLE 13 MISCELLANEOUS PROVISIONS

§ 13.1 GOVERNING LAW

The Contract shall be governed by the law of the place where the Project is located except that, if the parties have selected arbitration as the method of binding dispute resolution, the Federal Arbitration Act shall govern Section 15.4.

§ 13.2 SUCCESSORS AND ASSIGNS

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

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

§ 13.3 WRITTEN NOTICE

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

§ 13.4 RIGHTS AND REMEDIES

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

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

§ 13.5 TESTS AND INSPECTIONS

§ 13.5.1 Tests, inspections and approvals of portions of the Work shall be made as required by the Contract Documents and by applicable laws, statutes, ordinances, codes, rules and regulations or lawful orders of public authorities. Unless otherwise provided, the Contractor shall make arrangements for such tests, inspections and approvals with an independent testing laboratory or entity acceptable to the Owner, or with the appropriate public authority, and shall bear all related costs of tests, inspections and approvals. The Contractor shall give the Architect timely notice of when and where tests and inspections are to be made so that the Architect may be present for such procedures. The Owner shall bear costs of (1) tests, inspections or approvals that do not become requirements until after bids are received or negotiations concluded, and (2) tests, inspections or approvals where building codes or applicable laws or regulations prohibit the Owner from delegating their cost to the Contractor.

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

§ 13.5.3 If such procedures for testing, inspection or approval under Sections 13.5.1 and 13.5.2 reveal failure of the portions of the Work to comply with requirements established by the Contract Documents, all costs made necessary by

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such failure including those of repeated procedures and compensation for the Architect's services and expenses shall be at the Contractor's expense.

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

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

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

§ 13.6 INTEREST

Payments due and unpaid under the Contract Documents shall bear interest from the date payment is due at such rate as the parties may agree upon in writing or, in the absence thereof, at the legal rate prevailing from time to time at the place where the Project is located.

§ 13.7 TIME LIMITS ON CLAIMS

The Owner and Contractor shall commence all claims and causes of action, whether in contract, tort, breach of warranty or otherwise, against the other arising out of or related to the Contract in accordance with the requirements of the final dispute resolution method selected in the Agreement within the time period specified by applicable law, but in any case not more than 10 years after the date of Substantial Completion of the Work. The Owner and Contractor waive all claims and causes of action not commenced in accordance with this Section 13.7.

ARTICLE 14 TERMINATION OR SUSPENSION OF THE CONTRACT

§ 14.1 TERMINATION BY THE CONTRACTOR

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

- .1 Issuance of an order of a court or other public authority having jurisdiction that requires all Work to be stopped;
- .2 An act of government, such as a declaration of national emergency that requires all Work to be stopped;
- .3 Because the Architect has not issued a Certificate for Payment and has not notified the Contractor of the reason for withholding certification as provided in Section 9.4.1, or because the Owner has not made payment on a Certificate for Payment within the time stated in the Contract Documents; or
- .4 The Owner has failed to furnish to the Contractor promptly, upon the Contractor's request, reasonable evidence as required by Section 2.2.1.

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

§ 14.1.3 If one of the reasons described in Section 14.1.1 or 14.1.2 exists, the Contractor may, upon seven days' written notice to the Owner and Architect, terminate the Contract and recover from the Owner payment for Work executed, including reasonable overhead and profit, costs incurred by reason of such termination, and damages.

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

§ 14.2 TERMINATION BY THE OWNER FOR CAUSE

§ 14.2.1 The Owner may terminate the Contract if the Contractor

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

§ 14.2.2 When any of the above reasons exist, the Owner, upon certification by the Initial Decision Maker that sufficient cause exists to justify such action, may without prejudice to any other rights or remedies of the Owner and after giving the Contractor and the Contractor's surety, if any, seven days' written notice, terminate employment of the Contractor and may, subject to any prior rights of the surety:

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

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

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

§ 14.3 SUSPENSION BY THE OWNER FOR CONVENIENCE

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

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

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

§ 14.4 TERMINATION BY THE OWNER FOR CONVENIENCE

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

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

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

§ 14.4.3 In case of such termination for the Owner's convenience, the Contractor shall be entitled to receive payment for Work executed, and costs incurred by reason of such termination, along with reasonable overhead and profit on the Work not executed.

ARTICLE 15 CLAIMS AND DISPUTES

§ 15.1 CLAIMS

§ 15.1.1 DEFINITION

A Claim is a demand or assertion by one of the parties seeking, as a matter of right, payment of money, or other relief with respect to the terms of the Contract. The term "Claim" also includes other disputes and matters in question between the Owner and Contractor arising out of or relating to the Contract. The responsibility to substantiate Claims shall rest with the party making the Claim.

§ 15.1.2 NOTICE OF CLAIMS

Claims by either the Owner or Contractor must be initiated by written notice to the other party and to the Initial Decision Maker with a copy sent to the Architect, if the Architect is not serving as the Initial Decision Maker. Claims by either party must be initiated within 21 days after occurrence of the event giving rise to such Claim or within 21 days after the claimant first recognizes the condition giving rise to the Claim, whichever is later.

§ 15.1.3 CONTINUING CONTRACT PERFORMANCE

Pending final resolution of a Claim, except as otherwise agreed in writing or as provided in Section 9.7 and Article 14, the Contractor shall proceed diligently with performance of the Contract and the Owner shall continue to make payments in accordance with the Contract Documents. The Architect will prepare Change Orders and issue Certificates for Payment in accordance with the decisions of the Initial Decision Maker.

§ 15.1.4 CLAIMS FOR ADDITIONAL COST

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

§ 15.1.5 CLAIMS FOR ADDITIONAL TIME

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

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

§ 15.1.6 CLAIMS FOR CONSEQUENTIAL DAMAGES

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

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

This mutual waiver is applicable, without limitation, to all consequential damages due to either party's termination in accordance with Article 14. Nothing contained in this Section 15.1.6 shall be deemed to preclude an award of liquidated damages, when applicable, in accordance with the requirements of the Contract Documents.

§ 15.2 INITIAL DECISION

§ 15.2.1 Claims, excluding those arising under Sections 10.3, 10.4, 11.3.9, and 11.3.10, shall be referred to the Initial Decision Maker for initial decision. The Architect will serve as the Initial Decision Maker, unless otherwise indicated in the Agreement. Except for those Claims excluded by this Section 15.2.1, an initial decision shall be required as a condition precedent to mediation of any Claim arising prior to the date final payment is due, unless 30 days have passed after the Claim has been referred to the Initial Decision Maker with no decision having been rendered. Unless the Initial Decision Maker and all affected parties agree, the Initial Decision Maker will not decide disputes between the Contractor and persons or entities other than the Owner.

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

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

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

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

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

§ 15.2.6.1 Either party may, within 30 days from the date of an initial decision, demand in writing that the other party file for mediation within 60 days of the initial decision. If such a demand is made and the party receiving the demand fails to file for mediation within the time required, then both parties waive their rights to mediate or pursue binding dispute resolution proceedings with respect to the initial decision.

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

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

§ 15.3 MEDIATION

§ 15.3.1 Claims, disputes, or other matters in controversy arising out of or related to the Contract except those waived as provided for in Sections 9.10.4, 9.10.5, and 15.1.6 shall be subject to mediation as a condition precedent to binding dispute resolution.

§ 15.3.2 The parties shall endeavor to resolve their Claims by mediation which, unless the parties mutually agree otherwise, shall be administered by the American Arbitration Association in accordance with its Construction Industry Mediation Procedures in effect on the date of the Agreement. A request for mediation shall be made in writing, delivered to the other party to the Contract, and filed with the person or entity administering the mediation. The request may be made concurrently with the filing of binding dispute resolution proceedings but, in such event, mediation shall proceed in advance of binding dispute resolution proceedings, which shall be stayed pending mediation for a period of 60 days from the date of filing, unless stayed for a longer period by agreement of the parties or court order. If an arbitration is stayed pursuant to this Section 15.3.2, the parties may nonetheless proceed to the selection of the arbitrator(s) and agree upon a schedule for later proceedings.

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

§ 15.4 ARBITRATION

§ 15.4.1 If the parties have selected arbitration as the method for binding dispute resolution in the Agreement, any Claim subject to, but not resolved by, mediation shall be subject to arbitration which, unless the parties mutually agree otherwise, shall be administered by the American Arbitration Association in accordance with its Construction Industry Arbitration Rules in effect on the date of the Agreement. A demand for arbitration shall be made in writing, delivered to the other party to the Contract, and filed with the person or entity administering the arbitration. The party filing a notice of demand for arbitration must assert in the demand all Claims then known to that party on which arbitration is permitted to be demanded.

§ 15.4.1.1 A demand for arbitration shall be made no earlier than concurrently with the filing of a request for mediation, but in no event shall it be made after the date when the institution of legal or equitable proceedings based on the Claim would be barred by the applicable statute of limitations. For statute of limitations purposes, receipt of a written demand for arbitration by the person or entity administering the arbitration shall constitute the institution of legal or equitable proceedings based on the Claim.

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

§ 15.4.3 The foregoing agreement to arbitrate and other agreements to arbitrate with an additional person or entity duly consented to by parties to the Agreement shall be specifically enforceable under applicable law in any court having jurisdiction thereof.

§ 15.4.4 CONSOLIDATION OR JOINDER

§ 15.4.4.1 Either party, at its sole discretion, may consolidate an arbitration conducted under this Agreement with any other arbitration to which it is a party provided that (1) the arbitration agreement governing the other arbitration permits consolidation, (2) the arbitrations to be consolidated substantially involve common questions of law or fact, and (3) the arbitrations employ materially similar procedural rules and methods for selecting arbitrator(s).

§ 15.4.4.2 Either party, at its sole discretion, may include by joinder persons or entities substantially involved in a common question of law or fact whose presence is required if complete relief is to be accorded in arbitration, provided that the party sought to be joined consents in writing to such joinder. Consent to arbitration involving an additional person or entity shall not constitute consent to arbitration of any claim, dispute or other matter in question not described in the written consent.

§ 15.4.4.3 The Owner and Contractor grant to any person or entity made a party to an arbitration conducted under this Section 15.4, whether by joinder or consolidation, the same rights of joinder and consolidation as the Owner and Contractor under this Agreement.

ELIZABETHTOWN FIRE DISTRICT
FIRE STATION ADDITION
AES PROJECT NO. 4027

DOCUMENT 007313

SUPPLEMENTARY CONDITIONS - AIA

1.1 SUMMARY

- A. Document Includes:
 - 1. Supplementary Conditions.
- B. Related Documents:
 - 1. Document 004113 - Bid Form - Stipulated Sum.
 - 2. Document 004300 - Procurement Form Supplements with Appendices.
 - 3. Document 005214 - Agreement Form - AIA Stipulated Sum.
 - 4. Document 007214 - General Conditions - AIA Stipulated Sum.

1.2 SUPPLEMENTARY CONDITIONS

- A. These Supplementary Conditions modify the General Conditions of the Contract for Construction, AIA Document A201-1997, and other provisions of the Contract Documents as indicated below. All provisions which are not so modified remain in full force and effect.
- B. The terms used in these Supplementary Conditions which are defined in the General Conditions of the Contract for Construction, AIA Document A201-1997, have the meanings assigned to them in the General Conditions.

ARTICLE 1.1 - BASIC DEFINITIONS

Add the following subparagraphs:

- 1.1.8 Products: Means new material, machinery, components, equipment, fixtures, and systems forming the Work, but does 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 reuse.
- 1.1.9 Furnish: To supply and deliver, unload, inspect for damage.
- 1.1.10 Install: To unpack, assemble, erect, apply, place, finish, cure, protect, clean, and make ready for use.
- 1.1.11 Provide: To furnish and install.

ARTICLE 1.2 - CORRELATION AND INTENT OF THE CONTRACT DOCUMENTS

Add the following subparagraph:

- 1.2.4 Sections of Division 01 - General Requirements govern the execution of the work of all sections of the specifications.

ARTICLE 3.6 - TAXES

Add the following subparagraph:

ELIZABETHTOWN FIRE DISTRICT
FIRE STATION ADDITION
AES PROJECT NO. 4027

3.6.2 The owner is exempt from payment of sales and compensating use of the State of New York and of cities, counties and other subdivisions of the State, of materials sold to it pursuant to the provisions of the Contract. Those taxes are not to be included in bids.

Contractor's purchases of tangible personal property which does not become an integral part of the exempt organization's real property, and are consumed by the Contractor as well as purchases of taxable services are subject to tax.

ARTICLE 7.3 - CONSTRUCTION CHANGE DIRECTIVES

Add the following subparagraphs:

7.1.4 The Agreement identifies the overhead and profit fees applicable to Changes in the Work, whether additions to or deductions from the Work on which the Contract Sum is based and identifies the fees for subcontract work for changes (both additions and deductions) in the Work. The Contractor shall apply fees as noted, to the Subcontractor's gross (net plus fee) costs on additional work.

ARTICLE 8 - TIME

Add the following subparagraph:

8.1.5 Contract Time is identified in Document 002114 and 004113.

ARTICLE 9 - PAYMENTS AND COMPLETION

Add the following paragraphs:

9.11 Liquidated Damages

9.11.1 Liquidated damages in the amount of \$200 per calendar day shall accrue to the Owner after Substantial Completion for late completion of the Work after Contract Time has expired.

ARTICLE 11.1 - CONTRACTOR'S LIABILITY INSURANCE

The limits of liability for insurance required by Article 11.1 of the General Conditions shall provide coverage for not less than the following amounts or greater where required by Laws and Regulations:

1. Workers' Compensation, and related coverages under the General Conditions:
 - a. State: Statutory
 - b. Applicable Federal (e.g., Longshoremen's) Statutory
 - c. Employer's Liability \$ 1,000,000

2. Contractor's General Liability under the General Conditions which shall include completed operations and product liability coverages and eliminate the exclusion with respect to property under the care, custody, and control of the Contractor:
 - a. General Aggregate \$ 3,000,000
 - b. Products - Completed Operations Aggregate \$ 3,000,000

ELIZABETHTOWN FIRE DISTRICT
FIRE STATION ADDITION
AES PROJECT NO. 4027

- c. Personal and Advertising Injury \$ 1,000,000
 - d. Each Occurrence (Bodily Injury and Property Damage) \$ 1,000,000
 - e. Property Damage liability insurance will provide Explosion, Collapse, and Underground coverages where applicable.
 - f. Excess or Umbrella Liability
 - 1) General Aggregate \$ 3,000,000
 - 2) Each Occurrence \$ 3,000,000
3. Automobile Liability under the General Conditions: (including Hired and Non-Owned Vehicles)
- a. Bodily Injury:
 - Each Person \$ 1,000,000
 - Each Accident \$ 1,000,000
 - b. Property Damage:
 - Each Accident \$ 1,000,000
 - c. Combined Single Limit of \$ 1,000,000
4. The Contractual Liability coverage required by the General Conditions shall provide coverage for not less than the following amounts:
- a. Bodily Injury and Property Damage (Combined single limit): \$ 1,000,000
 - b. Annual Aggregate: \$ 3,000,000
2. Owner's and Contractor's Protective Liability Insurance:
- a. Each Occurrence \$ 1,000,000
 - b. General Aggregate \$ 2,000,000
5. The following names of other persons or entities are to be included on policy as additional insureds and included on General, Auto, and Excess/Umbrella Liability on a primary and non-contributory basis and includes Completed Operations for 3 years.

Elizabethtown Fire District
Woodruff Street
Elizabethtown, NY 12932

AES Northeast, PLLC
10-12 City Hall Place
Plattsburgh, NY 12901

ARTICLE 11.5 - PERFORMANCE BOND AND PAYMENT BOND

Add the following subparagraphs:

- 11.5.3 The Contractor shall furnish bonds to the Owner in the following amounts:
 - 11.5.3.1 Furnish a 100 percent Performance Bond on a standard surety bond form.
 - 11.5.3.2 Furnish a 100 percent Payment Bond on a standard surety bond form.

END OF DOCUMENT

Supplementary Conditions - AIA
007313

ELIZABETHTOWN FIRE DISTRICT
FIRE STATION ADDITION
AES PROJECT NO. 4027

DOCUMENT 009100

NYS PREVAILING WAGE RATE

PRC #2014007119



Andrew M. Cuomo, Governor

_____, Commissioner

Elizabethtown Fire District
David Whitford, Principal Architect
AES Northeast
10-12 City Hall Place
Plattsburgh NY 12901

Schedule Year 2014 through 2015
Date Requested 07/30/2014
PRC# 2014007119

Location Elizabethtown, NY
Project ID#
Project Type Construct a 24' x 48' one bay addition.

PREVAILING WAGE SCHEDULE FOR ARTICLE 8 PUBLIC WORK PROJECT

Attached is the current schedule(s) of the prevailing wage rates and prevailing hourly supplements for the project referenced above. A unique Prevailing Wage Case Number (PRC#) has been assigned to the schedule(s) for your project.

The schedule is effective from July 2014 through June 2015. All updates, corrections, posted on the 1st business day of each month, and future copies of the annual determination are available on the Department's website www.labor.state.ny.us. Updated PDF copies of your schedule can be accessed by entering your assigned PRC# at the proper location on the website.

It is the responsibility of the contracting agency or its agent to annex and make part, the attached schedule, to the specifications for this project, when it is advertised for bids and /or to forward said schedules to the successful bidder(s), immediately upon receipt, in order to insure the proper payment of wages.

Please refer to the "General Provisions of Laws Covering Workers on Public Work Contracts" provided with this schedule, for the specific details relating to other responsibilities of the Department of Jurisdiction.

Upon completion or cancellation of this project, enter the required information and mail **OR** fax this form to the office shown at the bottom of this notice, **OR** fill out the electronic version via the NYSDOL website.

NOTICE OF COMPLETION / CANCELLATION OF PROJECT

Date Completed: _____ Date Cancelled: _____

Name & Title of Representative: _____

Phone: (518) 457-5589 Fax: (518) 485-1870
W. Averell Harriman State Office Campus, Bldg. 12, Room 130, Albany, NY 12240

General Provisions of Laws Covering Workers on Article 8 Public Work Contracts

Introduction

The Labor Law requires public work contractors and subcontractors to pay laborers, workers, or mechanics employed in the performance of a public work contract not less than the prevailing rate of wage and supplements (fringe benefits) in the locality where the work is performed.

Responsibilities of the Department of Jurisdiction

A Department of Jurisdiction (Contracting Agency) includes a state department, agency, board or commission; a county, city, town or village; a school district, board of education or board of cooperative educational services; a sewer, water, fire, improvement and other district corporation; a public benefit corporation; and a public authority awarding a public work contract.

The Department of Jurisdiction (Contracting Agency) awarding a public work contract MUST obtain a Prevailing Rate Schedule listing the hourly rates of wages and supplements due the workers to be employed on a public work project. This schedule may be obtained by completing and forwarding a "Request for wage and Supplement Information" form (PW 39) to the Bureau of Public Work. The Prevailing Rate Schedule MUST be included in the specifications for the contract to be awarded and is deemed part of the public work contract.

Upon the awarding of the contract, the law requires that the Department of Jurisdiction (Contracting Agency) furnish the following information to the Bureau: the name and address of the contractor, the date the contract was let and the approximate dollar value of the contract. To facilitate compliance with this provision of the Labor Law, a copy of the Department's "Notice of Contract Award" form (PW 16) is provided with the original Prevailing Rate Schedule.

The Department of Jurisdiction (Contracting Agency) is required to notify the Bureau of the completion or cancellation of any public work project. The Department's PW 200 form is provided for that purpose.

Both the PW 16 and PW 200 forms are available for completion [online](#).

Hours

No laborer, worker, or mechanic in the employ of a contractor or subcontractor engaged in the performance of any public work project shall be permitted to work more than eight hours in any day or more than five days in any week, except in cases of extraordinary emergency. The contractor and the Department of Jurisdiction (Contracting Agency) may apply to the Bureau of Public Work for a dispensation permitting workers to work additional hours or days per week on a particular public work project.

There are very few exceptions to this rule. Complete information regarding these exceptions is available on the "[4 Day / 10 Hour Work Schedule](#)" form (PW 30R).

Wages and Supplements

The wages and supplements to be paid and/or provided to laborers, workers, and mechanics employed on a public work project shall be not less than those listed in the current Prevailing Rate Schedule for the locality where the work is performed. If a prime contractor on a public work project has not been provided with a Prevailing Rate Schedule, the contractor must notify the Department of Jurisdiction (Contracting Agency) who in turn must request an original Prevailing Rate Schedule form the Bureau of Public Work. Requests may be submitted by: mail to NYSDOL, Bureau of Public Work, State Office Bldg. Campus, Bldg. 12, Rm. 130, Albany, NY 12240; Fax to Bureau of Public Work (518) 485-1870; or electronically at the NYSDOL website www.labor.state.ny.us.

Upon receiving the original schedule, the Department of Jurisdiction (Contracting Agency) is REQUIRED to provide complete copies to all prime contractors who in turn MUST, by law, provide copies of all applicable county schedules to each subcontractor and obtain from each subcontractor, an affidavit certifying such schedules were received. If the original schedule expired, the contractor may obtain a copy of the new annual determination from the NYSDOL website www.labor.state.ny.us.

The Commissioner of Labor makes an annual determination of the prevailing rates. This determination is in effect from July 1st through June 30th of the following year. The annual determination is available on the NYSDOL website www.labor.state.ny.us.

Payrolls and Payroll Records

Every contractor and subcontractor MUST keep original payrolls or transcripts subscribed and affirmed as true under penalty of perjury. Payrolls must be maintained for at least three (3) years from the project's date of completion. At a minimum, payrolls must show the following information for each person employed on a public work project: Name, Address, Last 4 Digits of Social Security Number, Classification(s) in which the worker was employed, Hourly wage rate(s) paid, Supplements paid or provided, and Daily and weekly number of hours worked in each classification.

Every contractor and subcontractor shall submit to the Department of Jurisdiction (Contracting Agency), within thirty (30) days after issuance of its first payroll and every thirty (30) days thereafter, a transcript of the original payrolls, subscribed and affirmed as true under penalty of perjury. The Department of Jurisdiction (Contracting Agency) shall collect, review for facial validity, and maintain such payrolls.

In addition, the Commissioner of Labor may require contractors to furnish, with ten (10) days of a request, payroll records sworn to as their validity and accuracy for public work and private work. Payroll records include, but are not limited to time cards, work description sheets, proof that supplements were provided, cancelled payroll checks and payrolls. Failure to provide the requested information within the allotted ten (10) days will result in the withholding of up to 25% of the contract, not to exceed \$100,000.00. If the contractor or subcontractor does not maintain a place of business in New York State and the amount of the contract exceeds \$25,000.00, payroll records and certifications must be kept on the project worksite.

The prime contractor is responsible for any underpayments of prevailing wages or supplements by any subcontractor.

All contractors or their subcontractors shall provide to their subcontractors a copy of the Prevailing Rate Schedule specified in the public work contract as well as any subsequently issued schedules. A failure to provide these schedules by a contractor or subcontractor is a violation of Article 8, Section 220-a of the Labor Law.

All subcontractors engaged by a public work project contractor or its subcontractor, upon receipt of the original schedule and any subsequently issued schedules, shall provide to such contractor a verified statement attesting that the subcontractor has received the Prevailing Rate Schedule and will pay or provide the applicable rates of wages and supplements specified therein. (See NYS Labor Laws, Article 8 . Section 220-a).

Determination of Prevailing Wage and Supplement Rate Updates Applicable to All Counties

The wages and supplements contained in the annual determination become effective July 1st whether or not the new determination has been received by a given contractor. Care should be taken to review the rates for obvious errors. Any corrections should be brought to the Department's attention immediately. It is the responsibility of the public work contractor to use the proper rates. If there is a question on the proper classification to be used, please call the district office located nearest the project. Any errors in the annual determination will be corrected and posted to the NYS DOL website on the first business day of each month. Contractors are responsible for paying these updated rates as well, retroactive to July 1st.

When you review the schedule for a particular occupation, your attention should be directed to the dates above the column of rates. These are the dates for which a given set of rates is effective. To the extent possible, the Department posts rates in its possession that cover periods of time beyond the July 1st to June 30th time frame covered by a particular annual determination. Rates that extend beyond that instant time period are informational ONLY and may be updated in future annual determinations that actually cover the then appropriate July 1st to June 30th time period.

Withholding of Payments

When a complaint is filed with the Commissioner of Labor alleging the failure of a contractor or subcontractor to pay or provide the prevailing wages or supplements, or when the Commissioner of Labor believes that unpaid wages or supplements may be due, payments on the public work contract shall be withheld from the prime contractor in a sufficient amount to satisfy the alleged unpaid wages and supplements, including interest and civil penalty, pending a final determination.

When the Bureau of Public Work finds that a contractor or subcontractor on a public work project failed to pay or provide the requisite prevailing wages or supplements, the Bureau is authorized by Sections 220-b and 235.2 of the Labor Law to so notify the financial officer of the Department of Jurisdiction (Contracting Agency) that awarded the public work contract. Such officer MUST then withhold or cause to be withheld from any payment due the prime contractor on account of such contract the amount indicated by the Bureau as sufficient to satisfy the unpaid wages and supplements, including interest and any civil penalty that may be assessed by the Commissioner of Labor. The withholding continues until there is a final determination of the underpayment by the Commissioner of Labor or by the court in the event a legal proceeding is instituted for review of the determination of the Commissioner of Labor.

The Department of Jurisdiction (Contracting Agency) shall comply with this order of the Commissioner of Labor or of the court with respect to the release of the funds so withheld.

Summary of Notice Posting Requirements

The current Prevailing Rate Schedule must be posted in a prominent and accessible place on the site of the public work project. The prevailing wage schedule must be encased in, or constructed of, materials capable of withstanding adverse weather conditions and be titled "PREVAILING RATE OF WAGES" in letters no smaller than two (2) inches by two (2) inches.

The "[Public Work Project](#)" notice must be posted at the beginning of the performance of every public work contract, on each job site.

Every employer providing workers. compensation insurance and disability benefits must post notices of such coverage in the format prescribed by the Workers. Compensation Board in a conspicuous place on the jobsite.

Every employer subject to the NYS Human Rights Law must conspicuously post at its offices, places of employment, or employment training centers, notices furnished by the State Division of Human Rights.

Employers liable for contributions under the Unemployment Insurance Law must conspicuously post on the jobsite notices furnished by the NYS Department of Labor.

Apprentices

Employees cannot be paid apprentice rates unless they are individually registered in a program registered with the NYS Commissioner of Labor. The allowable ratio of apprentices to journeyworkers in any craft classification can be no greater than the statewide building trade ratios promulgated by the Department of Labor and included with the Prevailing Rate Schedule. An employee listed on a payroll as an apprentice who is not registered as above or is performing work outside the classification of work for which the apprentice is indentured, must be paid the prevailing journeyworker's wage rate for the classification of work the employee is actually performing.

NYSDOL Labor Law, Article 8, Section 220-3, require that only apprentices individually registered with the NYS Department of Labor may be paid apprenticeship rates on a public work project. No other Federal or State Agency of office registers apprentices in New York State.

Persons wishing to verify the apprentice registration of any person must do so in writing by mail, to the NYSDOL Office of Employability Development / Apprenticeship Training, State Office Bldg. Campus, Bldg. 12, Albany, NY 12240 or by Fax to NYSDOL Apprenticeship Training (518) 457-7154. All requests for verification must include the name and social security number of the person for whom the information is requested.

The only conclusive proof of individual apprentice registration is written verification from the NYSDOL Apprenticeship Training Albany Central office. Neither Federal nor State Apprenticeship Training offices outside of Albany can provide conclusive registration information.

It should be noted that the existence of a registered apprenticeship program is not conclusive proof that any person is registered in that program. Furthermore, the existence or possession of wallet cards, identification cards, or copies of state forms is not conclusive proof of the registration of any person as an apprentice.

Interest and Penalties

In the event that an underpayment of wages and/or supplements is found:

- Interest shall be assessed at the rate then in effect as prescribed by the Superintendent of Banks pursuant to section 14-a of the Banking Law, per annum from the date of underpayment to the date restitution is made.
- A Civil Penalty may also be assessed, not to exceed 25% of the total of wages, supplements, and interest due.

Debarment

Any contractor or subcontractor and/or its successor shall be ineligible to submit a bid on or be awarded any public work contract or subcontract with any state, municipal corporation or public body for a period of five (5) years when:

- Two (2) willful determinations have been rendered against that contractor or subcontractor and/or its successor within any consecutive six (6) year period.
- There is any willful determination that involves the falsification of payroll records or the kickback of wages or supplements.

Criminal Sanctions

Willful violations of the Prevailing Wage Law (Article 8 of the Labor Law) may be a felony punishable by fine or imprisonment of up to 15 years, or both.

Discrimination

No employee or applicant for employment may be discriminated against on account of age, race, creed, color, national origin, sex, disability or marital status.

No contractor, subcontractor nor any person acting on its behalf, shall by reason of race, creed, color, disability, sex or national origin discriminate against any citizen of the State of New York who is qualified and available to perform the work to which the employment relates (NYS Labor Law, Article 8, Section 220-e(a)).

No contractor, subcontractor, nor any person acting on its behalf, shall in any manner, discriminate against or intimidate any employee on account of race, creed, color, disability, sex, or national origin (NYS Labor Law, Article 8, Section 220-e(b)).

The Human Rights Law also prohibits discrimination in employment because of age, marital status, or religion.

There may be deducted from the amount payable to the contractor under the contract a penalty of \$50.00 for each calendar day during which such person was discriminated against or intimidated in violation of the provision of the contract (NYS Labor Law, Article 8, Section 220-e(c)).

The contract may be cancelled or terminated by the State or municipality. All monies due or to become due thereunder may be forfeited for a second or any subsequent violation of the terms or conditions of the anti-discrimination sections of the contract (NYS Labor Law, Article 8, Section 220-e(d)).

Every employer subject to the New York State Human Rights Law must conspicuously post at its offices, places of employment, or employment training centers notices furnished by the State Division of Human Rights.

Workers' Compensation

In accordance with Section 142 of the State Finance Law, the contractor shall maintain coverage during the life of the contract for the benefit of such employees as required by the provisions of the New York State Workers' Compensation Law.

A contractor who is awarded a public work contract must provide proof of workers' compensation coverage prior to being allowed to begin work.

The insurance policy must be issued by a company authorized to provide workers' compensation coverage in New York State. Proof of coverage must be on form C-105.2 (Certificate of Workers' Compensation Insurance) and must name this agency as a certificate holder.

If New York State coverage is added to an existing out-of-state policy, it can only be added to a policy from a company authorized to write workers' compensation coverage in this state. The coverage must be listed under item 3A of the information page.

The contractor must maintain proof that subcontractors doing work covered under this contract secured and maintained a workers' compensation policy for all employees working in New York State.

Every employer providing worker's compensation insurance and disability benefits must post notices of such coverage in the format prescribed by the Workers' Compensation Board in a conspicuous place on the jobsite.

Unemployment Insurance

Employers liable for contributions under the Unemployment Insurance Law must conspicuously post on the jobsite notices furnished by the New York State Department of Labor.



Andrew M. Cuomo, Governor

_____, Commissioner

Elizabethtown Fire District
David Whitford, Principal Architect
AES Northeast
10-12 City Hall Place
Plattsburgh NY 12901

Schedule Year 2014 through 2015
Date Requested 07/30/2014
PRC# 2014007119

Location Elizabethtown, NY
Project ID#
Project Type Construct a 24' x 48' one bay addition.

Notice of Contract Award

New York State Labor Law, Article 8, Section 220.3a requires that certain information regarding the awarding of public work contracts, be furnished to the Commissioner of Labor. One "Notice of Contract Award" (PW 16, which may be photocopied), **MUST** be completed for **EACH** prime contractor on the above referenced project.

Upon notifying the successful bidder(s) of this contract, enter the required information and mail **OR** fax this form to the office shown at the bottom of this notice, **OR** fill out the electronic version via the NYSDOL website.

Contractor Information

All information must be supplied

Federal Employer Identification Number: _____		
Name: _____		
Address: _____ _____		
City: _____	State: _____	Zip: _____
Amount of Contract: \$ _____	Contract Type:	
Approximate Starting Date: ____/____/____	<input type="checkbox"/> (01) General Construction	
Approximate Completion Date: ____/____/____	<input type="checkbox"/> (02) Heating/Ventilation	
	<input type="checkbox"/> (03) Electrical	
	<input type="checkbox"/> (04) Plumbing	
	<input type="checkbox"/> (05) Other : _____	

Phone: (518) 457-5589 Fax: (518) 485-1870
W. Averell Harriman State Office Campus, Bldg. 12, Room 130, Albany, NY 12240

IMPORTANT NOTICE

FOR

CONTRACTORS & CONTRACTING AGENCIES

Social Security Numbers on Certified Payrolls

The Department of Labor is cognizant of the concerns of the potential for misuse or inadvertent disclosure of social security numbers. Identity theft is a growing problem and we are sympathetic to contractors' concerns with regard to inclusion of this information on payrolls if another identifier will suffice.

For these reasons, *the substitution of the use of the last four digits of the social security number on certified payrolls submitted to contracting agencies on public work projects is now acceptable to the Department of Labor.*

NOTE: This change does not affect the Department's ability to request and receive the entire social security number from employers during the course of its public work / prevailing wage investigations.

**To all State Departments, Agency Heads and Public Benefit Corporations
IMPORTANT NOTICE REGARDING PUBLIC WORK ENFORCEMENT FUND**

Budget Policy & Reporting Manual

B-610

Public Work Enforcement Fund

effective date December 7, 2005

1. Purpose and Scope:

This Item describes the Public Work Enforcement Fund (the Fund, PWEF) and its relevance to State agencies and public benefit corporations engaged in construction or reconstruction contracts, maintenance and repair, and announces the recently-enacted increase to the percentage of the dollar value of such contracts that must be deposited into the Fund. This item also describes the roles of the following entities with respect to the Fund:

- New York State Department of Labor (DOL),
- The Office of the State of Comptroller (OSC), and
- State agencies and public benefit corporations.

2. Background and Statutory References:

DOL uses the Fund to enforce the State's Labor Law as it relates to contracts for construction or reconstruction, maintenance and repair, as defined in subdivision two of Section 220 of the Labor Law. State agencies and public benefit corporations participating in such contracts are required to make payments to the Fund.

Chapter 511 of the Laws of 1995 (as amended by Chapter 513 of the Laws of 1997, Chapter 655 of the Laws of 1999, Chapter 376 of the Laws of 2003 and Chapter 407 of the Laws of 2005) established the Fund.

3. Procedures and Agency Responsibilities:

The Fund is supported by transfers and deposits based on the value of contracts for construction and reconstruction, maintenance and repair, as defined in subdivision two of Section 220 of the Labor Law, into which all State agencies and public benefit corporations enter.

Chapter 407 of the Laws of 2005 increased the amount required to be provided to this fund to .10 of one-percent of the total cost of each such contract, to be calculated at the time agencies or public benefit corporations enter into a new contract or if a contract is amended. The provisions of this bill became effective August 2, 2005.

**To all State Departments, Agency Heads and Public Benefit Corporations
IMPORTANT NOTICE REGARDING PUBLIC WORK ENFORCEMENT FUND**

OSC will report to DOL on all construction-related ("D") contracts approved during the month, including contract amendments, and then DOL will bill agencies the appropriate assessment monthly. An agency may then make a determination if any of the billed contracts are exempt and so note on the bill submitted back to DOL. For any instance where an agency is unsure if a contract is or is not exempt, they can call the Bureau of Public Work at the number noted below for a determination. Payment by check or journal voucher is due to DOL within thirty days from the date of the billing. DOL will verify the amounts and forward them to OSC for processing.

For those contracts which are not approved or administered by the Comptroller, monthly reports and payments for deposit into the Public Work Enforcement Fund must be provided to the Administrative Finance Bureau at the DOL within 30 days of the end of each month or on a payment schedule mutually agreed upon with DOL.

Reports should contain the following information:

- Name and billing address of State agency or public benefit corporation;
- State agency or public benefit corporation contact and phone number;
- Name and address of contractor receiving the award;
- Contract number and effective dates;
- Contract amount and PWEF assessment charge (if contract amount has been amended, reflect increase or decrease to original contract and the adjustment in the PWEF charge); and
- Brief description of the work to be performed under each contract.

Checks and Journal Vouchers, payable to the "New York State Department of Labor" should be sent to:

Department of Labor
Administrative Finance Bureau-PWEF Unit
Building 12, Room 464
State Office Campus
Albany, NY 12240

Any questions regarding billing should be directed to NYSDOL's Administrative Finance Bureau-PWEF Unit at (518) 457-3624 and any questions regarding Public Work Contracts should be directed to the Bureau of Public Work at (518) 457-5589.

Construction Industry Fair Play Act

Required Posting For Labor Law Article 25-B § 861-d

Construction industry employers must post the "Construction Industry Fair Play Act" notice in a prominent and accessible place on the job site.

Failure to post the notice can result in penalties of up to \$1,500 for a first offense and up to \$5,000 for a second offense.

The posting is included as part of this wage schedule. Additional copies may be obtained from the NYS DOL website, www.labor.ny.gov.

If you have any questions concerning the Fair Play Act, please call the State Labor Department toll-free at 1-866-435-1499 or email us at: dol.misclassified@labor.state.ny.us .



New York State Department of Labor
Required Notice under Article 25-B of the Labor Law

**ATTENTION ALL EMPLOYEES, CONTRACTORS AND SUBCONTRACTORS:
YOU ARE COVERED BY THE
CONSTRUCTION INDUSTRY FAIR PLAY ACT**

The law says that you are an employee unless:

- You are free from direction and control in performing your job AND
- You perform work that is not part of the usual work done by the business that hired you AND
- You have an independently established business

Your employer cannot consider you to be an independent contractor unless all three of these facts apply to your work.

**IT IS AGAINST THE LAW FOR AN EMPLOYER TO MISCLASSIFY EMPLOYEES AS
INDEPENDENT CONTRACTORS OR PAY EMPLOYEES OFF-THE-BOOKS.**

Employee rights. If you are an employee:

- You are entitled to state and federal worker protections such as
 - unemployment benefits, if unemployed through no fault of your own, able to work, and otherwise qualified
 - workers' compensation benefits for on-the-job injuries
 - payment for wages earned, minimum wage, and overtime (under certain conditions)
 - prevailing wages on public work projects
 - the provisions of the National Labor Relations Act and
 - a safe work environment
- It is a violation of this law for employers to retaliate against anyone who asserts their rights under the law. Retaliation subjects an employer to civil penalties, a private lawsuit or both.

Independent Contractors: If you are an independent contractor:

- You must pay all taxes required by New York State and Federal Law.

Penalties for paying off-the-books or improperly treating employees as independent contractors:

- **Civil Penalty** First Offense: up to \$2,500 per employee.
 Subsequent Offense(s): up to \$5,000 per employee.
- **Criminal Penalty** First Offense: Misdemeanor - up to 30 days in jail, up to a \$25,000 fine and debarment from performing Public Work for up to one year.
 Subsequent Offense(s): Misdemeanor - up to 60 days in jail, up to a \$50,000 fine and debarment from performing Public Work for up to 5 years.

If you have questions about your employment status or believe that your employer may have violated your rights and you want to file a complaint, call the Department of Labor at 1(866)435-1499 or send an email to dol.misclassified@labor.state.ny.us. All complaints of fraud and violations are taken seriously and you can remain anonymous.

Employer Name:

WORKER NOTIFICATION

(Labor Law §220, paragraph a of subdivision 3-a)

Effective February 24, 2008

This provision is an addition to the existing prevailing wage rate law, Labor Law §220, paragraph a of subdivision 3-a. It requires contractors and subcontractors to provide written notice to all laborers, workers or mechanics of the *prevailing wage rate* for their particular job classification *on each pay stub**. It also requires contractors and subcontractors to *post a notice* at the beginning of the performance of every public work contract *on each job site* that includes the telephone number and address for the Department of Labor and a statement informing laborers, workers or mechanics of their right to contact the Department of Labor if he/she is not receiving the proper prevailing rate of wages and/or supplements for his/her particular job classification. The required notification will be provided with each wage schedule, may be downloaded from our website www.labor.state.ny.us or made available upon request by contacting the Bureau of Public Work at 518-457-5589.

* In the event that the required information will not fit on the pay stub, an accompanying sheet or attachment of the information will suffice.



New York State Department of Labor
Bureau of Public Work

Attention Employees

THIS IS A: **PUBLIC WORK PROJECT**

If you are employed on this project as a **worker, laborer, or mechanic** you are entitled to receive the **prevailing wage and supplements rate** for the classification at which you are working.

Chapter 629 of the Labor Laws of 2007:

These wages are set by law and must be posted at the work site. They can also be found at:
www.labor.ny.gov

If you feel that you have not received proper wages or benefits, please call our nearest office.*

Albany	(518) 457-2744	Patchogue	(631) 687-4882
Binghamton	(607) 721-8005	Rochester	(585) 258-4505
Buffalo	(716) 847-7159	Syracuse	(315) 428-4056
Garden City	(516) 228-3915	Utica	(315) 793-2314
New York City	(212) 775-3568	White Plains	(914) 997-9507
Newburgh	(845) 568-5287		

* For New York City government agency construction projects, please contact the Office of the NYC Comptroller at (212) 669-4443, or www.comptroller.nyc.gov – click on Bureau of Labor Law.

Contractor Name: _____

Project Location: _____

OSHA 10-hour Construction Safety and Health Course – S1537-A

Effective July 18, 2008

This provision is an addition to the existing prevailing wage rate law, Labor Law §220, section 220-h. It requires that on all public work projects of at least \$250,000.00, all laborers, workers and mechanics working on the site, be certified as having successfully completed the OSHA 10-hour construction safety and health course. It further requires that the advertised bids and contracts for every public work contract of at least \$250,000.00, contain a provision of this requirement.

NOTE: The OSHA 10 Legislation only applies to workers on a public work project that are required, under Article 8, to receive the prevailing wage.

Where to find OSHA 10-hour Construction Course

1. NYS Department of Labor website for scheduled outreach training at:

www.labor.state.ny.us/workerprotection/safetyhealth/DOSH_ONSITE_CONSULTATION.shtm

2. OSHA Training Institute Education Centers:

Rochester Institute of Technology OSHA Education Center

Rochester, NY

Donna Winter

Fax (585) 475-6292

e-mail: dlwtpo@rit.edu

(866) 385-7470 Ext. 2919

www.rit.edu/~outreach/course.php3?CourseID=54

Atlantic OSHA Training Center

UMDNJ – School of Public Health

Piscataway, NJ

Janet Crooks

Fax (732) 235-9460

e-mail: crooksje@umdnj.edu

(732) 235-9455

<https://ophp.umdnj.edu/wconnect/ShowSchedule.awp?~~GROUP~AOTCON~10~>

Atlantic OSHA Training Center

University at Buffalo

Buffalo, New York

Joe Syracuse

Fax (716) 829-2806

e-mail: mailto:japs@buffalo.edu

(716) 829-2125

http://www.smbs.buffalo.edu/CENTERS/trc/schedule_OSHA.php

Keene State College

Manchester, NH

Leslie Singleton

e-mail: lsingletin@keene.edu

(800) 449-6742

www.keene.edu/courses/print/courses_osh.cfm

3. List of trainers and training schedules for OSHA outreach training at:

www.OutreachTrainers.org

Requirements for OSHA 10 Compliance

Chapter 282 of the Laws of 2007, codified as Labor Law 220-h took effect on July 18, 2008. The statute provides as follows:

The advertised specifications for every contract for public work of \$250,000.00 or more must contain a provision requiring that every worker employed in the performance of a public work contract shall be certified as having completed an OSHA 10 safety training course. The clear intent of this provision is to require that all employees of public work contractors, required to be paid prevailing rates, receive such training “prior to the performing any work on the project.”

The Bureau will enforce the statute as follows:

All contractors and sub contractors must attach a copy of proof of completion of the OSHA 10 course to the first certified payroll submitted to the contracting agency and on each succeeding payroll where any new or additional employee is first listed.

Proof of completion may include but is not limited to:

- Copies of bona fide course completion card (*Note: Completion cards do not have an expiration date.*)
- Training roster, attendance record of other documentation from the certified trainer pending the issuance of the card.
- Other valid proof

**A certification by the employer attesting that all employees have completed such a course is not sufficient proof that the course has been completed.

Any questions regarding this statute may be directed to the New York State Department of Labor, Bureau of Public Work at 518-485-5696.

WICKS Reform 2008

(For all contracts advertised or solicited for bid on or after 7/1/08)

- Raises the threshold for public work projects subject to the Wicks Law requiring separate specifications and bidding for the plumbing, heating and electrical work. The total project's threshold would increase from \$50,000 to: \$3 million in Bronx, Kings, New York, Queens and Richmond counties; \$1.5 million in Nassau, Suffolk and Westchester counties; and \$500,000 in all other counties.
- For projects below the monetary threshold, bidders must submit a sealed list naming each subcontractor for the plumbing, HVAC and electrical work and the amount to be paid to each. The list may not be changed unless the public owner finds a legitimate construction need, including a change in specifications or costs or use of a Project Labor Agreement (PLA), and must be open to public inspection.
- Allows the state and local agencies and authorities to waive the Wicks Law and use a PLA if it will provide the best work at the lowest possible price. If a PLA is used, all contractors shall participate in apprentice training programs in the trades of work it employs that have been approved by the Department of Labor (DOL) for not less than three years. They shall also have at least one graduate in the last three years and use affirmative efforts to retain minority apprentices. PLA's would be exempt from Wicks, but deemed to be public work subject to prevailing wage enforcement.
- The Commissioner of Labor shall have the power to enforce separate specification requirements on projects, and may issue stop-bid orders against public owners for non-compliance.
- Other new monetary thresholds, and similar sealed bidding for non-Wicks projects, would apply to certain public authorities including municipal housing authorities, NYC Construction Fund, Yonkers Educational Construction Fund, NYC Municipal Water Finance Authority, Buffalo Municipal Water Finance Authority, Westchester County Health Care Association, Nassau County Health Care Corp., Clifton-Fine Health Care Corp., Erie County Medical Center Corp., NYC Solid Waste Management Facilities, and the Dormitory Authority.
- Reduces from 15 to 7 days the period in which contractors must pay subcontractors.

IMPORTANT INFORMATION

Regarding Use of Form PW30R

“Employer Registration for Use of 4 Day / 10 Hour Work Schedule”

To use the ‘4 Day / 10 Hour Work Schedule’:

There **MUST** be a *Dispensation of Hours (PW30)* in place on the project

AND

You **MUST** register your intent to work 4 / 10 hour days, by completing the PW30R Form.

REMEMBER...

The ‘4 Day / 10 Hour Work Schedule’ applies **ONLY** to Job Classifications and Counties listed on the PW30R Form.

Do not write in any additional Classifications or Counties.

(Please note : For each Job Classification check the individual wage schedule for specific details regarding their 4/10 hour day posting.)

Instructions for Completing Form PW30R

“Employer Registration for Use of 4 Day / 10 Hour Work Schedule”

Before completing Form PW30R check to be sure ...

- There is a *Dispensation of Hours* in place on the project.
- The 4 Day / 10 Hour Work Schedule applies to the Job Classifications you will be using.
- The 4 Day / 10 Hour Work Schedule applies to the County / Counties where the work will take place.

Instructions (Type or Print legibly):

Contractor Information:

- Enter the Legal Name of the business, FEIN, Street Address, City, State, Zip Code; the Company’s Phone and Fax numbers; and the Company’s email address (if applicable)
- Enter the Name of a Contact Person for the Company along with their Phone and Fax numbers, and the personal email address (if applicable)

Project Information:

- Enter the Prevailing Rate Case number (PRC#) assigned to this project
- Enter the Project Name / Type (i.e. Smithtown CSD – Replacement of HS Roof)
- Enter the Exact Location of Project (i.e. Smithtown HS, 143 County Route #2, Smithtown, NY; Bldgs. 1 & 2)
- If you are a Subcontractor, enter the name of the Prime Contractor for which you work
- On the Checklist of Job Classifications -
 - Go to pages 2 and 3 of the form
 - Place a checkmark in the box to the right of the Job Classification you are choosing
 - Mark all Job Classifications that apply

****Do not write in any additional Classifications or Counties.****

Requestor Information:

- Enter the name of the person submitting the registration, their title with the company , and the date the registration is filled out

Return Completed Form:

- **Mail** the completed PW30R form (3 pages) to: NYSDOL Bureau of Public Work, SOBC – Bldg.12 – Rm.130, Albany, NY 12240 **-OR-**
- **Fax** the completed PW30R form (3 pages) to: NYSDOL Bureau of Public Work at (518)485-1870



New York State Department of Labor
Bureau of Public Work
 W. Averell Harriman State Office Campus
 Building 12 - Room 130
 Albany, New York 12240
 Phone - (518) 457-5589 Fax - (518) 485-1870

Employer Registration for Use of 4 Day / 10 Hour Work Schedule

Before completing Form PW30R check to be sure ...
 There is a *Dispensation of Hours* in place on the project.
 The 4 Day / 10 Hour Work Schedule applies to the Job Classifications you will be using.
 The 4 Day / 10 Hour Work Schedule applies to the County / Counties where the work will take place.

Please Type or Print the Requested Information

When completed ...
 Mail to NYSDOL Bureau of Public Work, SOBC, Bldg. 12, Rm.130, Albany, NY 12240
 -or-
 Fax to NYSDOL Bureau of Public Work at (518) 485-1870

Contractor Information

Company Name: _____ FEIN: _____
 Address: _____
 City: _____ State: _____ Zip Code: _____
 Phone Number _____ Fax Number: _____ Email Address: _____
 Contact Person: _____
 Phone No: _____ Fax No: _____ Email: _____

Project Information

Project PRC#: _____ Project Name/Type: _____
 Exact Location of Project: _____ County: _____
 (If you are Subcontractor)
 Prime Contractor Name: _____
 Job Classification(s) to Work 4/10 Schedule: *(Choose all that apply on Job Classification Checklist - Pages 3-6)*
 *** Do not write in any additional Classifications or Counties***

Requestor Information

Name: _____
 Title: _____ Date : _____

Please use the list below with the number assigned to each county as a reference to the corresponding numbers listed in the following pages under "Entire Counties" & "Partial Counties".

- | | | | |
|-----|-----------------------------|-----|---------------------------------|
| 1. | Albany County | 33. | Oneida County |
| 2. | Allegany County | 34. | Onondaga County |
| 3. | Bronx County | 35. | Ontario County |
| 4. | Broome County | 36. | Orange County |
| 5. | Cattaraugus County | 37. | Orleans County |
| 6. | Cayuga County | 38. | Oswego County |
| 7. | Chautauqua County | 39. | Otsego County |
| 8. | Chemung County | 40. | Putnam County |
| 9. | Chenango County | 41. | Queens County |
| 10. | Clinton County | 42. | Rensselaer County |
| 11. | Columbia County | 43. | Richmond County (Staten Island) |
| 12. | Cortland County | 44. | Rockland County |
| 13. | Delaware County | 45. | Saint Lawrence County |
| 14. | Dutchess County | 46. | Saratoga County |
| 15. | Erie County | 47. | Schenectady County |
| 16. | Essex County | 48. | Schoharie County |
| 17. | Franklin County | 49. | Schuyler County |
| 18. | Fulton county | 50. | Seneca County |
| 19. | Genesee County | 51. | Steuben County |
| 20. | Greene County | 52. | Suffolk County |
| 21. | Hamilton County | 53. | Sullivan County |
| 22. | Herkimer County | 54. | Tioga County |
| 23. | Jefferson County | 55. | Tompkins County |
| 24. | Kings County (Brooklyn) | 56. | Ulster County |
| 25. | Lewis County | 57. | Warren county |
| 26. | Livingston County | 58. | Washington County |
| 27. | Madison County | 59. | Wayne County |
| 28. | Monroe County | 60. | Westchester County |
| 29. | Montgomery County | 61. | Wyoming County |
| 30. | Nassau County | 62. | Yates County |
| 31. | New York County (Manhattan) | | |
| 32. | Niagara County | | |

Job Classification Checklist

(Place a checkmark by all classifications that will be using the 4/10 schedule)

*** Do not write in any additional Classifications or Counties***

Job Classification	Tag #	Entire Counties	Partial Counties	Check Box
Carpenter-Building	276B-All	7	2, 5	<input type="checkbox"/>
Carpenter-Building	276B-Cat	15	5	<input type="checkbox"/>
Carpenter - Building	276-B-DW-LIV	26, 28, 35, 59	61	<input type="checkbox"/>
Carpenter-Building	276B-Gen	19, 32, 37	61	<input type="checkbox"/>
Carpenter-Floor Layers	276B-FL-Liv	26, 28, 35, 59	61	<input type="checkbox"/>
Carpenter-Heavy&Highway	276HH-All	2, 5, 7		<input type="checkbox"/>
Carpenter-Heavy&Highway	276HH-Erie	15		<input type="checkbox"/>
Carpenter-Heavy&Highway	276HH- Gen	19, 32, 37, 61		<input type="checkbox"/>
Carpenter-Heavy&Highway	276HH-Liv	26, 28, 35, 59		<input type="checkbox"/>
Carpenter-Residential	276R-All	7	2, 5	<input type="checkbox"/>
Carpenter - Building	277B-Bro	4, 54		<input type="checkbox"/>
Carpenter - Building	277B-CAY	6, 50, 62		<input type="checkbox"/>
Carpenter - Building	277B-CS	8, 12, 49, 51, 55	2	<input type="checkbox"/>
Carpenter - Building	277 JLS	23, 25, 45		<input type="checkbox"/>
Carpenter - Building	277 omh	22, 27, 33		<input type="checkbox"/>
Carpenter - Building	277 On	34		<input type="checkbox"/>
Carpenter - Building	277 Os	38		<input type="checkbox"/>
Carpenter - Building	277CDO Bldg	9, 13, 39		<input type="checkbox"/>
Carpenter - Heavy&Highway	277CDO HH	9, 13, 39		<input type="checkbox"/>
Carpenter - Heavy&Highway	277HH-BRO	4, 6, 8, 12, 49, 50, 51, 54, 55, 62		<input type="checkbox"/>
Carpenter - Heavy/Highway	277 oneida	22, 23, 25, 27, 33, 34, 38, 45		<input type="checkbox"/>
Carpenter - Building	291B-Alb	1, 18, 20, 29, 42, 47, 48		<input type="checkbox"/>
Carpenter - Building	291B-Cli	10, 16, 17		<input type="checkbox"/>
Carpenter - Building	291B-Ham	21, 57, 58		<input type="checkbox"/>
Carpenter - Building	291B-Sar	46		<input type="checkbox"/>
Carpenter - Heavy&Highway	291HH-Alb	1, 10, 16, 17, 18, 20, 21, 29, 42, 46, 47, 48, 57, 58		<input type="checkbox"/>
Electrician	25m	30, 52		<input type="checkbox"/>
Electrician-Teledata Cable Splicer	43	12, 22, 27, 33, 38	6, 9, 34, 39, 55, 59	<input type="checkbox"/>

Job Classification Checklist

(Place a checkmark by all classifications that will be using the 4/10 schedule)

*** Do not write in any additional Classifications or Counties***

Job Classification	Tag #	Entire Counties	Partial Counties	Check Box
Electrician	86	26, 28	19, 35, 37, 59, 61	<input type="checkbox"/>
Electrician	840Teledata and 840 Z1	62	6, 34, 35, 50, 59	<input type="checkbox"/>
Electrician	910	10, 16, 17, 23, 25, 45		<input type="checkbox"/>
Electrician Lineman	1049Line/Gas	30, 41, 52		<input type="checkbox"/>
Electrician Lineman	1249a	1, 2, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13, 14, 15, 16, 17, 18, 19, 20, 21, 22, 23, 25, 26, 27, 28, 29, 32, 33, 34, 35, 36, 37, 38, 39, 40, 42, 44, 46, 47, 48, 49, 50, 45, 51, 53, 54, 55, 56, 57, 58, 59, 61, 62		<input type="checkbox"/>
Electrical Lineman	1249a West	60		<input type="checkbox"/>
Electrical Lineman	1249a-LT	1, 2, 4, 5, 6, 7, 8, 9, 10, 12, 13, 15, 16, 17, 18, 19, 20, 21, 22, 23, 25, 26, 27, 28, 29, 32, 33, 34, 35, 37, 38, 39, 42, 46, 47, 48, 49, 50, 45, 51, 53, 54, 55, 57, 58, 59, 61, 62		<input type="checkbox"/>
Electrical Lineman	1249aREG8LT	11, 14, 36, 40, 44, 56		<input type="checkbox"/>
Electrical Lineman	1249aWestLT	60		<input type="checkbox"/>
Elevator Constructor	138	11, 14, 20, 36, 40, 53, 56	13, 44, 60	<input type="checkbox"/>
Elevator Constructor	14	2, 5, 7, 15, 19, 32, 37, 61		<input type="checkbox"/>
Elevator Constructor	27	8, 26, 28, 35, 49, 50, 51, 59, 62		<input type="checkbox"/>
Elevator Constructor	35	1, 10, 16, 18, 21, 22, 29, 39, 42, 46, 47, 48, 57, 58		<input type="checkbox"/>
Elevator Constructor	62.1	4, 6, 9, 12, 23, 25, 27, 33, 34, 38, 45, 54, 55	13	<input type="checkbox"/>
Glazier	201	1, 10, 11, 16, 17, 18, 20, 21, 29, 42, 46, 47, 48, 57, 58		<input type="checkbox"/>
Glazier	660r	2, 5, 7, 15, 19, 32, 37, 61		<input type="checkbox"/>
Glazier	660	2, 5, 7, 15, 19, 32, 37, 61		<input type="checkbox"/>
Glazier	677.1	23, 25, 26, 28, 35, 45, 50, 59, 62		<input type="checkbox"/>
Glazier	677Z-2	6, 12, 22, 27, 33, 34, 38		<input type="checkbox"/>
Glazier	677z3	4, 8, 9, 13, 39, 49, 51, 54, 55		<input type="checkbox"/>
Glazier	677r.2	6, 12, 22, 27, 33, 34, 38		<input type="checkbox"/>
Insulator - Heat & Frost	30-Syracuse	4, 6, 8, 9, 12, 22, 23, 25, 27, 33, 34, 38, 39, 49, 50, 45, 54, 55		<input type="checkbox"/>
Laborers - Building	322-2H	17, 23, 25, 45		<input type="checkbox"/>
Laborers - Building	785(7)	4	9, 13, 54	<input type="checkbox"/>

Job Classification Checklist

(Place a checkmark by all classifications that will be using the 4/10 schedule)

*** Do not write in any additional Classifications or Counties***

Job Classification	Tag #	Entire Counties	Partial Counties	Check Box
Laborers - Building	785B-CS	8, 51	49	<input type="checkbox"/>
Laborers- Heavy & Highway	322/2h	17, 23, 25, 45		<input type="checkbox"/>
Laborers- Heavy & Highway	7-785b	12, 55	49, 54	<input type="checkbox"/>
Laborers Heavy & Highway	785(7)	4	9, 13, 54	<input type="checkbox"/>
Laborer - Heavy & Highway	785HH-CS	8, 51	49	<input type="checkbox"/>
Laborer - Building	621b	2, 7	5	<input type="checkbox"/>
Laborer - Residential	621r	2, 7	5	<input type="checkbox"/>
Mason-Building	3b-Co-Z2	8, 49, 51	2	<input type="checkbox"/>
Mason-Building	3B-Z1	19, 26, 28, 35, 50, 59, 61, 62		<input type="checkbox"/>
Mason-Building-Residential	3B-Z1R	19, 26, 28, 35, 50, 59, 61, 62		<input type="checkbox"/>
Mason-Building	3B-Bing-Z2	4, 9, 13, 39, 54		<input type="checkbox"/>
Mason-Building	3B-lth-Z2	12, 55		<input type="checkbox"/>
Mason-Building	3B-Jam-Z2	7	2, 5	<input type="checkbox"/>
Mason-Building-Residential	3B-Jam-Z2R	2, 4, 8, 7, 9, 12, 39, 13, 49, 51, 54, 55	5	<input type="checkbox"/>
Mason-Building	3B-Z3	15, 32, 37	5	<input type="checkbox"/>
Mason-Building-Residential	3B-Z3R	15, 32, 37	5	<input type="checkbox"/>
Mason-Heavy Highway	3h	2, 4, 8, 7, 9, 12, 13, 19, 26, 28, 35, 37, 39, 49, 50, 51, 54, 55, 59, 61, 62	5, 15, 32	<input type="checkbox"/>
Mason-Tile Finisher	3TF-Z1	19, 26, 28, 35, 50, 59, 61, 62		<input type="checkbox"/>
Mason-Tile Finisher	3TF-Z2	2, 4, 8, 7, 9, 12, 13, 39, 49, 51, 54, 55	5	<input type="checkbox"/>
Mason-Tile Finisher	3TF-Z3	15, 32, 37	5	<input type="checkbox"/>
Mason-Tile Finisher	3TF-Z1R	19, 26, 28, 35, 50, 59, 61, 62		<input type="checkbox"/>
Mason-Tile Finisher	3TF-Z2R	2, 4, 7, 9, 12, 13, 39, 49, 51, 54, 55	5	<input type="checkbox"/>
Mason-Tile Finisher	3TF-Z3R	15, 32, 37	5	<input type="checkbox"/>
Mason-Tile Setter	3TS-Z1	19, 26, 28, 35, 50, 59, 61, 62		<input type="checkbox"/>

Job Classification Checklist

(Place a checkmark by all classifications that will be using the 4/10 schedule)

*** Do not write in any additional Classifications or Counties***

Job Classification	Tag #	Entire Counties	Partial Counties	Check Box
Mason-Tile Setter Residential	3TS-Z2R	2, 4, 7, 8, 9, 12, 13, 39, 49, 51, 54, 55	5	<input type="checkbox"/>
Mason-Tile Setter Residential	3TS-Z3R	15, 32, 37	5	<input type="checkbox"/>
Mason - Building/Heavy&Highway	780	3, 24, 30, 31, 41, 43, 52		<input type="checkbox"/>
Operating Engineer - Heavy/Highway	137H/H	40, 60	14	<input type="checkbox"/>
Operating Engineer - Heavy& Highway	832H	2, 8, 26, 28, 35, 49, 51, 59, 62	19	<input type="checkbox"/>
Painter	150	28, 59, 62	26, 35	<input type="checkbox"/>
Painter	178 B	4, 9, 54		<input type="checkbox"/>
Painter	178 E	8, 49	51	<input type="checkbox"/>
Painter	178 I	12, 55		<input type="checkbox"/>
Painter	178 O	13, 39		<input type="checkbox"/>
Painter	31	6, 22, 27, 33, 34, 50	25, 35, 38	<input type="checkbox"/>
Painter	38.O		38	<input type="checkbox"/>
Painter	38.W	23, 45	25	<input type="checkbox"/>
Painter	4-Buf,Nia,Olean	2, 15, 19, 32, 37, 61	5, 7, 26, 51	<input type="checkbox"/>
Painter	4-Jamestown		5, 7	<input type="checkbox"/>
Sheetmetal Worker	46	26, 28, 35, 50, 59, 62		<input type="checkbox"/>
Sheetmetal Worker	46r	26, 28, 35, 50, 59, 62		<input type="checkbox"/>
Teamsters-Heavy&Highway	294h/h	1, 11, 18, 20, 29, 42, 46, 47, 48, 58	57	<input type="checkbox"/>
Teamsters-Heavy&Highway	317bhh	6, 12, 50, 51, 55, 62	2	<input type="checkbox"/>
Teamsters-Building/Heavy&Highway	456	40, 60		<input type="checkbox"/>
				<input type="checkbox"/>
				<input type="checkbox"/>
				<input type="checkbox"/>

Introduction to the Prevailing Rate Schedule

Information About Prevailing Rate Schedule

This information is provided to assist you in the interpretation of particular requirements for each classification of worker contained in the attached Schedule of Prevailing Rates.

Classification

It is the duty of the Commissioner of Labor to make the proper classification of workers taking into account whether the work is heavy and highway, building, sewer and water, tunnel work, or residential, and to make a determination of wages and supplements to be paid or provided. It is the responsibility of the public work contractor to use the proper rate. If there is a question on the proper classification to be used, please call the district office located nearest the project. District office locations and phone numbers are listed below.

Prevailing Wage Schedules are issued separately for "General Construction Projects" and "Residential Construction Projects" on a county-by-county basis.

General Construction Rates apply to projects such as: Buildings, Heavy & Highway, and Tunnel and Water & Sewer rates.

Residential Construction Rates generally apply to construction, reconstruction, repair, alteration, or demolition of one family, two family, row housing, or rental type units intended for residential use.

Some rates listed in the Residential Construction Rate Schedule have a very limited applicability listed along with the rate. Rates for occupations or locations not shown on the residential schedule must be obtained from the General Construction Rate Schedule. Please contact the local Bureau of Public Work office before using Residential Rate Schedules, to ensure that the project meets the required criteria.

Paid Holidays

Paid Holidays are days for which an eligible employee receives a regular day's pay, but is not required to perform work. If an employee works on a day listed as a paid holiday, this remuneration is in addition to payment of the required prevailing rate for the work actually performed.

Overtime

At a minimum, all work performed on a public work project in excess of eight hours in any one day or more than five days in any workweek is overtime. However, the specific overtime requirements for each trade or occupation on a public work project may differ. Specific overtime requirements for each trade or occupation are contained in the prevailing rate schedules.

Overtime holiday pay is the premium pay that is required for work performed on specified holidays. It is only required where the employee actually performs work on such holidays.

The applicable holidays are listed under HOLIDAYS: OVERTIME. The required rate of pay for these covered holidays can be found in the OVERTIME PAY section listings for each classification.

Supplemental Benefits

Particular attention should be given to the supplemental benefit requirements. In most cases the payment or provision of supplements is for each hour worked (noted in the schedule as 'Per hour worked'). Some classifications require the payment or provision of supplements for each hour paid (noted in the schedule as 'Per hour paid'), which require supplements to be paid or provided at a premium rate for premium hours worked. Some classifications may also require the payment or provision of supplements for paid holidays on which no work is performed.

Effective Dates

When you review the schedule for a particular occupation, your attention should be directed to the dates above the column of rates. These are the dates for which a given set of rates is effective. The rate listed is valid until the next effective rate change or until the new annual determination which takes effect on July 1 of each year. All contractors and subcontractors are required to pay the current prevailing rates of wages and supplements. If you have any questions please contact the Bureau of Public Work or visit the New York State Department of Labor website (www.labor.state.ny.us) for current wage rate information.

Apprentice Training Ratios

The following are the allowable ratios of registered Apprentices to Journey-workers.

For example, the ratio 1:1,1:3 indicates the allowable initial ratio is one Apprentice to one Journeyworker. The Journeyworker must be in place on the project before an Apprentice is allowed. Then three additional Journeyworkers are needed before a second Apprentice is allowed. The last ratio repeats indefinitely. Therefore, three more Journeyworkers must be present before a third Apprentice can be hired, and so on.

Please call Apprentice Training Central Office at (518) 457-6820 if you have any questions.

Title (Trade)	Ratio
Boilermaker (Construction)	1:1,1:4
Boilermaker (Shop)	1:1,1:3
Carpenter (Bldg.,H&H, Pile Driver/Dockbuilder)	1:1,1:4
Carpenter (Residential)	1:1,1:3

Electrical (Outside) Lineman	1:1,1:2
Electrician (Inside)	1:1,1:3
Elevator/Escalator Construction & Modernizer	1:1,1:2
Glazier	1:1,1:3
Insulation & Asbestos Worker	1:1,1:3
Iron Worker	1:1,1:4
Laborer	1:1,1:3
Mason	1:1,1:4
Millwright	1:1,1:4
Op Engineer	1:1,1:5
Painter	1:1,1:3
Plumber & Steamfitter	1:1,1:3
Roofer	1:1,1:2
Sheet Metal Worker	1:1,1:3
Sprinkler Fitter	1:1,1:2

If you have any questions concerning the attached schedule or would like additional information, please contact the nearest BUREAU of PUBLIC WORK District Office or write to:

New York State Department of Labor
Bureau of Public Work
State Office Campus, Bldg. 12
Albany, NY 12240

District Office Locations:	Telephone #	FAX #
Bureau of Public Work - Albany	518-457-2744	518-485-0240
Bureau of Public Work - Binghamton	607-721-8005	607-721-8004
Bureau of Public Work - Buffalo	716-847-7159	716-847-7650
Bureau of Public Work - Garden City	516-228-3915	516-794-3518
Bureau of Public Work - Newburgh	845-568-5287	845-568-5332
Bureau of Public Work - New York City	212-775-3568	212-775-3579
Bureau of Public Work - Patchogue	631-687-4882	631-687-4904
Bureau of Public Work - Rochester	585-258-4505	585-258-4708
Bureau of Public Work - Syracuse	315-428-4056	315-428-4671
Bureau of Public Work - Utica	315-793-2314	315-793-2514
Bureau of Public Work - White Plains	914-997-9507	914-997-9523
Bureau of Public Work - Central Office	518-457-5589	518-485-1870

Essex County General Construction

Boilermaker **03/01/2015**

JOB DESCRIPTION Boilermaker **DISTRICT 1**

ENTIRE COUNTIES
 Albany, Broome, Chenango, Columbia, Delaware, Essex, Fulton, Greene, Hamilton, Herkimer, Montgomery, Otsego, Rensselaer, Saratoga, Schenectady, Schoharie, Tioga, Warren, Washington

WAGES

Per hour
 07/01/2014

Boilermaker \$ 31.24

SUPPLEMENTAL BENEFITS

Per hour worked

Journeyman \$ 23.88*
 + 1.19

* This portion of the benefit is subject to the SAME PREMIUM as shown for overtime.

OVERTIME PAY

See (B, E, Q) on OVERTIME PAGE

HOLIDAY

Paid: See (1) on HOLIDAY PAGE
 Overtime: See (5, 6, 15, 25) on HOLIDAY PAGE

Note: When a holiday falls on Sunday, the day observed by the State or Nation shall be observed, and when Christmas Day and New Year's fall on Saturday, Friday will be observed as the holiday.

REGISTERED APPRENTICES

Wages per hour

(1/2) year terms at the following percentage of Journeyman's wage.

1st	2nd	3rd	4th	5th	6th	7th	8th
65%	65%	70%	75%	80%	85%	90%	95%

Supplemental Benefits per hour worked

All Apprentices get same benefits as Journeyman.

1-197

Carpenter - Building **03/01/2015**

JOB DESCRIPTION Carpenter - Building **DISTRICT 2**

ENTIRE COUNTIES

Clinton, Essex, Franklin

WAGES

Per hour:	07/01/2014	06/01/2015 Additional
Carpenter	\$ 24.77	\$ 1.49*
Floor Coverer	24.77	1.49*
Carpet Layer	24.77	1.49*
Dry-Wall	24.77	1.49*
Lather	24.77	1.49*
Piledriver	25.02	1.49*
Diver-Wet Day	61.25	
Diver -Dry Day	25.77	1.49*
Diver Tender	25.77	1.49*

NOTE ADDITIONAL PREMIUMS PAID FOR THE FOLLOWING WORK LISTED BELOW:

- Certified welders shall receive \$1.00 per hour over the journeyman's rate of pay when the employee is required to be certified and performs DOT or ABS specified welding work
- When an employee performs work within a contaminated area on a State and/or Federally designated hazardous waste site, and where relevant State and/or Federal regulations require employees to be furnished and use or wear required forms of personal protection, then the employee shall receive his regular hourly rate plus \$1.50 per hour.
- Depth pay for Divers based upon deepest depth on the day of the dive:

- 0' to 80' no additional fee
- 81'to 100' additional \$.50 per foot
- 101'to 150' additional \$0.75 per foot
- 151'and deeper additional \$1.25 per foot
- Penetration pay for Divers based upon deepest penetration on the day of the dive:
 - 0' to 50' no additional fee
 - 51' to 100' additional \$.75 per foot
 - 101' and deeper additional \$1.00 per foot

(*) To be allocated at a later date.

Four (4), ten (10) hour days may be worked at straight time during a week, Monday thru Thursday. Friday may be used as a make-up day.

NOTE - In order to use the '4 Day/10 Hour Work Schedule,' you must submit an 'Employer Registration for Use of 4 Day/10 Hour Work Schedule,' form PW30R; additionally, there must be a dispensation of hours in place on the project.

SUPPLEMENTAL BENEFITS

Per hour worked:

Journeyman \$ 17.81

OVERTIME PAY

See (B, E, *E2, Q) on OVERTIME PAGE

* Note - Saturday is payable at straight time if the employee misses work, except where a doctor's or hospital verification of illness is produced Monday through Friday when work was available to the employee.

HOLIDAY

Paid: See (1) on HOLIDAY PAGE
Overtime: See (5, 6) on HOLIDAY PAGE

Note: Any holiday which occurs on Sunday shall be observed the following Monday.

REGISTERED APPRENTICES

Wages per hour

One year terms at the following percentage of Journeyman's base wage:

1st	2nd	3rd	4th
50%	60%	70%	80%

Supplemental Benefits per hour worked:

1st year term	\$ 9.96
2nd year term	9.96
3rd year term	12.56
4th year term	12.56

2-291B-ClI

Carpenter - Building / Heavy&Highway

03/01/2015

JOB DESCRIPTION Carpenter - Building / Heavy&Highway

DISTRICT 2

ENTIRE COUNTIES

Albany, Allegany, Broome, Cattaraugus, Cayuga, Chautauqua, Chemung, Chenango, Clinton, Columbia, Cortland, Delaware, Erie, Essex, Franklin, Fulton, Genesee, Greene, Hamilton, Herkimer, Jefferson, Lewis, Livingston, Madison, Monroe, Montgomery, Niagara, Oneida, Onondaga, Ontario, Orleans, Oswego, Otsego, Rensselaer, Saratoga, Schenectady, Schoharie, Schuyler, Seneca, St. Lawrence, Steuben, Sullivan, Tioga, Tompkins, Ulster, Warren, Washington, Wayne, Wyoming, Yates

WAGES

Wages per hour:

07/01/2014

Carpenter - ONLY for
Artificial Turf/Synthetic
Sport Surface Installer

\$ 28.40

Note - Does not include the operation of equipment. Please see Operating Engineers rates.

SUPPLEMENTAL BENEFITS

Per hour Paid:

07/01/2014

Journeyman

\$ 18.43

OVERTIME PAY

See (B, E, Q) on OVERTIME PAGE

HOLIDAY

Paid: See (2, 17) on HOLIDAY PAGE
 Overtime: See (5, 6, 16) on HOLIDAY PAGE

Notes:

When a holiday falls upon a Saturday, it shall be observed on the preceding Friday. When a holiday falls upon a Sunday, it shall be observed on the following Monday.

An employee taking an unexcused day off the regularly scheduled day before or after a paid Holiday shall not receive Holiday pay.

REGISTERED APPRENTICES

Wages per hour:

One year terms at the following percentage of Journeyman's wage:

1st	2nd	3rd	4th
50%	60%	70%	80%

Supplemental Benefits per hour paid:

07/01/2014

Carpenter

1st year term \$ 10.04

2nd year term 10.04

3rd year term 12.64

4th year term 12.64

2-42AtSS

Carpenter - Heavy&Highway

03/01/2015

JOB DESCRIPTION Carpenter - Heavy&Highway

DISTRICT 2

ENTIRE COUNTIES

Albany, Clinton, Essex, Franklin, Fulton, Greene, Hamilton, Montgomery, Rensselaer, Saratoga, Schenectady, Schoharie, Warren, Washington

WAGES

Per hour

07/01/2014

Carpenter \$ 28.04

Millwright 29.54

Piledriver 28.04

Diver-Wet Day 62.50

Diver-Dry Day 29.04

Diver-Tender 29.04

NOTE ADDITIONAL PREMIUMS PAID FOR THE FOLLOWING WORK LISTED BELOW:

- State or Federal designated hazardous site, requiring protective gear shall be an additional \$2.00 per hour.
- Certified welders when required to perform welding work will receive an additional \$1.25 per hour.
- Divers and Tenders shall receive one and one half (1 1/2) times their regular diver and tender rate of pay for Effluent and Slurry diving.
- Divers and tenders being paid at the specified rate for Effluent and Slurry diving shall have all overtime rates based on the specified rate plus the appropriate overtime rates (one and one half or two times the specified rate for Slurry and Effluent divers and tenders).
- Depth pay for Divers based upon deepest depth on the day of the dive:
 - 0' to 50' no additional fee
 - 51'to 100' additional \$.50 per foot
 - 101'to 150' additional \$.75 per foot
 - 151'and deeper additional \$1.25 per foot
- Penetration pay for Divers based upon deepest penetration on the day of the dive:
 - 0' to 50' no additional fee
 - 51' to 100' additional \$.75 per foot
 - 101' and deeper additional \$1.00 per foot
- Diver rates applies to all hours worked on dive day.

Four (4), ten (10) hour days may be worked at straight time during a week, Monday thru Friday, provided the project duration is more than forty (40) hours.

NOTE - In order to use the '4 Day/10 Hour Work Schedule,' you must submit an 'Employer Registration for Use of 4 Day/10 Hour Work Schedule,' form PW30R; additionally, there must be a dispensation of hours in place on the project.

SUPPLEMENTAL BENEFITS

Per hour worked plus paid holidays:

Journeyman \$ 18.79

OVERTIME PAY

See (B, E, Q) on OVERTIME PAGE

HOLIDAY

Paid: See (2, 17) on HOLIDAY PAGE
Overtime: See (5, 6) on HOLIDAY PAGE

In the event a Holiday falls on a Saturday, the Friday before will be observed as a Holiday. If a Holiday falls on a Sunday, then Monday will be observed as a Holiday.

REGISTERED APPRENTICES

Wages per hour

One year terms at the following percentage of Journeyman's base wage

1st	2nd	3rd	4th
50%	60%	70%	80%

Supplemental Benefits per hour worked plus paid holidays:

1st year terms	\$ 9.92
2nd year terms	9.92
3rd year terms	12.52
4th year terms	12.52

2-291HH-Alb

Electrician

03/01/2015

JOB DESCRIPTION Electrician

DISTRICT 6

ENTIRE COUNTIES

Clinton, Essex, Franklin, Jefferson, Lewis, St. Lawrence

WAGES

Per hour: 07/01/2014

Electrician	\$ 32.50
Cable Splicer	34.00
Tunnel Worker*, Welder	34.00

* For all underground and tunnel work, working 35 feet or more on scaffolds, ladders, towers, steeples, structural steel, or mechanical lifts over 65 feet.

Shift Work: The following rates will apply on all Contracting Agency mandated shifts worked between the hours listed below. The employer may be permitted to adjust the starting hours of the shift by up to two (2) hours if required by the agency. If a shift begins outside of the stated shift hours, the rate paid would be determined by what shift the majority of the hours were worked.

1st shift:	8:00 AM to 4:30 PM Regular wage rate
2nd shift:	4:30 PM to 1:00 AM Regular wage rate plus 17.3%
3rd shift:	12:30 AM to 9:00 AM Regular wage rate plus 31.4%

** IMPORTANT NOTICE - EFFECTIVE 07/01/2012 **

Four (4), ten (10) hour days may be worked at straight time during a week, Monday thru Thursday. Friday may be used as a make-up day.

NOTE - In order to use the '4 Day/10 Hour Work Schedule,' you must submit an 'Employer Registration for Use of 4 Day/10 Hour Work Schedule,' form PW30R; additionally, there must be a dispensation of hours in place on the project.

SUPPLEMENTAL BENEFITS

Per hour paid:

\$ 17.89
*plus 3% of
gross wage

* NOTE: THE 3% IS BASED ON THE HOURLY WAGE PAID ON STRAIGHT TIME RATE OR PREMIUM TIME RATE.

OVERTIME PAY

See (B, E, Q) on OVERTIME PAGE

HOLIDAY

Paid: See (1) on HOLIDAY PAGE
Overtime: See (5, 6) on HOLIDAY PAGE

REGISTERED APPRENTICES

WAGES: Hourly terms at the following percentage of Journeyman's wage.

	1-1000 40%	to 2000 45%	to 3500 50%	to 5000 60%	to 6500 70%	to 8000 80%
Electrician	\$13.00	\$14.63	\$16.25	\$19.50	\$22.75	\$26.00
Cable Splicer, Tunnel	\$14.50	\$16.13	\$17.75	\$21.00	\$24.25	\$27.50

SUPPLEMENTAL BENEFITS per hour worked:

Appr 1st & 2nd term	\$ 8.62 * plus 3% of gross wage
Appr All other terms	\$ 17.89 * plus 3% of gross wage paid.

* NOTE: THE 3% IS BASED ON THE HOURLY WAGE PAID ON STRAIGHT TIME RATE OR PREMIUM TIME RATE.

6-910

Elevator Constructor

03/01/2015

JOB DESCRIPTION Elevator Constructor

DISTRICT 1

ENTIRE COUNTIES

Albany, Clinton, Essex, Fulton, Hamilton, Herkimer, Montgomery, Otsego, Rensselaer, Saratoga, Schenectady, Schoharie, Warren, Washington

PARTIAL COUNTIES

Madison: Only the towns of: Brookfield, Hamilton, Lincoln, Madison, Smithfield and Stockbridge.
 Oneida: Entire county except the towns of: Camden, Florence, and Brookfield.

WAGES

Per hour	07/01/2014	01/01/2015
Mechanic	\$ 40.90	\$ 41.51
Helper	70% of Mechanic Wage Rate	

**** IMPORTANT NOTICE - EFFECTIVE 04/01/2009 ****

Four (4), ten (10) hour days may be worked at straight time during a week, Monday thru Thursday.

NOTE - In order to use the '4 Day/10 Hour Work Schedule,' you must submit an 'Employer Registration for Use of 4 Day/10 Hour Work Schedule,' form PW30R; additionally, there must be a dispensation of hours in place on the project.

SUPPLEMENTAL BENEFITS

Per hour worked	07/01/2014	01/01/2015
Journeyman/Helper	\$ 26.785*	\$ 28.385*

(*)Plus 6% of gross wages if less than 5 years service

(*)Plus 8% of gross wages if more than 5 years service

OVERTIME PAY

See (D, O) on OVERTIME PAGE

HOLIDAY

Paid: See (5, 6, 15, 16) on HOLIDAY PAGE

Overtime: See (5, 6, 15, 16) on HOLIDAY PAGE

Note: When a paid holiday falls on Saturday, it shall be observed on Friday. When a paid holiday falls on Sunday, it shall be observed on Monday.

REGISTERED APPRENTICES

Wages per hour

0-6 mo*

50%

*No supplemental benefits

6-12 mo	2nd yr	3rd yr	4th yr
55 %	65 %	70 %	80 %

Supplemental Benefits per hour worked

Same as Journeyman/Helper

1-35

Glazier

03/01/2015

JOB DESCRIPTION Glazier

DISTRICT 1

ENTIRE COUNTIES

Albany, Clinton, Columbia, Essex, Franklin, Fulton, Greene, Hamilton, Montgomery, Rensselaer, Saratoga, Schenectady, Schoharie, Warren, Washington

WAGES

Per hour

	07/01/2014	05/01/2015 Additional \$1.50**	05/01/2016 Additional \$1.50**
Glazier base wage	\$ 26.05		
	+ additional \$1.50 per hour for all hours worked		

*High Work Base Wage 29.05
 + additional \$3.50 per hour for all hours worked

(*)When working on Swing Stage or Lift 100 feet or more in height, measured from the ground level up.

(**) To be allocated at a later date, increase only applies to Glazier base wage.

Four (4), ten (10) hour days may be worked at straight time during a week, Monday thru Thursday. Friday may be used as a make-up day.

NOTE - In order to use the '4 Day/10 Hour Work Schedule,' you must submit an 'Employer Registration for Use of 4 Day/10 Hour Work Schedule,' form PW30R; additionally, there must be a dispensation of hours in place on the project.

SUPPLEMENTAL BENEFITS

Per hour worked

Journeyman	\$ 16.03
Journeyman High Work	21.58

OVERTIME PAY

See (B, E, E2, Q) on OVERTIME PAGE
 Premium is applied to the respective base wage only.

HOLIDAY

Paid: See (1) on HOLIDAY PAGE
 Overtime: See (5, 6) on HOLIDAY PAGE

Note: If any of the holidays are designated by federal law to be celebrated on a day other than that on which they regularly fall, then the holiday shall be celebrated on the day set by said federal law as if the day on which the holiday is celebrated was actually the holiday date.

REGISTERED APPRENTICES

Wages per hour

Apprentice Glazier One Half Year (900 hr) terms at the following percentage of Journeyman's base wage.

1st	2nd	3rd	4th	5th	6th	7th	8th
35%	45%	55%	65%	75%	85%	90%	95%
+ additional \$1.50 per hour for all hours worked for all terms							

Apprentice Glazier Hi-Work One Half Year (900 hr) terms at the following percentage of Journeyman's Hi-Work base wage.

1st	2nd	3rd	4th	5th	6th	7th	8th
-----	-----	-----	-----	-----	-----	-----	-----

35% 45% 55% 65% 75% 85% 90% 95%
 + additional \$3.50 per hour for all hours worked for all terms

Supplemental Benefits per hour worked

For apprentices indentured after 07/01/2009 the following supplemental benefit applies:

Apprentice	
1st-4th term	\$ 14.26
5th-8th term	16.03
Apprentice High Work	
1st-4th term	\$ 16.83
5th-8th term	21.58

For apprentices indentured prior to and including 07/01/2009, the following supplemental benefit applies:

Apprentice	\$ 16.03
Apprentice High Work	21.58

1-201

Insulator - Heat & Frost **03/01/2015**

JOB DESCRIPTION Insulator - Heat & Frost

DISTRICT 1

ENTIRE COUNTIES

Albany, Columbia, Delaware, Essex, Fulton, Greene, Hamilton, Montgomery, Rensselaer, Saratoga, Schenectady, Schoharie, Sullivan, Ulster, Warren, Washington

WAGES

Wages per hour	07/01/2014	05/01/2015
		Additional
Asbestos Worker*	\$ 31.56	\$ 1.50**
Insulator*	31.56	1.50**
Firestopping Worker*	26.83	1.50**

(*)On Mechanical Systems only.

(**)To be allocated at a later date.

SUPPLEMENTAL BENEFITS

Per hour worked

Journeyman	\$ 20.03
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OVERTIME PAY

See (*B1, **Q) on OVERTIME PAGE

*B1=Double time begins after 10 hours on Saturday

**Q=Triple time on Labor Day if worked.

HOLIDAY

Paid: See (1) on HOLIDAY PAGE

Overtime: See (5, 6) on HOLIDAY PAGE

When a holiday falls on Sunday the following Monday shall be observed as the holiday.

REGISTERED APPRENTICES

Wages per hour

one year terms at the following percentage of Journeyman's wage.

1st	2nd	3rd	4th
60 %	70 %	80 %	90 %

Supplemental Benefits per hour worked:

Apprentices	\$ 20.03
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1-40

Ironworker **03/01/2015**

JOB DESCRIPTION Ironworker

DISTRICT 1

ENTIRE COUNTIES

Albany, Clinton, Columbia, Delaware, Essex, Greene, Rensselaer, Saratoga, Schenectady, Schoharie, Warren, Washington

PARTIAL COUNTIES

Fulton: Only the Townships of Broadalbin, Mayfield, Northampton, Bleecker and Johnstown.

Hamilton: Only the Townships of Hope, Benson and Wells.

Montgomery: Only the Townships of Florida, Amsterdam, Charleston, Glen, Mohawk and Root.
 Otsego: Only the Towns of Unadilla, Butternuts, Morris, Otego, Oneonta, Laurens, Millford, Maryland and Worchester.

WAGES

Per hour	07/01/2014
Ornamental	\$ 29.05
Reinforcing	29.05
Rodman	29.05
Structural & Precast	29.05
Mover/Rigger	29.05
Fence Erector	29.05
Stone Derrickman	29.05
Sheeter	29.30
Curtain Wall Installer	29.05
Metal Window Installer	29.05

SUPPLEMENTAL BENEFITS

Per hour worked

JOURNEYMAN \$ 25.06

OVERTIME PAY

See (B, E, Q) on OVERTIME PAGE

HOLIDAY

Paid: See (1) on HOLIDAY PAGE

Overtime: See (5, 6) on HOLIDAY PAGE

Note: Any holiday which occurs on Sunday shall be observed the following Monday.

REGISTERED APPRENTICES

Wages per hour

ONE YEAR TERMS AT THE FOLLOWING WAGE RATES:

	07/01/2014
1st year	\$ 16.00
2nd year	18.00
3rd year	20.00
4th year	22.00
Supplemental Benefits per hour worked	
1st year	\$ 10.00
2nd year	19.38
3rd year	20.72
4th year	22.06

Laborer - Building

03/01/2015

JOB DESCRIPTION Laborer - Building

DISTRICT 1

ENTIRE COUNTIES

Clinton, Essex, Warren

WAGES

GROUP #A:

Basic Rate, Multi Trade Tender, Pipe Layer (water, sewer & etc), Self-propelled equipment operator

GROUP #B:

Demolition and wrecking, Concrete or plaster pump.

GROUP #C:

Sandblaster on construction clean-up, Drilling equipment only where a separate air compressor unit supplies power, Metal formsetter (sidewalk) and Curb Setter, Asphalt Raker, and Tail/Screwman on paving machine.

GROUP #D:

Acetylene Burner on demolition and cutting of Pipe

GROUP #E:

Blaster

GROUP #F:

Workers in kilns, tanks, boilers etc., Asbestos & Hazardous Waste Work.

WAGES per hour

07/01/2014

Group # A	\$ 20.88
Group # B	21.03
Group # C	21.18
Group # D	21.33
Group # E	21.38
Group # F	21.88

(*)To be allocated at a later date.

SUPPLEMENTAL BENEFITS

Per hour worked

Journeyman \$ 18.22

OVERTIME PAY

See (B, E, *E2, Q) on OVERTIME PAGE

*Inclement weather makeup day may be provided November 15 to May 15.

HOLIDAY

Paid: See (1) on HOLIDAY PAGE
Overtime: See (5, 6) on HOLIDAY PAGE

REGISTERED APPRENTICES

Wages per hour

Terms are at the following percentage of Group Rate A.

0-1,000 Hrs	1,001-2,000 Hrs	2,001-3,000 Hrs	3,001-4,000 Hrs
60%	70%	80%	90%

Supplemental Benefits per hour worked

Apprentices \$ 18.22

1-186ew

Laborer - Heavy&Highway

03/01/2015

JOB DESCRIPTION Laborer - Heavy&Highway

DISTRICT 1

ENTIRE COUNTIES

Clinton, Essex, Warren

WAGES

GROUP # A:

Basic Rate, Drill Helper, Flagman, Outboard and Hand Boats.

GROUP # B:

Chain Saw, Concrete Aggregate Bin, Concrete Bootman, Gin Buggy, Hand or Machine Vibrator, Jack Hammer, Mason Tender, Mortar Mixer, Pavement Breaker, Handlers of Steelmesh, Small Generators for Laborers' Tools, Installation of Bridge Drainage Pipe, Pipe Layers, Vibrator Type Rollers, Tamper, Drill Doctor, Water Pump Operator (1-1/2" and Single Diaphragm) Nozzle (Asphalt, Gunite, Seeding, and Sand Blasting) , Laborers Assisting on Chain Link Fence Installation, Rock Splitter and Power Unit, Pusher Type Concrete Saw and all other Gas, Electric, Oil and Air Tool Operators, Wrecking Laborer.

GROUP # C:

Drilling Equipment Only Where a Separate Air Compressor Unit Supplies Power, Acetylene Torch Operators, Asphalt Raker, Powderman, Tail or Screw Operator on Asphalt Paver.

GROUP # D:

Blasters, Metal Form Setters (sidewalk), Stone or Granite Curb Setters.

GROUP # E:

Hazardous waste, Lead & Abestos abatement.

WAGES per hour	07/01/2014	07/01/2015
		Additional

Group # A	\$ 23.99	\$ 1.30*
Group # B	24.19	1.30*
Group # C	24.39	1.30*
Group # D	24.59	1.30*
Group # E	25.99	1.30*

All employees who work a single irregular shift starting between 5:00 pm and 1:00 am on governmental mandated night work shall be paid an additional \$1.75 per hour.

(*)To be allocated at a later date.

SUPPLEMENTAL BENEFITS

Per hour worked

Journeyman \$ 19.23

OVERTIME PAY

See (B, E, Q) on OVERTIME PAGE

HOLIDAY

Paid: See (5, 6) on HOLIDAY PAGE

Overtime: See (5, 6) on HOLIDAY PAGE

Note: If a holiday falls on Sunday, it will be celebrated on Monday. In the event that men work on this Sunday holiday, they shall be paid double time. In the event that men work on Monday, they shall be compensated at double time plus the holiday pay. Accordingly, the Monday following the Sunday is treated as the holiday.

REGISTERED APPRENTICES

Wages per hour

Terms are at the following percentage of Group A rate.

0-1,000 Hrs	1,001-2,000 Hrs	2,001-3,000 Hrs	3001-4000 hrs
60%	70%	80%	90%

Supplements per hour worked

Apprentices \$ 19.23

1-186/2h

Laborer - Tunnel

03/01/2015

JOB DESCRIPTION Laborer - Tunnel

DISTRICT 1

ENTIRE COUNTIES

Clinton, Essex, Warren

WAGES

GROUP A: Change House Man

GROUP B: Miners and all Machine Men, Safety Miner, all Shaft-work, Caisson work, Drilling, Blow Pipe, all Air Tools, Tugger, Scaling, Nipper, Guniting pot to nozzle, Bit Grinder, Signal Man (top and bottom), Concrete Men, Shield driven tunnels, mixed face and soft ground, liner plate tunnels in free air.

GROUP C: Hazardous/Waste Work

WAGES (per hour)

	07/01/2014	07/01/2015
		Additional
Tunnel Laborer:		
Group A	\$ 27.17	\$ 1.30**
Group B	27.37	1.30**
Group C*	29.17	1.30**

(*)Work site required to be designated by State/Federal as hazardous waste site and relevant regulations require employees to use personal protection.

(**)To be allocated at a later date.

SUPPLEMENTAL BENEFITS

Per hour worked:

Journeyman \$ 19.23

OVERTIME PAY

See (B, E, Q) on OVERTIME PAGE

HOLIDAY

Paid: See (5, 6) on HOLIDAY PAGE

Overtime: See (5, 6) on HOLIDAY PAGE

If the holiday falls on Saturday, it will be celebrated on Friday. If the holiday falls on Sunday, it will be celebrated on Monday.

REGISTERED APPRENTICES

Wages per hour

Terms are at the following percentage of Group B rate.

0-1000 Hrs 60%	1001-2000 Hrs 70%	2001-3000 Hrs 80%	3001-4000 Hrs 90%
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Supplements per hour worked

Apprentices \$ 19.23

1-186T

Lineman Electrician

03/01/2015

JOB DESCRIPTION Lineman Electrician

DISTRICT 6

ENTIRE COUNTIES

Albany, Allegany, Broome, Cattaraugus, Cayuga, Chautauqua, Chemung, Chenango, Clinton, Columbia, Cortland, Delaware, Dutchess, Erie, Essex, Franklin, Fulton, Genesee, Greene, Hamilton, Herkimer, Jefferson, Lewis, Livingston, Madison, Monroe, Montgomery, Niagara, Oneida, Onondaga, Ontario, Orange, Orleans, Oswego, Otsego, Putnam, Rensselaer, Rockland, Saratoga, Schenectady, Schoharie, Schuyler, Seneca, St. Lawrence, Steuben, Sullivan, Tioga, Tompkins, Ulster, Warren, Washington, Wayne, Wyoming, Yates

WAGES

Per hour:

NOTE: Includes Teledata Work within ten (10) feet of High Voltage Transmission Lines

Below rates applicable on all overhead and underground distribution and maintenance work, and all overhead and underground transmission line work and the installation of fiber optic cable where no other construction trades are or have been involved. (Ref #14.01.01)

	07/01/2014	05/04/2015	05/02/2016
Lineman, Technician	\$ 45.51	\$ 46.90	Additional \$ 2.50*
Crane, Crawler Backhoe	45.51	46.90	2.50*
Welder, Cable Splicer	45.51	46.90	2.50*
Digging Machine Operator	40.96	42.21	2.50*
Tractor Trailer Driver	38.68	39.87	2.50*
Groundman, Truck Driver	36.41	37.52	2.50*
Mechanic 1st Class	36.41	37.52	2.50*
Flagman	27.31	28.14	2.50*

* To be allocated at a later date.

Additional \$1.00 per hour for entire crew when a helicopter is used.

Below rates applicable on all electrical sub-stations, switching structures, fiber optic cable and all other work not defined as "Utility outside electrical work". (Ref #14.02.01-A)

	07/01/2014	05/04/2015	05/02/2016
Lineman, Technician	\$ 45.51	\$ 46.90	Additional \$ 2.50*
Crane, Crawler Backhoe	45.51	46.90	2.50*
Cable Splicer-Pipe Type Cable	50.06	51.59	2.50*
Cert. Welder-Pipe Type Cable	47.79	49.25	2.50*
Digging Machine Operator	40.96	42.21	2.50*
Tractor Trailer Driver	38.68	39.87	2.50*
Mechanic 1st Class	36.41	37.52	2.50*
Groundman, Truck Driver	36.41	37.52	2.50*
Flagman	27.31	28.14	2.50*

* To be allocated at a later date.

Additional \$1.00 per hour for entire crew when a helicopter is used.

Below rates apply on switching structures, maintenance projects, railroad catenary install/maintenance third rail installation, bonding of rails and pipe type cable and installation of fiber optic cable. (Ref #14.02.01-B)

			Additional
Lineman, Technician, Welder	\$ 46.80	\$ 48.20	\$ 2.50*
Crane, Crawler Backhoe	46.80	48.20	2.50*
Digging Machine Operator	42.12	43.38	2.50*
Tractor Trailer Driver	39.78	40.97	2.50*
Groundman, Truck Driver	37.44	38.56	2.50*
Mechanic 1st Class	37.44	38.56	2.50*
Flagman	28.08	28.92	2.50*
Cert. Welder-Pipe Type Cable	49.14	50.61	2.50*
Cable Splicer-Pipe Type Cable	51.48	53.02	2.50*

* To be allocated at a later date.
 Additional \$1.00 per hour for entire crew when a helicopter is used.

Below rates applicable on all overhead and underground transmission line work & fiber optic cable where other construction trades are or have been involved. This applies to transmission line work only, not other construction. (Ref #14.03.01)

			Additional
Lineman, Technician, Welder	\$ 48.02	\$ 49.41	\$ 2.50*
Crane, Crawler Backhoe	48.02	49.41	2.50*
Cable Splicer	48.02	49.41	2.50*
Digging Machine Operator	43.22	44.47	2.50*
Tractor Trailer Driver	40.82	42.00	2.50*
Groundman, Truck Driver	38.42	39.53	2.50*
Mechanic 1st Class	38.42	39.53	2.50*
Flagman	28.81	29.65	2.50*

* To be allocated at a later date.
 Additional \$1.00 per hour for entire crew when a helicopter is used.

**** IMPORTANT NOTICE ****

Four (4), ten (10) hour days may be worked at straight time during a week, Monday thru Thursday. Friday may be used as a make-up day.
 *Effective 05/06/2013, Tuesday thru Friday may be worked with no make-up day.

NOTE - In order to use the '4 Day/10 Hour Work Schedule,' you must submit an 'Employer Registration for Use of 4 Day/10 Hour Work Schedule,' form PW30R; additionally, there must be a dispensation of hours in place on the project.

SUPPLEMENTAL BENEFITS

Per hour worked including holidays listed below:

The following SUPPLEMENTAL BENEFITS apply to all classification categories of CONSTRUCTION, TRANSMISSION and DISTRIBUTION.

\$ 19.75	\$ 20.50
*plus 7% of hourly wage	*plus 7% of hourly wage

*The 7% is based on the hourly wage paid, straight time rate or premium rate.

OVERTIME PAY

See (B, E, Q,) on OVERTIME PAGE. *Note* Double time for all emergency work designated by the Dept. of Jurisdiction.

NOTE: THE FOLLOWING RATES WILL APPLY ON ALL CONTRACTING AGENCY MANDATED MULTIPLE SHIFTS OF AT LEAST FIVE (5) DAYS DURATION WORKED BETWEEN THE HOURS LISTED BELOW:

1ST SHIFT	8:00 AM to 4:30 PM REGULAR RATE
2ND SHIFT	4:30 PM to 1:00 AM REGULAR RATE PLUS 17.3 %
3RD SHIFT	12:30 AM to 9:00 AM REGULAR RATE PLUS 31.4 %

HOLIDAY

Paid See (5, 6, 8, 13, 25) on HOLIDAY PAGE plus Governor of NYS Election Day.
 Overtime See (5, 6, 8, 13, 25) on HOLIDAY PAGE plus Governor of NYS Election Day.

SUPPLEMENTS for holidays paid at straight time

REGISTERED APPRENTICES

WAGES: 1000 hour terms at the following percentage of the Journeyman Lineman wage.

1st	2nd	3rd	4th	5th	6th	7th
60%	65%	70%	75%	80%	85%	90%

SUPPLEMENTAL BENEFITS: Same as Journeyman

6-1249a

Lineman Electrician - Teledata

03/01/2015

JOB DESCRIPTION Lineman Electrician - Teledata

DISTRICT 6

ENTIRE COUNTIES

Albany, Allegany, Broome, Cattaraugus, Cayuga, Chautauqua, Chemung, Chenango, Clinton, Columbia, Cortland, Delaware, Dutchess, Erie, Essex, Franklin, Fulton, Genesee, Greene, Hamilton, Herkimer, Jefferson, Lewis, Livingston, Madison, Monroe, Montgomery, Niagara, Oneida, Onondaga, Ontario, Orange, Orleans, Oswego, Otsego, Putnam, Rensselaer, Rockland, Saratoga, Schenectady, Schoharie, Schuyler, Seneca, St. Lawrence, Steuben, Sullivan, Tioga, Tompkins, Ulster, Warren, Washington, Wayne, Westchester, Wyoming, Yates

WAGES

Per hour:

FOR OUTSIDE WORK.

07/01/2014

Cable Splicer	\$ 29.12
Installer, Repairman	27.64
Teledata Lineman	27.64
Technician, Equipment Operator	27.64
Groundman	14.66

NOTE: EXCLUDES Teledata work within ten (10) feet of High Voltage (600 volts and over) transmission lines. For this work please see LINEMAN.

SUPPLEMENTAL BENEFITS

Per hour worked:

\$ 4.43
*plus 3% of
wage paid

*The 3% is based on the hourly wage paid, straight time rate or premium rate.

OVERTIME PAY

See (B, E, Q) on OVERTIME PAGE

HOLIDAY

Paid: See (1) on HOLIDAY PAGE
Overtime: See (5, 6, 16) on HOLIDAY PAGE

6-1249LT - Teledata

Lineman Electrician - Traffic Signal Lighting

03/01/2015

JOB DESCRIPTION Lineman Electrician - Traffic Signal Lighting

DISTRICT 6

ENTIRE COUNTIES

Albany, Allegany, Broome, Cattaraugus, Cayuga, Chautauqua, Chemung, Chenango, Clinton, Cortland, Delaware, Erie, Essex, Franklin, Fulton, Genesee, Greene, Hamilton, Herkimer, Jefferson, Lewis, Livingston, Madison, Monroe, Montgomery, Niagara, Oneida, Onondaga, Ontario, Orleans, Oswego, Otsego, Rensselaer, Saratoga, Schenectady, Schoharie, Schuyler, Seneca, St. Lawrence, Steuben, Sullivan, Tioga, Tompkins, Warren, Washington, Wayne, Wyoming, Yates

WAGES

Lineman/Technician shall perform all overhead aerial work. A Lineman/Technician on the ground will install all electrical panels, connect all grounds, install and connect all electrical conductors which includes, but is not limited to road loop wires; conduit and plastic or other type pipes that carry conductors, flex cables and connectors, and to oversee the encasement or burial of such conduits or pipes.

A Groundman/Groundman Truck Driver shall: Build and set concrete forms, handle steel mesh, set footer cages, transport concrete in a wheelbarrow, hand or machine concrete vibrator, finish concrete footers, mix mortar, grout pole bases, cover and maintain footers while curing in cold weather, operate jack hammer, operate hand pavement breaker, tamper, concrete and other motorized saws, as a drill helper, operate and maintain generators, water pumps, chain saws, sand blasting, operate mulching and seeding machine, air tools, electric tools, gas tools, load and unload materials, hand shovel and/or broom, prepare and pour mastic and other fillers, assist digger operator equipment operator in ground excavation and restoration, landscape work and painting. Only when assisting a lineman technician, a groundman/groundman truck driver may assist in installing conduit, pipe, cables and equipment.

A flagger's duties shall consist of traffic control only.

(Ref #14.01.01)

Per hour:

	07/01/2014	05/04/2015	05/02/2016
Lineman, Technician	\$ 40.12	\$ 41.04	Additional \$ 2.00*
Crane, Crawler Backhoe	40.12	41.04	2.00*
Certified Welder	42.13	43.09	2.00*
Digging Machine	36.11	36.94	2.00*
Tractor Trailer Driver	34.10	34.88	2.00*
Groundman, Truck Driver	32.10	32.83	2.00*
Mechanic 1st Class	32.10	32.83	2.00*
Flagman	24.07	24.62	2.00*

* To be allocated at a later date.

Above rates applicable on all Lighting and Traffic Signal Systems with the installation, testing, operation, maintenance and repair of all traffic control and illumination projects, traffic monitoring systems, road weather information systems and the installation of Fiber Optic Cable.

**** IMPORTANT NOTICE ****

Four (4), ten (10) hour days may be worked at straight time during a week, Monday thru Thursday. Friday may be used as a make-up day.

*Effective 05/06/2013, Tuesday thru Friday may be worked with no make-up day.

NOTE - In order to use the '4 Day/10 Hour Work Schedule,' you must submit an 'Employer Registration for Use of 4 Day/10 Hour Work Schedule,' form PW30R; additionally, there must be a dispensation of hours in place on the project.

SUPPLEMENTAL BENEFITS

Per hour worked including holidays listed below:

All classifications	\$ 19.75	\$ 20.50
	*plus 7.0% of hourly wage	*plus 7.0% of hourly wage

*The 7% is based on the hourly wage paid, straight time rate or premium rate.

Supplements paid at STRAIGHT TIME rate for holidays.

OVERTIME PAY

See (B, E, Q) on OVERTIME PAGE. *Note* Double time for all emergency work designated by the Dept. of Jurisdiction

NOTE: THE FOLLOWING RATES WILL APPLY ON ALL CONTRACTING AGENCY MANDATED MULTIPLE SHIFTS OF AT LEAST FIVE (5) DAYS DURATION WORKED BETWEEN THE HOURS LISTED BELOW:

1ST SHIFT	8:00 AM TO 4:30 PM	REGULAR RATE
2ND SHIFT	4:30 PM TO 1:00 AM	REGULAR RATE PLUS 17.3%
3RD SHIFT	12:30 AM TO 9:00 AM	REGULAR RATE PLUS 31.4%

HOLIDAY

Paid See (5, 6, 8, 13, 25) on HOLIDAY PAGE plus Governor of NYS Election Day.

Overtime See (5, 6, 8, 13, 25) on HOLIDAY PAGE plus Governor of NYS Election Day.

REGISTERED APPRENTICES

WAGES: Per hour. 1000 hour terms.

1st	2nd	3rd	4th	5th	6th	7th
\$ 24.07	\$ 26.08	\$ 28.08	\$ 30.09	\$ 32.10	\$ 34.10	\$ 36.11

SUPPLEMENTAL BENEFITS: Same as Journeyman

6-1249a-LT

Lineman Electrician - Tree Trimmer

03/01/2015

JOB DESCRIPTION Lineman Electrician - Tree Trimmer

DISTRICT 6

ENTIRE COUNTIES

Albany, Allegany, Broome, Cattaraugus, Cayuga, Chautauqua, Chemung, Chenango, Clinton, Columbia, Cortland, Delaware, Dutchess, Erie, Essex, Franklin, Fulton, Genesee, Greene, Hamilton, Herkimer, Jefferson, Lewis, Livingston, Madison, Monroe, Montgomery, Niagara, Oneida, Onondaga, Ontario, Orange, Orleans, Oswego, Otsego, Putnam, Rensselaer, Rockland, Saratoga, Schenectady, Schoharie, Schuyler, Seneca, St. Lawrence, Steuben, Sullivan, Tioga, Tompkins, Ulster, Warren, Washington, Wayne, Wyoming, Yates

WAGES

Per hour:

Applies to line clearance, tree work and right-of-way preparation on all new or existing energized overhead or underground electrical, telephone and CATV lines. This also would include stump removal near underground energized electrical lines, including telephone and CATV lines.

07/01/2014

Tree Trimmer	\$ 22.41
Equipment Operator	19.77
Equipment Mechanic	19.77
Truck Driver	16.71
Groundman	13.71
Flag person	9.76

SUPPLEMENTAL BENEFITS

Per hour worked including holidays listed below:

\$ 8.72
*plus 3% of
hourly wage

* The 3% is based on the hourly wage paid, straight time rate or premium rate.

OVERTIME PAY

See (B, E, Q) on OVERTIME PAGE

HOLIDAY

Paid: See (5, 6, 8, 15, 16, 25) on HOLIDAY PAGE

Overtime: See (5, 6, 8, 15, 16, 25) on HOLIDAY PAGE

All paid holidays falling on a Saturday shall be observed on the preceding Friday

All paid holidays falling on a Friday shall be observed on the following Monday

6-1249TT

Mason - Building

03/01/2015

JOB DESCRIPTION Mason - Building

DISTRICT 12

ENTIRE COUNTIES

Clinton, Essex, Franklin

PARTIAL COUNTIES

Warren: Only the Townships of Chester, Hague, Horicon and Johnsburg.

WAGES

Per hour 07/01/2014

Bricklayer	\$ 28.43
Cement Finisher	28.43
Plasterer/Fireproofers*	28.43
Pointer/Caulker/Cleaner	28.43
Stone Mason	28.43
Acid Brick	28.93

(*Fireproofers on Structural only.

SUPPLEMENTAL BENEFITS

Per hour worked

Journeyman \$ 17.68

OVERTIME PAY

See (B, E, E2, Q) on OVERTIME PAGE

HOLIDAY

Paid: See (1) on HOLIDAY PAGE

Overtime: See (5, 6) on HOLIDAY PAGE

Note: Any holiday which occurs on Sunday shall be observed the following Monday.

REGISTERED APPRENTICES

Wages per hour

750 hr terms at the following percentage of Journeyman's wage

1st	2nd	3rd	4th	5th	6th	7th	8th
55%	60%	65%	70%	75%	80%	85%	90%

Supplemental Benefits per hour worked

All others \$ 17.68

12-2b.8

Mason - Building

03/01/2015

JOB DESCRIPTION Mason - Building

DISTRICT 12

ENTIRE COUNTIES

Albany, Clinton, Columbia, Essex, Franklin, Fulton, Greene, Hamilton, Montgomery, Rensselaer, Saratoga, Schenectady, Schoharie, Warren, Washington

WAGES

Per hour 07/01/2014

Tile/Marble/Terazzo

Setter \$ 30.79
 Finisher 24.30

SUPPLEMENTAL BENEFITS

Per hour worked

Journeyman Setter \$ 18.25
 Journeyman Finisher 15.55

OVERTIME PAY

See (B, E, Q) on OVERTIME PAGE

HOLIDAY

Paid: See (1) on HOLIDAY PAGE
 Overtime: See (5, 6) on HOLIDAY PAGE

REGISTERED APPRENTICES

Wages per hour

Hour Terms at the following percentage of Journeyman's wage

Setter:

1st term 0-500 hrs	60%
2nd term 501-1500 hrs	70%
3rd term 1501-2500 hrs	80%
4th term 2501-3500 hrs	85%
5th term 3501-4500 hrs	90%
6th term 4501-6000 hrs	95%

Finisher:

1st term 0-500 hrs	70%
2nd term 501-1500 hrs	80%
3rd term 1501-2500 hrs	90%
4th term 2501-3700 hrs	95%

Supplemental Benefits per hour worked

07/01/2014

Setter:

1st term 0-500 hrs	\$ 10.50
2nd term 501-1500 hrs	10.50
3rd term 1501-2500 hrs	14.37
4th term 2501-3500 hrs	14.37
5th term 3501-4500 hrs	16.31
6th term 4501-6000 hrs	18.25

Finisher:	
1st term 0-500 hrs	\$ 10.00
2nd term 501-1500 hrs	10.00
3rd term 1501-2500 hrs	12.77
4th term 2501-3700 hrs	12.77

12-2TS.1

Mason - Heavy&Highway

03/01/2015

JOB DESCRIPTION Mason - Heavy&Highway

DISTRICT 12

ENTIRE COUNTIES

Albany, Cayuga, Clinton, Columbia, Essex, Franklin, Fulton, Greene, Hamilton, Herkimer, Jefferson, Lewis, Madison, Montgomery, Oneida, Oswego, Rensselaer, Saratoga, Schenectady, Schoharie, St. Lawrence, Warren, Washington

PARTIAL COUNTIES

Onondaga: For Heavy & Highway Cement Mason or Plaster Work in Onondaga County, refer to Mason-Heavy&Highway tag 1-2h/h on.

WAGES

Per hour	07/01/2014	07/01/2015
		Additional
Mason & Bricklayer	\$ 33.08	\$ 1.35*

Additional \$1.00 per hour for work on any swing scaffold or staging suspended by means of ropes or cables.

(*)To be allocated at a later date.

SUPPLEMENTAL BENEFITS

Per hour worked

Journeyman	\$ 17.96
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OVERTIME PAY

See (B, E, E2, Q) on OVERTIME PAGE

HOLIDAY

Paid: See (1) on HOLIDAY PAGE
 Overtime: See (5, 6) on HOLIDAY PAGE

Note: If a holiday falls on Sunday, the Monday following shall constitute the day of the legal holiday.

REGISTERED APPRENTICES

Wages per hour

750 HR TERMS at the following percent of Journeyman's wage

1st	2nd	3rd	4th	5th	6th	7th	8th
55%	60%	65%	70%	75%	80%	85%	90%

Supplemental Benefits per hour worked

07/01/2014
\$ 17.96

12-2hh.1

Millwright

03/01/2015

JOB DESCRIPTION Millwright

DISTRICT 2

ENTIRE COUNTIES

Clinton, Essex, Franklin, Hamilton, Warren, Washington

WAGES

Per hour:	07/01/2014
Millwright	\$ 26.00

Note: WELDER/HAZMAT - A Certified Welder shall receive \$ 1.25 per hour in addition to the current journeyman's rate provided he/she is directed to perform certified welding. If a work site has been declared a hazardous site by the Owner and the use of protective gear (including, as a minimum, air purifying canister-type chemical respirators) are required, then that Employee shall receive a \$ 1.25 premium per hour.

SUPPLEMENTAL BENEFITS

Per hour worked:

Journeyman \$ 18.59

OVERTIME PAY

See (B, E, *E2, Q) on OVERTIME PAGE

*Note - Saturday may be used as a make-up day and worked at the straight time rate of pay during a work week when conditions such as weather, power failure, fire, or natural disaster prevent the performance of work on a regular scheduled work day.

HOLIDAY

Paid: See (1) on HOLIDAY PAGE

Overtime: See (5, 6) on HOLIDAY PAGE

Note: Any holiday that falls on Sunday shall be observed the following Monday. Any holiday that falls on Saturday shall be observed the preceding Friday.

REGISTERED APPRENTICES

Wages per hour:

(1)year terms at the following percentage of journeyman's rate.

1st	2nd	3rd	4th
60%	70%	80%	90%

Supplemental Benefits per hours worked:

Apprentices:

1st term	\$ 8.45
2nd term	15.55
3rd term	16.56
4th term	17.58

2-1163b

Operating Engineer - Building

03/01/2015

JOB DESCRIPTION Operating Engineer - Building

DISTRICT 1

ENTIRE COUNTIES

Albany, Clinton, Columbia, Essex, Franklin, Fulton, Greene, Hamilton, Herkimer, Montgomery, Otsego, Rensselaer, Saratoga, Schenectady, Schoharie, Warren, Washington

PARTIAL COUNTIES

Dutchess: Defined as north of the northern boundary line of City of Poughkeepsie then due east to Route 115 to Bedelt Road then east along Bedelt Road to VanWagner Road then north along VanWagner Road to Bower Road then east along Bower Road to Rte. 44 east to Route 343 then along Route 343 east to the northern boundary of Town of Dover Plains and east along the northern boundary of Town of Dover Plains to Connecticut.

WAGES

CLASS A1:

Crane, hydraulic cranes, tower crane, locomotive crane, piledriver, cableway, derricks,whirlies, dragline, boom trucks over 5 tons.

CLASS A:

Shovel, all Excavators (including rubber tire full swing), Gradalls, power road grader, all CMI equipment, front-end rubber tire loader, tractor-mounted drill (quarry master), mucking machine, concrete central mix plant, concrete pump, belcrete system, automated asphalt concrete plant, and tractor road paver, boom trucks 5 tons and under, maintenance engineer, self-contained crawler drill-hydraulic rock drill.

CLASS B:

Backhoes (rubber tired backhoe/loader combination), bulldozer, pushcat, tractor, traxcavator, scraper, LeTourneau grader, form fine grader, self-propelled soil compactor (fill roller), asphalt roller, blacktop spreader, power brooms, sweepers, trenching machine, Barber Green loader, side booms, hydro hammer, concrete spreader, concrete finishing machine, one drum hoist, power hoisting (single drum), hoist two drum or more, three drum engine, power hoisting (two drum and over), two drum and swinging engine, three drum swinging engine, hod hoist, A-L frame winches, core and well drillers (one drum), post hole digger, model CHB Vibro-Tamp or similar machine, batch bin and plant operator, dinky locomotive, skid steer loader, track excavator 5/8 cubic yard or smaller, front end rubber tired loader under four cubic yards, vac truck.

CLASS C:

Fork lift, high lift, all terrain fork lift: or similar, oiler, fireman and heavy-duty greaser, boilers and steam generators, pump, vibrator, motor mixer, air compressor, dust collector, welding machine, well point, mechanical heater, generators, temporary light plants, electric submersible pumps 4" and over, murphy type diesel generator, conveyor, elevators, concrete mixer, belcrete power pack (belcrete system), seeding, and mulching machines, pumps.

* In the event that equipment listed above is operated by robotic control, the classification covering the operation will be the same as if manually operated.

WAGES per hour 07/01/2014

Class # A1	\$ 37.90
Class # A	37.46
Class # B	36.55
Class # C	33.98

Additional \$0.50 per hr for Tower Cranes.
 Additional \$1.00 per hr for Cranes with Boom length & jib 150ft. and over.
 Additional \$2.00 per hr for Cranes with Boom length & jib 200ft. and over.
 Additional \$2.00 per hr over B rate for Nuclear Leader work.
 Additional \$0.40 per hr for tunnel or excavation of shaft 40' or more deep.
 Additional \$2.50 per hour if work requires Personal Protective Equipment for hazardous waste site activities with a level C or over rating.

SUPPLEMENTAL BENEFITS

Per hour worked

Journeyman \$ 23.87

OVERTIME PAY

See (B, E, Q) on OVERTIME PAGE

HOLIDAY

Paid: See (1) on HOLIDAY PAGE

Overtime: See (5, 6) on HOLIDAY PAGE

Note: If a holiday falls on Sunday, it will be celebrated on Monday. If the holiday falls on Saturday, it will be celebrated on Friday. Employees who work a Saturday holiday shall be paid double time plus the holiday pay.

REGISTERED APPRENTICES

Wages per hour

1000 hours terms at the following percentage of Journeyman's wage Class B

1st	2nd	3rd	4th
60%	70%	80%	90%

Supplemental Benefits per hour worked

07/01/2014

All terms \$ 19.30

1-158 Alb

Operating Engineer - Heavy&Highway

03/01/2015

JOB DESCRIPTION Operating Engineer - Heavy&Highway

DISTRICT 1

ENTIRE COUNTIES

Albany, Broome, Chenango, Clinton, Columbia, Essex, Franklin, Fulton, Greene, Hamilton, Montgomery, Otsego, Rensselaer, Saratoga, Schenectady, Schoharie, Tioga, Warren, Washington

PARTIAL COUNTIES

Dutchess: Defined as north of the northern boundary line of City of Poughkeepsie then due east to Route 115 to Bedelt Road then east along Bedelt Road to VanWagner Road then north along VanWagner Road to Bower Road then east along Bower Road to Rte. 44 east to Route 343 then along Route 343 east to the northern boundary of Town of Dover Plains and east along the northern boundary of Town of Dover Plains to Connecticut.

Herkimer: That portion of the county that lies east of a line drawn due north and due south through the railroad station in Little Falls, NY

WAGES

CLASSIFICATION A:

Asphalt Curb Machine (Self Propelled, Slipform), Automated Concrete Spreader (CMI Type), Automatic Fine Grader, Backhoe (Except Tractor Mounted, Rubber Tired), Backhoe Excavator Full Swing (CAT 212 or similar type), Back Filling Machine, Belt Placer (CMI Type), Blacktop Plant (Automated), Boom truck, Cableway, Caisson Auger, Central Mix Concrete Plant (Automated), Concrete Curb Machine (Self Propelled, Slipform), Concrete Pump, Crane, Cherry Picker, Derricks (steel erection), Dragline, Overhead Crane (Gantry or Straddle type), Pile Driver, Truck Crane, Directional Drilling Machine, Dredge, Dual Drum Paver, Excavator (All PurposeHydraulically Operated) (Gradall or Similar), Front End Loader (4 cu. yd. and Over), Head Tower (Sauerman or Equal), Hoist (Two or Three Drum), Holland Loader, Maintenance Engineer, Mine Hoist, Mucking Machine or Mole, Pavement Breaker(SP) Wertgen; PB-4 and similar type, Power Grader, Profiler (over 105 H.P.), Quad 9, Quarry Master (or equivalent), Scraper, Shovel, Side Boom, Slip Form Paver (If a second man is needed, he shall be an Oiler), Tractor Drawn BeltType Loader, Truck or Trailer Mounted Log Chipper (Self Feeder), Tug Operator (Manned Rented Equipment Excluded), Tunnel Shovel

CLASSIFICATION B:

Asphalt Paver, Backhoe (Tractor Mounted, Rubber Tired), Bituminous Recycler Machine, Bituminous Spreader and Mixer, Blacktop Plant (NonAutomated), Blast or Rotary Drill (Truck or Tractor Mounted), Boring Machine, Cage Hoist, Central Mix Plant [(NonAutomated) and All Concrete Batching Plants], Cherry Picker (5 tons capacity and under), Concrete Paver (Over 16S), Crawler Drill (Self-contained), Crusher, Diesel Power Unit, Drill Rigs, Tractor Mounted, Front End Loader (Under 4 cu. yd.), Greaseman/Lubrication Engineer, HiPressure Boiler (15 lbs. and over), Hoist (One Drum), Hydro-Axe, Kolman Plant Loader and Similar Type Loaders (If Employer requires another man to clean the screen or to maintain the equipment, he shall be an Oiler), L.C.M. Work Boat Operator, Locomotive, Mixer (for stabilized base selfpropelled), Monorail Machine, Plant Engineer, Profiler (105 H.P. and under), Pug Mill, Pump Crete, Ready Mix Concrete Plant, Refrigeration Equipment (for soil stabilization), Road Widener, Roller (all above subgrade), Sea Mule, Self-contained Ride-on Rock Drill(Excluding Air-Track Type Drill), Skidder, Tractor with Dozer and/or Pusher, Trencher, Tugger Hoist, Vac Truck, Vermeer saw (ride on, any size or type), Welder

CLASSIFICATION C:

A Frame Winch Hoist on Truck, Articulated Heavy Hauler, Aggregate Plant, Asphalt or Concrete Grooving Machine (ride on), Ballast Regulator(Ride-on), oiler (used in conjunction with production), Bituminous Heater (self-propelled), oat (powered), Cement and Bin Operator, Concrete Pavement Spreader and Finisher Concrete Paver or Mixer (16S and under), Concrete Saw (self-propelled), Conveyor, Deck Hand, Directional Drill Machine Locator, Drill (Core and Well), Farm Tractor with accessories, Fine Grade Machine, Fireman, Fork Lift, Form Tamper, Grout Pump, Gunitite Machine, Hammers (Hydraulic self-propelled), Hydra-Spiker (ride-on), Hydraulic Pump (jacking system), Hydro -Blaster (Water), Mulching Machine, Oiler, Parapet Concrete or Pavement Grinder, Post Hole Digger and Post Driver, Power Broom (towed), Power Heaterman, Power Sweeper, Revinus Widener, Roller (Grade and Fill), Scarifier (ride-on), Shell Winder, Skid steer loader (Bobcat or similar), Span-Saw (ride-on), Steam Cleaner, Tamper (ride-on), Tie Extractor (ride-on), Tie Handler (ride-on), Tie Inserter (ride-on), Tie Spacer (ride-on), Tire Repair, Track Liner (ride-on), Tractor, Tractor (with towed accessories), Vibratory Compactor, Vibro Tamp, Well Point, and the following hands-off equipment: Compressors, Dust Collectors, Generators, Pumps, Welding Machines, Light Plants and Heaters

- Note for all above classifications of Operating Engineer - In the event that equipment listed above is operated by robotic control, the classification covering the operation will be the same as if manually operated.

WAGES per hour

	07/01/2014
Master Mechanic	\$ 39.02
Class A*	37.41
Class B	36.50
Class C	33.93

Additional \$2.00 per hour for All Employees who work a single irregular work shift starting from 5:00 PM to 1:00 AM that is mandated by the Contracting Agency.
Additional \$2.50 per hr. for hazardous waste removal work on State and/or Federally designated waste site which require employees to wear Level C or above forms of personal protection.

(*) Premiums for CRANES is based upon Class A rates with the following premiums:

- Additional \$4.00 per hr for Tower Cranes, including self erecting.
- Additional \$3.00 per hr for Lattice Boom Cranes and all other cranes with a manufacturers rating of fifty (50) tons and over.
- Additional \$2.00 per hr for all Hydraulic Cranes and Derricks with a manufacturer's rating of 49 ton and below, including boom trucks.

SUPPLEMENTAL BENEFITS

Per hour worked

Journeyman \$ 24.10

OVERTIME PAY

See (B, E, Q) on OVERTIME PAGE

HOLIDAY

Paid: See (5, 6) on HOLIDAY PAGE

Overtime: See (5, 6) on HOLIDAY PAGE

Note: If the holiday falls on Sunday, it will be celebrated on Monday. If the holiday falls on a Saturday, it will be celebrated on Saturday.

REGISTERED APPRENTICES

Wages per hour

1000 hours terms at the following percentage of Journeyman's wage Class B

1st	2nd	3rd	4th
60%	70%	80%	90%

Supplemental Benefits per hour worked

	07/01/2014
All Terms	\$ 19.50

JOB DESCRIPTION Operating Engineer - Marine Construction

DISTRICT 4

ENTIRE COUNTIES

Albany, Allegany, Bronx, Broome, Cattaraugus, Cayuga, Chautauqua, Chemung, Chenango, Clinton, Columbia, Cortland, Delaware, Dutchess, Erie, Essex, Franklin, Fulton, Genesee, Greene, Hamilton, Herkimer, Jefferson, Kings, Lewis, Livingston, Madison, Monroe, Montgomery, Nassau, New York, Niagara, Oneida, Onondaga, Ontario, Orange, Orleans, Oswego, Otsego, Putnam, Queens, Rensselaer, Richmond, Rockland, Saratoga, Schenectady, Schoharie, Schuyler, Seneca, St. Lawrence, Steuben, Suffolk, Sullivan, Tioga, Tompkins, Ulster, Warren, Washington, Wayne, Westchester, Wyoming, Yates

WAGES

Per Hour:

DREDGING OPERATIONS	07/01/2014	10/01/2014
CLASS A		
Operator, Leverman, Lead Dredgeman	\$ 34.73	\$ 35.63

CLASS A1 Dozer, Front Loader Operator	To conform to Operating Engineer Prevailing Wage in locality where work is being performed including benefits.
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CLASS B Spider/Spill Barge Operator, Tug Operator(over1000hp), OperatorII, Fill Placer, Derrick Operator, Engineer, Chief Mate, Electrician, Chief Welder, Maintenance Engineer	\$ 30.05	\$ 30.81
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Certified Welder, Boat Operator(licensed)	\$ 28.30	\$ 29.01
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CLASS C Drag Barge Operator, Steward, Mate, Assistant Fill Placer,	\$ 27.54	\$ 28.22
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Welder (please add)\$ 0.06

Boat Operator	\$ 26.55	\$ 27.30
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CLASS D Shoreman, Deckhand, Rodman, Scowman, Cook, Messman, Porter/Janitor	\$ 22.17	\$ 22.68
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Oiler(please add)\$ 0.09

SUPPLEMENTAL BENEFITS

Per Hour:

THE FOLLOWING SUPPLEMENTAL BENEFITS APPLY TO ALL CATEGORIES

All Classes A & B	07/01/2014 \$ 9.42 plus 8% of straight time wage, Overtime hours add \$ 0.63	10/01/2014 \$ 9.99 plus 8% of straight time wage, Overtime hours add \$ 0.63
All Class C	\$ 9.12 plus 8% of straight time wage, Overtime hours add \$ 0.48	\$ 9.69 plus 8% of straight time wage, Overtime hours add \$ 0.48
All Class D	\$ 8.82 plus 8% of straight time wage, Overtime hours add \$ 0.33	\$ 9.39 plus 8% of straight time wage, Overtime hours add \$ 0.33

OVERTIME PAY

See (B, F, R) on OVERTIME PAGE

HOLIDAY

Paid: See (1) on HOLIDAY PAGE
 Overtime: See (5, 6, 8, 15, 26) on HOLIDAY PAGE

4-25a-MarConst

Operating Engineer - Survey Crew

03/01/2015

JOB DESCRIPTION Operating Engineer - Survey Crew

DISTRICT 12

ENTIRE COUNTIES

Albany, Allegany, Broome, Cayuga, Chemung, Chenango, Clinton, Columbia, Cortland, Essex, Franklin, Fulton, Greene, Hamilton, Herkimer, Jefferson, Lewis, Livingston, Madison, Monroe, Montgomery, Niagara, Oneida, Onondaga, Ontario, Oswego, Otsego, Rensselaer, Saratoga, Schenectady, Schoharie, Schuyler, Seneca, St. Lawrence, Steuben, Tioga, Tompkins, Warren, Washington, Wayne, Yates

PARTIAL COUNTIES

Dutchess: The northern portion of the county from the northern boundary line of the City of Poughkeepsie, north.

Genesee: Only the portion of the county that lies east of a line down the center of Route 98 to include all area that lies within the City of Batavia.

WAGES

These rates apply to Building and Heavy Highway.

Per hour:

SURVEY CLASSIFICATIONS:

Party Chief - One who directs a survey party.

Instrument Person - One who runs the instrument and assists the Party Chief.

Rod Person - One who holds the rods and, in general, assists the Survey Party.

	07/01/2014	07/01/2015
Party Chief	\$ 35.49	\$ 36.53
Instrument Person	32.53	33.46
Rod Person	23.83	24.46

Additional \$3.00 per hr. for work in a Tunnel.

Additional \$2.50 per hr. for EPA or DEC certified toxic or hazardous waste work.

SUPPLEMENTAL BENEFITS

Per hour worked:

Journeyman	\$ 22.75	\$ 23.75
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OVERTIME PAY

See (B, E, Q) on OVERTIME PAGE

HOLIDAY

Paid: See (5, 6) on HOLIDAY PAGE

Overtime: See (5, 6) on HOLIDAY PAGE

REGISTERED APPRENTICES

WAGES: 1000 hour terms for Instrument & Rod Persons at the following rates:

	07/01/2014	07/01/2015
0-1000 Hrs	\$ 14.30	\$ 14.68
1001-2000 Hrs	16.68	17.12
2001-3000 Hrs	19.06	19.57

SUPPLEMENTAL BENEFITS per hour worked:

All Terms	\$ 22.75	\$ 23.75
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12-158-545 D.H.H.

Operating Engineer - Survey Crew - Consulting Engineer

03/01/2015

JOB DESCRIPTION Operating Engineer - Survey Crew - Consulting Engineer

DISTRICT 12

ENTIRE COUNTIES

Albany, Allegany, Broome, Cayuga, Chemung, Chenango, Clinton, Columbia, Cortland, Essex, Franklin, Fulton, Greene, Hamilton, Herkimer, Jefferson, Lewis, Livingston, Madison, Monroe, Montgomery, Niagara, Oneida, Onondaga, Ontario, Oswego, Otsego, Rensselaer, Saratoga, Schenectady, Schoharie, Schuyler, Seneca, St. Lawrence, Steuben, Tioga, Tompkins, Warren, Washington, Wayne, Yates

PARTIAL COUNTIES

Dutchess: The northern portion of the county from the northern boundary line of the City of Poughkeepsie, north.

Genesee: Only the portion of the county that lies east of a line down the center of Route 98 to include all area that lies within the City of Batavia.

WAGES

These rates apply to feasibility and preliminary design surveying, line and grade surveying for inspection or supervision of construction when performed under a Consulting Engineer Agreement.

Per hour:

SURVEY CLASSIFICATIONS:

Party Chief - One who directs a survey party.

Instrument Person - One who runs the instrument and assists the Party Chief.

Rod Person - One who holds the rods and, in general, assists the Survey Party.

	07/01/2014	07/01/2015
Party Chief	\$ 35.49	\$ 36.53
Instrument Person	32.53	33.46
Rod Person	23.83	24.46

Additional \$3.00 per hr. for work in a Tunnel.

Additional \$2.50 per hr. for EPA or DEC certified toxic or hazardous waste work.

SUPPLEMENTAL BENEFITS

Per hour worked:

Journeyman	\$ 22.75	\$ 23.75
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OVERTIME PAY

See (B, E, Q) on OVERTIME PAGE

HOLIDAY

Paid: See (5, 6) on HOLIDAY PAGE

Overtime: See (5, 6) on HOLIDAY PAGE

12-158-545 DCE

Operating Engineer - Tunnel

03/01/2015

JOB DESCRIPTION Operating Engineer - Tunnel

DISTRICT 7

ENTIRE COUNTIES

Albany, Allegany, Broome, Cayuga, Chemung, Chenango, Clinton, Columbia, Cortland, Essex, Franklin, Fulton, Greene, Hamilton, Herkimer, Jefferson, Lewis, Livingston, Madison, Monroe, Montgomery, Oneida, Onondaga, Ontario, Oswego, Otsego, Rensselaer, Saratoga, Schenectady, Schoharie, Schuyler, Seneca, St. Lawrence, Steuben, Tioga, Tompkins, Warren, Washington, Wayne, Yates

PARTIAL COUNTIES

Dutchess: Northern part of Dutchess to the northern boundary line of the City of Poughkeepie then due east to Route 115 to Bedelt Road then east along Bedelt Road to VanWagner Road then north along VanWagner Road to Bower Road then east along Bower Road to Rte. 44 east to Rte. 343 then along Rte. 343 east to the northern boundary of the Town of Dover Plains and east along the northern boundary of the Town of Dover Plains to Connecticut.

Genesee: Only that portion of the county that lies east of a linedrawn down the center of Route 98 and the entirety of the City of Batavia.

WAGES

Crane 1: All cranes, including self erecting to be paid \$4.00 per hour over the Class A rate.

Crane 2: All Lattice Boom Cranes and all other cranes with a manufacturer's rating of fifty (50) ton and over to be paid \$3.00 per hour over Class A rate.

Crane 3: All hydraulic cranes and derricks with a manufacturer's rating of forty nine (49) ton nad below, including boom trucks, to be paid \$2.00 per hour over Class A rate.

CLASS A: Automatic Concrete Spreader (CMI Type); Automatic Fine Grader; Backhoe (except tractor-mounted,rubber tired); Belt Placer (CMI Type); Blacktop Plant (Automated); Cableway; Caisson Auger; Central Mix Concrete Plant (Automated); Concrete Curb Machine (Self-propelled slipform) Concrete Pump (8" or over); Dredge; Dual Drum Paver; Any Mechanical Shaft Drill; Excavator (all purpose-hydraulic-Gradall or Similar); Fork Lift (factory rated 15 ft and over); Front End Loader (4 c.y & over); Gradall; Head Tower (Sauerman or Equal), Hoist Shaft; Hoist (two or three Drum); Mine Hoist; Maintenance Engineer (Shaft and Tunnel) ; Mine Hoist; Mucking Machine or Mole, Overhead Crane (Gantry or Straddle Type); Pile Driver; Power Grader; Remote Controlled Mole or Tunnel Mach.; Scraper; Shovel; Side Boom; Slip Form Paver (If a second man is needed, he shall be an Oiler); Tractor Drawn Belt Type Loader; Tripper/Maintenance Eng.(Shaft & Tunnel); Truck or Trailer Mounted Log Chipper (self-feeding); Tug Operator (Manned rented equip. excluded); Tunnel Shovel; Mining Machine(Mole and Similar Types).

CLASS B: Automated Central Mix Concrete Plant; Backhoe Trac-Mtd, Rubber Tired); Backhoe (topside); Bitum. Spred. & Mixer, Blacktop Plant non-automated); Blast or Rotary Drill (Truck or Tractor Mounted); Boring Machine; Cage Hoist; Central Mix Plant(NonAutomated) and All Concrete Batching Plants; Compressors (4 or less exceeding 2,000 c.f.m. combined capacity); Concrete Pump; Crusher; Diesel Power Unit; Drill Rigs (Tractor Mounted); Front End Loader (under 4 c.y.); Grayco Epoxy Machine; Hoist (One Drum); Hoist 2 or 3 Drum (Topside); Kolman Plant Loader & Similar Type Loaders (if Employer requires another person to clean the screen or to maintain the equipment, he shall be an Oiler); L.C.M. Work Boat Operator; Locomotive; Maint. Eng. (Topside); Grease Man; Welder; Mixer (for stabilized base-self propelled); Monorail Machine; Plant Eng.; Personnel Hoist; Pump Crete; Ready Mix Concrete Plant; Refrigeration Equipment (for soil stabilization); Road Widener; Roller (all above sub-grade); Sea Mule; Shotcrete Mach.; Shovel (Topside); Tractor with Dozer and/or Pusher; Trencher; Tugger Hoist; Tunnel Locomotive; Winch and Winch Cat.

CLASS C: A Frame Truck; Ballast Regulator (ride-on); Compressors (4 under 2,000 cfm combined capacity; or 3 or less with more than 1200 cfm. but not to exceed 2,000 cfm); Compressors (any size but subject to other provisions for compressors-Dust Collectors, Generators, Pumps, Welding Machines, Light Plants-4 of any type or combination); Concrete Pavement Spreaders and Finishers; Conveyor; Drill (core); Drill well; Elec Pump Used in Conjunction with Well Point System; Farm Tractor with Accessories; Fine Grade Machine; ForkLift (under 15 ft); Grout Pump (over (5) cu. ft.; Gunite Machine; Hammers (hydraulic- self propel.); Hydra-Spiker-Ride on; Hydra-Blaster; Hydra Blaster (water); Motorized Form Carrier; Post Hole Digger & Post Driver; Power Sweep; Roller grade & fill); Scarifer (Ride on); Span-Saw (Ride-on); Submersible Electric Pump (when used in lieu of well point system); Tamper (Ride-on); Tie-Extractor, Tie Handler, Tie Inserter, Tie Spacer and Track Liner (Ride-on); Tractor (with towed accessories); Vibratory Compactor; Vibro Tamp, Well Point.

CLASS D: Aggregate Plant; Cement & Bin Operator; Compressors(3 or less not to exceed 1,200 c.f.m. combined capacity); Compressors(any size, but subject to other provisions for compressors-Dust Collectors, Generators, Pumps, Welding Machines, Light Plants-3 or less-any type or combination); Concrete Saw (self propelled); Fireman; Form Tamper; Hydraulic Pump (jacking system); Light Plants; Mulching Machine; Oiler; Parapet Concrete or Pavement Grinder; Power Broome towed; Power Heaterman; Revinius Widener; Shell Winder; Steam Cleaner and Tractor; Greaseman; Junior Engineer.

Per hour:	07/01/2014
Crane 1	\$ 43.68
Crane 2	42.68
Crane 3	41.68
Master Mechanic	41.81
CLASS A	39.68
CLASS B	38.46
CLASS C	35.67
CLASS D	32.66

On hazardous waste work bid, on a state or federally designated hazardous waste site, where the Operating Engineer is in direct contact with hazardous material and when personal protective equipment is required for respiratory, skin and eye protection, the Operating Engineer shall receive the hourly wage plus \$5.00 per hour. Fringe benefits will be paid at the contractual hourly wage.

SUPPLEMENTAL BENEFITS

Per hour paid:
 Journeyman \$ 24.55

OVERTIME PAY

See (B, B2, E, Q) on OVERTIME PAGE

HOLIDAY

Paid: See (5, 6) on HOLIDAY PAGE
 Overtime: See (5, 6) on HOLIDAY PAGE

REGISTERED APPRENTICES

(1000) hours terms at the following percentages.

1st term	60% of Class D
2nd term	65% of Class C
3rd term	70% of Class B
4th term	75% of Class A

Supplemental Benefits per hour paid:
 \$ 24.55

7-158-832TL.

Painter **03/01/2015**

JOB DESCRIPTION Painter
ENTIRE COUNTIES

DISTRICT 1

Essex, Hamilton, Warren, Washington

WAGES

Per hour

	07/01/2014	05/01/2015 Additional	05/01/2016 Additional
Painter\Wallcover	\$ 27.49	\$ 1.40**	\$ 1.40**
Drywall Finishers	27.49	1.40**	1.40**
Spray Rate	27.49	1.40**	1.40**
Structural Steel*	28.49	1.40**	1.40**
Lead Abatement	28.49	1.40**	1.40**
Lead Abatement on Structural Steel	29.49	1.40**	1.40**

(*)Employees working on objects with the use of swing stage, boatswain chair, pick and cables only will be paid at Structural Steel rate.
 (**) To be allocated at a later date.

Bridge Painter

See Bridge Painter rates for the following work:

All Bridges and Tanks

SUPPLEMENTAL BENEFITS

Per hour worked

Journeyman \$ 11.22

OVERTIME PAY

See (B, E2, H) on OVERTIME PAGE

HOLIDAY

Paid: See (1) on HOLIDAY PAGE

Overtime: See (5, 6) on HOLIDAY PAGE

Note: If the holiday falls on Sunday, it shall be observed on Monday.

REGISTERED APPRENTICES

Wages per hour

1 year terms at the following percentage of Journeyman's wage.

1st year	2nd year	3rd year	4th year
40%	50%	60%	80%

Supplemental Benefits per hour worked

All terms \$ 11.22

1-466-ZZ

Painter - Bridge & Structural Steel

03/01/2015

JOB DESCRIPTION Painter - Bridge & Structural Steel

DISTRICT 8

ENTIRE COUNTIES

Albany, Bronx, Clinton, Columbia, Dutchess, Essex, Franklin, Fulton, Greene, Hamilton, Kings, Montgomery, Nassau, New York, Orange, Putnam, Queens, Rensselaer, Richmond, Rockland, Saratoga, Schenectady, Schoharie, Suffolk, Sullivan, Ulster, Warren, Washington, Westchester

WAGES

Per Hour Worked:

STEEL:

Bridge Painting:	07/01/2014	10/01/2014
From May 1st to Nov. 15th -	\$ 47.00 + 5.38*	\$ 48.75 + 5.63*
From Nov. 16th to April 30th -	\$ 47.00 + 5.38*	\$ 48.75 + 5.63*

*Not subject to overtime and limited to first 40 hours

NOTE: All premium wages are to be calculated on \$47.00 or \$48.75 per hour only.

EXCEPTION: During the period of May 1st to November 15th, for the first and last week of employment on the project, and for the weeks of Memorial Day, Independence Day and Labor Day, this rate shall be paid for the actual number of hours worked.

Power Tool/Spray is an additional \$6.00 per hour above hourly rate, whether straight time or overtime

NOTE: Generally, for Bridge Painting Contracts, ALL WORKERS on and off the bridge (including Flagmen) are to be paid Painter's Rate; the contract must be ONLY for Bridge Painting.

SUPPLEMENTAL BENEFITS

Per Hour Worked:

Journeyworker:	07/01/2014	10/01/2014
From May 1st to Nov. 15th -		
Hourly Rate up to 40 hours	\$ 28.20	\$ 28.95
Hourly Rate after 40 hours	7.50	7.50
From Nov. 16th to April 30th -		
Hourly Rate up to 50 hours	28.20	28.95
Hourly Rate after 50 hours	7.50	7.50

EXCEPTION: During the period of May 1st to November 15th, for the first and last week of employment on the project, and for the weeks of Memorial Day, Independence Day and Labor Day, this rate shall be paid for the actual number of hours worked.

OVERTIME PAY

See (A, F, R) on OVERTIME PAGE

HOLIDAY

Paid: See (1) on HOLIDAY PAGE
 Overtime: See (4, 6) on HOLIDAY PAGE

REGISTERED APPRENTICES

(Wage per hour Worked):

Apprentices: (1) year terms	07/01/2014	10/01/2014
1st 90 days	\$ 20.96	\$ 21.76
1st year after 90 days	20.96	21.76
2nd year	31.43	32.63
3rd year	41.91	43.51

Supplemental Benefits per hour worked:

	07/01/2014	10/01/2014
1st 90 days	\$ 8.29	\$ 8.59
1st year after 90 days	8.54	8.84
2nd year	16.93	17.38
3rd year	22.57	26.17

8-DC-9/806/155-BrSS

Painter - Line Striping

03/01/2015

JOB DESCRIPTION Painter - Line Striping

DISTRICT 8

ENTIRE COUNTIES

Albany, Bronx, Clinton, Columbia, Dutchess, Essex, Franklin, Fulton, Greene, Hamilton, Kings, Montgomery, Nassau, New York, Orange, Putnam, Queens, Rensselaer, Richmond, Rockland, Saratoga, Schenectady, Schoharie, Suffolk, Sullivan, Ulster, Warren, Washington, Westchester

WAGES

Per hour:

Painter (Striping-Highway):	07/01/2014
Striping-Machine Operator*	\$ 27.11
Linerman Thermoplastic	\$ 32.37

Note: * Includes but is not limited to: Positioning of cones and directing of traffic using hand held devices. Excludes the Driver/Operator of equipment used in the maintenance and protection of traffic safety

Four (4), ten (10) hour days may be worked at straight time during a week.

NOTE - In order to use the '4 Day/10 Hour Work Schedule,' you must submit an 'Employer Registration for Use of 4 Day/10 Hour Work Schedule,' form PW30R; additionally, there must be a dispensation of hours in place on the project.

SUPPLEMENTAL BENEFITS

Per hour paid: 07/01/2014
 Journeyworker:

Striping-Machine operator \$ 14.18
 Linerman Thermoplastic \$ 14.55

OVERTIME PAY

See (B, E, E2, F, S) on OVERTIME PAGE

HOLIDAY

Paid: See (5, 20) on HOLIDAY PAGE
 Overtime: See (5, 8, 11, 12, 15, 16, 17, 20, 21, 22) on HOLIDAY PAGE

8-1456-LS

Painter - Metal Polisher

03/01/2015

JOB DESCRIPTION Painter - Metal Polisher

DISTRICT 8

ENTIRE COUNTIES

Albany, Allegany, Bronx, Broome, Cattaraugus, Cayuga, Chautauqua, Chemung, Chenango, Clinton, Columbia, Cortland, Delaware, Dutchess, Erie, Essex, Franklin, Fulton, Genesee, Greene, Hamilton, Herkimer, Jefferson, Kings, Lewis, Livingston, Madison, Monroe, Montgomery, Nassau, New York, Niagara, Oneida, Onondaga, Ontario, Orange, Orleans, Oswego, Otsego, Putnam, Queens, Rensselaer, Richmond, Rockland, Saratoga, Schenectady, Schoharie, Schuyler, Seneca, St. Lawrence, Steuben, Suffolk, Sullivan, Tioga, Tompkins, Ulster, Warren, Washington, Wayne, Westchester, Wyoming, Yates

WAGES

07/01/2014

Metal Polisher \$ 27.15
 Metal Polisher** 28.24
 Metal Polisher*** 30.65

**Note: Applies on New Construction & complete renovation

*** Note: Applies when working on scaffolds over 34 feet.

SUPPLEMENTAL BENEFITS

Per Hour: 07/01/2014

Journeyworker:
 All classification \$ 13.61

OVERTIME PAY

See (B, E, E2, P, T) on OVERTIME PAGE

HOLIDAY

Paid: See (5, 6, 11, 15, 16, 25, 26) on HOLIDAY PAGE
 Overtime: See (5, 6, 9, 11, 15, 16, 25, 26) on HOLIDAY PAGE

REGISTERED APPRENTICES

Wages per hour:

One (1) year term at the following wage rates:

1st	2nd	3rd
\$11.00	\$12.50	\$15.50

Supplementals benefits:

Per hour paid:

1st	2nd	3rd
\$ 9.94	\$10.31	\$10.51

8-8A/28A-MP

Plumber

03/01/2015

JOB DESCRIPTION Plumber

DISTRICT 1

ENTIRE COUNTIES

Essex, Franklin

PARTIAL COUNTIES

Hamilton: The Townships of Long Lake and Indian Lake

WAGES

Per hour

07/01/2014	05/01/2015	05/01/2016
	Additional	Additional

Plumber & Steamfitter	\$ 34.68	\$2.00**	\$2.00**
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**To be allocated at a later date

SUPPLEMENTAL BENEFITS

Per hour worked

Journeyman	\$ 16.75
	+ 9.10*

* This portion of the benefit is subject to the SAME PREMIUM as shown for overtime.

OVERTIME PAY

See (B, E, Q) on OVERTIME PAGE

HOLIDAY

Paid: See (1) on HOLIDAY PAGE
 Overtime: See (5, 6, 16, 23) on HOLIDAY PAGE

Note: Whenever a Holiday falls on a Saturday, the preceding day, Friday, shall be observed as the Holiday. If a Holiday falls on a Sunday, the following day, Monday shall be observed as the Holiday.

REGISTERED APPRENTICES

Wages per hour

One year terms at the following percentage of Journeyman's wage

1st yr	50%
2nd yr	60%
3rd yr	70%
4th yr	80%
5th yr	90%

Supplemental Benefits per hour worked

1st yr	\$ 14.98 + 4.55*
2nd yr	15.33 + 5.46*
3rd yr	15.69 + 6.37*
4th yr	16.04 + 7.28*
5th yr	16.40 + 8.19*

* This portion of the benefit is subject to the SAME PREMIUM as shown for overtime.

1-773-SF

Roofer **03/01/2015**

JOB DESCRIPTION Roofer

DISTRICT 1

ENTIRE COUNTIES

Albany, Clinton, Columbia, Essex, Fulton, Greene, Hamilton, Montgomery, Rensselaer, Saratoga, Schenectady, Warren, Washington

WAGES

Per hour

07/01/2014

Roofer/Waterproofer	\$ 27.95
Pitch & Asbestos	29.95

SUPPLEMENTAL BENEFITS

Per hour worked

Journeyman	\$ 15.27
------------	----------

OVERTIME PAY

See (B, E*, Q) on OVERTIME PAGE.

* Saturday may be used as a make up day at straight time if employee misses 8 hrs or more during that week due to inclement weather.

HOLIDAY

Paid: See (1) on HOLIDAY PAGE
 Overtime: See (5, 6) on HOLIDAY PAGE

Note: When any Holiday falls on Saturday, the Friday before such Holiday shall be recognized as the legal Holiday. When a Holiday falls on Sunday, it shall be observed the following Monday.

REGISTERED APPRENTICES

Wages per hour

(1/2) year terms at the following per cent of the Roofer/Waterproofer rate. For Pitch & Asbestos work, an additional \$2.00 must be paid in wages.

1st yr 1st half	50%
1st yr 2nd half	58%
2nd yr 1st half	66%
2nd yr 2nd half	74%
3rd yr 1st half	82%
3rd yr 2nd half	90%

Supplemental Benefits per hour worked

1st yr 1st half	\$ 13.50
1st yr 2nd half	13.69
2nd yr 1st half	13.92
2nd yr 2nd half	14.12
3rd yr 1st half	14.40
3rd yr 2nd half	14.60

1-241

Sheetmetal Worker

03/01/2015

JOB DESCRIPTION Sheetmetal Worker

DISTRICT 1

ENTIRE COUNTIES

Albany, Clinton, Columbia, Essex, Franklin, Fulton, Greene, Hamilton, Montgomery, Rensselaer, Saratoga, Schenectady, Schoharie, Warren, Washington

WAGES

Per hour

07/01/2014	06/01/2015 Additional
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Sheetmetal Worker	\$ 31.81	\$ 2.15*
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(*) To be allocated at a later date.

SUPPLEMENTAL BENEFITS

Per hour worked

Journeyman	\$ 26.12
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OVERTIME PAY

See (B,E*,Q,) on OVERTIME PAGE

* Time and one half 1st 8 hours on Saturday. Double the hourly rate all additional Saturday hours.

HOLIDAY

Paid: See (1) on HOLIDAY PAGE
 Overtime: See (5, 6) on HOLIDAY PAGE

When any holiday falls on Saturday, the Friday before such holiday shall be recognized as the legal holiday. Any holiday falling on Sunday, the following Monday shall be recognized as the legal holiday.

REGISTERED APPRENTICES

Wages per hour

6 Month Terms at the following rate:

1st term	\$ 16.79
2nd term	18.20
3rd term	18.90
4th term	19.61
5th term	19.54
6th term	20.51
7th term	21.12
8th term	23.74

9th term	25.35
10th term	26.97

Supplemental Benefits per hour worked

1st term	\$ 16.43
2nd term	17.02
3rd term	17.26
4th term	17.51
5th term	21.60
6th term	21.96
7th term	22.56
8th term	23.15
9th term	23.75
10th term	24.34

1-83

Sprinkler Fitter

03/01/2015

JOB DESCRIPTION Sprinkler Fitter

DISTRICT 1

ENTIRE COUNTIES

Allegany, Broome, Cattaraugus, Cayuga, Chautauqua, Chemung, Chenango, Clinton, Columbia, Cortland, Delaware, Erie, Essex, Franklin, Fulton, Genesee, Greene, Hamilton, Herkimer, Jefferson, Lewis, Livingston, Madison, Monroe, Montgomery, Niagara, Oneida, Onondaga, Ontario, Orleans, Oswego, Otsego, Schoharie, Schuyler, Seneca, St. Lawrence, Steuben, Tioga, Tompkins, Washington, Wayne, Wyoming, Yates

WAGES

Per hour	07/01/2014	01/01/2015	04/01/2015
Sprinkler Fitter	\$ 31.04	\$31.04	\$31.66

SUPPLEMENTAL BENEFITS

Per hour worked

Journeyman	\$ 20.87	\$22.02	\$22.02
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OVERTIME PAY

See (B, E, Q) on OVERTIME PAGE

HOLIDAY

Paid: See (1) on HOLIDAY PAGE
 Overtime: See (5, 6) on HOLIDAY PAGE

Note: When a holiday falls on Sunday, the following Monday shall be considered a holiday and all work performed on either day shall be at the double time rate. When a holiday falls on Saturday, the preceding Friday shall be considered a holiday and all work performed on either day shall be at the double time rate.

REGISTERED APPRENTICES

Wages per hour

For Apprentices HIRED PRIOR TO 04/01/2010:

One Half Year terms at the following wage

1st	2nd	3rd	4th	5th	6th	7th	8th	9th	10th
\$ 15.52	\$ 15.52	\$ 17.07	\$ 18.62	\$ 20.18	\$ 21.93	\$ 23.28	\$ 24.83	\$ 26.38	\$ 27.94

Supplemental Benefits per hour worked

1st	2nd	3rd	4th	5th	6th	7th	8th	9th	10th
\$ 8.15	\$ 8.15	\$ 14.97	\$ 14.97	\$20.87	\$20.87	\$20.87	\$20.87	\$20.87	\$20.87

For Apprentices HIRED ON OR AFTER 04/01/2010:

One Half Year terms at the following wage

1st	2nd	3rd	4th	5th	6th	7th	8th	9th	10th
\$ 13.97	\$ 15.52	\$ 17.07	\$ 18.62	\$ 20.18	\$ 21.73	\$ 23.28	\$ 24.83	\$ 26.38	\$ 27.94

Supplemental Benefits per hour worked

1st	2nd	3rd	4th	5th	6th	7th	8th	9th	10th
-----	-----	-----	-----	-----	-----	-----	-----	-----	------

\$ 8.56	\$ 8.60	\$ 15.22	\$ 15.26	\$ 15.81	\$ 15.85	\$ 15.90	\$ 15.94	\$ 15.99	\$ 16.03
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For Apprentices HIRED ON OR AFTER 04/01/2013:

One Half Year terms at the following wage

1st	2nd	3rd	4th	5th	6th	7th	8th	9th	10th
\$ 13.97	\$ 15.52	\$ 17.07	\$ 18.62	\$ 20.18	\$ 21.73	\$ 23.28	\$ 24.83	\$ 26.38	\$ 27.94

Supplemental Benefits per hour worked

1st	2nd	3rd	4th	5th	6th	7th	8th	9th	10th
\$ 7.90	\$ 7.90	\$ 14.97	\$ 14.97	\$ 15.22	\$ 15.22	\$ 15.22	\$ 15.22	\$ 15.22	\$ 15.22

1-669

Teamster - Building **03/01/2015**

JOB DESCRIPTION Teamster - Building

DISTRICT 7

ENTIRE COUNTIES

Clinton, Essex, Franklin, Jefferson, St. Lawrence

PARTIAL COUNTIES

Lewis: Only the Townships of Croghan, Denmark, Diana, New Bremen, Harrisburg, Montague, Osceola and Pinckney.

Oswego: Only the Towns of Boylston, Redfield, and Sandy Creek.

Warren: Only the Townships of Hague, Horicon, Chester and Johnsburg.

WAGES

GROUP # 1: Fuel Trucks, Fork Lift (Warehouse & Storage Area Only), Bus, Warehouse, Yardman, Truck Helper, Pickups, Panel Truck, Flatbody Material Trucks (straight Jobs), Single axle Dump Trucks, Dumpsters, Material Checkers & Receivers, Greasers, Tiremen, Mechanic Helpers and Parts Chasers.

GROUP # 2: Tandems, Mechanics & Batch Trucks.

GROUP # 3: Semi Trailers, Low Boys, Asphalt Distributor Trucks, and Agitator Mixer Truck, Dump Crete Type Vehicles and 3 axle Dump trucks.

GROUP # 4: Asbestos Removal, Special earth moving Euclid type or similar off highway equip.(non self load.) Articulated and all-track dump trucks.

Wages per hour

07/01/2014

Building:

Group #1	\$ 20.59
Group #2	20.59
Group #3	20.69
Group #4	20.85

SUPPLEMENTAL BENEFITS

Per hour worked:

All groups \$ 21.66

OVERTIME PAY

See (B, E, Q) on OVERTIME PAGE

HOLIDAY

Paid: See (1) on HOLIDAY PAGE
 Overtime: See (5, 6) on HOLIDAY PAGE

7-687B

Teamster - Heavy&Highway **03/01/2015**

JOB DESCRIPTION Teamster - Heavy&Highway

DISTRICT 7

ENTIRE COUNTIES

Clinton, Essex, Franklin, Jefferson, St. Lawrence

PARTIAL COUNTIES

Lewis: Only the Townships of Croghan, Denmark, Diana, New Bremen, Harrisburg, Montague, Osceola and Pinckney.

Oswego: Only the Towns of Boylston, Redfield, and Sandy Creek.

Warren: Only the Townships of Hague, Horicon, Chester and Johnsburg.

WAGES

GROUP 1: Warehousemen, Yardmen, Truck Helpers, Pickups, Panel Trucks, Flatboy Material Trucks(straight jobs), Single Axle Dump Trucks,

Dumpsters, Material Checkers and Receivers, Greasers, Truck Tiremen, Mechanics Helpers and Parts Chasers. Fork Lift (storage & warehouse areas only) Tandems and Batch Trucks, Mechanics, Dispatcher. Semi-Trailers, Low-boy Trucks, Asphalt Distributor Trucks, and Agitator, Mixer Trucks and dumpcrete type vehicles, Truck Mechanic, Fuel Truck.

GROUP 2: Specialized Earth Moving Equipment, Euclid type, or similar off-highway where not self-loading, Straddle (Ross) Carrier, and self-contained concrete mobile truck. Off-highway Tandem Back-Dump, Twin Engine Equipment and Double-Hitched Equipment where not self-loading.

Per hour:

07/01/2014

Heavy/Highway:

Group #1 \$ 23.22

Group #2 23.44

Additional \$1.50 per hr for hazardous waste removal work on a City, County, and/or Federal Designated waste site and regulations require employee to use or wear respiratory protection. For work bid on or after April 1, 1982 there shall be a 12 month carryover of the negotiated rate in effect at the time of the bid.

SUPPLEMENTAL BENEFITS

Per hour worked:

All classes \$ 23.37

OVERTIME PAY

See (B, E, Q) on OVERTIME PAGE

HOLIDAY

Paid: See (5, 6) on HOLIDAY PAGE

Overtime: See (5, 6) on HOLIDAY PAGE

7-687

Welder

03/01/2015

JOB DESCRIPTION Welder

DISTRICT 1

ENTIRE COUNTIES

Albany, Allegany, Bronx, Broome, Cattaraugus, Cayuga, Chautauqua, Chemung, Chenango, Clinton, Columbia, Cortland, Delaware, Dutchess, Erie, Essex, Franklin, Fulton, Genesee, Greene, Hamilton, Herkimer, Jefferson, Kings, Lewis, Livingston, Madison, Monroe, Montgomery, Nassau, New York, Niagara, Oneida, Onondaga, Ontario, Orange, Orleans, Oswego, Otsego, Putnam, Queens, Rensselaer, Richmond, Rockland, Saratoga, Schenectady, Schoharie, Schuyler, Seneca, St. Lawrence, Steuben, Suffolk, Sullivan, Tioga, Tompkins, Ulster, Warren, Washington, Wayne, Westchester, Wyoming, Yates

WAGES

Per hour 07/01/2014

Welder (To be paid the same rate of the mechanic performing the work)

OVERTIME PAY

HOLIDAY

1-As Per Trade

Overtime Codes

Following is an explanation of the code(s) listed in the OVERTIME section of each classification contained in the attached schedule. Additional requirements may also be listed in the HOLIDAY section.

NOTE: Supplemental Benefits are 'Per hour worked' (for each hour worked) unless otherwise noted

- (AA) Time and one half of the hourly rate after 7 and one half hours per day
- (A) Time and one half of the hourly rate after 7 hours per day
- (B) Time and one half of the hourly rate after 8 hours per day
- (B1) Time and one half of the hourly rate for the 9th & 10th hours week days and the 1st 8 hours on Saturday.
Double the hourly rate for all additional hours
- (B2) Time and one half of the hourly rate after 40 hours per week
- (C) Double the hourly rate after 7 hours per day
- (C1) Double the hourly rate after 7 and one half hours per day
- (D) Double the hourly rate after 8 hours per day
- (D1) Double the hourly rate after 9 hours per day
- (E) Time and one half of the hourly rate on Saturday
- (E1) Time and one half 1st 4 hours on Saturday; Double the hourly rate all additional Saturday hours
- (E2) Saturday may be used as a make-up day at straight time when a day is lost during that week due to inclement weather
- (E3) Between November 1st and March 3rd Saturday may be used as a make-up day at straight time when a day is lost during that week due to inclement weather, provided a given employee has worked between 16 and 32 hours that week
- (E4) Saturday and Sunday may be used as a make-up day at straight time when a day is lost during that week due to inclement weather
- (E5) Double time after 8 hours on Saturdays
- (F) Time and one half of the hourly rate on Saturday and Sunday
- (G) Time and one half of the hourly rate on Saturday and Holidays
- (H) Time and one half of the hourly rate on Saturday, Sunday, and Holidays
- (I) Time and one half of the hourly rate on Sunday
- (J) Time and one half of the hourly rate on Sunday and Holidays
- (K) Time and one half of the hourly rate on Holidays
- (L) Double the hourly rate on Saturday
- (M) Double the hourly rate on Saturday and Sunday
- (N) Double the hourly rate on Saturday and Holidays
- (O) Double the hourly rate on Saturday, Sunday, and Holidays
- (P) Double the hourly rate on Sunday
- (Q) Double the hourly rate on Sunday and Holidays
- (R) Double the hourly rate on Holidays
- (S) Two and one half times the hourly rate for Holidays, if worked

- (S1) Two and one half times the hourly rate the first 8 hours on Sunday or Holidays One and one half times the hourly rate all additional hours.
- (T) Triple the hourly rate for Holidays, if worked
- (U) Four times the hourly rate for Holidays, if worked
- (V) Including benefits at SAME PREMIUM as shown for overtime
- (W) Time and one half for benefits on all overtime hours.

Holiday Codes

PAID Holidays:

Paid Holidays are days for which an eligible employee receives a regular day's pay, but is not required to perform work. If an employee works on a day listed as a paid holiday, this remuneration is in addition to payment of the required prevailing rate for the work actually performed.

OVERTIME Holiday Pay:

Overtime holiday pay is the premium pay that is required for work performed on specified holidays. It is only required where the employee actually performs work on such holidays. The applicable holidays are listed under HOLIDAYS: OVERTIME. The required rate of pay for these covered holidays can be found in the OVERTIME PAY section listings for each classification.

Following is an explanation of the code(s) listed in the HOLIDAY section of each classification contained in the attached schedule. The Holidays as listed below are to be paid at the wage rates at which the employee is normally classified.

- (1) None
- (2) Labor Day
- (3) Memorial Day and Labor Day
- (4) Memorial Day and July 4th
- (5) Memorial Day, July 4th, and Labor Day
- (6) New Year's, Thanksgiving, and Christmas
- (7) Lincoln's Birthday, Washington's Birthday, and Veterans Day
- (8) Good Friday
- (9) Lincoln's Birthday
- (10) Washington's Birthday
- (11) Columbus Day
- (12) Election Day
- (13) Presidential Election Day
- (14) 1/2 Day on Presidential Election Day
- (15) Veterans Day
- (16) Day after Thanksgiving
- (17) July 4th
- (18) 1/2 Day before Christmas
- (19) 1/2 Day before New Years
- (20) Thanksgiving
- (21) New Year's Day
- (22) Christmas
- (23) Day before Christmas
- (24) Day before New Year's
- (25) Presidents' Day
- (26) Martin Luther King, Jr. Day
- (27) Memorial Day



**New York State Department of Labor - Bureau of Public Work
State Office Building Campus
Building 12 - Room 130
Albany, New York 12240**

REQUEST FOR WAGE AND SUPPLEMENT INFORMATION

As Required by Articles 8 and 9 of the NYS Labor Law

Fax (518) 485-1870 or mail this form for new schedules or for determination for additional occupations.

This Form Must Be Typed

Submitted By:

(Check Only One)

- Contracting Agency Architect or Engineering Firm Public Work District Office

Date:

A. Public Work Contract to be let by: (Enter Data Pertaining to Contracting/Public Agency)

1. Name and complete address (Check if new or change)

Telephone: ()

Fax: ()

E-Mail:

2. NY State Units (see Item 5)

- | | |
|---|--|
| <input type="checkbox"/> 01 DOT | <input type="checkbox"/> 07 City |
| <input type="checkbox"/> 02 OGS | <input type="checkbox"/> 08 Local School District |
| <input type="checkbox"/> 03 Dormitory Authority | <input type="checkbox"/> 09 Special Local District, i.e.,
Fire, Sewer, Water District |
| <input type="checkbox"/> 04 State University
Construction Fund | <input type="checkbox"/> 10 Village |
| <input type="checkbox"/> 05 Mental Hygiene
Facilities Corp. | <input type="checkbox"/> 11 Town |
| <input type="checkbox"/> 06 OTHER N.Y. STATE UNIT | <input type="checkbox"/> 12 County |
| | <input type="checkbox"/> 13 Other Non-N.Y. State
(Describe) |

3. SEND REPLY TO check if new or change)
Name and complete address:

Telephone:()

Fax: ()

E-Mail:

4. SERVICE REQUIRED. Check appropriate box and provide project information.

New Schedule of Wages and Supplements.

APPROXIMATE BID DATE :

Additional Occupation and/or Redetermination

PRC NUMBER ISSUED PREVIOUSLY FOR
THIS PROJECT :

OFFICE USE ONLY

B. PROJECT PARTICULARS

5. Project Title _____

Description of Work _____

Contract Identification Number _____

Note: For NYS units, the OSC Contract No. _____

6. Location of Project:
Location on Site _____

Route No/Street Address _____

Village or City _____

Town _____

County _____

7. Nature of Project - Check One:

- 1. New Building
- 2. Addition to Existing Structure
- 3. Heavy and Highway Construction (New and Repair)
- 4. New Sewer or Waterline
- 5. Other New Construction (Explain)
- 6. Other Reconstruction, Maintenance, Repair or Alteration
- 7. Demolition
- 8. Building Service Contract

8. OCCUPATION FOR PROJECT :

- | | |
|--|---|
| <input type="checkbox"/> Construction (Building, Heavy
Highway/Sewer/Water) | <input type="checkbox"/> Guards, Watchmen |
| <input type="checkbox"/> Tunnel | <input type="checkbox"/> Janitors, Porters, Cleaners,
Elevator Operators |
| <input type="checkbox"/> Residential | <input type="checkbox"/> Moving furniture and
equipment |
| <input type="checkbox"/> Landscape Maintenance | <input type="checkbox"/> Trash and refuse removal |
| <input type="checkbox"/> Elevator maintenance | <input type="checkbox"/> Window cleaners |
| <input type="checkbox"/> Exterminators, Fumigators | <input type="checkbox"/> Other (Describe) |
| <input type="checkbox"/> Fire Safety Director, NYC Only | |

9. Has this project been reviewed for compliance with the Wicks Law involving separate bidding? YES NO

10. Name and Title of Requester

Signature



NEW YORK STATE DEPARTMENT OF LABOR
Bureau of Public Work - Debarment List

**LIST OF EMPLOYERS INELIGIBLE TO BID ON OR BE
AWARDED ANY PUBLIC WORK CONTRACT**

Under Article 8 and Article 9 of the NYS Labor Law, a contractor, sub-contractor and/or its successor shall be debarred and ineligible to submit a bid on or be awarded any public work or public building service contract/sub-contract with the state, any municipal corporation or public body for a period of five (5) years from the date of debarment when:

- Two (2) final determinations have been rendered within any consecutive six-year (6) period determining that such contractor, sub-contractor and/or its successor has WILLFULLY failed to pay the prevailing wage and/or supplements
- One (1) final determination involves falsification of payroll records or the kickback of wages and/or supplements

NOTE: The agency issuing the determination and providing the information, is denoted under the heading 'Fiscal Officer'. DOL = NYS Dept. of Labor; NYC = New York City Comptroller's Office; AG = NYS Attorney General's Office; DA = County District Attorney's Office.

A list of those barred from bidding, or being awarded, any public work contract or subcontract with the State, under section 141-b of the Workers' Compensation Law, may be obtained at the following link, on the NYS DOL Website:

<https://dbr.labor.state.ny.us/EDList/searchPage.do>

NYS DOL Bureau of Public Work Debarment List 02/25/2015

Article 8

AGENCY	Fiscal Officer	FEIN	EMPLOYER NAME	EMPLOYER DBA NAME	ADDRESS	DEBARMENT START DATE	DEBARMENT END DATE
DOL	DOL		4618 FOSTER AVE LLC		C/O KAHAN & KAHAN 225 BROADWAY-SUITE 715NEW YORK NY 10007	02/05/2013	02/05/2018
DOL	DOL	****0711	A ULIANO & SON LTD		22 GRIFFEN COURT MILLER PLACE NY 11746	10/26/2010	10/26/2015
DOL	DOL		A ULIANO CONSTRUCTION		22 GRIFFEN COURT MILLER PLACE NY 11746	10/26/2010	10/26/2015
DOL	NYC	****4486	ABBAY PAINTING CORP		21107 28TH AVENUE BAYSIDE NY 11360	07/02/2012	07/02/2017
DOL	DOL	****9095	ABDO TILE CO		6179 EAST MOLLOY ROAD EAST SYRACUSE NY 13057	06/25/2010	07/02/2017
DOL	DOL	****9095	ABDO TILE COMPANY		6179 EAST MOLLOY ROAD EAST SYRACUSE NY 13057	06/25/2010	07/02/2017
DOL	DOL	****8488	ABELCRAFT OF NEW YORK CORP		640 ASHFORD AVENUE ARDSLEY NY 10502	08/27/2013	08/27/2018
DOL	DOL	****1219	ABSOLUTE GENERAL CONTRACTING INC		1229 AVENUE U BROOKLYN NY 11229	01/28/2013	01/28/2018
DOL	DOL	****4539	ACCOMPLISHED WALL SYSTEMS INC		112 OSCAWANA HEIGHTS ROAD PUTNAM VALLEY NY 10542	08/27/2013	08/27/2018
DOL	DOL	****8018	ACCURATE MECHANICAL LLC		9547 BUSTLETON AVENUE PHILADELPHIA PA 19115	02/05/2014	02/05/2019
DOL	DOL		ACCURATE MECHANICAL OF PHILADELPHIA LLC		9547 BUSTLETON AVENUE PHILADELPHIA PA 19115	02/05/2014	02/05/2019
DOL	DOL		ADAM A CEMERYS		2718 CURRY ROAD SCHENECTADY NY 12303	07/08/2010	07/08/2015
DOL	DOL	****7584	ADAM'S FLOOR COVERING LLC		2718 CURRY ROAD SCHENECTADY NY 12303	07/08/2010	02/15/2017
DOL	DOL		ADESUWA UWUIGBE		P O BOX 21-1022 BROOKLYN NY 11221	05/16/2012	05/16/2017
DOL	NYC		ADRIANA SELA	C/O COLONIAL ROOFING COMPANY INC	247 48TH STREET BROOKLYN NY 11220	02/05/2014	02/05/2019
DOL	DOL	****6367	ADVANCED METALS		387 RIVERSIDE DRIVE JOHNSON CITY NY 13790	10/01/2012	10/01/2017
DOL	DOL		AFFORDABLE PAINTING PLUS		367 GREEVES ROAD NEW HAMPTON NY 10958	10/01/2010	10/01/2015
DOL	DOL	****2538	AGG MASONRY INC		160 72ND ST - SUITE 721 BROOKLYN NY 11209	03/19/2013	03/19/2018
DOL	DOL		ALBERT CASEY		43-28 54TH STREET WOODSIDE NY 11377	07/01/2011	07/01/2016
DOL	DOL		ALEJANDRO MATOS		C/O SEVEN STAR ELECTRICAL 23-24 STEINWAY STREETASTORIA NY 11105	06/27/2011	06/27/2016
DOL	DOL		ALISHER KARIMOV		C/O AGG MASONRY INC 7105 3RD AVENUEBROOKLYN NY 11209	03/19/2013	03/19/2018
DOL	DOL	****8740	ALLSTATE ENVIRONMENTAL CORP		C/O JOSE MONTAS 27 BUTLER PLACEYONKERS NY 10710	03/18/2011	03/15/2017
DOL	DOL	****8534	ALPHA INTERIORS INC		513 ACORN STREET/ SUITE C DEER PARK NY 11729	05/27/2010	05/27/2015
DOL	DOL	****4274	AMERICAN STEEL MECHANICAL INC		693 PAINTER STREET MEDIA PA 19063	02/20/2013	02/20/2018
DOL	NYC		ANDERSON LOPEZ		670 SOUTHERN BLVD BRONX NY 10455	06/14/2011	06/14/2016
DOL	DOL		ANDREW DIPAUL		C/O CONSOLIDATED INDUSTRI 2051 ROUTE 44/55MODENA NY 12548	12/11/2012	12/11/2017
DOL	NYC		ANDRZEJ WROBEL		24 CONGRESS LANE SOUTH RIVER NJ 08882	05/01/2013	05/01/2018
DOL	DOL	****7004	ANNEX CONTRACTING LTD		3005 WYNSUM AVENUE MERRICK NY 11566	08/18/2014	08/18/2019
DOL	DOL	****7004	ANNEX GENERAL CONTRACTING INC		3005 WYNSUM AVENUE MERRICK NY 11566	08/18/2014	08/18/2019
DOL	DA		ANTHONY CARDINALE		58-48 59TH STREET MASPETH NY 11378	05/16/2012	05/16/2017
DOL	DOL		ANTHONY ULIANO		22 GRIFFEN COURT MILLER PLACE NY 11746	10/26/2010	10/26/2015
DOL	DOL	****3020	APCO CONTRACTING CORP		24 SOUTH MARYLAND AVENUE PORT WASHINGTON NY 11050	09/24/2012	09/24/2017
DOL	DOL	****3219	APOLLO CONSTRUCTION SERVICES CORP	APOLLO PAINTING CO	157 TIBBETTS ROAD YONKERS NY 10705	03/12/2014	03/12/2019

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DOL	DOL		APOLLO PAINTING CO		157 TIBBETTS ROAD YONKERS NY 10705	03/12/2014	03/12/2019
DOL	DOL	****3295	APOLLO PAINTING CORP		3 ALAN B SHEPART PLACE YONKERS NY 10705	03/12/2014	03/12/2019
DOL	AG	****0194	APPLIED CONSTRUCTION INC		46 RUGBY ROAD WESTBURY NY 11590	11/20/2013	11/20/2018
DOL	NYC	****8403	AQUA JET PAINTING CORP		10 VIKING DRIVE WEST ISLIP NY 11795	04/16/2014	04/16/2019
DOL	DOL	****3953	ASCAPE LANDSCAPE & CONSTRUCTION CORP		634 ROUTE 303 BLAUVELT NY 10913	07/26/2012	11/19/2018
DOL	DOL		AVIS R HILL		3510 HICKORY WALK LANE ELLENWOOD GA 32094	01/22/2015	01/22/2020
DOL	DOL	****2534	B & B CONCRETE CONTRACTORS INC		55 OLD TURNPIKE ROAD SUITE 612NANUET NY 10954	02/04/2011	02/04/2016
DOL	NYC		BASIL ROMEO		243-03 137TH AVENUE ROSEDALE NY 11422	03/25/2010	03/25/2015
DOL	DOL	****2294	BEDELL CONTRACTING CORP		2 TINA LANE HOPEWELL JUNCTION NY 12533	01/06/2012	01/06/2017
DOL	DOL		BENNY VIGLIOTTI		C/O LUVIN CONSTRUCTION CO P O BOX 357CARLE PLACE NY 11514	03/15/2010	03/15/2015
DOL	DOL	****6999	BEST ROOFING OF NEW JERSEY LLC		30 MIDLAND AVENUE WALLINGTON NJ 07057	11/05/2010	11/05/2015
DOL	DOL		BEVERLY F WILLIAMS		1238 PRESIDENT STREET BROOKLYN NY 11225	11/18/2013	11/18/2018
DOL	DOL		BIAGIO CANTISANI		200 FERRIS AVENUE WHITE PLAINS NY 10603	12/04/2009	05/04/2017
DOL	NYC	****8377	BOSPHORUS CONSTRUCTION CORPORATION		3817 KINGS HIGHWAY-STE 1D BROOKLYN NY 11234	06/30/2010	06/30/2015
DOL	DOL	****6156	C & J LANDSCAPING & MAINTENANCE INC		520 PINE HILL ROAD CHESTER NY 10940	06/23/2014	06/23/2019
DOL	DOL		CANTISANI & ASSOCIATES LTD		442 FERRIS AVENUE WHITE PLAINS NY 10603	12/04/2009	05/04/2017
DOL	DOL		CANTISANI HOLDING LLC		220 FERRIS AVENUE WHITE PLAINS NY 10603	05/04/2012	05/04/2017
DOL	DOL	****1143	CARMODY BUILDING CORP		442 ARMONK ROAD MOUNT KISCO NY 10549	05/04/2012	05/04/2017
DOL	DOL	****3368	CARMODY CONCRETE CORP		442 ARMONK ROAD MOUNT KISCO NY 10549	12/04/2009	05/04/2017
DOL	DOL		CARMODY CONTRACTING CORP		220 FERRIS AVENUE WHITE PLAINS NY 10603	05/04/2012	05/04/2017
DOL	DOL	****6215	CARMODY CONTRACTING INC		220 FERRIS AVENUE WHITE PLAINS NY 10603	05/04/2012	05/04/2017
DOL	DOL		CARMODY ENTERPRISES LTD		220 FERRIS AVENUE WHITE PLAINS NY 10603	12/04/2009	05/04/2017
DOL	DOL	****3812	CARMODY INC		442 ARMONK ROAD MOUNT KISCO NY 10549	12/04/2009	05/04/2017
DOL	DOL	****3812	CARMODY INDUSTRIES INC		442 FERRIS AVENUE WHITE PLAINS NY 10603	05/04/2012	05/04/2017
DOL	DOL		CARMODY MAINTENANCE CORP		105 KISCO AVENUE MOUNT KISCO NY 10549	05/04/2012	05/04/2017
DOL	DOL	****0324	CARMODY MASONRY CORP		442 ARMONK ROAD MOUNT KISCO NY 10549	12/04/2009	05/04/2017
DOL	DOL	****3812	CARMODY"2" INC		220 FERRIS AVENUE WHITE PLAINS NY 10603	12/04/2009	05/04/2017
DOL	NYC	****9172	CASSIDY EXCAVATING INC		14 RAILROAD AVENUE VALHALLA NY 10595	05/15/2014	05/15/2019
DOL	DOL	****1683	CATONE CONSTRUCTION COMPANY INC		294 ALPINE ROAD ROCHESTER NY 14423	03/09/2012	03/09/2017
DOL	DOL		CATONE ENTERPRISES INC		225 DAKOTA STREET ROCHESTER NY 14423	03/09/2012	03/09/2017
DOL	DOL	****6745	CATSKILL FENCE INSTALLATIONS INC		5445 ROUTE 32 CATSKILL NY 12414	08/22/2014	08/22/2019
DOL	DOL	****8530	CAZ CONTRACTING CORP		37-11 35TH AVENUE LONG ISLAND CITY NY 11101	08/26/2013	08/26/2018
DOL	DOL	****7924	CBI CONTRACTING INCORPORATED		2081 JACKSON AVENUE COPIAGUE NY 11726	06/03/2010	06/03/2015
DOL	DOL	****5556	CERTIFIED INSTALLERS INC		113 N MAPLE AVENUE GREENSBURG PA 15601	02/21/2013	02/21/2018
DOL	NYC		CHARLES CASSIDY JR		14 RAILROAD AVENUE VALHALLA NY 10595	05/15/2014	05/15/2019
DOL	DOL		CHARLES OKRASKI		67 WARD ROAD SALT POINT NY 12578	01/21/2011	01/21/2016
DOL	DOL		CHARLES RIBAUDO		513 ACORN ST - SUITE C DEER PARK NY 11729	05/27/2010	05/27/2015

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DOL	DOL	****1416	CHEROMINO CONTROL GROUP LLC		61 WILLET ST - SUITE 14 PASSAIC NJ 07055	12/03/2009	02/23/2017
DOL	DOL		CHRIS SAVOURY		44 THIELLS-MT IVY ROAD POMONA NY 10970	10/14/2011	10/14/2016
DOL	DOL		CHRIST R PAPAS		C/O TRAC CONSTRUCTION INC 9091 ERIE ROADANGOLA NY 14006	02/03/2011	02/03/2016
DOL	DOL		CHRISTOF PREZBYL		2 TINA LANE HOPEWELL JUNCTION NY 12533	01/06/2012	01/06/2017
DOL	DOL		CITY GENERAL BUILDERS INC		131 MELROSE STREET BROOKLYN NY 11206	03/02/2010	03/02/2015
DOL	DOL	****7086	CITY GENERAL IRON WORKS INC		131 MELROSE STREET BROOKLYN NY 11206	03/02/2010	03/02/2015
DOL	DOL	****3360	CITY LIMITS GROUP INC		2279 HOLLERS AVENUE BRONX NY 10475	01/07/2014	06/23/2019
DOL	NYC	****1768	COFIRE PAVING CORPORATION		120-30 28TH AVENUE FLUSHING NY 11354	01/14/2011	01/14/2016
DOL	NYC	****2905	COLONIAL ROOFING COMPANY INC		247 48TH STREET BROOKLYN NY 11220	02/05/2014	02/05/2019
DOL	NYC	****3182	COLORTECH INC		5990 58TH AVENUE MASPETH NY 11378	11/18/2013	11/18/2018
DOL	DOL	****8342	CONKLIN PORTFOLIO LLC		60 COLONIAL ROAD STILLWATER NY 12170	02/15/2011	02/15/2016
DOL	DOL	****2703	CONKLIN'S TECH-MECHANICAL INC		5 PARKER AVENUE POUGHKEEPSIE NY 12601	03/25/2014	03/25/2019
DOL	DOL	****4175	CONSOLIDATED INDUSTRIAL SERVICES INC		2051 ROUTE 44/55 MODENA NY 12548	12/11/2012	01/28/2018
DOL	DOL		CONSTANTINOS ZERVAS		37-11 35TH AVENUE LONG ISLAND CITY NY 11101	08/26/2013	08/26/2018
DOL	DOL	****5740	CORTLAND GLASS COMPANY INC		336 TOMPKINS STREET CORTLAND NY 13045	10/21/2010	07/15/2016
DOL	NYC	****4468	CRAFT CONTRACTING GROUP INC		3256 BRUNER AVENUE BRONX NY 10469	07/29/2014	07/29/2019
DOL	NYC	****8507	CRAFT FENCE INC		3256 BRUNER AVENUE BRONX NY 10469	07/29/2014	07/29/2019
DOL	DOL	****0810	D & G PAINTING & DECORATING INC		53 LITTLE COLLABAR ROAD MONTGOMERY NY 12549	04/19/2012	04/19/2017
DOL	DOL		DANIEL CELLUCCI ELECTRIC		17 SALISBURY STREET GRAFTON MA 01519	06/02/2010	06/02/2015
DOL	DOL	****7129	DANIEL T CELLUCCI	DANIEL CELLUCCI ELECTRIC	17 SALISBURY STREET GRAFTON MA 01519	06/02/2010	06/02/2015
DOL	NYC		DAWN AVILA AKA DAWN BECHTOLD		1ST FLOOR STORE FRONT 88-10 LITTLE NECK PARKWAYFLORAL PARK NY 11001	06/24/2014	06/24/2019
DOL	NYC		DAWN BECHTOLD AKA DAWN AVILA		1ST FLOOR STORE FRONT 88-10 LITTLE NECK PARKWAYFLORAL PARK NY 11001	06/24/2014	06/24/2019
DOL	DOL		DEAN ROBBINS III		212 OXFORD WAY SCHENECTADY NY 12309	12/11/2012	09/16/2018
DOL	NYC	****3865	DECOMA BUILDING CORPORATION		134 EVERGREEN PL/STE 101 EAST ORANGE NJ 07018	12/30/2013	12/30/2018
DOL	DOL	****1446	DELTA CONTRACTING PAINTING AND DECORATING INC		437 SUNRISE HIGHWAY WEST BABYLON NY 11707	08/12/2013	08/12/2018
DOL	DOL	****3538	DELTA CONTRACTING PAINTING AND DESIGN INC		75 MCCULLOCH DRIVE DIX HILLS NY 11746	10/19/2010	08/12/2018
DOL	DOL		DEMETRIOS KOUTSOURAS		530 BEECH STREET NEW HYDE PARK NY 11040	07/02/2012	07/02/2017
DOL	DOL	****9868	DESANTIS ENTERPRISES		161 OSWEGO RIVER ROAD PHOENIX NY 13135	09/24/2013	11/18/2018
DOL	NYC	****8234	DEWATERS PLUMBING AND HEATING LLC		30 COLUMBUS CIRCLE EASTCHESTER NY 10709	08/21/2012	08/21/2017
DOL	DOL	****9252	DI BERNARDO TILE AND MARBLE CO INC		15 WALKER WAY ALBANY NY 12205	03/21/2014	03/21/2019
DOL	DOL		DIANE DEAVER		731 WARWICK TURNPIKE HEWITT NJ 07421	06/25/2012	12/11/2017
DOL	DOL		DORIS SKODA		C/O APCO CONTRACTING CORP 24 SOUTH MARYLAND AVENUEPORT WASHINGTON NY 11050	09/24/2012	09/24/2017
DOL	DOL		DRAGOLJUB RADOJEVIC		61 WILLET ST - SUITE 14 PASSAIC NJ 07055	12/03/2009	07/09/2015

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DOL	DOL	****6982	DUFOUR GROUP INC	DUFOUR MASONRY	353 WEST 56TH STREET #7M NEW YORK NY 10019	06/10/2014	06/10/2019
DOL	DOL		DUFOUR MASONRY		353 WEST 56TH ST #7M NEW YORK NY 10019	06/10/2014	06/10/2019
DOL	DOL		DUFOUR MASONRY & RESTORATION INC		353 WEST 56TH STREET #7M NEW YORK NY 10019	06/10/2014	06/10/2019
DOL	DOL	****5840	DYNA CONTRACTING INC		363 88TH STREET BROOKLYN NY 11209	11/18/2013	11/18/2018
DOL	NYC	****6176	E N E L ELECTRICAL CORP		1107 MCDONALD AVENUE BROOKLYN NY 11230	07/30/2010	07/30/2015
DOL	DOL		EARL GALBREATH		640 ASHFORD AVENUE ARDSLEY NY 10502	08/27/2013	08/27/2018
DOL	DOL	****1496	EAST COAST DRYWALL INC		1238 PRESIDENT STREET BROOKLYN NY 11225	11/18/2013	11/18/2018
DOL	DOL	****8011	EOCA CLEANING CONTRACTORS INC		P O BOX 21-1022 BROOKLYN NY 11221	05/16/2012	05/16/2017
DOL	NYC	****8074	ECONOMY IRON WORKS INC		670 SOUTHERN BLVD BRONX NY 10455	06/14/2011	06/14/2016
DOL	DOL		EDWARD L GAUTHIER		C/O IMPERIAL MASONRY REST 141 ARGONNE DRIVEKENMORE NY 14217	10/03/2012	10/03/2017
DOL	NYC		EDWARD MENKEN		C/O AQUA JET PAINTING 10 VIKING DRIVEWEST ISLIP NY 11795	04/16/2014	04/16/2019
DOL	NYC	****0900	EF PRO CONTRACTING INC		147 BROOME AVENUE ATLANTIC BEACH NY 11509	03/03/2014	03/03/2019
DOL	NYC		EFSTRATIOS BERNARDIS		23-73 48TH STREET LONG ISLAND CITY NY 11103	04/24/2014	04/24/2019
DOL	NYC	****6260	EL TREBOL SPECIAL CLEANING INC		95-26 76TH STREET OZONE PARK NY 11416	10/12/2011	10/12/2016
DOL	DOL		ELIZABETH RAMADANI		C/O RAMADA CONSTRUCTION 80 SAVO LOOPSTATEN ISLAND NY 10309	01/07/2014	01/07/2019
DOL	DOL		ELLEN DESANTIS	DESANTIS ENTERPRISES	161 OSWEGO RIVER ROAD PHOENIX NY 13135	09/24/2013	11/18/2018
DOL	DOL	****0780	EMES HEATING & PLUMBING CONTR		5 EMES LANE MONSEY NY 10952	01/20/2002	01/20/3002
DOL	AG		EMILIO FRANZA		90 JUNIUS STREET BROOKLYN NY 11212	01/23/2014	01/23/2019
DOL	DOL		EMPIRE CONCRETE SERVICES LLC		101 SULLYS TRAIL/SUITE 20 PITTSFORD NY 14534	11/18/2013	01/07/2019
DOL	DOL	****0511	EMPIRE CONCRETE SYSTEMS LLC		101 SULLYS TRAIL/ SUITE 2 PITTSFORD NY 14534	11/18/2013	01/07/2019
DOL	DOL	****2353	EMPIRE CONSTRUCTORS LLC		101 SULLYS TRAIL/SUITE 20 PITTSFORD NY 14534	11/18/2013	01/07/2019
DOL	DOL		EMPIRE PRECAST LLC		101 SULLYS TRAIL/SUITE 20 PITTSFORD NY 14534	11/18/2013	01/07/2019
DOL	DOL	****6101	ENHANCED DATA COM INC		75 SHERBROOK ROAD NORTH BABYLON NY 11704	07/01/2010	07/01/2015
DOL	DOL		ERIKA BARNETT		253 BEACH BREEZE LANE UNIT BARVERNE NY 11692	02/05/2013	02/05/2018
DOL	DOL		ESTEVEES & FRAGA CONSTRUCTION CO INC		986 MADISON AVENUE PATERSON NJ 07501	01/03/2013	01/03/2018
DOL	DOL		ESTEVEES & FRAGA INC		986 MADISON AVENUE PATERSON NJ 07501	01/03/2013	01/03/2018
DOL	DOL		EVELIO ELLEDIAS		114 PEARL STREET PORT CHESTER NY 10573	08/15/2012	08/15/2017
DOL	NYC		EVERTON CARLESS		134 EVERGREEN PL/STE 101 EAST ORANGE NJ 07018	12/30/2013	12/30/2018
DOL	DOL		F KALAFATIS		2279 HOLLERS AVENUE BRONX NY 10475	01/07/2014	06/23/2019
DOL	DOL		FANTASTIC PAINTING		493 LANSING ROAD FULTONVILLE NY 12072	11/18/2013	11/18/2018
DOL	DOL	****5867	FJM-FERRO INC		6820 14TH AVENUE BROOKLYN NY 11219	10/27/2011	10/27/2016
DOL	DOL	****1311	FLOZ-ON PAINTING & DECORATING INC		12 DUNDERBERG ROAD TOMKINS NY 10986	10/16/2013	10/16/2018
DOL	DOL	****8961	FLOZ-ON PAINTING INC		12 DUNDERBERG ROAD TOMKINS NY 10986	10/16/2013	10/16/2018
DOL	DOL		FMS		4 LEGHORN COURT NEW YORK NY 11746	11/28/2012	11/28/2017
DOL	DOL	****8067	FORTH SPORT FLOORS INC		P O BOX 74 EAST GREENBUSH NY 12061	02/28/2012	10/01/2017
DOL	DOL		FRAN MICELI		2279 HOLLERS AVENUE BRONX NY 10475	01/07/2014	06/23/2019

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DOL	DOL		FRANCES KALAFATIS		2279 HOLLERS AVENUE BRONX NY 10475	01/07/2014	06/23/2019
DOL	DOL		FRANCES KALAFATIS-MICELI		2279 HOLLERS AVENUE BRONX NY 10475	01/07/2014	06/23/2019
DOL	NYC		FRANK ACOCELLA		68 GAYLORD ROAD SCARSDALE NY 10583	02/10/2011	02/10/2016
DOL	DOL		FRANK J MERCANDO		134 MURRAY AVENUE YONKERS NY 10704	12/11/2009	02/03/2019
DOL	DOL		FRANK MICELI JR	C/O FRANK MICELI JR CONTRACTIN G INC	19 CLIFF STREET NEW ROCHELLE NY 10801	10/16/2013	10/16/2018
DOL	DOL	*****1321	FRANK MICELI JR CONTRACTING INC		19 CLIFF STREET NEW ROCHELLE NY 10801	10/16/2013	10/16/2018
DOL	DOL		FRANK ORTIZ		75 SHERBROOK ROAD NORTH BABYLON NY 11704	07/01/2010	07/01/2015
DOL	DOL		FRED ABDO	ABDO TILE COMPANY AKA ABDO TILE CO	6179 EAST MOLLOY ROAD EAST SYRACUSE NY 13057	06/25/2010	07/02/2017
DOL	DOL	*****2724	FRESH START PAINTING CORP		157 TIBBETS ROAD YONKERS NY 10705	03/12/2014	03/12/2019
DOL	DOL		G FUCCI CONSTRUCTION SERVICES		3 ALAN B SHEPARD PLACE YONKERS NY 10705	03/12/2014	03/12/2019
DOL	DOL	*****6767	G FUCCI PAINTING INC		C/O SPIEGEL & UTRERA 1 MAIDEN LANE - 5TH FLNEW YORK NY 10038	03/12/2014	03/12/2019
DOL	DOL	*****4546	GAF PAINTING LLC		157 TIBBETS ROAD YONKERS NY 10705	03/12/2014	03/12/2019
DOL	DOL		GARDEN STATE PAINTING		157 TIBBETS ROAD YONKERS NY 10705	03/12/2014	03/12/2019
DOL	DOL		GARY MCDOWELL	GM CONSTRUCTI ON & LAWN CARE SERVICE	76 PLEASANT STREET WELLSVILLE NY 14895	06/11/2013	06/11/2018
DOL	NYC		GELSOMINA TASSONE		25 CLIFF STREET NEW ROCHELLE NY 10801	06/15/2010	06/15/2015
DOL	DOL		GEORGE A PATTI III		P O BOX 772 JAMESTOWN NY 14701	08/13/2010	08/13/2015
DOL	DOL		GEORGE DI BERNARDO		C/O DI BERNARDO TILE 15 WALKER WAYALBANY NY 12205	03/21/2014	03/21/2019
DOL	NYC		GEORGE LUCEY		150 KINGS STREET BROOKLYN NY 11231	01/19/1998	01/19/2998
DOL	DOL		GERALD A POLLOCK		336 TOMPKINS STREET CORTLAND NY 13045	06/29/2010	07/15/2016
DOL	DOL		GERALD F POLUCH JR		2085 BRIGHTON HENRIETTA TOWN LINE ROADROCHESTER NY 14623	11/04/2010	11/04/2015
DOL	DOL	*****1075	GLOBAL TANK CONSTRUCTION LLC		P O BOX 1238 SALINA OK 74365	11/28/2012	11/28/2017
DOL	DOL	*****0878	GM CONSTRUCTION & LAWN CARE SERVICE		76 PLEASANT STREET WELLSVILLE NY 14895	06/11/2013	06/11/2018
DOL	DOL	*****0090	GOLDS FLOORING INSTALLATIONS INC		25 HAMILTON ROAD MONTICELLO NY 12701	10/16/2013	10/16/2018
DOL	DOL	*****4013	GR GRATES CONSTRUCTION CORPORATION		63 IRONWOOD ROAD UTICA NY 13520	06/14/2010	06/14/2015
DOL	DOL		GRATES MERCHANT NANNA INC		63 IRONWOOD ROAD UTICA NY 13520	06/14/2010	06/15/2015
DOL	DOL		GREGG G GRATES		63 IRONWOOD ROAD UTICA NY 13520	06/14/2010	06/14/2015
DOL	DOL		GREGORY A FUCCI		C/O PAF PAINTING SERVICES 157 TIBBETS ROADYONKERS NY 10705	03/12/2014	03/12/2019
DOL	DOL		GREGORY FUCCI JR		C/O APOLLO CONSTRUCTION 157 TIBBETS ROADYONKERS NY 10705	03/12/2014	03/12/2019
DOL	DOL		GRETCHEN SULLIVAN		P O BOX 130 CRETE IL 60417	11/10/2011	11/10/2016
DOL	DOL	*****7735	GRYF CONSTRUCTION INC		394 SPOTSWOOD-ENGLISH RD MONROE NJ 08831	08/08/2011	08/08/2016
DOL	DOL	*****9456	GUILLO CONTRACTING CORP		P O BOX 229 CALVERTON NY 11933	07/08/2013	07/08/2018
DOL	DOL		GUS PAPASTEFANOU		C/O D & G PAINTING & DECO 53 LITTLE COLLABAR ROADMONTGOMERY NY 12549	04/19/2012	04/19/2017

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DOL	NYC	****0346	H N H CONTRACTORS CORP		4558 BROADWAY # 6 NEW YORK NY 10040	08/04/2014	08/04/2019
DOL	DOL		H.H. RAUH CONSTRUCTION, LLC		2930 RT. 394 ASHVILLE NY 14710	01/14/2011	01/14/2016
DOL	DOL	****2499	H.H. RAUH CONTRACTING CO., LLC		2930 RT. 394 ASHVILLE NY 14710	01/14/2011	01/14/2016
DOL	DOL		H.H. RAUH PAVING, INC.		7 WEST 1ST ST. LAKEWOOD NY 14750	01/14/2011	01/14/2016
DOL	DOL		HALSSAM FOSTOK		5 HANSEN PLACE WAYNE NJ 07470	09/18/2013	09/18/2018
DOL	NYC		HAMEEDUL HASAN		240 HOME STREET TEANECK NJ 07666	08/04/2014	08/04/2019
DOL	AG	****9918	HARA ELECTRIC CORP		2461 47TH STREET ASTORIA NY 11103	09/26/2013	09/26/2018
DOL	DOL	****5405	HARD LINE CONTRACTING INC		89 EDISON AVENUE MOUNT VERNON NY 10550	10/28/2011	10/28/2016
DOL	AG		HARVINDER SINGH PAUL		90 JUNIUS STREET BROOKLYN NY 11212	01/23/2014	01/23/2019
DOL	DOL		HI-TECH CONTRACTING CORP		114 PEARL STREET PORT CHESTER NY 10573	08/15/2012	08/15/2017
DOL	DOL	****4331	HIDDEN VALLEY EXCAVATING INC		225 SEYMOUR STREET FREDONIA NY 14063	02/08/2011	02/08/2016
DOL	DOL	****6370	HILLIANO CONSTRUCTION & ELECTRICAL INC		354 MAGNOLIA STREET ROCHESTER NY 14611	01/22/2015	01/22/2020
DOL	DOL	****8426	IMPERIAL MASONRY RESTORATION INC		141 ARGONNE DRIVE KENMORE NY 14217	10/03/2012	10/03/2017
DOL	DOL	****7561	INDUS GENERAL CONSTRUCTION		33-04 91ST STREET JACKSON HEIGHTS NY 11372	04/28/2010	04/28/2015
DOL	DA	****1958	IRON HORSE ONE INC		10 ROSWELL AVENUE OCEANSIDE NY 11572	09/30/2010	09/30/2015
DOL	DOL		ISABEL FRAGA		C/O THREE FRIENDS CONSTR 986 MADISON AVENUEPATERSON NJ 07501	01/03/2013	01/03/2018
DOL	DOL	****7598	J M RICH LLC		P O BOX 268 STILLWATER NY 12170	09/16/2013	03/21/2019
DOL	DOL	****3478	J N P CONSTRUCTION CORP		50 LOUIS COURT P O BOX 1907SOUTH HACKENSACK NY 07606	03/21/2014	03/21/2019
DOL	DOL		J N RICH LLC		P O BOX 268 STILLWATER NY 12170	09/16/2013	03/21/2019
DOL	DOL	****9368	J TECH CONSTRUCTION		PO BOX 64782 ROCHESTER NY 14624	09/24/2012	09/24/2017
DOL	DOL		J THE HANDYMAN			09/24/2012	09/24/2017
DOL	DOL		JACQUELINE HOWE		C/O FLOZ-ON PAINTING INC 12 DUNDERBERG ROADTOMKINS NY 10986	10/16/2013	10/16/2018
DOL	DOL	****8627	JAG I LLC		635 LUZERNE ROAD QUEENSBURY NY 12804	09/16/2013	09/16/2018
DOL	DOL	****2868	JAG INDUSTRIES INC		175 BROAD ST - SUITE 320 GLENS FALLS NY 12801	09/16/2013	09/16/2018
DOL	DOL		JAMES BOYCE		C/O EMPIRE CONCRETE SYST 101 SULLYS TRAIL/SUITE 20PITTSFORD NY 14534	11/18/2013	01/07/2019
DOL	DOL		JAMES SICKAU		3090 SHIRLEY ROAD NORTH COLLINS NY 14111	04/19/2011	12/30/2016
DOL	DOL		JAMES WALSH		89 EDISON AVENUE MOUNT VERNON NY 10550	10/28/2011	10/28/2016
DOL	DOL		JASON M RICH		P O BOX 268 STILLWATER NY 12170	09/16/2013	03/21/2019
DOL	DOL		JAY PRESUTTI		C/O CONSOLIDATED INDUSTRI 2051 ROUTE 44/55MODENA NY 12548	01/28/2013	01/28/2018
DOL	DOL		JEFF P BRADLEY		520 PINE HILL ROAD CHESTER NY 10940	06/23/2014	06/23/2019
DOL	DOL		JEFFREY A NANNA		502 WOODBURNE DRIVE UTICA NY 13502	06/14/2010	06/14/2015
DOL	NYC		JEFFREY CASSIDY		14 RAILROAD AVENUE VALHALLA NY 10595	05/15/2014	05/15/2019
DOL	DOL		JERALD HOWE		C/O FLOZ-ON PAINTING INC 12 DUNDERBERG ROADTOMKINS NY 10986	10/16/2013	10/16/2018
DOL	DOL		JEROME LACITIGNOLA		C/O CATSKILL FENCE INSTAL 5445 ROUTE 32 CATSKILL NY 12414	08/22/2014	08/22/2019
DOL	NYC		JERRY DEWATERS		30 COLUMBUS CIRCLE EASTCHESTER NY 10709	08/21/2012	08/21/2017

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DOL	DOL		JOHN CATONE		C/O CATONE CONSTRUCTION 294 ALPINE ROAD ROCHESTER NY 14612	03/09/2012	03/09/2017
DOL	DOL		JOHN DESCUL		437 SUNRISE HIGHWAY A WEST BABYLON NY 11704	08/12/2013	08/12/2018
DOL	NYC		JOHN DITURI		1107 MCDONALD AVENUE BROOKLYN NY 11230	07/30/2010	07/30/2015
DOL	NYC		JOHN FICARELLI		120-30 28TH AVENUE FLUSHING NY 11354	01/14/2011	01/14/2016
DOL	DOL		JOHN H LEE	JOHN LEE QUALITY PAVING	67 WILER ROAD HILTON NY 14468	01/28/2013	01/28/2018
DOL	DOL		JOHN JIULIANNI		222 GAINSBORG AVENUE E WEST HARRISON NY 10604	05/10/2010	05/10/2015
DOL	DOL	****1749	JOHN LEE QUALITY PAVING		67 WILER ROAD HILTON NY 14468	01/28/2013	01/28/2018
DOL	DOL	****2701	JOHN SMYKLA	AFFORDABLE PAINTING PLUS	367 GREEVES ROAD NEW HAMPTON NY 10958	10/01/2010	10/01/2015
DOL	DOL	****9368	JORGE I DELEON	J TECH CONSTRUCTI ON	PO BOX 64782 ROCHESTER NY 14624	09/24/2012	09/24/2017
DOL	DOL		JORGE OUVINA		344 SOUNDVIEW LANE COLLEGE POINT NY 11356	11/22/2011	11/22/2016
DOL	DOL		JOSE MONTAS		27 BUTLER PLACE YONKERS NY 10710	03/18/2011	03/15/2017
DOL	DOL		JOSEPH CASUCCI		6820 14TH AVENUE BROOKLYN NY 11219	10/27/2011	10/27/2016
DOL	DOL		JOSEPH MARTONE		112 OSCAWANA HEIGHTS ROAD PUTNAM VALLEY NY 10542	08/27/2013	08/27/2018
DOL	DOL		JOSHUA DEBOWSKY		9547 BUSTLETON AVENUE PHILADELPHIA PA 19115	02/05/2014	02/05/2019
DOL	DOL		JOYA MUSCOLINO		10 ST CHARLES STREET THORNWOOD NY 10594	09/03/2013	09/03/2018
DOL	DOL	****4340	JUBCO SITE DEVELOPMENT LLC		462 LAKEVIEW AVENUE VALHALLA NY 10595	12/16/2013	12/16/2018
DOL	DOL		JULIUS AND GITA BEHREND		5 EMES LANE MONSEY NY 10952	11/20/2002	11/20/3002
DOL	NYC		KAMIL OZTURK		3715 KINGS HWY - STE 1D BROOKLYN NY 11234	06/30/2010	06/30/2015
DOL	DOL		KAREN HARTMAN		C/O GUILLO CONTRACTING P O BOX 229 CALVERTON NY 11933	07/08/2013	07/08/2018
DOL	NYC		KATHLEEN SELA	C/O COLONIAL ROOFING COMPANY INC	247 48TH STREET BROOKLYN NY 11220	02/05/2014	02/05/2019
DOL	DOL		KEITH SCHEPIS		C/O KJS HAULING AND HOME 95 MAPLE AVENUE NEW CITY NY 10956	04/15/2013	04/15/2018
DOL	DOL		KEN DEAVER		731 WARWICK TURNPIKE HEWITT NJ 07421	06/25/2012	12/11/2017
DOL	DOL		KEVIN BABCOCK JR		P O BOX 46 THOMPSON RIDGE NY 10985	08/22/2014	08/22/2019
DOL	DOL		KEVIN M BABCOCK		P O BOX 46 THOMPSON RIDGE NY 10985	08/22/2014	08/22/2019
DOL	DOL	****5941	KINGSVIEW ENTERPRISES INC		7 W FIRST STREET P O BOX 2 LAKEWOOD NY 14750	01/14/2011	01/14/2016
DOL	DOL	****2463	KJS HAULING AND HOME IMPROVEMENT INC		95 MAPLE AVENUE NEW CITY NY 10956	04/15/2013	04/15/2018
DOL	AG		KOSTAS "GUS" ANDRIKOPOULOS		2461 47TH STREET ASTORIA NY 11103	09/26/2013	09/26/2018
DOL	DOL		KRZYSZTOF PRXYBYL		2 TINA LANE HOPEWELL JUNCTION NY 12533	01/06/2012	01/06/2017
DOL	DOL	****6033	KUSNIR CONSTRUCTION		2677 ANAWALK ROAD KATONAH NY 10536	08/03/2012	08/03/2017
DOL	DOL	****0526	LAGUARDIA CONSTRUCTION CORP		47-40 48TH STREET WOODSIDE NY 11377	07/01/2011	07/01/2016
DOL	NYC	****8816	LAKE CONSTRUCTION AND DEVELOPMENT CORPORATION		150 KINGS STREET BROOKLYN NY 11231	08/19/1998	08/19/2998
DOL	DOL		LARRY DOMINGUEZ		114 PEARL STREET PORT CHESTER NY 10573	08/15/2012	08/15/2017
DOL	DOL		LAURA A. GAUTHIER		C/O IMPERIAL MASONRY REST 141 ARGONNE DRIVE KENMORE NY 14217	10/03/2012	10/03/2017

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DOL	DOL		LAURI MARTONE		112 OSCAWANA HEIGHTS ROAD PUTNAM VALLEY NY 10542	08/27/2013	08/27/2018
DOL	DOL		LAVERN GLAVE		C/O RAW POWER ELECTRIC 3 PARK CIRCLE MIDDLETOWN NY 10940	09/15/2014	09/15/2019
DOL	DOL		LAWRENCE J RUGGLES		P O BOX 371 ROUND LAKE NY 12151	05/12/2014	05/12/2019
DOL	DOL	****0597	LEED INDUSTRIES CORP	HI-TECH CONTRACTING CORP	114 PEART STREET PORT CHESTER NY 10573	08/15/2012	08/15/2017
DOL	AG		LEONID FRIDMAN		APT 5 200 BRIGHTON, 15TH ST BROOKLYN NY 11235	01/23/2013	01/23/2019
DOL	DOL	****8453	LINPHILL ELECTRICAL CONTRACTORS INC		523 SOUTH 10TH AVENUE MOUNT VERNON NY 10553	01/07/2011	04/15/2018
DOL	DOL		LINVAL BROWN		523 SOUTH 10TH AVENUE MOUNT VERNON NY 10553	01/07/2011	04/15/2018
DOL	DOL	****5171	LUVIN CONSTRUCTION CORP		P O BOX 357 CARLE PLACE NY 11514	03/15/2010	03/15/2015
DOL	NYC	****2850	M A 2 FLAGS CONTRACTING CORP		25-18 100TH STREET EAST ELMHURST NY 11369	08/21/2013	08/21/2018
DOL	NYC	****3141	MACKAY REED ELECTRIC INC		1ST FLOOR STORE FRONT 88-10 LITTLE NECK PARKWAY FLORAL PARK NY 11001	06/24/2014	06/24/2019
DOL	DOL		MANUEL ESTEVES		55 OLD TURNPIKE ROAD SUITE 612 NANUET NY 10954	02/04/2011	02/04/2016
DOL	NYC		MANUEL P TOBIO		150 KINGS STREET BROOKLYN NY 14444	08/19/1998	08/19/2998
DOL	NYC		MANUEL TOBIO		150 KINGS STREET BROOKLYN NY 11231	08/19/1998	08/19/2998
DOL	DOL		MAR CONTRACTING CORP		620 COMMERCE STREET THORNWOOD NY 10594	09/24/2012	09/24/2017
DOL	DOL		MARGARET FORTH		P O BOX 74 EAST GREENBUSH NY 12061	02/28/2012	10/01/2017
DOL	DOL		MARIA ESTEVES AKA MARIA MARTINS		C/O THREE FRIENDS CONSTR 986 MADISON AVENUE PATERSON NJ 07501	01/03/2013	01/03/2018
DOL	DOL		MARIA MARTINS AKA MARIA ESTEVES		C/O THREE FRIENDS CONSTR 986 MADISON AVENUE PATERSON NJ 07501	01/03/2013	01/03/2018
DOL	DOL		MARIO LUIS		31 DURANT AVENUE BETHEL CT 06801	07/02/2012	07/02/2017
DOL	DOL		MARIO R ECHEVERRIA JR		588 MEACHAM AVE-SUITE 103 ELMONT NY 11003	08/24/2010	08/24/2015
DOL	DOL	****5533	MARQUISE CONSTRUCTION & DEVELOPMENT CORP		10 ST CHARLES STREET THORNWOOD NY 10594	09/03/2013	09/03/2018
DOL	DOL	****8810	MARQUISE CONSTRUCTION ASSOCIATES INC		20 BOSWELL ROAD PUTNAM VALLEY NY 10579	09/03/2013	09/03/2018
DOL	DOL	****1134	MARQUISE CONSTRUCTION CORP		10 ST CHARLES STREET THORNWOOD NY 10594	09/03/2013	09/03/2018
DOL	NYC	****4314	MASCON RESTORATION INC		129-06 18TH AVENUE COLLEGE POINT NY 11356	02/09/2012	02/09/2017
DOL	NYC	****4314	MASCON RESTORATION LLC		129-06 18TH AVENUE COLLEGE POINT NY 11356	02/09/2012	02/09/2017
DOL	DOL	****0845	MASONRY CONSTRUCTION INC		442 ARMONK ROAD MOUNT KISCO NY 10549	12/04/2009	05/04/2017
DOL	DOL	****3333	MASONRY INDUSTRIES INC		442 ARMONK ROAD MOUNT KISCO NY 10549	12/04/2009	05/04/2017
DOL	DOL	****9857	MBL CONTRACTING CORPORATION		2620 ST RAYMOND AVENUE BRONX NY 10461	08/30/2011	08/30/2016
DOL	DOL	****9028	MCINTOSH INTERIORS LLC		8531 AVENUE B BROOKLYN NY 11236	02/05/2013	02/05/2018
DOL	DOL	****5936	MCSI ADVANCED AV SOLUTIONS LLC		2085 BRIGHTON HENRIETTA TOWN LINE ROAD ROCHESTER NY 14623	11/04/2010	11/04/2015
DOL	DOL	****4259	MERCANDO CONTRACTING CO INC		134 MURRAY AVENUE YONKERS NY 10704	12/11/2009	02/03/2019
DOL	DOL	****0327	MERCANDO INDUSTRIES LLC		134 MURRAY AVENUE YONKERS NY 10704	12/11/2009	02/03/2019
DOL	NYC	****5330	METRO DUCT SYSTEMS INC		12-19 ASTORIA BOULEVARD LONG ISLAND CITY NY 11102	04/16/2014	06/24/2019
DOL	DOL	****3368	MICEK CONSTRUCTION CO INC		20 CROSS STREET FALCONER NY 14733	12/02/2014	12/02/2019
DOL	DOL	****9198	MICHAEL CZECHOWICZ	OCTAGON CO	37-11 35TH AVENUE-2ND FL LONG ISLAND CITY NY 11101	01/08/2013	01/08/2018

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DOL	DOL		MICHAEL F LEARY JR		3813 SNOWDEN HILL ROADNEW HARTFORD NY 13413	06/19/2013	06/19/2018
DOL	DOL		MICHAEL F LEARY JR METAL STUD & DRYWALL		3813 SNOWDEN HILL ROAD NEW HARTFORD NY 13413	06/19/2013	06/19/2018
DOL	DOL		MICHAEL KTISTAKIS		363 88TH STREET BROOKLYN NY 11209	11/18/2013	11/18/2018
DOL	DOL	****6033	MICHAEL KUSNIR	KUSNIR CONSTRUCTI ON	2677 ANAWALK ROAD KATONAH NY 10536	08/03/2012	08/03/2017
DOL	DOL		MICHAEL MARGOLIN		4 LEGHORN COURT NEW YORK NY 11746	11/28/2012	11/28/2017
DOL	DOL		MICHELLE L BARBER		635 LUZERNE ROAD QUEENSBURY NY 12804	09/16/2013	09/16/2018
DOL	DOL	****2635	MIDLAND CONSTRUCTION OF CEDAR LAKE INC		13216 CALUMET AVENUE CEDAR LAKE IL 46303	11/10/2011	11/10/2016
DOL	NYC		MIGUEL ACOSTA		25-18 100TH STREET EAST ELMHURST NY 11369	08/21/2013	08/21/2018
DOL	DOL	****5517	MILLENNIUM PAINTING INC		67 WARD ROAD SALT POINT NY 12578	01/21/2011	01/21/2016
DOL	AG		MOHAMMAD RIAZ		46 RUGBY ROAD WESTBURY NY 11590	11/20/2013	11/20/2018
DOL	NYC		MOHAMMAD SELIM		73-12 35TH AVE - APT F63 JACKSON HEIGHTS NY 11372	03/04/2010	03/04/2015
DOL	DA		MOHAMMED SALEEM		768 LYDIG AVENUE BRONX NY 10462	08/18/2009	05/25/2015
DOL	NYC	****2690	MONDOL CONSTRUCTION INC		11-27 30TH DRIVE LONG ISLAND CITY NY 11102	05/25/2011	05/25/2016
DOL	DOL		MORTON LEVITIN		3506 BAYFIELD BOULEVARD OCEANSIDE NY 11572	08/30/2011	08/30/2016
DOL	DOL	****2737	MOUNTAIN'S AIR INC		2471 OCEAN AVENUE- STE 7A BROOKLYN NY 11229	09/24/2012	09/24/2017
DOL	NYC		MUHAMMAD ZULFIQAR		129-06 18TH AVENUE COLLEGE POINT NY 11356	02/09/2012	02/09/2017
DOL	DOL	****2357	MUNICIPAL MILLING & MIX-IN- PLACE		9091 ERIE ROAD ANGOLA NY 14006	02/03/2011	02/03/2016
DOL	DOL		MURRAY FORTH		P O BOX 74 EAST GREENBUSH NY 12061	02/28/2012	10/01/2017
DOL	DA	****9642	MUTUAL OF AMERICAL GENERAL CONSTRUCTION & MANAGEMENT CORP		768 LYDIG AVENUE BRONX NY 10462	08/18/2009	05/25/2015
DOL	DOL		MUZAFFAR HUSSAIN		C/O ABSOLUTE GENERAL CONT 1129 AVENUE UBROOKLYN NY 11229	01/28/2013	01/28/2018
DOL	DA	****6988	NEW YORK INSULATION INC		58-48 59TH STREET MASPETH NY 11378	05/16/2012	05/16/2017
DOL	DOL		NICHOLAS DEGREGORY JR	NJ DEGREGORY & COMPANY	1698 ROUTE 9 GLENS FALLS NY 12801	05/23/2013	05/23/2018
DOL	NYC		NICHOLAS PROVENZANO		147 BROOME AVENUE ATLANTIC BEACH NY 11509	03/03/2014	03/03/2019
DOL	NYC		NICHOLAS PROVENZANO		147 BROOME AVENUE ATLANTIC BEACH NY 11509	03/03/2014	03/03/2019
DOL	DOL		NICOLE SPELLMAN		2081 JACKSON AVENUE COPIAGUE NY 11726	06/03/2010	06/03/2015
DOL	DOL		NIKOLAS PSAREAS		656 N WELLWOOD AVE/STE C LINDENHURST NY 11757	09/01/2011	09/01/2016
DOL	DOL	****5279	NJ DEGREGORY & COMPANY		1698 ROUTE 9 GLENS FALLS NY 12801	05/23/2013	05/23/2018
DOL	DOL		NJ DEGREGORY & SONS CONSTRUCTION		1698 ROUTE 9 GLENS FALLS NY 12801	05/23/2013	05/23/2018
DOL	DOL	****9198	OCTAGON CO		37-11 35TH AVENUE-2ND FL LONG ISLAND CITY NY 11101	01/08/2013	01/08/2018
DOL	DOL		OKBY ELSAYED		1541 EAST 56TH STREET BROOKLYN NY 11234	05/04/2012	05/04/2017
DOL	NYC		OLIVER HOLGUIN		95-26 76TH STREET OZONE PARK NY 11416	10/12/2011	10/12/2016
DOL	NYC	****8337	OPTIMUM CONSTRUCTION INC		23-73 48TH STREET LONG ISLAND CITY NY 11103	04/24/2014	04/24/2019
DOL	NYC		ORSON ARROYO		C/O METRO DUCT SYSTEMS 12-19 ASTORIA BOULEVARDLONG ISLAND CITY NY 11102	04/16/2014	06/24/2019
DOL	DOL	****4546	PAF PAINTING CORP		161 TIBBETTS ROAD YONKERS NY 10705	03/12/2014	03/12/2019

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DOL	DOL	****5242	PAF PAINTING SERVICES INC	GARDEN STATE PAINTING	157 TIBBETTS ROAD YONKERS NY 10103	03/12/2014	03/12/2019
DOL	DOL		PAF PAINTING SERVICES OF WESTCHESTER INC		C/O SPIEGEL & UTRERA 1 MAIDEN LANE - 5TH FL NEW YORK NY 10038	03/12/2014	03/12/2019
DOL	DOL	****8802	PAT'S HEATING AND AIR CONDITIONING LTD		P O BOX 371 ROUND LAKE NY 12151	05/12/2014	05/12/2019
DOL	DOL		PATRICIA M RUGGLES		P O BOX 371 ROUND LAKE NY 12151	05/12/2014	05/12/2019
DOL	DOL		PAUL VERNA		C/O AMERICAN STEEL MECHA 693 PAINTER STREET MEDIA PA 19063	02/20/2013	02/20/2018
DOL	DOL		PEDRO RINCON		131 MELROSE STREET BROOKLYN NY 11206	03/02/2010	03/02/2015
DOL	DOL	****9569	PERFORM CONCRETE INC		31 DURANT AVENUE BETHEL CT 06801	07/02/2012	07/02/2017
DOL	NYC		PETER LUSTIG		30 COLUMBUS CIRCLE EASTCHESTER NY 10709	08/21/2012	08/21/2017
DOL	NYC		PETER TRITARIS		5990 58TH AVENUE MASPETH NY 11378	11/18/2013	11/18/2018
DOL	DOL	****1136	PHOENIX ELECTRICIANS COMPANY INC		540 BROADWAY P O BOX 22222ALBANY NY 12201	03/09/2010	03/09/2015
DOL	DOL	****7914	PRECISION SITE DEVELOPMENT INC		89 EDISON AVENUE MOUNT VERNON NY 10550	10/28/2011	10/28/2016
DOL	DOL	****2989	PROFESSIONAL ESTIMATING & BUSINESS CORP		157 TIBBETS ROAD YONKERS NY 10705	03/12/2014	03/12/2019
DOL	DOL	****6895	PROLINE CONCRETE OF WNY INC		3090 SHIRLEY ROAD NORTH COLLINS NY 14111	04/19/2011	12/30/2016
DOL	DOL	****0015	RAMADA CONSTRUCTION CORP		80 SAVO LOOP STATEN ISLAND NY 10309	01/07/2014	01/07/2019
DOL	DOL		RAMON BONILLA		938 E 232ND STREET #2 BRONX NY 10466	05/25/2010	05/25/2015
DOL	DOL	****2633	RAW POWER ELECTRIC CORP		3 PARK PLACE MIDDLETOWN NY 10940	09/16/2013	09/15/2019
DOL	NYC		RAYMOND PEARSON		P O BOX 957 PORT JEFFERSON STA NY 11776	03/12/2014	03/12/2019
DOL	DOL		REBECCA THORNE		113 N MAPLE AVENUE GREENSBURG PA 15601	02/21/2013	02/21/2018
DOL	DOL		REGINALD WARREN		C/O RAW POWER ELECTRIC 3 PARK CIRCLE MIDDLETOWN NY 10940	09/15/2014	09/15/2019
DOL	DOL		REVOLUTIONARY FLOORS LLC		P O BOX 268 STILLWATER NY 12170	09/16/2013	03/21/2019
DOL	DOL		RHINO CONCRETE LLC		101 SULLYS TRAIL/SUITE 20 PITTSFORD NY 14534	11/18/2013	01/07/2019
DOL	DOL		RICHARD WILSON		C/O DUFOUR GROUP INC 353 WEST 56TH STREET #7M NEW YORK NY 10019	06/10/2014	06/10/2019
DOL	NYC	****6978	RISINGTECH INC		243-03 137TH AVENUE ROSEDALE NY 11422	03/25/2010	03/25/2015
DOL	DOL		ROBBYE BISSE SAR		89-51 SPRINGFIELD BLVD QUEENS VILLAGE NY 11427	01/11/2003	01/11/3003
DOL	DOL	****1855	ROBERT D BISHOP JR	ROBERT D BISHOP JR	P O BOX 112 MORRISONVILLE NY 12962	07/15/2014	07/15/2019
DOL	DOL		ROBERT D BISHOP JR		P O BOX 112 MORRISONVILLE NY 12962	07/15/2014	07/15/2019
DOL	NYC		ROBERT FICARELLI		120-30 28TH AVENUE FLUSHING NY 11354	01/14/2011	01/14/2016
DOL	NYC		ROBERT GUIDO		3256 BRUNER AVENUE BRONX NY 10469	07/29/2014	07/29/2019
DOL	DOL		ROBERT L EVANS		128A NORTH STAMFORD ROAD STAMFORD CT 06903	05/23/2013	05/23/2018
DOL	DOL		ROCCO ESPOSITO		C/O ROCMAR CONTRACTING CO 620 COMMERCE STREET THORNWOOD NY 10594	09/24/2012	09/24/2017
DOL	DOL		ROCMAR CONSTRUCTION CORP		620 COMMERCE STREET THORNWOOD NY 10594	09/24/2012	09/24/2017
DOL	DOL	****7083	ROCMAR CONTRACTING CORP		620 COMMERCE STREET THORNWOOD NY 10594	09/24/2012	09/24/2017
DOL	DOL	****9025	ROJO MECHANICAL LLC		938 E 232ND STREET #2 BRONX NY 10466	05/25/2010	05/25/2015

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DOL	DOL		ROMEO WARREN		C/O RAW POWER ELECTR CORP 3 PARK PLACEMIDDLETOWN NY 10940	09/16/2013	09/15/2019
DOL	DOL	****5905	ROSE PAINTING CORP		222 GAINSBORG AVENUE EAST WEST HARRISON NY 10604	05/10/2010	05/10/2015
DOL	DOL		ROSEANNE CANTISANI		11 TATAMUCK ROAD POUND RIDGE NY 10576	05/04/2012	05/04/2017
DOL	NYC		ROSS J HOLLAND		120-30 28TH AVENUE FLUSHING NY 11354	01/14/2011	01/14/2016
DOL	DOL		ROSS J MUSCOLINO		10 ST CHARLES STREET THORNWOOD NY 10594	09/03/2013	09/03/2018
DOL	DOL		S & M CONTRACTING LLC		30 MIDLAND AVENUE WALLINGTON NJ 07057	11/05/2010	11/05/2015
DOL	DOL		S & S ELECTRIC		235 BROADWAY SCHENECTADY NY 12306	06/19/2013	06/19/2018
DOL	NYC		SAEED HASAN		4558 BROADWAY #6 NEW YORK NY 10040	08/04/2014	08/04/2019
DOL	DOL	****4923	SCHENLEY CONSTRUCTION INC		731 WARWICK TURNPIKE HEWITT NJ 07421	06/25/2012	12/11/2017
DOL	DOL		SCOTT LEONARD	GLOBAL TANK CONSTRUCTI ON LLC	P O BOX 1238 SALINA OK 74365	11/28/2012	11/28/2017
DOL	DOL		SEAKCO CONSTRUCTION COMPANY LLC		128A NORTH STAMFORD ROAD STAMFORD CT 06903	05/23/2013	05/23/2018
DOL	DOL	****9030	SEAKCO NEW YORK LLC	SEAKCO CONSTRUCTI ON COMPANY	128A NORTH STAMFORD ROAD STAMFORD CT 06903	05/23/2013	05/23/2018
DOL	DOL		SEAN BURBAGE	C/O SEAN BURBAGE CORP	445 ROOSA GAP ROAD BLOOMINGBURG NY 12721	04/14/2014	04/14/2019
DOL	DOL	****6586	SEAN BURBAGE CORP		445 ROOSA GAP ROAD BLOOMINGBURG NY 12721	04/14/2014	04/14/2019
DOL	DOL	****3540	SEVEN STAR ELECTRICAL CONTRACTING CORP		23-24 STEINWAY STREET ASTORIA NY 11105	06/27/2011	06/27/2016
DOL	DOL		SEVEN STAR ELECTRICAL INC		C/O THEONI ATHANASIADIS 1023 COMMACK ROAD DIX HILLS NY 11746	06/27/2011	06/27/2016
DOL	NYC		SHAFIQL ISLAM		11-27 30TH DRIVE LONG ISLAND CITY NY 11102	05/25/2011	05/25/2016
DOL	NYC		SHAHZAD ALAM		21 107 28TH AVE BAYSIDE NY 11360	07/02/2012	07/02/2017
DOL	DOL		SHAIKF YOUSUF		C/O INDUS GENERAL CONST 33-04 91ST STREET JACKSON HEIGHTS NY 11372	04/28/2010	04/28/2015
DOL	DOL	****0415	SIGNAL CONSTRUCTION LLC		199 GRIDER STREET BUFFALO NY 14215	11/14/2006	02/25/2015
DOL	DOL	****8469	SIGNATURE PAVING AND SEALCOATING		P O BOX 772 JAMESTOWN NY 14701	08/13/2010	08/13/2015
DOL	DOL	****8469	SIGNATURE SEALCOATING AND STRIPING SERVICE		345 LIVINGSTON AVENUE P O BOX 772 JAMESTOWN NY 14702	04/04/2007	08/13/2015
DOL	DOL	****6904	SIGNING STAR LIMITED LIABILITY COMPANY		5 HANSEN PLACE WAYNE NJ 07470	09/18/2013	09/18/2018
DOL	DOL	****0667	SNEEM CONSTRUCTION INC		43-22 42ND STREET SUNNYSIDE NY 11104	07/01/2011	07/01/2016
DOL	DOL		SPASOJE DOBRIC		61 WILLET STREET - SUITE PASSAIC NJ 07055	07/09/2010	02/23/2017
DOL	NYC	****4934	SPHINX CONTRACTING CORP		240 HOME STREET TEANECK NJ 07666	08/04/2014	08/04/2019
DOL	DOL		SPORTSCRAFTERS INC		113 N MAPLE AVENUE GREENSBURG PA 15601	02/21/2013	02/21/2018
DOL	DOL	****3539	SPOTLESS CONTRACTING	IMPACT INDUSTRIAL SERVICES INC	44 THIELLS-MT IVY ROAD POMONA NY 10970	10/14/2011	10/14/2016
DOL	DOL	****3496	STAR INTERNATIONAL INC		89-51 SPRINGFIELD BLVD QUEENS VILLAGE NY 11427	08/11/2003	08/11/3003
DOL	DOL		STEFANIE MCKENNA		30 MIDLAND AVENUE WALLINGTON NJ 07057	11/05/2010	11/05/2015
DOL	DOL		STEPHEN BIANCHI		462 LAKEVIEW AVENUE VALHALLA NY 10595	12/16/2013	12/16/2018
DOL	DOL		STEPHEON SHELDON	FANTASTIC PAINTING	493 LANSING ROAD FULTONVILLE NY 12072	11/18/2013	11/18/2018
DOL	DOL		STEVEN CONKLIN		60 COLONIAL ROAD STILLWATER NY 12170	02/15/2011	02/15/2016

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DOL	DOL		STEVEN SAGGESE		3005 WYNSUM AVENUE MERRICK NY 11566	08/18/2014	08/18/2019
DOL	DOL		STUART CHAITIN		634 ROUTE 303 BLAUVET NY 10913	07/26/2012	11/19/2018
DOL	DOL	****3210	SUPER SWEEP	FMS	4 LEGHORN COURT NEW YORK NY 11746	11/28/2012	11/28/2017
DOL	DOL		SUZANNE G GOLD	C/O GOLDS FLOORING INSTALLATION S INC	25 HAMILTON ROAD MONTICELLO NY 12701	10/16/2013	10/16/2018
DOL	DOL	****9676	T D CONTRACTORS CORP	T D CONTRACTOR S INC	113 N MAPLE AVENUE GREENSBURG PA 15601	02/21/2013	02/21/2018
DOL	DOL		T D CONTRACTORS INC		113 N MAPLE AVENUE GREENSBURG PA 15601	02/21/2013	02/21/2018
DOL	DOL		TAMMY LACITIGNOLA		C/O CATSKILL FENCE INSTAL 5445 ROUTE 32CATSKILL NY 12414	08/22/2014	08/22/2019
DOL	DOL		TECH-MECHANICAL FAB DC INC		5 PARKER AVENUE POUGHKEEPSIE NY 12601	03/25/2014	03/25/2019
DOL	DOL	****4293	THE J OUVINA GROUP LLC		344 SOUNDVIEW LANE COLLEGE POINT NY 11356	11/22/2011	11/22/2016
DOL	DOL		THE THORNE GROUP INC		113 N MAPLE AVENUE GREENSBURG PA 15601	02/21/2013	02/21/2018
DOL	DOL	****2070	THE UNIVERSAL GROUP OF NEW YORK INC		212 OXFORD WAY SCHENECTADY NY 12309	12/11/2012	09/16/2018
DOL	DOL	****9243	THE WELCOME MAT PROPERTY MANAGEMENT LLC		P O BOX 268 STILLWATER NY 12170	09/16/2013	03/21/2019
DOL	DOL		THEONI ATHANASIADIS		C/O SEVEN STAR ELECTRICAL 23-24 STEINWAY STREET ASTORIA NY 11105	06/27/2011	06/27/2016
DOL	DOL		THOMAS DESANTIS	DESANTIS ENTERPRISES	161 OSWEGO RIVER ROAD PHOENIX NY 13135	09/24/2013	11/18/2018
DOL	NYC		THOMAS SCARINCI		130-43 92ND AVENUE RICHMOND HILLS NY 11418	11/27/2013	11/27/2018
DOL	DOL		THOMAS TERRANOVA		13 NEW ROAD/SUITE 1 NEWBURGH NY 12550	11/15/2010	11/15/2015
DOL	DOL	****2734	THREE FRIENDS CONSTRUCTION CORP		986 MADISON AVENUE PATERSON NJ 07501	01/03/2013	01/03/2018
DOL	NYC	****6253	THUNDER BROTHERS CORP		24 CONGRESS LANE SOUTH RIVER NJ 08882	05/01/2013	05/01/2018
DOL	DOL		TIMOTHY F BARBER		635 LUZERNE ROAD QUEENSBURY NY 12804	09/16/2013	09/16/2018
DOL	NYC		TIMOTHY O'SULLIVAN		C/O SNEEM CONSTRUCTION 4322 42ND STREETSUNNYSIDE NY 11104	07/01/2011	07/01/2016
DOL	NYC	****1523	TM MECHANICAL CORP		130-43 92ND AVENUE RICHMOND HILLS NY 11418	11/27/2013	11/27/2018
DOL	DOL	****8176	TOURO CONTRACTING CORP		1541 EAST 56TH STREET BROOKLYN NY 11234	05/04/2012	05/04/2017
DOL	DOL	****2357	TRAC CONSTRUCTION INC	MUNICIPAL MILLING & MIX -IN- PLACE	9091 ERIE ROAD ANGOLA NY 14006	02/03/2011	02/03/2016
DOL	DOL	****6914	TRI-COUNTY RESTORATIONS & CONSTRUCTION INC		13 SUMMERSET DRIVE WALLKILL NY 12589	08/22/2014	08/22/2019
DOL	DOL		TRI-COUNTY RESTORATIONS INC		392 ROCK CUT ROAD WALDEN NY 12586	08/22/2014	08/22/2019
DOL	DOL	****5213	TRIAD PAINTING CO INC		656 N WELLWOOD AVE/STE C LINDENHURST NY 11757	09/01/2011	09/01/2016
DOL	DOL		TROY D CLARKE	ADVANCED METALS	387 RIVERSIDE DRIVE JOHNSON CITY NY 13790	10/01/2012	10/01/2017
DOL	DOL	****4294	TWT CONSTRUCTION COMPANY INC		13 NEW ROAD/SUITE 1 NEWBURGH NY 12550	11/15/2010	11/15/2015
DOL	DOL		ULIANO AND SONS INC		22 GRIFFEN COURT MILLER PLACE NY 11746	10/26/2010	10/26/2015
DOL	AG	****6490	UNIVERSAL STEEL FABRICATORS INC		90 JUNIUS STREET BROOKLYN NY 11212	01/23/2014	01/23/2019
DOL	NYC	****7174	V&R CONTRACTING		P O BOX 957 PORT JEFFERSON STA NY 11776	03/12/2014	03/12/2019
DOL	DOL	****0854	VANESSA CONSTRUCTION INC		588 MEACHAM AVE/STE 103 ELMONT NY 11003	08/24/2010	08/24/2015
DOL	NYC		VEAP SELA	C/O COLONIAL ROOFING COMPANY INC	247 48TH STREET BROOKLYN NY 11220	02/05/2014	02/05/2019
DOL	DOL	****3270	VEZANDIO CONTRACTING CORP		530 BEECH STREET NEW HYDE PARK NY 11040	07/02/2012	07/02/2017

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DOL	NYC		VICK CONSTRUCTION		21 DAREWOOD LANE VALLEY STREAM NY 11581	12/31/2013	12/31/2018
DOL	NYC		VICKRAM MANGRU	VICK CONSTRUCTI ON	21 DAREWOOD LANE VALLEY STREAM NY 11581	12/31/2013	12/31/2018
DOL	NYC		VINCENT PIZZITOLA		P O BOX 957 PORT JEFFERSON STA NY 11776	03/12/2014	03/12/2019
DOL	NYC	****9936	VISHAL CONSTRUCTION INC		73-12 35TH AVE - APT F63 JACKSON HEIGHTS NY 11272	03/04/2010	03/04/2015
DOL	DOL		WESLEY J STAROBA		206 TALLY HO COURT SCHENECTADY NY 12303	06/19/2013	06/19/2018
DOL	DOL	****0078	WESLEY J STAROBA INC	S & S ELECTRIC	235 BROADWAY SCHENECTADY NY 12306	06/19/2013	06/19/2018
DOL	DOL	****7617	WHITE PLAINS CARPENTRY CORP		P O BOX 309 WHITE PLAINS NY 10603	12/04/2009	05/04/2017
DOL	DOL		WILLIAM CONKLIN		5 PARKER AVENUE POUGHKEEPSIE NY 12601	03/25/2014	03/25/2019
DOL	DOL		WILLIAM MAZZELLA		134 MURRAY AVENUE YONKERS NY 10704	02/03/2014	02/03/2019
DOL	DOL		WILLIAM SCRIVENS		30 MIDLAND AVENUE WALLINGTON NJ 07057	11/05/2010	11/05/2015
DOL	DOL		WILLIAM THORNE		113 N MAPLE AVENUE GREENSBURG PA 15601	02/21/2013	02/21/2018
DOL	NYC	****5498	XAVIER CONTRACTING LLC		68 GAYLORD ROAD SCARSDALE NY 10583	02/10/2011	02/10/2016
DOL	DOL		YURIY IVANIN		C/O MOUNTAIN'S AIR INC 2471 OCEAN AVENUE-STE 7ABROOKLYN NY 11229	09/24/2012	09/24/2017

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SECTION 011000

SUMMARY

PART 1 GENERAL

1.1 SECTION INCLUDES

- A. Contract description.
- B. Contractor's use of site and premises.
- C. Owner occupancy.
- D. Specification Conventions.

1.2 CONTRACT DESCRIPTION

- A. Work of the Project includes approximately 1,152 sq. ft. one story truck bay addition to existing Fire Station. Addition includes site, HVAC, electrical and plumbing work.

1.3 CONTRACTOR'S USE OF SITE AND PREMISES

- A. Limit use of site and premises to allow:
 - 1. Owner occupancy.
 - 2. Work by Others and Work by Owner.
 - 3. Use of site and premises by the public.
- B. Utility Outages and Shutdown: Coordinate with Owner.

1.4 OWNER OCCUPANCY

- A. The Owner intends to occupy the existing portion of the fire station.
- B. The Owner will occupy the premises during the entire period of construction.
- C. Cooperate with Owner to minimize conflict, and to facilitate Owner's operations.
- D. Schedule the Work to accommodate Owner occupancy.

1.5 SPECIFICATION CONVENTIONS

- A. These specifications are written in imperative mood and streamlined form. This imperative language is directed to the Contractor, unless specifically noted otherwise. The words "shall be" are included by inference where a colon (:) is used within sentences or phrases.

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PART 2 PRODUCTS - Not Used

PART 3 EXECUTION - Not Used

END OF SECTION

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SECTION 012000

PRICE AND PAYMENT PROCEDURES

PART 1 GENERAL

1.1 SECTION INCLUDES

- A. Contingency allowances.
- B. Testing and inspection allowances.
- C. Schedule of values.
- D. Applications for payment.
- E. Change procedures.
- F. Defect assessment.
- G. Alternates.

1.2 CONTINGENCY ALLOWANCES

- A. Include in Contract a stipulated sum/price of (See Bid Form) for use upon Owner's instruction as a contingency allowance.
- B. Contractor's costs for products, delivery, installation, labor, insurance, payroll, taxes, bonding, equipment rental, overhead and profit will be included in Change Orders authorizing expenditure of funds from this Contingency Allowance.
- C. Funds will be drawn from Contingency Allowance only by Change Order.
- D. At closeout of Contract, funds remaining in Contingency Allowance will be credited to Owner by Change Order.

1.3 TESTING AND INSPECTION ALLOWANCES

- A. Contractor shall include Testing and Inspecting Allowances: Cost of engaging testing and inspecting agency; execution of tests and inspecting; and reporting results.
- B. Costs Not Included in Testing and Inspecting Allowance But Included in Contract Sum/Price:
 - 1. Costs of incidental labor and facilities required to assist testing or inspecting agency.
 - 2. Costs of testing services used by Contractor separate from Contract Document requirements.
 - 3. Costs of retesting upon failure of previous tests as determined by Architect/Engineer.
- C. Payment Procedures:
 - 1. Submit one copy of inspecting or testing firm's invoice with next application for payment.
 - 2. Pay invoice on approval by Architect/Engineer.
- D. Testing and Inspecting Allowances Schedule:

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1. Include sum of \$ for payment of testing and inspecting laboratory services specified in Section 014000 - Quality Requirements.

E. Differences in cost will be adjusted by Change Order.

1.4 SCHEDULE OF VALUES

- A. Submit printed schedule on AIA Form G703 - Continuation Sheet for G702. Contractor's standard form or electronic media printout will be considered.
- B. Submit Schedule of Values in duplicate within 15 days after date of Owner-Contractor Agreement.
- C. Format: Utilize Table of Contents of this Project Manual. Identify each line item with number and title of major specification Section. Identify site mobilization, bonds and insurance, and all allowances.
- D. Include in each line item, amount of Allowances specified in this section.
- E. Include within each line item, direct proportional amount of Contractor's overhead and profit.
- F. Revise schedule to list approved Change Orders, with each Application For Payment.

1.5 APPLICATIONS FOR PAYMENT

- A. Submit three copies of each application on AIA Form G702 - Application and Certificate for Payment and AIA G703 - Continuation Sheet for G702 or Contractor's electronic form.
- B. Content and Format: Utilize Schedule of Values for listing items in Application for Payment.
- C. Payment Period: Submit at intervals stipulated in the Agreement.
- D. Submit with transmittal letter as specified for Submittals in Section 013300 - Submittal Procedures.
- E. Submit waivers.
- F. Substantiating Data: When Architect/Engineer requires substantiating information, submit data justifying dollar amounts in question. Include the following with Application for Payment:
 1. Current construction photographs specified in Section 017000.
 2. Partial release of liens from major subcontractors and vendors.
 3. Record documents as specified in Section 017000, for review by Owner which will be returned to Contractor.
 4. Affidavits attesting to off-site stored products.
 5. Construction progress schedules, revised and current.

1.6 CHANGE PROCEDURES

- A. Submittals: Submit name of individual authorized to receive change documents, and be responsible for informing others in Contractor's employ or Subcontractors of changes to the Work.

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- B. The Architect/Engineer will advise of minor changes in the Work not involving adjustment to Contract Sum/Price or Contract Time by issuing supplemental instructions on AIA Form G710.
- C. The Architect/Engineer may issue a Proposal Request including a detailed description of proposed change with supplementary or revised Drawings and specifications, a change in Contract Time for executing the change with stipulation of overtime work required and the period of time during which the requested price will be considered valid. Contractor will prepare and submit estimate within 7 days.
- D. Contractor may propose changes by submitting a request for change to Architect/Engineer, describing proposed change and its full effect on the Work. Include a statement describing reason for the change, and effect on Contract Sum/Price and Contract Time with full documentation and a statement describing effect on Work by separate or other Contractors. Document requested substitutions in accordance with Section 016000 - Product Requirements.
- E. Stipulated Sum/Price Change Order: Based on Proposal Request and Contractor's fixed price quotation or Contractor's request for Change Order as approved by Architect/Engineer.
- F. Construction Change Directive: Architect/Engineer may issue directive, on AIA Form G713 Construction Change Directive signed by Owner, instructing Contractor to proceed with change in the Work, for subsequent inclusion in a Change Order. Document will describe changes in the Work, and designate method of determining any change in Contract Sum/Price or Contract Time. Promptly execute change.
- G. Time and Material Change Order: Submit itemized account and supporting data after completion of change, within time limits indicated in Conditions of the Contract. Architect/Engineer will determine change allowable in Contract Sum/Price and Contract Time as provided in Contract Documents.
- H. Maintain detailed records of work done on Time and Material basis. Provide full information required for evaluation of proposed changes, and to substantiate costs for changes in the Work.
- I. Document each quotation for change in cost or time with sufficient data to allow evaluation of quotation.
- J. Change Order Forms: AIA G701 Change Order.
- K. Execution of Change Orders: Architect/Engineer will issue Change Orders for signatures of parties as provided in Conditions of the Contract.
- L. Correlation Of Contractor Submittals:
 - 1. Promptly revise Schedule of Values and Application for Payment forms to record each authorized Change Order as separate line item and adjust Contract Sum/Price.
 - 2. Promptly revise progress schedules to reflect change in Contract Time, revise sub-schedules to adjust times for other items of work affected by the change, and resubmit.
 - 3. Promptly enter changes in Project Record Documents.

1.7 DEFECT ASSESSMENT

- A. Replace the Work, or portions of the Work, not conforming to specified requirements.

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- B. If, in the opinion of the Architect/Engineer, it is not practical to remove and replace the Work, the Architect/Engineer will direct appropriate remedy or adjust payment.
- C. The defective Work may remain, but unit sum will be adjusted to new sum/price and reduced at discretion of Architect/Engineer and Owner.
- D. Defective Work will be partially repaired to instructions of Architect/Engineer, and unit sum will be adjusted to new sum reduced at discretion of Architect/Engineer and Owner.
- E. Individual specification sections may modify these options or may identify specific formula or percentage sum/price reduction.
- F. Authority of Architect/Engineer and Owner to assess defects and identify payment adjustments, is final.
- G. Non-Payment For Rejected Products: Payment will not be made for rejected products for any of the following:
 - 1. Products wasted or disposed of in a manner that is not acceptable.
 - 2. Products determined as unacceptable before or after placement.
 - 3. Products not completely unloaded from transporting vehicle.
 - 4. Products placed beyond lines and levels of required Work.
 - 5. Products remaining on hand after completion of the Work.
 - 6. Loading, hauling, and disposing of rejected products.

1.8 ALTERNATES

- A. Alternates quoted on Bid Forms will be reviewed and accepted or rejected at Owner's option. Accepted Alternates will be identified in Owner-Contractor Agreement.
- B. Coordinate related work and modify surrounding work.
- C. Schedule of Alternates:
 - 1. Alternate No.1 (DEDUCT):
 - a. Base Bid Item: Not Applicable.
 - b. Alternate Item: Change from masonry walls and bar joist roof framing to light gauge metal framed walls and rafters.
 - 2. Alternate No.2 (ADD):
 - a. Base Bid Item: Not Applicable.
 - b. Alternate Item: Gravel driveway on North east side of Fire Station.
 - 3. Alternate No.3 (ADD):
 - a. Base Bid Item: Not Applicable.
 - b. Alternate Item: Entrance door pad, foundation, and footing for new main door.
 - 4. Alternate No.4 (ADD):
 - a. Base Bid Item: Not Applicable.
 - b. Alternate Item: (2) Aluminum windows and (2) new openings in existing masonry wall.
 - 5. Alternate No.5 (ADD):
 - a. Base Bid Item: Not Applicable.
 - b. Alternate Item: Domestic cold water piping, (2) hose stations, and (2) wall hydrants.
 - 6. Alternate No.6 (ADD):

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- a. Base Bid Item: Not Applicable.
 - b. Alternate Item: Vehicle Exhaust System.
7. Alternate No.7 (ADD):
- a. Base Bid Item: Not Applicable.
 - b. Alternate Item: New lighting in existing bays (in kind replacement of existing HID's).

PART 2 PRODUCTS - Not Used

PART 3 EXECUTION - Not Used

END OF SECTION

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SECTION 012300

ALTERNATES

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

- A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and other Division 1 Specification Sections, apply to this Section.

1.2 SUMMARY

- A. This Section includes administrative and procedural requirements for alternates.

1.3 DEFINITIONS

- A. Alternate: An amount proposed by bidders and stated on the Bid Form for certain work defined in the Bidding Requirements that may be added to or deducted from the Base Bid amount if Owner decides to accept a corresponding change either in the amount of construction to be completed or in the products, materials, equipment, systems, or installation methods described in the Contract Documents.
 - 1. The cost or credit for each alternate is the net addition to or deduction from the Contract Sum to incorporate alternate into the Work. No other adjustments are made to the Contract Sum.

1.4 PROCEDURES

- A. Coordination: Modify or adjust affected adjacent work as necessary to completely integrate work of the alternate into Project.
 - 1. Include as part of each alternate, miscellaneous devices, accessory objects, and similar items incidental to or required for a complete installation whether or not indicated as part of alternate.
- B. Notification: Immediately following award of the Contract, notify each party involved, in writing, of the status of each alternate. Indicate if alternates have been accepted, rejected, or deferred for later consideration. Include a complete description of negotiated modifications to alternates.
- C. Execute accepted alternates under the same conditions as other work of the Contract.
- D. Schedule: A Schedule of Alternates is included at the end of this Section. Specification Sections referenced in schedule contain requirements for materials necessary to achieve the work described under each alternate.

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PART 2 - PRODUCTS - (Not Used)

PART 3 - EXECUTION

3.1 SCHEDULE OF ALTERNATES

- A. Alternate No. 1 (DEDUCT): Change from masonry walls and bar joist roof framing to light gauge metal framed walls and rafters.
- B. Alternate No. 2 (ADD): Gravel driveway on North East side of Fire Station.
- C. Alternate No. 3 (ADD): Entrance door pad, foundation, and footing for new main door.
- D. Alternate No. 4 (ADD): (2) Aluminum windows and (2) new openings in existing masonry wall.
- E. Alternate No. 5 (ADD): Domestic cold water piping, (2) hose stations, and (2) wall hydrants.
- F. Alternate No. 6 (ADD): Vehicle Exhaust System.
- G. Alternate No. 7 (ADD): New lighting in existing bays (in kind replacement of existing HID'S).

END OF SECTION

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SECTION 013000

ADMINISTRATIVE REQUIREMENTS

PART 1 GENERAL

1.1 SECTION INCLUDES

- A. Coordination and project conditions.
- B. Field engineering.
- C. Preconstruction meeting.
- D. Site mobilization meeting.
- E. Progress meetings.
- F. Pre-installation meetings.

1.2 COORDINATION AND PROJECT CONDITIONS

- A. Coordinate scheduling, submittals, and Work of various sections of Project Manual to ensure efficient and orderly sequence of installation of interdependent construction elements, with provisions for accommodating items installed later.
- B. Verify utility requirements and 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, operating equipment.
- C. Coordinate space requirements, supports, and installation of mechanical and electrical Work indicated diagrammatically on Drawings. Follow routing shown for pipes, ducts, and conduit, as closely as practicable; place runs parallel with lines of building. Utilize spaces efficiently to maximize accessibility for other installations, for maintenance, and for repairs.
- D. In finished areas except as otherwise indicated, conceal pipes, ducts, and wiring within construction. Coordinate locations of fixtures and outlets with finish elements.
- E. Coordinate completion and clean-up of Work of separate sections in preparation for Substantial Completion and for portions of Work designated for Owner's partial occupancy.
- F. 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 FIELD ENGINEERING

- A. Employ Land Surveyor registered in State of New York and acceptable to Architect/Engineer.

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- B. Locate and protect survey control and reference points. Promptly notify Architect/Engineer of discrepancies discovered.
- C. Control datum for survey is that shown on Drawings.
- D. Verify set-backs and easements; confirm drawing dimensions and elevations.
- E. Provide field engineering services. Establish elevations, lines, and levels, utilizing recognized engineering survey practices.
- F. Submit copy of site drawing signed by Land Surveyor certifying elevations and locations of the Work are in conformance with Contract Documents.
- G. Maintain complete and accurate log of control and survey work as Work progresses.
- H. On completion of foundation walls and major site improvements, prepare certified survey illustrating dimensions, locations, angles, and elevations of construction and site work.
- I. Protect survey control points prior to starting site work; preserve permanent reference points during construction.
- J. Promptly report to Architect/Engineer loss or destruction of reference point or relocation required because of changes in grades or other reasons.
- K. Replace dislocated survey control points based on original survey control. Make no changes without prior written notice to Architect/Engineer.

1.4 PRECONSTRUCTION MEETING

- A. Architect/Engineer will schedule meeting after Notice of Award.
- B. Attendance Required: Owner, Architect/Engineer, and Contractors.
- C. Agenda:
 - 1. Execution of Owner-Contractor Agreement.
 - 2. Submission of executed bonds and insurance certificates.
 - 3. Distribution of Contract Documents.
 - 4. Submission of list of Subcontractors, list of products, schedule of values, and progress schedule.
 - 5. Designation of personnel representing parties in Contract, and Architect/Engineer.
 - 6. Procedures and processing of field decisions, submittals, substitutions, applications for payments, proposal request, Change Orders, and Contract closeout procedures.
 - 7. Scheduling.
 - 8. Scheduling activities of Geotechnical Engineer.
- D. Architect/Engineer will record minutes and distribute copies to participants and those affected by decisions made.

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1.5 SITE MOBILIZATION MEETING

- A. Architect/Engineer will schedule meeting at Project site prior to Contractor occupancy.
- B. Attendance Required: Owner, Architect/Engineer, and, Contractor, Contractor's Superintendent, and major Subcontractors.
- C. Agenda:
 - 1. Use of premises by Owner and Contractor.
 - 2. Owner's requirements.
 - 3. Construction facilities and controls provided by Owner.
 - 4. Temporary utilities provided by Owner.
 - 5. Survey and building layout.
 - 6. Security and housekeeping procedures.
 - 7. Schedules.
 - 8. Application for payment procedures.
 - 9. Procedures for testing.
 - 10. Procedures for maintaining record documents.
 - 11. Requirements for start-up of equipment.
 - 12. Inspection and acceptance of equipment put into service during construction period.
- D. Architect/Engineer will record minutes and distribute copies to participants and those affected by decisions made.

1.6 PROGRESS MEETINGS

- A. Architect/Engineer will schedule and administer meetings throughout progress of the Work at maximum bi-monthly intervals.
- B. Architect/Engineer will make arrangements for meetings, prepare agenda with copies for participants, preside at meetings.
- C. Attendance Required: Job superintendent, major subcontractors and suppliers, Owner, Architect/Engineer, as appropriate to agenda topics for each meeting.
- D. Agenda:
 - 1. Review minutes of previous meetings.
 - 2. Review of Work progress.
 - 3. Field observations, problems, and decisions.
 - 4. Identification of problems impeding planned progress.
 - 5. Review of submittals schedule and status of submittals.
 - 6. Review of off-site fabrication and delivery schedules.
 - 7. Maintenance of progress schedule.
 - 8. Corrective measures to regain projected schedules.
 - 9. Planned progress during succeeding work period.
 - 10. Coordination of projected progress.
 - 11. Maintenance of quality and work standards.
 - 12. Effect of proposed changes on progress schedule and coordination.
 - 13. Other business relating to Work.

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- E. Architect/Engineer will record minutes and distribute copies after meeting to participants and those affected by decisions made.

1.7 PRE-INSTALLATION MEETINGS

- A. When required in individual specification sections, convene pre-installation meetings at Project site prior to commencing work of specific section.
- B. Require attendance of parties directly affecting, or affected by, Work of specific section.
- C. Notify Architect/Engineer four days in advance of meeting date.
- D. Prepare agenda and preside at meeting:
 - 1. Review conditions of installation, preparation and installation procedures.
 - 2. Review coordination with related work.
- E. Record minutes and distribute copies within two days after meeting to participants, with two copies to Architect/Engineer, Owner, and those affected by decisions made.

PART 2 PRODUCTS - Not Used

PART 3 EXECUTION – Not Used

END OF SECTION

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SECTION 013300

SUBMITTAL PROCEDURES

PART 1 GENERAL

1.1 SECTION INCLUDES

- A. Submittal procedures.
- B. Construction progress schedules.
- C. Proposed products list.
- D. Product data.
- E. Shop drawings.
- F. Samples.
- G. Design data.
- H. Test reports.
- I. Certificates.
- J. Manufacturer's instructions.
- K. Manufacturer's field reports.
- L. Construction photographs.

1.2 SUBMITTAL PROCEDURES

- A. Transmit each submittal with Architect/Engineer accepted form.
- B. Sequentially number transmittal forms. Mark revised submittals with original number and sequential alphabetic suffix.
- C. Identify Project, Contractor, subcontractor and supplier; pertinent drawing and detail number, and specification section number, appropriate to submittal.
- D. Apply Contractor's stamp, signed or initialed certifying that review, approval, verification of products required, field dimensions, adjacent construction Work, and coordination of information is in accordance with requirements of the Work and Contract Documents.
- E. Schedule submittals to expedite Project, and deliver to Architect/Engineer at business address. Coordinate submission of related items.
- F. For each submittal for review, allow 15 days excluding delivery time to and from Contractor.

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- G. Identify variations from Contract Documents and product or system limitations which may be detrimental to successful performance of completed Work.
- H. Allow space on submittals for Contractor and Architect/Engineer review stamps.
- I. When revised for resubmission, identify changes made since previous submission.
- J. Distribute copies of reviewed submittals as appropriate. Instruct parties to promptly report inability to comply with requirements.
- K. Submittals not requested will not be recognized or processed.

1.3 CONSTRUCTION PROGRESS SCHEDULES

- A. The General Contractor shall develop the construction schedule in conjunction with other prime contractors. All contractors' shall cooperate and provide full information to General Contractor.
- B. Submit preliminary outline Schedules within 15 days after date of Owner-Contractor Agreement for coordination with work of separate contracts. After review, submit detailed schedules within 15 days modified to accommodate revisions recommended by Architect/Engineer.
- C. Submit revised Progress Schedules as requested by Architect/Engineer.
- D. Distribute copies of reviewed schedules to other contractors, subcontractors, suppliers, and other concerned parties.
- E. Instruct recipients to promptly report, in writing, problems anticipated by projections indicated in schedules.
- F. Submit computer generated horizontal bar chart with separate line for each major portion of Work or operation, identifying first work day of each week.
- G. Show complete sequence of construction by activity, identifying Work of separate stages and other logically grouped activities. Indicate early and late start, early and late finish, float dates, and duration.
- H. Indicate estimated percentage of completion for each item of Work at each submission.
- I. Include schedule of submittal dates for shop drawings, product data, and samples, including Owner furnished products and dates reviewed submittals will be required from Architect/Engineer. Indicate decision dates for selection of finishes.
- J. Indicate delivery dates for Owner furnished products.
- K. Revisions To Schedules:
 - 1. Indicate progress of each activity to date of submittal, and projected completion date of each activity.
 - 2. Identify activities modified since previous submittal, major changes in scope, and other identifiable changes.

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1.4 PROPOSED PRODUCTS LIST

- A. Within 15 days after date of Owner-Contractor Agreement, submit list of major products proposed for use, with name of manufacturer, trade name, and model number of each product.
- B. For products specified only by reference standards, give manufacturer, trade name, model or catalog designation, and reference standards.

1.5 PRODUCT DATA

- A. Product Data: Submit to Architect/Engineer for review for limited purpose of checking for conformance with information given and design concept expressed in Contract Documents.
- B. Submit number of copies Contractor requires, plus two copies Architect/Engineer will retain.
- C. Mark each copy to identify applicable products, models, options, and other data. Supplement manufacturers' standard data to provide information specific to this Project.
- D. Indicate product utility and electrical characteristics, utility connection requirements, and location of utility outlets for service for functional equipment and appliances.
- E. After review, produce copies and distribute in accordance with SUBMITTAL PROCEDURES article and for record documents described in Section 017000 - Execution and Closeout Requirements.

1.6 SHOP DRAWINGS

- A. Shop Drawings: Submit to Architect/Engineer for review for limited purpose of checking for conformance with information given and design concept expressed in Contract Documents.
- B. Indicate special utility and electrical characteristics, utility connection requirements, and location of utility outlets for service for functional equipment and appliances.
- C. When required by individual specification sections, provide shop drawings signed and sealed by professional engineer responsible for designing components shown on shop drawings.
 - 1. Include signed and sealed calculations to support design.
 - 2. Submit drawings and calculations in form suitable for submission to and approval by authorities having jurisdiction.
 - 3. Make revisions and provide additional information when required by authorities having jurisdiction.
- D. Submit number of opaque reproductions Contractor requires, plus two copies Architect/Engineer will retain.
- E. After review, produce copies and distribute in accordance with SUBMITTAL PROCEDURES article and for record documents described in Section 017000 - Execution and Closeout Requirements.

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1.7 SAMPLES

- A. Samples: Submit to Architect/Engineer for review for limited purpose of checking for conformance with information given and design concept expressed in Contract Documents.
- B. Samples For Selection as Specified in Product Sections:
 - 1. Submit to Architect/Engineer for aesthetic, color, or finish selection.
 - 2. Submit samples of finishes from full range of manufacturers' standard colors, textures, and patterns for Architect/Engineer selection.
- C. Submit samples to illustrate functional and aesthetic characteristics of Products, with integral parts and attachment devices. Coordinate sample submittals for interfacing work.
- D. Include identification on each sample, with full Project information.
- E. Submit number of samples specified in individual specification sections; Architect/Engineer will retain one sample.
- F. Reviewed samples which may be used in the Work are indicated in individual specification sections.
- G. Samples will not be used for testing purposes unless specifically stated in specification section.
- H. After review, produce duplicates and distribute in accordance with SUBMITTAL PROCEDURES article and for record documents purposes described in Section 017000 - Execution and Closeout Requirements.

1.8 DESIGN DATA

- A. Submit for Architect/Engineer's knowledge as contract administrator or for Owner.
- B. Submit for information for limited purpose of assessing conformance with information given and design concept expressed in Contract Documents.

1.9 TEST REPORTS

- A. Submit for Architect/Engineer's knowledge as contract administrator or for Owner.
- B. Submit test reports for information for limited purpose of assessing conformance with information given and design concept expressed in Contract Documents.

1.10 CERTIFICATES

- A. When specified in individual specification sections, submit certification by manufacturer, installation/application subcontractor, or Contractor to Architect/Engineer, in quantities specified for Product Data.
- B. Indicate material or product conforms to or exceeds specified requirements. Submit supporting reference data, affidavits, and certifications as appropriate.
- C. Certificates may be recent or previous test results on material or Product, but must be acceptable to Architect/Engineer.

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1.11 MANUFACTURER'S INSTRUCTIONS

- A. When specified in individual specification sections, submit printed instructions for delivery, storage, assembly, installation, start-up, adjusting, and finishing, to Architect/Engineer for delivery to Owner in quantities specified for Product Data.
- B. Indicate special procedures, perimeter conditions requiring special attention, and special environmental criteria required for application or installation.

1.12 MANUFACTURER'S FIELD REPORTS

- A. Submit reports for Architect/Engineer's benefit as contract administrator or for Owner.
- B. Submit report in duplicate within 5 days of observation to Architect/Engineer for information.
- C. Submit for information for limited purpose of assessing conformance with information given and design concept expressed in Contract Documents.

1.13 CONSTRUCTION PHOTOGRAPHS

- A. Provide dated digital photographs of site and construction throughout progress of Work.
- B. Twice monthly submit photographs with Application for Payment.
- C. Take two site photographs from differing directions and five interior photographs indicating relative progress of the Work.
- D. Take photographs as evidence of project conditions as follows:
 - 1. Interior views: Concealed buried and hidden by construction.
 - 2. Exterior views: Concealed buried and hidden by construction.

PART 2 PRODUCTS - Not Used

PART 3 EXECUTION - Not Used

END OF SECTION

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SECTION 014000

QUALITY REQUIREMENTS

PART 1 GENERAL

1.1 SECTION INCLUDES

- A. Quality control and control of installation.
- B. Tolerances.
- C. References.
- D. Labeling.
- E. Mock-up requirements.
- F. Testing and inspection services.
- G. Manufacturers' field services.
- H. Examination.
- I. Preparation.
- J. Cutting and Patching

1.2 QUALITY CONTROL 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 with manufacturers' instructions, including each step in sequence.
- C. When manufacturers' instructions conflict with Contract Documents, request clarification from Architect/Engineer before proceeding.
- D. Comply with specified standards as minimum quality for the Work except where more stringent tolerances, codes, or specified requirements indicate higher standards or more precise workmanship.
- E. Perform Work by persons qualified to produce required and specified quality.
- F. Verify field measurements are as indicated on Shop Drawings or as instructed by manufacturer.
- G. Secure products in place with positive anchorage devices designed and sized to withstand stresses, vibration, physical distortion, or disfigurement.

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1.3 TOLERANCES

- A. Monitor fabrication and installation tolerance control of products to produce acceptable Work. Do not permit tolerances to accumulate.
- B. Comply with manufacturers' tolerances. When manufacturers' tolerances conflict with Contract Documents, request clarification from Architect/Engineer before proceeding.
- C. Adjust products to appropriate dimensions; position before securing products in place.

1.4 REFERENCES

- A. For products or workmanship specified by association, trade, or other consensus standards, comply with requirements of standard, except when more rigid requirements are specified or are required by applicable codes.
- B. Conform to reference standard by date of issue current on date of Contract Documents, date for receiving bids, date of Owner-Contractor Agreement when there are no Bids, except where specific date is established by code.
- C. Obtain copies of standards where required by product specification sections.
- D. When specified reference standards conflict with Contract Documents, request clarification from Architect/Engineer before proceeding.
- E. Neither contractual relationships, duties, nor responsibilities of parties in Contract nor those of Architect/Engineer shall be altered from Contract Documents by mention or inference otherwise in reference documents.

1.5 LABELING

- A. Attach label from agency approved by authority having jurisdiction for products, assemblies, and systems required to be labeled by applicable code.
- B. Label Information: Include manufacturer's or fabricator's identification, approved agency identification, and the following information, as applicable, on each label.
 - 1. Model number.
 - 2. Serial number.
 - 3. Performance characteristics.

1.6 MOCK-UP REQUIREMENTS

- A. Tests will be performed under provisions identified in this section and identified in respective product specification sections.
- B. Assemble and erect specified items with specified attachment and anchorage devices, flashings, seals, and finishes.
- C. Accepted mock-ups shall be comparison standard for remaining Work.

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- D. Where mock-up has been accepted by Architect/Engineer and is specified in product specification sections to be removed; remove mock-up and clear area when directed to do so by Architect/Engineer.

1.7 TESTING AND INSPECTION SERVICES

- A. Each Contractor shall employ and pay for services of an independent testing agency or laboratory acceptable to Architect/Engineer to perform specified testing.
 - 1. Prior to start of Work, submit testing laboratory name, address, and telephone number, and names of full time specialist and responsible officer.
 - 2. Submit copy of report of laboratory facilities inspection made by Materials Reference Laboratory of National Bureau of Standards during most recent inspection, with memorandum of remedies of deficiencies reported by inspection.
- B. The independent firm will perform tests, inspections and other services specified in individual specification sections and as required by Architect/Engineer or Authority having jurisdiction.
 - 1. Laboratory: Authorized to operate in State of New York.
 - 2. Laboratory Staff: Maintain full time specialist on staff to review services.
 - 3. Testing Equipment: Calibrated at reasonable intervals with devices of an accuracy traceable to National Bureau of Standards or accepted values of natural physical constants.
- C. Testing, inspections and source quality control may occur on or off project site. Perform off-site testing as required by Architect/Engineer or Owner.
- D. Reports will be submitted by independent firm to Architect/Engineer, Contractor, and authority having jurisdiction, in duplicate, indicating observations and results of tests and indicating compliance or non-compliance with Contract Documents.
 - 1. Submit final report indicating correction of Work previously reported as non-compliant.
- E. Cooperate with independent firm; furnish samples of materials, design mix, equipment, tools, storage, safe access, and assistance by incidental labor as requested.
 - 1. Notify Architect/Engineer and independent firm 24 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.
- F. Testing and employment of testing agency or laboratory shall not relieve Contractor of obligation to perform Work in accordance with requirements of Contract Documents.
- G. Re-testing or re-inspection required because of non-conformance to specified requirements shall be performed by same independent firm on instructions by Architect/Engineer. Payment for re-testing or re-inspection will be charged to Contractor by deducting testing charges from Contract Sum/Price.
- H. Agency Responsibilities:
 - 1. Test samples of mixes submitted by Contractor.
 - 2. Provide qualified personnel at site. Cooperate with Architect/Engineer and Contractor in performance of services.
 - 3. Perform specified sampling and testing of products in accordance with specified standards.

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4. Ascertain compliance of materials and mixes with requirements of Contract Documents.
5. Promptly notify Architect/Engineer and Contractor of observed irregularities or non-conformance of Work or products.
6. Perform additional tests required by Architect/Engineer.
7. Attend preconstruction meetings and progress meetings, as requested.

I. Agency Reports: After each test, promptly submit two copies of report to Architect/Engineer, Contractor, and authority having jurisdiction. When requested by Architect/Engineer, provide interpretation of test results. Include the following:

1. Date issued.
2. Project title and number.
3. Name of inspector.
4. Date and time of sampling or inspection.
5. Identification of product and specifications section.
6. Location in Project.
7. Type of inspection or test.
8. Date of test.
9. Results of tests.
10. Conformance with Contract Documents.

J. Limits On Testing Authority:

1. Agency or laboratory may not release, revoke, alter, or enlarge on requirements of Contract Documents.
2. Agency or laboratory may not approve or accept any portion of the Work.
3. Agency or laboratory may not assume duties of Contractor.
4. Agency or laboratory has no authority to stop the Work.

1.8 MANUFACTURERS' FIELD SERVICES

- A. When specified in individual specification sections, require material or product suppliers or manufacturers to provide qualified staff personnel to observe site conditions, conditions of surfaces and installation, quality of workmanship, start-up of equipment and test, adjust and balance of equipment as applicable, and to initiate instructions when necessary.
- B. Submit qualifications of observer to Architect/Engineer 30 days in advance of required observations. Observer subject to approval of Architect/Engineer.
- C. Report observations and site decisions or instructions given to applicators or installers that are supplemental or contrary to manufacturers' written instructions.
- D. Refer to Section 013300 - Submittal Procedures, MANUFACTURERS' FIELD REPORTS article.

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PART 2 PRODUCTS - Not Used

PART 3 EXECUTION

3.1 EXAMINATION

- A. Verify existing site conditions and substrate surfaces are acceptable for subsequent Work. Beginning new Work means acceptance of existing conditions.
- B. Verify existing substrate is capable of structural support or attachment of new Work being applied or attached.
- C. Examine and verify specific conditions described in individual specification sections.
- D. Verify utility services are available, of correct characteristics, and in correct locations.

3.2 PREPARATION

- A. Clean substrate surfaces prior to applying next material or substance.
- B. Seal cracks or openings of substrate prior to applying next material or substance.
- C. Apply manufacturer required or recommended substrate primer, sealer, or conditioner prior to applying new material or substance in contact or bond.

3.3 CUTTING AND PATCHING

- A. Employ skilled and experienced installer to perform cutting and patching.
- B. Submit written request in advance of cutting or altering elements affecting:
 - 1. Structural integrity of element.
 - 2. Integrity of weather-exposed or moisture-resistant elements.
 - 3. Efficiency, maintenance, or safety of element.
 - 4. Visual qualities of sight exposed elements.
 - 5. Work of Owner or separate contractor.
- C. Execute cutting, fitting, and patching including excavation and fill, to complete Work, and to:
 - 1. Fit the several parts together, to integrate with other Work.
 - 2. Uncover Work to install or correct ill-timed Work.
 - 3. Remove and replace defective and non-conforming Work.
 - 4. Remove samples of installed Work for testing.
 - 5. Provide openings in elements of Work for penetrations of mechanical and electrical Work.
- D. Execute work by methods to avoid damage to other Work, and to provide proper surfaces to receive patching and finishing.
- E. Cut masonry and concrete materials using masonry saw or core drill.

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- F. Restore Work with new products in accordance with requirements of Contract Documents.
- G. Fit Work tight to pipes, sleeves, ducts, conduit, and other penetrations through surfaces.
- H. Maintain integrity of wall, ceiling, or floor construction; completely seal voids.
- I. At penetrations of fire rated walls, partitions, ceiling, or floor construction, completely seal voids with fire rated material in accordance with Section 078400, to full thickness of penetrated element.
- J. Refinish surfaces to match adjacent finishes. For continuous surfaces, refinish to nearest intersection; for assembly, refinish entire unit.
- K. Identify hazardous substances or conditions exposed during the Work to Architect/Engineer for decision or remedy.

END OF SECTION

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SECTION 015000

TEMPORARY FACILITIES AND CONTROLS

PART 1 GENERAL

1.1 SECTION INCLUDES

A. Temporary Utilities:

1. Temporary electricity.
2. Temporary lighting.
3. Temporary heating.
4. Temporary ventilation.
5. Telephone service.
6. Facsimile service.
7. Temporary water service.
8. Temporary sanitary facilities.

B. Construction Facilities:

1. Field offices and sheds.
2. Vehicular access.
3. Parking.
4. Progress cleaning and waste removal.
5. Project identification.
6. Traffic regulation.
7. Fire prevention facilities.

C. Temporary Controls:

1. Barriers.
2. Enclosures and fencing.
3. Security.
4. Water control.
5. Dust control.
6. Erosion and sediment control.
7. Noise control.
8. Pest control.
9. Pollution control.
10. Rodent control.

D. Removal of utilities, facilities, and controls.

1.2 TEMPORARY ELECTRICITY

- A. Provide and pay for power service required from utility source as needed for construction operation.
- B. Provide temporary electric feeder from electrical service at location as directed by utility. Do not disrupt Owner's use of service.
- C. Complement power service capacity and characteristics as required for construction operations.

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- D. Provide power outlets, with branch wiring and distribution boxes located at each floor as required for construction operations. Each Contractor shall provide flexible power cords as required for portable construction tools and equipment.
- E. Provide main service disconnect and over-current protection at convenient location.
- F. Permanent convenience receptacles may be utilized during construction.
- G. Provide distribution equipment, wiring, and outlets to provide single phase branch circuits for power and lighting.
 - 1. Provide 20 ampere duplex outlets, single phase circuits for power tools for every 2,000 sq ft of active work area.
 - 2. Provide 20 ampere, single phase branch circuits for lighting.

1.3 TEMPORARY LIGHTING

- A. Provide and maintain incandescent lighting for construction operations to achieve minimum lighting level of 2 watt/sq ft.
- B. Provide and maintain 1 watt/sq ft lighting to exterior staging and storage areas after dark for security purposes.
- C. Provide and maintain 0.25 watt/sq ft HID lighting to interior work areas after dark for security purposes.
- D. Provide branch wiring from power source to distribution boxes with lighting conductors, pigtails, and lamps for specified lighting levels.
- E. Maintain lighting and provide routine repairs.
- F. Permanent building lighting may be utilized during construction.

1.4 TEMPORARY HEATING

- A. Provide and pay for heating devices and heat as needed to maintain specified conditions for construction operations.
- B. Enclose building prior to activating temporary heat in accordance with Enclosures article in this section.
- C. Prior to operation of permanent equipment for temporary heating purposes, verify installation is approved for operation, equipment is lubricated and filters are in place. Provide and pay for operation, maintenance, and regular replacement of filters and worn or consumed parts.
- D. Maintain minimum ambient temperature of 50 degrees F in areas where construction is in progress, unless indicated otherwise in product sections.

1.5 TEMPORARY VENTILATION

- A. Ventilate enclosed areas to achieve curing of materials, to dissipate humidity, and to prevent accumulation of dust, fumes, vapors, or gases.

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1.6 TEMPORARY WATER SERVICE

- A. Provide suitable quality water service as needed to maintain specified conditions for construction operations. Connect to existing water source. PROVIDE TEMPORARY FILTERING OF WATER.
- B. Owner will pay cost of temporary water. Exercise measures to conserve energy. Utilize Owner's existing water system, extend and supplement with temporary devices as needed to maintain specified conditions for construction operations.
- C. Extend branch piping with outlets located so water is available by hoses with threaded connections.

1.7 TEMPORARY SANITARY FACILITIES

- A. Provide and maintain required facilities and enclosures (portable toilet). Existing facility use is not permitted. Provide facilities at time of project mobilization.
- B. Environmental Control:
 - 1. Heating, Cooling, and Ventilating for Offices: Automatic equipment to maintain 68 degrees F heating and 76 degrees F cooling.
 - 2. Storage Spaces: Heating and ventilation as needed to maintain products in accordance with Contract Documents; lighting for maintenance and inspection of products.
- C. Storage Areas And Sheds: Size to storage requirements for products of individual Sections, allowing for access and orderly provision for maintenance and for inspection of products to requirements of Section 016000 - Product Requirements.
- D. Preparation: Fill and grade sites for temporary structures sloped for drainage away from buildings.
- E. Installation:
 - 1. Install office spaces ready for occupancy 15 days after date fixed in Notice to Proceed.
 - 2. Parking: Two surfaced parking spaces for use by Owner and Architect/Engineer, connected to office by walk.
 - 3. Employee Residential Occupancy: Not allowed on Owner's property.
- F. Maintenance And Cleaning:
 - 1. Weekly janitorial services for offices; periodic cleaning and maintenance for office and storage areas.
 - 2. Maintain approach walks free of mud, water, and snow.
- G. Removal: At completion of Work remove buildings, foundations, utility services, and debris. Restore areas.

1.8 VEHICULAR ACCESS

- A. Provide unimpeded access for emergency vehicles. Maintain 20 feet wide driveways with turning space between and around combustible materials.
- B. Provide means of removing mud from vehicle wheels before entering streets.

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- C. Use designated existing on-site roads for construction traffic.

1.9 PARKING

- A. Use of designated existing on-site streets and driveways used for construction traffic is permitted. Tracked vehicles not allowed on paved areas.
- B. Use of designated areas of existing parking facilities used by construction personnel is permitted.
- C. Do not allow heavy vehicles or construction equipment in parking areas.
- D. Removal, Repair:
 - 1. Repair existing and permanent facilities damaged by use, to original or specified condition.
- E. Mud From Site Vehicles: Provide means of removing mud from vehicle wheels before entering streets.

1.10 PROGRESS CLEANING AND WASTE REMOVAL

- A. Maintain areas free of waste materials, debris, and rubbish. Maintain site in clean and orderly condition.
- B. Remove debris and rubbish from pipe chases, plenums, attics, crawl spaces, and other closed or remote spaces, prior to enclosing spaces.
- C. Broom and vacuum clean interior areas prior to start of surface finishing, and continue cleaning to eliminate dust.
- D. Collect and remove waste materials, debris, and rubbish from site weekly and dispose off-site.
- E. Open free-fall chutes are not permitted. Terminate closed chutes into appropriate containers with lids.

1.11 TRAFFIC REGULATION

- A. Flag Persons: Provide trained and equipped flag persons to regulate traffic when construction operations or traffic encroach on public traffic lanes.

1.12 FIRE PREVENTION FACILITIES

- A. Prohibit smoking with buildings under construction. Designate area on site where smoking is permitted. Provide approved ashtrays in designated smoking areas.
- B. Establish fire watch for cutting and welding and other hazardous operations capable of starting fires. Maintain fire watch before, during, and after hazardous operations until threat of fire does not exist.
- C. Portable Fire Extinguishers: NFPA 10; 10 pound capacity, 4A-60B: C UL rating.
 - 1. Provide one fire extinguisher at each stair on each floor of buildings under construction.
 - 2. Provide minimum one fire extinguisher in every construction trailer and storage shed.
 - 3. Provide minimum one fire extinguisher on roof during roofing operations using heat producing equipment.

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1.13 BARRIERS

- A. Provide barriers to prevent unauthorized entry to construction areas to allow for Owner's use of site, and to protect existing facilities and adjacent properties from damage from construction operations.
- B. Provide protection for plants designated to remain. Replace damaged plants.
- C. Protect non-owned vehicular traffic, stored materials, site, and structures from damage.

1.14 ENCLOSURES AND FENCING

- A. Construction: Plastic construction netting.
- B. Provide 4 feet high fence around construction site; equip with vehicular and pedestrian gates with locks.
- C. Exterior Enclosures: "GC" Contractor shall provide:
 - 1. Provide temporary weather tight closure of exterior openings to accommodate acceptable working conditions and protection for products, to allow for temporary heating and maintenance of required ambient temperatures identified in individual specification sections, and to prevent entry of unauthorized persons. Provide access doors with self-closing hardware and locks.
 - 2. Provide temporary roofing.

1.15 SECURITY

- A. Security Program:
 - 1. Protect Work existing premises and Owner's operations from theft, vandalism, and unauthorized entry.
 - 2. Initiate program in coordination with Owner's existing security system at project mobilization.
 - 3. Maintain program throughout construction period until Owner occupancy.
- B. Entry Control:
 - 1. Restrict entrance of persons and vehicles into Project site and existing facilities.
 - 2. Allow entrance only to authorized persons with proper identification.
 - 3. Coordinate access of Owner's personnel to site.
- C. Personnel Identification:
 - 1. Provide identification badge to each person authorized to enter premises.
 - 2. Badge To Include: Personal photograph, name, expiration date, and employer.
 - 3. Maintain list of accredited persons, submit copy to Owner on request.
 - 4. Require return of badges at expiration of their employment on the Work.
- D. Restrictions:
 - 1. Do not allow cameras on site or photographs taken except by written approval of Owner.
 - 2. Do no work on days indicated in Owner-Contractor Agreement.

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1.16 WATER CONTROL

- A. Grade site to drain. Maintain excavations free of water. Provide, operate, and maintain pumping equipment.
- B. Protect site from puddling or running water. Provide water barriers as required to protect site from soil erosion.

1.17 DUST CONTROL

- A. Execute Work by methods to minimize raising dust from construction operations.
- B. Provide positive means to prevent air-borne dust from dispersing into atmosphere.

1.18 EROSION AND SEDIMENT CONTROL

- A. Plan and execute construction by methods to control surface drainage from cuts and fills, from borrow and waste disposal areas. Prevent erosion and sedimentation.
- B. Minimize surface area of bare soil exposed at one time.
- C. Provide temporary measures including berms, dikes, and drains, and other devices to prevent water flow.
- D. Construct fill and waste areas by selective placement to avoid erosive surface silts or clays.
- E. Periodically inspect earthwork to detect evidence of erosion and sedimentation; promptly apply corrective measures.

1.19 NOISE CONTROL

- A. Provide methods, means, and facilities to minimize noise produced by construction operations.

1.20 PEST CONTROL

- A. Provide methods, means, and facilities to prevent pests and insects from damaging the Work and entering facility.

1.21 POLLUTION CONTROL

- A. Provide methods, means, and facilities to prevent contamination of soil, water, and atmosphere from discharge of noxious, toxic substances, and pollutants produced by construction operations.
- B. Comply with pollution and environmental control requirements of authorities having jurisdiction.

1.22 RODENT CONTROL

- A. Provide methods, means, and facilities to prevent rodents from accessing or invading premises.

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1.23 REMOVAL OF UTILITIES, FACILITIES, AND CONTROLS

- A. Remove temporary utilities, equipment, facilities, materials, prior to Substantial Completion inspection.
- B. Remove underground installations to minimum depth of 2 feet. Grade site as indicated on Drawings.
- C. Clean and repair damage caused by installation or use of temporary work.
- D. Restore existing and permanent facilities used during construction to original condition. Restore permanent facilities used during construction to specified condition.

PART 2 PRODUCTS - Not Used

PART 3 EXECUTION - Not Used

END OF SECTION

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SECTION 016000

PRODUCT REQUIREMENTS

PART 1 GENERAL

1.1 SECTION INCLUDES

- A. Products.
- B. Product delivery requirements.
- C. Product storage and handling requirements.
- D. Product options.
- E. Product substitution procedures.

1.2 PRODUCTS

- A. Furnish products of qualified manufacturers suitable for intended use. Furnish products of each type by single manufacturer unless specified otherwise.
- B. Do not use materials and equipment removed from existing premises, except as specifically permitted by Contract Documents.
- C. Furnish interchangeable components from same manufacturer for components being replaced.

1.3 PRODUCT DELIVERY REQUIREMENTS

- A. Transport and handle products in accordance with manufacturer's instructions.
- B. Promptly inspect shipments to ensure products comply with requirements, quantities are correct, and products are undamaged.
- C. Provide equipment and personnel to handle products by methods to prevent soiling, disfigurement, or damage.

1.4 PRODUCT STORAGE AND HANDLING REQUIREMENTS

- A. Store and protect products in accordance with manufacturers' instructions.
- B. Store with seals and labels intact and legible.
- C. Store sensitive products in weather tight, climate controlled, enclosures in an environment favorable to product.
- D. For exterior storage of fabricated products, place on sloped supports above ground.

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- E. Provide insured off-site storage and protection when site does not permit on-site storage or protection.
- F. Cover products subject to deterioration with impervious sheet covering. Provide ventilation to prevent condensation and degradation of products.
- G. Store loose granular materials on solid flat surfaces in well-drained area. Prevent mixing with foreign matter.
- H. Provide equipment and personnel to store products by methods to prevent soiling, disfigurement, or damage.
- I. Arrange storage of products to permit access for inspection. Periodically inspect to verify products are undamaged and are maintained in acceptable condition.

1.5 PRODUCT OPTIONS

- A. Products Specified by Reference Standards or by Description Only: Any product meeting those standards or description.
- B. Products Specified by Naming One or More Manufacturers: Products of one of manufacturers named and meeting specifications, no options or substitutions allowed.
- C. Products Specified by Naming One or More Manufacturers with Provision for Substitutions: Submit request for substitution for any manufacturer not named in accordance with the following article.

1.6 PRODUCT SUBSTITUTION PROCEDURES

- A. Instructions to Bidders specify time restrictions for submitting requests for Substitutions during bidding period to requirements specified in this section.
- B. Architect/Engineer will consider requests for Substitutions only within 30 days after date of Owner-Contractor Agreement.
- C. Substitutions may be considered when a product becomes unavailable through no fault of Contractor.
- D. Document each request with complete data substantiating compliance of proposed Substitution with Contract Documents.
- E. A request constitutes a representation that Contractor:
 - 1. Has investigated proposed product and determined that it meets or exceeds quality level of specified product.
 - 2. Will provide same warranty for Substitution as for specified product.
 - 3. Will coordinate installation and make changes to other Work which may be required for the Work to be complete with no additional cost to Owner.
 - 4. Waives claims for additional costs or time extension which may subsequently become apparent.

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5. Will reimburse Owner and Architect/Engineer for review or redesign services associated with re-approval by authorities having jurisdiction.
- F. Substitutions will not be considered when they are indicated or implied on Shop Drawing or Product Data submittals, without separate written request, or when acceptance will require revision to Contract Documents.
- G. Substitution Submittal Procedure:
 1. Submit three copies of request for Substitution for consideration. Limit each request to one proposed Substitution.
 2. Submit Shop Drawings, Product Data, and certified test results attesting to proposed product equivalence. Burden of proof is on proposer.
 3. Architect/Engineer will notify Contractor in writing of decision to accept or reject request.

PART 2 PRODUCTS- Not Used

PART 3 EXECUTION - Not Used

END OF SECTION

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SECTION 017000

EXECUTION AND CLOSEOUT REQUIREMENTS

PART 1 GENERAL

1.1 SECTION INCLUDES

- A. Closeout procedures.
- B. Final cleaning.
- C. Starting of systems.
- D. Demonstration and instructions.
- E. Testing, adjusting and balancing.
- F. Protecting installed construction.
- G. Project record documents.
- H. Operation and maintenance manuals.
- I. Spare parts and maintenance products.
- J. Product warranties.
- K. Maintenance service.

1.2 CLOSEOUT PROCEDURES

- A. Submit written certification that Contract Documents have been reviewed, Work has been inspected, and that Work is complete in accordance with Contract Documents and ready for Architect/Engineer's review.
- B. Provide submittals to Architect/Engineer required by authorities having jurisdiction.
- C. Submit final Application for Payment identifying total adjusted Contract Sum, previous payments, and sum remaining due.
- D. Owner will occupy all of building as specified in Section 011000 - Summary.

1.3 FINAL CLEANING

- A. Execute final cleaning prior to final project assessment.
- B. Clean interior and exterior glass, surfaces exposed to view; remove temporary labels, stains and foreign substances, polish transparent and glossy surfaces, vacuum carpeted and soft surfaces.

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- C. Clean equipment and fixtures to sanitary condition with cleaning materials appropriate to surface and material being cleaned.
- D. Clean or replace filters of operating equipment.
- E. Clean debris from roofs, gutters, downspouts, and drainage systems.
- F. Clean site; sweep paved areas, rake clean landscaped surfaces.
- G. Remove waste and surplus materials, rubbish, and construction facilities from site.

1.4 STARTING OF SYSTEMS

- A. Coordinate schedule for start-up of various equipment and systems.
- B. Notify Architect/Engineer and Owner seven days prior to start-up of each item.
- C. Verify each piece of equipment or system has been checked for proper lubrication, drive rotation, belt tension, control sequence, and for conditions which may cause damage.
- D. Verify tests, meter readings, and specified electrical characteristics agree with those required by equipment or system manufacturer.
- E. Verify wiring and support components for equipment are complete and tested.
- F. Execute start-up under supervision of applicable manufacturer's representative and Contractors' personnel in accordance with manufacturers' instructions.
- G. When specified in individual specification Sections, require manufacturer to provide authorized representative to be present at site to inspect, check, and approve equipment or system installation prior to start-up, and to supervise placing equipment or system in operation.
- H. Submit a written report in accordance with Section 013300 - Submittal Procedures that equipment or system has been properly installed and is functioning correctly.

1.5 DEMONSTRATION AND INSTRUCTIONS

- A. Demonstrate operation and maintenance of products to Owner's personnel two weeks prior to date of final inspection.
- 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 Owner's 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 time at designated location.

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- E. Prepare and insert additional data in operations and maintenance manuals when need for additional data becomes apparent during instruction.
- F. Required instruction time for each item of equipment and system is specified in individual sections.

1.6 TESTING, ADJUSTING AND BALANCING

- A. Contractor will employ services of independent firm to perform testing, adjusting, and balancing. Contractor shall pay for services from testing allowance specified in Section 012000 - Price and Payment Procedures.
- B. Independent firm will perform services specified in Sections.
- C. Reports will be submitted by independent firm to Architect/Engineer indicating observations and results of tests and indicating compliance or non-compliance with requirements of Contract Documents.

1.7 PROTECTING INSTALLED CONSTRUCTION

- A. Protect installed Work and provide special protection where specified in individual specification sections.
- B. Provide temporary and removable protection for installed products. Control activity in immediate work area to prevent damage.
- C. Provide protective coverings at walls, projections, jambs, sills, and soffits of openings.
- D. Protect finished floors, stairs, and other surfaces from traffic, dirt, wear, damage, or movement of heavy objects, by protecting with durable sheet materials.
- E. Prohibit traffic or storage upon waterproofed or roofed surfaces. When traffic or activity is necessary, obtain recommendations for protection from waterproofing or roofing material manufacturer.
- F. Prohibit traffic from landscaped areas.

1.8 PROJECT RECORD DOCUMENTS

- A. Maintain on site one set of the following record documents; record actual revisions to the Work:
 - 1. Drawings.
 - 2. Specifications.
 - 3. Addenda.
 - 4. Change Orders and other modifications to the Contract.
 - 5. Reviewed Shop Drawings, Product Data, and Samples.
 - 6. Manufacturer's instruction for assembly, installation, and adjusting.
- B. Ensure entries are complete and accurate, enabling future reference by Owner.
- C. Store record documents separate from documents used for construction.

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- D. Record information concurrent with construction progress, not less than weekly.
- E. Specifications: Legibly mark and record at each product section description of actual products installed, including the following:
 - 1. Manufacturer's name and product model and number.
 - 2. Product substitutions or alternates utilized.
 - 3. Changes made by Addenda and modifications.
- F. Record Drawings and Shop Drawings: Legibly mark each item to record actual construction including:
 - 1. Measured depths of foundations in relation to finish first floor datum.
 - 2. Measured horizontal and vertical locations of underground utilities and appurtenances, referenced to permanent surface improvements.
 - 3. Measured locations of internal utilities and appurtenances concealed in construction, referenced to visible and accessible features of the Work.
 - 4. Field changes of dimension and detail.
 - 5. Details not on original Contract drawings.
- G. Submit documents to Architect/Engineer with claim for final Application for Payment.

1.9 OPERATION AND MAINTENANCE MANUAL

- A. Submit data bound in 8-1/2 x 11 inch (A4) text pages, three D side ring binders with durable plastic covers.
- B. Prepare binder cover with printed title "OPERATION AND MAINTENANCE INSTRUCTIONS", title of project, and subject matter of binder when multiple binders are required.
- C. Internally subdivide binder contents with permanent page dividers, logically organized as described below; with tab titling clearly printed under reinforced laminated plastic tabs.
- D. Drawings: Provide with reinforced punched binder tab. Bind in with text; fold larger drawings to size of text pages.
- E. Contents: Prepare Table of Contents for each volume, with each product or system description identified, typed on white paper, in three parts as follows:
 - 1. Part 1: Directory, listing names, addresses, and telephone numbers of Architect/Engineer, Contractor, Subcontractors, and major equipment suppliers.
 - 2. Part 2: Operation and maintenance instructions, arranged by system and subdivided by specification section. For each category, identify names, addresses, and telephone numbers of Subcontractors and suppliers. Identify the following:
 - a. Significant design criteria.
 - b. List of equipment.
 - c. Parts list for each component.
 - d. Operating instructions.
 - e. Maintenance instructions for equipment and systems.
 - f. Maintenance instructions for special finishes, including recommended cleaning methods and materials, and special precautions identifying detrimental agents.
 - 3. Part 3: Project documents and certificates, including the following:

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- a. Shop drawings and product data.
- b. Air and water balance reports.
- c. Certificates.
- d. Originals of warranties.

1.10 SPARE PARTS AND MAINTENANCE PRODUCTS

- A. Furnish spare parts, maintenance, and extra products in quantities specified in individual specification sections.
- B. Deliver to Project site and place in location as directed by Owner; obtain receipt prior to final payment.

1.11 PRODUCT WARRANTIES

- A. Obtain warranties and bonds executed in duplicate by responsible subcontractors, suppliers, and manufacturers, within ten days after completion of applicable item of work.
- B. Execute and assemble transferable warranty documents and bonds from subcontractors, suppliers, and manufacturers.
- C. Verify documents are in proper form, contain full information, and are notarized.
- D. Co-execute submittals when required.
- E. Include Table of Contents and assemble in three D side ring binder with durable plastic cover.

1.12 MAINTENANCE SERVICE

- A. Furnish service and maintenance of components indicated in specification sections for one year from date of Substantial Completion.
- B. Examine system components at frequency consistent with reliable operation. Clean, adjust, and lubricate as required.
- C. Include systematic examination, adjustment, and lubrication of components. Repair or replace parts whenever required. Use parts produced by manufacturer of original component.
- D. Do not assign or transfer maintenance service to agent or Subcontractor without prior written consent of Owner.

PART 2 PRODUCTS - Not Used

PART 3 EXECUTION - Not Used

END OF SECTION

**PROJECT CLOSEOUT CHECKLIST
CONSTRUCTION PHASE
(EXHIBIT 1)**

AES PROJECT NO.: 4027
 PROJECT TITLE: Fire Station Addition
 OWNER : Elizabethtown Fire District
 CONTRACTOR:
 CONTRACT: General Construction "GC"

LEGEND

O = OWNER
 AES = AES NORTHEAST, PLLC
 C = CONTRACTOR
 A = REGULATORY AGENCY
 N/A = NOT APPLICABLE

DISTRIBUTION DATE

REQ'D	DATE REC'D	DESCRIPTION	SUBMITTED BY	O	C	AES	REMARKS
X		Punchlist by AES	AES				
X		Certificate of Substantial Completion	AES				
X		Certificate of Occupancy	A				
X		Certificate of Completion	A				
X		Final Change Order	AES				
X		Final Application for Payment	C				
X		Certificate Debts & Claims	C				
X		Release of Liens from Suppliers and Subcontractors	C				
X		Consent of Surety	C				
X		Record Drawings	C				
X		Operations & Maintenance Manuals	C				
X		Warranties - Manufacturers/Suppliers	C				
X		Project Guarantee and Certification	C				
X		Maintenance Stock	C				
X		Systems Demonstrations	C				
X		Certified Payrolls	C				
X		Maintenance Service Contracts	C				
X		Delete Construction Job Phone Nos. from Contacts	AES				

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SECTION 024119

SELECTIVE STRUCTURE DEMOLITION

PART 1 GENERAL

1.1 SUMMARY

- A. Section Includes:
 - 1. Demolishing designated building equipment and fixtures.
 - 2. Demolishing designated construction.
 - 3. Cutting and alterations for completion of the Work.
 - 4. Removing designated items for Owner's retention.
 - 5. Protecting items designated to remain.
 - 6. Removing demolished materials.

1.2 SUBMITTALS

- A. Section 013300 - Submittal Procedures: Requirements for submittals.
- B. Demolition Schedule: Indicate overall schedule and interruptions required for utility and building services.

1.3 CLOSEOUT SUBMITTALS

- A. Section 017000 - Execution and Closeout Requirements: Requirements for submittals.
- B. Project Record Documents: Accurately record actual locations of capped utilities, concealed utilities discovered during demolition, and subsurface obstructions.

1.4 QUALITY ASSURANCE

- A. Conform to applicable code for demolition work, dust control, products requiring electrical disconnection and re-connection.
- B. Conform to applicable code for procedures when hazardous or contaminated materials are discovered.
- C. Obtain required permits from authorities having jurisdiction.
- D. Perform Work in accordance with State of New York Public Work's standard.

1.5 SEQUENCING

- A. Owner will conduct salvage operations before demolition begins to remove materials Owner chooses to retain.

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1.6 SCHEDULING

- A. Section 013000 - Administrative Requirements: Requirements for scheduling.
- B. Schedule Work to coincide with new construction.
- C. Cooperate with Owner in scheduling noisy operations and waste removal that may impact Owners operation and adjoining spaces.
- D. Coordinate utility and building service interruptions with Owner.
 - 1. Do not disable or disrupt building fire or life safety systems without three days prior written notice to Owner.
 - 2. Schedule tie-ins to existing systems to minimize disruption.
 - 3. Coordinate Work to ensure fire sprinklers, fire alarms, smoke detectors, emergency lighting, exit signs and other life safety systems remain in full operation in occupied areas.

1.7 PROJECT CONDITIONS

- A. Conduct demolition to minimize interference with adjacent and occupied building areas.
- B. Cease operations immediately if structure appears to be in danger and notify Architect/Engineer. Do not resume operations until directed.
- C. The existing flat roof also consists of the original asphalt built-up roofing system (under the existing EPDM membrane) that shall be completely removed to expose the gypsum deck.
- D. The Owner has tested the existing roofing system, including the original built-up roof, and found no asbestos on the roofs scheduled for replacement. See section 018000 for Limited Asbestos Survey.

PART 2 PRODUCTS

Not Used.

PART 3 EXECUTION

3.1 PREPARATION

- A. Notify affected utility companies before starting work and comply with their requirements.
- B. Mark location and termination of utilities.
- C. Erect, and maintain temporary barriers and security devices, including warning signs and lights, and similar measures, for protection of the Owner and existing improvements indicated to remain.
- D. Erect and maintain weatherproof closures for exterior openings.

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- E. Erect and maintain temporary partitions to prevent spread of dust, odors, and noise to permit continued Owner occupancy.
- F. Prevent movement of structure; provide temporary bracing and shoring required to ensure safety of existing structure.
- G. Provide appropriate temporary signage including signage for exit or building egress.
- H. Do not close or obstruct building egress path.
- I. Do not disable or disrupt building fire or life safety systems without 3 days prior written notice to Owner.

3.2 SALVAGE REQUIREMENTS

- A. Coordinate with Owner to identify building components and equipment required to be removed and delivered to Owner.
- B. Tag components and equipment Owner designates for salvage.
- C. Protect designated salvage items from demolition operations until items can be removed.
- D. Carefully remove building components and equipment indicated to be salvaged.
- E. Disassemble as required to permit removal from building.
- F. Package small and loose parts to avoid loss.
- G. Mark equipment and packaged parts to permit identification and consolidation of components of each salvaged item.
- H. Prepare assembly instructions consistent with disassembled parts. Package assembly instructions in protective envelope and securely attach to each disassembled salvaged item.
- I. Deliver salvaged items to Owner. Obtain signed receipt from Owner.

3.3 DEMOLITION

- A. Conduct demolition to minimize interference with adjacent and occupied building areas.
- B. Maintain protected egress from and access to adjacent existing buildings at all times.
- C. Do not close or obstruct roadways.
- D. Cease operations immediately when structure appears to be in danger and notify Architect/Engineer.
- E. Disconnect and remove designated utilities within demolition areas.

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- F. Cap and identify abandoned utilities at termination points when utility is not completely removed. Annotate Record Drawings indicating location and type of service for capped utilities remaining after demolition.
- G. Demolish in orderly and careful manner. Protect existing improvements and supporting structural members.
- H. Carefully remove building components indicated to be reused.
 - 1. Disassemble components as required to permit removal.
 - 2. Package small and loose parts to avoid loss.
 - 3. Mark components and packaged parts to permit reinstallation.
 - 4. Store components, protected from construction operations, until reinstalled.
- I. Remove demolished materials from site except where specifically noted otherwise. Do not burn or bury materials on site.
- J. Remove materials as Work progresses. Upon completion of Work, leave areas in clean condition.
- K. Remove temporary Work.

END OF SECTION

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SECTION 033000

CAST-IN-PLACE CONCRETE

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

- A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 1 Specification Sections, apply to this Section.

1.2 SUMMARY

- A. This Section specifies cast-in place concrete, including formwork, reinforcement, concrete materials, mix design, placement procedures, and finishes.

1.3 DEFINITIONS

- A. Cementitious Materials: Portland cement alone or in combination with fly ash and other pozzolans.

1.4 SUBMITTALS

- A. Product Data: For each type of manufactured material indicated.
 - 1. Cementitious materials and aggregates.
 - 2. Form materials and form-release agents.
 - 3. Steel reinforcement and reinforcement accessories.
 - 4. Fiber reinforcement.
 - 5. Admixtures.
 - 6. Waterstops.
 - 7. Curing materials.
 - 8. Floor and slab treatments.
 - 9. Bonding agents.
 - 10. Adhesives.
 - 11. Vapor retarders.
 - 12. Epoxy joint filler.
 - 13. Repair materials.
- B. Testing: Use a qualified independent testing agency for preparing and reporting proposed mix designs for the laboratory trial mix basis.
- C. Design Mixes: Prepare design mixes for each type and strength of concrete determined by either laboratory trial mix or field test data bases, as follows:
 - 1. Proportion normal-weight concrete according to ACI 211.1 and ACI 301.
 - 2. Indicate amounts of mix water to be withheld for later addition at Project site.
 - 3. For each concrete mix include alternate mix designs when characteristic of materials, project conditions, weather, test results, or other circumstances warrant adjustments.
 - 4. Concrete trial mixes shall include admixtures where specified.

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- D. Steel Reinforcement Shop Drawings: Details of fabrication, bending, and placement, prepared according to ACI 315, "Details and Detailing of Concrete Reinforcement." Include material, grade, bar schedules, stirrup spacing, bent bar diagrams, arrangement, and supports of concrete reinforcement. Include special reinforcement required for openings through concrete structures. Provide elevations of each wall and plans of each slab at a minimum of 1/4" = 1'-0" scale.
- E. Manufacturer's Certificate: Certify products are in compliance with the American Recovery and Reinvestment Act (ARRA). Refer to Section 013300.

1.5 QUALITY ASSURANCE

- A. Installer Qualifications: An experienced installer who has completed concrete Work similar in material, design, and extent to that indicated for this Project and whose work has resulted in construction with a record of successful in-service performance.
- B. Manufacturer Qualifications: A firm experienced in manufacturing ready-mixed concrete products complying with ASTM C 94 requirements for production facilities and equipment.
 - 1. Manufacturer must be certified according to the National Ready Mixed Concrete Association's Certification of Ready Mixed Concrete Production Facilities.
- C. Testing Agency Qualifications: An independent testing agency, acceptable to authorities having jurisdiction, qualified according to ASTM C 1077 and ASTM E 329 to conduct the testing indicated, as documented according to ASTM E 548.
 - 1. Personnel conducting field tests shall be qualified as ACI Concrete Field Testing Technician, Grade 1, according to ACI CP-1 or an equivalent certification program.
- D. Source Limitations: Obtain each type or class of cementitious material of the same brand from the same manufacturer's plant, each aggregate from one source, and each admixture from the same manufacturer.
- E. ACI Publications: Comply with the following, unless more stringent provisions are indicated:
 - 1. ACI 301, "Specification for Structural Concrete."
 - 2. ACI 117, "Specifications for Tolerances for Concrete Construction and Materials."
 - 3. ACI 305, "Hot Weather Concreting."
 - 4. ACI 306 "Cold Weather Concreting."
 - 5. ACI SP-15 "Field Reference Manual."
 - 6. ACI 302.1 "Guide for Concrete Floor and Slab Construction."
 - 7. NYS DOT "Standard Specification for Construction and Materials."
- F. Pre-installation Conference: Conduct conference at Project site to comply with requirements in Division 1 Section "Project Meetings."
 - 1. Before submitting design mixes, review concrete mix design and examine procedures for ensuring quality of concrete materials. Require representatives of each entity directly concerned with cast-in-place concrete to attend, including the following:
 - a. Contractor's superintendent.
 - b. Independent testing agency responsible for concrete design mixes.
 - c. Ready-mix concrete producer.
 - d. Concrete subcontractor.
- G. Slabs on Grade
 - 1. Reference Standard: ACI 302 "Guide for Concrete Floor and Slab Construction."

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2. Hold a slab preconstruction meeting (10) days prior to the slab placement. Topics shall include subbase preparation, reinforcement support and placement, slab joints, concrete mix designs, concrete placement, finishing curing, and means of slab protection after and during curing.
3. Prior to slab placement, subbase and vapor barrier shall be dry and not frozen.
4. After slab placement continuing until the end of the curing period provide protection of the slab from: direct sun exposure, wind, precipitation, and excessive temperatures.
5. Contractor shall repair slab defects caused by inadequate protection methods at no additional costs.

1.6 DELIVERY, STORAGE, AND HANDLING

- A. Deliver, store, and handle steel reinforcement to prevent bending and damage.
 1. Avoid damaging coatings on steel reinforcement.
 2. Repair damaged epoxy coatings on steel reinforcement according to ASTM D 3963/D 3963M.

PART 2 - PRODUCTS

2.1 FORM-FACING MATERIALS

- A. Smooth-Formed Finished Concrete: Form-facing panels that will provide continuous, true, and smooth concrete surfaces. Furnish in largest practicable sizes to minimize number of joints.
 1. Plywood, metal, or other approved panel materials.
 2. Exterior-grade plywood panels, suitable for concrete forms, complying with DOC PS 1, and as follows:
 - a. B-B (Concrete Form), Class 1, or better, mill oiled and edge sealed.
- B. Forms for Cylindrical Columns, Pedestals, and Supports: Metal, glass-fiber-reinforced plastic, paper, or fiber tubes 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.
- C. Pan-Type Forms: Glass-fiber-reinforced plastic or formed steel, stiffened to resist plastic concrete loads without detrimental deformation.
- D. Chamfer Strips: Wood, metal, PVC, or rubber strips, 3/4 by 3/4 inch minimum, unless otherwise noted.
- 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 the exposed concrete surface.
 2. Furnish ties that, when removed, will leave holes not larger than 1 inch in diameter in concrete surface.

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3. Furnish ties with integral water-barrier plates to walls indicated to receive dampproofing or waterproofing.

2.2 STEEL REINFORCEMENT

- A. Reinforcing Bars: ASTM A 615, Grade 60, deformed.
- B. Plain-Steel Welded Wire Fabric: ASTM A 185, fabricated from as-drawn steel wire into flat sheets.
- C. Tie Wire: ASTM A82, 16 gauge annealed, minimum.
- D. Reinforcement Schedule:

Foundation and Walls	Plain Deformed
Slabs on Grade	Plain Deformed

- E. Manufacturer's Certificate: Certify products are in compliance with the American Recovery and Reinvestment Act (ARRA). Refer to Section 013300.

2.3 REINFORCEMENT ACCESSORIES

- A. Bar Supports: Bolsters, chairs, spacers, and other devices for spacing, supporting, and fastening reinforcing bars and welded wire fabric in place. Manufacture bar supports according to CRSI's "Manual of Standard Practice" from steel wire, plastic, or precast concrete or fiber-reinforced concrete 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 or CRSI Class 2 stainless-steel bar supports.
 2. Brick reinforcement supports are prohibited.

2.4 CONCRETE MATERIALS

- A. Portland Cement: ASTM C 150, Type I/II.
 1. Fly Ash ASTM C618, Class F.
 - a. Maximum percent of Fly Ash of total cementitious material by weight is 20%.
- B. Normal-Weight Aggregate: ASTM C 33, uniformly graded, and as follows:
 1. Class: Severe weathering region, but not less than 3S.
 2. Class: Moderate weathering region, but not less than 3M.
 3. Nominal Maximum Aggregate Size: As specified for each specialized Concrete Mix Design.
 4. Combined Aggregate Gradation: Well graded from coarsest to finest with not more than 18 percent and not less than 8 percent retained on an individual sieve, except that less than 8 percent may be retained on coarsest sieve and on No. 50 sieve, and less than 8 percent may be retained on sieves finer than No. 50.
 5. Fine Aggregate: Free of materials with deleterious reactivity to alkali in cement.
- C. Water: Potable and complying with ASTM C 94.

2.5 ADMIXTURES

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- A. General: Admixtures certified by manufacturer to contain not more than 0.1 percent water-soluble chloride ions by mass of cementitious material and to be compatible with other admixtures and cementitious materials. Do not use admixtures containing calcium chloride.
- B. Air-Entraining Admixture: ASTM C 260.
 - 1. Daravair 1000; W. R. Grace & Co.
 - 2. MB-AE90-BASF Construction Chemicals, LLC.
 - 3. Substitutions or approved equal: Section 016000 – Product Requirements.
- C. Mid-Range Water-Reducing Admixture: ASTM C 494, Type A. Mid-range water-reducers shall only be accepted for use in concrete with water/cement ratios of .45 and above.
 - 1. Daracem 55; W. R. Grace & Co.
 - 2. Poly Heed 1020-BASF Construction Chemicals, LLC.
 - 3. Substitutions or approved equal: Section 016000 – Product Requirements.
- D. High-Range Water-Reducing Admixture: ASTM C 494, Type F. High-range water-reducers shall be required for use in all concrete with water/cement ratios below 0.45.
 - 1. ADVA 140; W. R. Grace & Co.
 - 2. Glenium 3030 NS-BASF Construction Chemicals, LLC.
 - 3. Substitutions or approved equal: Section 016000 – Product Requirements.

2.6 VAPOR RETARDERS

- A. Vapor Retarder: ASTM E 1745, Class A, of one of the following materials:
 - 1. Polyolefin not less than 10 mils thick: Stegowrap 10 mil Class A or Moistop 10 Ultra by Fortifiber.

2.7 CURING MATERIALS

- A. Water: Potable.
- B. Clear, Waterborne, Membrane-Forming Curing Compound: ASTM C 309, Type 1, Class B.
- C. Available Products: Subject to compliance with requirements, products that may be incorporated into the Work include, but are not limited to, the following:
 - 1. Clear, Waterborne, Membrane-Forming Curing Compound:
 - a. AH Clear Cure WB; Anti-Hydro International, Inc.
 - b. Klear Kote WB II Regular; Burke Chemicals.
 - c. Safe Cure and Seal; Dayton Superior Corporation.
 - 2. Curing Sheet Materials: ASTM C171: Polyethylene Film.

2.8 RELATED MATERIALS

- A. Epoxy Joint Filler: Two-component, semi-rigid, 100 percent solids, epoxy resin, with a Shore A hardness of 80 per ASTM D 2240.
- B. Bonding Agent: ASTM C 1059, Type II, non-redispersible, acrylic emulsion or styrene butadiene.
- C. Epoxy-Bonding Adhesive: ASTM C 881, two-component epoxy resin, capable of humid curing and bonding to damp surfaces, of class and grade to suit requirements, and as follows:

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1. Type II, non-load bearing, for bonding freshly mixed concrete to hardened concrete.
 2. Types I and II, non-load bearing, for bonding hardened or freshly mixed concrete to hardened concrete.
 3. Types IV and V, load bearing, for bonding hardened or freshly mixed concrete to hardened concrete.
- D. Premolded Joint Filler: Resilient and non-extruding premolded bituminous units complying with ASTM D 1751; ½-inch-thick, full depth of slab.
- E. Joint Sealants:
1. “Sikadur 515L”, by Sika; “Euco 600” by Euclid Chemical Co; or accepted equivalent. (Interior Slabs).
 2. “Sikaflex-2c-5L” by Sika; “Eurolastic 25L” by Euclid Chemical Co.; or accepted equivalent. (Exterior Slabs).
- F. Crack Repair Material: “Sika Pronto 19” by Sika; “Crack-Fill 4” by Metzger/McGoire or accepted equivalent.

2.9 REPAIR MATERIALS

- A. Repair Topping: Traffic-bearing, cement-based, polymer-modified, self-leveling product that can be applied in thicknesses from 1/4 inch.
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 5,700 psi at 28 days when tested according to ASTM C 109/C 109M.

2.10 CONCRETE MIXES

- A. Mix ‘A’ – Standard Concrete: Proportion normal-weight concrete mix as follows:
- | | |
|------------------------------------|----------------------------|
| 1. Compressive Strength (28 Days): | 4,000 psi |
| 2. Maximum Water Cement Ratio: | .42 |
| 3. Maximum Aggregate Size: | 1 1/2 inch |
| 4. Maximum Water Amount: | 275 lb/cu yd of concrete |
| 5. Minimum Cementitious Materials: | 655 lb/cu yd of concrete |
| 6. Maximum Initial Slump: | 3½ inches |
| 7. Max. Slump w/ High Range WRA: | 7 inches |
| 8. Air Content: | 5 % Unless Noted Otherwise |
- B. Air Content:
1. Add air-entraining admixture at manufacturer's prescribed rate to result in concrete at point of placement having an air content as specified for each concrete mix design within a tolerance of plus 1 or minus 1.5 percent, unless otherwise indicated:
 2. Do not add air entraining admixture to concrete to receive trowel-finish such as interior floors and suspended slabs. Do not allow entrapped air content to exceed 2.5 percent.

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- C. Limit water-soluble, chloride-ion content in hardened concrete to 0.15 percent by weight of cement.
- D. Admixtures: Use admixtures according to manufacturer's written instructions.
 - 1. Use water-reducing admixture or high-range water-reducing admixture (superplasticizer) in concrete, as required, for placement and workability.
 - 2. 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 0.45.
 - 3. Use corrosion-inhibiting admixture in concrete mixtures where indicated.

2.11 FABRICATING REINFORCEMENT

- A. Fabricate steel reinforcement according to CRSI's "Manual of Standard Practice."

2.12 CONCRETE MIXING

- A. Ready-Mixed Concrete: Measure, batch, mix, and deliver concrete according to ASTM C 94 and ASTM C 1116, 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.
 - 2. Cold weather concreting shall follow recommendations of ACI 306, particularly Table 1.4.1- "Recommended Concrete Temperatures" and Table 1.4.2- "Protection Recommended for Concrete Placed in Cold Weather." When ambient placement temperatures are less than 50° F, all concrete shall contain PolarSet accelerating admixture.

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 concrete 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 concrete slabs.
 - 2. Class B, 1/4 inch building frame members, water and sludge holding structures
 - 3. Class C, 1/2 inch footings and foundation walls.
- 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. Kerf wood inserts for forming keyways, reglets, recesses, and the like, for easy removal.
 - 1. Do not use rust-stained steel form-facing material.

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- 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.
- M. Provide 1" minimum chamfer on all exposed concrete edges unless indicated otherwise.

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.
 - 1. Install anchor bolts, accurately located, to elevations required.
- B. Do not "wet set" dowels or anchor rods.

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 provided concrete is hard enough to not be damaged by form-removal operations and provided curing and protection operations are maintained.
- B. Leave formwork, for beam soffits, joists, slabs, and other structural elements, that supports weight of concrete in place until concrete has achieved the following:
 - 1. 28-day design compressive strength.
 - 2. At least 70 percent of 28-day design compressive strength.
 - 3. Determine compressive strength of in-place concrete by testing representative field- or laboratory-cured test specimens according to ACI 301.
 - 4. Remove forms only if shores have been arranged to permit removal of forms without loosening or disturbing shores.

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- C. 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.
- D. 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 SHORES AND RESHORES

- A. Comply with ACI 318, ACI 301, and recommendations in ACI 347R for design, installation, and removal of shoring and reshoring.
- B. In multistory construction, extend shoring or reshoring over a sufficient number of stories to distribute loads in such a manner that no floor or member will be excessively loaded or will induce tensile stress in concrete members without sufficient steel reinforcement.
- C. Plan sequence of removal of shores and reshore to avoid damage to concrete. Locate and provide adequate reshoring to support construction without excessive stress or deflection.

3.5 VAPOR RETARDERS

- A. Vapor Retarder: Place, protect, and repair vapor-retarder sheets according to ASTM E 1643 and manufacturer's written instructions.

3.6 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.
- 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 fabric 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.
- F. Masonry Dowels: At top of concrete walls (where masonry starts), contractor may drill concrete (minimum of 8" embedment) and embed steel dowels into concrete with epoxy or acrylic bonding adhesive, to allow alignment with masonry cores. See Section 055000 for adhesive.

3.7 JOINTS

- A. General: Construct joints true to line with faces perpendicular to surface plane of concrete.

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- 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 from preformed galvanized steel, plastic keyway-section forms, or bulkhead forms with keys, unless otherwise indicated. Embed keys at least 1-1/2 inches into concrete.
 - 3. Space vertical joints in walls as indicated. Locate joints beside piers integral with walls, near corners, and in concealed locations where possible.
 - 4. Use a bonding agent at locations where fresh concrete is placed against hardened or partially hardened concrete surfaces.

- C. Control Joints in Slabs-on-Grade: Form weakened-plane control joints, sectioning concrete into areas as indicated. Construct control joints for a depth equal to at least one-fourth of concrete thickness, as follows:
 - 1. Sawed Joints: Form control joints with power saws equipped with shatterproof abrasive or diamond-rimmed blades. Cut 1/8-inch- wide joints into concrete as soon as cutting action will not tear, abrade, or otherwise damage surface and before concrete develops random contraction cracks. Cut every second bar at location of control joints.

- D. Isolation Joints: Install in slabs at perimeter, around columns and floor drains.
 - 1. Use preformed fiberboard joint filler.
 - 2. Install to the full depth of the slab.
 - 3. Hold joint filler firmly in the correct position until concrete is poured.

3.8 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 mix.

- C. Deposit concrete continuously or in 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 specified. Deposit concrete to avoid segregation.

- D. Deposit concrete in forms in horizontal layers no deeper than 24 inches and in a manner to avoid inclined construction joints. Place each layer while preceding layer is still plastic, to avoid cold joints.
 - 1. Consolidate placed concrete with mechanical vibrating equipment. Use equipment and procedures for consolidating concrete recommended by ACI 309R.
 - 2. Do not use vibrators to transport concrete inside forms. Insert and withdraw vibrators vertically at uniformly spaced locations no farther than the visible effectiveness of the vibrator. Place vibrators 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

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consolidate concrete and complete embedment of reinforcement and other embedded items without causing mix constituents to segregate.

- E. 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, free of humps or hollows, before excess moisture or bleed-water appears on the surface. Do not further disturb slab surfaces before starting finishing operations.

- F. 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 air temperature has fallen to or is expected to fall below 40 deg F, uniformly heat water and aggregates before mixing to obtain a concrete mixture temperature of not less than 50 deg F and not more than 80 deg F at point of placement.
 - 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 mix designs.

- G. Hot-Weather Placement: Place concrete according to recommendations in ACI 305R and as follows, when hot-weather conditions exist:
 - 1. Cool ingredients before mixing to 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. Cover steel reinforcement with water-soaked burlap so steel temperature will not exceed ambient air temperature immediately before embedding in concrete.
 - 3. Fog-spray forms, steel reinforcement, and subgrade just before placing concrete. Keep subgrade moisture uniform without standing water, soft spots, or dry areas.

3.9 FINISHING FORMED SURFACES

- A. 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 defective areas. Remove fins and other projections exceeding 1/8 inch in height.
 - 1. Apply to concrete surfaces as scheduled, a coating or covering material applied directly to concrete, such as waterproofing, dampproofing, veneer plaster, or painting.
 - 2. Do not apply rubbed finish to smooth-formed finish.

- B. Rubbed Finish: Apply the following to smooth-formed finished concrete:
 - 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.

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- C. 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.

3.10 FINISHING FLOORS AND SLABS

- A. General: Comply with recommendations in ACI 302.1R for screeding, re-straightening, 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 (6 mm) in 1 direction.
 - 1. Apply scratch finish to surfaces indicated, to receive concrete floor toppings, to receive mortar setting beds for bonded cementitious floor finishes.
- C. Float Finish: Consolidate surface with power-driven floats or by hand floating if area is small or inaccessible to power driven floats. Re-straighten, cut down high spots, and fill low spots. Repeat float passes and re-straightening until surface is left with a uniform, smooth, granular texture.
 - 1. Apply float finish to surfaces indicated, to surfaces to receive trowel finish, and to floor and slab surfaces to be covered with fluid-applied or sheet waterproofing, built-up or membrane roofing, or sand-bed terrazzo.
- D. Trowel Finish: After applying float finish, apply first trowel finish and consolidate concrete by hand or power-driven trowel. Continue troweling passes and re-straighten 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 indicated and to floor and slab 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 and measure surface so gap at any point between concrete surface and an unlevelled freestanding 10-foot- long straightedge, resting on two high spots and placed anywhere on the surface, does not exceed 1/8 inch.
 - 3. All interior slabs to receive trowel finish unless otherwise noted.
- E. Trowel and Fine-Broom Finish: Apply a first trowel finish to surfaces where indicated or where ceramic or quarry tile is to be installed by either thickset or thin-set method. While concrete is still plastic, slightly scarify surface with a fine broom.
- F. 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.
- G. Slip-Resistive Finish: Before final floating, apply slip-resistive aggregate or aluminum granule finish where indicated and to concrete stair treads, platforms, and ramps. Apply according to manufacturer's written instructions and as follows:

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1. Uniformly spread 25 lb/100 sq. ft. (or manufacturers recommended rate) of dampened slip-resistive aggregate or aluminum granules over surface in 1 or 2 applications. Tamp aggregate flush with surface, but do not force below surface.
 2. After broadcasting and tamping, apply float finish.
 3. After curing, lightly work surface with a steel wire brush or an abrasive stone and water to expose slip-resistive aggregate or aluminum granules.
- H. Contractor shall finish concrete slabs in areas with floor drains so that surface moisture will drain and that no puddling will occur. Contractor shall correct slabs which do not meet these criteria at their own expense.

3.11 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 Work.
- B. Curbs and Containment Walls: 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.
- C. Equipment Bases and Foundations: Provide machine and equipment bases and foundations as shown on Drawings. Set anchor bolts for machines and equipment at correct elevations, complying with diagrams or templates of manufacturer furnishing machines and equipment.

3.12 CONCRETE PROTECTION 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 with recommendations in ACI 305R for hot-weather protection during curing.
- B. 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.
- C. Unformed Surfaces: Begin curing immediately after finishing concrete. Cure unformed surfaces, including floors and slabs, concrete floor toppings, and other surfaces.
- D. 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

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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.

E. Slabs on Grade

1. Protect slabs immediately after placement from premature drying and excessive temperatures. Cure slab completely by sheet – curing by covering slabs for 7 days. Do not allow slabs to dry rapidly at the end of the curing period. Lap and tape seams of curing membrane and repair tears with waterproof tape throughout the curing period.
2. Do not allow foot traffic over slabs during curing period. Do not place equipment on slabs until 14 days after placement.

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 months. Do not fill joints until construction traffic has permanently ceased.
- B. Remove dirt, debris, saw cuttings, curing compounds, and sealers from joints; leave contact faces of joint clean and dry.
- C. Install semi-rigid epoxy 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.

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- 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, pop-outs, honeycombs, rock pockets, crazing and cracks in excess of 0.01 inch wide or that penetrate to reinforcement or completely through un-reinforced 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 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.
 5. 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 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 mix as original concrete except without coarse aggregate. Place, compact, and finish to blend with adjacent finished concrete. Cure in same manner as adjacent concrete.
 6. 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.

Cast-In-Place Concrete

033000

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3.15 FIELD QUALITY CONTROL

- A. Testing Agency: Contractor shall engage a qualified independent testing and inspecting agency to sample materials, perform tests, and submit test reports during concrete placement. Sampling and testing for quality control may include those specified in this Article.
- B. Testing Services: 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 mix exceeding 5 cu. yd., but less than 25 cu. yd., plus one set for each additional 50 cu. yd. or fraction thereof.
 - 2. Slump: ASTM C 143; one test at point of placement for each composite sample, but not less than one test for each day's pour of each concrete mix. Perform additional tests when concrete consistency appears to change.
 - 3. Air Content: ASTM C 231, pressure method, for normal-weight concrete; ASTM C 173, volumetric method, for structural lightweight concrete; one test for each composite sample, but not less than one test for each day's pour of each concrete mix.
 - 4. Concrete Temperature: ASTM C 1064; 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; cast and laboratory cure one set of four standard cylinder specimens for each composite sample.
 - 6. Compressive-Strength Tests: ASTM C 39; test two laboratory-cured specimens at 7 days and two at 28 days.
 - a. A compressive-strength test shall be the average compressive strength from two specimens obtained from same composite sample and tested at age indicated.
- C. When strength of field-cured cylinders is less than 85 percent of companion laboratory-cured cylinders, Contractor shall evaluate operations and provide corrective procedures for protecting and curing in-place concrete.
- D. Strength of each concrete mix will be satisfactory if every average of any three consecutive compressive-strength tests equals or exceeds specified compressive strength and no compressive-strength test value falls below specified compressive strength by more than 500 psi.
- E. Test results shall be reported in writing to Architect, concrete manufacturer, and Contractor within 48 hours of testing. Reports of compressive-strength tests shall contain Project identification name and number, date of concrete placement, name of concrete testing and inspecting agency, location of concrete batch in Work, design compressive strength at 28 days, concrete mix proportions and materials, compressive breaking strength, and type of break for both 7-and 28-day tests.
- F. Nondestructive Testing: Impact hammer, sonoscope, or other nondestructive device may be permitted by Architect but will not be used as sole basis for approval or rejection of concrete.
- G. Additional Tests: Testing and inspecting agency shall make additional tests of concrete when test results indicate that slump, air entrainment, compressive strengths, or other requirements have not been met, as directed by Architect. Testing and inspecting agency may conduct tests to determine adequacy of concrete by cored cylinders complying with ASTM C 42 or by other methods as directed by Architect.

END OF SECTION

Cast-In-Place Concrete

033000

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SECTION 033660

CONCRETE DENSIFIER / SEALER / HARDENER

PART 1 GENERAL

1.1 DESCRIPTION

- A. Summary of Work
 - 1. Furnish all labor, materials, tools, equipment and service for all concrete sealer/densifier/hardener application as indicated, in accordance with provisions of Contract Documents.
 - 2. Completely coordinate with work of all other trades.
 - 3. Although such work is not specifically indicated, furnish and install all supplementary or miscellaneous items, appurtenances and devices incidental to, or necessary for sound, secure and complete installation.
 - 4. Refer to Division 1 for General Requirements
- B. Related Work
 - 1. Section 033000 – Cast-in-Place Concrete.

1.2 SYSTEM

- A. Description: A sealer/densifier/hardener that will react with concrete surfaces to produce a dense, hydrophobic, insoluble, moisture barrier to seal out contaminants, while hardening and densifying surface.

1.3 REFERENCES AND QUALITY ASSURANCE

- A. References:
 - 1. Corps of Engineers Spec: CEGS 03300 4-79.
 - 2. USDA approved.
 - 3. Dept. Of Navy, GSA, VA approved.
- B. Design criteria:
 - 1. ACI 302 Class 1 through 4 concrete floors.
 - 2. May be used on Class 5 and 6 floors when used with mineral or metallic aggregate hardeners and toppings, and Class 9, Super-flat floors.
 - 3. Complies with all Federal and State VOC requirements.
 - 4. Independent Test Data, ASTM C 779, Procedure A, reduction of surface abrasion by 50% or more at the 30 minute time interval.
- C. Applicator qualifications:
 - 1. Approved in writing by manufacturer.

1.4 SUBMITTALS

- A. Product data.

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B. Manufacturer's Certificate: Refer to Section 013300.

1.5 DELIVERY, STORAGE AND HANDLING

A. Deliver to jobsite in sealed, labeled containers.

B. Store and handle to prevent damage to product and environment.

1.6 JOB CONDITIONS

A. Existing conditions, prior to installation:

1. Assure concrete has been cured a minimum of 3 days.
2. Assure concrete is clean and free of membrane forming curing compounds and/or other sealers.
3. Concrete is free of laitance, grease, oil and contaminants.

B. Environmental requirements:

1. Comply with all VOC and EPA requirements.

C. Protection:

1. Protect adjacent surfaces/areas from damage due to over spray; especially glass and painted surfaces.

1.7 PRE-INSTALLATION MEETING

A. At the engineer's request, technical personnel shall be available for a pre-job conference to review installation procedures.

1.8 WARRANTY

A. Written warranty signed jointly by applicator, manufacturer and contractor.

B. Warrant installation for a period of 10 years from date of substantial completion against dusting from abrasion.

PART 2 PRODUCTS

2.1 CONCRETE SEALER/DENSIFIER/HARDENER

A. Acceptable manufacturers:

1. L & M Construction Chemicals, Inc.
 - a. SEAL HARD.
2. Euclid Chemical Co.
 - a. Euco Diamond Hard.
3. Substitutions or approved equal: Section 016000 – Product Requirements.

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PART 3 EXECUTION

3.1 PRE-INSTALLATION INSPECTION

- A. Assure surfaces are clean and free of all contaminants, and any film forming curing compounds or sealers.
- B. Assure concrete has been cured a minimum of 3 days before application.
- C. Protect concrete from construction activity staining.

3.2 APPLICATION

- A. Apply in accord with manufacturer's instructions.
 - 1. Apply directly from sealer container onto prepared surfaces, undiluted.
 - 2. Application equipment: Mechanical "walk-behind" or riding scrubber.
 - 3. Apply at minimum rate of 1 gallon per 150-200 sq. ft.
 - 4. Allow surfaces to remain wet with sealer for 30-60 minutes.
 - 5. Remove excess sealer at end of application procedure by water flushing and then squeegee dry.
 - 6. Apply in 1 coat.

3.3 FIELD QUALITY CONTROL

- A. Have applicator certify rate of application.

3.4 CLEANING

- A. Leave area broom clean.

3.5 SCHEDULE

- A. Truck bay floors.

END OF SECTION

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SECTION 048100

UNIT MASONRY ASSEMBLIES

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

- A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 1 Specification Sections, apply to this Section.

1.2 SUMMARY

- A. This Section includes unit masonry assemblies consisting of the following:
 - 1. Concrete masonry units.
 - 2. Mortar and grout.
 - 3. Reinforcing steel.
 - 4. Masonry joint reinforcement.
 - 5. Ties and anchors.
- B. Products installed, but not furnished, under this Section include the following:
 - 1. Steel and concrete lintels and steel shelf angles for unit masonry.
 - 2. Metal frames in unit masonry openings.

1.3 DEFINITIONS

- A. Reinforced Masonry: Masonry containing reinforcing steel in grouted cells.

1.4 SUBMITTALS

- A. Product Data: For each different masonry unit, accessory, and other manufactured product specified.
- B. Shop Drawings: Show fabrication and installation details for the following:
 - 1. Reinforcing Steel: Detail bending and placement of unit masonry reinforcing bars. Comply with ACI 315, "Details and Detailing of Concrete Reinforcement."
- C. Material Test Reports: From a qualified testing agency indicating and interpreting test results of the following for compliance with requirements indicated:
 - 1. Grout mixes complying with compressive strength requirements of ASTM C 476. Include description of type and proportions of grout ingredients.
- D. Cold-Weather Procedures: Detailed description of methods, materials, and equipment to be used to comply with cold-weather requirements.
- E. Samples for initial selection: Split faced block samples.

1.5 QUALITY ASSURANCE

- A. Testing Agency Qualifications: An independent testing agency, acceptable to authorities having jurisdiction, qualified according to ASTM C 1093 to conduct the testing indicated, as documented according to ASTM E 548.

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- B. Source Limitations for Masonry Units: Obtain exposed masonry units of a uniform texture and color, or a uniform blend within the ranges accepted for these characteristics, through one source from a single manufacturer for each product required.
 - C. Source Limitations for Mortar Materials: Obtain mortar ingredients of a uniform quality, including color for exposed masonry, from one manufacturer for each cementitious component and from one source or producer for each aggregate.
 - 1. Concrete Masonry Unit Test: For each concrete masonry unit indicated, per ASTM C 140.
 - 2. Grout Test: For compressive strength per ASTM C 1019.
 - D. Fire-Resistance Ratings: Where indicated, provide materials and construction identical to those of assemblies with fire-resistance ratings determined per ASTM E 119 by a testing and inspecting agency, by equivalent concrete masonry thickness, or by another means, as acceptable to authorities having jurisdiction.
 - E. Preinstallation Conference: Conduct conference at Project site to comply with requirements in Division 1 Section "Project Meetings."
 - F. Comply with ACI 530:1 "Specifications for Masonry Structures."
- 1.6 DELIVERY, STORAGE, AND HANDLING
- A. Store masonry units on elevated platforms in a dry location. If units are not stored in an enclosed location, cover tops and sides of stacks with waterproof sheeting, securely tied. If units become wet, do not install until they are dry.
 - 1. Protect Type I concrete masonry units from moisture absorption so that, at the time of installation, the moisture content is not more than the maximum allowed at the time of delivery.
 - B. Store cementitious materials on elevated platforms, under cover, and in a dry location. Do not use cementitious materials that have become damp.
 - C. Store aggregates where grading and other required characteristics can be maintained and contamination avoided.
 - D. Store masonry accessories, including metal items, to prevent corrosion and accumulation of dirt and oil.
- 1.7 PROJECT CONDITIONS
- A. Protection of Masonry: During construction, 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.
 - B. Do not apply uniform floor or roof loads for at least 12 hours and concentrated loads for at least 3 days after building masonry walls or columns.
 - C. Stain Prevention: Prevent grout, mortar, and soil from staining the face of masonry to be left exposed or painted. Immediately remove grout, mortar, and soil that come in contact with such masonry.

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1. Protect base of walls from rain-splashed mud and from mortar splatter by coverings spread on ground and over wall surface.
 2. Protect sills, ledges, and projections from mortar droppings.
 3. Protect surfaces of window and door frames, as well as similar products with painted and integral finishes, from mortar droppings.
 4. Turn scaffold boards near the wall on edge at the end of each day to prevent rain from splashing mortar and dirt onto completed masonry.
- D. Cold-Weather Requirements: Do not use frozen materials or materials mixed or coated with ice or frost. Do not build on frozen substrates. Remove and replace unit masonry damaged by frost or by freezing conditions. Comply with cold-weather construction requirements contained in ACI 530.1/ASCE 6/TMS 602.
1. Cold-Weather Cleaning: Use liquid cleaning methods only when air temperature is 40 deg F and above and will remain so until masonry has dried, but not less than 7 days after completing cleaning.
 2. Remove masonry damaged by freezing conditions.
- E. Hot-Weather Requirements: Protect unit masonry work when temperature and humidity conditions produce excessive evaporation of water from mortar and grout. Provide artificial shade and wind breaks and use cooled materials as required.
1. When ambient temperature exceeds 90 deg F with a wind velocity greater than 8 mph, do not spread mortar beds more than 48 inches ahead of masonry. Set masonry units within one minute of spreading mortar.

PART 2 - PRODUCTS

2.1 CONCRETE MASONRY UNITS

- A. General: Provide shapes indicated and as follows:
1. Provide special shapes for lintels, corners, jambs, sash, control joints, headers, bonding, and other special conditions.
 2. Provide square-edged units for outside corners, unless indicated as bullnose.
- B. Concrete Masonry Units: ASTM C 90 and as follows:
1. Weight Classification: Normal weight.
 2. Provide Type I, moisture-controlled units.
 3. Size (Width): Manufactured to the following dimensions:
 - a. 4 inches nominal; 3-5/8 inches actual.
 - b. 6 inches nominal; 5-5/8 inches actual.
 - c. 8 inches nominal; 7-5/8 inches actual.
 - d. 10 inches nominal; 9-5/8 inches actual.
 - e. 12 inches nominal; 11-5/8 inches actual.
 4. Exposed Faces: Manufacturer's standard color and texture, unless otherwise indicated.
 5. Load Bearing Concrete Masonry Units: ASTM C90; net compressive strength of 1900 psi.

2.2 MORTAR AND GROUT MATERIALS

- A. Portland Cement: ASTM C 150, Type I or II, except Type III may be used for cold-weather construction. Provide natural color or white cement as required to produce mortar color indicated.

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- B. Hydrated Lime: ASTM C 207, Type S.
- C. Aggregate for Mortar: ASTM C 144; except for joints less than 1/4 inch thick, use aggregate graded with 100 percent passing the No. 16 sieve.
- D. Aggregate for Grout: ASTM C 404.
- E. Cold-Weather Admixture: Nonchloride, noncorrosive, accelerating admixture complying with ASTM C 494, Type C, and recommended by the manufacturer for use in masonry mortar of composition indicated.
- F. Ready Mixed Mortar: ASTM 11f2.
- G. Water: Potable.

2.3 REINFORCING STEEL

- A. Uncoated Steel Reinforcing Bars: ASTM A 615; ASTM A 616, including Supplement 1; or ASTM A 617, Grade 60 (Grade 400).

2.4 MASONRY JOINT REINFORCEMENT

- A. General: ASTM A 951 and as follows:
 - 1. Hot-dip galvanized, carbon-steel wire for both interior and exterior walls.
 - 2. Hot-dip galvanized, carbon-steel wire for interior walls.
 - 3. Wire Size for Side Rods: 9 gauge or .1483 inch diameter.
 - 4. Wire Size for Cross Rods: 9 gauge or .1483 inch diameter.
 - 5. Provide in lengths of not less than 10 feet, with prefabricated corner and tee units where indicated.
- B. For single-wythe masonry, provide either ladder or truss type with single pair of side rods and cross rods spaced not more than 16 inches o.c.
- C. For cavity walls, use units with adjustable two-piece rectangular ties to connect wythes.

2.5 TIES AND ANCHORS, GENERAL

- A. General: Provide ties and anchors, specified in subsequent articles, made from materials that comply with this Article, unless otherwise indicated.
- B. Hot-Dip Galvanized Carbon-Steel Wire: ASTM A 82; with ASTM A 153, Class B-2 coating.
- C. Galvanized Steel Sheet: ASTM A 653/A 653M, G60, commercial-quality, steel sheet zinc coated by hot-dip process on continuous lines before fabrication.
- D. Steel Plates, Shapes, and Bars: ASTM A 36/A 36M.
- E. Wall Ties: Individual units prefabricated from bent wire to comply with requirements indicated below:
 - 1. Rectangular 4" wide with closed ends.

2.6 MORTAR AND GROUT MIXES

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- A. General: Do not use admixtures, including pigments, air-entraining agents, accelerators, retarders, water-repellent agents, antifreeze compounds, or other admixtures, unless otherwise indicated.
 - 1. Do not use calcium chloride in mortar or grout.
- B. Mortar for Unit Masonry: Comply with ASTM C 270, Proportion Specification.
 - 1. Extended-Life Mortar for Unit Masonry: Mortar complying with ASTM C 1142 may be used instead of mortar specified above, at Contractor's option.
 - 2. Limit cementitious materials in mortar to portland cement, mortar cement, and lime.
 - 3. For masonry below grade, in contact with earth, and where indicated, use Type S.
 - 4. For reinforced masonry and where indicated, use Type N.
 - 5. For exterior, above-grade, load-bearing and non-load-bearing walls and parapet walls; for interior load-bearing walls; for interior non-load-bearing partitions; and for other applications where another type is not indicated, use Type N.
- C. Grout for Unit Masonry: Comply with ASTM C 476.
 - 1. Use grout of type indicated or, if not otherwise indicated, of type (fine or coarse) that will comply with Table 5 of ACI 530.1/ASCE 6/TMS 602 for dimensions of grout spaces and pour height.
 - 2. Provide grout with a slump of 8 to 11 inches as measured according to ASTM C 143.
 - 3. 2000 psi.

2.7 FLASHING

- A. Copper/Kraft Paper Flashing: 7 oz/sq ft rolled sheet copper bonded to fiber reinforced asphalt treated Kraft paper.

2.8 ACCESSORIES

- A. Weeps/Vents: Preformed polypropylene tubes.

PART 3 - EXECUTION

3.1 EXAMINATION

- A. Examine conditions, with Installer present, for compliance with requirements for installation tolerances and other conditions affecting performance.
 - 1. For the record, prepare written report, endorsed by Installer, listing conditions detrimental to performance.
 - 2. Verify that foundations are within tolerances specified.
 - 3. Verify that reinforcing dowels are properly placed.
 - 4. Proceed with installation only after unsatisfactory conditions have been corrected.
- B. Before installation, examine rough-in and built-in construction to verify actual locations of piping connections.

3.2 INSTALLATION, GENERAL

- A. Thickness: Build single-wythe walls to the actual widths of masonry units, using units of widths indicated.

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- B. Build chases and recesses to accommodate items specified in this Section and in other Sections of the Specifications.
- C. Leave openings for equipment to be installed before completing masonry. After installing equipment, complete masonry to match the construction immediately adjacent to the opening.
- D. Cut masonry units with motor-driven saws to provide clean, sharp, unchipped edges. Cut units as required to provide a continuous pattern and to fit adjoining construction. Where possible, use full-size units without cutting. Allow units cut with water-cooled saws to dry before placing, unless wetting of units is specified. Install cut units with cut surfaces and, where possible, cut edges concealed.
- E. Select and arrange units for exposed unit masonry to produce a uniform blend of colors and textures.
 - 1. Mix units from several pallets or cubes as they are placed.

3.3 CONSTRUCTION TOLERANCES

- A. Comply with tolerances in ACI 530.1/ASCE 6/TMS 602 and the following:
- B. For conspicuous vertical lines, such as external corners, door jambs, reveals, and expansion and control joints, do not vary from plumb by more than 1/4 inch in 20 feet, nor 1/2 inch maximum.
- C. For vertical alignment of exposed head joints, do not vary from plumb by more than 1/4 inch in 10 feet, nor 1/2 inch maximum.
- D. For conspicuous horizontal lines, such as exposed lintels, sills, parapets, and reveals, do not vary from level by more than 1/4 inch in 20 feet, nor 1/2 inch maximum.
- E. For exposed bed joints, do not vary from thickness indicated by more than plus or minus 1/8 inch, with a maximum thickness limited to 1/2 inch. Do not vary from bed-joint thickness of adjacent courses by more than 1/8 inch.
- F. For exposed head joints, do not vary from thickness indicated by more than plus or minus 1/8 inch. Do not vary from adjacent bed-joint and head-joint thicknesses by more than 1/8 inch.

3.4 LAYING MASONRY WALLS

- A. Lay out walls in advance for accurate spacing of surface bond patterns with uniform joint thicknesses and for accurate location of openings, movement-type joints, returns, and offsets. Avoid using less-than-half-size units, particularly at corners, jambs, and, where possible, at other locations.
- B. Bond Pattern for Exposed Masonry: Lay exposed masonry in the following bond pattern, unless noted otherwise; do not use units with less than nominal 4-inch horizontal face dimensions at corners or jambs.
 - 1. One-half running bond with vertical joint in each course centered on units in courses above and below.
- C. Lay concealed masonry with all units in a wythe in running bond or bonded by lapping not less than 2 inches. Bond and interlock each course of each wythe at corners. Do not use units with less than nominal 4-inch horizontal face dimensions at corners or jambs.

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- D. Stopping and Resuming Work: In each course, rack back one-half-unit length for one-half running bond or one-third-unit length for one-third running bond; do not tooth. Clean exposed surfaces of set masonry, wet clay masonry units lightly if required, and remove loose masonry units and mortar before laying fresh masonry.
- E. Built-in Work: As construction progresses, build in items specified under this and other Sections of the Specifications. Fill in solidly with masonry around built-in items.
- F. Fill space between hollow-metal frames and masonry solidly with mortar, unless otherwise indicated.
- G. Where built-in items are to be embedded in cores of hollow masonry units, place a layer of metal lath in the joint below and rod mortar or grout into core.
- H. Fill cores in hollow concrete masonry units with grout a minimum of 24" below bearing plates, beams, lintels, posts, and similar items, unless otherwise indicated.
- I. Build non-load-bearing interior partitions full height of story to underside of solid floor or roof structure above, unless otherwise indicated.
 - 1. At fire-rated partitions, install firestopping in joint between top of partition and underside of structure above to comply with Division 7 Section "Firestopping."
- J. Weeps and Vents: Furnish weeps and vents in outer wythe at 32 inches oc horizontally above through-wall flashing, above shelf angels and lintels and at bottom of walls.

3.5 MORTAR BEDDING AND JOINTING

- A. Lay hollow masonry units as follows:
 - 1. With full mortar coverage on horizontal and vertical face shells.
 - 2. Bed webs in mortar in all courses.
 - 3. For starting course on footings where cells are not grouted, spread out full mortar bed, including areas under cells.
- B. Tool exposed joints slightly concave when thumbprint hard, using a jointer larger than the joint thickness, unless otherwise indicated.
- C. Cut joints flush for masonry walls to receive plaster or other direct-applied finishes (other than paint), unless otherwise indicated.

3.6 MASONRY JOINT REINFORCEMENT

- A. General: Provide continuous masonry joint reinforcement as indicated. Install entire length of longitudinal side rods in mortar with a minimum cover of 5/8 inch on exterior side of walls, 1/2 inch elsewhere. Lap reinforcement a minimum of 6 inches.
 - 1. Space reinforcement not more than 16 inches o.c., vertically.
 - 2. Provide reinforcement not more than 8 inches above and below wall openings and extending 12 inches beyond openings.
 - a. Reinforcement above is in addition to continuous hand beam reinforcement.
- B. Cut or interrupt joint reinforcement at control and expansion joints, unless otherwise indicated.

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- C. Provide continuity at corners and wall intersections by using prefabricated "L" and "T" sections. Cut and bend reinforcing units as directed by manufacturer for continuity at returns, offsets, column fireproofing, pipe enclosures, and other special conditions.
- D. Joint Reinforcement and Anchorage – Masonry Veneer:
 - 1. Install horizontal joint reinforcement 16 inches oc.
 - 2. Place masonry joint reinforcement in first horizontal joints above and below openings. Extend minimum 16 inches each side of opening.
 - 3. Place joint reinforcement continuous in first joint below top of walls.
 - 4. Lap joint reinforcement ends minimum 6 inches.
 - 5. Embed wall ties anchors in masonry backing to connect to bond veneer at maximum 16 inches o.c. vertically and 36 inches o.c. horizontally. Place at maximum 8 inches o.c. each way around perimeter of openings, within 12 inches of openings.

3.7 CONTROL AND EXPANSION JOINTS

- A. General: Install control and expansion joints in unit masonry where indicated. Build-in related items as masonry progresses. Do not form a continuous span through movement joints unless provisions are made to prevent in-plane restraint of wall or partition movement.
- B. Form control joints in concrete masonry in one of the following two manners:
 - 1. Install interlocking units designed for control joints. Install bond-breaker strips at joint. Keep head joints free and clear of mortar or rake joint.
 - 2. Install preformed control joint gaskets designed to fit standard sash block.
 - 3. Form 3/8 inch open joint for installation of sealant and backer rod.
- C. Build in horizontal, pressure-relieving joints where indicated; construct joints by either leaving an air space or inserting a compressible filler of width required for installing sealant and backer rod specified in Division 7 Section "Joint Sealants."
 - 1. Locate horizontal, pressure-relieving joints beneath shelf angles supporting masonry veneer and attached to structure behind masonry veneer.

3.8 LINTELS

- A. Provide masonry lintels where shown and where openings of more than 12 inches for brick-size units and 24 inches for block-size units are shown without structural steel or other supporting lintels.
 - 1. Provide lintels made from concrete matching concrete masonry units in color, texture, and compressive strength and with reinforcing bars indicated or required to support loads indicated. Cure precast lintels by the same method used for concrete masonry units.
 - 2. Provide prefabricated or built-in-place masonry lintels. Use specially formed bond beam units with reinforcing bars placed as indicated and filled with coarse grout. Cure precast lintels before handling and installing. Temporarily support built-in-place lintels until cured.
 - 3. Provide either of above at Contractor's option or provide precast or formed-in-place concrete lintels complying with requirements in Division 3 Section "Cast-in-Place Concrete."
- B. Provide minimum bearing of 8 inches at each jamb, unless otherwise indicated.

3.9 REINFORCED UNIT MASONRY INSTALLATION

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- A. Temporary Formwork and Shores: Construct formwork and shores to support reinforced masonry elements during construction.
 - 1. Construct formwork to conform to shape, line, and dimensions shown. Make it sufficiently tight to prevent leakage of mortar and grout. Brace, tie, and support forms to maintain position and shape during construction and curing of reinforced masonry.
 - 2. Do not remove forms and shores until reinforced masonry members have hardened sufficiently to carry their own weight and other temporary loads that may be placed on them during construction.
- B. Placing Reinforcement: Comply with requirements of ACI 530.1/ASCE 6/TMS 602.
- C. Grouting: Do not place grout until entire height of masonry to be grouted has attained sufficient strength to resist grout pressure.
 - 1. Comply with requirements of ACI 530.1/ASCE 6/TMS 602 for cleanouts and for grout placement, including minimum grout space and maximum pour height.

3.10 FLASHING

- A. Masonry Flashings:
 - 1. Extend flashings horizontally through outer wythe at foundation walls, above ledge or shelf angels and lintels, at bottom of walls, and turn down on outside face to form drip.
 - 2. Turn flashing up minimum 8 inches and bed into mortar joint of masonry.
 - 3. Lap end joints minimum 6 inches and seal watertight.
 - 4. Turn flashing, fold, and seal at corners, bends, and interruptions.

3.11 FIELD QUALITY CONTROL

- A. Owner will engage a qualified independent testing agency to perform field quality-control testing indicated below.
 - 1. Payment for these services will be made by Owner
 - 2. Retesting of materials failing to meet specified requirements shall be done at Contractor's expense.
- B. Mortar properties will be tested per ASTM C 780.
- C. Grout will be sampled and tested for compressive strength per ASTM C 1019.

3.12 REPAIRING, POINTING, AND CLEANING

- A. Remove and replace masonry units that are loose, chipped, broken, stained, or otherwise damaged or that do not match adjoining units. Install new units to match adjoining units; install in fresh mortar, pointed to eliminate evidence of replacement.
- B. Pointing: During the tooling of joints, enlarge voids and holes, except weep holes, and completely fill with mortar. Point up joints, including corners, openings, and adjacent construction, to provide a neat, uniform appearance. Prepare joints for sealant application.
- C. In-Progress Cleaning: Clean unit masonry as work progresses by dry brushing to remove mortar fins and smears before tooling joints.
- D. Final Cleaning: After mortar is thoroughly set and cured, clean exposed masonry as follows:

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1. Remove large mortar particles by hand with wooden paddles and nonmetallic scrape hoes or chisels.
2. Test cleaning methods on sample wall panel; leave one-half of panel uncleaned for comparison purposes. Obtain Architect's approval of sample cleaning before proceeding with cleaning of masonry.
3. Clean concrete masonry by cleaning method indicated in NCMA TEK 8-2 applicable to type of stain on exposed surfaces.

3.13 MASONRY WASTE DISPOSAL

- A. Recycling: Unless otherwise indicated, excess masonry materials are Contractor's property. At completion of unit masonry work, remove from Project site.
- B. Disposal as Fill Material: Dispose of clean masonry waste, including broken masonry units, waste mortar, and excess or soil-contaminated sand, by crushing and mixing with fill material as fill is placed.
 1. Crush masonry waste to less than 4 inches in each dimension.
 2. Mix masonry waste with at least two parts of specified fill material for each part of masonry waste. Fill material is specified in Division 2.
 3. Do not dispose of masonry waste as fill within 18 inches of finished grade.
- C. Excess Masonry Waste: Remove excess, clean masonry waste that cannot be used as fill, as described above, and other masonry waste, and legally dispose of off Owner's property.

END OF SECTION

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SECTION 051200

STRUCTURAL STEEL

PART 1 GENERAL

1.1 SUMMARY

- A. Section includes structural steel framing members; base or bearing plates; anchor bolts for structural steel; beams, columns; connecting materials for framing structural steel to structural steel; bolts; fasteners for connecting structural steel items; lintels; and grouting under base plates.

1.2 REFERENCES

- A. American Institute of Steel Construction:
1. AISC S303 - Code of Standard Practice for Steel Buildings and Bridges.
- B. American Society for Testing and Materials:
1. ASTM A36/A36M - Standard Specification for Carbon Structural Steel.
 2. ASTM A53 - Standard Specification for Pipe, Steel, Black and Hot-Dipped, Zinc-Coated, Welded and Seamless.
 3. ASTM A123/A123M - Standard Specification for Zinc (Hot-Dip Galvanized) Coatings on Iron and Steel Products.
 4. ASTM A153/A153M - Standard Specification for Zinc Coating (Hot-Dip) on Iron and Steel Hardware.
 5. ASTM A242/A242M - Standard Specification for High-Strength Low-Alloy Structural Steel.
 6. ASTM A307 - Standard Specification for Carbon Steel Bolts and Studs, 60 000 PSI Tensile Strength.
 7. ASTM A325 - Standard Specification for Structural Bolts, Steel, Heat Treated, 120/105 ksi Minimum Tensile Strength.
 8. ASTM A449 - Standard Specification for Quenched and Tempered Steel Bolts and Studs.
 9. ASTM A490 - Standard Specification for Heat-Treated Steel Structural Bolts, 150 ksi Minimum Tensile Strength.
 10. ASTM A490M - Standard Specification for High-Strength Steel Bolts, Classes 10.9 and 10.9.3, for Structural Steel Joints (Metric).
 11. ASTM A500 - Standard Specification for Cold-Formed Welded and Seamless Carbon Steel Structural Tubing in Rounds and Shapes.
 12. ASTM A501 - Standard Specification for Hot-Formed Welded and Seamless Carbon Steel Structural Tubing.
 13. ASTM A514/A514M - Standard Specification for High-Yield-Strength, Quenched and Tempered Alloy Steel Plate, Suitable for Welding.
 14. ASTM A529/A529M - Standard Specification for High-Strength Carbon-Manganese Steel of Structural Quality.
 15. ASTM A563 - Standard Specification for Carbon and Alloy Steel Nuts.
 16. ASTM A563M - Standard Specification for Carbon and Alloy Steel Nuts (Metric).

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17. ASTM A568/A568M - Standard Specification for Steel, Sheet, Carbon, and High-Strength, Low-Alloy, Hot-Rolled and Cold-Rolled, General Requirements for.
 18. ASTM A572/A572M - Standard Specification for High-Strength Low-Alloy Columbium-Vanadium Structural Steel.
- C. American Welding Society:
1. AWS A2.4 - Standard Symbols for Welding, Brazing, and Nondestructive Examination.
 2. AWS D1.1 - Structural Welding Code - Steel.
- D. Research Council on Structural Connections:
1. RCSC - Specification for Structural Joints Using ASTM A325 or A490 Bolts.
- E. SSPC: The Society for Protective Coatings:
1. SSPC - Steel Structures Painting Manual.
- F. Underwriters Laboratories Inc.:
1. UL - Fire Resistance Directory.
- G. Warnock Hersey:
1. WH - Certification Listings.

1.3 SUBMITTALS

- A. Shop Drawings: Submit detailed Drawings including:
1. Reference Contract Drawing numbers and relevant Addendum numbers on each Shop Drawing.
 2. Shop erection details shall include connections, holes, bolts, and other pertinent information.
 3. Material, including ASTM designations and grades or manufacturer's data as appropriate.
 4. Welds with size, length, and type.
 5. Location of shop-welded masonry anchors and anchor rods.
 6. Connections: Submit proposed connection types and calculations for review.
- B. Certifications: Submit certification from independent agency verifying all structural connections in the field.

1.4 QUALITY ASSURANCE

- A. Comply with latest editions of:
1. American Institute of Steel Construction (AISC) Publications:
 - a. Manual of Steel Construction (*Allowable Stress Design or Load and Resistance Factor Design*).
(Includes *Specification for Structural Steel Buildings, Code of Standard Practice for Steel Buildings and Bridges, Specification for Structural Joints Using ASTM A 325 or A 490 Bolts, LRFD Specification for Steel Hollow Structural Sections, LRFD Specification for Single-Angle Members.*)

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- b. Manual of Steel Construction, Volume II, Connections.
 - c. Hollow Structural Sections Connections Manual (includes *AISC Specification for the Design of Steel Hollow Structural Sections*).
 - d. *Allowable Stress Design of Simple Shear Connections, or Load and Resistance Factor Design of Simple Shear Connections*.
- 2. American Welding Society, Inc.
 - a. *AWS D1.1 Structural Welding Code – Steel*.
 - b. *AWS C5.4 Recommended Practices for Stud Welding*.
 - 3. American Hot-Dip Galvanizers Association, Inc.
 - a. *Inspection Manual for Hot-Dip Galvanized Products*.
 - 4. Steel Structures Painting Council
 - a. *Surface Preparation Specifications*.
- B. Qualifications for Welding Work:
- 1. Certify that welders have satisfactorily passed AWS qualification tests within the previous year.
 - 2. Qualify welding processes and operators in accordance with AWS Standards.
- C. Qualifications for Fabricator, Detailer, and Erector:
- 1. Fabricator, Detailer, and Erector of structural steel shall have a minimum of 2 years experience in fabrication, detailing, and erection of structural steel.

1.5 MATERIAL HANDLING

- A. Store material in horizontal position on supports above ground.
- B. Protect from weather and keep free of dirt and debris.
- C. Handle material carefully so that it is not bent or marred.
- D. Repair or replace damaged materials.

PART 2 PRODUCTS

2.1 MATERIALS

- A. Rolled steel C, MC, S, M and HP Shapes: ASTM A36 unless indicated otherwise on drawings.
- B. Rolled Steel Plates, Bars, and Angles: ASTM A36/A36M.
- C. Hollow Structural Sections (HSS): ASTM A500, Grade B or C.
- D. Rolled Steel with Shapes: ASTM A992.
- E. Steel Pipe: ASTM A53, Type E or S, Grade B.
- F. Anchor Rods: ASTM F 1554 Grade 36 unless noted as stainless Steel (306) or galvanized.

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- G. Nuts: ASTM A563 Grade and finish to match bolt or rod type.
- H. Washers: ASTM F 436 finish to match bolt or rod type.
- I. Headed Stud Anchors: ASTM A-108 Grade 1010-1020. All arc shield (ferrule) shall be used with each anchor.
- J. Non-Shrink Grout: Corp. of Engineers CRD-C 621. "Sika Grout 212" by Sika Corp.; "NS Grout" by Euclid Chemical Co, or approved equal.
- K. Hot Dipped Galvanizing: Hot-dip galvanize after fabrication in accordance with ASTM A 123. Re-straighten after galvanizing as required.
- L. Cold Galvanizing: Zinc-rich cathodic paint or accepted equivalent. (For touch up of galvanized surfaces).
- M. Bolts: ASTM A325 bolts, galvanized to ASTM A153/A153M for galvanized structural members. Stainless steel where noted.
- N. Welding Materials: AWS D1.1 E70 unless otherwise noted; type required for materials being welded.
- O. Shop and Touch-Up Primer: SSPC 15, Type 1, red oxide.
- P. Touch-Up Primer for Galvanized Surfaces: SSPC 20 Type I Inorganic.

2.2 FABRICATION

- A. Fabricate structural steel in accordance with reviewed Shop Drawings and referenced standards.
- B. Shop fabricate and assemble structural material where possible.
- C. Provide holes for securing other work to structural steel framing. Cut, drill, or punch holes perpendicular to metal surfaces. Do not flame-cut holes or enlarge holes by burning. Drill holes in base and bearing plates more than 3/4-inch thick.
- D. Finish bottom of column and weld to base plate.
- E. Use leveling plates 1/4 inch thick which are flat.

2.3 SHOP PAINTING

- A. Shop-paint structural steel that will remain exposed to view in final Work. Do not paint those members or portions of members to be concealed, or embedded in concrete or mortar unless noted otherwise on drawings.
- B. Do not paint surfaces within 3 inches of field welds.

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- C. Apply two coats of paint or galvanizing paint to surfaces that will be inaccessible after assembly or erection.
- D. For steel to be hot-dip galvanized, immerse steel in chemical baths of caustic cleaning, pickling, and flux.
- E. Immediately after surface preparation, apply structural steel primer paint in accordance with manufacturer's instructions. Provide full coverage of joints, corners, edges, and exposed surfaces.

2.4 CONNECTIONS

- A. Use connections which are published by AISC.
- B. Bolt field connections unless noted otherwise or where bolting is not possible.
- C. Eccentric connections are permitted if shown on Drawings or accepted by Engineer.
- D. Capacity of Beam Connections: For connections not detailed, provide connection capacity of reactions shown on Drawings or, if not shown, based on either Allowable Stress Design or Load and Resistance Factor Design as follows:
 - 1. 50 percent of the allowable uniform load from Allowable Uniform Load Tables in *AISC ASD Manual*, Part 2 for the given steel member.
 - 2. 50 percent of the maximum total factored uniform load from Maximum Total Factored Uniform Load Tables in *AISC LRFD Manual*, Part 5, for the given steel member.
 - 3. Concentrated loads closer than 1/8 of the member span to the support must be added to the loads as calculated above.
- E. Use AISC single-plate shear connections for beam connections to face of tubes and column flanges where double angle connections are not possible. Use single angle connections wherever possible, designing plate and connections for loads shown on plans.
- F. Provide snug tight unfinished threaded fasteners for bolted connections unless otherwise indicated.
- G. Provide high-strength fasteners for principal bolted connections, unless otherwise indicated.

PART 3 EXECUTION

3.1 EXAMINATION

- A. Section 013000 - Administrative Requirements: Coordination and project conditions.

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3.2 ERECTION

- A. Allow for erection loads, and for sufficient temporary bracing to maintain structure safe, plumb, and in alignment until completion of erection and installation of permanent bracing.
- B. Field connect members with threaded fasteners.
- C. Do not field cut or alter structural members without approval of Architect/Engineer.
- D. After erection, prime welds, abrasions, and surfaces not shop primed, except surfaces to be in contact with concrete.
- E. Grout under base plates. Trowel grouted surface smooth, splay neatly to 45 degrees.
- F. Field connections and framing shall be installed as detailed on the Contract Documents and accepted Shop Drawings. If the Contractor finds that field modifications are necessary, the Contractor shall submit documentation of the proposed field modifications to the Engineer for review.

3.3 ERECTION TOLERANCES

- A. Section 014000 - Quality Requirements: Tolerances.
- B. Maximum Variation From Plumb: $\frac{1}{4}$ inch per story, non-cumulative.
- C. Maximum Offset From Alignment: $\frac{1}{4}$ inch.

3.4 FIELD QUALITY CONTROL

- A. Section 014000 - Quality Requirements: Testing and Inspection Services 017000 - Execution Requirements: Testing, adjusting, and balancing.

END OF SECTION

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SECTION 052100

STEEL JOIST FRAMING

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

- A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 01 Specification Sections, apply to this Section.

1.2 SUMMARY

- A. Section Includes:
 - 1. K-series steel joists.
 - 2. Joist accessories.
- B. Related Requirements:
 - 1. Section 051200 - Structural Steel Framing.

1.3 DEFINITIONS

- A. SJI's "Specifications": Steel Joist Institute's "Standard Specifications, Load Tables and Weight Tables for Steel Joists and Joist Girders."
- B. Special Joists: Steel joists or joist girders requiring modification by manufacturer to support nonuniform, unequal, or special loading conditions that invalidate load tables in SJI's "Specifications."

1.4 ACTION SUBMITTALS

- A. Product Data: For each type of joist, accessory, and product.
- B. Shop Drawings:
 - 1. Include layout, designation, number, type, location, and spacing of joists.
 - 2. Include joining and anchorage details, bracing, bridging, and joist accessories; splice and connection locations and details; and attachments to other construction.
 - 3. Indicate locations and details of bearing plates to be embedded in other construction.

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1.5 INFORMATIONAL SUBMITTALS

- A. Manufacturer certificates.

1.6 QUALITY ASSURANCE

- A. Manufacturer Qualifications: A manufacturer certified by SJI to manufacture joists complying with applicable standard specifications and load tables in SJI's "Specifications.
- B. Welding Qualifications: Qualify field-welding procedures and personnel according to AWS D1.1/D1.1M, "Structural Welding Code - Steel."

1.7 DELIVERY, STORAGE, AND HANDLING

- A. Deliver, store, and handle joists as recommended in SJI's "Specifications.
- B. Protect joists from corrosion, deformation, and other damage during delivery, storage, and handling.

PART 2 - PRODUCTS

2.1 K-SERIES STEEL JOISTS

- A. Manufacturers:
 - 1. Vulcraft Steel Corp.
 - 2. Canam Steel Corp.
 - 3. New Millennium Building Systems.
 - 4. Substitutions or approved equal: Section 01600 – Product Requirements.
- B. Manufacture steel joists of type indicated according to "Standard Specifications for Open Web Steel Joists, K-Series" in SJI's "Specifications," with steel-angle top- and bottom-chord members, underslung ends, and parallel top chord.
 - 1. Joist Type: K-series steel joists.
- C. Provide holes in chord members for connecting and securing other construction to joists.
- D. Camber joists according to SJI's "Specifications."

2.2 PRIMERS

- A. Low-Emitting Materials: Paints and coatings shall comply with the testing and product requirements of the California Department of Health Services' "Standard Practice for the

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Testing of Volatile Organic Emissions from Various Sources Using Small-Scale Environmental Chambers."

- B. Primer: SSPC-Paint 15, or manufacturer's standard shop primer complying with performance requirements in SSPC-Paint 15.

2.3 JOIST ACCESSORIES

- A. Bridging: Provide bridging anchors and number of rows of horizontal or diagonal bridging of material, size, and type required by SJI's "Specifications" for type of joist, chord size, spacing, and span. Furnish additional erection bridging if required for stability.
- B. Carbon-Steel Bolts and Threaded Fasteners: ASTM A 307, Grade A, carbon-steel, hex-head bolts and threaded fasteners; carbon-steel nuts; and flat, unhardened steel washers.
 - 1. Finish: Plain, uncoated.
- C. High-Strength Bolts, Nuts, and Washers: ASTM A 325, Type 1, heavy hex steel structural bolts; ASTM A 563 heavy hex carbon-steel nuts; and ASTM F 436 hardened carbon-steel washers.
 - 1. Finish: Plain.
- D. Welding Electrodes: Comply with AWS standards.
- E. Furnish miscellaneous accessories including splice plates and bolts required by joist manufacturer to complete joist assembly.

2.4 CLEANING AND SHOP PAINTING

- A. Clean and remove loose scale, heavy rust, and other foreign materials from fabricated joists and accessories by hand-tool cleaning, SSPC-SP 2 or power-tool cleaning, SSPC-SP 3.
- B. Apply one coat of shop primer to joists and joist accessories to be primed to provide a continuous, dry paint film not less than 1 mil thick.

PART 3 - EXECUTION

3.1 EXAMINATION

- A. Examine supporting substrates, embedded bearing plates, and abutting structural framing for compliance with requirements for installation tolerances and other conditions affecting performance.
- B. Proceed with installation only after unsatisfactory conditions have been corrected.

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3.2 INSTALLATION

- A. Do not install joists until supporting construction is in place and secured.
- B. Install joists and accessories plumb, square, and true to line; securely fasten to supporting construction according to SJI's "Specifications, joist manufacturer's written recommendations, and requirements in this Section."
 - 1. Before installation, splice joists delivered to Project site in more than one piece.
 - 2. Space, adjust, and align joists accurately in location before permanently fastening.
 - 3. Install temporary bracing and erection bridging, connections, and anchors to ensure that joists are stabilized during construction.
- C. Field weld joists to supporting steel. Coordinate welding sequence and procedure with placement of joists. Comply with AWS requirements and procedures for welding, appearance and quality of welds, and methods used in correcting welding work.
- D. Bolt joists to supporting steel framework using high-strength structural bolts. Comply with Research Council on Structural Connection's "Specification for Structural Joints Using ASTM A 325 or ASTM A 490 Bolts" for high-strength structural bolt installation and tightening requirements.
- E. Install and connect bridging concurrently with joist erection, before construction loads are applied. Anchor ends of bridging lines at top and bottom chords if terminating at walls or beams.

3.3 FIELD QUALITY CONTROL

- A. Testing Agency: Owner will engage a qualified independent testing and inspecting agency to inspect field welds and bolted connections and to perform field tests and inspections and prepare test and inspection reports.
- B. Visually inspect field welds according to AWS D1.1/D1.1M.
 - 1. In addition to visual inspection, test field welds according to AWS D1.1/D1.1M and the following procedures, as applicable:
 - a. Liquid Penetrant Inspection: ASTM E 165.
 - b. Magnetic Particle Inspection: ASTM E 709.
 - c. Ultrasonic Testing: ASTM E 164.
 - d. Radiographic Testing: ASTM E 94.
- C. Visually inspect bolted connections.
- D. Correct deficiencies in Work that test and inspection reports have indicated are not in compliance with specified requirements.

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- E. Perform additional testing to determine compliance of corrected Work with specified requirements.

3.4 PROTECTION

- A. Touchup Painting: After installation, promptly clean, prepare, and prime or reprime field connections, rust spots, and abraded surfaces of prime-painted joists, abutting structural steel, and accessories.
 - 1. Clean and prepare surfaces by hand-tool cleaning according to SSPC-SP 2, or power-tool cleaning according to SSPC-SP 3.
 - 2. Apply a compatible primer of same type as primer used on adjacent surfaces.
- B. Provide final protection and maintain conditions, in a manner acceptable to manufacturer and installer, that ensure joists and accessories are without damage or deterioration at time of Substantial Completion.

END OF SECTION

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SECTION 053123

STEEL ROOF DECKING

PART 1 GENERAL

1.1 SUMMARY

- A. Section Includes:
 - 1. Steel roof decks and accessories.
 - 2. Formed steel edge closure strips.

1.2 REFERENCES

- A. ASTM A36/A36M - Carbon Structural Steel.
- B. ASTM A446 - Steel Sheet, Zinc-Coated (Galvanized) by the Hot-Dip process, Structural (Physical) Quality.
- C. ASTM A525 - Steel Sheet, Zinc-Coated, Galvanized by the Hot-Dip Process.
- D. ASTM A611 - Steel, Cold-Rolled Sheet, Carbon, Structural.
- E. AWS D1.1 (American Welding Society) - Structural Welding Code.
- F. SDI (Steel Deck Institute) - Design Manual for Composite Decks, Form Decks, Roof Decks, Cellular Metal Floor Deck with Electrical Distribution.
- G. SSPC (Steel Structures Painting Council) - Painting Manual. SSPC Paint No. 15, Steel Joist Shop Paint Type 1, red oxide; SSPC-20, Type I - Inorganic; and SSPC-20, Type II - Organic.

1.3 SUBMITTALS

- A. Shop Drawings: Indicate deck plan, support locations, Projections, openings and reinforcement, pertinent details, and accessories.
- B. Product Data: Submit deck profile characteristics and dimensions, structural properties, finishes.

1.4 DELIVERY, STORAGE, AND HANDLING

- A. Section 016000 - Product Requirements: Product storage and handling requirements.
- B. Cut plastic wrap to encourage ventilation.
- C. Separate sheets and store deck on dry wood sleepers; slope for positive drainage.

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PART 2 PRODUCTS

2.1 MATERIALS

- A. Manufacturers:
 - 1. United Steel Deck.
 - 2. Vulcraft Steel Deck.
 - 3. Wheeling Corrugating Co.
- B. Sheet Steel: ASTM A653, Grade A Structural Quality; with G90 galvanized coating conforming to ASTM A525.
- C. Bearing Plates and Angles: ASTM A36 steel, unfinished.
- D. Welding Materials: AWS D1.1.
- E. Touch-Up Primer for Galvanized Surfaces: SSPC 20 Type I – Inorganic.

2.2 FABRICATION

- A. Metal Deck: Sheet steel, configured as follows:
 - 1. Span Design: Single.
 - 2. Minimum Metal Thickness Excluding Finish: 18 gauge = .0475”.
 - 3. Minimum Section Properties (per foot width): S= .480 in³, I= .517 in⁴.
 - 4. Nominal Height: 1½”.
 - 5. Formed Sheet Width: 36”.
 - 6. Side Joints: lapped 2 flutes.
 - 7. Span: (2) Bays minimum or provide shoring.
- B. Related Deck Accessories: Metal closure strips.

PART 3 EXECUTION

3.1 EXAMINATION

- A. Section 013000 - Administrative Requirements: Coordination and project conditions.

3.2 INSTALLATION

- A. Erect metal deck in accordance with SDI Manual.
- B. Bear deck on steel supports with 2 ½ inch minimum bearing. Align and level.
- C. Fasten deck to steel support members at ends and intermediate supports with mechanical fasteners at 12 inches o.c. maximum, parallel with deck flute and at every other transverse flute.
- D. Mechanically fasten male/female side laps at 24 inches o.c. maximum or weld male/female side laps at 18 inches o.c. maximum.

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- E. Install sheet steel closures and angle flashings to close openings between deck and walls, columns, and openings.
- F. Immediately after welding deck and other metal components in position, coat welds, burned areas, and damaged surface coating, with touch-up prime paint.

END OF SECTION

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SECTION 054000

COLD-FORMED METAL FRAMING

PART 1 GENERAL

1.1 SUMMARY

- A. Section includes cold formed metal channels, rafters, joists, outriggers, studs, and miscellaneous framing.

1.2 REFERENCES

- A. American Iron and Steel Institute:
 - 1. AISI - Residential Steel Framing Manual.
 - 2. AISI SG-973 - Cold-Formed Steel Design Manual.
- B. American Society for Testing and Materials:
 - 1. ASTM A123/A123M - Standard Specification for Zinc (Hot-Dip Galvanized) Coatings on Iron and Steel Products.
 - 2. ASTM A570/A570M - Standard Specification for Steel, Sheet and Strip, Carbon, Hot-Rolled, Structural Quality.
 - 3. ASTM A611 - Standard Specification for Steel, Sheet, Carbon, Cold-Rolled, Structural Quality.
 - 4. ASTM A653/A653M - Standard Specification for Steel Sheet, Zinc-Coated (Galvanized) or Zinc-Iron Alloy-Coated (Galvannealed) by the Hot-Dip Process.
 - 5. ASTM C955 - Standard Specification for Load-Bearing (Transverse and Axial) Steel Studs, Runners (Tracks), and Bracing or Bridging for Screw Application of Gypsum Panel Products and Metal Plaster Bases.
- C. American Welding Society:
 - 1. AWS D1.1 - Structural Welding Code - Steel.
 - 2. AWS D1.3 - Structural Welding Code - Sheet Steel.
- D. National Association of Architectural Metal Manufacturers:
 - 1. NAAMM ML/SFA 540 - Lightweight Steel Framing Systems Manual.
- E. SSPC: The Society for Protective Coatings:
 - 1. SSPC Paint 15 - Steel Joist Shop Paint.
 - 2. SSPC Paint 20 - Zinc-Rich Primers (Type I - Inorganic and Type II - Organic).

1.3 SUBMITTALS

- A. Product Data: Submit data on standard framing members; describe materials and finish, and product criteria.

PART 2 PRODUCTS

2.1 COLD-FORMED METAL FRAMING

- A. Manufacturers:
 - 1. Clark Steel Framing Systems.
 - 2. Marino\Ware.

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3. Unimast Incorporated.

2.2 FRAMING MATERIALS

- A. Framing Materials: Roll from new sheet steel; cold reduction steels not being acceptable.
1. For 16-gauge and heavier members: Fabricate metal framing components using steel with a minimum yield point of 50,000 psi; ASTM A 653.
 2. For 18-gauge and lighter units: Fabricate metal framing components using steel with a minimum yield point of 33,000 psi; ASTM A 653.
- B. Hat channels: 20 gauge ASTM Grade 33 ksi sheet steel dimensions as indicated on drawings.
- C. Studs: Steel sheet, formed to channel shape, punched web, gage noted on drawings, 2 inch face, depth indicated on drawings.
- D. Joists and Outriggers: Steel sheet, formed to channel shape, solid web, gage noted on drawings, 2 inch face, depth indicated on drawings.
- E. Track: Steel sheet, formed to channel shape; same width and gage as studs and joists, tight fit; solid web.
- F. Bracing, Furring, and Bridging: Same material as stud or joist.

2.3 FASTENERS AND ADHESIVES

- A. Self-drilling, Self-tapping Screws, Bolts, Nuts, and Washers: Steel, hot dip galvanized to ASTM A123/A123M 1.25 oz/sq ft.
- B. Welding: In conformance with AWS D1.1 and AWS D1.3.
- C. Adhesive: Loctite PL400 construction adhesive.

2.4 FINISHES

- A. Galvanize interior framing members to G60 coating class. Galvanize exterior framing members to G90.

PART 3 EXECUTION

3.1 GENERAL

- A. Install metal framing systems according to manufacturers written instructions.

3.2 INSTALLATION OF JOISTS AND RAFTERS

- A. Attach joists securely to supports to prevent lateral movement of bottom flange.
- B. Install horizontal bridging in joist system at mid-span of joists.
- C. Field Painting: Touch up damaged shop-applied protective coatings and welds. Use galvanizing repair paint and system for galvanized surfaces in accordance with ASTM A780.
- D. Fasten rafters with fasteners, hangers, and straps as shown on structural drawings. Provide hangers with allowable loads high enough to resist design loads as shown on structural framing plans.

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3.3 ERECTION OF STUDS

- A. Align floor and ceiling tracks; locate to wall and partition layout. Secure tracks in place with fasteners at maximum 24 inches oc.
- B. Place studs at spacing noted on drawings; not more than 2 inches from abutting walls and at each side of openings. Connect studs to tracks using fastener method.
- C. Construct corners using minimum three studs. Double stud wall openings, door jambs, and window jambs.
- D. Erect load bearing studs one piece full length. Splicing of studs is not permitted.
- E. Erect load bearing studs, brace, and reinforce to develop full strength, to achieve design requirements.
- F. Fully seal axial loaded studs in receiving tracks (maximum 1/16 inch gap between stud and track web).
- G. Coordinate placement of insulation in multiple stud spaces after erection.
- H. Install intermediate studs above and below openings to align with wall stud spacing.
- I. Install studs with deflection allowance in stud track, directly below horizontal building framing at non-load bearing framing.
- J. Attach cross studs to studs for attachment of fixtures anchored to walls.
- K. Install framing between studs for attachment of mechanical and electrical items, and to prevent stud rotation.
- L. Provide rubber grommets where utilities penetrate studs and at punched openings.
- M. Touch-up field welds and damaged (metallic coatings, primed) surfaces with primer to match shop coating.

3.4 BRACING

- A. Diagonal Strapping: Install as shown on drawings at 45 degree angle. Fasten to each stud.

3.5 ERECTION TOLERANCES

- A. Wall Framing: Not more than 1/2" out of plumb in 10'.

END OF SECTION

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SECTION 061000

ROUGH CARPENTRY

PART 1 GENERAL

1.1 SUMMARY

- A. Section includes wood blocking and wall sheathing.

1.2 REFERENCES

- A. American Wood-Preservers' Association:
 - 1. AWWPA C1 - All Timber Products - Preservative Treatment by Pressure Process.
 - 2. AWWPA C20 - Structural Lumber - Fire-Retardant Treatment by Pressure Processes.

1.3 SUBMITTALS

- A. Product Data: Submit technical data on wood preservative.

PART 2 PRODUCTS

2.1 MATERIALS

- A. Lumber Grading Rules: NELMA.
- B. Miscellaneous Framing: No. 2, Southern yellow pine species, construction grade 19 percent maximum moisture content, pressure preservative treatment.
- C. Plywood: DOC PS 1, Exterior, Structural I, C-C Plugged single panels.
 - 1. Span Rating: Not less than 24 o.c.
 - 2. Nominal Thickness: As noted on drawings.
 - 3. Edge Detail: Tongue and groove.
 - 4. Surface Finish: Fully sanded face.

2.2 ACCESSORIES

- A. Fasteners and Anchors:
 - 1. Fasteners: Hot dipped galvanized steel for high humidity and treated wood locations, unfinished steel elsewhere.
 - 2. Anchors: Toggle bolt type for anchorage to hollow masonry. Expansion shield and lag bolt type for anchorage to solid masonry or concrete. Bolt or ballistic fastener for anchorages to steel.

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2.3 FACTORY WOOD TREATMENT

- A. Wood Preservative (Pressure Treatment): AWPAC1 using water borne preservative with 0.25 percent retainage; Non-CCA treated.

PART 3 EXECUTION

3.1 EXAMINATION

- A. Section 013000 - Administrative Requirements: Verification of existing conditions before starting work.
- B. Verify substrate conditions are ready to receive blocking.

3.2 PREPARATION

- A. Coordinate placement of blocking items.

3.3 GENERAL INSTALLATION

- A. Set members level and plumb, in correct position.
- B. Place horizontal members, crown side up.
- C. Space framing and furring 16 inches oc.
- D. Secure sheathing to framing members with ends over firm bearing and staggered.
- E. Install telephone and electrical panel back boards with plywood sheathing material where required. Size back boards 12 inches beyond size of electrical and telephone panel.

3.4 SHEATHING INSTALLATION

- A. General: Comply with applicable recommendations in American Wood Council, "ASD/LRFD Manual for Engineered Wood Construction," 2012 edition for types of structural-use panels and applications indicated.
- B. Do not use materials with defects that impair quality of sheathing or pieces that are too small to use with minimum number of joints or optimum joint arrangement.
- C. Cut panels at penetrations, edges, and other obstructions of work; fit tightly against abutting construction unless otherwise indicated.
- D. Securely attach to substrate by fastening as indicated, complying with the following:
 - 1. ICC-ES ESR-1539 or NES NER-272 for power-driven fasteners.
 - 2. Chapter 23 in ICC's "International Building Code."
- E. Fastening Methods: Fasten panels as indicated below:
 - 1. Wall Sheathing:

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- a. Screw to cold-formed metal framing.
- b. APA recommends spacing panels 1/8 inch apart at edges and ends.
- c. Install fasteners 3/8 inch to 1/2 inch from panel edges.
- d. Space fasteners in compliance with requirements of authority having jurisdiction.

END OF SECTION

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SECTION 071100

DAMPPROOFING

PART 1 GENERAL

1.1 SUMMARY

- A. Section includes cold applied bituminous dampproofing.
- B. Related Sections:
 - 1. Section 072113 - Board Insulation.

1.2 REFERENCES

- A. ASTM International:
 - 1. ASTM D41 - Standard Specification for Asphalt Primer Used in Roofing, Dampproofing, and Waterproofing.
 - 2. ASTM D43 - Standard Specification for Coal Tar Primer Used in Roofing, Dampproofing, and Waterproofing.
 - 3. ASTM D449 - Standard Specification for Asphalt Used in Dampproofing and Waterproofing.
 - 4. ASTM D450 - Standard Specification for Coal-Tar Pitch Used in Roofing, Dampproofing, and Waterproofing.
 - 5. ASTM D1227 - Standard Specification for Emulsified Asphalt Used as a Protective Coating for Roofing.
 - 6. ASTM D3747 - Standard Specification for Emulsified Asphalt Adhesive for Adhering Roof Insulation.
 - 7. ASTM D4586 - Standard Specification for Asphalt Roof Cement, Asbestos-Free.
 - 8. ASTM D5643 - Standard Specification for Coal Tar Roof Cement, Asbestos Free.
- B. National Roofing Contractors Association:
 - 1. NRCA - The NRCA Waterproofing and Dampproofing Manual.

1.3 SUBMITTALS

- A. Section 013300 - Submittal Procedures: Submittal procedures.
- B. Product Data: Submit properties of primer, bitumen, and mastics.

1.4 ENVIRONMENTAL REQUIREMENTS

- A. Section 016000 - Product Requirements.

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PART 2 PRODUCTS

2.1 COMPONENTS

- A. Cold Asphaltic Materials:
 - 1. Asphalt Emulsion: Conforming to ASTM D3747.
 - 2. Asphalt Primer: ASTM D41, compatible with substrate.

2.2 ACCESSORIES

- A. Protection Board: 1/2 inch thick biodegradable hardboard.

PART 3 EXECUTION

3.1 EXAMINATION

- A. Section 013000 - Administrative Requirements: Coordination and project conditions.
- B. Verify substrate surfaces are durable, free of matter detrimental to adhesion or application of dampproofing system.
- C. Verify items penetrating surfaces to receive dampproofing are securely installed.

3.2 PREPARATION

- A. Protect adjacent surfaces not designated to receive dampproofing.
- B. Clean and prepare surfaces to receive dampproofing.
- C. Do not apply dampproofing to surfaces unacceptable to manufacturer.
- D. Apply mastic to seal penetrations, small cracks, or minor honeycomb in substrate.

3.3 APPLICATION

- A. Prime surfaces in accordance with NRCA - Waterproofing Manual.
- B. Apply cold bitumen with mop, roller, by spray application, or by trowel.
- C. Apply bitumen at temperature limited by equiviscous temperature (EVT) plus or minus 25 degrees F; do not exceed finish blowing temperature for four hours.
- D. Apply bitumen in one coat, continuous and uniform, at rate recommended by manufacturer.
- E. Apply from 2 inches below finish grade elevation to top of footings.
- F. Seal items Projecting through dampproofing surface with mastic. Seal watertight.

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- G. Adhere protection board to substrate to tacky dampproofing surface. Scribe and cut boards around Projections, penetrations, and interruptions.
- H. Immediately backfill against dampproofing to protect from damage.

3.4 SCHEDULES

- A. Foundation Wall: One coating of asphalt dampproofing.

END OF SECTION

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SECTION 072113

BOARD INSULATION

PART 1 GENERAL

1.1 SUMMARY

- A. Section includes board insulation at perimeter foundation wall, under floor slab, over exterior walls and ceilings.

1.2 REFERENCES

- A. ASTM C578 - Preformed, Cellular Polystyrene Thermal Insulation.
- B. ASTM C1289 – Polyisocyanurate Board Insulation.

1.3 SUBMITTALS

- A. Product Data: Submit data on product characteristics, performance criteria, limitations, adhesives.

1.4 ENVIRONMENTAL REQUIREMENTS

- A. Section 016000 - Product Requirements.
- B. Do not install adhesives when temperature or weather conditions are detrimental to successful installation.

1.5 QUALITY ASSURANCE

- A. Insulation Installed in Concealed Locations Surface Burning Characteristics:
 - 1. Foam Plastic Insulation: Maximum 75/450 flame spread/smoke developed index when tested in accordance with ASTM E84.
 - 2. Other Insulation: maximum 25/450 flame spread/smoke developed index when tested in accordance with ASTM E84.
- B. Insulation Installed in Exposed Locations Surface Burning Characteristics: Maximum 25/450 flame spread/smoke developed index when tested in accordance with ASTM E84.
 - 1. Mezzanine Floor Insulation: Minimum 0.12 watt per sq cm critical radiant flux when tested in accordance with ASTM E970 and manufactured/tested for exposure without a thermal barrier.
- C. Apply label from agency approved by authority having jurisdiction to identify each foam plastic insulation board.

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PART 2 PRODUCTS

2.1 BOARD INSULATION

- A. Manufacturers:
1. Johns Manville Corporation.
 2. Dow Chemical.
 3. Tenneco Foam Products.
 4. UC Industries/Owens Corning.
 5. Celetex Corporation.
 6. Substitutions or approved equal: Section 016000 - Product Requirements.

2.2 COMPONENTS

- A. Type - Extruded Polystyrene Insulation (XPS): ASTM C578 Type VI; cellular type, conforming to the following:
1. Board Size: 24 x 96 inch or 48" x 96".
 2. Board Thickness: As noted on drawings.
 3. Thermal Resistance: R of 5.0 per inch.
 4. Water Absorption: In accordance with ASTM D2842 0.3 percent by volume maximum.
 5. Compressive Strength: Minimum 25 psi.
 6. Board Edges: Tongue and groove edges for below grade.
- B. Type - Polyisocyanurate Board Insulation: ASTM C1289, rigid board, conforming to the following: (Polyiso)
1. Board size: 24 x 96 inches.
 2. Thickness: As noted on drawings.
 3. Facing: Factory applied aluminum foil one side.
 4. Thermal resistance: R of 6.5 per inch.
 5. Water absorption: less than 1 ½% by volume.

2.3 ACCESSORIES

- A. Adhesive: Type recommended by insulation manufacturer for application.
- B. Joint Reinforcement: Foil tape.

PART 3 EXECUTION

3.1 EXAMINATION

- A. Section 013000 - Administrative Requirements: Coordination and project conditions.
- B. Verify substrate, adjacent materials, and insulation boards are dry and ready to receive insulation and adhesive.
- C. Verify substrate surface is flat, free of honeycomb, fins, irregularities, materials or substances affecting adhesive bond.

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3.2 INSTALLATION - FOUNDATION PERIMETER

- A. Apply Type 1 adhesive in three continuous beads per board length to full bed 1/8 inch thick.
- B. Install boards on foundation wall horizontally.
 - 1. Place boards in method to maximize contact bedding.
 - 2. Stagger end joints.
 - 3. Butt edges and ends tight to adjacent board and to protrusions.
- C. Cut and fit insulation tight to protrusions or interruptions to insulation plane.

3.3 INSTALLATION – WALLS

- A. Install boards vertically, fit tight, and secured to walls with adhesive and with Z channels.
- B. Place boards in method to maximize contact bedding. Stagger end joints. Butt edges and ends tight to adjacent board and to protrusions.
- C. Cut and fit insulation tight to protrusions.
- D. Tape all joints with foil tape.

3.4 PROTECTION OF INSTALLED CONSTRUCTION

- A. Section 017000 - Execution Requirements: Protecting installed construction.
- B. Do not permit work to be damaged prior to covering insulation.

3.5 SCHEDULE

Extruded Polystyrene (XPS)	Below Grade. (foundation)
Polyisocyanurate (Polyiso)	All other locations. (walls)

END OF SECTION

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SECTION 072130

BATT INSULATION

PART 1 GENERAL

1.1 SUMMARY

- A. Section includes batt insulation and vapor retarder in exterior wall and ceiling roof construction; and batt insulation for filling perimeter window and door shim spaces, crevices in exterior wall and roof.
- B. Related Sections:
 - 1. Section 072700 - Air Barriers: Air barrier materials adjacent to insulation.
 - 2. Section 072113 - Board Insulation.

1.2 REFERENCES

- A. ASTM International:
 - 1. ASTM C665 - Standard Specification for Mineral-Fiber Blanket Thermal Insulation for Light Frame Construction and Manufactured Housing.
 - 2. ASTM E84 - Standard Test Method for Surface Burning Characteristics of Building Materials.
- B. National Fire Protection Association:
 - 1. NFPA 255 - Standard Method of Test of Surface Burning Characteristics of Building Materials.
- C. Underwriters Laboratories Inc.:
 - 1. UL 723 - Tests for Surface Burning Characteristics of Building Materials.

1.3 SYSTEM DESCRIPTION

- A. Materials of This Section: Provide continuity of thermal barrier at building enclosure elements.

1.4 SUBMITTALS

- A. Product Data: Submit data on product characteristics, performance criteria, limitations.

1.5 COORDINATION

- A. Section 013000 - Administrative Requirements: Coordination and project conditions.

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PART 2 PRODUCTS

2.1 BATT INSULATION

- A. Manufacturers:
 - 1. CertainTeed Insulation Model.
 - 2. Johns Manville Model.
 - 3. Owens Corning Fiberglas Model.
 - 4. U.S. Gypsum Co. Thermafiber LLC Model.
- B. Substitutions or approved equal: Section 016000 - Product Requirements

2.2 COMPONENTS

- A. Batt Insulation: ASTM C665; preformed glass fiber batt; friction fit, conforming to the following:
 - 1. Batt Roll Size: thickness as noted.
 - 2. Facing: Faced on one side with asphalt treated Kraft paper.
 - 3. Flame/Smoke Properties: in accordance with ASTM E84.
- B. Sheet Vapor Retarder: Polyethylene film reinforced with glass fiber square mesh, 10 mil thick.
- C. Staples: Steel wire; galvanized; type and size to suit application.
- D. Tape: Polyethylene self-adhering type, 2 inch wide.

PART 3 EXECUTION

3.1 EXAMINATION

- A. Section 013000 - Administrative Requirements: Coordination and project conditions.
- B. Verify substrate, adjacent materials, and insulation are dry and ready to receive insulation.

3.2 INSTALLATION

- A. Install in exterior walls roof and ceiling spaces without gaps or voids. Do not compress insulation.
- B. Trim insulation neatly to fit spaces. Insulate miscellaneous gaps and voids.
- C. Fit insulation tight in spaces and tight to exterior side of mechanical and electrical services within plane of insulation.

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- D. Install with factory applied vapor retarder membrane facing warm side of building spaces. Lap ends and side flanges of membrane over framing members.
- E. Staple facing flanges in place at maximum 6 inches oc.
- F. Tape seal butt ends, lapped flanges, and tears or cuts in membrane.
- G. Wood Framing: Place vapor retarder on warm side of insulation by stapling at 6 inches oc. Lap and seal sheet retarder joints over member face.
- H. Extend vapor retarder tight to full perimeter of adjacent window and door frames and other items interrupting plane of membrane. Tape seal in place.

END OF SECTION

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SECTION 072600

VAPOR RETARDERS

PART 1 GENERAL

1.1 SUMMARY

- A. Section includes sheet and sealant materials for controlling vapor diffusion.

1.2 REFERENCES

- A. ASTM International:
 - 1. ASTM C920 - Standard Specification for Elastomeric Joint Sealants.
 - 2. ASTM E96 - Standard Test Methods for Water Vapor Transmission of Materials.
- B. Sealant, Waterproofing and Restoration Institute:
 - 1. SWRI - Sealant Specification.

1.3 PERFORMANCE REQUIREMENTS

- A. Vapor Retarder Permeance: Maximum 1 perm when tested in accordance with ASTM E96, Procedure A.

1.4 SUBMITTALS

- A. Section 013300 - Submittal Procedures: Submittal procedures.
- B. Product Data: Submit data indicating material characteristics, performance criteria and limitations.

1.5 QUALITY ASSURANCE

- A. Perform Work in accordance with SWRI - Sealant and Caulking Guide Specification requirements for materials and installation.

1.6 MOCKUP

- A. Section 014000 - Quality Requirements: Requirements for mockup.

1.7 SEQUENCING

- A. Section 011000 - Summary: Work sequence.
- B. Do not install vapor retarder until items penetrating vapor retarder are in place.

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PART 2 PRODUCTS

2.1 VAPOR RETARDERS

- A. Manufacturers:
 - 1. Alumiseal Corp.
 - 2. Fiberweb Corp.
 - 3. Fi-Foil Co., Inc.
 - 4. Fortifiber Corp.
 - 5. Griffolyn, Reef Industries.
 - 6. Lamtec Corp.
 - 7. Raven Industries.
 - 8. Substitutions: Section 016000 - Product Requirements.

2.2 COMPONENTS

- A. Sheet Retarder: White polyethylene film reinforced with glass fiber square mesh, .008 mil thick.
- B. Sealant: Type specified in Section 079000.
- C. Primer and Backer Rods: Recommended by sealant manufacturer to suit application.
- D. Cleaner: Non-corrosive type; recommended by sealant manufacturer; compatible with adjacent materials.
- E. Adhesive: Compatible with sheet retarder and substrate, permanently non-curing.

2.3 ACCESSORIES

- A. Thinner and Cleaner for Sheet: As recommended by sheet material manufacturer.
- B. Tape: Polyethylene or Polyester self-adhering type, mesh reinforced, 2 inch wide, compatible with sheet material.

PART 3 EXECUTION

3.1 PREPARATION

- A. Remove loose or foreign matter capable of impairing adhesion.
- B. Clean and prime substrate surfaces to receive adhesive and sealants.

3.2 INSTALLATION

- A. Vapor Retarder For Stud Framed Walls: Secure sheet retarder to stud faces with adhesive. Lap edges over stud faces, lap ends onto adjacent construction; calk ends with sealant to ensure complete seal.

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- B. Vapor Retarder Seal For Openings: Install sheet retarder between window and door frames and adjacent vapor retarder and seal with sealant or adhesive. Calk with sealant to ensure complete seal. Position laps over firm bearing.
- C. Apply sealant within recommended application temperature ranges. Consult manufacturer when sealant cannot be applied within these temperature ranges or where compatibility with adjacent materials may be in doubt.

END OF SECTION

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SECTION 072700

AIR BARRIERS

PART 1 GENERAL

1.1 SUMMARY

- A. Section includes air leakage criteria for primary air seal building enclosure materials and assemblies; materials and installation methods supplementing air seal materials and assemblies; and air seal materials to connect and seal openings, joints, and junctions between other air seal materials and assemblies.

1.2 REFERENCES

- A. ANSI A58.1 - Minimum Design Loads For Buildings and Other Structures.
- B. ASTM A123 - Zinc (Hot-Dip Galvanized) Coatings on Iron and Steel Products.
- C. ASTM C920 - Elastomeric Joint Sealants.
- D. ASTM E283 - Test Method for Determining Rate of Air Leakage Through Exterior Windows, Curtain Walls and Doors Under Specified Pressure Differences Across the Specimen.
- E. ASTM E330 - Structural Performance of Exterior Windows, Curtain Walls, and Doors by Uniform Static Air Pressure Difference.
- F. SWRI (Sealant, Waterproofing and Restoration Institute) - Sealant and Caulking Guide Specification.

1.3 DEFINITIONS

- A. Air Barrier: Continuous network of materials and joints providing air tightness, with adequate strength and stiffness to not deflect excessively under air pressure differences, to which it will be subjected in service. It can be comprised of single material or combination of materials to achieve performance requirements.

1.4 DESIGN REQUIREMENTS

- A. Perform design work in accordance with ANSI A58.1.

1.5 SUBMITTALS

- A. Product Data: Submit data on material characteristics, performance criteria, limitations.

1.6 ENVIRONMENTAL REQUIREMENTS

- A. Section 016000 - Product Requirements.

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- B. Maintain temperature and humidity recommended by materials manufacturers before, during and after installation.

1.7 COORDINATION

- A. Section 013000 - Administrative Requirements: Coordination and project conditions.
- B. Coordinate the Work of this section with sections referencing this section.

PART 2 PRODUCTS

2.1 AIR BARRIERS

- A. Manufacturers:
 - 1. Dupont Tyvek – “Commercial Wrap”.
 - 2. Innovative Energy.
 - 3. Substitutions or approved equal: Section 016000 - Product Requirements.
- B. Product Description:
 - 1. ASTM E-1677 Type 1.
 - 2. Non woven, non perforated, breathable building wrap.

2.2 ACCESSORIES

- A. Tape: Polyethylene self adhering type, mesh reinforced, 50 mm wide, compatible with sheet material.

PART 3 EXECUTION

3.1 INSTALLATION

- A. Install air barrier to maintain continuity across different substrates and interface with construction.
- B. Install over wood sheathing.
- C. Install at other locations noted on drawings in Buildings A and D.

3.2 PROTECTION OF INSTALLED CONSTRUCTION

- A. Section 017000 - Execution Requirements: Protecting installed construction.
- B. Do not permit adjacent work to damage work of this section.

END OF SECTION

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SECTION 074600

VINYL SIDING

PART 1 GENERAL

1.1 SUMMARY

- A. Section includes prefinished plastic siding for walls, related trim, flashings, accessories, and fastenings.

1.2 SUBMITTALS

- A. Product Data: Submit data indicating materials, component profiles, fastening methods, jointing details, sizes, surface texture, finishes, and accessories.

1.3 WARRANTY

- A. Furnish five year manufacturer's warranty for siding, including deterioration of finish for factory prefinished products.

PART 2 PRODUCTS

2.1 SIDING

- A. Product Description: Furnish prefinished vinyl siding and associated trim/moldings (match existing).

2.2 COMPONENTS

- A. Extruded Polyvinyl Chloride (PVC): ASTM D3679; minimum 0.035 inches thick; without integral backing material; match existing size, color, and profile.

2.3 ACCESSORIES

- A. Nails or Screws: Hot dipped galvanized or Aluminum type, non-staining, prefinished to match siding finish.
 - 1. Vinyl Siding Nails: Minimum 0.313 inch diameter head and 0.125 inch shank diameter; length required to penetrate support minimum 0.75 inch.
- B. Flashings: 28 gage thick metal or plastic to match siding.
- C. Accessory Components: Starter strips, trim, and corner boards; of same material and finish as siding.

2.4 FABRICATION

- A. Panel Siding: Shall match existing.

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2.5 SHOP FINISHING

- A. Pre-finish Color: Match Existing.

PART 3 EXECUTION

3.1 INSTALLATION

- A. Install vinyl siding in accordance with ASTM D4756 and manufacturer's instructions.
- B. Install one layer of air barrier horizontally on sheathed walls. Weather lap edges and ends. Staple in place.
 - Nail vinyl siding into solid backing.
 - 1. Horizontal Siding: Space fasteners maximum 16 inches horizontally and 12 inches vertically.
- C. Nail to aligned pattern. Blind nail except on overtrim.
- D. Install siding for natural watershed.
- E. Align level, and plumb. Locate cut board edges and ends over bearing.
- F. Install metal flashings at internal and external corners, sills, head of wall openings, and horizontal joints of sheet materials.
- G. Install corner strips, closures, trim, and battens.
- H. Install sealant to prevent weather penetration. Maintain neat appearance.
- I. Touch-up damaged prefinished paint surfaces.

END OF SECTION

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SECTION 075303

SINGLE PLY MEMBRANE ROOFING SYSTEM

PART 1 GENERAL

1.1 GENERAL NOTES

- A. Contractor will perform all work by competent, trained, and properly equipped personnel in strict accordance with good roofing practices and applicable industry standards.
- B. Contractor will observe all published safety prevention policies and practices relating to application of roofing system and related work. All federal, state, and local codes shall be followed.
- C. Contractor will follow application, safety, etc. information as published in the most current edition of the Roofing System Technical Specifications.

1.2 WORK INCLUDED

- A. Work under this section covers the installation of a new insulated membrane Roofing System consisting of a fully adhered 60-mil EPDM system on

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In addition, contractor shall include all related items of work as noted herein or indicated on the drawings or otherwise required to complete the specified elements of work and provide the necessary warranties for this work.

- B. Maintain existing structure in weather tight condition at end of each workday.

1.3 SECTION INCLUDES

- A. Substrate preparation.
- B. Wood nailer installation.
- C. Membrane installation.
- D. Membrane flashing installation.

1.4 RELATED SECTIONS

- A. Section 076200 - Sheet Metal Flashing and Trim.
- B. Section 077140 - Gutters and Downspouts
- C. Section 079000 - Joint Sealers.

Single Ply Membrane Roofing System
075303

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1.5 DEFINITIONS

- A. Roofing Terminology: Refer to ASTM D1079 for definition of terms related to roofing work not otherwise defined in the section.
- B. American Society for Testing and Materials (ASTM): 1916 Race St., Philadelphia, PA 19103.

1.6 SYSTEM DESCRIPTION

- A. 60 mil EPDM elastomeric sheet roofing that is adhered to insulation boards with bonding adhesive.

1.7 SUBMITTALS

- A. Product Data:
 - 1. Submit copies of Technical Information Sheets for all products used on this project.
- B. Shop Drawings: Design, prepare, and submit tapered insulation drawing in compliance with the specifications for review and approval by Architect.
- C. Samples:
 - 1. Submit samples of roof membrane, fasteners, and walkway pads.
- D. Application Information:
 - 1. Submit copy of Roofing System application specification.
 - 2. Submit copy of job related details including flashings, base tie-ins, roof edges, terminations, expansion joints, penetrations, drains, and any other relevant details.
- E. Letter attesting that manufacturer currently licenses roofing contractor.
- F. Pre Installation Notice:
 - 1. Submit copy of Pre Installation Notice that has been accepted and approved by manufacturer.

1.8 QUALITY ASSURANCE

- A. Manufacturer:
 - 1. Company specializing in manufacturing the roofing membrane specified in this Section with ten years of manufacturing experience.
 - 2. System supplier must have ISO 9002 certification.
 - 3. Manufacturer must be able to provide the project with the membrane and Isocyanurate insulation that is produced in their facilities.
- B. Applicator:
 - 1. Shall be a current Contractor certified by manufacturer.
 - 2. Shall have at least five years experience in installing specified system.

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1.9 REGULATORY REQUIREMENTS

- A. Conform to applicable local building code requirements.
- B. Underwriters Laboratories, Inc. (UL): Class A Fire Hazard Classification.
- C. Factory Mutual Corporation (FM): Roof Assembly Classification, FM Construction Bulletin 1-28, and 1-29 meeting minimum requirements of FM (1-90).

1.10 QUALITY INSPECTION/OBSERVATION

- A. Inspection by Manufacturer: Provide a final inspection of the roofing system by a Technical Representative employed by roofing system manufacturer.
 - 1. Technical representative shall not perform any sales functions.
 - 2. Contractor shall complete any necessary repairs required for issuance of warranty.

1.11 PRE-INSTALLATION CONFERENCE

- A. Before start of roofing work, attend a conference to discuss the proper installation of materials. Attendees shall include all parties directly affecting work of this Section.

1.12 DELIVERY, STORAGE AND HANDLING

- A. Deliver products in manufacturer's original containers dry, undamaged, seals and labels intact and legible.
- B. Store all materials clear of ground and moisture with weather protective covering.
- C. Keep all combustible materials away from ALL ignition sources.

1.13 ENVIRONMENTAL REQUIREMENTS

- A. Install roofing membrane only when surfaces are clean, dry, smooth and free of snow or ice.
- B. Do not apply roofing membrane during inclement weather or when ambient conditions will not allow proper application.

1.14 WARRANTY

- A. Type/Term:
 - 1. Provide 20-year Roofing System Warranty. Warranty shall include membrane, roof insulation, membrane accessories and metal edging.
- B. Coverage:
 - 1. Warranty:
 - a. Limit of liability: No Dollar Limitation

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- b. Scope of coverage
Repair any leak in the EPDM Roofing System caused by the ordinary wear and tear of the elements, punctures, rooftop service traffic, winds up to 90 mph, manufacturing defect in materials, and the workmanship used to install these materials.

PART 2 PRODUCTS

2.1 NAILERS FOR FLANGES AND ROOF ACCESSORIES

- A. Description: Structural Grade No. 2 or better Southern Pine, Douglas Fir or Exterior Grade plywood. All wood shall be pressure treated for rot resistance.
 - 1. Nailer width: Minimum 3-1/2 in. (nominal) wide or as wide as the nailing flange of each roof accessory.
 - 2. Nailer thickness: Thickness of roof insulation.
- B. Reference Standards:
 - 1. Southern Pines: PS 20; SPIB Grading Rules.
 - 2. Western Woods: PS 20; WWPA Grading Rules
 - 3. Pressure preservative treatment: AWPB LP2.

2.2 MANUFACTURERS - MEMBRANE MATERIALS

- A. Firestone, Carlisle, or equal, single-ply membrane system: .060 elastomeric sheet roofing that is adhered to acceptable substrate with bonding adhesive.
- B. Approved Equals: See substitutions.

2.3 ELASTOMERIC SHEET ROOFING MEMBRANE

- A. Description: Non-reinforced, cured, synthetic single-ply membrane composed of Ethylene Propylene Diene Terpolymer (EPDM) conforming to the following physical properties:

- 1. Membrane Type: .060" (Alternate: .090")

Property:	Specification:
Specific Gravity	1.15 +/- 0.05
Tensile Strength, Minimum, psi (Mpa)	1600 (11)
Elongation, Minimum, %	465
Tear Resistance, lbf / in (N / M)	200 (933)
Ozone Resistance, 166 hours @ 100 pphm @ 104°F with 50% extension	No Cracks
Heat Aging, 28 days @ 240°F	
Tensile Strength, Minimum psi (Mpa)	1450 (10)
Elongation, Minimum %	280
Brittleness Point, max., °F, (°C)	-49 (-45)
Water Absorption, change in weight after immersion in water for 166 hours @ 158°F, %	+2

Single Ply Membrane Roofing System
075303

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Tolerance On Nominal Thickness, % +/- 10
Water Vapor Permeability, Perm .03

B. Reference Standards:

1. ASTM D4637-96: Standard Specification for EPDM Sheet used in single-ply roof membrane
2. ASTM D297: Methods for Rubber Products, Chemical Analysis.
3. ASTM D412, Die C: Test Methods for Rubber Properties in Tension.
4. ASTM D471: Test Methods for Rubber Property, Effect of Liquids.
5. ASTM D573: Test Method for Rubber, Deterioration in an Air Oven.
6. ASTM D624, Die C: Test Method for rubber property-Tear Resistance
7. ASTM D746: Test Method for Brittleness Temperature of Plastics and Elastomers by Impact.
8. ASTM D751: (Grab Method) Method of Testing Coated Fabrics.
9. ASTM D816: (Modified) Methods of Testing Rubber Cements.
10. ASTM D1149: Test Method for Rubber Deterioration, Surface Ozone Cracking in a Chamber.
11. ASTM D2240: Test Method for Rubber Property - Durometer Hardness.
12. ASTM E96: Test Methods for Water Vapor Transmission of Materials.

2.4 INSULATION PRODUCTS

INSULATION FASTENERS

1. Description: Heavy duty threaded fastener with 3-coat waterborne fluorocarbon polymer coating and drill point tip capable of penetrating 20-gauge steel. Fastener shall meet minimum thread size of .260" and 13 threads per inch. Length shall be sufficient to penetrate deck a minimum of 3/4" for steel.
2. Reference Standard: SAE 1022, Heat Treated
3. Product/Producer:
 - a. Heavy Duty (HD) fasteners.

POLYISOCYANURATE ROOF INSULATION

- A. Description: Tapered (1/4"/ft.) Roof insulation consisting of closed cell polyisocyanurate foam core and a perforated black glass reinforced mat laminated to the face.
1. Thickness: See drawings.
 2. Nominal Size: 48 in. x 48 in.
- B. Reference Standards:
1. ASTM C1289, Type II, Class 1.
 2. ASTM C 209 - Water Absorption.
 3. ASTM E 96 - Water Vapor Transmission of Materials.
 4. ASTM D 1621 - Compressive Strength.
 5. ASTM D 1622 - Density.
 6. ASTM D 2126 - Dimensional Stability.

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2.5 ELASTOMERIC SHEET ROOFING SYSTEM COMPONENTS

A. Roof Flashing:

1. Description: Semi-cured 45 mil EPDM membrane laminated to 35 mil EPDM tape adhesive

B. Elastomeric Uncured Flashing:

1. Description: Non-reinforced, self curing, synthetic, single-ply flashing composed of Ethylene Propylene Diene Terpolymer (EPDM) conforming to the following physical properties as indicated by ASTM D4811-90 standard specification for Non-vulcanized rubber sheet used as roof flashing.

- a. Nominal Thickness: .060 inch

Property:	Specification:
Thickness	0.055
Green Strength Modulus 100% @ 75°F(psi)	25-250
Elongation, (Ultimate), %	400
modulus 100% @ 122°F(psi)	12
Elongation (Ultimate) %	200
Shelf Stability: Modulus 100% at 75°F(psi)	250
Elongation, min, %	400
Vulcanizability: Tensile strength, min, (psi)	406
Elongation, min, %	400
Tensile Set: min, %	80
Dimensional Stability, max, %	+/- 10
Weatherability , no cracks or crazing	pass
Water Vapor Permeability, Perm-Mils	2.0

- b. Reference Standards:

- 1) ASTM D412: Test Methods for Rubber Properties in Tension.
- 2) ASTM D471: Test Methods for Rubber Property-Effect of liquids.
- 3) ASTM D573: Test Methods for Rubber-Deterioration in Air oven.
- 4) ASTM D624: Test Methods for Rubber Property-Tear Resistance.
- 5) ASTM D1149: Test Method for Rubber Deterioration-Surface zone Cracking in a chamber.
- 6) ASTM D1204: Test Method for Linear Dimensional Changes on a Non-rigid Thermoplastic Sheeting or Film at Elevated Temperatures.
- 7) ASTM D2137: Test Methods for Rubber Property-Brittleness Point of Flexible Polymers and Coated Fabrics.

C. Lap Splice Tape:

1. Description: 35 mil EPDM-based, formulated for compatibility with EPDM membrane and high-solids primer.

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- D. Adhesive Primer:
 - 1. Description: High-solids, butyl based primer formulated for compatibility with EPDM membrane & tape adhesive.
- E. Batten Covers:
 - 1. Description: Cured 60 mil EPDM membrane laminated to 35 mil EPDM tape adhesive.
- F. Splice Adhesive:
 - 1. Description: Butyl-based, formulated for compatibility with EPDM membrane.
- G. Bonding Adhesive:
 - 1. Description: Neoprene-based, formulated for compatibility with EPDM membrane & a wide variety of substrate materials, including masonry, wood, and insulation facings.
- H. Pourable Sealer:
 - 1. Description: 2-Part urethane, 2-color for reliable mixing.
- I. Seam Plates, Batten Strips and Insulation Plates:
 - 1. Description: Steel with a Galvalume® coating.
 - 2. Reference Standard: Corrosion-resistant to meet FM-4470 criteria.
- J. Termination Bar:
 - 1. Description: 1.3" X 0.10" thick aluminum bar with integral caulk ledge.

2.6 VAPOR BARRIER

- A. Glass-Fiber Felts: ASTM D 2178, Type IV, asphalt-impregnated, glass-fiber felt.

PART 3 INSTALLATION

3.1 EXAMINATION

- A. Examine roof deck to determine that it is sufficiently rigid to support roofers and their mechanical equipment and that deflection will no strain or rupture roof components or deform deck.
- B. Verify that surfaces and site conditions are ready to receive work. Correct defects in the substrate before commencing with roofing work.
- C. Examine roof substrate to verify that it is properly sloped to gutters.
- D. Start work with sealants and adhesives at 60° - 80° F.
- E. Fumes from adhesive solvents may be drawn into the building during installation through rooftop intakes. Appropriate measures must be taken to assure that fumes from adhesive solvents are not drawn into the building through air intakes.

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- F. The surface must be clean, dry, smooth, free of sharp edges, fins, loose or foreign materials, oil, grease and other materials that may damage the membrane. All roughened surfaces, which could cause damage, shall be properly repaired before proceeding.
- G. All surface voids of the immediate substrate greater than 1/4" wide must be properly filled with an acceptable insulation or suitable fill material.

3.2 PROTECTION OF OTHER WORK

- A. Protect metal, glass, plastic, and painted surfaces from adhesives and sealants.
- B. Protect neighboring work, property, cars, and persons from spills and overspray from adhesives, sealants and coatings and from damage related to roofing work.
- C. Protect finished areas of the roofing system from roofing related work traffic and traffic by other trade.
- D. Provide weathertight waterproof permanent and temporary membranes at all times and at the end of each work day.

3.3 MATERIAL STORAGE AND HANDLING

- A. Keep all adhesives, sealants, primers and cleaning materials away from all sources of ignition.
- B. Consult container labels and material Safety Data Sheets (MSDS) for specific safety instructions.
- C. Deliver materials to job site in their original containers as labeled by the manufacturer.

3.4 WOOD NAILER LOCATION AND INSTALLATION

- A. Total wood nailer height shall match the total thickness of insulation being used and shall be installed with a 1/8" gap between each length and at each change of direction.
- B. Wood nailers shall be firmly fastened to the deck. Mechanically fasten wood nailers to resist a force of 200 lbs. Per linear foot.

3.5 VAPOR RETARDER

- A. Install vapor barrier over steel deck per manufacturer's instructions.

3.6 ROOF INSULATION APPLICATION: GENERAL

- A. Install only as much insulation as can be covered with the completed roofing system before the end of the day's work or before the onset of inclement weather.
- B. Seal deck joints, where needed, to prevent bitumen drippage.

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- C. Lay roof insulation in courses parallel to roof edges.
- D. Neatly fit insulation to all penetrations, projections, and nailers. Insulation shall be fit tightly, with gaps not greater than 1/4". All gaps greater than 1/4" shall be filled with acceptable insulation. Under no circumstances shall the roofing membrane be left unsupported over a space greater than 1/4".
- E. When installing multiple layers of insulation, all joints between layers shall be staggered at least 6 in.

3.7 INSULATION ATTACHMENT

- A. All Layers:
 - 1. Attachment: Mechanically Attached.

3.8 INSULATION APPLICATION

- A. All Layers:
 - 1. Using the Heavy Duty fasteners and approved plate, engage fastener through insulation into existing steel deck at the depth specified by the manufacturer.

3.9 MEMBRANE PLACEMENT AND ATTACHMENT

- A. Beginning at the low point of the roof, place the membrane without stretching over the acceptable substrate and allow to relax a minimum of 30 minutes before attachment or splicing.
- B. After making sure the sheet is placed in its final position, fold it back evenly onto itself so as to expose the underside.
- C. Sweep the mating surface of the membrane with a stiff broom to remove excess dusting agent (if any) or other contaminants from the mating surface.
- D. Apply Bonding Adhesive at about the same time to both the exposed underside of the sheet and the substrate to which it will be adhered so as to allow approximately the same drying time. Apply Bonding Adhesive so to provide an even and uniform film thickness. Do not apply bonding adhesive to areas that will be subsequently spliced.
- E. Allow Bonding Adhesive to flash off until tacky. Touch the Bonding Adhesive surface with a clean, dry finger to be certain that the adhesive does not stick or string. As you are touching the adhesive, pushing straight down to check for stringing, also push forward on the adhesive at an angle to ensure that the adhesive is ready throughout its thickness. If either motion exposes wet or stringy adhesive when the finger is lifted, then it is not ready for mating.
- F. Starting at the fold, roll the previously coated portion of the sheet into the coated substrate slowly and evenly so as to minimize wrinkles.
- G. Compress the bonded half of the sheet to the substrate with a stiff push broom.

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- H. Fold the unadhered half of the membrane sheet back onto itself, and repeat the bonding procedure to complete the bonding of the sheet.

3.10 MEMBRANE LAP SPLICING

A. General:

1. Position the sheet at the splice area by overlapping membrane 5 inches. Once the membrane is in place, mark the bottom sheet 1/2" to 3/4" from the edge of the top sheet every 4 to 6 feet. Tack the sheet back with adhesive at 5' centers and at factory splices or as necessary to hold back the membrane at the splicing area.
2. Remove excess amounts of dusting agent on the sheet and at factory splices using a stiff push broom. Stir adhesive thoroughly before and during use. Dip the scrubber into the bucket of adhesive, keeping the scrubber flat. Apply the adhesive using long back and forth type strokes with pressure along the length of the splicing area until surfaces become a dark gray in color. Apply adhesive to both surfaces at the same time to allow the same flash off time. Change the scrub pad each 200 feet of 3-inch field splice, or when the pad will no longer hold the proper amount of adhesive. Additional scrubbing is required at areas that may have become contaminated or have excess amounts of dusting agent, and at all factory splices.
3. Position the Seam Splice Tape on the bottom sheet, aligning the edge of the release paper with the markings. Immediately roll the splice tape with a 3"-4" wide silicone or silicone sleeved steel hand roller or a short nap 3" paint roller.
4. When the Seam Splice Tape has been installed for the entire splice length allow the top sheet to rest on top of the tape's paper backing. Trim the top sheet as necessary to assure that 1/8"-1/2" of the Splice Tape will be exposed on the finished splice.
5. To remove the paper backing from the tape, first roll back the membrane sheet, then peel the paper backing off the Seam Splice Tape by pulling against the weight of the bottom sheet at approximately a 45-degree angle to the tape and parallel with the roof surface. Allow the top sheet to fall freely onto the exposed Seam Splice Tape. Broom the entire length of the splice as the release paper is being removed.
6. Roll the splice using a 1-1/2"-2" wide silicone or silicone sleeved steel hand roller, first across the splice, and then along the entire length of the splice.
7. Over the completed seam install a 6" Seam Flashing cover strip centered over the Lap Splice. Remove excess amounts of dusting agent on the sheet and at factory splices using a stiff push broom. Stir adhesive thoroughly before and during use. Dip the Scrubber into the bucket of adhesive, keeping the Scrubber flat. Apply the adhesive using long back and forth type strokes with pressure along the length of the splicing area until surfaces become a dark gray in color. Change the scrub pad each 100 feet of cover strip, or when the pad will no longer hold the proper amount of adhesive. Additional scrubbing is required at areas that may have become contaminated or have excess amounts of dusting agent, and at all factory splices.
8. Position the 6" Seam Flashing cover strip centered over the Lap Splice. Immediately roll the splice tape with a 3"-4" wide silicone or silicone sleeved steel hand roller or a short nap 3" paint roller.

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9. To remove the paper backing from the flashing, peel the paper backing off the 5" Seam Flashing cover strip by pulling at approximately a 45-degree angle to the flashing and parallel with the roof surface. Broom the entire length of the cover strip as the release paper is being removed.
10. Roll the cover strip using a 1-1/2"-2" wide silicone or silicone sleeved steel hand roller, first across the cover strip, and then along the entire length of the cover strip.

3.11 MEMBRANE SECUREMENT

- A. Secure membrane at all locations where the membrane terminates or goes through an angle change greater than 2" in 12" except for round pipe penetrations less than 18" in diameter and square penetrations less than 4" square.
- B. Mechanically fasten Seam Reinforced Perimeter Fastening Strips per manufacturer recommendations.

3.12 FLASHING - PENETRATIONS

- A. General:
 1. Flash all penetrations passing through the membrane.
 2. The flashing seal must be made directly to the penetration.
- B. Pipes, Round Supports, etc:
 1. Flash with Pre-Molded EPDM Pipe Flashings where practical.
 2. Flash using FormFlash when Pre-Molded EPDM Pipe Flashing is not practical.
- C. Pipe Clusters and Unusual Shaped Penetrations:
 1. Fabricate penetration pockets to allow a minimum clearance of 1" between the penetration and all sides.
 2. Secure penetration pockets per manufacturer details
 3. Fill penetration pockets with Pourable Sealer, so as to shed water. Pourable Sealer shall be a minimum of 2" deep.
- D. Hot Pipes:
 1. Protect the rubber components from direct contact with steam or heat sources when the in-service temperature is in excess of 180° F. In all such cases flash to an intermediate insulated "cool" sleeve per manufacturer details.
- E. Flexible Penetrations:
 1. Provide a weathertight gooseneck set in Water Block Seal and secured to the deck.
 2. Flash in accordance with manufacturer details

3.13 FLASHING - WALLS, PARAPETS, MECHANICAL EQUIPMENT CURBS, ETC.

- A. General:
 1. Using the longest pieces practical, flash all walls, parapets, curbs, etc., a minimum of 8" high per manufacturer details.

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- B. Evaluate Substrate:
 - 1. Evaluate the substrate and overlay per manufacturer specifications as necessary.
- C. Complete the splice between flashing and the main roof sheet with Seam Splice Tape before adhering flashing to the vertical surface. Provide lap splices in accordance with manufacturer details.
- D. Apply Bonding Adhesive at about the same time to both the flashing and the surface to which it is being bonded so as to allow approximately the same flash off time. Apply Bonding Adhesive in a uniform coating.
- E. Allow Bonding Adhesive to flash off until tacky. Touch the Bonding Adhesive surface with a clean, dry finger to be certain that the adhesive does not stick or string. While touching the adhesive, pushing straight down to check for stringing, also push forward on the adhesive at an angle to ensure that the adhesive is ready throughout its thickness. If either motion exposes wet or stringy adhesive when the finger is lifted, then it is not ready for mating. Flash off time will vary depending on ambient air conditions.
- F. Roll the flashing into the adhesive evenly and carefully so as to minimize wrinkles.
- G. Ensure proper contact of flashing by brooming in place.
- H. Provide termination directly to the vertical substrate as shown on roof drawings.
- I. Install T-Joint covers at field and flashing splice intersections as required by manufacturer.
- J. Install Termination Bar and Counter flashing as required by manufacturer Specifications and details.
- K. Install intermediate flashing attachment as required by manufacturer Specifications and details.

3.14 FLASHING - ROOF EDGE METALS

- A. Apply adhesive to the metal edging and membrane as described in manufacturer Specifications.
- B. Place the roll of 6" Seam Flashing on the roof a few feet ahead of the application starting point, positioned so that it unrolls from the top of the roll. Remove approximately 2'-3' of release paper and apply to the metal flange and membrane. Lap adjacent rolls of Seam Flashing a minimum of one inch.
- C. With a 2"-3" wide silicone or silicone sleeved steel hand roller, roll the Seam Flashing ensure proper adhesion. Additional attention must be given to factory splice intersections and to any change in plane.
- D. Install a second layer of 9" Seam Flashing over the 6" Seam Flashing as described above.

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- E. Apply 6" length of Seam Flashing, a Seam Joint Cover, or 6"x6" FormFlash to the inside edge of the Seam Flashing at all overlaps.
- F. Apply 6" length of Seam Flashing, a Seam Joint Cover, or 6"x6" FormFlash at all intersections between the Seam Flashing and field fabricated splices.
- G. Where Seam Flashing will not completely cover the metal flange, an additional piece of Seam Flashing must be applied to the metal edge laps. Apply Seam Edge Treatment at the intersections of the flashing sections.
- H. If the roof edge includes a gravel stop and sealant is not applied between the laps in the metal edging, an additional piece of Seam Flashing shall be applied over the metal lap to the top of the gravel stop, after the initial application of Seam Flashing. Seam Edge Treatment shall be applied at the intersections of the two flashing sections.
- I. When the roof slope is greater than 1 in 12, apply Seam Edge Treatment along the back edge of the Quick Seam Flashing.

3.15 TEMPORARY CLOSURE

- A. Temporary closures, which ensure that moisture does not damage any completed section of the new roofing system are the responsibility of the applicator. Completion of flashings, terminations, and temporary closures shall be completed as required to provide a watertight condition.

3.16 SHEET METAL WORK

- A. Install sheet metal as shown on roof drawings.
- B. Follow current industry guidelines (SMACNA) for installation or manufacturer requirements, whichever is more stringent.

3.17 FIELD QUALITY CONTROL

- A. Field inspection and testing will be performed as required by the manufacturer
- B. Correct identified defects or irregularities.

3.18 CLEAN-UP

- A. Clean all contaminants from building and surrounding areas.
- B. Remove trash, debris, equipment from project site and surrounding areas.
- C. Repair or replace damaged building components or surrounding areas to the satisfaction of the building owner. Provide re-grading and hydroseed where required in areas lawn is disturbed.

END OF SECTION

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SECTION 076200

SHEET METAL FLASHING

PART 1 GENERAL

1.1 SUMMARY

- A. Section includes flashings and counterflashings and fabricated sheet metal items, as indicated on drawings.
- B. Related Sections:
 - 1. Section 075300 – Single Ply Membrane Roofing.
 - 2. Section 079000 - Joint Sealers.

1.2 REFERENCES

- A. American Architectural Manufacturers Association:
 - 1. AAMA 611 - Voluntary Specification for Anodized Architectural Aluminum.
 - 2. AAMA 2603 - Voluntary Specification, Performance Requirements and Test Procedures for Pigmented Organic Coatings on Aluminum Extrusions and Panels.
 - 3. AAMA 2604 - Voluntary specification, Performance Requirements and Test Procedures for High Performance Organic Coatings on Aluminum Extrusions and Panels.
 - 4. AAMA 2605 - Voluntary Specification, Performance Requirements and Test Procedures for Superior Performing Organic Coatings on Aluminum Extrusions and Panels.
- B. ASTM International:
 - 1. ASTM A653/A653M - Standard Specification for Steel Sheet, Zinc-Coated (Galvanized) or Zinc-Iron Alloy-Coated (Galvannealed) by the Hot-Dip Process.
 - 2. ASTM A666 - Standard Specification for Austenitic Stainless Steel Sheet, Strip, Plate, and Flat Bar.
 - 3. ASTM A924/A924M - Standard Specification for General Requirements for Steel Sheet, Metallic-Coated by the Hot-Dip Process.
 - 4. ASTM B32 - Standard Specification for Solder Metal.
 - 5. ASTM B101 - Standard Specification for Lead-Coated Copper Sheet and Strip for Building Construction.
 - 6. ASTM B209 - Standard Specification for Aluminum and Aluminum-Alloy Sheet and Plate.
 - 7. ASTM B370 - Standard Specification for Copper Sheet and Strip for Building Construction.
 - 8. ASTM B749 - Standard Specification for Lead and Lead Alloy Strip, Sheet, and Plate Products.
 - 9. ASTM D226 - Standard Specification for Asphalt-Saturated Organic Felt Used in Roofing and Waterproofing.

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- 10. ASTM D4397 - Standard Specification for Polyethylene Sheeting for Construction, Industrial, and Agricultural Applications.
- 11. ASTM D4586 - Standard Specification for Asphalt Roof Cement, Asbestos-Free.
- C. Federal Specification Unit:
 - 1. FS TT-C-494 - Coating Compound, Bituminous, Solvent Type, Acid Resistant.
- D. Sheet Metal and Air Conditioning Contractors:
 - 1. SMACNA - Architectural Sheet Metal Manual.

1.3 DESIGN REQUIREMENTS

- A. Sheet Metal Flashings: Conform to the following criteria of SMACNA "Architectural Sheet Metal Manual."
- B. Maintain one copy of each document on site.

1.4 SUBMITTALS

- A. Section 013300 - Submittal Procedures: Submittal procedures.
- B. Shop Drawings: Indicate material profile, jointing pattern, jointing details, fastening methods, flashings, terminations, and installation details.
- C. Product Data: Submit data on manufactured components metal types, finishes, and characteristics.

1.5 QUALIFICATIONS

- A. Fabricator and Installer: Company specializing in sheet metal work with minimum three years experience.

1.6 DELIVERY, STORAGE, AND HANDLING

- A. Section 016000 - Product Requirements: Product storage and handling requirements.
- B. Stack material to prevent twisting, bending, and abrasion, and to provide ventilation. Slope metal sheets to ensure drainage.
- C. Prevent contact with materials causing discoloration or staining.

PART 2 PRODUCTS

2.1 SHEET METAL FLASHING AND TRIM

- A. Aluminum Sheet: ASTM B209 alloy, alloy and temper as required for application and finish; 0.032 inch thick; mill finish.

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- B. Edge Metal Fascia:
 - 1. Description: Provide prefabricated 0.040" Aluminum with (factory painted) fluoropolymer finish in manufacturer's standard colors.

2.2 ACCESSORIES

- A. Fasteners: Aluminum with soft neoprene washers.
- B. Underlayment: ASTM D226, organic roofing felt, Type II, No. 30.
- C. Protective Backing Paint: FS TT-C-494, Bituminous.
- D. Sealant: As specified in Section 079000.
- E. Plastic Cement: ASTM D4586, Type I.
- F. Reglets: Recessed type.
- G. Solder: ASTM B32; type suitable for application and material being soldered.

2.3 FABRICATION

- A. Form sections shape indicated on Drawings, accurate in size, square, and free from distortion or defects.
- B. Fabricate cleats of same material as sheet metal, interlocking with sheet.
- C. Form pieces in longest possible lengths.
- D. Hem exposed edges on underside 1/2 inch; miter and seam corners.
- E. Form material with standing seams, except where otherwise indicated. At moving joints, use sealed lapped, bayonet-type or interlocking hooked seams.
- F. Fabricate corners from one piece with minimum 18 inch long legs solder for rigidity, seal with sealant.
- G. Fabricate vertical faces with bottom edge formed outward 1/4 inch and hemmed to form drip.
- H. Fabricate flashings to allow toe to extend 2 inches over roofing. Return and brake edges.
- I. Seal metal joints.

PART 3 EXECUTION

3.1 EXAMINATION

- A. Section 013000 - Administrative Requirements: Coordination and project conditions.

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- B. Verify roof openings, curbs, pipes, sleeves, ducts, and vents through roof are solidly set, reglets in place, and nailing strips located.
- C. Verify roofing termination and base flashings are in place, sealed, and secure.

3.2 PREPARATION

- A. Install starter and edge strips, and cleats before starting installation.
- B. Install surface mounted reglets to lines and levels indicated on Drawings. Seal top of reglets with sealant.
- C. Paint concealed metal surfaces with protective backing paint to minimum dry film thickness of 15 mil.

3.3 INSTALLATION

- A. Insert flashings into reglets to form tight fit. Secure in place with plastic wedges. Seal flashings into reglets with sealant.
- B. Secure flashings in place using concealed fasteners. Use exposed fasteners only where permitted.
- C. Apply plastic cement compound between metal flashings and felt flashings.
- D. Fit flashings tight in place. Make corners square, surfaces true and straight in planes, and lines accurate to profiles.
- E. Seal metal joints watertight.

3.4 FIELD QUALITY CONTROL

- A. Inspection will involve surveillance of Work during installation to ascertain compliance with specified requirements.

END OF SECTION

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SECTION 077140

GUTTERS AND DOWNSPOUTS

PART 1 GENERAL

1.1 SUMMARY

- A. Section includes pre-finished aluminum gutters and downspouts and precast concrete splash pads.
- B. Related Sections:
 - 1. Section 079000 - Joint Sealers.

1.2 REFERENCES

- A. American Architectural Manufacturers Association:
 - 1. AAMA 611 - Voluntary Specification for Anodized Architectural Aluminum.
 - 2. AAMA 2603 - Voluntary Specification, Performance Requirements and Test Procedures for Pigmented Organic Coatings on Aluminum Extrusions and Panels.
 - 3. AAMA 2604 - Voluntary specification, Performance Requirements and Test Procedures for High Performance Organic Coatings on Aluminum Extrusions and Panels.
 - 4. AAMA 2605 - Voluntary Specification, Performance Requirements and Test Procedures for Superior Performing Organic Coatings on Aluminum Extrusions and Panels.
- B. ASTM International:
 - 1. ASTM B209 - Standard Specification for Aluminum and Aluminum-Alloy Sheet and Plate.
- C. Sheet Metal and Air Conditioning Contractors:
 - 1. SMACNA - Architectural Sheet Metal Manual

1.3 DESIGN REQUIREMENTS

- A. Conform to NYS Plumbing Code and SMACNA Manual for sizing components for rainfall intensity determined by storm occurrence, but not less than size shown on drawings.

1.4 SUBMITTALS

- A. Section 013300 - Submittal Procedures: Submittal procedures.
- B. Shop Drawings: Indicate locations, configurations, jointing methods, fastening methods, locations, and installation details.
- C. Product Data: Submit data on manufactured components, materials, and finishes.

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1.5 QUALITY ASSURANCE

- A. Perform Work in accordance with SMACNA Manual.

1.6 DELIVERY, STORAGE, AND HANDLING

- A. Section 016000 - Product Requirements: Product storage and handling requirements.
- B. Stack material to prevent twisting, bending, and abrasion, and to provide ventilation. Slope to drain.
- C. Prevent contact with materials during storage capable of causing discoloration, staining, or damage.

1.7 COORDINATION

- A. Section 013000 - Administrative Requirements: Coordination and project conditions.

1.8 WARRANTY

- A. Section 017000 - Execution Requirements: Product warranties and product bonds.
- B. Furnish five year manufacturer warranty for gutter and downspout finishes.

PART 2 PRODUCTS

2.1 GUTTERS AND DOWNSPOUTS

- A. Product Description:
 - 1. Gutters: Sheet metal; SMACNA, Rectangular style profile.
 - 2. Downspouts: Sheet metal; SMACNA, Rectangular profile.
 - 3. Splash Pads: Precast concrete type, minimum 3,000 psi at 28 days, with minimum 5 percent air entrainment.

2.2 COMPONENTS

- A. Pre-Finished Aluminum Sheet: ASTM B209, manufacturer's standard alloy and temper for specified finish; 0.032 inch thick; shop pre-coated with polyester or PVDF (polyvinylidene fluoride) coating; color as selected from manufacturer's standard color.

2.3 ACCESSORIES

- A. Anchors and Supports: Profiled to suit gutters and downspouts.
 - 1. Anchoring Devices: In accordance with SMACNA requirements.
 - 2. Gutter Supports: Brackets or Straps. Spikes and ferrules.
 - 3. Downspout Supports: Brackets or Straps.
- B. Fasteners: Aluminum with soft neoprene washers.

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2.4 FABRICATION

- A. Form gutters and downspouts of profiles and sizes indicated on shop drawings.
- B. Fabricate with required connection pieces.
- C. Form sections to shape indicated on Shop Drawings, square, and accurate in size, in maximum possible lengths, free of distortion or defects detrimental to appearance or performance. Allow for expansion at joints.
- D. Hem exposed edges of metal.
- E. Fabricate gutter and downspout accessories; seal watertight.

2.5 FACTORY FINISHING

- A. Acrylic polyester coating: Baked enamel system conforming to AAMA 2603.

***** OR *****
- B. PVDF (polyvinylidene fluoride) coating: Multiple coat, thermally cured, fluoropolymer system conforming to AAMA 2604 or AAMA 2605.
- C. Primer Coat: Finish concealed side of metal sheets with primer compatible with finish system, as recommended by finish system manufacturer.

PART 3 EXECUTION

3.1 EXAMINATION

- A. Section 013000 - Administrative Requirements: Coordination and project conditions.
- B. Verify surfaces are ready to receive gutters and downspouts.

3.2 INSTALLATION

- A. Sheet Metal: Join lengths with formed seams sealed watertight. Flash and seal gutters to downspouts and accessories.
- B. Slope gutters 1/10 inch per foot minimum.
- C. Connect downspouts to storm sewer system. Seal connection watertight.
- D. Set splash pads under downspouts. Secure in place.

END OF SECTION

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SECTION 079000

JOINT PROTECTION

PART 1 GENERAL

1.1 SUMMARY

- A. Section includes sealants and joint backing, precompressed foam sealers and accessories.

1.2 REFERENCES

- A. ASTM International:
 1. ASTM C920 - Standard Specification for Elastomeric Joint Sealants.
 2. ASTM C1193 - Standard Guide for Use of Joint Sealants.
 3. ASTM D1056 - Standard Specification for Flexible Cellular Materials-Sponge or Expanded Rubber.
 4. ASTM D1667 - Standard Specification for Flexible Cellular Materials-Vinyl Chloride Polymers and Copolymers (Closed-Cell Foam).
 5. ASTM D2628 - Standard Specification for Preformed Polychloroprene Elastomeric Joint Seals for Concrete Pavements.

1.3 SUBMITTALS

- A. Section 013300 - Submittal Procedures: Submittal procedures.
- B. Products Data: Submit data indicating sealant chemical characteristics, performance criteria, substrate preparation, limitations, and color availability.

1.4 QUALIFICATIONS

- A. Manufacturer: Company specializing in manufacturing products specified in this section with minimum three years experience.
- B. Applicator: Company specializing in performing Work of this section with minimum three years experience.

1.5 ENVIRONMENTAL REQUIREMENTS

- A. Section 016000 - Product Requirements.
- B. Maintain temperature and humidity recommended by sealant manufacturer during and after installation.

1.6 COORDINATION

- A. Section 013000 - Administrative Requirements: Coordination and project conditions.

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- B. Coordinate Work with sections referencing this section.

PART 2 PRODUCTS

2.1 JOINT SEALERS

A. Products Description:

1. High Performance General Purpose Exterior (Nontraffic) Sealant: Polyurethane; ASTM C920, Grade NS, Class 25, Uses M, G, and A; single component.
 - a. Color: Standard colors matching finished surfaces.
 - b. Applications: Use for:
 - 1) Control, expansion, and soft joints in masonry.
 - 2) Joints between concrete and other materials.
 - 3) Joints between metal frames and other materials.
 - 4) Other exterior nontraffic joints for which no other sealant is indicated.
2. General Purpose Traffic Bearing Sealant: Polyurethane; ASTM C920, Grade P, Class 25, Use T; single component.
 - a. Color: Standard colors matching finished surfaces.
 - b. Applications: Use for exterior and interior pedestrian and vehicular traffic bearing joints.
3. Exterior Foam Expansion Joint Sealer: Precompressed foam sealer; Polyurethane with water-repellent.
 - a. Color: Black color.
4. General Purpose Interior Sealant: Acrylic emulsion latex; ASTM C834, single component, paintable.
 - a. Color: Standard colors matching finished surfaces.
 - b. Applications: Use for interior wall and ceiling control joints, joints between door and window frames and wall surfaces, and other interior joints for which no other type of sealant is indicated.
5. Non-sag Polyurethane Sealant: ASTM C920, Grade NS, Class 25, Uses NT, M; single component, chemical curing, non-staining, non-bleeding, capable of continuous water immersion, non-sagging type.
 - a. Color: Standard colors matching finished surfaces.
 - b. Movement Capability: Plus and minus 25 percent.
 - c. Service Temperature Range: -40 to 180 degrees F.
 - d. Shore A Hardness Range: 20 to 35.

2.2 ACCESSORIES

- A. Primer: Non-staining type, recommended by sealant manufacturer to suit application.
- B. Joint Cleaner: Non-corrosive and non-staining type, recommended by sealant manufacturer; compatible with joint forming materials.
- C. Joint Backing: Round foam rod compatible with sealant; ASTM D1056, sponge or expanded rubber D1667, closed cell PVC; oversized 30 to 50 percent larger than joint width.
- D. Bond Breaker: Pressure sensitive tape recommended by sealant manufacturer to suit application.

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PART 3 EXECUTION

3.1 EXAMINATION

- A. Section 013000 - Administrative Requirements: Coordination and project conditions.
- B. Verify substrate surfaces and joint openings are ready to receive work.
- C. Verify joint backing and release tapes are compatible with sealant.

3.2 PREPARATION

- A. Remove loose materials and foreign matter impairing adhesion of sealant.
- B. Clean and prime joints.
- C. Perform preparation in accordance with ASTM C1193.
- D. Protect elements surrounding Work of this section from damage or disfiguration.

3.3 INSTALLATION

- A. Perform installation in accordance with ASTM C1193.
- B. Measure joint dimensions and size joint backers to achieve width-to-depth ratio, neck dimension, and surface bond area as recommended by manufacturer, except where specific dimensions are indicated.
- C. Install bond breaker where joint backing is not used.
- D. Install sealant free of air pockets, foreign embedded matter, ridges, and sags.
- E. Apply sealant within recommended application temperature ranges. Consult manufacturer when sealant cannot be applied within these temperature ranges.
- F. Tool joints concave.
- G. Precompressed Foam Sealant: Do not stretch; avoid joints except at corners, ends, and intersections; install with face 1/8 to 1/4 inch below adjoining surface.
- H. Compression Gaskets: Avoid joints except at ends, corners, and intersections; seal joints with adhesive; install with face 1/8 to 1/4 inch below adjoining surface.

3.4 CLEANING

- A. Section 017000 - Execution and Closeout Requirements: Final cleaning.
- B. Clean adjacent soiled surfaces.

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3.5 PROTECTION OF INSTALLED CONSTRUCTION

- A. Section 017000 - Execution and Closeout Requirements: Protecting installed construction.
- B. Protect sealants until cured.

3.6 SCHEDULE

- A. Exterior Joints for Which No Other Sealant Type is Indicated: Polyurethane.
- B. Exterior Wall Expansion Joints: Polyurethane (High Elasticity).
- C. Control, Expansion, and Soft Joints in Masonry, and between Masonry and Adjacent Work: polyurethane (Low Elasticity).
- D. Joints between Exterior Metal Frames and Adjacent Work (except masonry): Polyurethane.
- E. Interior Joints for Which No Other Sealant is Indicated: Acrylic.
- F. Control and Expansion Joints in Interior Concrete Slabs and Floors: Polyurethane.
- G. Joints between Plumbing Fixtures and Walls and Floors, and between Counter tops and Walls: Acrylic.

END OF SECTION

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SECTION 081000

STEEL DOORS AND FRAMES

PART 1 GENERAL

1.1 WORK INCLUDED

- A. The work under this section shall include the furnishing of all items shown on the drawings and as specified including, but not limited to, the following:
 - 1. Fire Rated and Non-Rated Steel Doors and Frames.

1.2 REFERENCES

- A. Steel Doors and Frames in this section must meet all standards as established by the following:
 - 1. Door and Hardware Preparation ANSI 115.
 - 2. Life Safety Codes NFPA-101 (Latest edition).
 - 3. Fire Doors and Windows NFPA-80 (Latest edition).
 - 4. Steel Door Institute ANSI/SDI-100 (Latest edition).
 - 5. UL103 – Fire Tests of Door Assemblies.

1.3 SUBMITTAL

- A. Product Data: Indicate frame configuration, anchor types and spacings, location of cutouts for hardware, reinforcement, and finish.
- B. Shop Drawings: Coordinate approved shop drawings with all other trades and manufacturers whose products are used in conjunction with the Steel Doors and Frames.
- C. Finish hardware supplier is to furnish templates, template reference number and/or physical hardware to the steel door and frame supplier in order to cut, reinforce or otherwise prepare the doors and frames to receive the finish hardware items.

1.4 QUALITY ASSURANCE

- A. Provide Steel Doors and Frames manufactured by a single firm specializing in the production of this type of work.
- B. Provide Steel Doors and Frames complying with the Steel Door Institute recommended specifications for Standard Steel Doors and Frames ANSI/SDI 100 (Latest edition), and as herein specified.
- C. Fire Rated Door Construction: Conform to NFPA 252.
- D. Installed Fire Rated Door Assembly: Conform to NFPA 80.
- E. Attach label to fire rated doors/frames.

1.5 DELIVERY, STORAGE AND HANDLING

- A. All steel doors and frames must be properly marked with door opening mark number to correspond with the door schedule.

Steel Doors and Frames
081000

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- B. Deliver all steel doors in cartons and palletized to provide protection during transit and job storage.
- C. Inspect doors and frames upon delivery for damage. Minor damage is to be repaired, provided the finish items are equal in all respects to new work and acceptable to the architect.
- D. Store doors and frames at the building site under cover. Place units on wood sills or on the floor in a manner that will prevent rust and damage. Avoid the use of non-vented plastic or canvas shelters which could create a humidity chamber. If the wrapper on the door becomes wet, remove the carton immediately. Provide a 1/4 inch space between stacked doors to promote air circulation.

1.6 JOB CONDITIONS

- A. Installer must examine the conditions under which steel doors and frames will be installed and notify the contractor in writing of any condition detrimental to the proper and timely completion of the work.

PART 2 PRODUCTS

2.1 ACCEPTABLE MANUFACTURERS – As long as they meet the following specifications:

- A. Ceco Door Products.
- B. Dean Steel Manufacturing Company.
- C. Kewanee Corporation.
- D. Steelcraft.
- E. Other SDI members that conform to the specific requirements of this specification.

2.2 HARDWARE LOCATIONS AND GENERAL REINFORCEMENTS

- A. Locate hardware on doors and frames in accordance with the manufactures standard location.
- B. Hardware reinforcements are to be in accordance with the minimum standard gages as listed in SDI-100.
- C. Doors shall be mortised, reinforced and function holes provided at the factory in accordance with the hardware schedule and templates provided by the hardware supplier. Through bolt holes, attachment holes, or drilling and tapping for surface hardware, shall be done by others.

2.3 STEEL DOORS

- A. Materials
 - 1. Face sheets are to be made of commercial quality 16 gage hot dipped zinc coated steel that complies with ASTM A525 A60.

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2. Vertical edges shall join the face sheets by a continuous weld extending the full height of the door. Welds are to be ground, filled and dress smooth to make them invisible and provide a smooth flush surface.
3. Hinge reinforcement shall be not less than 7 gage (3/16") plate 1-1/4" X 9" height to receive standard weight (.134) hinges.
4. Reinforce tops and bottoms of all doors with a continuous steel channel not less than 16 gage, extending the full width of the door and welded to the face sheet. Doors with an inverted top channel shall have a steel closure channel welded or screwed in place so that the web of the channel is flush with the top of the face sheets of the door.
5. Door Cores - Exterior doors shall have polyurethane core.
6. All exterior doors shall be galvanized.

2.4 STEEL FRAMES

A. Materials.

1. Shall be 14 gage hot dipped zinc coated steel that complies with ASTM designations A525 A60.
2. All frames are to be assembled so that the face miter seam is "closed and tight". Weld the face seam and the full web of the frame corner or intersection. Grind and dress the weld area smooth. Apply a zinc rich primer over the grinding area, and finish with a matching prime paint.

2.5 PRIME FINISH

- ##### A.
- Doors and frames are to be thoroughly cleaned, and chemically treated to insure maximum finish paint adhesion. All surfaces of the door and frame exposed to view shall receive a factory applied coat of rust inhibiting primer. The finish shall meet the requirements for acceptance stated in ANSI A224.1 "Test Procedure and Acceptance Criteria for Prime Painted Steel Surfaces." The prime finish is not intended to be the final layer of protection from the elements. Field painting using a good grade of oil base paints shall be provided in accordance with the recommendations of the door and frame manufacturer. For specialty types of finished coatings, the paint supplier should also be consulted.

PART 3 EXECUTION

3.1 INSPECTION

- ##### A.
- It is the responsibility of the Contractor to make sure that all dimensions for existing opening or existing frames (strike height, hinge spacing, hinge backset, etc.) given to the steel door and frame manufacturer are accurate.
- ##### B.
- It is the responsibility of the Contractor to assure that scratches or disfigurements caused in shipping or handling are properly cleaned and touched up with a rust inhibitive primer.

3.2 INSTALLATION

A. Door Frames

1. Prior to installation, all frames must be checked for rack, twist and out of square conditions.

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2. Place frames prior to enclosing walls and ceilings. Set frames accurately in position, plumbed and braced securely until permanent anchors are set. Remove shipping bar spreader and insert a wood spreader cut to the opening width, notched to clear the stops of the frame.
3. Fill frames in masonry walls with mortar.
4. When temperature conditions necessitate an additive to be used in the plaster or mortar to prevent freezing, the contractor installing the frames shall coat the inside of the frames, in the field, with a corrosion inhibiting bituminous material.
5. SDI-105, "Recommended Erection Instructions for Steel Frames" and SDI-110 "Standard Steel Doors and Frames for Modular Masonry Construction" shall indicate the proper installation procedures.
6. Install fire-rated frames in accordance with NFPA 80.

B. Doors

1. Install doors plumb and in true alignment in a prepared opening and fasten them to achieve the maximum operational effectiveness and appearance.
2. Proper door clearance must be maintained in accordance with SDI-110.
3. Where necessary, metal hinge shims are acceptable to maintain clearances.
4. "Installation Guide for Doors and Hardware" published by DHI is recommended for further details.

- C. Hardware must be applied in accordance with hardware manufacturer's templates and instructions.

3.3 ADJUST AND CLEAN

A. Final adjustments

1. Check and re-adjust operating finish hardware items in hollow metal work just prior to final inspection. Leave work in complete and proper condition.

B. Prime Coat Touch-Up

1. Immediately after erection, sand smooth any rusted or damaged areas of prime coat and apply to touch-up or compatible air-drying primer.

3.4 SCHEDULES

- A. After installation, door schedules shall be turned over to the owner when the building is accepted.

END OF SECTION

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SECTION 083613

SECTIONAL DOORS

PART 1 GENERAL

1.1 SUMMARY

- A. Section includes electric overhead sectional door and operating hardware.
- B. Related Sections:
 - 1. Section 048100 - Unit Masonry Assemblies.

1.2 REFERENCES

- A. American National Standards Institute:
 - 1. ANSI A135.4 - Basic Hardboard.
- B. ASTM International:
 - 1. ASTM A653/A653M - Standard Specification for Steel Sheet, Zinc-Coated (Galvanized) or Zinc-Iron Alloy-Coated (Galvannealed) by the Hot-Dip Process.
 - 2. ASTM B209 - Standard Specification for Aluminum and Aluminum-Alloy Sheet and Plate.
 - 3. ASTM B221 - Standard Specification for Aluminum and Aluminum-Alloy Extruded Bars, Rods, Wire, Profiles, and Tubes.
 - 4. ASTM E84 - Standard Test Method for Surface Burning Characteristics of Building Materials.
 - 5. ASTM E330 - Standard Test Method for Structural Performance of Exterior Windows, Curtain Walls, and Doors By Uniform Static Air Pressure Difference.
- C. Door and Access Systems Manufacturers Association International:
 - 1. DASMA 102 - Specifications for Sectional Overhead Type Doors.
- D. National Electrical Manufacturers Association:
 - 1. NEMA MG 1 - Motors and Generators.

1.3 SYSTEM DESCRIPTION

- A. Panels: Flush steel, insulated.
- B. Lift Type: Standard lift operating style with track and hardware.
- C. Operation: Electric with chain hoist.
- D. Wind Loads: Design and size components to withstand loads caused by pressure and suction of wind acting normal to plane of wall as measured in accordance with ASTM E330.

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1.4 SUBMITTALS

- A. Section 013300 - Submittal Procedures: Submittal procedures.
- B. Shop Drawings: Indicate opening dimensions and required tolerances, connection details, anchorage spacing, hardware locations, and installation details.
- C. Product Data: Submit component construction, anchorage method, and hardware.

1.5 CLOSEOUT SUBMITTALS

- A. Section 017000 - Execution and Closeout Requirements: Closeout procedures.
- B. Operation and Maintenance Data:
 - 1. Include electrical control adjustment recommendations.
 - 2. Include data for motor and transmission, shaft and gearing, lubrication frequency, periodic adjustments required, and spare part sources.

1.6 QUALITY ASSURANCE

- A. Perform Work in accordance with DASMA 102, Application Type Industrial.
- B. Products Requiring Electrical Connection: Listed and classified by Underwriters Laboratories, Inc., as suitable for purpose specified.
- C. Surface Burning Characteristics:
 - 1. Foam Insulation: Maximum 75/450 flame spread/smoke developed index when tested in accordance with ASTM E84.
- D. Apply label from agency approved by authority having jurisdiction to identify each foam plastic insulation board.

1.7 QUALIFICATIONS

- A. Manufacturer: Company specializing in manufacturing products specified in this section with minimum three years experience.

1.8 WARRANTY

- A. Section 017000 - Execution and Closeout Requirements: Product warranties and product bonds.
- B. Furnish five year manufacturer warranty for electric operating equipment.

PART 2 PRODUCTS

2.1 SECTIONAL OVERHEAD DOORS

- A. Manufacturers:

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1. Clopay Building Products Co.
2. Holmes-Hally Industries.
3. Raynor Garage Door.
4. Overhead Door.
5. Substitutions: Section 016000 - Product Requirements.

- B. Product Description: Steel overhead sectional doors, manual and electric operation, stock configuration and hardware.
1. Door Nominal Thickness: 1 3/8 inches thick.
 2. Flush Steel Panel Construction: Minimum .015 inches thick sheet steel, hot-dipped galvanized roll-formed steel, ribbed, textured surface. Intermediate EPDM rubber seal and integral steel hinge mounting tip.

2.2 COMPONENTS

- A. Sheet Steel: ASTM A653/A653M galvanized to G60, manufacturer's standard thermosetting finish, plain surface.
- B. Insulation: Rigid polyurethane, nominal R-Value of 12.76 bonded to facing.
- C. Metal Primer Paint: Zinc chromate type.
- D. Glazing: Fully tempered clear float glass specified in Section 088000.
- E. Glazed Lights: Glazed lights (as shown); set in place with resilient glazing channel.

2.3 ACCESSORIES

- A. Track: Rolled galvanized steel, 0.120 inch thick; 3 inch wide, continuous one piece for each side; galvanized steel mounting brackets minimum 1/4 inch thick.
- B. Hinge and Roller Assemblies: Heavy duty hinges and adjustable roller holders of galvanized steel; floating hardened steel bearing rollers, located at top and bottom of each panel, each side.
- C. Lift Mechanism: Torsion spring on cross head shaft, with braided galvanized steel lifting cables. Manual operation to require maximum exertion of 25 lbs force.
- D. Sill Weatherstripping: Resilient rubber or neoprene strip, one piece; fitted to bottom of door panel, full length contact.
- E. Jamb Weatherstripping: Roll formed steel section full height of jamb, fitted with resilient weatherstripping, placed in moderate contact with door panels.
- F. Head Weatherstripping: EPDM rubber seal, one piece full length.
- G. Panel Joint Weatherstripping: Neoprene foam seal, one piece full length.
- H. Lock: Inside side mounted, adjustable keeper, spring activated latch bar with feature to retain in locked or retracted position; interior handle; lock keyed alike.

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2.4 ELECTRICAL CHARACTERISTICS AND COMPONENTS

- A. Electrical Characteristics: In accordance with the following:
 - 1. 3/4 hp; manually operable in case of power failure; transit speed of nominal 12 inches per second.
 - 2. 115 volts, single phase, 60 Hz.
- B. Motor Type: NEMA MG1.
- C. Wiring Terminations: Furnish terminal lugs to match branch circuit conductor quantities, sizes, and materials indicated.
- D. Disconnect Switch: Factory mount disconnect switch in control panel.
- E. Electric Operator: side mounted (as shown on drawings) on cross head shaft, adjustable safety friction clutch; brake system actuated by independent voltage solenoid controlled by motor starter; enclosed gear driven limit switch; enclosed magnetic cross line reversing starter; mounting brackets and hardware. Provide means to disengage motor to allow manual operation in event of power failure.
- F. Control Station: Standard three button (open-close-stop) momentary type, control for each electric operator; 24 volt circuit, surface mounted.
- G. Pneumatic Sensing Edge: Up to 18 feet wide..

2.5 FACTORY FINISHING

- A. Interior and Exterior Surfaces: Factory finish, baked polymer or enamel, color as selected.

PART 3 EXECUTION

3.1 EXAMINATION

- A. Section 013000 - Administrative Requirements: Coordination and project conditions.
- B. Verify wall openings are ready to receive work and opening dimensions and tolerances are within specified limits.
- C. Verify electric power is available and of correct characteristics.

3.2 PREPARATION

- A. Prepare opening to permit correct installation of door unit to perimeter air and vapor retarder seal.
- B. Apply primer to wood frame.

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3.3 INSTALLATION

- A. Anchor assembly to wall construction and building framing without distortion or stress.
- B. Securely brace door tracks suspended from structure. Secure tracks to structural members only.
- C. Fit and align door assembly including hardware.
- D. Coordinate installation of electrical service. Complete power and control wiring from disconnect to unit components.
- E. Coordinate installation of sealants and backing materials at frame perimeter as specified in Section 079000.
- F. Install perimeter weatherstripping.

3.4 ERECTION TOLERANCES

- A. Section 014000 - Quality Requirements: Tolerances.
- B. Maximum Variation from Plumb: 1/16 inch.
- C. Maximum Variation from Level: 1/16 inch.
- D. Longitudinal or Diagonal Warp: Plus or minus 1/8 inch from 10 ft straight edge.
- E. Maintain dimensional tolerances and alignment with adjacent work.

3.5 MANUFACTURER'S FIELD SERVICES

- A. Section 014000 - Quality Requirements: Manufacturers' field services.
- B. Ensure operation and adjustments to door assembly for specified operation.

3.6 ADJUSTING

- A. Section 017000 - Execution and Closeout Requirements: Testing, adjusting, and balancing.
- B. Adjust door assembly to smooth operation and in full contact with weatherstripping.

3.7 CLEANING

- A. Section 017000 - Execution and Closeout Requirements: Final cleaning.
- B. Clean doors, frames and glass.
- C. Remove temporary labels and visible markings.

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3.8 PROTECTION OF INSTALLED CONSTRUCTION

- A. Section 017000 - Execution and Closeout Requirements: Protecting installed construction.
- B. Do not permit construction traffic through overhead door openings after adjustment and cleaning.

END OF SECTION

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SECTION 085113

ALUMINUM WINDOWS

PART 1 GENERAL

1.1 SUMMARY

- A. Section Includes:
 - 1. Extruded aluminum windows.
 - 2. Factory glazing.
 - 3. Operating hardware.
 - 4. Insect screens.

- B. Related Requirements:
 - 1. Section 079000 - Joint Protection.
 - 2. Section 088000 - Glazing.

1.2 REFERENCE STANDARDS

- A. Aluminum Association:
 - 1. AA DAF-45 - Designation System for Aluminum Finishes.

- B. American Architectural Manufacturers Association:
 - 1. AAMA 101 - Voluntary Performance Specification for Windows, Skylights and Glass Doors.
 - 2. AAMA 611 - Voluntary Specification for Anodized Architectural Aluminum.
 - 3. AAMA 1503 - Voluntary Test Method for Thermal Transmittance and Condensation Resistance of Windows, Doors and Glazed Wall Sections.
 - 4. AAMA 2603 - Voluntary Specification, Performance Requirements and Test Procedures for Pigmented Organic Coatings on Aluminum Extrusions and Panels.
 - 5. AAMA 2604 - Voluntary specification, Performance Requirements and Test Procedures for High Performance Organic Coatings on Aluminum Extrusions and Panels.
 - 6. AAMA 2605 - Voluntary Specification, Performance Requirements and Test Procedures for Superior Performing Organic Coatings on Aluminum Extrusions and Panels.
 - 7. AAMA MCWM-1 - Metal Curtain Wall manual.

- C. ASTM International:
 - 1. ASTM A123/A123M - Standard Specification for Zinc (Hot-Dip Galvanized) Coatings on Iron and Steel Products.
 - 2. ASTM B209 - Standard Specification for Aluminum and Aluminum-Alloy Sheet and Plate.
 - 3. ASTM B221 - Standard Specification for Aluminum and Aluminum-Alloy Extruded Bars, Rods, Wire, Profiles, and Tubes.
 - 4. ASTM D3656 - Standard Specification for Insect Screening and Louver Cloth Woven from Vinyl-Coated Glass Yarns.
 - 5. ASTM E283 - Standard Test Method for Determining the Rate of Air Leakage Through Exterior Windows, Curtain Walls, and Doors Under Specified Pressure Differences Across the Specimen.

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6. ASTM E330 - Standard Test Method for Structural Performance of Exterior Windows, Curtain Walls, and Doors By Uniform Static Air Pressure Difference.
7. ASTM E331 - Standard Test Method for Water Penetration of Exterior Windows, Curtain Walls, and Doors By Uniform Static Air Pressure Difference.
8. ASTM E547 - Standard Test Method for Water Penetration of Exterior Windows, Skylights, Doors, and Curtain Walls by Cyclic Static Air Pressure Differential.
9. ASTM E1105 - Standard Test Method for Field Determination of Water Penetration of Installed Exterior Windows, Curtain Walls, and Doors by Uniform or Cyclic Static Air Pressure Difference.
10. ASTM E1886 - Standard Test Method for Performance of Exterior Windows, Curtain Walls, Doors, and Impact Protective Systems Impacted by Missile(s) and Exposed to Cyclic Pressure Differentials.
11. ASTM E1996 - Standard Specification for Performance of Exterior Windows, Curtain Walls, Doors and Impact Protective Systems Impacted by Windborne Debris in Hurricanes.
12. ASTM F588 - Standard Test Methods for Measuring the Forced Entry Resistance of Window Assemblies, Excluding Glazing Impact.

D. Consumer Product Safety Commission:

1. CPSC 16 CFR 1201; Safety Standard for Architectural Glazing.

E. Glass Association of North America:

1. GANA - Glazing Manual.

F. National Fenestration Rating Council Incorporated:

1. NFRC 100 - Procedures for Determining Fenestration Product U-Factors.

G. SSPC: The Society for Protective Coatings:

1. SSPC Paint 20 - Zinc-Rich Primers (Type I - Inorganic and Type II - Organic).
2. SSPC Paint 25 - Red Iron Oxide, Zinc Oxide, Raw Linseed Oil, and Alkyd Primer.

1.3 SUBMITTALS

A. Section 013300 - Submittal Procedures: Requirements for submittals.

B. Product Data: Submit component dimensions, anchorage and fasteners, glass, internal drainage, and typical details.

C. Shop Drawings: Indicate opening dimensions, framed opening tolerances, affected related Work; and installation requirements.

1.4 QUALITY ASSURANCE

A. Perform Work in accordance with the following:

1. Aluminum Windows: Fabricate and label window assemblies in accordance with AAMA 101 for types of windows required.
2. Insulated Glass: Fabricate insulated glass units in accordance with GANA (formerly FGMA) Glazing Manual.
3. Safety Glass: Conform to CPSC 16 CFR 1201 and applicable codes.

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1.5 QUALIFICATIONS

- A. Manufacturer: Company specializing in manufacturing commercial aluminum windows with minimum three years experience.
- B. Installer: Company specializing in installation of commercial aluminum windows with minimum three years experience.

1.6 DELIVERY, STORAGE, AND PROTECTION

- A. Section 016000 - Product Requirements: Requirements for transporting, handling, storing, and protecting products.
- B. Handle Work of this section in accordance with AAMA MCWM-1 - Curtain Wall Manual #10.
- C. Protect factory finished aluminum surfaces with wrapping. Do not use adhesive papers or sprayed coatings that bond when exposed to sunlight or weather.

1.7 AMBIENT CONDITIONS

- A. Section 015000 - Temporary Facilities and Controls: Ambient conditions control facilities for product storage and installation.
- B. Do not install glazing materials when ambient temperature is less than 40 degrees F.
- C. Maintain this minimum temperature during and after installation of glazing materials.

1.8 WARRANTY

- A. Section 017000 - Execution and Closeout Requirements: Requirements for warranties.
- B. Furnish five year manufacturer warranty for insulated glass units from seal failure, interpane dusting or misting, and replacement of same.
- C. Warranty: Include coverage for degradation of color finish.

PART 2 PRODUCTS

2.1 ALUMINUM WINDOWS

- A. Manufacturer List:
 - 1. EFCO Corp.
 - 2. Kawneer Co., Inc.
 - 3. Traco.
 - 4. Section 016000 - Product Requirements: Requirements for substitutions for other manufacturers and products.

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- B. Product Description: Aluminum windows thermally broken with interior portion of frame insulated from exterior portion; applied glass stops of screw fastened type, sash, glass and glazing, operating hardware, and insect screen.
 - 1. Reinforced Mullion: Extruded aluminum with integral reinforcement of aluminum structural section.
- C. Window Configuration: Conform with AAMA 101 Designations for windows required for Project; HS-horizontal sliding.
- D. Performance / Design Criteria:
 - 1. Primary Performance Requirements: Aluminum windows to meet the minimum performance criteria for AAMA 101 Designation CW30 Commercial, or better.
 - 2. Wind-Borne Debris Loads: Design and size glass located less than 60 feet above grade to withstand the following loads:
 - a. Glass Within 30 feet of Grade: ASTM E1886 and ASTM E1996; large missile impact test.
 - b. Small missile impact test. Wind Load Deflection: In accordance with AAMA 101.
 - 3. Assembly: To accommodate, without damage to components or deterioration of seals, movement between window and perimeter framing, deflection of lintel.
 - 4. Air and Vapor Seal: Maintain continuous air barrier and vapor retarder throughout assembly, primarily in line with inside pane of glass and heel bead of glazing compound.
 - 5. System Internal Drainage: Drain water entering joints, condensation occurring in glazing channels, and migrating moisture occurring within system, to exterior by weep drainage network.
 - 6. Air Infiltration: Limit air infiltration through assembly to 0.3 cfm/sqft wall area, measured at reference differential pressure across assembly of 1.57 psf when tested in accordance with ASTM E283.
 - 7. Vapor Seal: Limit vapor seal with interior atmospheric pressure of 1 inch sp, 72 degrees F, 40 percent RH without seal failure.
 - 8. Thermal Performance:
 - a. Condensation Resistance Factor (CRF) Class of not less than C45 when measured in accordance with AAMA 1503.
 - b. Thermal Transmittance of Assembly: Maximum U Value of 0.45 Btu/sq ft per hour per deg F when measured in accordance with AAMA 1503 or NFRC 100.
 - 9. Water Leakage: None, when measured in accordance with ASTM E331 with test pressure difference as defined by AAMA 101.
 - 10. Forced Entry Resistance: Conform to ASTM F588.

2.2 COMPONENTS

- A. Extruded Aluminum: ASTM B221; 6063 alloy, T5 temper.
- B. Sheet Aluminum: ASTM B209; 5005 alloy, H15 or H34 temper.
- C. Insulating Glass: Sealed double pane units conforming with requirements in Section 088000.
 - 1. Outer Pane: Clear float glass.
 - 2. Inner Pane: Clear float glass.
 - 3. Pane Thickness: Minimum 1/8 inch thick.
 - 4. Minimum Total Unit Thickness: 1 inch.

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5. Glazing Materials: Manufacturer's standard conforming with requirements specified in Section 088000.

- D. Hardware:
 1. Sash lock: Lever handle with cam lock. Furnish pole handle of size to allow access to sash locks and operable windows where over 5 feet above floor.
 2. Pulls: Manufacturer's standard.
 3. Sash lock: Lever handle with cam lock.
 4. Bottom Rollers: Stainless steel, adjustable.

- E. Sills: Extruded aluminum; sloped for positive wash; fit under sash 1/2 inch beyond wall face; one piece full width of opening jamb angles to terminate sill end.

- F. Stools: Extruded aluminum; sloped for positive wash; fit under sash to Project 1/2 inch beyond wall face; one piece full width of opening.

- G. Operable Sash Weather Stripping: Wool pile or Nylon pile or Resilient plastic; permanently resilient, profiled to effect weather seal.

- H. Insect Screen Frame: Rolled aluminum frame of rectangular sections; fit with adjustable hardware; nominal size similar to operable glazed unit.

- I. Insect Screens: ASTM D3656, Class 2, 18 by 14 mesh, gray color.

2.3 FABRICATION

- A. Fabricate components with minimum clearances and shim spacing around perimeter of assembly, yet enabling installation and dynamic movement of perimeter seal.

- B. Accurately fit and secure joints and corners. Make joints flush, hairline, and weatherproof.

- C. Prepare components to receive anchor devices. Fabricate anchors.

- D. Arrange fasteners and attachments to ensure concealment from view.

- E. Prepare components with internal reinforcement for operating hardware.

- F. Furnish internal reinforcement in mullions with galvanized steel members to maintain rigidity.

- G. Permit internal drainage weep holes and channels to migrate moisture to exterior. Furnish internal drainage of glazing spaces to exterior through weep holes.

- H. Assemble insect screen frame, miter and reinforce frame corners. Fit mesh taut into frame and secure. Fit frame with four spring loaded steel pin retainers.

- I. Double weatherstrip operable units.

- J. Factory glaze window units. Install glass in accordance with Section 088000, to exterior wet/dry method of glazing.

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2.4 FINISHES

- A. Finish Coatings: Conform to AAMA 2603.
- B. Exterior Surfaces: Anodized to color as selected.
- C. Interior Surfaces: Anodized to color as selected.
- D. Color Anodized Aluminum Surfaces: AA-M12C22A44 non-specular as fabricated mechanical finish, medium matte chemical finish, and Architectural Class I 0.7 mils anodized coating.
- E. Locks, Operators, and Exposed Hardware: Enameled to match window finish.
- F. Pull Handles: Anodized aluminum to color as selected.
- G. Screens: Match gray color of window.
- H. Apply coat of bituminous paint on concealed aluminum surfaces in contact with cementitious or dissimilar materials.
- I. Shop and Touch-Up Primer for Steel Components: SSPC Paint 25 red oxide.
- J. Touch-Up Primer for Galvanized Steel Surfaces: SSPC Paint 20 zinc rich.
- K. Galvanizing: ASTM A123/A123M; hot dip galvanize after fabrication.
- L. Galvanizing for Nuts, Bolts and Washers: ASTM A153/A153M.

2.5 ACCESSORIES

- A. Fasteners and Anchors: Galvanized steel.
- B. Visual Glass Dividers: Formed aluminum, fitted against interior of glazed surface, secured with spring loaded steel pins into plastic sockets.
- C. Visual Glass Muntins: Formed aluminum, applied to exterior glass surface.
- D. Bituminous Paint: Fibered asphaltic type.
- E. Limit Stops: Resilient rubber.

PART 3 EXECUTION

3.1 EXAMINATION

- A. Section 017000 - Execution and Closeout Requirements: Requirements for installation examination.
- B. Verify wall openings and adjoining air and vapor seal materials are ready to receive Work of this section.

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3.2 INSTALLATION

- A. Attach window frame and shims to perimeter opening to accommodate construction tolerances and other irregularities.
- B. Align window plumb and level, free of warp or twist. Maintain dimensional tolerances and alignment with adjacent Work.
- C. Install sill and sill end angles.
- D. Install thermal isolation where components penetrate or disrupt building insulation. Pack fibrous insulation in shim spaces at perimeter of assembly to maintain continuity of thermal barrier.
- E. Coordinate attachment and seal of perimeter air barrier and vapor retarder materials.
- F. Install operating hardware.

3.3 TOLERANCES

- A. Section 014000 - Quality Requirements: Tolerances.
- B. Maximum Variation from Level or Plumb: 1/16 inches every 3 ft non-cumulative or 1/8 inches per 10 ft, whichever is less.

3.4 ADJUSTING

- A. Section 017000 - Execution and Closeout Requirements: Requirements for starting and adjusting.
- B. Adjust hardware for smooth operation and secure weathertight closure.

3.5 CLEANING

- A. Section 017000 - Execution and Closeout Requirements: Requirements for cleaning.
- B. Remove protective material from factory finished aluminum surfaces.
- C. Wash surfaces by method recommended and acceptable to sealant and window manufacturer; rinse and wipe surfaces clean.
- D. Remove excess sealant by moderate use of mineral spirits or other solvent acceptable to sealant and window manufacturer.

END OF SECTION

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0SECTION 087100

DOOR HARDWARE

PART 1 GENERAL

1.1 SUMMARY

- A. Section includes hardware for doors, including door gaskets, weatherstripping, seals, and thresholds.

1.2 REFERENCES

- A. American National Standards Institute:
1. ANSI A156.1 - Butts and Hinges.
 2. ANSI A156.2 - Bored and Pre-assembled Locks and Latches.
 3. ANSI A156.3 - Exit Devices.
 4. ANSI A156.4 - Door Controls - Closures.
 5. ANSI A156.5 - Auxiliary Locks and Associated Products.
 6. ANSI A156.6 - Architectural Door Trim.
 7. ANSI A156.7 - Template Hinge Dimensions.
 8. ANSI A156.8 - Door Controls - Overhead Holders.
 9. ANSI A156.12 - Interconnected Locks and Latches.
 10. ANSI A156.13 - Mortise Locks and Latches.
 11. ANSI A156.14 - Sliding and Folding Door Hardware.
 12. ANSI A156.15 - Closer Holder Release Devices.
 13. ANSI A156.16 - Auxiliary Hardware.
 14. ANSI A156.18 - Materials and Finishes
 15. ANSI A156.19 - Power Assist and Low Energy Power Operated Doors.
 16. ANSI A156.23 - Electromagnetic Locks.
 17. ANSI A156.24 - Delayed Egress Locks.
 18. ANSI A156 - Complete Set of 24 BHMA Standards (A156 Series) with Binder.
- B. National Fire Protection Association:
1. NFPA 80 - Standard for Fire Doors, Fire Windows.
 2. NFPA 252 - Standard Methods of Fire Tests of Door Assemblies.
- C. Underwriters Laboratories Inc.:
1. UL 10B - Fire Tests of Door Assemblies.
 2. UL 305 - Panic Hardware.
 3. UL - Building Materials Directory.
- D. Warnock Hersey:
1. WH - Certification Listings.

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1.3 SUBMITTALS

- A. Product Data.
- B. Shop Drawings:
 - 1. Indicate locations and mounting heights of each type of hardware, schedules, catalog cuts.
- C. Hardware Schedule.

1.4 CLOSEOUT SUBMITTALS

- A. Section 017000 - Execution Requirements: Closeout Procedures.
- B. Project Record Documents: Record actual locations of installed cylinders and their master key code.
- C. Operation and Maintenance Data: Submit data on operating hardware, lubrication requirements, and inspection procedures related to preventative maintenance.
- D. Keys: Deliver with identifying tags to Owner by security shipment direct from hardware supplier.

1.5 QUALITY ASSURANCE

- A. Perform Work in accordance with the following requirements:
 - 1. ANSI A156 series.
 - 2. NFPA 80.
 - 3. UL 305.

1.6 QUALIFICATIONS

- A. Manufacturer: Company specializing in manufacturing products specified in this section with minimum three years documented experience.
- B. Hardware Supplier: Company specializing in supplying institutional door hardware with minimum three years documented experience approved by primary hardware manufacturers.

1.7 PRE-INSTALLATION MEETINGS

- A. Section 013000 - Administrative Requirements: Pre-installation meeting.
- B. Convene minimum one week prior to commencing work of this section.
- C. Include persons involved with installation of doors, frames, and hardware.

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1.8 DELIVERY, STORAGE, AND HANDLING

- A. Section 016000 - Product Requirements: Product storage and handling requirements.
- B. Package hardware items individually with necessary fasteners, instructions, and installation templates, when necessary; label and identify each package with door opening code to match hardware schedule.

1.9 COORDINATION

- A. Section 013000 - Administrative Requirements: Coordination and project conditions.
- B. Coordinate Work with other directly affected sections involving manufacture or fabrication of internal reinforcement for door hardware and recessed items.
 - 1. Provide templates or actual hardware as required to ensure proper preparation of doors and frames.
- C. Sequence installation to accommodate required utility connections.
- D. Coordinate Owner's keying requirements during course of Work.

1.10 WARRANTY

- A. Section 017000 - Execution Requirements: Product warranties and product bonds.
- B. Furnish two year manufacturer warranty for locksets and door closers.

1.11 MAINTENANCE MATERIALS

- A. Section 017000 - Execution Requirements: Maintenance materials.
- B. Furnish special wrenches and tools applicable for each different and for each special hardware component.
- C. Furnish maintenance tools and accessories supplied by hardware component manufacturer.

1.12 EXTRA MATERIALS

- A. Section 017000 - Execution Requirements: Spare parts and maintenance products.
- B. Furnish ten extra key lock cylinders for each master keyed group.

PART 2 PRODUCTS

2.1 DOOR HARDWARE

- A. Hinge Manufacturers:

Door Hardware

087100

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1. Stanley.
 2. Hager.
 3. Ives.
 4. Substitutions or approved equal: Section 016000 - Product Requirements.
- B. Lockset Manufacturers:
1. Best Lock Corp.
 2. Sargent.
 3. Schlage.
 4. Substitutions or approved equal: Section 016000 - Product Requirements.
- C. Cylinder Manufacturers:
1. Best Lock Corp.
 2. Sargent.
 3. Substitutions or approved equal: Section 016000 - Product Requirements.
- D. Closers Manufacturers:
1. LCN.
 2. Dorma.
 3. Sargent.
 4. Substitutions or approved equal: Section 016000 - Product Requirements.
- E. Protection Plates, Gaskets, Thresholds, and Trim Manufacturers:
1. Zero International.
 2. National Guard Products.
 3. Substitutions or approved equal: Section 016000 - Product Requirements.

2.2 COMPONENTS

- A. General Hardware Requirements: Where not specifically indicated, comply with applicable ANSI A156 standard for type of hardware required. Furnish each type of hardware with accessories as required for applications indicated and for complete, finished, operational doors.
1. Templates: Furnish templates or physical hardware items to door and frame manufacturers sufficiently in advance to avoid delay in Work.
 2. Reinforcing Units: Furnished by door and frame manufacturers; coordinated by hardware supplier or hardware manufacturer.
 3. Fasteners: Furnish as recommended by hardware manufacturer and as required to secure hardware.
 - a. Finish: Match hardware item being fastened.
 4. Fire Ratings: Provide hardware with UL or Warnock Hersey listings for type of application involved.
- B. Hinges: ANSI A156.1, full mortise type complying with following general requirements unless otherwise scheduled.
1. Widths: Sufficient to clear trim projection when door swings 180 degrees.
 2. Number: Furnish minimum three hinges.
 3. Size and Weight: 4-1/2 inch.

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- a. Extra heavy weight ball bearing hinges.
 4. Pins: Furnish nonferrous hinges with non-removable pins (NRP) at exterior and locked out-swinging doors, non-rising pins at interior doors.
 5. Tips: Flat button.
- C. Locksets: Furnish locksets compatible with specified cylinders. Typical 2-3/4 inch backset. Furnish standard strikes with extended lips to protect trim from being marred by latch bolt verify type of cutouts provided in metal frames.
1. Mortise Locksets: ANSI A156.13, Series 1000, Grade 1 unless otherwise indicated.
 2. Latch Sets: Match locksets.
- D. Cylinders: ANSI A156.5, Grade 1, 7 pin type interchangeable core type cylinders.
1. Keying: Key to existing keying system.
 2. Include construction keying.
 3. Keys: Nickel silver. Stamp keys with "DO NOT DUPLICATE".
 4. Supply keys in the following minimum quantities:
 - a. 5 master keys.
 - b. 3 grand master keys.
 - c. 3 great grand master keys.
 - d. 3 construction keys.
 - e. 3 control keys and 10 extra cylinder cores.
 - f. 3 change keys for each lock.
- E. Closers: ANSI A156.4 modern type with cover surface mounted closers; full rack and pinion type with steel spring and non-freezing hydraulic fluid; closers required for fire rated doors unless otherwise indicated.
1. Adjustability: Furnish controls for regulating closing, latching, speeds, and back checking.
 2. Arms: Type to suit individual condition; parallel-arm closers at reverse bevel doors and where doors swing full 180 degrees.
 3. Location: Mount closers on inside of exterior doors, room side of interior doors typical; mount on pull side of other doors.
 4. Operating Pressure: Maximum operating pressure as follows.
 - a. Interior Doors: Maximum 5 pounds.
 - b. Exterior Doors: Maximum 10 pound.
 - c. Fire Rated Doors: As required for fire rating, maximum 15 pounds.
- F. Protection Plates, Gaskets, Thresholds, and Trim: Furnish as indicated on Drawings, with accessories as required for complete operational door installations.
1. Kickplates: ANSI A156.6, metal; 12 inch height by 1 inch less than door width; minimum 0.050 inch thick stainless steel.
 2. Weatherstripping: Furnish continuous weatherstripping at top and sides of exterior doors, including meeting styles.
 3. Fire Rated Gaskets: Furnish continuous fire rated gaskets at top and sides of fire rated doors.
 4. Thresholds: Maximum 1/2 inch height.

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5. Floor Stops: ANSI A156.1 Grade 1 dome type; furnish with accessories as required for applications indicated.

2.3 ACCESSORIES

- A. Lock Trim: Furnish levers with rose as selected from manufacturer's full range of levers and roses.
- B. Through Bolts: Do not permit through bolts and grommet nuts on door faces in occupied areas unless no alternative is possible.

2.4 FINISHING

- A. Finishes: ANSI A156.18; furnish following finishes except where otherwise indicated.
 1. Hinges:
 - a. Brushed stainless steel.
 2. Typical Exterior Exposed and High Use Interior Door Hardware:
 - a. Brushed stainless steel.
 3. Typical Interior Door Hardware:
 - a. Brushed stainless steel.
 4. Closers: Finish appearance to match door hardware on same face of door.
 - a. BHMA 628, satin aluminum, clear anodized.
 5. Perimeter air seals and Thresholds:
 - a. BHMA 722, clear anodized.
 6. Other Items: As noted.

PART 3 EXECUTION

3.1 EXAMINATION

- A. Section 013000 - Administrative Requirements: Coordination and project conditions.
- B. Verify doors and frames are ready to receive door hardware and dimensions are as indicated on shop drawings.

3.2 INSTALLATION

- A. Coordinate mounting heights with door and frame manufacturers. Use templates provided by hardware item manufacturer.
- B. Mounting Heights From Finished Floor to Center Line of Hardware Item: Comply with manufacturer recommendations and applicable codes where not otherwise indicated.
 1. Locksets: 38 inch.
 2. Push/Pulls: 42 inch.
 3. Dead Locks: 48 inch.
 4. Push Pad Type Exit Devices: 42 inch.
 5. Cross Bar Type Exit Devices: 38 inch.

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6. Top Hinge: Jamb manufacturer's standard, but not greater than 10 inches from head of frame to centerline of hinge.
7. Bottom Hinge: Jamb manufacturer's standard, but not greater than 12-1/2 inches from floor to centerline of hinge.
8. Intermediate Hinges: Equally spaced between top and bottom hinges and from each other.
9. Hinge Mortise on Door Leaf: 1/4 inch to 5/16 inch from stop side of door.

3.3 ADJUSTING

- A. Section 017000 - Execution Requirements: Testing, adjusting, and balancing.
- B. Adjust hardware for smooth operation.

3.4 PROTECTION OF INSTALLED CONSTRUCTION

- A. Section 017000 - Execution Requirements: Protecting installed construction.
- B. Do not permit adjacent work to damage hardware or hardware finish.

END OF SECTION

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SECTION 088000

GLAZING

PART 1 GENERAL

1.1 SUMMARY

- A. Section Includes:
 - 1. Glass glazing for doors and windows.
- B. Related Sections:
 - 1. Section 085113 - Aluminum Windows: Glazed windows.

1.2 REFERENCES

- A. American National Standards Institute:
 - 1. ANSI Z97.1 - Safety Glazing Materials Used in Buildings Safety.
- B. American Society of Civil Engineers:
 - 1. ASCE 7 - Minimum Design Loads for Buildings and Other Structures.
- C. ASTM International:
 - 1. ASTM C509 - Standard Specification for Elastomeric Cellular Preformed Gasket and Sealing Material.
 - 2. ASTM C864 - Standard Specification for Dense Elastomeric Compression Seal Gaskets, Setting Blocks, and Spacers.
 - 3. ASTM C920 - Standard Specification for Elastomeric Joint Sealants.
 - 4. ASTM C1036 - Standard Specification for Flat Glass.
 - 5. ASTM C1048 - Standard Specification for Heat-Treated Flat Glass-Kind HS, Kind FT Coated and Uncoated Glass.
 - 6. ASTM C1172 - Standard Specification for Laminated Architectural Flat Glass.
 - 7. ASTM C1193 - Standard Guide for Use of Joint Sealants.
 - 8. ASTM C1376 - Standard Specification for Pyrolytic and Vacuum Deposition Coatings on Flat Glass.
 - 9. ASTM D635 - Standard Test Method for Rate of Burning and or Extent and Time of Burning of Plastics in a Horizontal Position.
 - 10. ASTM D1929 - Standard Test Method for Determining Ignition Temperature of Plastics.
 - 11. ASTM D4802 - Standard Specification for Poly (Methyl Methacrylate) Acrylic Plastic Sheet.
 - 12. ASTM E84 - Standard Test Method for Surface Burning Characteristics of Building Materials.
 - 13. ASTM E90 - Standard Test Method for Laboratory Measurement of Airborne Sound Transmission Loss of Building Partitions and Elements.
 - 14. ASTM E119 - Standard Test Methods for Fire Tests of Building Construction and Materials.
 - 15. ASTM E1300 - Standard Practice for Determining Load Resistance of Glass in Buildings.
 - 16. ASTM E1425 - Standard Practice for Determining the Acoustical Performance of Windows, Doors, Skylight, and Glazed Wall Systems.
 - 17. ASTM E2190 - Standard Specification for Insulating Glass Unit Performance and Evaluation.

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18. ASTM E1886 - Standard Test Method for Performance of Exterior Windows, Curtain Walls, Doors, and Impact Protective Systems Impacted by Missile(s) and Exposed to Cyclic Pressure Differentials.
19. ASTM E1996 - Standard Specification for Performance of Exterior Windows, Curtain Walls, Doors and Impact Protective Systems Impacted by Windborne Debris in Hurricanes.

D. Consumer Products Safety Commission:

1. CPSC 16 CFR 1201 - Safety Standard for Architectural Glazing.

E. Glass Association of North America:

1. GANA - Sealant Manual.
2. GANA - Glazing Manual.
3. GANA - Laminated Glass Design Guide.

F. National Fenestration Rating Council Incorporated:

1. NFRC 100 - Procedures for Determining Fenestration Product U-Factors.
2. NFRC 200 - Procedure for Determining Fenestration Product Solar Heat Gain Coefficient and Visible Transmittance at Normal Incidence.
3. NFRC 300 - Test Method for Determining the Solar Optical Properties of Glazing Materials and Systems.

G. National Fire Protection Association:

1. NFPA 80 - Standard for Fire Doors, Fire Windows.
2. NFPA 252 - Standard Methods of Fire Tests of Door Assemblies.
3. NFPA 257 - Standard on Fire Test for Window and Glass Block Assemblies.

H. Underwriters Laboratories Inc.:

1. UL 10C - Positive Pressure Fire Tests of Door Assemblies.
2. UL - Building Materials Directory.

1.3 PERFORMANCE REQUIREMENTS

- A. Provide glass and glazing materials for continuity of building enclosure vapor retarder and air barrier.
- B. Glass Thickness: Select minimum thickness in accordance with ASTM E1300 to resist specified design loads with the following maximum probability of breakage:
 1. Vertical Glass: 8 lites per 1000 for wind loads with 60 seconds maximum load duration.
 2. Minimum Thickness: 1/4 inch for exterior glass.
- C. Structural Design: Design in accordance with applicable code for most critical combination of wind, snow, seismic, and dead loads.
- D. Wind Loads: Design and size glass to withstand positive and negative wind loads acting normal to plane of wall, including increased loads at building corners.
 1. Design Wind Load: As calculated in accordance with applicable code and ASCE 7.
- E. Wind-Borne Debris Loads: Design and size glass located less than 60 feet above grade to withstand the following loads:

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- 1. Glass Within 30 feet of Grade: ASTM E1886 and ASTM E1996; large missile impact test.
- F. Seismic Loads: Design and size components to withstand seismic loads and sway displacement as calculated in accordance with applicable code.
- G. Exterior Glass Deflection: Maximum of 1/175 of glass edge length or 3/4 inch, which ever is less with full recovery of glazing materials.
- H. Interior Glass Deflection: Maximum differential deflection for two adjacent unsupported edges when 50 plf force is applied to one panel at any point up to 42 inches above finished floor less than thickness of glass.

1.4 SUBMITTALS

- A. Section 013300 - Submittal Procedures: Submittal procedures.
- B. Shop Drawings.
 - 1. Indicate sizes, layout, thicknesses, and loading conditions for glass.
- C. Product Data:
 - 1. Glass: Provide structural, physical, and thermal and solar optical performance characteristics, size limitations, special handling or installation requirements.
 - 2. Glazing Sealants, Compounds and Accessories: Provide chemical, functional, and environmental characteristics, limitations, special application requirements. Identify available colors where exposed.

1.5 QUALITY ASSURANCE

- A. Perform Work in accordance with GANA Glazing Manual for glazing installation methods.
- B. Fire Rated Door Glazing: Tested in accordance with one of the following and complying with NFPA 80.
 - 1. NFPA 252; with neutral pressure level at 40 inches maximum above sill at 5 minutes into test.
 - 2. UL 10C.
- C. Apply label from agency approved by authority having jurisdiction to identify each fire rated glass lite.

1.6 QUALIFICATIONS

- A. Installer: Company specializing in performing Work of this section with minimum three years experience.

1.7 ENVIRONMENTAL REQUIREMENTS

- A. Section 016000 - Product Requirements.
- B. Do not install glazing when ambient temperature is less than 50 degrees F.

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- C. Maintain minimum ambient temperature before, during and 24 hours after installation of glazing compounds.

1.8 WARRANTY

- A. Section 017000 - Execution and Closeout Requirements: Product warranties and product bonds.
- B. Furnish ten year warranty to include coverage for sealed glass units from seal failure, interpane dusting or misting, and replacement of same.

PART 2 PRODUCTS

2.1 FLOAT GLASS MATERIALS

- A. Heat Strengthened Glass: ASTM C1048, Type 1 transparent flat, Quality Q3, Kind HS heat strengthened, Condition A uncoated, float glass.
- B. Tempered Glass: ASTM C1048, Type 1 transparent flat, Quality Q3, Kind FT fully tempered, Condition A uncoated, float glass with horizontal tempering.
 - 1. Furnish tempered glass where heat strengthened glass cannot meet specified performance requirements.
 - 2. Furnish tempered glass conforming to CPSC 16 CFR 1201 at locations where safety glass is required by applicable code.

2.2 FLOAT GLASS PRODUCTS

- A. Float Glass Manufacturers:
 - 1. ACH Glass Operations.
 - 2. AFG Industries, Inc.
 - 3. Guardian Industries Corp.
 - 4. PPG Industries.
 - 5. Pilkington North America, Inc.
 - 6. Substitutions: Section 016000 - Product Requirements.
- B. Clear Glass: Heat strengthened and Tempered float glass as specified; Class 1 clear.
 - 1. Clear annealed glass (FG-CA).
 - 2. Clear heat strengthened glass (FG-CH).
 - 3. Clear tempered glass (FG-CT).
 - 4. Minimum Thickness: 1/4 inch unless otherwise indicated.

2.3 INSULATING GLASS PRODUCTS

- A. Insulating Glass Manufacturers:
 - 1. AFG Industries, Inc.
 - 2. Guardian Industries Corp.
 - 3. PPG Industries.
 - 4. Substitutions: Section 016000 - Product Requirements.

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- B. Insulating Glass: ASTM E2190 certified by Insulating Glass Certification Council and Insulating Glass Manufacturers Alliance; with silicone sealant edge seal; purge interpane space with dry hermetic air.
 - 1. Total Unit Thickness: 1 inch unless.
 - 2. Insulating Glass Unit Edge Seal Construction: Aluminum or Stainless steel, thermally broken, mitered and spigoted corners.

2.4 GLAZING SEALANTS

- A. Elastomeric Glazing Sealants: Materials compatible with adjacent materials including glass, insulating glass seals, and glazing channels.
 - 1. Silicone Glazing Sealant: ASTM C920, Type S, Grade NS, Class and Use suitable for glazing application indicated; single component; solvent curing; capable of water immersion without loss of properties; non-bleeding, non-staining, cured Shore A hardness of 15 to 25.
 - a. Structural Silicone: Furnish high-modulus structural silicone glazing materials where sealant bonds glass to substrate.
- ***** OR *****
- 2. Polyurethane Glazing Sealant: ASTM C920, Type S, Grade NS, Class and Use suitable for glazing application indicated; single component, chemical curing, non-staining, non-bleeding, Shore A Hardness Range 20 to 35.

2.5 GLAZING ACCESSORIES

- A. Setting Blocks: Elastomeric material recommended by glass manufacturer, 80 to 90 Shore A durometer hardness, length of 0.1 inch for each square foot of glazing or minimum 4 inch x width of glazing rabbet space minus 1/16 inch x height to suit glazing method and pane weight and area.
- B. Spacer Shims: Elastomeric material recommended by glass manufacturer, 50 to 60 Shore A durometer hardness, minimum 3 inch long x one half the height of glazing stop x thickness to suit application, self adhesive on one face.
- C. Glazing Clips: Manufacturer's standard type.

2.6 SOURCE QUALITY CONTROL AND TESTS

- A. Test insulating glass samples in accordance with ASTM E2190.
- B. Heat soak tempered glass in accordance with DIN 18516-4.
 - 1. Statistical Heat Soaking: Heat soak statistical sampling each type of tempered glass to ensure 95 percent probability of maximum 0.1 percent glass breakage caused by nickel sulfide inclusions.
 - 2. Full Heat Soaking: Heat soak each tempered glass lite before final fabrication.

PART 3 EXECUTION

3.1 EXAMINATION

- A. Section 013000 - Administrative Requirements: Coordination and project conditions.

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- B. Verify openings for glazing are correctly sized and within acceptable tolerance.
- C. Verify surfaces of glazing channels or recesses are clean, free of obstructions impeding moisture movement, weeps are clear, and ready to receive glazing.

3.2 PREPARATION

- A. Clean contact surfaces with solvent and wipe dry.
- B. Seal porous glazing channels or recesses with substrate compatible primer or sealer.
- C. Prime surfaces scheduled to receive sealant.

3.3 INSTALLATION

- A. Perform installation in accordance with GANA Glazing Manual.
 - 1. Glazing Sealants: Comply with ASTM C1193.
 - 2. Fire Rated Openings: Comply with NFPA 80.
- B. Exterior Dry Method (Gasket Glazing):
 - 1. Cut glazing gasket to length; install on glazing pane. Seal corners by butting tape and sealing junctions with compatible butyl sealant.
 - 2. Place setting blocks at 1/4 points with edge block no more than 6 inches from corners.
 - 3. Rest glazing on setting blocks and push against fixed stop with sufficient pressure to attain full contact.
 - 4. Install removable stops without displacing glazing spline. Exert pressure for full continuous contact.

3.4 CLEANING

- A. Section 017000 - Execution and Closeout Requirements: Final cleaning.
- B. Remove glazing materials from finish surfaces.
- C. Remove labels after Work is complete.
- D. Clean glass and adjacent surfaces.

3.5 PROTECTION OF INSTALLED CONSTRUCTION

- A. Section 017000 - Execution and Closeout Requirements: Protecting installed construction.
- B. After installation, mark pane with an 'X' by using removable plastic tape or paste.

END OF SECTION

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SECTION 089100

LOUVERS

PART 1 GENERAL

1.1 SUMMARY

- A. Section includes louvers, frames, and accessories.

1.2 REFERENCES

- A. AMCA 500 (Air Movement and Control Association) - Test Method for Louvers, Dampers, and Shutters.
- B. ASTM A653/A653M - Standard Specification for Steel Sheet, Zinc-Coated (Galvanized) or Zinc-Iron Alloy-Coated (Galvanealed) by the Hot-Dip Process.
- C. ASTM A666 - Standard Specification for Austenitic Stainless Steel Sheet, Strip, Plate, and Flat Bar.
- D. ASTM B209/B209M - Standard Specification for Aluminum-Alloy Sheet and Plate.
- E. ASTM B221/B221M - Standard Specification for Aluminum-Alloy Extruded Bars, Rods, Wire, Shapes, and Tubes.
- F. UL (Underwriters Laboratories, Inc.) - Electrical Construction Materials Directory.

1.3 SUBMITTALS

- A. Shop Drawings: Indicate louver layout plan and elevations, opening and clearance dimensions, tolerances; head, jamb and sill details; blade configuration, screens, blackout areas required, and frames and wiring diagrams.
- B. Product Data: Submit data describing design characteristics, maximum recommended air velocity, design free area, materials and finishes.

1.4 CLOSEOUT SUBMITTALS

- A. Section 017000 - Execution Requirements: Closeout Procedures.
- B. Operation and Maintenance Data: Submit Operation and Maintenance Data.

1.5 QUALITY ASSURANCE

- A. Perform Work in accordance with AMCA Certification for louvers, in accordance with AMCA 500.
- B. Conform to applicable code for closing operable louvers in conjunction with the fire and smoke alarm system.

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- C. Products Requiring Electrical Connection: Listed and classified by Underwriters Laboratories, Inc., as suitable for the purpose specified and indicated.

1.6 QUALIFICATIONS

- A. Manufacturer: Company specializing in manufacturing products specified in this section with minimum three years documented experience.

1.7 FIELD MEASUREMENTS

- A. Verify field measurements prior to fabrication.

1.8 COORDINATION

- A. Section 013000 - Administrative Requirements: Coordination and project conditions.
- B. Coordinate the Work with installation of siding, masonry and flashings.
- C. Coordinate the Work with installation of mechanical ductwork and electrical services to motorized devices.

1.9 WARRANTY

- A. Section 017000 - Execution Requirements: Product warranties and product bonds.
- B. Provide twenty-year manufacturer warranty for louvers.
- C. Warranty: Include coverage for degradation of finish.

PART 2 PRODUCTS

2.1 EXTRUDED ALUMINUM STATIONARY LOUVERS

- A. Fabrication:
 - 1. Performance Ratings: AMCA licensed.
 - 2. Frame:
 - a. Material: Extruded aluminum, Alloy 6063-T5.
 - b. Wall Thickness: 0.081 inch, nominal.
 - c. Depth: 6 inches.
 - d. Downspouts and caulking surfaces.
 - 3. Blades:
 - a. Style: Drainable.
 - b. Material: Extruded aluminum, Alloy 6063-T5.
 - c. Wall Thickness: 0.081 inch, nominal.
 - d. Angle: 37.5 degrees.
 - e. Centers: 5-29/32 inches, nominal.
 - 4. Bird Screen:
 - a. Material: Aluminum, flattened, 1/2 inch mesh x 0.063 inch.
 - b. Frame: Removable.
 - 5. Gutters: Drain gutter in head frame and each blade.

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6. Downspouts: Downspouts in jambs to drain water from louver for minimum water cascade from blade to blade.
 7. Vertical Supports: Hidden vertical supports to allow continuous line appearance up to 120 inches.
 8. Sill: Steeply angled integral sill eliminating areas of standing or trapped moisture where mold or mildew may thrive and effect indoor air quality.
 9. Assembly: Factory assemble louver components. All welded construction.
- B. Performance Data:
1. Based on testing 48 inch x 48 inch size unit in accordance with AMCA 500.
 2. Free Area: 57 percent, nominal.
 3. Free Area Size: 9.08 square feet.
 4. Maximum Recommended Air Flow Thru Free Area: 1,023 feet per minute.
 5. Air Flow: 9,289 cubic feet per minute.
 6. Maximum Pressure Drop: 0.15 inches w.g.
 7. Water Penetration: Maximum of 0.01 ounces per square foot of free area at an air flow of 1,023 feet per minute free area velocity when tested for 15 minutes.
- C. Accessories:
1. Extended Sills: Extruded aluminum, Alloy 6063-T5. Minimum nominal wall thickness 0.060 inch.
 2. Visible Mullions: Manufacturer's standard horizontal or vertical visible mullions for architectural accent as indicated on drawings.
- D. Factory Finish:
1. Fluoropolymer Coating:
 - a. Conform to AAMA 605.2.
 - b. Apply coating following cleaning and pretreatment.
 - c. Cleaning: AA-C12C42R1X.
 - d. Dry louvers before final finish application.
 - e. Total Dry Film Thickness: Approximately 1.2 mils, when baked at 450 degrees F for 10 minutes.
 2. Prime Coat:
 - a. Apply alkyd prime coat following chemical cleaning and pretreatment.
 3. Color for Fluoropolymer Coating: Color as selected by Architect from manufacturer's standard colors.

PART 3 EXECUTION

3.1 EXAMINATION

- A. Section 013000 - Administrative Requirements: Coordination and project conditions.
- B. Verify prepared openings and flashings are ready to receive Work and opening dimensions are as instructed by the louver manufacturer.
- C. Verify that electric power is available and of the correct characteristics.

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3.2 INSTALLATION

- A. Install louvers level and plumb.
- B. Install flashings and align louver assembly to ensure moisture shed from flashings and diversion of moisture to exterior.
- C. Secure louvers in opening framing with concealed fasteners for maintenance purposes.
- D. Install bird screen and frame to exterior or interior of louver.
- E. Install bird screens to exhaust and intake louvers.
- F. Install perimeter sealant in accordance with Section 079000.

3.3 ADJUSTING

- A. Section 017000 - Execution Requirements: Testing, adjusting, and balancing.
- B. Adjust operable louvers for freedom of movement of control mechanism. Lubricate operating joints.

3.4 CLEANING

- A. Section 017000 - Execution Requirements - Final cleaning.
- B. Strip protective finish coverings.
- C. Clean surfaces and components.

END OF SECTION

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SECTION 092116

GYPSUM BOARD ASSEMBLIES

PART 1 GENERAL

1.1 SUMMARY

- A. Framing to receive Panels shall be structurally sound, free from bow, and in general Framing compliance with local building code requirements. Damaged and excessively bowed studs shall be replaced before installation of gypsum panels.
- B. All materials shall be delivered in their original unopened packages and stored in an enclosed shelter providing Delivery and Storage protection from damage and exposure to the elements. All materials should be stored flat. Damaged or of Materials deteriorated materials shall be removed from the premises.
- C. In cold weather during panel application and joint finishing, temperatures within the building shall be maintained Environmental Conditions within a range of 55 to 70°F. Adequate ventilation shall be provided to carry off excess moisture.

1.2 SUBMITTALS

- A. Product Data.

PART 2 PRODUCTS

2.1 GYPSUM BOARD PANELS

- A. Manufacturer:
 - 1. USG Corp.
 - 2. Georgia Pacific Gypsum, LLC.
 - 3. National Gypsum, LLC.
 - 4. Substitutions or approved equal: Section 016000 – Product Requirements.
- B. Panels: Moisture resistant, Fire resistant, and Abuse resistant.
- C. Size:
 - 1. 4' x 8' x 1/2" tapered.
- D. Joint Reinforcement: Compatible Joint Tape and compatible Setting-Type Joint Compound for the embedment of tape of same manufacturer as panels.
- E. Metal Bead and Trim; Primer-Surfacer, of same manufacturer as panels.

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PART 3 EXECUTION

- 3.1 Space framing a maximum of 16 o.c. is recommended for abuse-resistant applications. Furred walls shall be fully braced back to structure.
- 3.2 Ceiling joists, furring channels, or furring strips must be spaced max. 24 o.c. Framing must be capable of Ceilings supporting the total ceiling system dead load.
- 3.3 CUTTING PANELS
 - A. Manufacturer:
 - 1. Panel
 - a. Cut ends, edges, scribe, and make cutouts within fields of panels in a workmanlike manner. Panels should be Application cut to size utilizing a knife and straight edge. A power saw should be used only if it is equipped with a dust-collection device. Panels may be cut by scoring and snapping, or by sawing, working from the face side. A SNAPPER SHEAR[®] tool specifically designed for Panels may also be used.
 - B. When using the score-and-snap method, score the panel twice and snap the panel away from the cut face. The backside of the panel is then broken by snapping the panel in the reverse direction.
 - C. Panels should be scored and snapped working from the mesh side.
 - D. If a power-operated saw is used, a low-RPM, 3-1/2 carbide-blade, portable saw is recommended.
 - E. Where necessary to obtain neatly fitting joints, a rasp or surform should be used to smooth cut edges.
 - F. Holes for pipes, fixtures, and other small openings can be cut out with a saw or a drywall router equipped with a 1/4 carbide bit. When using a router, panels should be held away from the wall to avoid damage to utility boxes.
- 3.4 BASIC SINGLE-LAYER SYSTEM, TREATED JOINTS
 - A. Position all ends and edges of all gypsum fiber panels over framing members, except when joints are at right angles to framing members, as in perpendicular application or when end joints are back-blocked.
 - B. Apply gypsum fiber panels first to the ceiling, then to the walls. Install panels vertically whenever possible. For horizontal panel application, panels must be gapped 1/16" of an inch. End joints should be loosely fit. Install panels a minimum of 3/8" above the floor. To minimize end joints, use panels of maximum practical lengths. Stagger end joints in successive courses with joints on opposite sides of a partition placed on different studs.
 - C. Attach panels to framing supports by Power-Driven Screws. Space fasteners not less than 3/8 from edges and ends of panels and drive as recommended for specified fastening method. Drive fasteners in field of panels first, working toward ends and edges. Hold

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panel in firm contact with framing while driving fasteners. Drive fastener heads slightly below surface of gypsum fiber panels in a uniform dimple.

- D. For non-fire-rated partition designs, refer to the table below for fastener spacing. For UL fire-rated partition designs, refer to the specific UL design for proper fastener spacing.
 - 1. Fastener Spacing = 8" o.c.
- E. Install trim at all internal and external angles formed by the intersection of either panel surfaces or other surfaces. Apply (metal, paper-faced) corner bead to all vertical or horizontal external corners in accordance with manufacturer's directions.

3.5 CONTROL JOINT INSTALLATION

- A. Attach Zinc Control Joint No. 093 with Bostitch 9/16 "G" staples or equivalent spaced not over 6 apart in each flange. Cut end joints square and align for neat fit. Remove protective tape when joint treatment is completed. Break panel behind joint and back by double framing members (spaced 1/2 apart).

3.6 FASTENER APPLICATION

- A. Drywall Screws: Power-drive with an electric screw gun so screw heads provide a slight depression below surface of gypsum fiber panels. Do not drive screws closer than 3/8 from edges and ends of gypsum fiber panels. B Nails: Drive nails with heads slightly below gypsum fiber panel surface in a uniform dimple 1/32 deep formed by crowned face of hammer. Drive nails no closer than 3/8 from edges and ends of panel.

3.7 INTERIOR JOINT SYSTEM APPLICATION

- A. Mix joint compound in accordance with manufacturer's recommendation. Use Setting-Type Joint Compound for the embedment of the Joint Tape.
- B. Apply joint compound in a thin uniform layer to all joints and angles to be reinforced. Immediately apply Joint Tape centered over joint and seated into compound. Sufficient compound must remain under the tape to provide proper bond. Follow immediately with a thin skim coat to embed tape, but not to function as a second coat. Fold and embed tape properly in all interior angles to provide a true angle. The tape or embedding coat must be hardened prior to application of second coat. Note: Do not use fiberglass tape.
- C. Apply second coat of joint compound over embedding coat, filling panel taper flush with surface; cover tape and feather beyond first coat. On joints with no taper, cover the tape and feather on either side of tape. Allow second coat to harden prior to application of finish coat.
- D. Spread finish coat evenly over and extend beyond second coat on all joints and feather to a smooth uniform finish. Do not allow finished joint to protrude beyond plane of the surface. Apply a finish coat to cover tape and taping compound at all tapered angles and provide a true angle. Where necessary, sand lightly between coats and following the final application of compound to provide a smooth surface ready for decoration.

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- E. Tape, fill, and sand exposed joints, edges, and corners to produce smooth surface ready to receive finishes.

3.8 FINISHING FASTENERS

- A. Apply joint compound to all fastener depressions.

3.9 FINISHING BEAD AND TRIM

- A. Apply first coat to all bead and trim and properly feather out from ground to plane of surface. Compound must harden prior to application of second coat.
- B. Apply second coat in same manner as first coat, extending compound slightly beyond first coat, and properly feathering from ground to plane or surface. When dry, sand finish as necessary to provide a flat smooth surface ready for decoration. When sanding, take care not to roughen surface.
- C. Treat all joints, fasteners and accessories with a recommended joint treatment system.

3.10 SCHEDULE

- A. Finishes in accordance with GA-214 Level:
 - 1. Level 5: Walls exposed to view.

END OF SECTION

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SECTION 093050

CEMENT BOARD SYSTEMS

PART 1 GENERAL

1.1 SUMMARY

- A. Cement board and associated installation materials for foundation and ceiling/wall applications.
- B. Storage of Materials: All materials shall be delivered in their original unopened packages and stored in an enclosed shelter providing protection from damage and exposure to the elements. Damaged or deteriorated materials shall be removed from the premises. **WARNING:** Store all Cement Board panels flat. Panels are heavy and can fall over, causing serious injury or death. Do not move unless authorized.
- C. Environmental Conditions: In cold weather and during Cement Panel and tile installation, temperatures within the building shall be maintained within the range of 40 to 100 °F. Adequate ventilation shall be provided to carry off excess moisture.
- D. Interior Applications: Wood framing shall approximate the moisture content it will reach in service by allowing the enclosed building to stand as long as possible prior to the application of the cement board. Do not install board when the board is wet.
- E. Exterior Applications: Finishes, leveling/skim coats and basecoats shall not be applied to Cement Panel that is wet or frozen or that contains frost. After application, and for at least 24 hours, finishes, leveling/skim coats and basecoats shall be effectively protected from rain and excessive moisture. In cold weather and during finish applications, Cement Panel, skim or basecoat, mortar, finish material and air temperature must be at least 40 °F, and must remain at this temperature or higher for at least 24 hours after application. Hot and dry weather may affect working time of leveling/skim or basecoat and finish materials. Under rapid drying conditions, dampening or light fogging of board, leveling/skim or basecoat surface may be required to improve workability.
- F. Steel or wood wall framing to receive Cement Panels shall be structurally sound, free from bow, and in general compliance with local building code requirements. Damaged and excessively bowed studs shall be replaced before installation of Cement Panels. Framing shall be designed (based on stud properties alone) not to exceed L/360 deflection for tile and thin brick, L/240 for Direct-Applied Exterior Finish Systems. Steel framing must be 20 gauge or heavier with corrosion-resistant metal coating equivalent to G60 hot-dipped galvanized. Exterior steel framing should be laterally braced.
- G. Installation Practices: Panel should be cut to size with carbide-tipped knife and straight edge. Power saw should be used only if equipped with a dust-collection device and a NIOSH/MSHA-approved respirator is worn.

PART 2 PRODUCTS

2.1 CEMENT BOARD

- A. Products Materials — Exterior Type Cement Board, 1/2" thickness, 48" width x lengths of 4' to 10'; exceeds ANSI A118.9-1992 for cementitious backer units.

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2.2 JOINT REINFORCEMENT

- A. Joint Tape: Alkali-resistant glass-fiber tape, 2" wide.
- B. Fasteners: Self-tapping Steel Screws (No. 8), 1¼" and 1 5/8" for 14 to 20 gauge steel framing; ¼" diameter Masonry Screws for concrete.
- C. Adhesives/Mortars:
 - 1. Products compatible with alkaline or portland cement-based Cement Board:
 - a. Meeting ASTM C557-73: multipurpose adhesive.
 - b. Meeting ANSI A136.1 Type I.
 - c. Meeting ANSI A118.1: dry-set mortar mixed with acrylic latex additive.
 - d. Meeting ANSI A118.4: latex portland cement mortar.

PART 3 EXECUTION

3.1 INSTALLATION

- A. Panel Application: Pre-drill cement board for fasteners or use self-tapping screws. Pre-cut board to required sizes and make necessary cut-outs. Fit ends and edges closely but not forced together, leaving a 1/8" gap. Install board abutting top of spacer strip. Stagger end joints in successive courses. Fasten boards to concrete spaced max. 16" o.c. and with masonry screws.
- B. Wall and Ceiling Installation: Install board edges centered over studs. Abut ends and edges of each board with those of adjacent boards. Attach boards at perimeter and within field of board to each stud.
 - 1. Space fasteners approximately 8" o.c. and set back a minimum of 3/8" from edges and ends of boards for wall installation.
 - 2. Space fasteners approximately 6" o.c. and set back a minimum of 3/8" from edges and ends of boards for ceiling installation.
- C. Joint Finishing: Caulk joints with sealant, specified in Section 079000.
- D. Finish interior panels as specified in Section 099000.

END OF SECTION

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SECTION 099000

PAINTING AND COATING

PART 1 GENERAL

1.1 SUMMARY

- A. Section includes surface preparation and field application of paints and other coatings.

1.2 REFERENCES

- A. ASTM International:
 - 1. ASTM D16 - Standard Terminology for Paint, Related Coatings, Materials, and Applications.
 - 2. ASTM D4442 - Standard Test Methods for Direct Moisture Content Measurement of Wood and Wood-Base Materials.
 - 3. ASTM E84 - Standard Test Method for Surface Burning Characteristics of Building Materials.
- B. Painting and Decorating Contractors of America:
 - 1. PDCA - Architectural Painting Specification Manual.
- C. SSPC: The Society for Protective Coatings:
 - 1. SSPC - Steel Structures Painting Manual.

1.3 DEFINITIONS

- A. Conform to ASTM D16 for interpretation of terms used in this section.

1.4 SUBMITTALS

- A. Section 013300 - Submittal Procedures: Submittal procedures.
- B. Product Data: Submit data on finishing products.
- C. Samples:
 - 1. Submit paper chip samples, illustrating range of colors available for each surface finishing product scheduled.

1.5 CLOSEOUT SUBMITTALS

- A. Section 017000 - Execution and Closeout Requirements: Closeout procedures.
- B. Operation and Maintenance Data: Submit data on cleaning, touch-up, and repair of painted and coated surfaces.

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1.6 QUALITY ASSURANCE

- A. Surface Burning Characteristics:
 - 1. Fire Retardant Finishes: Maximum 25/450 flame spread/smoke developed index when tested in accordance with ASTM E84.

1.7 QUALIFICATIONS

- A. Manufacturer: Company specializing in manufacturing products specified in this section with minimum three years experience.
- B. Applicator: Company specializing in performing work of this section with minimum three years experience.

1.8 DELIVERY, STORAGE, AND HANDLING

- A. Section 016000 - Product Requirements: Product storage and handling requirements.
- B. Deliver products to site in sealed and labeled containers; inspect to verify acceptability.
- C. Container Label: Include manufacturer's name, type of paint, brand name, lot number, brand code, coverage, surface preparation, drying time, cleanup requirements, color designation, and instructions for mixing and reducing.
- D. Paint Materials: Store at minimum ambient temperature of 45 degrees F and maximum of 90 degrees F, in ventilated area, and as required by manufacturer's instructions.

1.9 ENVIRONMENTAL REQUIREMENTS

- A. Section 016000 - Product Requirements.
- B. Do not apply materials when surface and ambient temperatures are outside temperature ranges required by paint product manufacturer.
- C. Do not apply exterior coatings during rain or snow when relative humidity is outside humidity ranges, or moisture content of surfaces exceed those required by paint product manufacturer.
- D. Minimum Application Temperatures for Latex Paints: 45 degrees F for interiors; 50 degrees F for exterior; unless required otherwise by manufacturer's instructions.

1.10 SEQUENCING

- A. Section 011000 - Summary: Work sequence.
- B. Sequence application to the following:
 - 1. Do not apply finish coats until paintable sealant is applied.

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1.11 WARRANTY

- A. Section 017000 - Execution and Closeout Requirements: Product warranties and product bonds.
- B. Furnish five year manufacturer warranty for paints and coatings.

1.12 EXTRA MATERIALS

- A. Section 017000 - Execution and Closeout Requirements: Spare parts and maintenance products.
- B. Supply 1 gallons of each color, type; store where directed.
- C. Label each container with color, type, texture, and room locations, in addition to manufacturer's label.

PART 2 PRODUCTS

2.1 PAINTS AND COATINGS

- A. Manufacturers: Paint, Primer Sealers, and Block Filler.
 - 1. Tnemec Inc.
 - 2. Sherwin-Williams.
 - 3. PPG Industries.
 - 4. Devoe Paint Co.
 - 5. Benjamin Moore.
 - 6. Substitutions: Section 016000 - Product Requirements.

2.2 COMPONENTS

- A. Coatings: Ready mixed, except field catalyzed coatings. Prepare coatings:
 - 1. To soft paste consistency, capable of being readily and uniformly dispersed to homogeneous coating.
 - 2. For good flow and brushing properties.
 - 3. Capable of drying or curing free of streaks or sags.
- B. Accessory Materials: Linseed oil, shellac, turpentine, paint thinners and other materials not specifically indicated but required to achieve finishes specified; commercial quality.
- C. Patching Materials: Latex filler.
- D. Fastener Head Cover Materials: Latex filler.

PART 3 EXECUTION

3.1 EXAMINATION

- A. Section 013000 - Administrative Requirements: Coordination and project conditions.

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- B. Verify surfaces and substrate conditions are ready to receive Work as instructed by product manufacturer.
- C. Examine surfaces scheduled to be finished prior to commencement of work. Report conditions capable of affecting proper application.
- D. Test shop applied primer for compatibility with subsequent cover materials.
- E. Measure moisture content of surfaces using electronic moisture meter. Do not apply finishes unless moisture content of surfaces are below the following maximums:
 - 1. Gypsum Wallboard: 12 percent.
 - 2. Masonry, Concrete, and Concrete Unit Masonry: 12 percent.

3.2 PREPARATION

- A. Surface Appurtenances: Remove electrical plates, hardware, light fixture trim, escutcheons, and fittings prior to preparing surfaces or finishing.
- B. Surfaces: Correct defects and clean surfaces capable of affecting work of this section.
- C. Marks: Seal with shellac those which may bleed through surface finishes.
- D. Impervious Surfaces: Remove mildew by scrubbing with solution of tri-sodium phosphate and bleach. Rinse with clean water and allow surface to dry.
- E. Insulated Coverings: Remove dirt, grease, and oil from canvas and cotton.
- F. Concrete Floors: Remove contamination, acid etch, and rinse floors with clear water. Verify required acid-alkali balance is achieved. Allow to dry.
- G. Gypsum Board Surfaces: Fill minor defects with filler compound. Spot prime defects after repair.
- H. Galvanized Surfaces: Remove surface contamination and oils and wash with solvent. Apply coat of etching primer.
- I. Concrete and Unit Masonry Surfaces Scheduled to Receive Paint Finish: Remove dirt, loose mortar, scale, salt or alkali powder, and other foreign matter. Remove oil and grease with solution of tri-sodium phosphate; rinse well and allow to dry. Remove stains caused by weathering of corroding metals with solution of sodium metasilicate after thoroughly wetting with water. Allow to dry.
- J. Uncoated Steel and Iron Surfaces: Remove grease, mill scale, weld splatter, dirt, and rust. Where heavy coatings of scale are evident, remove by power tool wire brushing or sandblasting; clean by washing with solvent. Apply treatment of phosphoric acid solution, ensuring weld joints, bolts, and nuts are similarly cleaned. Spot prime paint after repairs.
- K. Shop Primed Steel Surfaces: Sand and scrape to remove loose primer and rust. Feather edges to make touch-up patches inconspicuous. Clean surfaces with solvent. Prime bare steel surfaces.

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- L. Metal Doors Scheduled for Painting: Prime metal door top and bottom edge surfaces.

3.3 APPLICATION

- A. Do not apply finishes to surfaces that are not dry. Allow applied coats to dry before next coat is applied.
- B. Apply each coat to uniform appearance. Apply each coat of paint slightly darker than preceding coat unless specified otherwise.
- C. Sand metal surfaces lightly between coats to achieve required finish.
- D. Vacuum clean surfaces of loose particles. Use tack cloth to remove dust and particles just prior to applying next coat.
- E. Where clear finishes are required, tint fillers to match wood. Work fillers into grain before set. Wipe excess from surface.
- F. Finishing Mechanical And Electrical Equipment:
 - 1. Refer to Section 220553, Section 230553, and Section 260553, for schedule of color coding and identification banding of equipment, duct work, piping, and conduit.
 - 2. Paint shop primed equipment.
 - 3. Remove unfinished louvers, grilles, covers, and access panels on mechanical and electrical components and paint separately.
 - 4. Prime and paint insulated and exposed pipes, conduit, boxes, insulated and exposed ducts, hangers, brackets, collars and supports, except where items are shop finished.
 - 5. Paint exposed conduit and electrical equipment occurring in finished areas.
 - 6. Color code equipment, piping, conduit, and exposed duct work in accordance with requirements indicated.
 - 7. Reinstall electrical cover plates, hardware, light fixture trim, escutcheons, and fittings removed prior to finishing.

3.4 FIELD QUALITY CONTROL

- A. Section 014000 - Quality Requirements: Field inspecting, testing, adjusting, and balancing.
- B. Inspect and test questionable coated areas.

3.5 CLEANING

- A. Section 017000 - Execution and Closeout Requirements: Final cleaning.
- B. Collect waste material which may constitute fire hazard, place in closed metal containers, and remove daily from site.

3.6 SCHEDULE - EXTERIOR SURFACES

- A. Steel - Unprimed: (Bollards)
 - 1. One coat of alkyd primer.

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2. Two coats of alkyd enamel, semi-gloss.

B. Steel - Shop Primed (Lintels, Doors, and Frames):

1. Touch-up with zinc chromate primer.

2. Two coats of alkyd enamel, semi-gloss.

3.7 SCHEDULE - INTERIOR SURFACES

A. Concrete Block: (Walls)

1. One coat of block filler.

2. Two coats of polyamide epoxy, semi-gloss.

B. Steel - Unprimed:

1. One coat of alkyd primer.

2. Two coats of alkyd enamel, semi-gloss.

C. Steel - Primed: (Bar Joists)

1. Touch-up with alkyd primer.

2. Two coats of alkyd enamel, semi-gloss.

END OF SECTION

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SECTION 104400

FIRE PROTECTION SPECIALTIES

PART 1 GENERAL

1.1 SUMMARY

- A. Section includes fire extinguishers; fire extinguisher cabinets; and brackets for wall mounting.

1.2 REFERENCES

- A. National Fire Protection Association:
 - 1. NFPA 10 - Standard for Portable Fire Extinguishers.
- B. Underwriters Laboratories Inc.:
 - 1. UL - Fire Protection Equipment Directory.

1.3 PERFORMANCE REQUIREMENTS

- A. Conform to NFPA 10 code.
- B. Provide extinguishers classified and labeled by Underwriters Laboratories Inc. for purpose specified and indicated.
- C. Provide fire extinguisher cabinets classified and labeled by Underwriters Laboratories Inc. for purpose specified and indicated.

1.4 SUBMITTALS

- A. Section 013300 - Submittal Procedures: Submittal procedures.
- B. Shop Drawings: Indicate cabinet physical dimensions and wall bracket mounted measurements.
- C. Product Data: Submit extinguisher operational features, color and finish, anchorage details.

1.5 CLOSEOUT SUBMITTALS

- A. Section 017000 - Execution and Closeout Requirements: Closeout procedures.
- B. Operation and Maintenance Data: Submit test, refill or recharge schedules and re-certification requirements.

1.6 ENVIRONMENTAL REQUIREMENTS

- A. Section 016000 - Product Requirements: Environmental conditions affecting products on site.
- B. Do not install extinguishers when ambient temperature are capable of freezing extinguisher ingredients.

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PART 2 PRODUCTS

2.1 FIRE EXTINGUISHERS

- A. Manufacturers:
 - 1. JL Industries.
 - 2. Larsen's Manufacturing Co.
 - 3. Nystrom Products Co.
 - 4. Potter Roemer.
 - 5. Substitutions: Section 016000 - Product Requirements.
- B. Dry Chemical Type: Cast steel tank, with pressure gage; Class B: C, Size 20.
- C. Extinguisher Finish: Steel, enamel to red color.

2.2 FIRE EXTINGUISHER CABINETS

- A. Metal: Formed sheet steel, primed; 0.036 inch thick base metal.
- B. Configuration: Surface type.
- C. Trim Type: Flat.
- D. Door: 0.016 inch thick, reinforced for flatness and rigidity; latch with full glass access.
- E. Door Glazing: Glass, clear, 1/8 inch thick tempered.
- F. Cabinet Mounting Hardware: Appropriate to cabinet.
- G. Form cabinet enclosure with right angle inside corners and seams. Form perimeter trim and door stiles.
- H. Pre-drill for anchors.
- I. Hinge doors for 180 degree opening with continuous piano hinge. Furnish roller type catch.
- J. Weld, fill, and grind components smooth.
- K. Glaze doors with resilient channel gasket glazing.
- L. Finishing Cabinet Exterior Trim and Door: Red baked enamel color.
- M. Finishing Cabinet Interior: White enamel.

2.3 ACCESSORIES

- A. Extinguisher Brackets: Formed steel, white enamel finish.

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PART 3 EXECUTION

3.1 EXAMINATION

- A. Section 013000 - Administrative Requirements: Coordination and project conditions.

3.2 INSTALLATION

- A. Install wall brackets, maximum 48 inches from finished floor to top of extinguisher handle.
- B. Secure rigidly in place.
- C. Place extinguishers in cabinets on wall brackets.

END OF SECTION

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SECTION 221100

FACILITY WATER DISTRIBUTION

PART 1 GENERAL

1.1 SUMMARY

- A. Section Includes:
1. Wall hydrants.
 2. Hose and hose accessories.

1.2 REFERENCES

- A. American National Standards Institute:
1. ANSI Z21.22 - Relief Valves for Hot Water Supply Systems.
- B. American Society of Mechanical Engineers:
1. ASME B16.18 - Cast Copper Alloy Solder Joint Pressure Fittings.
 2. ASME B16.22 - Wrought Copper and Copper Alloy Solder Joint Pressure Fittings.
 3. ASME B16.26 - Cast Copper Alloy Fittings for Flared Copper Tubes.
 4. ASME B31.9 - Building Services Piping.
 5. ASME B40.1 - Gauges - Pressure Indicating Dial Type - Elastic Element.
 6. ASME Section VIII - Boiler and Pressure Vessel Code - Pressure Vessels.
 7. ASME Section IX - Boiler and Pressure Vessel Code - Welding and Brazing Qualifications.
- C. American Society of Sanitary Engineering:
1. ASSE 1010 - Performance Requirements for Water Hammer Arresters.
 2. ASSE 1011 - Performance Requirements for Hose Connection Vacuum Breakers.
 3. ASSE 1012 - Performance Requirements for Backflow Preventer with Intermediate Atmospheric Vent.
 4. ASSE 1013 - Performance Requirements for Reduced Pressure Principle Backflow Preventers and Reduced Pressure Fire Protection Principle Backflow Preventers.
 5. ASSE 1019 - Performance Requirements for Vacuum Breaker Wall Hydrants, Freeze Resistant, Automatic Draining Type.
 6. ASSE 5015 - Performance Requirements for Testing Double Check Backflow Prevention Assemblies (DC) and Double Check Fire Protection Backflow Prevention Assemblies (RPDF).
- D. ASTM International:
1. ASTM A53/A53M - Standard Specification for Pipe, Steel, Black and Hot-Dipped, Zinc-Coated, Welded and Seamless.
 2. ASTM A234/A234M - Standard Specification for Piping Fittings of Wrought Carbon Steel and Alloy Steel for Moderate and High Temperature Service.
 3. ASTM B32 - Standard Specification for Solder Metal.

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4. ASTM B42 - Standard Specification for Seamless Copper Pipe, Standard Sizes.
 5. ASTM B88 - Standard Specification for Seamless Copper Water Tube.
- E. American Welding Society:
1. AWS A5.8 - Specification for Filler Metals for Brazing and Braze Welding.
- F. Manufacturers Standardization Society of the Valve and Fittings Industry:
1. MSS SP 58 - Pipe Hangers and Supports - Materials, Design and Manufacturer.
 2. MSS SP 69 - Pipe Hangers and Supports - Selection and Application.
 3. MSS SP 70 - Cast Iron Gate Valves, Flanged and Threaded Ends.
 4. MSS SP 71 - Cast Iron Swing Check Valves, Flanged and Threaded Ends.
 5. MSS SP 78 - Cast Iron Plug Valves, Flanged and Threaded Ends.
 6. MSS SP 80 - Bronze Gate, Globe, Angle and Check Valves.
 7. MSS SP 85 - Cast Iron Globe & Angle Valves, Flanged and Threaded.
 8. MSS SP 89 - Pipe Hangers and Supports - Fabrication and Installation Practices.
 9. MSS SP 110 - Ball Valves Threaded, Socket-Welding, Solder Joint, Grooved and Flared Ends.
- G. National Electrical Manufacturers Association:
1. NEMA 250 - Enclosures for Electrical Equipment (1000 Volts Maximum).
- H. Plumbing and Drainage Institute:
1. PDI WH201 - Water Hammer Arrester Standard.
- I. SDWA
1. Section 1417 – Prohibition on Use and Introduction into Commerce of Lead Pipes, Solder, and Flux
 - a. The SDWA, Section 1417 changes the definition of “lead-free” by reducing lead content from 8% to a weighted average of not more than 0.25% in the wetted surface material, effective January 4, 2014.

1.3 SUBMITTALS

- A. Product Data:
1. Piping: Submit data on pipe materials, fittings, and accessories. Submit manufacturer's catalog information.
 2. Valves: Submit manufacturers catalog information with valve data and ratings for each service.
 3. Domestic Water Specialties: Submit manufacturers catalog information, component sizes, rough-in requirements, service sizes, and finishes.
 4. Pumps: Submit pump type, capacity, certified pump curves showing pump performance characteristics with pump and system operating point plotted. Include NPSH curve when applicable. Include electrical characteristics and connection requirements.
 5. Water Treatment System: Provide product data, manufacturer information, performance characteristics, etc. and submit a complete package of system components under one cover. All components shall be available through a single source supplier/manufacturer's representative.

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- B. Manufacturer's Installation Instructions: Submit installation instructions for pumps, valves and accessories.
- C. Manufacturer's Certificate: Certify products meet or exceed specified requirements.

1.4 CLOSEOUT SUBMITTALS

- A. Project Record Documents: Record actual locations of valves and equipment.
- B. Operation and Maintenance Data: Submit spare parts list, exploded assembly views and recommended maintenance intervals.

1.5 QUALITY ASSURANCE

- A. For drinking water service, provide valves complying with NSF 61.

1.6 QUALIFICATIONS

- A. Manufacturer: Company specializing in manufacturing products specified in this section with minimum three years documented experience.
- B. Installer: Company specializing in performing Work of this section with minimum three years documented experience.

1.7 DELIVERY, STORAGE, AND HANDLING

- A. Accept valves and equipment on site in shipping containers with labeling in place. Inspect for damage.
- B. Provide temporary protective coating on cast iron and steel valves.
- C. Provide temporary end caps and closures on piping and fittings. Maintain in place until installation.
- D. Protect piping systems from entry of foreign materials by temporary covers, completing sections of the Work, and isolating parts of completed system.

1.8 FIELD MEASUREMENTS

- A. Verify field measurements prior to fabrication.

1.9 WARRANTY

- A. Refer to standard General Requirements.

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PART 2 PRODUCTS

NOTE: ALL DOMESTIC WATER PLUMBING PRODUCTS (PIPE, TUBE, VALVES, FITTINGS, ETC.) SHALL BE LEAD FREE AS DESCRIBED ABOVE.

2.1 WALL HYDRANTS

- A. Manufacturers:
 - 1. Zurn, Model Z1346 and Z1341.
 - 2. Watts.
 - 3. JR Smith.
- B. Exterior Wall Hydrant: ASSE 1019; non-freeze, self-draining type with chrome wall plate and hose thread spout, integral vacuum breaker.
- C. Interior Wall Hydrant: ASME B1.20.7; exposed wall faucet, anti-siphon, all bronze interior components, rough bronze finish, 3/4" male hose connection, 3/4" FPT inlet connection.

2.2 HOSE BRACKET

- A. Heavy duty stainless steel or cast aluminum wall bracket, capable of holding up to 100 feet of 3/4" heavy duty hose.

2.3 HOSE

- A. Gilmour Model 18-25-34050 or equal. Heavy duty hose, 50 feet in length, 3/4 inch reinforced rubber/vinyl, 600 psi burst strength, double cord reinforced, kink resistant, abrasion resistant, hot water rated up to 180F, stainless steel spring protector and bronze swivel attachment.

2.4 HOSE NOZZLE

- A. Gilmour Model 572FR or equal. Heavy duty commercial insulated pistol grip spray nozzle with male threaded front, die cast zinc body, brass head insert, solid brass valve stem wither adjusting nut, stainless steel spring.

PART 3 EXECUTION

3.1 EXAMINATION

- A. Verify excavations are to required grade, dry, and not over-excavated.

3.2 PREPARATION

- A. Ream pipe and tube ends. Remove burrs.

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- B. Remove scale and dirt, on inside and outside, before assembly.

3.3 INSTALLATION - THERMOMETERS AND GAGES

- A. Install gage taps in piping.
- B. Install pressure gages with pulsation dampers. Provide needle valve to isolate each gage.
- C. Install thermometers in piping systems in sockets in short couplings. Enlarge pipes smaller than 2-1/2 inches for installation of thermometer sockets. Allow clearance from insulation.
- D. Provide instruments with scale ranges selected according to service with largest appropriate scale.
- E. Install gages and thermometers in locations where they are easily read from normal operating level. Install vertical to 45 degrees off vertical.
- F. Adjust gages and thermometers to final angle, clean windows and lenses, and calibrate to zero.

3.4 INSTALLATION - ABOVE GROUND PIPING

- A. Install non-conducting dielectric connections wherever jointing dissimilar metals.
- B. Route piping in orderly manner and maintain gradient. Route parallel and perpendicular to walls.
- C. Install piping to maintain headroom without interfering with use of space or taking more space than necessary.
- D. Group piping whenever practical at common elevations.
- E. Slope piping and arrange systems to drain at low points.
- F. Provide clearance in hangers and from structure and other equipment for installation of insulation and access to valves and fittings. Provide access where valves and fittings are not accessible.
- G. Where pipe support members are welded to structural building framing, scrape, brush clean, and apply one coat of zinc rich primer to welding.
- H. Install domestic water piping in accordance with ASME B31.9.
- I. Sleeve pipes passing through partitions, walls and floors. Install firestopping at fire rated construction perimeters and openings containing penetrating sleeves and piping. Install unions downstream of valves and at equipment or apparatus connections.
- J. Install valves with stems upright or horizontal, not inverted.

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- K. Install brass male adapters each side of valves in copper piped system. Solder adapters to pipe.
- L. Install ball valves for shut-off and to isolate equipment, part of systems, or vertical risers.
- M. Pipe relief from valves, back-flow preventers and drains to nearest floor drain.
- N. Test backflow preventers in accordance with ASSE 5013.
- O. Install long radius reducing elbows or reducers between pump and piping. Support piping adjacent to pump so no weight is carried on pump casings.

END OF SECTION

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DOCUMENT 230500

BASIC MECHANICAL AND PLUMBING MATERIALS AND METHODS

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

- A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 1 Specification Sections, apply to this Section.

1.2 SUMMARY

- A. This Section includes the following:
 - 1. Piping materials and installation instructions common to most piping systems.
 - 2. Transition fittings.
 - 3. Dielectric fittings.
 - 4. Mechanical sleeve seals.
 - 5. Sleeves.
 - 6. Escutcheons.
 - 7. Grout.
 - 8. Mechanical demolition.
 - 9. Equipment installation requirements common to equipment sections.
 - 10. Painting and finishing.
 - 11. Concrete bases.
 - 12. Supports and anchorages.

1.3 DEFINITIONS

- A. Finished Spaces: Spaces other than mechanical and electrical equipment rooms, furred spaces, pipe and duct shafts, unheated spaces immediately below roof, spaces above ceilings, unexcavated spaces, crawlspace, and tunnels.
- B. Exposed, Interior Installations: Exposed to view indoors. Examples include finished occupied spaces and mechanical equipment rooms.
- C. Exposed, Exterior Installations: Exposed to view outdoors or subject to outdoor ambient temperatures and weather conditions. Examples include rooftop locations.
- D. Concealed, Interior Installations: Concealed from view and protected from physical contact by building occupants. Examples include above ceilings and in duct shafts.
- E. Concealed, Exterior Installations: Concealed from view and protected from weather conditions and physical contact by building occupants but subject to outdoor ambient temperatures. Examples include installations within unheated shelters.
- F. The following are industry abbreviations for plastic materials:
 - 1. ABS: Acrylonitrile-butadiene-styrene plastic.

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2. CPVC: Chlorinated polyvinyl chloride plastic.
3. PE: Polyethylene plastic.
4. PVC: Polyvinyl chloride plastic.

- G. The following are industry abbreviations for rubber materials:
1. EPDM: Ethylene-propylene-diene terpolymer rubber.
 2. NBR: Acrylonitrile-butadiene rubber.

1.4 SUBMITTALS

- A. Product Data: For the following:
1. Transition fittings.
 2. Dielectric fittings.
 3. Mechanical sleeve seals.
 4. Escutcheons.
 5. Sleeves

1.5 QUALITY ASSURANCE

- A. Electrical Characteristics for Mechanical Equipment: Equipment of higher electrical characteristics may be furnished provided such proposed equipment is approved in writing and connecting electrical services, circuit breakers, and conduit sizes are appropriately modified. If minimum energy ratings or efficiencies are specified, equipment shall comply with requirements.

1.6 DELIVERY, STORAGE, AND HANDLING

- A. Deliver pipes and tubes with factory-applied end caps. Maintain end caps through shipping, storage, and handling to prevent pipe end damage and to prevent entrance of dirt, debris, and moisture.
- B. Store plastic pipes protected from direct sunlight. Support to prevent sagging and bending.

1.7 COORDINATION

- A. Arrange for pipe spaces, chases, slots, and openings in building structure during progress of construction, to allow for mechanical installations.
- B. Coordinate installation of required supporting devices and set sleeves in poured-in-place concrete and other structural components as they are constructed.
- C. Coordinate requirements for access panels and doors for mechanical items requiring access that are concealed behind finished surfaces.

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PART 2 - PRODUCTS

2.1 PIPE, TUBE, AND FITTINGS

- A. Refer to individual Division 23 piping Sections for pipe, tube, and fitting materials and joining methods.
- B. Pipe Threads: ASME B1.20.1 for factory-threaded pipe and pipe fittings.

2.2 JOINING MATERIALS

- A. Refer to individual Division 23 piping Sections for special joining materials.

2.3 TRANSITION FITTINGS

- A. AWWA Transition Couplings: Same size as, and with pressure rating at least equal to and with ends compatible with, piping to be joined.
 - 1. Underground Piping NPS 1-1/2 and Smaller: Manufactured fitting or coupling.
 - 2. Underground Piping NPS 2 and Larger: AWWA C219, metal sleeve-type coupling.
 - 3. Aboveground Pressure Piping: Pipe fitting.
- B. Plastic-to-Metal Transition Fittings: CPVC one-piece fitting with manufacturer's Schedule 80 equivalent dimensions; one end with threaded brass insert, and one solvent-cement-joint end.
- C. Plastic-to-Metal Transition Adaptors: One-piece fitting with manufacturer's SDR 11 equivalent dimensions; one end with threaded brass insert, and one solvent-cement-joint end.
- D. Plastic-to-Metal Transition Unions: MSS SP-107, CPVC Four-part union. Include brass end, solvent-cement-joint end, rubber O-ring, and union nut.
- E. Flexible Transition Couplings for Underground Non-pressure Drainage Piping: ASTM C 1173 with elastomeric sleeve; ends same size as piping to be joined, and corrosion-resistant metal band on each end.

2.4 DIELECTRIC FITTINGS

- A. Description: Combination fitting of copper alloy and ferrous materials with threaded, solder-joint, plain, or weld-neck end connections that match piping system materials.
- B. Insulating Material: Suitable for system fluid, pressure, and temperature.
- C. Dielectric Unions: Factory-fabricated, union assembly, for 250-psig minimum working pressure at 180 deg F.
- D. Dielectric Flanges: Factory-fabricated, companion-flange assembly, for 150- or 300-psig minimum working pressure as required to suit system pressures.

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- E. Dielectric-Flange Kits: Companion-flange assembly for field assembly. Include flanges, full-face- or ring-type neoprene or phenolic gasket, phenolic or polyethylene bolt sleeves, phenolic washers, and steel backing washers.
 - 1. Separate companion flanges and steel bolts and nuts shall have 150- or 300-psig minimum working pressure where required to suit system pressures.
- F. Dielectric Couplings: Galvanized-steel coupling with inert and non-corrosive, thermoplastic lining; threaded ends; and 300-psig minimum working pressure at 225 deg F.
- G. Dielectric Nipples: Electroplated steel nipple with inert and non-corrosive, thermoplastic lining; plain, threaded, or grooved ends; and 300-psig minimum working pressure at 225 deg F.

2.5 MECHANICAL SLEEVE SEALS

- A. Description: Modular sealing element unit, designed for field assembly, to fill annular space between pipe and sleeve.
 - 1. Sealing Elements: EPDM interlocking links shaped to fit surface of pipe. Include type and number required for pipe material and size of pipe.
 - 2. Pressure Plates: Stainless steel. Include two for each sealing element.
 - 3. Connecting Bolts and Nuts: Stainless steel of length required to secure pressure plates to sealing elements. Include one for each sealing element.

2.6 SLEEVES

- A. Galvanized-Steel Sheet: 0.0239-inch minimum thickness; round tube closed with welded longitudinal joint.
- B. Steel Pipe: ASTM A 53, Type E, Grade B, Schedule 40, galvanized, plain ends.
- C. Cast Iron: Cast or fabricated "wall pipe" equivalent to ductile-iron pressure pipe, with plain ends and integral waterstop, unless otherwise indicated.

2.7 ESCUTCHEONS

- A. Description: Manufactured wall and ceiling escutcheons and floor plates, with an ID to closely fit around pipe, tube, and insulation of insulated piping and an OD that completely covers opening.
- B. One-Piece, Deep-Pattern Type: Deep-drawn, box-shaped brass with polished chrome-plated finish.
- C. One-Piece, Cast-Brass Type: With setscrew.
 - 1. Finish: Polished chrome-plated.
- D. Split-Casting, Cast-Brass Type: With concealed hinge and set screw.
 - 1. Finish: Polished chrome-plated.

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- E. One-Piece, Stamped-Steel Type: With set screw and chrome-plated finish.
- F. Split-Plate, Stamped-Steel Type: With concealed hinge, set screw, and chrome-plated finish.
- G. One-Piece, Floor-Plate Type: Cast-iron floor plate.
- H. Split-Casting, Floor-Plate Type: Cast brass with concealed hinge and set screw.

2.8 GROUT

- A. Description: ASTM C 1107, Grade B, non-shrink and nonmetallic, dry hydraulic-cement grout.
 - 1. Characteristics: Post-hardening, volume adjusting, non-staining, non-corrosive, nongaseous, and recommended for interior and exterior applications.
 - 2. Design Mix: 5000-psi, 28-day compressive strength.
 - 3. Packaging: Premixed and factory packaged.

PART 3 - EXECUTION

3.1 PIPING SYSTEMS - COMMON REQUIREMENTS

- A. Install piping according to the following requirements and Division 23 Sections specifying piping systems.
- B. Drawing plans, schematics, and diagrams indicate general location and arrangement of piping systems. Indicated locations and arrangements were used to size pipe and calculate friction loss, expansion, pump sizing, and other design considerations. Install piping as indicated unless deviations to layout are approved on Coordination Drawings.
- C. Install piping in concealed locations, unless otherwise indicated and except in equipment rooms and service areas.
- D. Install piping indicated to be exposed and piping in equipment rooms and service areas at right angles or parallel to building walls. Diagonal runs are prohibited unless specifically indicated otherwise.
- E. Install piping above accessible ceilings to allow sufficient space for ceiling panel removal.
- F. Install piping to permit valve servicing.
- G. Install piping at indicated slopes.
- H. Install piping free of sags and bends.
- I. Install fittings for changes in direction and branch connections.
- J. Install piping to allow application of insulation.

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- K. Select system components with pressure rating equal to or greater than system operating pressure.
- L. Install escutcheons for penetrations of walls, ceilings, and floors according to the following:
 - 1. New Piping:
 - a. Piping with Fitting or Sleeve Protruding from Wall: One-piece, deep-pattern type.
 - b. Chrome-Plated Piping: One-piece, cast-brass type with polished chrome-plated finish.
 - c. Insulated Piping: One-piece, stamped-steel type with spring clips.
 - d. Bare Piping at Wall and Floor Penetrations in Finished Spaces: One-piece, cast-brass type with polished chrome-plated finish.
 - e. Bare Piping at Wall and Floor Penetrations in Finished Spaces: One-piece, stamped-steel type.
 - f. Bare Piping at Ceiling Penetrations in Finished Spaces: One-piece, cast-brass type with polished chrome-plated finish.
 - g. Bare Piping at Ceiling Penetrations in Finished Spaces: One-piece, stamped-steel type and set screw.
 - h. Bare Piping in Unfinished Service Spaces: One-piece, cast-brass type with rough-brass finish.
 - i. Bare Piping in Unfinished Service Spaces: One-piece, stamped-steel type with concealed or exposed-rivet hinge and set screw or spring clips.
 - j. Bare Piping in Equipment Rooms: One-piece, cast-brass type.
 - k. Bare Piping in Equipment Rooms: One-piece, stamped-steel type with set screw or spring clips.
 - l. Bare Piping at Floor Penetrations in Equipment Rooms: One-piece, floor-plate type.
- M. Install sleeves for pipes passing through concrete and masonry walls and concrete floor and roof slabs.
- N. Install sleeves for pipes passing through concrete and masonry walls, gypsum-board partitions, and concrete floor and roof slabs.
 - 1. Cut sleeves to length for mounting flush with both surfaces.
 - a. Exception: Extend sleeves installed in floors of mechanical equipment areas or other wet areas 2 inches above finished floor level. Extend cast-iron sleeve fittings below floor slab as required to secure clamping ring if ring is specified.
 - 2. Install sleeves in new walls and slabs as new walls and slabs are constructed.
 - 3. Install sleeves that are large enough to provide 1/4-inch annular clear space between sleeve and pipe or pipe insulation.
 - 4. Except for underground wall penetrations, seal annular space between sleeve and pipe or pipe insulation, using joint sealants appropriate for size, depth, and location of joint.
- O. Aboveground, Exterior-Wall Pipe Penetrations: Seal penetrations using sleeves and mechanical sleeve seals. Select sleeve size to allow for 1-inch annular clear space between pipe and sleeve for installing mechanical sleeve seals.

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1. Install steel pipe for sleeves smaller than 6 inches in diameter.
 2. Install cast-iron "wall pipes" for sleeves 6 inches and larger in diameter.
 3. Mechanical Sleeve Seal Installation: Select type and number of sealing elements required for pipe material and size. Position pipe in center of sleeve. Assemble mechanical sleeve seals and install in annular space between pipe and sleeve. Tighten bolts against pressure plates that cause sealing elements to expand and make watertight seal.
- P. Underground, Exterior-Wall Pipe Penetrations: Install cast-iron "wall pipes" for sleeves. Seal pipe penetrations using mechanical sleeve seals. Select sleeve size to allow for 1-inch annular clear space between pipe and sleeve for installing mechanical sleeve seals.
1. Mechanical Sleeve Seal Installation: Select type and number of sealing elements required for pipe material and size. Position pipe in center of sleeve. Assemble mechanical sleeve seals and install in annular space between pipe and sleeve. Tighten bolts against pressure plates that cause sealing elements to expand and make watertight seal.
- Q. Fire-Barrier Penetrations: Maintain indicated fire rating of walls, partitions, ceilings, and floors at pipe penetrations. Seal pipe penetrations with firestop materials.
- R. Verify final equipment locations for roughing-in.
- S. Refer to equipment specifications in other Sections of these Specifications for roughing-in requirements.

3.2 PIPING JOINT CONSTRUCTION

- A. Join pipe and fittings according to the following requirements and Division 23 Sections specifying piping systems.
- B. Ream ends of pipes and tubes and remove burrs. Bevel plain ends of steel pipe.
- C. Remove scale, slag, dirt, and debris from inside and outside of pipe and fittings before assembly.
- D. Soldered Joints: Apply ASTM B 813, water-flushable flux, unless otherwise indicated, to tube end. Construct joints according to ASTM B 828 or CDA's "Copper Tube Handbook," using lead-free solder alloy complying with ASTM B 32.
- E. Brazed Joints: Construct joints according to AWS's "Brazing Handbook," "Pipe and Tube" Chapter, using copper-phosphorus brazing filler metal complying with AWS A5.8.
- F. Threaded Joints: Thread pipe with tapered pipe threads according to ASME B1.20.1. Cut threads full and clean using sharp dies. Ream threaded pipe ends to remove burrs and restore full ID. Join pipe fittings and valves as follows:
 1. Apply appropriate tape or thread compound to external pipe threads unless dry seal threading is specified.
 2. Damaged Threads: Do not use pipe or pipe fittings with threads that are corroded or damaged. Do not use pipe sections that have cracked or open welds.

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- G. Welded Joints: Construct joints according to AWS D10.12, using qualified processes and welding operators according to Part 1 "Quality Assurance" Article.
- H. Flanged Joints: Select appropriate gasket material, size, type, and thickness for service application. Install gasket concentrically positioned. Use suitable lubricants on bolt threads.
- I. Plastic Piping Solvent-Cement Joints: Clean and dry joining surfaces. Join pipe and fittings according to the following:
 - 1. Comply with ASTM F 402 for safe-handling practice of cleaners, primers, and solvent cements.
 - 2. ABS Piping: Join according to ASTM D 2235 and ASTM D 2661 Appendixes.
 - 3. CPVC Piping: Join according to ASTM D 2846/D 2846M Appendix.
 - 4. PVC Pressure Piping: Join schedule number ASTM D 1785, PVC pipe and PVC socket fittings according to ASTM D 2672. Join other-than-schedule-number PVC pipe and socket fittings according to ASTM D 2855.
 - 5. PVC Nonpressure Piping: Join according to ASTM D 2855.
 - 6. PVC to ABS Nonpressure Transition Fittings: Join according to ASTM D 3138 Appendix.
- J. Plastic Pressure Piping Gasketed Joints: Join according to ASTM D 3139.
- K. Plastic Nonpressure Piping Gasketed Joints: Join according to ASTM D 3212.

3.3 PIPING CONNECTIONS

- A. Make connections according to the following, unless otherwise indicated:
 - 1. Install unions, in piping NPS 2 and smaller, adjacent to each valve and at final connection to each piece of equipment.
 - 2. Install flanges, in piping NPS 2-1/2 and larger, adjacent to flanged valves and at final connection to each piece of equipment.
 - 3. Dry Piping Systems: Install dielectric unions and flanges to connect piping materials of dissimilar metals.
 - 4. Wet Piping Systems: Install dielectric coupling and nipple fittings to connect piping materials of dissimilar metals.

3.4 EQUIPMENT INSTALLATION - COMMON REQUIREMENTS

- A. Install equipment to allow maximum possible headroom unless specific mounting heights are not indicated.
- B. Install equipment level and plumb, parallel and perpendicular to other building systems and components in exposed interior spaces, unless otherwise indicated.
- C. Install mechanical equipment to facilitate service, maintenance, and repair or replacement of components. Connect equipment for ease of disconnecting, with minimum interference to other installations. Extend grease fittings to accessible locations.
- D. Install equipment to allow right of way for piping installed at required slope.

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3.5 PAINTING

- A. Damage and Touchup: Repair marred and damaged factory-painted finishes with materials and procedures to match original factory finish.

3.6 CONCRETE BASES

- A. Concrete Bases: Anchor equipment to concrete base according to equipment manufacturer's written instructions and according to seismic codes at Project.
 1. Construct concrete bases of dimensions indicated, but not less than 4 inches larger in both directions than supported unit.
 2. Install dowel rods to connect concrete base to concrete floor. Unless otherwise indicated, install dowel rods on 18-inch centers around the full perimeter of the base.
 3. Install epoxy-coated anchor bolts for supported equipment that extend through concrete base, and anchor into structural concrete floor.
 4. Place and secure anchorage devices. Use supported equipment manufacturer's setting drawings, templates, diagrams, instructions, and directions furnished with items to be embedded.
 5. Install anchor bolts to elevations required for proper attachment to supported equipment.
 6. Install anchor bolts according to anchor-bolt manufacturer's written instructions.
 7. Use 4000-psi, 28-day compressive-strength concrete and reinforcement as specified in Division 3 Section "Cast-in-Place Concrete."

3.7 ERECTION OF METAL SUPPORTS AND ANCHORAGES

- A. Refer to Division 05 Section "Metal Fabrications" for structural steel.
- B. Cut, fit, and place miscellaneous metal supports accurately in location, alignment, and elevation to support and anchor mechanical materials and equipment.
- C. Field Welding: Comply with AWS D1.1.

3.8 ERECTION OF WOOD SUPPORTS AND ANCHORAGES

- A. Cut, fit, and place wood grounds, nailers, blocking, and anchorages to support, and anchor mechanical materials and equipment.
- B. Select fastener sizes that will not penetrate members if opposite side will be exposed to view or will receive finish materials. Tighten connections between members. Install fasteners without splitting wood members.
- C. Attach to substrates as required to support applied loads.

3.9 GROUTING

- A. Mix and install grout for mechanical equipment base bearing surfaces, pump and other equipment base plates, and anchors.

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- B. Clean surfaces that will come into contact with grout.
- C. Provide forms as required for placement of grout.
- D. Avoid air entrapment during placement of grout.
- E. Place grout, completely filling equipment bases.
- F. Place grout on concrete bases and provide smooth bearing surface for equipment.
- G. Place grout around anchors.
- H. Cure placed grout.

END OF SECTION

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SECTION 230503

PIPES AND TUBES

PART 1 GENERAL

1.1 SUMMARY

- A. Section includes pipe and pipe fittings for domestic water, sanitary, and heating water.
- B. Related Sections:
 - 1. Section 230529 – Hangers and Supports for Piping and Equipment: Product requirements for pipe hangers and supports and firestopping for placement by this section.
 - 2. Section 230553 – Identification for Piping and Equipment: Product requirements for pipe identification and valve tags for placement by this section.
 - 3. Section 230700 – Mechanical Insulation: Product and execution requirements for pipe insulation.

1.2 REFERENCES

- A. ASME (American Society of Mechanical Engineers) - Boiler and Pressure Vessel Codes, SEC IX - Qualification Standard for Welding and Brazing Procedures, Welders, Brazers, and Welding and Brazing Operators.
- B. ASME B16.3 (American Society of Mechanical Engineers) - Malleable Iron Threaded Fittings Class 50 and 300.
- C. ASME B16.18 (American Society of Mechanical Engineers) - Cast Copper Alloy Solder Joint Pressure Fittings.
- D. ASME B16.22 (American Society of Mechanical Engineers) - Wrought Copper and Copper Alloy Solder Joint Pressure Fittings.
- E. ASME B16.26 (American Society of Mechanical Engineers) - Cast Copper Alloy Fittings For Flared Copper Tubes.
- F. ASME B31.1 (American Society of Mechanical Engineers) - Power Piping.
- G. ASME B31.9 (American Society of Mechanical Engineers) - Building Services Piping.
- H. ASME B40.1 – Gauges – Pressure Indicating Dial Type – Elastic Element.
- I. ASTM A53 - Pipe, Steel, Black and Hot-Dipped, Zinc-Coated, Welded and Seamless.
- J. ASTM A53/A53M – Standard Specification for Pipe, Steel, Black and Hot-Dipped, Zinc-Coated, Welded and Seamless.
- K. ASTM B42 – Standard Specification for Seamless Copper Pipe, Standard Sizes.
- L. ASTM A234 - Piping Fittings of Wrought Carbon Steel and Alloy Steel for Moderate and Elevated Temperatures.

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- M. ASTM B32 - Solder Metal.
- N. ASTM B88 - Seamless Copper Water Tube.
- O. ASTM F708 – Design and Installation of Rigid Pipe Hangers.
- P. American Welding Society:
 - 1. AWS A5.8 – Specification for Filler Metals for Brazing and Braze Welding.
- Q. Manufacturers Standardization Society of the Valve and Fittings Industry.
 - 1. MSS SP 58 – Pipe Hangers and Supports – Materials, Design and Manufacturer.
 - 2. MSS SP 69 – Pipe Hangers and Supports – Selection and Application.
 - 3. MSS SP 89 – Pipe Hangers and Supports – Fabrication and Installation Practices.
- R. Cast Iron Soil Pipe Institute:
 - 1. CISPI 301 - Standard Specification for Hubless Cast Iron Soil Pipe and Fittings for Sanitary and Storm Drain, Waste, and Vent Piping Applications.
 - 2. CISPI 310 - Specification for Coupling for Use in Connection with Hubless Cast Iron Soil Pipe and Fittings for Sanitary and Storm Drain, Waste, and Vent Piping Applications.
- S. National Fire Protection Association:
 - 1. NFPA 30 – Flammable and Combustible Liquids Code
- T. Underwriters laboratories, Inc.:
 - 1. UL 842 – Valves for Flammable Fluids.

1.3 SYSTEM DESCRIPTION

- A. Where more than one piping system material is specified, provide compatible system components and joints. Provide flanges, union, and couplings at locations requiring servicing.
- B. Use unions, flanges, and couplings downstream of valves and at equipment or apparatus connections. Use non-conducting dielectric connections whenever jointing dissimilar metals in open systems. Do not use direct welded or threaded connections to valves, equipment or other apparatus.
- C. Provide pipe hangers and supports in accordance with ASME B31.1 unless indicated otherwise.
- D. Flexible Connectors: Utilize at or near compressors where piping configuration does not absorb vibration.

1.4 SUBMITTALS

- A. Section 013300 - Submittal Procedures: Submittal procedures.
- B. Product Data: Submit data on pipe materials and fittings. Submit manufacturers catalog information.

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1.5 QUALIFICATIONS

- A. Manufacturer: Company specializing in manufacturing products specified in this section with minimum three years documented experience.
- B. Installer: Company specializing in performing Work of this section with minimum three years documented experience.

1.6 DELIVERY, STORAGE, AND HANDLING

- A. Provide temporary end caps and closures on piping and fittings. Maintain in place until installation.
- B. Protect piping systems from entry of foreign materials by temporary covers, completing sections of the Work, and isolating parts of completed system.

1.7 FIELD MEASUREMENTS

- A. Verify field measurements prior to fabrication.

1.8 QUALITY ASSURANCE

- A. Perform fuel oil piping work in accordance with NFPA 30.
- B. Perform work in accordance with ASME B31.9 code for installation of piping systems and ASME Section IX for welding materials and procedures.
- C. Furnish shutoff valves complying with ASME B16.33 or ANSI Z21.15.

PART 2 PRODUCTS

2.1 DOMESTIC WATER PIPING

- A. Copper Tubing: ASTM B88, Type L, drawn.
 - 1. Fittings: ASME B16.18, cast copper alloy or ASME B16.22, wrought copper and bronze.
 - 2. Joints: ASTM B32, Alloy Grade Sb5 tin-antimony, or Alloy Grade Sn95 tin-silver, lead free.

2.2 HEATING HOT WATER PIPING

- A. Copper Tubing: ASTM B88, Type L, hard drawn.
 - 1. Fittings: ASME B16.18, cast brass, or ASME B16.22 solder wrought copper.
 - 2. Joints: Solder, lead free, ASTM B32, 95-5 tin-antimony, or tin and silver, with melting range 430 to 535 degrees F.

2.3 COMPRESSED AIR PIPING

- A. Steel Pipe: ASTM A53/A53M, Schedule 40 black.
 - 1. Fittings: ASME B16.3, malleable iron.

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2. Joints: Threaded.

2.4 EQUIPMENT DRAINS AND OVERFLOWS

- A. Copper Tubing: ASTM B88, Type L, hard drawn.
 - 1. Fittings: ASME B16.18, cast brass, or ASME B16.22 solder wrought copper.
 - 2. Joints: Solder, lead free, ASTM B32 95-5 tin-antimony, or tin and silver, with melting range 430 to 535 degrees F.

2.5 UNIONS, FLANGES, AND COUPLINGS

- A. Unions for Pipe 2 inches and Under:
 - 1. Ferrous Piping: 150 psig malleable iron, threaded.
 - 2. Copper Pipe: Bronze, soldered joints.
- B. Flanges for Pipe Over 2 inches:
 - 1. Ferrous Piping: 150 psig forged steel, slip-on.
 - 2. Copper Piping: Bronze.
 - 3. Gaskets: 1/16 inch thick preformed neoprene.
- C. Dielectric Connections: Union with galvanized or plated steel threaded end, copper solder end, water impervious isolation barrier.

PART 3 EXECUTION

3.1 PREPARATION

- A. Ream pipe and tube ends. Remove burrs. Bevel plain end ferrous pipe.
- B. Remove scale and dirt on inside and outside before assembly.
- C. Prepare piping connections to equipment with flanges or unions.
- D. Keep open ends of pipe free from scale and dirt. Protect open ends with temporary plugs or caps.

3.2 INSTALLATION

- A. Install heating water piping in accordance with ASME B31.1.
- B. Route piping parallel to building structure and maintain gradient.
- C. Install piping to conserve building space, and not interfere with use of space.
- D. Group piping whenever practical at common elevations.
- E. Sleeve pipe passing through partitions, walls and floors.
- F. Install piping to allow for expansion and contraction without stressing pipe, joints, or connected equipment.
- G. Slope piping and arrange systems to drain at low points.

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- H. Insulate piping; refer to Section 230700.
- 3.3 INSTALLATION - DOMESTIC WATER PIPING SYSTEMS
- A. Install domestic water piping system in accordance with ASME B31.9.
- 3.4 INSTALLATION - COMPRESSED AIR PIPING SYSTEMS
- A. Install compressed air piping systems piping in accordance with ASME B31.9.
 - B. Install drip connections with valves at low points of piping system.
 - C. Install take-off to outlets from top of main, with shut off valve after take off. Slope take-off piping to outlets.
 - D. Install compressed air couplings, female quick connectors, and pressure gages where outlets are indicated.
 - E. Install tees instead of elbows at changes in direction of piping. Fit open end of each tee with plug.
 - F. Cut pipe and tubing accurately and install without springing or forcing.
 - G. Slope piping in direction of flow.
 - H. Install strainers on inlet side of pressure reducing valves. Install pressure reducing valves with bypasses and isolation valves to allow maintenance without interruption of service.
- 3.5 FIELD QUALITY CONTROL
- A. Test domestic water piping system in accordance with applicable code.
 - B. Test sanitary waste and vent piping system in accordance with applicable code.
- 3.6 CLEANING
- A. Prior to starting work, verify system is complete, flushed and clean.
 - B. Verify 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 and tablet or gas form, throughout system to obtain residual from 50 to 80 mg/L.
 - D. Bleed water from outlets to obtain distribution and test for disinfectant residual at minimum 15 percent of outlets.
 - E. Maintain disinfectant in system for 24 hours.
 - F. When final disinfectant residual tests less than 25 mg/L, repeat treatment.

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- G. Flush disinfectant from system until residual concentration is equal to 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.

END OF SECTION

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SECTION 230523

VALVES

PART 1 GENERAL

1.1 SUMMARY

- A. Section Includes:
 - 1. Ball valves.
 - 2. Check valves.
 - 3. Relief Valves.
- B. Related Sections:
 - 1. Section 230503 – Pipes and Tubes – Pipes and Tubes: Product and installation requirements for piping.
 - 2. Section 230700 - Mechanical Insulation: Product and installation requirements for insulation for valves.

1.2 REFERENCES

- A. ASTM International:
 - 1. ASTM A216/A216M - Standard Specification for Steel Castings, Carbon, Suitable for Fusion Welding, for High-Temperature Service.
- B. Manufacturers Standardization Society of the Valve and Fittings Industry:
 - 1. MSS SP 67 - Butterfly Valves.
 - 2. MSS SP 70 - Cast Iron Gate Valves, Flanged and Threaded Ends.
 - 3. MSS SP 71 - Cast Iron Swing Check Valves, Flanged and Threaded Ends.
 - 4. MSS SP 80 - Bronze Gate, Globe, Angle and Check Valves.
 - 5. MSS SP 85 - Cast Iron Globe & Angle Valves, Flanged and Threaded.
 - 6. MSS SP 110 - Ball Valves Threaded, Socket-Welding, Solder Joint, Grooved and Flared Ends.
- C. Underwriters Laboratories Inc.:
 - 1. UL 842 - Valves for Flammable Fluids.

1.3 SUBMITTALS

- A. Section 013300 - Submittal Procedures: Requirements for submittals.
- B. Product Data: Submit manufacturers catalog information with valve data and ratings for each service.
- C. Manufacturer's Installation Instructions: Submit hanging and support methods, joining procedures.

1.4 CLOSEOUT SUBMITTALS

- A. Section 017000 - Execution Requirements: Requirements for submittals.

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- B. Project Record Documents: Record actual locations of valves.
- C. Operation and Maintenance Data: Submit installation instructions, spare parts lists, exploded assembly views.

1.5 QUALIFICATIONS

- A. Manufacturer: Company specializing in manufacturing Products specified in this section with minimum three years documented experience.
- B. Installer: Company specializing in performing work of this section with minimum 3 years documented experience.

1.6 DELIVERY, STORAGE, AND HANDLING

- A. Section 016000 - Product Requirements: Requirements for transporting, handling, storing, and protecting products.
- B. Accept valves on site in shipping containers with labeling in place. Inspect for damage.
- C. Provide temporary protective coating on cast iron and steel valves.

1.7 WARRANTY

- A. Section 017000 - Execution Requirements: Requirements for warranties.

PART 2 PRODUCTS

2.1 BALL VALVES

- A. MSS SP 110, Class 150, bronze, two piece body, type chrome plated bronze ball, full port, teflon seats, blow-out proof stem, threaded ends, lever handle, lead free.

2.2 CHECK VALVES

- A. Horizontal Swing Check Valves:
 - 1. 2 inches and Smaller: MSS SP 80, Class 150, bronze body and cap, bronze seat, Buna-N teflon disc, solder or threaded ends, lead free.

2.3 RELIEF VALVES

- A. Pressure Relief:
 - 1. Bronze body, Teflon seat, steel stem and springs, automatic, direct pressure actuated at maximum 60 psi, UL listed for fuel oil, capacities ASME certified and labeled.
- B. Temperature and Pressure Relief:
 - 1. ANSI Z21.22 certified, bronze body, teflon seat, stainless steel stem and springs, automatic, direct pressure actuated, temperature relief maximum 210 degrees F, capacity ASME certified and labeled.

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PART 3 EXECUTION

3.1 EXAMINATION

- A. Section 013000 - Administrative Requirements: Verification of existing conditions before starting work.
- B. Verify piping system is ready for valve installation.

3.2 INSTALLATION

- A. Install valves with stems upright or horizontal, not inverted.
- B. Install brass male adapters each side of valves in copper piped system. Solder adapters to pipe.
- C. Install ball valves with cap for drains at main shut-off valves, low points of piping, bases of vertical risers, and at equipment.
- D. Install valves with clearance for installation of insulation and allowing access.
- E. Provide access where valves and fittings are not accessible.
- F. Refer to Section 230500 for piping materials applying to various system types.

3.3 VALVE APPLICATIONS

- A. Install shutoff and drain valves at locations indicated on Drawings in accordance with this Section.
- B. Install ball valves for shut-off and to isolate equipment, part of systems, or vertical risers.
- C. Install globe valves for throttling, bypass, or manual flow control services.
- D. Install spring loaded check valves on discharge of water pumps.
- E. Install lug end butterfly valves adjacent to equipment when functioning to isolate equipment.

END OF SECTION

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SECTION 230529

HANGERS AND SUPPORTS FOR PIPING AND EQUIPMENT

PART 1 GENERAL

1.1 SUMMARY

- A. Section Includes:
1. Pipe hangers and supports.
 2. Hanger rods.
 3. Shields and Saddles.
 4. Flashing.
 5. Equipment curbs.
 6. Sleeves.
 7. Mechanical sleeve seals.
 8. Formed steel channel.
 9. Firestopping.
 10. Firestopping accessories.
 11. Equipment bases and supports.
 12. Seismic requirements for single rod hanger supports.
 13. Seismic requirements for trapeze type supports.
- B. Related Sections:
1. Section 230503 – Pipes and Tubes.
 2. Section 230700 – Mechanical Insulation

1.2 REFERENCES

- A. American Society of Mechanical Engineers:
1. ASME B31.9 - Building Services Piping.
- B. ASTM International:
1. ASTM E119 - Standard Test Methods for Fire Tests of Building Construction and Materials.
 2. ASTM E814 - Standard Test Method for Fire Tests of Through Penetration Fire Stops.
 3. ASTM F708 - Standard Practice for Design and Installation of Rigid Pipe Hangers.
 4. ASTM E1966 - Standard Test Method for Fire-Resistive Joint Systems.
- C. American Welding Society:
1. AWS D1.1 - Structural Welding Code - Steel.
- D. FM Global:
1. FM - Approval Guide, A Guide to Equipment, Materials & Services Approved By Factory Mutual Research For Property Conservation.
- E. Manufacturers Standardization Society of the Valve and Fittings Industry:
1. MSS SP 58 - Pipe Hangers and Supports - Materials, Design and Manufacturer.
 2. MSS SP 69 - Pipe Hangers and Supports - Selection and Application.

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3. MSS SP 89 - Pipe Hangers and Supports - Fabrication and Installation Practices.

F. Underwriters Laboratories Inc.:

1. UL 263 - Fire Tests of Building Construction and Materials.
2. UL 723 - Tests for Surface Burning Characteristics of Building Materials.
3. UL 1479 - Fire Tests of Through-Penetration Firestops.
4. UL 2079 - Tests for Fire Resistance of Building Joint Systems.
5. UL - Fire Resistance Directory.

G. Intertek Testing Services (Warnock Hersey Listed):

1. WH - Certification Listings.

H. New York State Building Code (NYSBC), 2010

I. American Society of Civil Engineers, ASCE Standard 7, 2005

1.3 DEFINITIONS

A. Firestopping (Through-Penetration Protection System): Sealing or stuffing material or assembly placed in spaces between and penetrations through building materials to arrest movement of fire, smoke, heat, and hot gases through fire rated construction.

1.4 SYSTEM DESCRIPTION

A. Firestopping Materials: ASTM E119, ASTM E814, UL 263, UL 1479, to achieve fire ratings as noted on Drawings for adjacent construction, but not less than 1 hour fire rating.

B. Firestop interruptions to fire rated assemblies, materials, and components.

1.5 PERFORMANCE REQUIREMENTS

A. Firestopping: Conform to UL for fire resistance ratings and surface burning characteristics.

B. Firestopping: Provide certificate of compliance from authority having jurisdiction indicating approval of materials used.

C. Seismic Design: This project is subject to the seismic bracing requirements of the New York Building Code, 2010 Edition. The following criteria are applicable to this project.

1. Seismic Occupancy Category (Table 1604.5): [II]
2. Site Class Category (Table 1613.5.2): [D]
3. Design Spectral Response Acceleration (SDS_s): 0.543
 - a. Site Coefficient (F_a): 1.3
 - b. Mapped Spectral Acceleration (S_s): 0.628 g
4. Seismic Design Category: [D]
5. Seismic Importance Factor (I_P): [1.00]
6. Component Amplification Factor (a_P): 1.0
7. Component Response Mod. Factor (R_P): [3.0]

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8. The total height of the structure (h) and the height of the system to be restrained within the structure (z) shall be determined in coordination with architectural plans and the General Contractor.
9. Design analysis shall include calculated dead loads, static seismic loads, and capacity of materials utilized for the connection of equipment or system to the structure.
10. All seismic restraint devices shall be designed to accept without failure the forces calculated per the applicable code and as summarized in this specification.

1.6 SUBMITTALS

- A. Product Data:
 1. Hangers and Supports: Submit manufacturers catalog data including load capacity.
 2. Firestopping: Submit data on product characteristics, performance and limitation criteria.
- B. Product Data (Seismic Systems):
 1. Seismic product data: Strut channels including, but not limited to, types, materials, finishes, gauge thicknesses, and hole patterns. For each different strut cross section, For each different strut cross-section, submit cross sectional properties including Section Modulus (S_x) and Moment of Inertia (I_x).
 2. Signed and sealed by a licensed Professional Engineer in the State of New York.
 3. Design Calculations: Calculate requirements for selecting seismic restraints.
 4. Details: Identify center of gravity, locate, and describe mounting and anchoring provisions. Detail fabrication and attachment of seismic restraints. Show anchorage details and indicate quantity, diameter, and depth of penetrating anchors.
 5. Calculations: Submit seismic force level (F_p) calculations. Submit pre-approved restraint selections and installation details. Restraint selection and installation details shall be pre-approved by a licensed professional engineer in the State of New York experienced in seismic restraint design.
- C. Firestopping Schedule: Submit schedule of opening locations and sizes, penetrating items, and required listed design numbers to seal openings to maintain fire resistance rating of adjacent assembly.
- D. Manufacturer's Installation Instructions:
 1. Hangers and Supports: Submit special procedures and assembly of components.
 2. Firestopping: Submit preparation and installation instructions.
- E. Manufacturer's Certificate: Certify products meet or exceed specified requirements.
 1. Submit certification that all specified equipment will withstand seismic forces identified in performance requirements, including the following:
 2. Basis for Certification: Indicate whether certification is based on actual test of assembled components or calculations.
 3. The term withstand means the unit will remain in place without separation of any parts from the device with subject to the seismic forces applied and the unit will be full operational after the seismic event.

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1.7 QUALITY ASSURANCE

- A. Through Penetration Firestopping of Fire Rated Assemblies: UL 1479 or ASTM E814 with 0.10 inch water gage minimum positive pressure differential to achieve fire F-Ratings and temperature T-Ratings as indicated on Drawings, but not less than 1-hour.
 - 1. Wall Penetrations: Fire F-Ratings as indicated on Drawings, but not less than 1-hour.
- B. Through Penetration Firestopping of Non-Fire Rated Floor Assemblies: Materials to resist free passage of flame and products of combustion.
 - 1. Noncombustible Penetrating Items: Noncombustible materials for penetrating items connecting maximum of three stories.
 - 2. Penetrating Items: Materials approved by authorities having jurisdiction for penetrating items connecting maximum of two stories.
- C. Fire Resistant Joints in Fire Rated Floor, Roof, and Wall Assemblies: ASTM E1966 or UL 2079 to achieve fire resistant rating as indicated on Drawings for assembly in which joint is installed.
- D. Fire Resistant Joints Between Floor Slabs and Exterior Walls: ASTM E119 with 0.10 inch water gage minimum positive pressure differential to achieve fire resistant rating as indicated on Drawings for floor assembly.
- E. Surface Burning Characteristics: Maximum 25/450 flame spread/smoke developed index when tested in accordance with ASTM E84.
- F. Perform Work in accordance with AWS D1.1 for welding hanger and support attachments to building structure.

1.8 QUALIFICATIONS

- A. Manufacturer: Company specializing in manufacturing Products specified in this section with minimum three years documented experience.
- B. Installer: Company specializing in performing Work of this section with minimum years documented experience.

1.9 DELIVERY, STORAGE, AND HANDLING

- A. Accept materials on site in original factory packaging, labeled with manufacturer's identification.
- B. Protect from weather and construction traffic, dirt, water, chemical, and damage, by storing in original packaging.

1.10 ENVIRONMENTAL REQUIREMENTS

- A. Do not apply firestopping materials when temperature of substrate material and ambient air is below 60 degrees F.

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- B. Maintain this minimum temperature before, during, and for minimum 3 days after installation of firestopping materials.
- C. Provide ventilation in areas to receive solvent cured materials.

1.11 FIELD MEASUREMENTS

- A. Verify field measurements prior to fabrication.

1.12 WARRANTY

- A. Section 017000 – Execution Requirements: Product warranties and product bonds.

PART 2 PRODUCTS

2.1 MATERIALS AND FINISHES

- A. Carbon Steel: Cold formed type.
- B. Stainless Steel: AISI type 304 and 316 stainless steel.
- C. Electroplated Zinc: ASTM B 633 SC1 or SC3.
- D. Pre-galvanized: ASTM A 653, G90 designation
- E. Hot Dipped Galvanized: ASTM A 123. Field applied zinc rich applied to field cuts.
- F. Hardware: Products shall be of the same manufacturer, material and finish of main products.
- G. Fittings and Accessories: Products shall be of the same manufacturer as strut and designed for use with that product.

2.2 PIPE HANGERS AND SUPPORTS

- A. Manufacturers:
 - 1. Cooper B-line.
 - 2. Globe Pipe Hanger Products, Inc.
 - 3. Michigan Hanger Co.
- B. Domestic Water and Compressed Air Piping:
 - 1. Conform to ASME B31.9.
 - 2. Hangers for Pipe Sizes 1/2 to 1-1/2 inch: Carbon steel, adjustable swivel, split ring. B-Line B1300 or equal.
 - 3. Hangers for Cold Pipe Sizes 2 inches and larger: Carbon steel, adjustable, clevis. B-Line B3100 or equal.
 - 4. Multiple or Trapeze Hangers: Steel channels with welded spacers and hanger rods.
 - 5. Wall Support for Pipe Sizes 3 inches and Smaller: Riser clamp, B-Line B3373 or equal.
 - 6. Wall Support for Pipe Sizes 4 inches and Larger: Welded steel bracket and wrought steel clamp – B-Line B3066.
 - 7. Vertical Support: Steel riser clamp.

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8. Floor Support for Cold Pipe: B-Line B3093 with B-Line B3088T stand.
9. Copper Pipe Support: Copper-plated, Carbon-steel ring.

C. Hydronic Piping:

1. Conform to ASME B31.9.
2. Hangers for Pipe Sizes 1/2 to 1-1/2 inch: Carbon steel, adjustable steel yoke pipe roll. B-Line B3110 or equal.
3. Hangers for Pipe Sizes 2 to 4 inches: Carbon steel, adjustable steel yoke pipe roll. B-Line B3110 or equal.
4. Multiple or Trapeze Hangers for Pipe Sizes 4 inches and Smaller: Steel channels with welded spacers and hanger rods.
5. Wall Support for Pipe Sizes 3 inches and Smaller: Welded steel bracket and roller support.
6. Wall Support for Pipe Sizes 4 to 5 inches: Welded steel bracket and roller support. B-Line 3068 and B379 or equal.
7. Vertical Support: Steel riser clamp, B-Line B3373 or equal.
8. Floor Support for Pipe Sizes 4 inches and Smaller: Steel adjustable roller support. B-Line B3122 or equal.

2.3 ACCESSORIES

- A. Hanger Rods: Mild steel continuous threaded.

2.4 SHIELDS AND SADDLES

A. Manufacturers:

1. Cooper B-Line.
2. Globe Pine Hanger Co.
3. Michigan Hanger Co.

B. Product Description:

1. Insulation Shields: B-Line B-3153 or equal.
2. Pre-galvanized finish with bottom tabs for entering shield on hanger.

2.5 FLASHING

- A. Metal Flashing: 26 gage thick galvanized steel.
- B. Metal Counterflashing: 22 gage thick galvanized steel.
- C. Flexible Flashing: 47 mil thick sheet butyl; compatible with roofing.
- D. Caps: Steel, 22 gage minimum; 16 gage at fire resistant elements.

2.6 SLEEVES

- A. Sleeves for Pipes Through Non-fire Rated Floors: 18 gage thick galvanized steel.

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- B. Sleeves for Pipes Through Non-fire Rated Beams, Walls, Footings, and Potentially Wet Floors: Steel pipe or 18 gage thick galvanized steel.
- C. Sealant: Refer to Section 079000.

2.7 FORMED STEEL CHANNEL

- A. Manufacturers:
 - 1. Cooper B-Line Systems.
 - 2. Unistrut Corp.
 - 3. Substitutions or approved equal: Section 016000 – Product Requirements.
- B. Product Description: Galvanized 12 gage thick steel. With holes 1-1/2 inches on center.

2.8 FIRESTOPPING

- A. Manufacturers:
 - 1. Dow Corning Corp.
 - 2. Hilti Corp.
 - 3. International Protective Coating Corp.
 - 4. Substitutions or approved equal: Section 016000 – Product Requirements.
- B. Product Description: Different types of products by multiple manufacturers are acceptable as required to meet specified system description and performance requirements; provide only one type for each similar application.
 - 1. Silicone Firestopping Elastomeric Firestopping: Single component silicone elastomeric compound and compatible silicone sealant.
 - 2. Foam Firestopping Compounds: Single component foam compound.
 - 3. Formulated Firestopping Compound of Incombustible Fibers: Formulated compound mixed with incombustible non-asbestos fibers.
 - 4. Fiber Stuffing and Sealant Firestopping: Composite of mineral fiber stuffing insulation with silicone elastomer for smoke stopping.
 - 5. Mechanical Firestopping Device with Fillers: Mechanical device with incombustible fillers and silicone elastomer, covered with sheet stainless steel jacket, joined with collars, penetration sealed with flanged stops.
 - 6. Intumescent Firestopping: Intumescent putty compound which expands on exposure to surface heat gain.
 - 7. Firestop Pillows: Formed mineral fiber pillows.
- C. Color: Dark gray.

2.9 FIRESTOPPING ACCESSORIES

- A. Primer: Type recommended by firestopping manufacturer for specific substrate surfaces and suitable for required fire ratings.
- B. Dam Material: Permanent:
 - 1. Mineral fiberboard.
 - 2. Mineral fiber matting.

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- 3. Sheet metal.
- C. Installation Accessories: Provide clips, collars, fasteners, temporary stops or dams, and other devices required to position and retain materials in place.
- D. General:
 - 1. Furnish UL listed products.
 - 2. Select products with rating not less than rating of wall or floor being penetrated.
- E. Non-Rated Surfaces:
 - 1. Stamped steel, chrome plated, hinged, split ring escutcheons or floor plates or ceiling plates for covering openings in occupied areas where piping is exposed.
 - 2. For exterior wall openings below grade, furnish mechanical sealing device to continuously fill annular space between piping and cored opening or water-stop type wall sleeve.

2.10 SEISMIC BRACING COMPONENTS

- A. Channel Type Bracing Assemblies: Slotted steel channel with adjustable hinged steel brackets and bolts.
- B. Cable Type Bracing Assemblies: Zinc coated, high strength steel wire rope cable attached to steel thimbles, brackets, and bolts designed for cable service.
- C. Hanger Rod Stiffeners: Slotted steel channels with internally bolted connections to hanger rod.
- D. Anchor Bolts: Seismic rated, drill in and stud wedge or female wedge type. Select anchor bolts with strength required for anchor and as tested according to ASTM E 488E.

PART 3 EXECUTION

3.1 EXAMINATION

- A. Verify openings are ready to receive sleeves.
- B. Verify openings are ready to receive firestopping.

3.2 PREPARATION

- A. Clean substrate surfaces of dirt, dust, grease, oil, loose material, or other matter affecting bond of firestopping material.
- B. Remove incompatible materials affecting bond.
- C. Install backing materials to arrest liquid material leakage.
- D. Obtain permission from Architect/Engineer before using powder-actuated anchors.
- E. Do not drill or cut structural members.

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3.3 INSTALLATION - PIPE HANGERS AND SUPPORTS

- A. Install in accordance with ASME B31.5; ASME 31.9.
- B. Support horizontal piping as scheduled.
- C. Install hangers with minimum 1/2 inch space between finished covering and adjacent work.
- D. Place hangers within 12 inches of each horizontal elbow.
- E. Use hangers with 1-1/2 inch minimum vertical adjustment.
- F. Support vertical piping at every floor.
- G. Where piping is installed in parallel and at same elevation, provide multiple pipe or trapeze hangers.
- H. Support riser piping independently of connected horizontal piping.
- I. Provide copper plated hangers and supports for copper piping.
- J. Design hangers for pipe movement without disengagement of supported pipe.
- K. Prime coat exposed steel hangers and supports. Hangers and supports located in crawl spaces, pipe shafts, and suspended ceiling spaces are not considered exposed.
- L. Provide clearance in hangers and from structure and other equipment for installation of insulation.

3.4 INSTALLATION - EQUIPMENT BASES AND SUPPORTS

- A. Provide housekeeping pads of concrete, minimum 3-1/2 inches thick and extending 6 inches beyond supported equipment. Refer to Section 230500.
- B. Using templates furnished with equipment, install anchor bolts, and accessories for mounting and anchoring equipment.
- C. Construct supports of formed steel channel steel pipe and fittings. Brace and fasten with flanges bolted to structure.
- D. Provide rigid anchors for pipes after vibration isolation components are installed.

3.5 INSTALLATION - FLASHING

- A. Provide flexible flashing and metal counter flashing where piping and ductwork penetrate weather or waterproofed walls, floors, and roofs.

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3.6 INSTALLATION - FIRESTOPPING

- A. Install material at fire rated construction perimeters and openings containing penetrating sleeves, piping, ductwork, and other items, requiring firestopping.
- B. Apply primer where recommended by manufacturer for type of firestopping material and substrate involved, and as required for compliance with required fire ratings.
- C. Apply firestopping material in sufficient thickness to achieve required fire and smoke rating, to uniform density and texture.
- D. Place foamed material in layers to ensure homogenous density, filling cavities and spaces. Place sealant to completely seal junctions with adjacent dissimilar materials.
- E. Place intumescent coating in sufficient coats to achieve rating required.
- F. Remove dam material after firestopping material has cured.
- G. Fire Rated Surface:
 - 1. Seal opening at floor, wall, partition, and ceiling, as follows:
 - a. Install sleeve through opening and extending beyond minimum of 1 inch on both sides of building element.
 - b. Size sleeve allowing minimum of 1 inch void between sleeve and building element.
 - c. Pack void with backing material.
 - d. Seal ends of sleeve with UL listed fire resistive silicone compound to meet fire rating of structure penetrated.
 - 2. Where cable tray, conduit, wireway, and penetrates fire rated surface, install firestopping product in accordance with manufacturer's instructions.
- H. Non-Rated Surfaces:
 - 1. Seal opening through non-fire rated wall, partition floor, and ceiling, as follows:
 - a. Install sleeve through opening and extending beyond minimum of 1 inch on both sides of building element.
 - b. Size sleeve allowing minimum of 1 inch void between sleeve and building element.
 - c. Install type of firestopping material recommended by manufacturer.
 - 2. Install escutcheons floor plates or ceiling plates where conduit, penetrates non-fire rated surfaces in occupied spaces. Occupied spaces include rooms with finished ceilings and where penetration occurs below finished ceiling.
 - 3. Exterior wall openings below grade: Assemble rubber links of mechanical sealing device to size of piping and tighten in place, in accordance with manufacturer's instructions.

3.7 INSTALLATION – SEISMIC SYSTEMS

- A. All seismic restraint systems shall be installed in strict accordance with the manufacturers seismic restraint guidelines manual and all certified submittal data.

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- B. Ductile Piping (Steel, copper, etc.) with ductile connections (welded, brazed, etc.): Transverse piping restraints shall be at 40 foot maximum spacing for all pipe sizes, except where lesser spacing is required to limit anchoring loads.
- C. Ductile Piping (Steel, copper, etc.) with ductile connections (welded, brazed, etc.): Longitudinal restraints shall be at 80 foot maximum spacing for all pipe sizes, except where lesser spacing is required to limit anchoring loads.
- D. Non-Ductile Piping (PVC, HDPE, etc.): Transverse piping restraints shall be at 20 foot maximum spacing for all pipe sizes, except where lesser spacing is required to limit anchoring loads.
- E. Non-Ductile Piping (PVC, HDPE, etc.) Longitudinal restraints shall be at 40 foot maximum spacing for all pipe sizes, except where lesser spacing is required to limit anchoring loads.
- F. Fuel oil piping transverse restraints shall be 20 foot maximum spacing and 40 foot maximum spacing for longitudinal restraints for all pipe sizes.
- G. Transverse restraint for one pipe section may also act as a longitudinal restraint for a pipe section of the same size connected perpendicular to it if the restraint is installed within 24 inches of the elbow or tee or combined stresses are within the allowable limits at longer distances.
- H. Hold down clamps shall be used to attach pipe to all trapeze members before applying restraints.
- I. Provide reinforced clevis bolts when required.
- J. Piping crossing building seismic or expansion joints, passing from building to building or supported from different portions of the building shall be installed to allow differential support displacements without damaging the pipe, equipment connections, or support connections. Pipe offsets, loops, anchors, and guides shall be provided for motion capability and limit motion of adjacent piping.
- K. Do not brace a system to two independent structures, such as a ceiling and a wall.
- L. Install restraining cables at each trapeze and individual pipe hanger. At trapeze anchor locations, shackle piping to trapeze. Install cables so they do not bend across sharp edges of adjacent equipment or building structure.
- M. Install steel angle or channel, sized to prevent buckling, clamped to hanger rods for trapeze and individual pipe hangers. A trapeze location, shackle piping to trapeze. Requirements apply equally to hanging equipment. Do not weld angles to rods.
- N. Transverse and longitudinal braces shall not exceed 45 degrees above or below the centerline of the pipe, duct or trapeze.
- O. Seismic restraints are required for the following installations:

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1. All fuel oil, gas, medical gas, compressed air vacuum and other potentially hazardous piping systems, unless specifically noted otherwise by engineer.
2. All ductwork containing hazardous gases or exhaust unless specifically noted otherwise by engineer.
3. All rectangular and square ducts 6 square feet and larger cross sectional area and round ducts 28 inches and larger in diameter.
4. All mechanical piping 1 ¼” nominal diameter and larger located in boiler, mechanical equipment and refrigeration rooms.
5. All other piping 2 ½” inches nominal diameter and larger.
6. PIPING EXCEPTIONS (12 inch rule): All piping suspended by individual hanger rods 12 inches or less as measured from the top of the pipe (or top of trapeze attachment) to the bottom of the support where the hanger is attached. If the limit is exceeded by any hanger in the run, seismic bracing is required for the run.
7. DUCTWORK EXCEPTIONS (12 inch rule): All ducts suspended by hanger straps 12 inches or less in length as measured from the top of the duct to the point of attachment to the structure. If any hanger in the run exceeds the limit, seismic bracing is required.

3.8 FIELD QUALITY CONTROL

- A. Inspect installed firestopping for compliance with specifications and submitted schedule.

3.9 CLEANING

- A. Clean adjacent surfaces of firestopping materials.

3.10 PROTECTION OF FINISHED WORK

- A. Protect adjacent surfaces from damage by material installation.

3.11 SCHEDULES

- A. Copper and Steel Pipe Hanger Spacing:

PIPE SIZE Inches	COPPER TUBING MAXIMUM HANGER SPACING Feet	STEEL PIPE MAXIMUM HANGER SPACING Feet	COPPER TUBING HANGER ROD DIAMETER Inches	STEEL PIPE HANGER ROD DIAMETER Inches
1/2	5	7	3/8	3/8
3/4	5	7	3/8	3/8
1	6	7	3/8	3/8
1-1/4	7	7	3/8	3/8
1-1/2	8	9	3/8	3/8
2	8	10	3/8	3/8

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2-1/2 (Note 2)	9	11	1/2	1/2
3	10	12	1/2	1/2
4	12	14	1/2	5/8
5	13	16	1/2	5/8
6	14	17	5/8	3/4
8	16	19	3/4	3/4

- B. Note 2: 20 feet maximum spacing, minimum of one hanger for each pipe section close to joint behind bell. Provide hanger at each change of direction and each branch connection. For pipe sizes 6 inches and smaller, subjected to loadings other than weight of pipe and contents, limit span to maximum spacing for water service steel pipe.

END OF SECTION

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SECTION 230553

IDENTIFICATION FOR HVAC PIPING AND EQUIPMENT

PART 1 GENERAL

1.1 SUMMARY

- A. Section Includes:
 - 1. Nameplates.
 - 2. Tags.
 - 3. Stencils.
 - 4. Pipe markers.
 - 5. Labels.

1.2 REFERENCES

- A. American Society of Mechanical Engineers:
 - 1. ASME A13.1 - Scheme for the Identification of Piping Systems.

1.3 SUBMITTALS

- A. Section 013300 - Submittal Procedures: Submittal procedures.
- B. Product Data: Submit manufacturers catalog literature for each product required.
- C. Shop Drawings: Submit list of wording, symbols, letter size, and color coding for mechanical identification and valve chart and schedule, including valve tag number, location, function, and valve manufacturer's name and model number.
- D. Manufacturer's Installation Instructions: Indicate installation instructions, special procedures, and installation.

1.4 CLOSEOUT SUBMITTALS

- A. Section 013300 - Submittal Procedures: Submittal procedures.
- B. Project Record Documents: Record actual locations of tagged valves; include valve tag numbers.

1.5 QUALITY ASSURANCE

- A. Conform to ASME A13.1 for color scheme for identification of piping systems and accessories.
- B. Maintain one copy of each document on site.

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1.6 QUALIFICATIONS

- A. Manufacturer: Company specializing in manufacturing products specified in this section with minimum three years documented experience.
- B. Installer: Company specializing in performing Work of this section with minimum three years documented experience.

1.7 FIELD MEASUREMENTS

- A. Verify field measurements prior to fabrication.

PART 2 PRODUCTS

2.1 NAMEPLATES

- A. Manufacturers:
 - 1. MSI Marking Services.
 - 2. Seton Identification Products.
 - 3. Substitutions – Section 016000 – Product Requirements.
- B. Product Description:
 - 1. Laminated three layer plastic with engraved black letters on light contrasting background color.
 - 2. 1/16 inch plastic stock with adhesive backing.
 - 3. Color Schedule: Black with white letters.
 - 4. Provide nameplates to the following equipment:
 - a. Air Handling Equipment.
 - b. Unit Heaters.
 - c. Pumps
 - d. Control Panels

2.2 PLASTIC TAGS

- A. Manufacturers:
 - 1. MSI Marking Services.
 - 2. Seton Identification Products.
- B. Product Description:
 - 1. Laminated three-layer plastic with engraved black letters on light contrasting background color. Tag size minimum 1-1/2 inches diameter, 1/16 inch thick.
 - 2. Color Schedule: Domestic Cold Water –Blue with white letters, Domestic Hot Water – Red with white letters.
 - 3. Tag Chart: Typewritten letter size list of applied tags and location in anodized aluminum frame.
 - 4. Plastic Tag Accessories: Flexible bead chain.

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2.3 PIPE MARKERS

- A. Manufacturers:
 - 1. MSI Marking Services, Model MS-900.
 - 2. Seton Identification Products.
- B. Product Description:
 - 1. Fade resistant, heavy duty vinyl with adhesive backing.
 - 2. Flow direction arrows independent of pipe labels.
 - 3. Color and Lettering: Conform to ASME A13.1

PART 3 EXECUTION

3.1 PREPARATION

- A. Degrease and clean surfaces to receive adhesive for identification materials.

3.2 INSTALLATION

- A. Install identifying devices after completion of coverings and painting.
- B. Install plastic nameplates with corrosive-resistant mechanical fasteners, or adhesive.
- C. Install labels with sufficient adhesive for permanent adhesion and seal with clear lacquer. For unfinished canvas covering, apply paint primer before applying labels.
- D. Install tags using corrosion resistant chain. Number tags consecutively by location.
- E. Identify air handling units, heat transfer equipment, and control components, with plastic nameplates. Identify other small devices with tags.
- F. Identify control panels and major control components outside panels with plastic nameplates.
- G. Identify valves in main and branch piping with tags.
- H. Identify radiator valves with numbered tags.
- I. Tag automatic controls, instruments, and relays. Key to control schematic.
- J. Identify piping, concealed or exposed, with plastic pipe markers. Identify service, flow direction, and pressure. Install in clear view and align with axis of piping. Locate identification not to exceed 20 feet on straight runs including risers and drops, adjacent to each valve and tee, at each side of penetration of structure or enclosure, and at each obstruction.

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- K. Identify ductwork with plastic nameplates. Identify with air handling unit identification number and area served. Locate identification at air handling unit, at each side of penetration of structure or enclosure, and at each obstruction.

3.3 SCHEDULES

A. Identification:

1. Heating Hot Water (new piping only).
 - a. Identification Type: Heating Hot Water Supply/Return.
 - b. Background Color: Yellow.
 - c. Lettering Color: Black.
2. Ductwork (new duct only).
 - a. Identification Type: Exhaust.
 - b. Lettering Color: Black.
3. Domestic Cold Water Piping (new piping only).
 - a. Label: Domestic Cold Water.
 - b. Background Color: Green.
 - c. Lettering Color: White.
4. Compressed Air Piping (new piping only).
 - a. Label: Compressed Air.
 - b. Background Color: Yellow.
 - c. Lettering Color: Black.

END OF SECTION

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SECTION 230593

TESTING, ADJUSTING, AND BALANCING FOR HVAC

PART 1 GENERAL

1.1 SUMMARY

- A. Section Includes:
 - 1. Testing, adjusting, and balancing of air systems.
 - 2. Testing, adjusting, and balancing of hydronic systems.
 - 3. Measurement of final operating condition of HVAC systems.

1.2 REFERENCES

- A. Associated Air Balance Council:
 - 1. AABC MN-1 - National Standards for Testing and Balancing Heating, Ventilating, and Air Conditioning Systems.
- B. American Society of Heating, Refrigerating and Air-Conditioning Engineers:
 - 1. ASHRAE 111 - Practices for Measurement, Testing, Adjusting and Balancing of Building Heating, Ventilation, Air-Conditioning and Refrigeration Systems.
- C. Natural Environmental Balancing Bureau:
 - 1. NEBB - Procedural Standards for Testing, Adjusting, and Balancing of Environmental Systems.

1.3 SUBMITTALS

- A. Prior to commencing Work, submit proof of latest calibration date of each instrument.
- B. Test Reports: Indicate data on AABC MN-1 National Standards for Total System Balance forms.
- C. Field Reports: Indicate deficiencies preventing proper testing, adjusting, and balancing of systems and equipment to achieve specified performance.
- D. Prior to commencing Work, submit report forms or outlines indicating adjusting, balancing, and equipment data required. Include detailed procedures, agenda, sample report forms and copy of AABC National Project Performance Guaranty.
- E. Submit draft copies of report for review prior to final acceptance of Project.
- F. Furnish reports in soft cover, letter size, 3-ring binder manuals, complete with table of contents page and indexing tabs, with cover identification at front and side. Include set of reduced drawings with air outlets and equipment identified to correspond with data sheets, and indicating thermostat locations.

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1.4 CLOSEOUT SUBMITTALS

- A. Project Record Documents: Record actual locations of balancing valves and rough setting.
- B. Operation and Maintenance Data: Furnish final copy of testing, adjusting, and balancing report inclusion in operating and maintenance manuals.

1.5 QUALITY ASSURANCE

- A. Perform Work in accordance with AABC MN-1 National Standards for Field Measurement and Instrumentation, Total System Balance.
- B. Maintain one copy of each document on site.
- C. Prior to commencing Work, calibrate each instrument to be used.

1.6 QUALIFICATIONS

- A. Agency: Company specializing in testing, adjusting, and balancing of systems specified in this section with minimum three years documented experience certified by AABC.

1.7 SEQUENCING

- A. Sequence balancing between completion of systems tested and Date of Substantial Completion.

PART 2 PRODUCTS

Not Used.

PART 3 EXECUTION

3.1 EXAMINATION

- A. Verify systems are complete and operable before commencing work. Verify the following:
 - 1. Systems are started and operating in safe and normal condition.
 - 2. Temperature control systems are installed complete and operable.
 - 3. Proper thermal overload protection is in place for electrical equipment.
 - 4. Final filters are clean and in place. If required, install temporary media in addition to final filters.
 - 5. Duct systems are clean of debris.
 - 6. Fans are rotating correctly.
 - 7. Fire and volume dampers are in place and open.
 - 8. Air coil fins are cleaned and combed.
 - 9. Access doors are closed and duct end caps are in place.

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10. Air outlets are installed, connected and adjusted.
11. Duct system leakage is minimized.
12. Hydronic systems are flushed, filled, and vented.
13. Pumps are rotating correctly.
14. Proper strainer baskets are clean and in place or in normal position.
15. Service and balancing valves are open.

3.2 PREPARATION

- A. Furnish instruments required for testing, adjusting, and balancing operations.
- B. Make instruments available to Architect/Engineer to facilitate spot checks during testing.

3.3 INSTALLATION TOLERANCES

- A. Air Handling Systems: Adjust to within plus or minus 10 percent of design.
- B. Air Outlets and Inlets: Adjust total to within plus 10 percent and minus 5 percent of design to space. Adjust outlets and inlets in space to within plus or minus 10 percent of design.
- C. Hydronic Systems: Adjust to within plus or minus 10 percent of design.

3.4 ADJUSTING

- A. Section 017000 - Execution Requirements: Testing, adjusting, and balancing.
- B. Verify recorded data represents actual measured or observed conditions.
- C. Permanently mark settings of dampers, and other adjustment devices allowing settings to be restored. Set and lock memory stops.
- D. After adjustment, take measurements to verify balance has not been disrupted. If disrupted, verify correcting adjustments have been made.
- E. Report defects and deficiencies noted during performance of services, preventing system balance.
- F. Leave systems in proper working order, replacing belt guards, closing access doors, closing doors to electrical switch boxes, and restoring thermostats to specified settings.
- G. At final inspection, recheck random selections of data recorded in report. Recheck points or areas as selected and witnessed by Owner.
- H. Check and adjust systems approximately six months after final acceptance and submit report.

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3.5 AIR SYSTEM PROCEDURE

- A. Adjust air handling and distribution systems to obtain required or design supply, return, and exhaust air quantities at site altitude.
- B. Make air quantity measurements in main ducts by Pitot tube traverse of entire cross sectional area of duct.
- C. Measure air quantities at air inlets and outlets.
- D. Adjust distribution system to obtain uniform space temperatures free from objectionable drafts.
- E. Use volume control devices to regulate air quantities only to extent adjustments do not create objectionable air motion or sound levels. Effect volume control by using volume dampers located in ducts.
- F. Vary total system air quantities by adjustment of fan speeds. Provide sheave drive changes to vary fan speed. Vary branch air quantities by damper regulation.
- G. Provide system schematic with required and actual air quantities recorded at each outlet or inlet.
- H. Measure static air pressure conditions on air supply units, including filter and coil pressure drops, and total pressure across fan. Make allowances for 50 percent loading of filters.
- I. Adjust outside air automatic dampers, outside air, return air, and exhaust dampers for design conditions.
- J. Measure temperature conditions across outside air, return air, and exhaust dampers to check leakage.

3.6 WATER SYSTEM PROCEDURE

- A. Adjust water systems, after air balancing, to obtain design quantities.
- B. Use calibrated Venturi tubes, orifices, or other metered fittings and pressure gauges to determine flow rates for system balance. Where flow-metering devices are not installed, base flow balance on temperature difference across various heat transfer elements in system.
- C. Adjust systems to obtain specified pressure drops and flows through heat transfer elements prior to thermal testing. Perform balancing by measurement of temperature differential in conjunction with air balancing.
- D. Effect system balance with automatic control valves fully open or in normal position to heat transfer elements.

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- E. Effect adjustment of water distribution systems by means of balancing cocks, valves, and fittings. Do not use service or shut-off valves for balancing unless indexed for balance point.
- F. Where available pump capacity is less than total flow requirements or individual system parts, simulate full flow in one part by temporary restriction of flow to other parts.

3.7 SCHEDULES

- A. Equipment Requiring Testing, Adjusting, and Balancing:
 - 1. Exhaust Fans.
 - 2. Air Inlets and Outlets.
 - 3. Hydronic pumps.
 - 4. Unit Heaters
- B. Report Forms
 - 1. Title Page:
 - a. Name of Testing, Adjusting, and Balancing Agency.
 - b. Address of Testing, Adjusting, and Balancing Agency.
 - c. Telephone and facsimile numbers of Testing, Adjusting, and Balancing Agency.
 - d. Project name.
 - e. Project location.
 - f. Project Architect.
 - g. Project Engineer.
 - h. Project Contractor.
 - i. Project altitude.
 - j. Report date.
 - 2. Summary Comments:
 - a. Design versus final performance.
 - b. Notable characteristics of system.
 - c. Description of systems operation sequence.
 - d. Summary of outdoor and exhaust flows to indicate building pressurization.
 - e. Nomenclature used throughout report.
 - f. Test conditions.
 - 3. Instrument List:
 - a. Instrument.
 - b. Manufacturer.
 - c. Model number.
 - d. Serial number.
 - e. Range.
 - f. Calibration date.
 - 4. Electric Motors:
 - a. Manufacturer.
 - b. Model/Frame.
 - c. HP/BHP and kW.
 - d. Phase, voltage, amperage; nameplate, actual, no load.
 - e. RPM.

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- f. Service factor.
- g. Starter size, rating, heater elements.
- h. Sheave Make/Size/Bore.
- 5. V-Belt Drive:
 - a. Identification/location.
 - b. Required driven RPM.
 - c. Driven sheave, diameter and RPM.
 - d. Belt, size and quantity.
 - e. Motor sheave diameter and RPM.
 - f. Center to center distance, maximum, minimum, and actual.
- 6. Pump Data:
 - a. Identification/number.
 - b. Manufacturer.
 - c. Size/model.
 - d. Impeller.
 - e. Service.
 - f. Design flow rate, pressure drop, BHP and kW.
 - g. Actual flow rate, pressure drop, BHP and kW.
 - h. Discharge pressure.
 - i. Suction pressure.
 - j. Total operating head pressure.
 - k. Shut off, discharge and suction pressures.
 - l. Shut off, total head pressure.
- 7. Combustion Test:
 - a. Manufacturer.
 - b. Model number.
 - c. Serial number.
 - d. Firing rate.
 - e. Overfire draft.
 - f. Gas meter timing dial size.
 - g. Gas meter time per revolution.
 - h. Gas pressure at meter outlet.
 - i. Gas flow rate.
 - j. Heat input.
 - k. Burner manifold gas pressure.
 - l. Percent carbon monoxide (CO).
 - m. Percent carbon dioxide (CO₂).
 - n. Percent oxygen (O₂).
 - o. Percent excess air.
 - p. Flue gas temperature at outlet.
 - q. Ambient temperature.
 - r. Net stack temperature.
 - s. Percent stack loss.
 - t. Percent combustion efficiency.
 - u. Heat output.
- 8. Air Moving Equipment:
 - a. Location.
 - b. Manufacturer.

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- c. Model number.
- d. Serial number.
- e. Arrangement/Class/Discharge.
- f. Air flow, specified and actual.
- g. Return air flow, specified and actual.
- h. Outside air flow, specified and actual.
- i. Total static pressure (total external), specified and actual.
- j. Inlet pressure.
- k. Discharge pressure.
- l. Sheave Make/Size/Bore.
- m. Number of Belts/Make/Size.
- n. Fan RPM.
- 9. Return Air/Outside Air Data:
 - a. Identification/location.
 - b. Design air flow.
 - c. Actual air flow.
 - d. Design return air flow.
 - e. Actual return air flow.
 - f. Design outside air flow.
 - g. Actual outside air flow.
 - h. Return air temperature.
 - i. Outside air temperature.
 - j. Required mixed air temperature.
 - k. Actual mixed air temperature.
 - l. Design outside/return air ratio.
 - m. Actual outside/return air ratio.
- 10. Exhaust Fan Data:
 - a. Location.
 - b. Manufacturer.
 - c. Model number.
 - d. Serial number.
 - e. Air flow, specified and actual.
 - f. Total static pressure (total external), specified and actual.
 - g. Inlet pressure.
 - h. Discharge pressure.
 - i. Sheave Make/Size/Bore.
 - j. Number of Belts/Make/Size.
 - k. Fan RPM.
- 11. Duct Traverse:
 - a. System zone/branch.
 - b. Duct size.
 - c. Area.
 - d. Design velocity.
 - e. Design air flow.
 - f. Test velocity.
 - g. Test air flow.
 - h. Duct static pressure.
 - i. Air temperature.

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- j. Air correction factor.
- 12. Duct Leak Test:
 - a. Description of ductwork under test.
 - b. Duct design operating pressure.
 - c. Duct design test static pressure.
 - d. Duct capacity, air flow.
 - e. Maximum allowable leakage duct capacity times leak factor.
 - f. Test apparatus.
 - 1) Blower.
 - 2) Orifice, tube size.
 - 3) Orifice size.
 - 4) Calibrated.
 - g. Test static pressure.
 - h. Test orifice differential pressure.
 - i. Leakage.
- 13. Air Distribution Test Sheet:
 - a. Air terminal number.
 - b. Room number/location.
 - c. Terminal type.
 - d. Terminal size.
 - e. Area factor.
 - f. Design velocity.
 - g. Design air flow.
 - h. Test (final) velocity.
 - i. Test (final) air flow.
 - j. Percent of design air flow.

END OF SECTION

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SECTION 230700

PIPING INSULATION

PART 1 GENERAL

1.1 SUMMARY

- A. Section Includes:
1. HVAC and plumbing piping insulation, jackets and accessories.

1.2 REFERENCES

- A. ASTM International:
1. ASTM B209 - Standard Specification for Aluminum and Aluminum-Alloy Sheet and Plate.
 2. ASTM C195 - Standard Specification for Mineral Fiber Thermal Insulating Cement.
 3. ASTM C449/C449M - Standard Specification for Mineral Fiber Hydraulic-Setting Thermal Insulating and Finishing Cement.
 4. ASTM C450 - Standard Practice for Fabrication of Thermal Insulating Fitting Covers for NPS Piping, and Vessel Lagging.
 5. ASTM C534 - Standard Specification for Preformed Flexible Elastomeric Cellular Thermal Insulation in Sheet and Tubular Form.
 6. ASTM C547 - Standard Specification for Mineral Fiber Pipe Insulation.
 7. ASTM C553 - Standard Specification for Mineral Fiber Blanket Thermal Insulation for Commercial and Industrial Applications.
 8. ASTM C585 - Standard Practice for Inner and Outer Diameters of Rigid Thermal Insulation for Nominal Sizes of Pipe and Tubing (NPS System).
 9. ASTM C921 - Standard Practice for Determining the Properties of Jacketing Materials for Thermal Insulation.
 10. ASTM C1071 - Standard Specification for Thermal and Acoustical Insulation (Glass Fiber, Duct Lining Material).
 11. ASTM C1136 - Standard Specification for Flexible, Low Permeance Vapor Retarders for Thermal Insulation.
 12. ASTM C1290 - Standard Specification for Flexible Fibrous Glass Blanket Insulation Used to Externally Insulate HVAC Ducts.
 13. ASTM D1785 - Standard Specification for Rigid Poly (Vinyl Chloride) (PVC) Compounds and Chlorinated Poly (Vinyl Chloride) (CPVC) Compounds.
 14. ASTM E96/E96M - Standard Test Methods for Water Vapor Transmission of Materials.
 15. ASTM E162 - Standard Test Method for Surface Flammability of Materials Using a Radiant Heat Energy Source.
- B. Sheet Metal and Air Conditioning Contractors':
1. SMACNA - HVAC Duct Construction Standard - Metal and Flexible.
- C. Underwriters Laboratories Inc.:
1. UL 1978 - Standard for Safety for Grease Ducts.

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1.3 SUBMITTALS

- A. Section 013300 - Submittal Procedures: Submittal procedures.
- B. Product Data: Submit product description, thermal characteristics and list of materials and thickness for each service, and location.
- C. Manufacturer's Installation Instructions: Submit manufacturers published literature indicating proper installation procedures.
- D. Manufacturer's Certificate: Certify products meet or exceed specified requirements.

1.4 QUALITY ASSURANCE

- A. Test pipe insulation for maximum flame spread index of 25 and maximum smoke developed index of not exceeding 50 in accordance with ASTM E84.
- B. Pipe insulation manufactured in accordance with ASTM C585 for inner and outer diameters.
- C. Factory fabricated fitting covers manufactured in accordance with ASTM C450.
- D. Duct insulation, Coverings, and Linings: Maximum 25/50 flame spread/smoke developed index, when tested in accordance with ASTM E84, using specimen procedures and mounting procedures of ASTM E 2231.

1.5 QUALIFICATIONS

- A. Manufacturer: Company specializing in manufacturing products specified in this section with minimum three years documented experience.
- B. Applicator: Company specializing in performing Work of this section with minimum three years documented experience.

1.6 PRE-INSTALLATION MEETINGS

- A. Section 013000 - Administrative Requirements: Pre-installation meeting.
- B. Convene minimum one week prior to commencing work of this section.

1.7 DELIVERY, STORAGE, AND HANDLING

- A. Section 013000 - Administrative Requirements: Requirements for coordination.
- B. Accept materials on site in original factory packaging, labeled with manufacturer's identification, including product density and thickness.
- C. Protect insulation from weather and construction traffic, dirt, water, chemical, and damage, by storing in original wrapping.

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1.8 ENVIRONMENTAL REQUIREMENTS

- A. Install insulation only when ambient temperature and humidity conditions are within range recommended by manufacturer.
- B. Maintain temperature before, during, and after installation for minimum period of 24 hours.

1.9 FIELD MEASUREMENTS

- A. Verify field measurements prior to fabrication.

1.10 WARRANTY

- A. Section 017000 - Execution and Closeout Requirements: Product warranties and product bonds.

PART 2 PRODUCTS

2.1 MANUFACTURER

- A. Manufacturers for Glass Fiber and Mineral Fiber Insulation Products:
 - 1. Knauf 1000° Pipe Insulation and Friendly Feel Duct Wrap.
 - 2. CertainTeed.
 - 3. Johns Manville.
 - 4. Owens-Corning.
 - 5. Substitutions: Section 016000 - Product Requirements.

2.2 PIPE INSULATION

- A. Hydronic Piping: ASTM C547, molded glass fiber pipe insulation.
 - 1. Thermal Conductivity: 0.23 at 75 degrees F.
 - 2. Operating Temperature Range: 0 to 1000 degrees F.
 - 3. Vapor Barrier Jacket: ASTM C1136, Type I, factory applied reinforced foil kraft with self-sealing adhesive joints.
 - 4. Jacket Temperature Limit: minus 20 to 150 degrees F.
- B. Domestic Water Piping: ASTM C547, molded glass fiber pipe insulation.
 - 1. Thermal Conductivity: 0.23 at 75 degrees F.
 - 2. Maximum Service Temperature: 0 to 850 degrees F.
 - 3. Vapor Barrier Jacket: ASTM C1136, Type 1, factory applied reinforced foil kraft with self sealing adhesive joints.
 - 4. Jacket Temperature Limit: -20 to 150 degrees F.

2.3 PIPE INSULATION JACKETS

- A. Vapor Retarder Jacket:
 - 1. ASTM C921, white Kraft paper with glass fiber yarn, bonded to aluminized film.
 - 2. Water Vapor Permeance: ASTM E96/E96M; 0.02 perms.

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- B. PVC Plastic Pipe Jacket:
 - 1. Product Description: ASTM D1785, One piece molded type fitting covers and sheet material, off-white color.
 - 2. Thickness: 15 mil.
 - 3. Connections: Brush on welding adhesive.

2.4 PIPE INSULATION ACCESSORIES

- A. Vapor Retarder Lap Adhesive: Compatible with insulation.
- B. Covering Adhesive Mastic: Compatible with insulation.
- C. Piping 1-1/2 inches diameter and smaller: Galvanized steel insulation protection shield, specified under 230529.
- D. Tie Wire: 0.048 inch stainless steel with twisted ends on maximum 12 inch centers.
- E. Mineral Fiber Hydraulic-Setting Thermal Insulating and Finishing Cement: ASTM C449/C449M.
- F. Insulating Cement: ASTM C195; hydraulic setting on mineral wool.
- G. Adhesives: Compatible with insulation.

PART 3 EXECUTION

3.1 EXAMINATION

- A. Section 013000 - Administrative Requirements: Coordination and project conditions.
- B. Verify piping, equipment and ductwork has been tested before applying insulation materials.
- C. Verify surfaces are clean and dry, with foreign material removed.

3.2 INSTALLATION - PIPING SYSTEMS

- A. Piping Exposed to View in Finished Spaces: Locate insulation and cover seams in least visible locations.
- B. Continue insulation through penetrations of building assemblies or portions of assemblies having fire resistance rating of one hour or less. Provide intumescent firestopping when continuing insulation through assembly. Finish at supports, protrusions, and interruptions.
- C. Piping Systems Conveying Fluids Below Ambient Temperature:
 - 1. Insulate entire system including fittings, valves, unions, flanges, strainers, flexible connections, and expansion joints.
 - 2. Furnish factory-applied or field-applied vapor retarder jackets. Secure factory-applied jackets with pressure sensitive adhesive self-sealing longitudinal laps and

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butt strips. Secure field-applied jackets with outward clinch expanding staples and seal staple penetrations with vapor retarder mastic.

3. Insulate fittings, joints, and valves with molded insulation of like material and thickness as adjacent pipe. Finish with glass cloth and vapor retarder adhesive or PVC fitting covers.

D. Hot Piping Systems:

1. Furnish factory-applied or field-applied standard jackets. Secure with outward clinch expanding staples or pressure sensitive adhesive system on standard factory-applied jacket and butt strips or both.
2. Insulate fittings, joints, and valves with insulation of like material and thickness as adjoining pipe. Finish with glass cloth and adhesive or PVC fitting covers.
3. Insulate flanges and unions at equipment.

E. Inserts and Shields:

1. Piping 1-1/2 inches Diameter and Smaller: Install galvanized steel shield between pipe hanger and insulation.

F. Insulation Terminating Points:

1. Coil Branch Piping 1 inch and Smaller: Terminate steam piping at union upstream of the coil control valve.
2. Condensate Piping: Insulate entire piping system and components to prevent condensation.

- G. Piping to 10'-0" above finished floor: Finish with PVC jacket and fitting covers.

3.3 INSTALLATION - EQUIPMENT

- A. Factory Insulated Equipment: Do not insulate.
- B. Fill joints, cracks, seams, and depressions with bedding compound to form smooth surface. On cold equipment, use vapor retarder cement.
- C. Nameplates and ASME Stamps: Bevel and seal insulation around; do not cover with insulation.
- D. Equipment Requiring Access for Maintenance, Repair, or Cleaning: Install insulation for easy removal and replacement without damage.

3.4 SCHEDULES

- A. Piping Schedule:

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PIPING SYSTEMS	INSULATION THICKNESS inches
Heating Hot Water Supply \leq 1.5" diameter	1.5
Heating Hot Water Supply $>$ 1.5" diameter	2.0
Domestic Cold Water Supply, All Sizes	0.5

END OF SECTION

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SECTION 230900

INSTRUMENTATION AND CONTROL FOR HVAC

PART 1 GENERAL

1.1 SUMMARY

- A. Section Includes:
 - 1. Thermostats.
 - 2. Building Automation Starters.
 - 3. Gas Detection System.
 - 4. Refer to 233100 Duct Systems for Vehicle Exhaust System Control Panel
- B. Related Sections:
 - 1. Section 230993 - Sequence of Operations for HVAC Controls: Sequences of operation implemented using products specified in this section.
 - 2. Refer to Division 26 –Electrical relevant specifications for requirements for installing HVAC Instrumentation and Controls for HVAC.

1.2 REFERENCES

- A. Air Movement and Control Association International, Inc.:
 - 1. AMCA 500 - Test Methods for Louvers, Dampers, and Shutters.
- B. American Society of Heating, Refrigerating and Air-Conditioning Engineers:
 - 1. ASHRAE 62 - Ventilation for Acceptable Indoor Air Quality.
- C. American Society of Mechanical Engineers:
 - 1. ASME B16.18 - Cast Copper Alloy Solder Joint Pressure Fittings.
 - 2. ASME B16.22 - Wrought Copper and Copper Alloy Solder Joint Pressure Fittings.
- D. ASTM International:
 - 1. ASTM A126 - Standard Specification for Gray Iron Castings for Valves, Flanges, and Pipe Fittings.
 - 2. ASTM A536 - Standard Specification for Ductile Iron Castings.
 - 3. ASTM B32 - Standard Specification for Solder Metal.
 - 4. ASTM B88 - Standard Specification for Seamless Copper Water Tube.
 - 5. ASTM B280 - Standard Specification for Seamless Copper Tube for Air Conditioning and Refrigeration Field Service.
 - 6. ASTM D2737 - Standard Specification for Polyethylene (PE) Plastic Tubing.
- E. American Welding Society:
 - 1. AWS A5.8 - Specification for Filler Metals for Brazing and Braze Welding.
- F. National Electrical Manufacturers Association:
 - 1. NEMA DC 3 - Residential Controls - Electrical Wall Mounted Room Thermostats.
 - 2. NEMA 250 - Enclosures for Electrical Equipment (1000 Volts Maximum).
- G. National Fire Protection Association:

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1. NFPA 72 - National Fire Alarm Code.
2. NFPA 90A - Standard for the Installation of Air Conditioning and Ventilating Systems.

H. Underwriters Laboratories, Inc.:

1. UL 1820 - Fire Test of Pneumatic Tubing for Flame and Smoke Characteristics.

1.3 SUBMITTALS

- A. Shop Drawings: Indicate operating data, system drawings, wiring diagrams, and written detailed operational description of sequences. Coordinate submittals with information requested in Section 230993.
- B. Product Data: Submit description and engineering data for each control system component. Include sizing as required.
- C. Design Data: Indicate data for sizing of air tubing.
- D. Manufacturer's Installation Instructions: Submit installation requirements for each control component.
- E. Manufacturer's Certificate: Certify products meet or exceed specified requirements.

1.4 CLOSEOUT SUBMITTALS

- A. Project Record Documents: Record actual locations of control components, including panels, thermostats, and sensors.
- B. Operation and Maintenance Data: Submit inspection period, cleaning methods, recommended cleaning materials, and calibration tolerances.

1.5 QUALITY ASSURANCE

- A. Control Air Damper Performance: Test in accordance with AMCA 500.

1.6 QUALIFICATIONS

- A. Manufacturer: Company specializing in manufacturing products specified in this section with minimum three years documented experience.
- B. Installer: Company specializing in performing Work of this section with minimum three years documented experience.

1.7 DELIVERY, STORAGE, AND HANDLING

- A. Accept controls on site in original factory packaging Inspect for damage.

1.8 COORDINATION

- A. Coordinate installation of control components with project phasing requirements.

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1.9 WARRANTY

- A. Furnish five year manufacturer warranty for each control system.

PART 2 PRODUCTS

2.1 THERMOSTATS

- A. Zone Thermostats
 1. Compatible with Zone Pump Controller.
 2. Power Supply: 24 VAC, 3VA, 2A max relay, class 2.
 3. CSA Approved.
 4. Dead band: Maximum 2 degrees F.

2.2 BUILDING AUTOMATION STARTER (GAS DETECTION SYSTEM)

- A. Manufacturers:
 1. Cerus Industries, Model BAS.
 2. Square D Company.
 3. GE.
- B. Product Description: Single phase automatic combination starter with door mounted HOA switch and start/stop pushbuttons and lockable on/off disconnect (UL/NEC/NFPA listed). LED indication lights for power, run, and fault. Electronic overload (Class 10) with manual reset. NEMA ICS 2, Class A full voltage, non-reversing, across the line.
- C. Combination Controller: Disconnecting means, lockable, branch and short circuit protection without fuses.
- D. Overload Relay: Class 1-60 Electronic, inverse time 0.5-95 amps, manual reset.
- E. Inputs: Dry and Voltage Auto Input – 10-30 VAC/DC to energize. N.C. dry contact (shutdown)
- F. Outputs: Damper control and status – 120 VAC 0.2A, N.O. [0.3A@125VAC](#) fault relay.
- G. Power fail mode: Restart last mode, with delay.
- H. Voltage: 230 VAC, 1 Phase, 1 thru 25 horsepower.
- I. Enclosure: NEMA 1, -5 F to 140 F ambient operating temperature.
- J. Listings: UL508 Listed.

2.3 GAS DETECTION SYSTEM

- A. Manufacturers:
 1. Honeywell Analytics, Model VA301C Controller and E3 Point Sensors.
 2. Sensidyne.
- B. Product Description: Gas detection system composed of a main controller, relay panel, remote sensors, and horn/strobe. Sensors shall be networkable. Gas detection system shall provide necessary relay outputs for signaling of HVAC system components.

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- C. Controller: Wall mounted, central gas detection controller in a polycarbonate industrial enclosure. Three modbus channels for up to 96 transmitters. Maximum of 2000 ft communication line per channel. 24 VAC nominal, RS-485 Modbus communication. Operating temperature: -4 degrees F to 122 degrees F, 0-95% RH non-condensing.
 - 1. Relay Output Rating: 5A, 30 VDC or 250VAC resistive.
 - 2. Alarms: (3) fully programmable.
 - 3. Time delays: 0, 30, 45 seconds, 1-99 minutes before and after alarm.
 - 4. Outputs: (3) DPDT relays.
 - 5. Display: Large alphanumeric.
 - 6. Nitrogen Dioxide: 0.1 ppm resolution, 0-10 ppm range.
 - 7. Accessory relay module as required for activation of specified HVAC components.

- D. Sensors: Wall mounted, single, networkable detector in a polycarbonate enclosure for monitoring carbon monoxide (CO) or nitrogen dioxide (NO2). 24 VAC nominal, RS-485 Modbus communication. Operating temperature: -40 degrees F to 122 degrees F.
 - 1. Carbon Monoxide: 1 ppm resolution, 0-250 ppm range.
 - 2. Nitrogen Dioxide: 0.1 ppm resolution, 0-10 ppm range.

- E. Horn/strobe: Wall mounted standard candela, white polycarbonate enclosure, blue lens, 2-wire 24VAC.

- F. Listings: UL 61010-1, CAN/CSA C22.2.

PART 3 EXECUTION

3.1 EXAMINATION

- A. Verify air handling units and ductwork installation is complete and air filters are in place before installing sensors in air streams.

- B. Verify location of thermostats and humidistats and other exposed control sensors with Drawings before installation.

- C. Verify building systems to be controlled are ready to operate.

3.2 INSTALLATION

- A. Install thermostats, humidistats, space temperature sensors, and other exposed control sensors after locations are coordinated with other Work.

- B. Install thermostats, humidistats, space temperature sensors, and other exposed control sensors 60 inches 48 inches 42 inches above floor. Align with light switches.

- C. Install control panels adjacent to associated equipment on vibration free walls or freestanding supports. Install engraved plastic nameplates for instruments and controls inside cabinet and engraved plastic nameplates on cabinet face. Label with appropriate equipment or system designation.

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3.3 FIELD QUALITY CONTROL

- A. After completion of installation, test and adjust control equipment. Submit data showing set points and final adjustments of controls.

3.4 DEMONSTRATION AND TRAINING

- A. Demonstrate complete operation of systems, including sequence of operation prior to Date of Substantial Completion.
- B. Demonstrate complete and operating system to Owner.
- C. Provide a minimum of 2 hours of training on operation and maintenance of gas detection system. Training shall be performed by system manufacturer.

END OF SECTION

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SECTION 230993

SEQUENCE OF OPERATIONS FOR HVAC CONTROLS

PART 1 GENERAL

1.1 SUMMARY

- A. Section includes sequence of operation for:
 - 1. Gas Detection/General Ventilation Control
 - 2. Heating System Control.
 - 3. Refer to specification 233100 Duct Systems for the control of the vehicle exhaust system.
- B. Related Sections:
 - 1. Section 230900 - Instrumentation and Control for HVAC: For equipment, devices, and system components to implement sequences of operation.

1.2 SYSTEM DESCRIPTION

- A. Provide control of systems following sequence of operations, utilizing factory equipment controls and instrumentation devices as specified.

1.3 SUBMITTALS

- A. Shop Drawings: Indicate mechanical system controlled and control system components.
 - 1. Label with settings, adjustable range of control and limits. Submit written description of control sequence.
 - 2. Submit flow diagrams for each control system, graphically depicting control logic.
 - 3. Submit draft copies of graphic displays indicating mechanical system components, control system components, and controlled function status and value.

1.4 CLOSEOUT SUBMITTALS

- A. Project Record Documents: Record actual locations of components and set points of controls, including changes to sequences made after submission of shop drawings.

PART 2 PRODUCTS

Not Used.

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PART 3 EXECUTION

3.1 GAS DETECTION SYSTEM/GENERAL VENTILATION SYSTEM (EF-1, CD-1, CD-2)

- A. The storage bay shall contain an exhaust air system, consisting of wall exhaust fan and intake louver/damper/actuator. Systems shall be controlled automatically by a gas detection controller, detecting carbon monoxide (CO) and nitrogen dioxide (NO₂). Systems shall also be capable of being controlled manually, through a Hand-Off-Auto selector switch on the face of the combination controller.
- B. Automatic Mode: With the combination controllers HOA set to auto, the system shall operate based on remote gas sensors and gas detection system setpoints. If gas level exposure limits are exceeded, the gas detection controller shall initiate exhaust fan EF-1/damper CD-1 and intake damper CD-2 to start/open on ventilation request. Both units shall ventilate continuously until gas levels are reduced and the detection system sensors are satisfied. Upon activation by the gas detection system, gas detection controller shall signal visual alarm strobe.
- C. Manual Mode: Both the exhaust fan EF-1/damper CD-1 and intake damper CD-2 shall be started with the HOA in the hand position. This shall allow either direct ventilation to the space, manually by the operator, independent of the gas detection system. Fans shall operate continuously until the HOA is returned to the auto or off positions.

3.2 VEHICLE EXHAUST SYSTEM (CD-3)

- A. The vehicle exhaust system shall be a factory wired and tested package as discussed in section 233100. A control relay and interlock shall be added to this system to allow intake damper CD-3 to open (spring) when the vehicle exhaust system starts. Damper CD-3 shall open to allow for make up air to the vehicle exhaust fan system. Upon deactivation of the vehicle exhaust fan, damper CD-3 shall close (power).

3.3 HEATING SYSTEM

- A. The heating for the new bay shall be controlled by a low voltage zone relay control panel (similar to the existing) located in the mechanical room. The panel shall be 24VDC control input, with 120V relays for pump starting. The panel shall accept the room t-stat 24V control signal and initiate the zone pump (P-7) to start. The panel shall also send a heating system demand signal to the boiler. The unit heaters shall contain individual aquastats which shall be field set to 150 degrees F. Unit heater fan motors shall start when temperatures of 150 F or greater are present in the heating hot water supply piping.

END OF SECTION

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SECTION 231500

GENERAL SERVICE COMPRESSED-AIR SYSTEMS

PART 1 GENERAL

1.1 SUMMARY

A. Section Includes:

1. Flexible connectors.
2. Relief valves.
3. Compressed air outlets.
4. Hose Reels (HR-1).
5. Hose connectors.

B. Related Sections:

1. Section 230503 - Pipes and Tubes for Piping and Equipment: Product and installation requirements for piping materials applying to various system types.
2. Section 230529 - Hangers and Supports for Plumbing Piping and Equipment: Product requirements for pipe hangers and supports and firestopping for placement by this section.
3. Section 230553 - Identification for Plumbing Piping and Equipment: Product requirements for pipe and valve identification for placement by this section.

1.2 REFERENCES

A. American Society of Mechanical Engineers:

1. ASME B16.3 - Malleable Iron Threaded Fittings.
2. ASME B16.18 - Cast Copper Alloy Solder Joint Pressure Fittings.
3. ASME B16.22 - Wrought Copper and Copper Alloy Solder Joint Pressure Fittings.
4. ASME B16.26 - Cast Copper Alloy Fittings for Flared Copper Tubes.
5. ASME B31.1 - Power Piping.
6. ASME B31.9 - Building Services Piping.
7. ASME Section VIII - Boiler and Pressure Vessel Code - Pressure Vessels.
8. ASME Section IX - Boiler and Pressure Vessel Code - Welding and Brazing Qualifications.

B. ASTM International:

1. ASTM A53/A53M - Standard Specification for Pipe, Steel, Black and Hot-Dipped, Zinc-Coated, Welded and Seamless.
2. ASTM A126 - Standard Specification for Gray Iron Castings for Valves, Flanges, and Pipe Fittings.
3. ASTM A536 - Standard Specification for Ductile Iron Castings.
4. ASTM B32 - Standard Specification for Solder Metal.
5. ASTM B62 - Standard Specification for Composition Bronze or Ounce Metal Castings.
6. ASTM F1476 - Standard Specification for Performance of Gasketed Mechanical Couplings for Use in Piping Applications.

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- C. American Welding Society:
 - 1. AWS A5.8 - Specification for Filler Metals for Brazing and Braze Welding.
 - 2. AWS D1.1 - Structural Welding Code - Steel.

- D. Manufacturers Standardization Society of the Valve and Fittings Industry:
 - 1. MSS SP 58 - Pipe Hangers and Supports - Materials, Design and Manufacturer.
 - 2. MSS SP 67 - Butterfly Valves.
 - 3. MSS SP 69 - Pipe Hangers and Supports - Selection and Application.
 - 4. MSS SP 70 - Cast Iron Gate Valves, Flanged and Threaded Ends.
 - 5. MSS SP 71 - Cast Iron Swing Check Valves, Flanged and Threaded Ends.
 - 6. MSS SP 80 - Bronze Gate, Globe, Angle and Check Valves.
 - 7. MSS SP 89 - Pipe Hangers and Supports - Fabrication and Installation Practices.
 - 8. MSS SP 110 - Ball Valves Threaded, Socket-Welding, Solder Joint, Grooved and Flared Ends.

- E. National Electrical Manufacturers Association:
 - 1. NEMA 250 - Enclosures for Electrical Equipment (1000 Volts Maximum).

1.3 SUBMITTALS

- A. Section 013300 - Submittal Procedures: Requirements for submittals.

- B. Shop Drawings: Indicate piping system schematic with electrical and connection requirements general assembly of components, mounting and installation details, and general layout of control and alarm panels.

- C. Product Data:
 - 1. Piping: Submit data on pipe materials, fittings, and accessories.
 - 2. System Components: Submit manufacturers catalog information including capacity, component sizes, rough-in requirements, and service sizes. When applicable, include electrical characteristics and connection requirements.
 - 3. Compressors: Submit type, capacity, and performance characteristics. Include electrical characteristics and connection requirements.

- D. Product Data: Submit manufacturers catalog literature with capacity, weight, and electrical characteristics and connection requirements.

- E. Manufacturer's Installation Instructions: Submit hoisting and setting requirements, starting procedures.

- F. Manufacturer's Certificate: Certify products meet or exceed specified requirements.

1.4 CLOSEOUT SUBMITTALS

- A. Section 017000 - Execution and Closeout Requirements for submittals.

- B. Operation and Maintenance Data: Submit assembly views, lubrication instructions, replacement part numbers and availability.

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1.5 QUALITY ASSURANCE

- A. Perform Work in accordance with ASM B31.9 code for installation of piping systems and ASME Section IX for welding materials and procedures.

1.6 DELIVERY, STORAGE, AND HANDLING

- A. Section 016000 - Product Requirements: Requirements for transporting, handling, storing, and protecting products.
- B. Accept equipment on site in factory fabricated containers with shipping skids and plastic pipe end protectors in place. Inspect for damage.
- C. Protect equipment from weather and construction traffic. Maintain factory packaging and caps in place until installation.
- D. Deliver each length of piping with manufacturer's plugged or capped ends and keep sealed until installation.
- E. Deliver fittings, valves, and other components in sealed containers and keep sealed until installation.

1.7 WARRANTY

- A. Section 017000 - Execution and Closeout Requirements: Requirements for warranties.
- B. Furnish one year manufacturer warranty for hose reels.

PART 2 PRODUCTS

2.1 FLEXIBLE CONNECTORS

- A. Manufacturers:
 - 1. The Metraflex Company.
 - 2. Flex-Hose Co., Inc.
- B. Corrugate stainless steel hose with single layer of stainless steel exterior braiding, Schedule 40 ends; maximum working pressure 190 psig, threaded connections.

2.2 COMPRESSED AIR OUTLETS

- A. Compressed Air Outlets: Quick Connector: 3/8 brass, snap on connector with self closing valve.

2.3 HOSE REEL (HR-1)

- A. Manufacturers:
 - 1. Coxreels, Heavy Duty Hose Reels.

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- B. Wall mounted heavy duty hose reel with dual axel support, spring driven, nitrile swivel seals and multi position locking ratchet. Stainless steel spring.
- C. Horizontal swing swivel bracket, ball bearing rotation, powder coated steel.
- D. Each reel shall be provided with 50'-0" of oil resistant 3/8" hose.

2.4 HOSE CONNECTORS

- A. Hose Connectors: Corrugated stainless steel tubing with stainless steel wire braid covering and ends welded to inner tubing.
- B. Working Pressure: 250 psig minimum.
- C. End Connections:
 - 1. 2 inches and Smaller: Threaded steel pipe nipple.

PART 3 EXECUTION

3.1 EXAMINATION

- A. Section 013000 - Administrative Requirements Verification of existing conditions before starting work.
- B. Verify excavations are to required grade, dry, and not over-excavated.

3.2 INSTALLATION - ABOVE GROUND PIPING - COMPRESSED AIR SYSTEMS

- A. Install drip connections with valves at low points of piping system.
- B. Install take-off to outlets from top of main, with shut off valve after take off. Slope take-off piping to outlets.
- C. Install compressed air couplings, female quick connectors, and pressure gages where outlets are indicated.
- D. Install tees instead of elbows at changes in direction of piping. Fit open end of each tee with plug.
- E. Cut pipe and tubing accurately and install without springing or forcing.
- F. Slope piping in direction of flow.
- G. Install pipe sleeves where pipes and tubing pass through walls, floors, roofs, and partitions. Refer to Section 230529.
- H. Install pipe identification in accordance with Section 230553.

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- I. Except where indicated, install manual shut off valves with stem vertical and accessible for operation and maintenance.
- J. Install strainers on inlet side of pressure reducing valves. Install pressure reducing valves with bypasses and isolation valves to allow maintenance without interruption of service.

3.3 FIELD QUALITY CONTROL

- A. Section 01 40 00 - Quality Requirements Field inspecting, testing, adjusting, and balancing.
- B. Compressed Air Piping Leak Test: Prior to initial operation, clean and test compressed air piping in accordance with ASME B31.9.
- C. Verify for atmospheric pressure in piping systems, other than system under test.
- D. Test system with dry compressed air or dry nitrogen with test pressure in piping system at 50 psi.

3.4 CLEANING

- A. Section 017000 - Execution Requirements: Requirements for cleaning.
- B. Blow systems clear of free moisture and foreign matter.

END OF SECTION

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SECTION 232116

HYDRONIC PIPING SPECIALTIES

PART 1 GENERAL

1.1 SUMMARY

- A. Section Includes:
 - 1. Pressure gages.
 - 2. Thermometers.
 - 3. Diaphragm-type expansion tanks.
 - 4. Air vents.
 - 5. Strainers.
 - 6. Circuit Setters.

- B. Related Sections:
 - 1. Section 232123 – Hydronic Pumps: Execution requirements for piping connections to products specified by this section.

1.2 REFERENCES

- A. American Society of Mechanical Engineers:
 - 1. ASME B40.1 - Gauges - Pressure Indicating Dial Type - Elastic Element.
 - 2. ASME Section VIII - Boiler and Pressure Vessel Code - Pressure Vessels.

- B. ASTM International:
 - 1. ASTM A105/A105M - Standard Specification for Carbon Steel Forgings for Piping Applications.
 - 2. ASTM A126 - Standard Specification for Gray Iron Castings for Valves, Flanges, and Pipe Fittings.
 - 3. ASTM A216/A216M - Standard Specification for Steel Castings, Carbon, Suitable for Fusion Welding, for High-Temperature Service.
 - 4. ASTM A395/A395M - Standard Specification for Ferritic Ductile Iron Pressure-Retaining Castings for Use at Elevated Temperatures.
 - 5. ASTM E1 - Standard Specification for ASTM Thermometers.
 - 6. ASTM E77 - Standard Test Method for Inspection and Verification of Thermometers.

1.3 SUBMITTALS

- A. Section 013300 - Submittal Procedures: Submittal procedures.

- B. Product Data: Submit for manufactured products and assemblies used in this Project.
 - 1. Manufacturer's data indicating use, operating range, total range, accuracy, and location for manufactured components.
 - 2. Submit product description, model, dimensions, component sizes, rough-in requirements, service sizes, and finishes.

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- 3. Submit schedule indicating manufacturer, model number, size, location, rated capacity, load served, and features for each piping specialty.
 - 4. Submit electrical characteristics and connection requirements.
- C. Manufacturer's Installation Instructions: Submit hanging and support methods, joining procedures, application, selection, and hookup configuration. Include pipe and accessory elevations.

1.4 CLOSEOUT SUBMITTALS

- A. Section 017000 - Execution Requirements: Closeout procedures.
- B. Project Record Documents: Record actual locations of actual locations of components and instrumentation.
- C. Operation and Maintenance Data: Submit instructions for calibrating instruments, installation instructions, assembly views, servicing requirements, lubrication instruction, and replacement parts list.

1.5 QUALIFICATIONS

- A. Manufacturer: Company specializing in manufacturing products specified in this section with minimum three years experience.
- B. Installer: Company specializing in performing Work of this section with minimum three years experience.

1.6 DELIVERY, STORAGE, AND HANDLING

- A. Section 016000 - Product Requirements: Product storage and handling requirements.
- B. Accept piping specialties on site in shipping containers with labeling in place. Inspect for damage.
- C. Provide temporary protective coating on cast iron and steel valves.
- D. Protect systems from entry of foreign materials by temporary covers, caps and closures, completing sections of the work, and isolating parts of completed system until installation.

1.7 ENVIRONMENTAL REQUIREMENTS

- A. Section 016000 - Product Requirements.
- B. Do not install instruments when areas are under construction, except rough in, taps, supports and test plugs.

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1.8 FIELD MEASUREMENTS

- A. Verify field measurements before fabrication.

1.9 WARRANTY

- A. Section 017000 - Execution Requirements: Product warranties and product bonds.

PART 2 PRODUCTS

2.1 PRESSURE GAGES

- A. Manufacturer:
 - 1. Miljoco Corporation.
 - 2. Weiss Instruments.
 - 3. Substitutions or approved equal: Section 016000 – Product Requirements.
- B. Gage: ASME B40.1, UL 393 with bourdon tube, rotary brass movement, brass socket, front calibration adjustment, black scale on white background.
 - 1. Case: Cast aluminum.
 - 2. Bourdon Tube: Bronze.
 - 3. Dial Size: 2 inch diameter.
 - 4. Mid-Scale Accuracy: One percent full scale.
 - 5. Scale: Range 0-30 psi mechanical systems, 0-100 psi plumbing systems.
 - 6. Connection size.
 - 7. Lens: Glass.
 - 8. Mounting: Stem.
 - 9. Process Temperature: -40° - 200°F.
 - 10. Ambient Temperature: -40° - 140°F.

2.2 STEM TYPE THERMOMETERS

- A. Manufacturer:
 - 1. Miljoco Corporation.
 - 2. Weiss Instruments.
 - 3. Substitutions or approved equal: Section 016000 – Product Requirements.
- B. Thermometer: ASTM E1, adjustable angle, red appearing mercury, lens front tube, cast aluminum case with enamel finish, cast aluminum adjustable joint with positive locking device.
 - 1. Size: 7 inch scale.
 - 2. Lens: Acrylic.
 - 3. Thermowell: Brass, 3/4 inch NPT.
 - 4. Accuracy: 2 percent.
 - 5. Scale: Degrees F only.
 - 6. Temperature Range: 30° - 240°F.

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2.3 DIAL THERMOMETERS

- A. Manufacturer:
 - 1. Miljoco Corporation.
 - 2. Weiss Instruments.
 - 3. Substitutions or approved equal: Section 016000 – Product Requirements.

- B. Thermometer: ASTM E1, stainless steel case, adjustable angle with front calibration, bimetallic helix actuated with silicone fluid damping, white with black markings and black pointer hermetically sealed lens, stainless steel stem.
 - 1. Size: 3 inch diameter dial.
 - 2. Lens: Clear glass.
 - 3. Accuracy: 1 percent.
 - 4. Calibration: Degrees F only.

2.4 THERMOMETER SUPPORTS

- A. Socket: Brass separable sockets for thermometer stems without extensions, and with cap and chain.

2.5 DIAPHRAGM-TYPE EXPANSION TANK

- A. Manufacturer:
 - 1. Amtrol SX-30V
 - 2. Taco.
 - 3. Watts

- B. Construction: Welded steel, rated for working pressure of 125 psig and temperature of 240 degrees F with heavy duty butyl diaphragm.

- C. Accessories: Pressure gage and air-charging fitting, lifting lugs. Floor support stand.

- D. Capacity: 14 gallon tank volume, 11.3 gallon acceptance volume.
 - 1. Diameter: 15”.
 - 2. Height: 24”.
 - 3. Pre-charge to 12 psig.

2.6 AIR VENTS

- A. Manufacturer:
 - 1. Armstrong.
 - 2. Taco.
 - 3. Caleffi

- B. High Capacity Automatic Float Type:
 - 1. Brass body, solid non-metallic float, stainless steel valve and EPDM, integral check valve, valve seat; suitable for 150 psi and 240° F, ½” net connection.

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2.7 STRAINERS

- A. Size 2 inch and Smaller:
 - 1. Screwed iron body for 175 psig working pressure, Y pattern with 1/32 inch stainless steel perforated screen.

2.8 CIRCUIT BALANCING VALVES

- A. Manufactures:
 - 1. Armstrong ARMflo, Model CBV-VS.
 - 2. Taco.
 - 3. Caleffi
- B. Construction: Bronze body (1/2"-2" NPT), union on inlet and outlet.
- C. Fixed port venturi orifice balancing valve with flow measurement function independent of stem and ball position.
- D. Blow out proof stem, built in drain port, and Teflon seats.
- E. Calibration: Control within 5 percent of design flow over entire operating pressure.

PART 3 EXECUTION

3.1 INSTALLATION - THERMOMETERS AND GAGES

- A. Install thermometers in piping systems in sockets in short couplings. Enlarge pipes smaller than 2-1/2 inches for installation of thermometer sockets. Allow clearance from insulation.
- B. Provide instruments with scale ranges selected according to service with largest appropriate scale.
- C. Install gages and thermometers in locations where they are easily read from normal operating level. Install vertical to 45 degrees off vertical.
- D. Adjust gages and thermometers to final angle, clean windows and lenses, and calibrate to zero.

3.2 INSTALLATION - HYDRONIC PIPING SPECIALTIES

- A. Where large air quantities accumulate, provide enlarged air collection standpipes.
- B. Install automatic air vents at system high points.
- C. For automatic air vents in ceiling spaces or other concealed locations, install vent tubing to nearest drain.
- D. Pipe relief valve outlet to nearest floor drain.

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- E. Feed glycol solution to system through make-up line with pressure switch, venting system high points. Set to fill at 15 psig.

3.3 FIELD QUALITY CONTROL

- A. Section 017000 - Execution Requirements: Testing, adjusting, and balancing.
- B. Test for strength of glycol and water solution and submit written test results.

3.4 CLEANING

- A. Clean and flush glycol system before adding glycol solution.

3.5 PROTECTION OF INSTALLED CONSTRUCTION

- A. Do not install hydronic pressure gauges until after systems are pressure tested.

END OF SECTION

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SECTION 232123

HYDRONIC PUMPS

PART 1 GENERAL

1.1 SUMMARY

- A. Section Includes:
 - 1. System lubricated circulators (wet rotor).

1.2 REFERENCES

- A. American Society of Mechanical Engineers:
 - 1. ASME Section VIII - Boiler and Pressure Vessel Code - Pressure Vessels.
- B. National Electrical Manufacturers Association:
 - 1. NEMA 250 - Enclosures for Electrical Equipment (1000 Volts Maximum).
- C. Underwriters Laboratories Inc.:
 - 1. UL 778 - Motor Operated Water Pumps.

1.3 PERFORMANCE REQUIREMENTS

- A. Provide pumps to operate at system fluid temperatures indicated on Drawings without vapor binding and cavitation, are non-overloading in parallel or individual operation, and operate within 25 percent of midpoint of published maximum efficiency curve.

1.4 SUBMITTALS

- A. Section 013300 - Submittal Procedures: Submittal procedures.
- B. Product Data: Submit certified pump curves showing performance characteristics with pump and system operating point plotted. Include NPSH curve when applicable. Include electrical characteristics and connection requirements. Submit also, manufacturer model number, dimensions, service sizes, and finishes.
- C. Manufacturer's Installation Instructions: Submit application, selection, and hookup configuration with pipe and accessory elevations. Submit hanging and support requirements and recommendations.
- D. Manufacturer's Certificate: Certify products meet or exceed specified requirements.

1.5 CLOSEOUT SUBMITTALS

- A. Section 017000 - Execution Requirements: Closeout procedures.
- B. Operation and Maintenance Data: Submit installation instructions, servicing requirements, assembly views, lubrication instructions, and replacement parts list.

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- C. Maintain one copy of each document on site.

1.6 QUALIFICATIONS

- A. Manufacturer: Company specializing in manufacturing products specified in this section with minimum three years documented experience.
- B. Installer: Company specializing in performing Work of this section with minimum three years documented experience.

1.7 DELIVERY, STORAGE, AND HANDLING

- A. Section 016000 - Product Requirements: Product storage and handling requirements.
- B. Protect systems from entry of foreign materials by temporary covers, completing sections of the work, and isolating parts of completed system.

1.8 FIELD MEASUREMENTS

- A. Verify field measurements prior to fabrication.

1.9 WARRANTY

- A. Section 017000 - Execution Requirements: Product warranties and product bonds.

1.10 EXTRA MATERIALS

- A. Section 017000 - Execution Requirements: Spare parts and maintenance products.
- B. Furnish one set of mechanical seals for boiler pump.

PART 2 PRODUCTS

2.1 SYSTEM LUBRICATED CIRCULATORS (WET ROTOR)

- A. Manufacturers:
 - 1. Grundfos, Series UP.
 - 2. Substitutions: Section 016000 - Product Requirements.
- B. Type: Horizontal shaft, single stage, canned rotor type, in-line mounting, for 125 psig maximum working pressure, 240 degrees F maximum water temperature.
- C. Casing: Cast Iron.
- D. Impeller: Stainless steel.
- E. Shaft: Stainless steel.
- F. Rotor Can and Bearing Plate: Stainless Steel.

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- G. Shaft Bearings: Tungsten Carbide.
- H. Thrust Bearings: Carbon.
- I. Fluid Temperature: 230 degrees F.
- J. Motor: Impedance protected, single speed.
- K. Performance: Refer to schedules on drawings.
- L. Electrical Characteristics and Components:
 - 1. Electrical Characteristics:
 - a. 115 volts, single phase, 60 Hz.

PART 3 EXECUTION

3.1 INSTALLATION

- A. Provide pumps to operate at specified system fluid temperatures without vapor binding and cavitation, are non-overloading in parallel or individual operation, and operate within 25 percent of midpoint of published maximum efficiency curve.
- B. Install long radius reducing elbows or reducers between pump and piping. Support piping adjacent to pump so no weight is carried on pump casings.
- C. Decrease from line size with long radius reducing elbows or reducers. Support piping adjacent to pump so no weight is carried on pump casings. Provide supports under elbows on pump suction and discharge lines.

END OF SECTION

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SECTION 233100

HVAC DUCTS

PART 1 GENERAL

1.1 SUMMARY

- A. Section Includes:
1. Duct Materials.
 2. Vehicle Exhaust System and Accessories.
 3. Single wall spiral round ducts.
 4. Transverse duct connection system.
 5. Ductwork fabrication.

1.2 REFERENCES

- A. ASTM International:
1. ASTM A36/A36M - Standard Specification for Carbon Structural Steel.
 2. ASTM A90/A90M - Standard Test Method for Weight Mass of Coating on Iron and Steel Articles with Zinc or Zinc-Alloy Coatings.
 3. ASTM A240/A240M - Standard Specification for Chromium and Chromium-Nickel Stainless Steel Plate, Sheet, and Strip for Pressure Vessels and for General Applications.
 4. ASTM A568/A568M - Standard Specification for Steel, Sheet, Carbon, and High-Strength, Low-Alloy, Hot-Rolled and Cold-Rolled, General Requirements for.
 5. ASTM A653/A653M - Standard Specification for Steel Sheet, Zinc-Coated (Galvanized) or Zinc-Iron Alloy-Coated (Galvannealed) by the Hot-Dip Process.
 6. ASTM A1008/A1008M - Standard Specification for Steel, Sheet, Cold-Rolled, Carbon, Structural, High-Strength Low-Alloy and High-Strength Low-Alloy with Improved Formability.
 7. A1011/A1011M-07 Standard Specification for Steel, Sheet and Strip, Hot-Rolled, Carbon, Structural, High-Strength Low-Alloy, High-Strength Low-Alloy with Improved Formability, and Ultra-High Strength.
 8. ASTM B209 - Standard Specification for Aluminum and Aluminum-Alloy Sheet and Plate.
 9. ASTM E84 - Standard Test Method for Surface Burning Characteristics of Building Materials.
- B. National Fire Protection Association:
1. NFPA 90A - Standard for the Installation of Air Conditioning and Ventilating Systems.
 2. NFPA 90B - Standard for the Installation of Warm Air Heating and Air Conditioning Systems.
 3. NFPA 37 – Standard for Engine Exhaust Systems.
- C. Sheet Metal and Air Conditioning Contractors:
1. SMACNA - HVAC Air Duct Leakage Test Manual.
 2. SMACNA - HVAC Duct Construction Standard - Metal and Flexible.
- D. Underwriters Laboratories Inc.:

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1. UL 181 - Factory-Made Air Ducts and Connectors.

1.3 PERFORMANCE REQUIREMENTS

- A. Variation of duct configuration or sizes other than those of equivalent or lower loss coefficient is not permitted except by written permission. Size round ducts installed in place of rectangular ducts in accordance with ASHRAE table of equivalent rectangular and round ducts.

1.4 SUBMITTALS

- A. Shop Drawings: Submit duct fabrication drawings, drawn to scale not smaller than 1/8 inch equals 1 foot, on drawing sheets same size as Contract Documents, indicating:
 1. Fabrication, assembly, and installation details, including plans, elevations, sections, details of components, and attachments to other work.
 2. Duct layout, indicating pressure classifications and sizes in plan view. For exhaust duct systems, indicate classification of materials handled as defined in this section.
 3. Fittings.
 4. Reinforcing details and spacing.
 5. Seam and joint construction details.
 6. Penetrations through fire rated and other walls.
 7. Terminal unit, coil, and humidifier installations.
 8. Hangers and supports, including methods for building attachment, vibration isolation, and duct attachment.
- B. Product Data: Submit data for duct materials duct connectors.
- C. Test Reports: Indicate pressure tests performed. Include date, section tested, test pressure, and leakage rate, following SMACNA HVAC Air Duct Leakage Test Manual.
- D. Manufacturer's Installation Instructions: Submit special procedures for glass fiber ducts.

1.5 CLOSEOUT SUBMITTALS

- A. Project Record Documents: Record actual locations of ducts and duct fittings. Record changes in fitting location and type. Show additional fittings used.

1.6 QUALITY ASSURANCE

- A. Perform Work in accordance with SMACNA - HVAC Duct Construction Standards - Metal and flexible.
- B. Construct ductwork to NFPA 90A and NFPA 90B standards.
- C. Maintain one copy of each document on site.

1.7 QUALIFICATIONS

- A. Manufacturer: Company specializing in manufacturing products specified in this section with minimum three years documented experience.

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- B. Installer: Company specializing in performing Work of this section with minimum three years documented experience.

1.8 ENVIRONMENTAL REQUIREMENTS

- A. Do not install duct sealant when temperatures are less than those recommended by sealant manufacturers.
- B. Maintain temperatures during and after installation of duct sealant.

1.9 FIELD MEASUREMENTS

- A. Verify field measurements prior to fabrication.

1.10 WARRANTY

- A. Refer to standard General Requirements.

PART 2 PRODUCTS

2.1 DUCT MATERIALS

- A. Aluminum Ducts: ASTM B209; aluminum sheet, alloy 3003-H14. Aluminum Connectors and Bar Stock: Alloy 6061-T6 or of equivalent strength.
- B. Fasteners: Rivets, bolts, or sheet metal screws, stainless steel.
- C. Hanger Rod: ASTM A36 galvanized steel, continuously threaded.

2.2 VEHICLE EXHAUST DUCTS AND ACCESSORIES

- A. Basis of Design, Fume-A-Vent Simple Drop System for Emergency Apparatus or equal. Duct components Norfab Ducting or equal. Pre-manufactured duct system meeting NFPA 37 requirements.
- B. Duct Construction: Rolled sheet, Longitudinal Seam – Butt welded, continuous, five foot lengths, 22 gauge. Lateral joints – single lever clamp system.
- C. Clamps shall be constructed of an over center spring lever action, quick connect mechanism. A retaining pin shall be inserted in the lever handle as a safety feature to ensure duct lever does not disconnect. Internal clamp seal shall be compressed to cover both rolled beads.
- D. Ends of duct shall be die formed rolled for uniform circumference edge. All duct shall be tested to 80" wg gauge listed.
- E. Sealing gaskets and caulk: Shall be compatible with the exhaust gas temperatures present in the duct system.
- F. Material: Ducts and fittings: 304 Stainless steel, ASTM A240, 1100 F temperature rating.
- G. Pressure Class: Negative 6 inch w.c.

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- H. Ventilated Wall Thimble: Manufacturer DME Incorporated or equal. Carbon steel ventilated wall thimble, fully welded, not less than 12 inches larger in diameter than the exhaust pipe. Built in pipe guides shall keep exhaust pipe centered in opening.
- I. Exhaust Outlet: Straight outlet extension with 125# ANSI flange, mounted directly after exterior wall thimble. Matching size to duct, minimum 18" length, 12 gauge welded birdscreen, shop primed.
- J. Tailpipe adapter: Vehicle tailpipe clamp adapter, field installed to truck exhaust tailpipe. Adapter used for connection to the clamp on nozzle. Size to be field verified, approximately 4" diameter.
- K. Clamp on nozzle (automatic release): High temperature synthetic rubber nozzle, spring clamp, reducing elbow, and hardware to attach the flexible hose to the vehicle tailpipe. System provides leverage for automatic release with the apparatus exits the fire station.
- L. Flexible Hose: High temperature hose, 2-ply silicone coated Nomex, reinforced with enclosed steel wire helix. Temperature rating: 600 degrees F.
- M. Blower: Direct drive, high static blower with ODP motor, cast aluminum wheel, epoxy coated housing and motor base, vibration isolators, AMCA certified.
- N. The vehicle exhaust collection system shall be 100% source capture when engines are running. An engine sensor (located in branch duct) shall automatically activate the exhaust fan upon detection of exhaust flow. The clamp on nozzle shall automatically disconnect from the tailpipe of the vehicle when the vehicle exits the fire station. Operator intervention is not required, only when the vehicle returns to the station and the clamp on nozzle needs to be reattached to the vehicle. The system shall be complete, consisting of control panel, pressure sensors (2), temperature sensors, and items specified above. The control panel shall include a fan starter, timer, overloads, HOA switch, transformer and fusing, all contained in a NEMA 12 enclosure. The entire package shall be UL listed. The control panel shall have three functions: On/Off/Auto. The preset timer shall allow for the system to run for 3 minutes in Auto mode.

2.3 DUCTWORK FABRICATION

- A. Fabricate and support rectangular ducts in accordance with SMACNA HVAC Duct Construction Standards - Metal and Flexible and as indicated on Drawings. Provide duct material, gages, reinforcing, and sealing for operating pressures indicated.
- B. Fabricate and support round ducts with longitudinal seams in accordance with SMACNA HVAC Duct Construction Standards - Metal and Flexible (Round Duct Construction Standards), and as indicated on Drawings. Provide duct material, gages, reinforcing, and sealing for operating pressures indicated. Draw band and crimp type transverse joints are not permitted.
- C. Construct T's, bends, and elbows with minimum radius 1-1/2 times centerline duct width. Where not possible and where rectangular elbows are used, provide airfoil turning vanes. Where acoustical lining is indicated, furnish turning vanes of perforated metal with glass fiber insulation.

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- D. Increase duct sizes gradually, not exceeding 15 degrees divergence wherever possible; maximum 30 degrees divergence upstream of equipment and 45 degrees convergence downstream.
- E. Provide standard 45-degree lateral wye takeoffs. When space does not allow 45-degree lateral wye takeoff, use 90-degree conical tee connections.
- F. Seal joints between duct sections and duct seams with welds, gaskets, mastic adhesives, mastic plus embedded fabric systems, or tape.
 - 1. Sealants, Mastics and Tapes: Conform to UL 181A. Provide products bearing appropriate UL 181A markings.
 - 2. Do not provide sealing products not bearing UL approval markings.
- G. Seal class B shall be provided on all ductwork.
- H. Duct Pressure Class shall be 0.5" w.g.

PART 3 EXECUTION

3.1 EXAMINATION

- A. Verify sizes of equipment connections before fabricating transitions.

3.2 INSTALLATION

- A. Install and seal ducts in accordance with SMACNA HVAC Duct Construction Standards - Metal and Flexible.
- B. During construction, install temporary closures of metal or taped polyethylene on open ductwork to prevent construction dust from entering ductwork system.
- C. Use double nuts and lock washers on threaded rod supports.
- D. Connect flexible ducts to metal ducts with draw bands. Maximum flexible duct length shall be 5 feet.

3.3 INTERFACE WITH OTHER PRODUCTS

- A. Install openings in ductwork where required to accommodate thermometers and controllers. Install pitot tube openings for testing of systems. Install pitot tube complete with metal can with spring device or screw to prevent air leakage. Where openings are provided in insulated ductwork, install insulation material inside metal ring.
- B. Connect air outlets and inlets to supply ducts with five foot maximum length of flexible duct. Do not use flexible duct to change direction.

END OF SECTION

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SECTION 233400

HVAC FANS

PART 1 GENERAL

1.1 SUMMARY

- A. Section Includes:
 - 1. Sidewall Centrifugal Exhaust Fans.
 - 2. Vehicle Exhaust System.

1.2 REFERENCES

- A. American Bearing Manufacturers Association:
 - 1. ABMA 9 - Load Ratings and Fatigue Life for Ball Bearings.
 - 2. ABMA 11 - Load Ratings and Fatigue Life for Roller Bearings.
- B. Air Movement and Control Association International, Inc.:
 - 1. AMCA 99 - Standards Handbook.
 - 2. AMCA 204 - Balance Quality and Vibration Levels for Fans.
 - 3. AMCA 210 - Laboratory Methods of Testing Fans for Aerodynamic Performance Rating.
 - 4. AMCA 300 - Reverberant Room Method for Sound Testing of Fans.
 - 5. AMCA 301 - Methods for Calculating Fan Sound Ratings from Laboratory Test Data.
- C. ASTM International:
 - 1. ASTM E1996 - Standard Specification for Performance of Exterior Windows, Curtain Walls, Doors and Impact Protective Systems Impacted by Windborne Debris in Hurricanes.
- D. National Electrical Manufacturers Association:
 - 1. NEMA MG 1 - Motors and Generators.
 - 2. NEMA 250 - Enclosures for Electrical Equipment (1000 Volts Maximum).
- E. Underwriters Laboratories Inc.:
 - 1. UL 705 - Power Ventilators.
- F. ARI Certified and UL listed.

1.3 PERFORMANCE REQUIREMENTS

- A. Refer to fan schedules on Drawing M-002.

1.4 SUBMITTALS

- A. Shop Drawings: Indicate size and configuration of fan assembly, mountings, weights, ductwork and accessory connections.

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- B. Product Data: Submit data on each type of fan and include accessories, fan curves with specified operating point plotted, power, RPM, sound power levels for both fan inlet and outlet at rated capacity, electrical characteristics and connection requirements.
- C. Manufacturer's Installation Instructions: Submit fan manufacturer's instructions.
- D. Manufacturer's Certificate: Certify products meet or exceed specified requirements.

1.5 CLOSEOUT SUBMITTALS

- A. Operation and Maintenance Data: Submit instructions for lubrication, motor and drive replacement, spare parts list, and wiring diagrams.

1.6 QUALITY ASSURANCE

- A. Performance Ratings: Conform to AMCA 210 and bear AMCA Certified Rating Seal.
- B. Sound Ratings: AMCA 301, tested to AMCA 300, and bear AMCA Certified Sound Rating Seal.
- C. UL Compliance: UL listed and labeled, designed, manufactured, and tested in accordance with UL 705.
- D. Balance Quality: Conform to AMCA 204.
- E. Heat Recovery Wheel Rating: Meet ARI 1060.

1.7 QUALIFICATIONS

- A. Manufacturer: Company specializing in manufacturing products specified in this section with minimum three years experience.
- B. Installer: Company specializing in performing Work of this section with minimum three years experience.

1.8 DELIVERY, STORAGE, AND HANDLING

- A. Protect motors, shafts, and bearings from weather and construction dust.

1.9 FIELD MEASUREMENTS

- A. Verify field measurements prior to fabrication.

1.10 WARRANTY

- A. Furnish five year manufacturer's warranty for fans.

1.11 MAINTENANCE SERVICE

- A. Include systematic examination, adjustment, and lubrication of fans, and controls checkout and adjustments. Repair or replace parts in accordance with manufacturer's

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operating and maintenance data. Use parts produced by manufacturer of original equipment.

- B. Perform work without removing fans from service during building normal occupied hours.

PART 2 PRODUCTS

2.1 SIDEWALL CENTRIFUGAL EXHAUST FANS

- A. Manufacturers:
 - 1. Loren Cook Company, Model ACW-B.
 - 2. Greenheck Corp. Model CUBE.
 - 3. Twin City Fan.
- B. Fan Unit: Upblast type. V-belt drive, spun aluminum housing with grease tray; resilient mounted motor; aluminum wire bird screen; square base to suit roof curb with continuous curb gaskets. 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.
- C. Sheaves: Steel, dynamically balanced, bored to fit shafts and keyed; variable and adjustable pitch motor sheave selected so required rpm is obtained with sheaves set at mid-position; fan shaft with self-aligning pre-lubricated ball bearings.
- D. Motor: 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 on vibration isolators, out of the airstream. Fresh air for motor cooling shall be drawn into the motor compartment from an area free of discharge contaminants. Motors shall be readily accessible for maintenance. Drive frame assemblies shall be constructed of heavy gauge steel and mounted on vibration isolators.
- 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. 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.
- F. Motor pulleys shall be adjustable for final system balancing. A disconnect switch shall be factory installed and wired from the fan motor to a junction box installed within the motor compartment. A conduit chase shall be provided through the curb cap to the motor compartment for ease of electrical wiring.
- G. Disconnect Switch: Factory wired, non-fusible, in housing for thermal overload protected motor NEMA 250 Type 3R enclosure.
- H. Accessories:
 - 1. Backdraft Damper: Gravity actuated, aluminum multiple blade construction, felt edged with offset hinge pin, nylon bearings, blades linked.

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2. Grip Notch Belt.
3. Aluminum birdscreen.

- I. Performance:
1. Refer to fan schedule on drawing M-002.

- J. Electrical Characteristics and Components:
1. Refer to fan schedule on drawing M-002.

2.2 VEHICLE EXHAUST SYSTEM

- A. Refer to specification 233100 HVAC Ducts for Vehicle Exhaust System Fan and Components.

PART 3 EXECUTION

3.1 INSTALLATION

- A. Install safety screen where inlet or outlet is exposed.
- B. Provide sheaves required for final air balance.

3.2 MANUFACTURER'S FIELD SERVICES

- A. Furnish services of factory trained representative for minimum of one day to start-up, calibrate controls, and instruct Owner on operation and maintenance.

3.3 CLEANING

- A. Vacuum clean coils and inside of fan cabinet.

3.4 DEMONSTRATION

- A. Demonstrate fan operation and maintenance procedures.

3.5 PROTECTION OF FINISHED WORK

- A. Do not operate fans for until ductwork is clean, filters in place, bearings lubricated, and fan has been test run under observation.

END OF SECTION

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SECTION 233700

AIR OUTLETS AND INLETS

PART 1 GENERAL

1.1 SUMMARY

- A. Section Includes:
 - 1. Return Grilles.

1.2 REFERENCES

- A. Air Movement and Control Association International, Inc.:
 - 1. AMCA 500 - Test Methods for Louvers, Dampers, and Shutters.
- B. American Society of Heating, Refrigerating and Air-Conditioning Engineers:
 - 1. ASHRAE 70 - Method of Testing for Rating the Performance of Air Outlets and Inlets.
- C. Sheet Metal and Air Conditioning Contractors:
 - 1. SMACNA - HVAC Duct Construction Standard - Metal and Flexible.

1.3 SUBMITTALS

- A. Product Data: Submit sizes, finish, and type of mounting. Submit schedule of outlets and inlets showing type, size, location, application, and noise level.
- B. Test Reports: Rating of air outlet and inlet performance.
- C. Manufacturer's Certificate: Certify products meet or exceed specified requirements.

1.4 CLOSEOUT SUBMITTALS

- A. Project Record Documents: Record actual locations of air outlets and inlets.

1.5 QUALITY ASSURANCE

- A. Test and rate diffuser, register, and grille performance in accordance with ASHRAE 70.
- B. Test and rate louver performance in accordance with AMCA 500.
- C. Maintain one copy copies of each document on site.

1.6 QUALIFICATIONS

- A. Manufacturer: Company specializing in manufacturing products specified in this section with minimum three years experience.

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1.7 PERFORMANCE

- A. Inlets and outlets shall be tested in accordance with ANSI/ASHRAE standard 70-1991.

1.8 WARRANTY

- A. Section 017000 - Execution Requirements: Product warranties and product bonds.

PART 2 PRODUCTS

2.1 WALL RETURN GRILLE

- A. Manufacturers:
 - 1. Nailor Industries, Model 61FH-HD.
 - 2. Titus.
 - 3. EH Price Company.
- B. Heavy duty wall mounted steel grille with 0 degree 14 gauge individually welded fixed blades, spaced at 1/2" on center. 1 1/4" wide 16 gauge face border with 1" overlap and counter sunk screws.
- C. White baked enamel finish.

PART 3 EXECUTION

3.1 EXAMINATION

- A. Verify inlet and outlet locations.
- B. Verify ceiling systems are ready for installation.

3.2 INSTALLATION

- A. Install diffusers to ductwork with airtight connection.
- B. Install balancing dampers on duct take-off to diffusers, grilles, and registers, whether or not dampers are furnished as part of diffuser, grille, and register assembly.

3.3 INTERFACE WITH OTHER PRODUCTS

- A. Check location of outlets and inlets and make necessary adjustments in position to conform to architectural features, symmetry, and lighting arrangement.

3.4 SCHEDULES

- A. Air Outlet and Inlet Schedule: Refer to drawing M-002.

END OF SECTION

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SECTION 238200

CONVECTION HEATING UNITS

PART 1 GENERAL

1.1 SUMMARY

- A. Section Includes:
 - 1. Hydronic Unit Heaters (UH-1).

1.2 REFERENCES

- A. Air-Conditioning and Refrigeration Institute:
 - 1. ARI 410 - Forced-Circulation Air-Cooling and Air-Heating Coils.
- B. Sheet Metal and Air Conditioning Contractors:
 - 1. SMACNA - HVAC Duct Construction Standard - Metal and Flexible.

1.3 SUBMITTALS

- A. Shop Drawings: Indicate cross sections of cabinets, grilles, bracing and reinforcing, and typical elevations. Indicate schedules of equipment and enclosures typically indicating length and number of pieces of element and enclosure, corner pieces, end caps, cap strips, access doors, pilaster covers.
- B. Product Data: Submit coil and frame configurations, dimensions, materials, rows, connections, and rough-in dimensions. Submit mechanical and electrical service locations, capacities and accessories or optional items.
- C. Manufacturer's Installation Instructions: Submit assembly, support details, and connection requirements.
- D. Manufacturer's Certificate: Certify products meet or exceed specified requirements.

1.4 CLOSEOUT SUBMITTALS

- A. Project Record Documents: Record actual locations of components and locations of access doors in radiation cabinets required for access to valves.
- B. Operation and Maintenance Data: Submit manufacturer's descriptive literature, operating instructions, installation instructions, maintenance and repair data, and parts listings.

1.5 DELIVERY, STORAGE, AND HANDLING

- A. Accept units on site in factory packing. Inspect for damage. Store under roof.

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- B. Protect coil fins from crushing and bending by leaving in shipping cases until installation, and by storing indoors. Protect coils from entry of dirt and debris with pipe caps or plugs.

1.6 WARRANTY

- A. Section 017000 - Execution Requirements: Product warranties and product bonds.
- B. Furnish five year manufacturer's warranty for unit heaters and dedicated cooling unit.

1.7 FIELD MEASUREMENTS

- A. Verify field measurements prior to fabrication.

PART 2 PRODUCTS

2.1 HYDRONIC UNIT HEATERS

- A. Manufacturers:
 - 1. Zehnder Rittling
 - 2. Trane Company
 - 3. Modine
- B. Horizontal Unit Heaters
 - 1. Product Description:
 - a. Horizontal unit heater with hot water coil, fan, motor guard, louvered diffuser, hanger and casing.
 - b. Coils shall be serpentine type, steel headers with aluminum fins permanently mechanically bonded. Fins shall be minimum of 12 fins per inch, die formed with a thickness no less than 0.010 inches. Rated for 350° F and 150 psig.
 - c. Casings shall be minimum 18 gauge steel with top, back, and side halves. Final finish shall be an epoxy powder coat, factory applied.
 - d. Motors to be open drip proof construction.
 - e. Fans to be aluminum blade, steel hub designed to assure quiet operation.
 - f. Provide fan guards.
 - g. Factory installed options: Unit mounted toggle disconnect, NEMA 4X rated.
 - h. Performance as noted on drawing M-002.

PART 3 EXECUTION

3.1 EXAMINATION

- A. For recessed units, verify recess dimensions are correct size.
- B. Verify wall construction is ready for installation.

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- C. Verify ductwork is ready for installation.
- D. Verify concealed blocking and supports are in place and connections are correctly located.

3.2 INSTALLATION

- A. Protect coils to prevent damage to fins and flanges. Comb out bent fins.
- B. Install equipment exposed to finished areas after walls and ceilings are finished and painted. Avoid damage.
- C. Unit Heaters: Hang from building structure, with pipe hangers anchored to building, not from piping. Mount as high as possible to maintain greatest headroom unless otherwise indicated.

3.3 CLEANING

- A. After construction is completed, including painting, clean exposed surfaces of units. Vacuum clean coils and inside of cabinets.
- B. Touch-up marred or scratched surfaces of factory-finished cabinets, using finish materials furnished by manufacturer.
- C. Install new filters.

3.4 SCHEDULES

- A. Refer to schedules on drawing M-001.

END OF SECTION

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SECTION 260519

LOW-VOLTAGE ELECTRICAL POWER CONDUCTORS AND CABLES

PART 1 GENERAL

1.1 SUMMARY

- A. Section includes building wire.
- B. Related Sections:
 - 1. Section 260553 - Identification for Electrical Systems: Product requirements for wire identification.

1.2 REFERENCES

- A. International Electrical Testing Association:
 - 1. NETA ATS - Acceptance Testing Specifications for Electrical Power Distribution Equipment and Systems.
- B. National Fire Protection Association:
 - 1. NFPA 70 - National Electrical Code.
 - 2. NFPA 262 - Standard Method of Test for Flame Travel and Smoke of Wires and Cables for Use in Air-Handling Spaces.

1.3 SYSTEM DESCRIPTION

- A. Product Requirements: Provide products as follows:
 - 1. Solid conductor for feeders and branch circuits 10 AWG and smaller.
 - 2. Stranded conductors for control circuits.
 - 3. Conductor not smaller than 12 AWG for power and lighting circuits.
 - 4. Conductor not smaller than 16 AWG for control circuits.
- B. Wiring Methods: Provide the following wiring methods:
 - 1. Concealed Dry Interior Locations: Use only building wire, Type THHN insulation, in raceway.
 - 2. Exposed Dry Interior Locations: Use only building wire, Type THHN insulation, in raceway.
 - 3. Exposed Wet Interior Locations: Use only building wire, Type THWN insulation in raceway.
 - 4. Exterior locations: Use only building wire, Type THWN insulation, in raceway.

1.4 DESIGN REQUIREMENTS

- A. Conductor sizes are based on copper.

1.5 SUBMITTALS

- A. Product Data: Submit for building wire and each cable assembly type.

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B. Test Reports: Indicate procedures and values obtained.

1.6 CLOSEOUT SUBMITTALS

A. Project Record Documents: Record actual locations of components and circuits.

1.7 QUALIFICATIONS

A. Manufacturer: Company specializing in manufacturing products specified in this section with minimum three years documented experience.

1.8 FIELD MEASUREMENTS

A. Verify field measurements are as indicated on Drawings.

1.9 COORDINATION

A. Where wire and cable destination is indicated and routing is not shown, determine routing and lengths required.

PART 2 PRODUCTS

2.1 BUILDING WIRE

A. Manufacturers:

1. Diamond Wire & Cable Co.
2. Essex Group Inc.
3. General Cable Co.

B. Product Description: Single conductor insulated wire.

C. Conductor: Copper.

D. Insulation Voltage Rating: 600 volts.

E. Insulation Temperature Rating: 75 degrees C.

F. Insulation Material: Thermoplastic, type THHN.

PART 3 EXECUTION

3.1 EXAMINATION

A. Verify interior of building has been protected from weather.

B. Verify mechanical work likely to damage wire and cable has been completed.

C. Verify raceway installation is complete and supported.

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3.2 PREPARATION

- A. Completely and thoroughly swab raceway before installing wire.

3.3 INSTALLATION

- A. Route wire and cable to meet Project conditions.
- B. Neatly train and lace wiring inside boxes, equipment, and panelboards.
- C. Identify and color code wire and cable under provisions of Section 260553. Identify each conductor with its circuit number or other designation indicated.
- D. Special Techniques--Building Wire in Raceway:
 - 1. Pull conductors into raceway at same time.
 - 2. Install building wire 4 AWG and larger with pulling equipment.
- E. Special Techniques - Cable:
 - 1. Protect exposed cable from damage.
 - 2. Support cables above accessible ceiling, using spring metal clips or metal cable ties to support cables from structure or ceiling suspension system. Do not rest cable on ceiling panels.
 - 3. Use suitable cable fittings and connectors.
- F. Special Techniques - Wiring Connections:
 - 1. Clean conductor surfaces before installing lugs and connectors.
 - 2. Make splices, taps, and terminations to carry full ampacity of conductors with no perceptible temperature rise.
 - 3. Tape uninsulated conductors and connectors with electrical tape to 150 percent of insulation rating of conductor.
 - 4. Install split bolt connectors for copper conductor splices and taps, 6 AWG and larger.
 - 5. Install solderless pressure connectors with insulating covers for copper conductor splices and taps, 8 AWG and smaller.
 - 6. Install insulated spring wire connectors with plastic caps for copper conductor splices and taps, 10 AWG and smaller.
- G. Install stranded conductors for branch circuits 10 AWG and smaller. However, when stranded conductors are used in lieu of solid, and then install crimp on fork terminals for device terminations. Do not place bare stranded conductors directly under screws.

3.4 WIRE COLOR

- A. General:
 - 1. For wire sizes 10 AWG and smaller, install wire colors in accordance with the following:
 - a. Black and red for single phase circuits at 120/240 volts.
 - 2. For wire sizes 8 AWG and larger, identify wire with colored tape at terminals, splices and boxes. Colors are as follows:

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- a. Black and red for single phase circuits at 120/240 volts.
 - B. Neutral Conductors: White. When two or more neutrals are located in one conduit, individually identify each with proper circuit number.
 - C. Branch Circuit Conductors: Install three or four wire home runs with each phase uniquely color coded.
 - D. Feeder Circuit Conductors: Uniquely color code each phase.
 - E. Ground Conductors:
 - 1. For 6 AWG and smaller: Green.
 - 2. For 4 AWG and larger: Identify with green tape at both ends and visible points including junction boxes.
- 3.5 FIELD QUALITY CONTROL
- A. Inspect and test in accordance with NETA ATS, except Section 4.
 - B. Perform inspections and tests listed in NETA ATS, Section 7.3.1.

END OF SECTION

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SECTION 260526

GROUNDING AND BONDING FOR ELECTRICAL SYSTEMS

PART 1 GENERAL

1.1 SUMMARY

- A. Section Includes:
 - 1. Wire.
 - 2. Mechanical connectors.
 - 3. Ground Rods

1.2 REFERENCES

- A. Institute of Electrical and Electronics Engineers:
 - 1. IEEE 142 - Recommended Practice for Grounding of Industrial and Commercial Power Systems.
 - 2. IEEE 1100 - Recommended Practice for Powering and Grounding Electronic Equipment.
- B. International Electrical Testing Association:
 - 1. NETA ATS - Acceptance Testing Specifications for Electrical Power Distribution Equipment and Systems.
- C. National Fire Protection Association:
 - 1. NFPA 70 - National Electrical Code.
- D. Building Industry Consulting Service International, Inc.
 - 1. BICSI TDM Manual - Telecommunications Distribution Methods Manual.
- E. Telecommunication Industry Association/Electronic Industries Alliance:
 - 1. TIA/EIA 607 - Commercial Building Grounding and Bonding Requirements for Telecommunications.

1.3 SYSTEM DESCRIPTION

- A. All work shall comply with NEC Article 250.

1.4 SUBMITTALS

- A. Product Data: Submit data on grounding electrodes and connections.

1.5 QUALIFICATIONS

- A. Manufacturer: Company specializing in manufacturing Products specified in this section with minimum five years documented experience.
- B. Installer: Company specializing in performing work of this section with minimum five years documented experience.

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1.6 DELIVERY, STORAGE, AND HANDLING

- A. Accept materials on site in original factory packaging, labeled with manufacturer's identification.
- B. Protect from weather and construction traffic, dirt, water, chemical, and mechanical damage, by storing in original packaging.
- C. Do not deliver items to project before time of installation. Limit shipment of bulk and multiple-use materials to quantities needed for immediate installation.

1.7 COORDINATION

- A. Refer to standard General Requirements.

PART 2 PRODUCTS

2.1 WIRE

- A. Partially below or completely below grade: bare copper wire, stranded, sizes as specified.
- B. Exterior exposed locations: Insulated Copper wire, solid or stranded, sizes as specified. Jacketing shall be labeled/color coded per NFPA 70 Article 250.119A and ANSI –J-STD-607-A-2002.

2.2 MECHANICAL CONNECTORS

- A. Mechanical Connections (below grade): UL listed irreversible high compression fittings. Fittings and compression tools (mechanical, hydraulic, battery powered) rated for 12 tons of force. All mechanical connections shall be coated with a conductive anti-oxidant compound, liberally applied between the two metals being connected.
- B. Mechanical Connections (above grade): UL listed irreversible high compression fittings. Fittings and compression tools (mechanical, hydraulic, battery powered) rated for 12 tons of force. UL listed clamps, pressure fittings and 2-hole lugs, bolts, washers as required. Connectors matching type of conductors, conductor quantity, designed for the application. All mechanical connections shall be coated with a conductive anti-oxidant compound, liberally applied between the two metals being connected.
- C. Exothermic Connections (above and below grade): Exothermic materials, accessories, and tools for preparing and making permanent field connections between grounding system components.
- D. Listings: Exterior installations: UL 467 with minimum 88% conductivity rating. Interior installations: UL 486A with minimum 88% conductivity rating. Compression systems shall include crimped die index and company logo for inspection purposes.

2.3 GROUND RODS

- A. Copper construction, 3/4" diameter, 10 feet long, pointed ends, UL listed.

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PART 3 EXECUTION

3.1 EXAMINATION

- A. Refer to standard General Requirements.

3.2 PREPARATION

- A. Remove paint, rust, mill oils, surface contaminants at connection points.

3.3 EXISTING WORK

- A. Modify existing grounding system to maintain continuity to accommodate renovations.

3.4 EXTERNAL GROUNDING SYSTEM

A. External Grounding Conductors:

1. All below ground or partially below ground grounding conductors shall be min. #2 bare copper (unless noted otherwise in this specification).
2. External grounding conductors shall be splice free.
3. External grounding conductors bend angle shall be no less than 90 degrees nor have a bend radius of 8". It shall be run to the grounding electrode system in a direct manner, without loops or sharp bends.
4. Above grade conductors shall be protected, when subject to physical damage.

B. General Requirements for External Bonding:

1. All mechanical and compression type connectors shall be UL 467 listed for size and application.
2. Clamps shall be UL 467 listed and have an 88% conductivity rating.

3.5 INTERNAL GROUNDING SYSTEM

A. Bonding Jumpers: Creates a conductive path between electrical components, such as cable trays, piping, conduits or structural framing.

1. Bonding jumpers shall be as short as possible, routed directly to equipment, free of bends or loops.
2. Attachment points shall be free of paint or other coatings to allow for a conductive path.
3. Bonding jumpers shall be no longer than 6'-0" when installed outside a raceway or enclosure.

B. General Requirements for Internal Bonding:

1. All mechanical and compression type connectors shall be UL 486A listed for size and application.
2. Clamps shall be UL 486A listed and have a 88% conductivity rating.
3. Compression lugs shall be two-hole, long barrel type.
4. Connection between dissimilar metals shall not be used unless conductors are separated by a suitable material that is part of the attachment device.
5. Self tapping or sheet metal type screws shall not be used for any grounding attachments.

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6. Insulating piercing connectors are not acceptable.
7. Aluminum connection devices are not acceptable.
8. Daisy chain connections between chassis and equipment is not permitted.
9. Mechanical lugs and clamps shall not be used on solid conductors.

3.6 ELECTRICAL INSTALLATION

- A. Install isolated grounding conductor for circuits supplying personal computers in accordance with IEEE 1100.
- B. Equipment Grounding Conductor: Install separate, insulated conductor within each feeder and branch circuit raceway. Terminate each end on suitable lug, bus, or bushing.
- C. Permanently ground entire light and power system in accordance with NEC, including service equipment, distribution panels, lighting panelboards, switch and starter enclosures, motor frames, grounding type receptacles, and other exposed non-current carrying metal parts of electrical equipment.
- D. Install branch circuits feeding isolated ground receptacles with separate insulated grounding conductor, connected only at isolated ground receptacle, ground terminals, and at ground bus of serving panel.
- E. Accomplish grounding of electrical system by using insulated grounding conductor installed with feeders and branch circuit conductors in conduits. Size grounding conductors in accordance with NEC.
- F. Permanently attach equipment and grounding conductors prior to energizing equipment.
- G. Install bonding jumper only in power distribution panel. Installing bonding jumper in any other cabinets could lead to electrification of cabinets and or conduit within the structure. Distribution panel in stepped down system requires jumper as it is a separately derived system.

END OF SECTION

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SECTION 260529

HANGERS AND SUPPORTS FOR ELECTRICAL SYSTEMS

PART 1 GENERAL

1.1 SUMMARY

- A. Section Includes:
1. Conduit supports.
 2. Formed steel channel.
 3. Spring steel clips.
 4. Sleeves.
 5. Mechanical sleeve seals.
 6. Firestopping relating to electrical work.
 7. Firestopping accessories.

1.2 REFERENCES

- A. ASTM International:
1. ASTM E84 - Standard Test Method for Surface Burning Characteristics of Building Materials.
 2. ASTM E119 - Standard Test Methods for Fire Tests of Building Construction and Materials.
 3. ASTM E814 - Standard Test Method for Fire Tests of Through-Penetration Fire Stops.
 4. ASTM E1966 - Standard Test Method for Fire-Resistive Joint Systems.
- B. FM Global:
1. FM - Approval Guide, A Guide to Equipment, Materials & Services Approved By Factory Mutual Research For Property Conservation.
- C. National Fire Protection Association:
1. NFPA 70 - National Electrical Code.
- D. Underwriters Laboratories Inc.:
1. UL 263 - Fire Tests of Building Construction and Materials.
 2. UL 723 - Tests for Surface Burning Characteristics of Building Materials.
 3. UL 1479 - Fire Tests of Through-Penetration Firestops.
 4. UL 2079 - Tests for Fire Resistance of Building Joint Systems.
 5. UL - Fire Resistance Directory.
- E. Intertek Testing Services (Warnock Hersey Listed):
1. WH - Certification Listings.

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1.3 DEFINITIONS

- A. Firestopping (Through-Penetration Protection System): Sealing or stuffing material or assembly placed in spaces between and penetrations through building materials to arrest movement of fire, smoke, heat, and hot gases through fire rated construction.

1.4 SYSTEM DESCRIPTION

- A. Firestopping Materials: ASTM UL 1479 to achieve fire ratings as noted on Drawings for adjacent construction, but not less than 1 hour fire rating.
 - 1. Ratings may be 3-hours for firestopping in through-penetrations of 4-hour fire rated assemblies unless otherwise required by applicable codes.
- B. Surface Burning: ASTM E84 with maximum flame spread/smoke developed rating of 25/450.
- C. Firestop interruptions to fire rated assemblies, materials, and components.

1.5 PERFORMANCE REQUIREMENTS

- A. Firestopping: Conform to applicable code UL for fire resistance ratings and surface burning characteristics.

1.6 SUBMITTALS

- A. Product Data:
 - 1. Hangers and Supports: Submit manufacturers catalog data including load capacity.
 - 2. Firestopping: Submit data on product characteristics, performance and limitation criteria.
- B. Firestopping Schedule: Submit schedule of opening locations and sizes, penetrating items, and required listed design numbers to seal openings to maintain fire resistance rating of adjacent assembly.
- C. Design Data: Indicate load carrying capacity of trapeze hangers and hangers and supports.
- D. Manufacturer's Installation Instructions:
 - 1. Hangers and Supports: Submit special procedures and assembly of components.
 - 2. Firestopping: Submit preparation and installation instructions.
- E. Manufacturer's Certificate: Certify products meet or exceed specified requirements.
- F. Engineering Judgements: For conditions not covered by UL or WH listed designs, submit judgements by licensed professional engineer suitable for presentation to authority having jurisdiction for acceptance as meeting code fire protection requirements.

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1.7 QUALIFICATIONS

- A. Manufacturer: Company specializing in manufacturing Products specified in this section with minimum three years documented experience.
- B. Installer: Company specializing in performing work of this section with minimum years documented experience approved by manufacturer.

1.8 DELIVERY, STORAGE, AND HANDLING

- A. Accept materials on site in original factory packaging, labeled with manufacturer's identification.
- B. Protect from weather and construction traffic, dirt, water, chemical, and mechanical damage, by storing in original packaging.

1.9 ENVIRONMENTAL REQUIREMENTS

- A. Do not apply firestopping materials when temperature of substrate material and ambient air is below 60 degrees F.
- B. Maintain this minimum temperature before, during, and for minimum 3 days after installation of firestopping materials.
- C. Provide ventilation in areas to receive solvent cured materials.

PART 2 PRODUCTS

2.1 CONDUIT SUPPORTS

- A. Manufacturers:
 - 1. B-Line Systems.
 - 2. Allied Tube & Conduit Corp.
- B. Hanger Rods: Threaded high tensile strength galvanized carbon steel with free running threads.
- C. Beam Clamps: Malleable Iron, with tapered hole in base and back to accept either bolt or hanger rod. Set screw: hardened steel.
- D. Conduit clamps for trapeze hangers: Galvanized steel, notched to fit trapeze with single bolt to tighten.
- E. Conduit clamps - general purpose: One hole malleable iron for surface mounted conduits.
- F. Cable Ties: High strength nylon temperature rated to 185 degrees F. Self locking.

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2.2 FORMED STEEL CHANNEL

- A. Manufacturers:
 - 1. B-Line Systems.
 - 2. Unistrut Corp.
- B. Interior Channel (Dry Areas): Electroplated Zinc, 1 5/8 inch 12 gage thick steel. With holes 1-1/2 inches on center.
- C. Interior (Wet Areas) and Exterior Channel: Hot dipped galvanized, 1 5/8 inch, 12 gage thick steel. With holes 1-1/2 inches on center.

2.3 SPRING STEEL CLIPS

- A. Manufacturers:
 - 1. B-Line Systems.
 - 2. Allied Tube & Conduit Corp.
- B. Product Description: Mounting hole and screw closure.

2.4 INSERTS

- A. Concrete Over Metal Decking: malleable iron case of galvanized steel shell and expander plug for threaded connection with lateral adjustment, top slot for reinforcing rods, lugs for attachment to forms. Size inserts to suit threaded hanger rods.

2.5 SLEEVES

- A. Sleeves for Raceway Through Non-fire Rated Beams, Walls, Footings, and Potentially Wet Floors: Steel pipe or 18 gage thick galvanized steel.
- B. Sleeves for Raceway Through Fire Rated and Fire Resistive Floors and Walls, and Fire Proofing: Prefabricated fire rated sleeves including seals, UL listed.
- C. Fire-stopping Insulation: Glass fiber type, non-combustible.

2.6 FIRESTOPPING

- A. Manufacturers:
 - 1. Dow Corning Corp.
 - 2. Hilti Corp.
 - 3. 3M fire Protection Products.
- B. Product Description: Different types of products by multiple manufacturers are acceptable as required to meet specified system description and performance requirements; provide only one type for each similar application.
 - 1. Silicone Firestopping Elastomeric Firestopping: Single component silicone elastomeric compound and compatible silicone sealant.
 - 2. Foam Firestopping Compounds: Single component foam compound.

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3. Formulated Firestopping Compound of Incombustible Fibers: Formulated compound mixed with incombustible non-asbestos fibers.
4. Fiber Stuffing and Sealant Firestopping: Composite of mineral fiber stuffing insulation with silicone elastomer for smoke stopping.
5. Mechanical Firestopping Device with Fillers: Mechanical device with incombustible fillers and silicone elastomer, covered with sheet stainless steel jacket, joined with collars, penetration sealed with flanged stops.
6. Intumescent Firestopping: Intumescent putty compound which expands on exposure to surface heat gain.
7. Firestop Pillows: Formed mineral fiber pillows.

C. Color: Dark gray.

2.7 FIRESTOPPING ACCESSORIES

- A. Primer: Type recommended by firestopping manufacturer for specific substrate surfaces and suitable for required fire ratings.
- B. Installation Accessories: Provide clips, collars, fasteners, temporary stops or dams, and other devices required to position and retain materials in place.
- C. General:
 1. Furnish UL listed products or products tested by independent testing laboratory.
 2. Select products with rating not less than rating of wall or floor being penetrated.
- D. Non-Rated Surfaces:
 1. Stamped steel, chrome plated, hinged, split ring escutcheons or floor plates or ceiling plates for covering openings in occupied areas where conduit is exposed.
 2. For exterior wall openings below grade, furnish modular mechanical type seal consisting of interlocking synthetic rubber links shaped to continuously fill annular space between conduit and cored opening or water-stop type wall sleeve.

2.8 FIRESTOPPING FITTINGS

- A. Manufacturers
 1. Wiremold / LeGrand Flame Stopper.
 2. Hilti Corporation.
- B. Product Description: UL Classified thru floor/wall fittings consisting of (2) box assemblies with adjustable steel doors that attach to EMT conduit. Intumescent firestopping material is factory installed and no other firestopping material is required.
- C. UL Tested to ASTM E514 and UL 1479.

PART 3 EXECUTION

3.1 EXAMINATION

- A. Verify openings are ready to receive sleeves.

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- B. Verify openings are ready to receive firestopping.

3.2 PREPARATION

- A. Clean substrate surfaces of dirt, dust, grease, oil, loose material, or other matter affecting bond of firestopping material.
- B. Remove incompatible materials affecting bond.
- C. Do not drill or cut structural members.

3.3 INSTALLATION - HANGERS AND SUPPORTS

- A. Anchors and Fasteners:
 - 1. Concrete Structural Elements: Provide precast inserts, expansion anchors, powder actuated anchors and preset inserts.
 - 2. Steel Structural Elements: Provide beam clamps, spring steel clips.
 - 3. Concrete Surfaces: Provide self-drilling anchors and expansion anchors.
 - 4. Hollow Masonry, Plaster, and Gypsum Board Partitions: Provide toggle bolts and hollow wall fasteners.
 - 5. Solid Masonry Walls: Provide expansion anchors.
 - 6. Sheet Metal: Provide sheet metal screws.
 - 7. Wood Elements: Provide wood screws.
- B. Install conduit and raceway support and spacing in accordance with NEC.
- C. Do not fasten supports to pipes, ducts, mechanical equipment, or conduit.
- D. Install multiple conduit runs on common hangers.
- E. Supports:
 - 1. Fabricate supports from structural steel or formed steel channel. Install hexagon head bolts to present neat appearance with adequate strength and rigidity. Install spring lock washers under nuts.
 - 2. Install surface mounted cabinets and panelboards with minimum of four anchors.
 - 3. In wet and damp locations install steel channel supports to stand cabinets and panelboards 1 inch off wall.
 - 4. Support vertical conduit at every other floor.

3.4 INSTALLATION - FIRESTOPPING

- A. Install material at fire rated construction perimeters and openings containing penetrating sleeves, piping, ductwork, conduit and other items, requiring firestopping.
- B. Apply primer where recommended by manufacturer for type of firestopping material and substrate involved, and as required for compliance with required fire ratings.
- C. Apply firestopping material in sufficient thickness to achieve required fire and smoke rating, to uniform density and texture.

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- D. Fire Rated Surface:
 - 1. Seal opening at floor, wall, partition, and ceiling as follows:
 - a. Install sleeve through opening and extending beyond minimum of 1 inch on both sides of building element.
 - b. Size sleeve allowing minimum of 1 inch void between sleeve and building element.
 - c. Pack void with backing material.
 - d. Seal ends of sleeve with UL listed fire resistive silicone compound to meet fire rating of structure penetrated.
 - 2. Where conduit penetrates fire rated surface, install firestopping product in accordance with manufacturer's instructions.

- E. Non-Rated Surfaces:
 - 1. Seal opening through non-fire rated wall, partition, and ceiling, as follows:
 - a. Install sleeve through opening and extending beyond minimum of 1 inch on both sides of building element.
 - b. Size sleeve allowing minimum of 1 inch void between sleeve and building element.
 - c. Install type of firestopping material recommended by manufacturer.
 - 2. Install escutcheons where conduit, penetrates non-fire rated surfaces in occupied spaces. Occupied spaces include rooms with finished ceilings and where penetration occurs below finished ceiling.
 - 3. Exterior wall openings below grade: Assemble rubber links of mechanical seal to size of conduit and tighten in place, in accordance with manufacturer's instructions.
 - 4. Interior partitions: Seal pipe penetrations at computer rooms, telecommunication rooms data rooms. Apply sealant to both sides of penetration to completely fill annular space between sleeve and conduit.

3.5 INSTALLATION - SLEEVES

- A. Exterior watertight entries: Seal with adjustable interlocking rubber links.
- B. Conduit penetrations not required to be watertight: Sleeve and fill with silicon foam.
- C. Size sleeves large enough to allow for movement due to expansion and contraction. Provide for continuous insulation wrapping.
- D. Where conduit or raceway penetrates floor, ceiling, or wall, close off space between conduit or raceway and adjacent work with fire stopping insulation and caulk airtight. Provide close fitting metal collar or escutcheon covers at both sides of penetration.
- E. Install chrome plated steel escutcheons at finished surfaces.

3.6 FIELD QUALITY CONTROL

- A. Inspect installed firestopping for compliance with specifications and submitted schedule.

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3.7 CLEANING

- A. Clean adjacent surfaces of firestopping materials.

3.8 PROTECTION OF FINISHED WORK

- A. Protect adjacent surfaces from damage by material installation.

END OF SECTION

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SECTION 260533

RACEWAY AND BOXES FOR ELECTRICAL SYSTEMS

PART 1 GENERAL

1.1 SUMMARY

- A. Section includes conduit and tubing, surface raceways, wireways, outlet boxes, pull and junction boxes.
- B. Related Sections:
 - 1. Section 260526 - Grounding and Bonding for Electrical Systems.
 - 2. Section 260529 - Hangers and Supports for Electrical Systems.
 - 3. Section 260553 - Identification for Electrical Systems.
 - 4. Section 262726 - Wiring Devices.

1.2 REFERENCES

- A. American National Standards Institute:
 - 1. ANSI C80.1 - Rigid Steel Conduit, Zinc Coated.
 - 2. ANSI C80.3 - Specification for Electrical Metallic Tubing, Zinc Coated.
- B. National Electrical Manufacturers Association:
 - 1. NEMA 250 - Enclosures for Electrical Equipment (1000 Volts Maximum).
 - 2. NEMA FB 1 - Fittings, Cast Metal Boxes, and Conduit Bodies for Conduit and Cable Assemblies.
 - 3. NEMA OS 1 - Sheet Steel Outlet Boxes, Device Boxes, Covers, and Box Supports.
 - 4. NEMA FB 1 - Fittings, Cast Metal Boxes, and Conduit Bodies for Conduit and Cable Assemblies.
 - 5. NEMA TC 2 - Electrical Polyvinyl Chloride (PVC) Tubing and Conduit.
 - 6. NEMA TC 3 - PVC Fittings for Use with Rigid PVC Conduit and Tubing.
 - 7. NEMA TC 6 - PVC and ABS Plastic Utilities Duct for Underground Installation.
 - 8. NEMA TC 7 - Smooth wall Coilable PE Electrical Plastic Conduit.
 - 9. NEMA TC 9 - Fittings for ABS and PVC Plastic Utilities Duct for Underground Installation.
- C. Underwriters Laboratories Inc.:
 - 1. UL 651 A & B - Type EB and A Rigid PVC Conduit and HDPE Conduit.

1.3 SYSTEM DESCRIPTION

- A. Raceway and boxes located as indicated on Drawings, and at other locations required for splices, taps, wire pulling, equipment connections, and compliance with regulatory requirements. Raceway and boxes are shown in approximate locations unless dimensioned. Provide raceway to complete wiring system.

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- B. Outdoor Locations, Above Grade: Provide rigid nonmetallic conduit and liquid tight flexible metal conduit. Provide cast metal outlet, pull, and junction boxes.
- C. Exposed Interior Dry Locations: Provide electric metallic tubing (EMT) and flexible metal conduit. Provide surface mounted outlet boxes.
- D. Encased Locations: Provide electric metallic conduit with approved compression fittings for concrete encasement. Provide cast metal outlet, pull and junction boxes.

1.4 DESIGN REQUIREMENTS

- A. Minimum Raceway Size: 3/4 inch unless otherwise specified.

1.5 SUBMITTALS

- A. Product Data: Submit for the following:
 - 1. Flexible metal conduit.
 - 2. Liquid tight flexible metal conduit.
 - 3. Raceways and associated fittings.
 - 4. Conduit bodies.
 - 5. Surface raceway.
 - 6. Wireway.
 - 7. Pull and junction boxes.
- B. Manufacturer's Installation Instructions: Submit application conditions and limitations of use stipulated by Product testing agency specified under Regulatory Requirements. Include instructions for storage, handling, protection, examination, preparation, and installation of Product.

1.6 CLOSEOUT SUBMITTALS

- A. Project Record Documents:
 - 1. Record actual routing of conduits larger than 1 ¼ inch.

1.7 DELIVERY, STORAGE, AND HANDLING

- A. Protect conduit from corrosion and entrance of debris by storing above grade. Provide appropriate covering.

1.8 COORDINATION

- A. Coordinate mounting heights, orientation and locations of outlets mounted above counters, work benches, and backslashes.

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PART 2 PRODUCTS

2.1 NONMETALLIC CONDUIT

- A. Manufacturers:
 - 1. Carlon Electrical Products.
 - 2. Hubbell Wiring Devices.
 - 3. Thomas & Betts Corp.
 - 4. Walker Systems Inc.
- B. Product Description: NEMA TC 2; Schedule 80 PVC. Provide Schedule 40 conduit below concrete slabs only.
- C. Fittings and Conduit Bodies: NEMA TC 3.

2.2 ELECTRICAL METALLIC TUBING (EMT)

- A. Manufacturers:
 - 1. Carlon Electrical Products.
 - 2. Hubbell Wiring Devices.
 - 3. Thomas & Betts Corp.
 - 4. Walker Systems Inc.
- B. Product Description: ANSI C80.3; galvanized tubing.
- C. Fittings and Conduit Bodies: NEMA FB 1; steel set screw type.

2.3 FLEXIBLE METAL CONDUIT (FMC)

- A. Manufacturers:
 - 1. Carlon Electrical Products.
 - 2. Hubbell Wiring Devices.
 - 3. Thomas & Betts Corp.
 - 4. Walker Systems Inc.
- B. Product Description: Interlocked steel construction.
- C. Fittings: NEMA FB 1.

2.4 LIQUIDTIGHT FLEXIBLE METAL CONDUIT (LFMC)

- A. Manufacturers:
 - 1. Carlon Electrical Products.
 - 2. Hubbell Wiring Devices.
 - 3. Thomas & Betts Corp.
- B. Product Description: Interlocked steel construction with PVC jacket.
- C. Fittings: NEMA FB 1.

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2.5 WIREWAY

- A. Manufacturers:
 - 1. Carlon Electrical Products.
 - 2. Hubbell Wiring Devices.
 - 3. Thomas & Betts Corp.
- B. Product Description: General purpose type wireway – NEMA 1 interior locations, NEMA 3R exterior locations.
- C. Knockouts: Manufacturer's standard.
- D. Cover: Screw cover.
- E. Connector: Slip-in.
- F. Fittings: Lay-in type with removable top, bottom, and side; captive screws.
- G. Finish: Rust inhibiting primer coating with gray enamel finish.

2.6 OUTLET BOXES

- A. Manufacturers:
 - 1. Carlon Electrical Products.
 - 2. Hubbell Wiring Devices.
 - 3. Thomas & Betts Corp.
- B. Sheet Metal Outlet Boxes: NEMA OS 1, galvanized steel.
 - 1. Luminaire and Equipment Supporting Boxes: Rated for weight of equipment supported; furnish 1/2 inch male fixture studs where required.
 - 2. Concrete Ceiling Boxes: Concrete type.
- C. Cast Boxes: NEMA FB 1, Type FD, aluminum. Furnish gasketed cover by box manufacturer.
- D. Wall Plates for Finished Areas: As specified in Section 262726.
- E. Wall Plates for Unfinished Areas: Furnish gasketed cover.

2.7 PULL AND JUNCTION BOXES

- A. Manufacturers:
 - 1. Carlon Electrical Products.
 - 2. Hubbell Wiring Devices.
 - 3. Thomas & Betts Corp.
- B. Sheet Metal Boxes: NEMA OS 1, galvanized steel.

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- C. Surface Mounted Cast Metal Box: NEMA 250, Type 4; flat-flanged, surface mounted junction box:
 - 1. Material: Cast aluminum.
 - 2. Cover: Furnish with ground flange, neoprene gasket, and stainless steel cover screws.

PART 3 EXECUTION

3.1 EXAMINATION

- A. Verify outlet locations and routing and termination locations of raceway prior to rough-in.

3.2 INSTALLATION

- A. Ground and bond raceway and boxes in accordance with Section 260526.
- B. Fasten raceway and box supports to structure and finishes in accordance with Section 260529.
- C. Identify raceway and boxes in accordance with Section 260553.
- D. Arrange raceway and boxes to maintain headroom and present neat appearance.

3.3 INSTALLATION – SITE ELECTRICAL

- A. Install conduit minimum 3'-0" below finish grade with underground conduit markers.
- B. Install conduit and duct with minimum slope of 4 inches per 100 feet (0.33 percent). Slope conduit and duct toward manholes and away from building entrances.
- C. Install no more than equivalent of three 90-degree bends between pull points.
- D. Install fittings to accommodate expansion and deflection.
- E. Terminate conduit at handholes.
- F. Swab conduit. Use suitable caps to protect installed duct against entrance of dirt and moisture.

3.4 INSTALLATION - RACEWAY

- A. Raceway routing is shown in approximate locations unless dimensioned. Route to complete wiring system.
- B. Arrange raceway supports to prevent misalignment during wiring installation.

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- C. Support raceway using coated steel or malleable iron straps, lay-in adjustable hangers, clevis hangers, and split hangers.
- D. Group related raceway; support using conduit rack. Construct rack using steel channel specified in Section 260529.
- E. Do not support raceway with wire or perforated pipe straps. Remove wire used for temporary supports.
- F. Do not attach raceway to ceiling support wires or other piping systems.
- G. Construct wireway supports from steel channel specified in Section 260529.
- H. Route exposed raceway parallel and perpendicular to walls.
- I. Route raceway installed above accessible ceilings parallel and perpendicular to walls.
- J. Route conduit in and under slab from point-to-point. Do not interfere with radiant heating piping.
- K. Maintain clearance between raceway and piping for maintenance purposes.
- L. Maintain 12 inch clearance between raceway and surfaces with temperatures exceeding 104 degrees F.
- M. Cut conduit square using saw or pipe cutter; de-burr cut ends.
- N. Bring conduit to shoulder of fittings; fasten securely.
- O. Install conduit hubs or sealing locknuts to fasten conduit to sheet metal boxes in damp and wet locations.
- P. Install no more than equivalent of three 90 degree bends between boxes. Install conduit bodies to make sharp changes in direction, as around beams. Install hydraulic one-shot bender to fabricate factory elbows for bends in metal conduit larger than 2 inch size.
- Q. Avoid moisture traps; install junction box with drain fitting at low points in conduit system.
- R. Install suitable pull string or cord in each empty raceway except sleeves and nipples.
- S. Install suitable caps to protect installed conduit against entrance of dirt and moisture.
- T. Surface Raceway: Install flat-head screws, clips, and straps to fasten raceway channel to surfaces; mount plumb and level. Install insulating bushings and inserts at connections to outlets and corner fittings.
- U. Close ends and unused openings in wireway.

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3.5 INSTALLATION - BOXES

- A. Install wall mounted boxes at elevations to accommodate mounting heights specified in section for outlet device.
- B. Orient boxes to accommodate wiring devices oriented as specified in Section 262726.
- C. Install pull boxes and junction boxes above accessible ceilings and in unfinished areas only.
- D. In Accessible Ceiling Areas: Install outlet and junction boxes no more than 6 inches from ceiling access panel or from removable recessed luminaire.
- E. Locate flush mounting box in masonry wall to require cutting of masonry unit corner only. Coordinate masonry cutting to achieve neat opening.
- F. Do not install flush mounting box back-to-back in walls; install with minimum 6 inches separation. Install with minimum 24 inches separation in acoustic rated walls.
- G. Secure flush mounting box to interior wall and partition studs. Accurately position to allow for surface finish thickness.
- H. Install stamped steel bridges to fasten flush mounting outlet box between studs.
- I. Install flush mounting box without damaging wall insulation or reducing its effectiveness.
- J. Install adjustable steel channel fasteners for hung ceiling outlet box.
- K. Do not fasten boxes to ceiling support wires or other piping systems.
- L. Support boxes independently of conduit.
- M. Install gang box where more than one device is mounted together. Do not use sectional box.
- N. Install gang box with plaster ring for single device outlets.

3.6 INTERFACE WITH OTHER PRODUCTS

- A. Install conduit to preserve fire resistance rating of partitions and other elements, using materials and methods in accordance with Section 260529.
- B. Route conduit through roof openings for piping and ductwork or through suitable roof jack with pitch pocket.
- C. Locate outlet boxes to allow luminaires positioned as indicated on Drawings.
- D. Align adjacent wall mounted outlet boxes for switches, thermostats, and similar devices.

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3.7 ADJUSTING

- A. Adjust flush-mounting outlets to make front flush with finished wall material.
- B. Install knockout closures in unused openings in boxes.

3.8 CLEANING

- A. Clean interior of boxes to remove dust, debris, and other material.
- B. Clean exposed surfaces and restore finish.

END OF SECTION

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SECTION 260553

IDENTIFICATION FOR ELECTRICAL SYSTEMS

PART 1 GENERAL

1.1 SUMMARY

- A. Section Includes:
 - 1. Nameplates.
 - 2. Labels.
 - 3. Wire markers.
 - 4. Underground conduit markers.

1.2 SUBMITTALS

- A. Product Data:
 - 1. Submit manufacturer's catalog literature for each product required.
 - 2. Submit electrical identification schedule including list of wording, symbols, letter size, color coding, tag number, location, and function.
- B. Manufacturer's Installation Instructions: Indicate installation instructions, special procedures, and installation.

1.3 CLOSEOUT SUBMITTALS

- A. Project Record Documents: Record actual locations of tagged devices; include tag numbers.

1.4 DELIVERY, STORAGE, AND HANDLING

- A. Accept identification products on site in original containers. Inspect for damage.
- B. Accept materials on site in original factory packaging, labeled with manufacturer's identification, including product density and thickness.
- C. Protect insulation from weather and construction traffic, dirt, water, chemical, and mechanical damage, by storing in original wrapping.

1.5 ENVIRONMENTAL REQUIREMENTS

- A. Install labels and nameplates only when ambient temperature and humidity conditions for adhesive are within range recommended by manufacturer.

PART 2 PRODUCTS

2.1 NAMEPLATES & SIGNS

- A. Manufacturers:

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1. MSI Marking Services.
2. Seton Identification Products

B. Product Description:

1. Laminated three layer plastic with engraved black letters on light contrasting background color.
2. 1/16 inch plastic stock with adhesive backing.
3. Color Schedule: Black with white letters.
4. Nameplates shall be provided for the following: panelboards, transfer switches, and equipment disconnect switches.

2.2 CONDUIT AND CABLE ID

A. Manufacturers:

1. MSI Marking Services, MS-900.
2. Seton Identification Products.

B. Product Description:

1. Fade resistant, heavy duty vinyl with adhesive backing.
2. Size: ½" x 2 ½".
3. Color Schedule: Black text with orange background.
4. Legends: 240 VOLTS (Main feeder conduits and emergency conduits).

2.3 WIRE MARKERS

A. Manufacturers:

1. MSI Marking Services.
2. Seton Identification Products.

B. Description: Split sleeve or tubing type wire markers.

C. Legend:

1. Power and Lighting Circuits: Branch circuit or feeder number as indicated on Drawings.
2. Control Circuits: Control wire number as indicated on schematic and interconnection diagrams and Drawings.

2.4 UNDERGROUND CONDUIT MARKERS

- A. Underground Warning Tape: 6 inch wide plastic tape, detectable type, colored black/red, 4.5 mil., with suitable warning legend describing buried electrical lines.

PART 3 EXECUTION

3.1 PREPARATION

- A. Degrease and clean surfaces to receive adhesive for identification materials.

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3.2 EXISTING WORK

- A. Install identification on existing equipment to remain in accordance with this section.
- B. Install identification on unmarked existing equipment.

3.3 INSTALLATION

- A. Install identifying devices after completion of painting.
- B. Nameplate Installation:
 - 1. Install nameplate parallel to equipment lines.
 - 2. Install nameplate for each electrical distribution and control equipment enclosure with corrosive-resistant mechanical fasteners, or adhesive.
 - 3. Install nameplates for each control panel and major control components located outside panel with corrosive-resistant mechanical fasteners, or adhesive.
 - 4. Secure nameplate to equipment front using adhesive.
 - 5. Secure nameplate to inside surface of door on recessed panelboard in finished locations.
 - 6. Install nameplates for the following:
 - a. Panelboards.
 - b. Disconnects.
 - c. Transfer switches.
- C. Label Installation:
 - 1. Install label parallel to equipment lines.
 - 2. Install label for identification of individual control device stations.
 - 3. Install labels for permanent adhesion and seal with clear lacquer.
- D. Wire Marker Installation:
 - 1. Install wire marker for each conductor at panelboard gutters and each load connection.
 - 2. Mark data cabling at each end. Install additional marking at accessible locations along the cable run.
 - 3. Install labels at data outlets identifying patch panel and port designation.

END OF SECTION

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SECTION 262416

PANELBOARDS

PART 1 GENERAL

1.1 SUMMARY

- A. Section includes branch circuit panelboards.
- B. Related Sections:
 - 1. Section 260526 - Grounding and Bonding for Electrical Systems.
 - 2. Section 260553 - Identification for Electrical Systems.

1.2 REFERENCES

- A. Institute of Electrical and Electronics Engineers:
 - 1. IEEE C62.41 - Recommended Practice on Surge Voltages in Low-Voltage AC Power Circuits.
- B. National Electrical Manufacturers Association:
 - 1. NEMA AB 1 - Molded Case Circuit Breakers and Molded Case Switches.
 - 2. NEMA FU 1 - Low Voltage Cartridge Fuses.
 - 3. NEMA ICS 2 - Industrial Control and Systems: Controllers, Contactors, and Overload Relays, Rated Not More Than 2000 Volts AC or 750 Volts DC.
 - 4. NEMA ICS 5 - Industrial Control and Systems: Control Circuit and Pilot Devices.
 - 5. NEMA KS 1 - Enclosed and Miscellaneous Distribution Equipment Switches (600 Volts Maximum).
 - 6. NEMA PB 1 - Panelboards.
 - 7. NEMA PB 1.1 - General Instructions for Proper Installation, Operation, and Maintenance of Panelboards Rated 600 Volts or Less.
- C. International Electrical Testing Association:
 - 1. NETA ATS - Acceptance Testing Specifications for Electrical Power Distribution Equipment and Systems.
- D. National Fire Protection Association:
 - 1. NFPA 70 - National Electrical Code.
- E. Underwriters Laboratories Inc.:
 - 1. UL 67 - Safety for Panelboards.
 - 2. UL 1283 - Electromagnetic Interference Filters.
 - 3. UL 1449 - Transient Voltage Surge Suppressors.

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1.3 SUBMITTALS

- A. Shop Drawings: Indicate outline and support point dimensions, voltage, main bus ampacity, integrated short circuit ampere rating, circuit breaker and fusible switch arrangement and sizes.
- B. Product Data: Submit catalog data showing specified features of standard products.

1.4 CLOSEOUT SUBMITTALS

- A. Project Record Documents: Record actual locations of panelboards and record actual circuiting arrangements.
- B. Operation and Maintenance Data: Submit spare parts listing; source and current prices of replacement parts and supplies; and recommended maintenance procedures and intervals.

1.5 MAINTENANCE MATERIALS

- A. Furnish two of each panelboard key.

PART 2 PRODUCTS

2.1 LIGHTING AND APPLIANCE PANELBOARDS

- A. Manufacturers:
 - 1. Square D, Type NQ
 - 2. GE
 - 3. Cutler Hammer
- B. 240/120 VAC
 - 1. Interior
 - a. Shall be rated for 240 VAC maximum. Continuous main current ratings, as indicated on associated schedules, not to exceed 400 amperes maximum.
 - b. Minimum short circuit current rating: 22,000 in rms symmetrical amperes at 240 VAC.
 - c. Provide one (1) continuous bus bar per phase. Each bus bar shall have sequentially phased branch circuit connectors suitable for bolt-on branch circuit breakers. The bussing shall be fully rated. Panelboard bus current ratings shall be determined by heat-rise tests conducted in accordance with UL 67. Bussing rated 100-400 amperes shall be copper. Panelboards shall be suitable for use as Service Equipment when application requirements comply with UL 67 and NEC Articles 230-F and -G.
 - d. All current-carrying parts shall be insulated from ground and phase-to-phase by Noryl high dielectric strength thermoplastic or equivalent.

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- e. Split solid neutral shall be plated and located in the mains compartment up to 225 amperes so all incoming neutral cable may be of the same length.
 - f. Interior trim shall be of dead-front construction to shield user from energized parts. Dead-front trim shall have pre-formed twist outs covering unused mounting space.
 - g. Nameplates shall contain system information and catalog number or factory order number. Interior wiring diagram, neutral wiring diagram, UL Listed label and short circuit current rating shall be displayed on the interior or in a booklet format.
 - h. Interiors shall be field convertible for top or bottom incoming feed. Main and sub-feed circuit breakers shall be vertically mounted. Main lug interiors up to 400 amperes shall be field convertible to main breaker. Interior leveling provisions shall be provided for flush mounted applications.
2. Main Circuit Breaker
- a. Main circuit breakers shall have an overcenter, trip-free, toggle mechanism which will provide quick-make, quick-break contact action. Circuit breakers shall have a permanent trip unit with thermal and magnetic trip elements in each pole. Each thermal element shall be true rms sensing and be factory calibrated to operate in a 40° C ambient environment. Thermal elements shall be ambient compensating above 40° C.
 - b. Two- and three-pole circuit breakers shall have common tripping of all poles. Circuit breakers frame sizes above 100 amperes shall have a single magnetic trip adjustment located on the front of the circuit breaker which allows the user to simultaneously select the desired trip level of all poles. Circuit breakers shall have a push-to-trip button for maintenance and testing purposes.
 - c. Breaker handle and faceplate shall indicate rated ampacity. Standard construction circuit breakers shall be UL Listed for reverse connection without restrictive line or load markings.
 - d. Circuit breaker escutcheon shall have international I/O markings, in addition to standard ON/OFF markings. Circuit breaker handle accessories shall provide provisions for locking handle in the ON or OFF position.
 - e. Lugs shall be UL Listed to accept solid or stranded copper conductors only. Lugs shall be suitable for 75° C rated wire. Lug body shall be bolted in place; snap-in designs are not acceptable.
3. Branch Circuit Breakers
- a. Circuit breakers shall be UL Listed with amperage ratings, interrupting ratings, and number of poles as indicated on the panelboard schedules.
 - b. Molded case branch circuit breakers shall have bolt-on type bus connectors.
 - c. Circuit breakers shall have an overcenter toggle mechanism which will provide quick-make, quick-break contact action. Circuit breakers shall have thermal and magnetic trip elements in each pole. Two- and three-pole circuit breakers shall have common tripping of all poles.

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- d. There shall be two forms of visible trip indication. The breaker handle shall reside in a position between ON and OFF. In addition, there shall be indicator appearing in the clear window of the
 - e. circuit breaker housing.
 - f. Inverse time, thermal magnetic trip circuit breakers, listed as Type SWD for lighting circuits, Type HACR for equipment circuits, Class A ground fault interrupter circuit breakers as indicated on Drawings. Do not use tandem circuit breakers.
 - g. The exposed faceplates of all branch circuit breakers shall be flush with one another.
 - h. Lugs shall be UL Listed to accept solid or stranded copper conductors only. Lugs shall be suitable for 75° C rated wire. Branch circuit breakers rated 30 amperes and below shall be UL Listed to accept 60° C rated wire.
4. Enclosures
- a. Type 1 Boxes
 - 1) Boxes shall be galvanized steel constructed in accordance with UL 50 requirements. Galvanealed steel will not be acceptable.
 - 2) Boxes shall have removable end walls with knockouts located on one end. Boxes shall have welded interior mounting studs. Interior mounting brackets are not required.
 - 3) Box width shall be 20 in wide.
 - b. Type 1 Fronts
 - 1) Front shall meet strength and rigidity requirements per UL 50 standards. Front shall have ANSI 49 gray enamel electrodeposited over cleaned phosphatized steel.
 - 2) Fronts shall be 1-piece with door. Mounting shall be surface.
 - 3) Panelboards rated 225 amperes and below shall have MONO-FLAT fronts with concealed door hinges and trim screws. Front shall not be removable with the door locked. Front doors shall have rounded corners and edges shall be free of burrs.
 - 4) Front shall have cylindrical tumbler type lock with catch and spring-loaded stainless steel door pull. All lock assemblies shall be keyed alike. Two (2) keys shall be provided with each lock. A clear plastic directory cardholder shall be mounted on the inside of door.

PART 3 EXECUTION

3.1 INSTALLATION

- A. Install panelboards in accordance with NEMA PB 1.1.
- B. Install panelboards plumb.
- C. Height: 6 feet to top of panelboard.
- D. Install filler plates for unused spaces in panelboards.

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- E. Provide typed circuit directory for each branch circuit panelboard. Revise directory to reflect circuiting changes to balance phase loads.
- F. Install engraved plastic nameplates in accordance with Section 260553.
- G. Install spare conduits out of each recessed panelboard to accessible location above ceiling. Minimum spare conduits: 5 empty ¾ inch. Identify each as SPARE.
- H. Ground and bond panelboard enclosure according to Section 260526. Connect equipment ground bars of panels in accordance with NFPA 70.

3.2 FIELD QUALITY CONTROL

- A. Inspect and test in accordance with NETA ATS, except Section 4.
- B. Perform circuit breaker inspections and tests listed in NETA ATS, Section 7.6.
- C. Perform switch inspections and tests listed in NETA ATS, Section 7.5.
- D. Perform controller inspections and tests listed in NETA ATS, Section 7.16.1.

3.3 ADJUSTING

- A. Measure steady state load currents at each panelboard feeder; rearrange circuits in panelboard to balance phase loads to within 20 percent of each other. Maintain proper phasing for multi-wire branch circuits.

END OF SECTION

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SECTION 262726

WIRING DEVICES

PART 1 GENERAL

1.1 SUMMARY

- A. Section includes wall switches, receptacles, device plates, and cord reels.
- B. Related Sections:
 - 1. Section 260533 - Raceway and Boxes for Electrical Systems: Outlet boxes for wiring devices.

1.2 REFERENCES

- A. National Electrical Manufacturers Association:
 - 1. NEMA WD 1 - General Requirements for Wiring Devices.
 - 2. NEMA WD 6 - Wiring Devices-Dimensional Requirements.

1.3 SUBMITTALS

- A. Product Data: Submit manufacturer's catalog information showing dimensions, colors, and configurations.

1.4 QUALIFICATIONS

- A. Manufacturer: Company specializing in manufacturing products specified in this section with minimum three years documented experience.

PART 2 PRODUCTS

2.1 WALL SWITCHES

- A. Manufacturers:
 - 1. Arrow Hart Wiring Devices.
 - 2. Eagle Electric.
 - 3. Siemens Co.
 - 4. Leviton.
- B. Product Description: NEMA WD 1, Heavy-Duty, AC only general-use snap switch. UL to meet Federal Specification WS-896 and UL Test 20.
- C. Body and Handle: Ivory plastic with toggle handle.
- D. Ratings:
 - 1. Voltage: 120-277 volts, AC.

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2. Current: 20 amperes.

2.2 RECEPTACLES

- A. Manufacturers:
 1. Arrow Hart Wiring Devices.
 2. Eagle Electric.
 3. Siemens Co.
 4. Leviton.
- B. Product Description: NEMA WD 1, Heavy-duty general use receptacle.
- C. Device Body: Gray plastic.
- D. Configuration: NEMA WD 6..
- E. Convenience Receptacle: Type 5-20, 20 Amps, 125V.
- F. GFCI Receptacle: Convenience receptacle with integral ground fault circuit interrupter to meet regulatory requirements.

2.3 WALL PLATES

- A. Manufacturers:
 1. Arrow Hart Wiring Devices.
 2. Eagle Electric.
 3. Siemens Co.
 4. Leviton.
- B. Cover Plates: Galvanized sheet metal.
- C. Weatherproof Cover Plate: Gasketed cast metal plate with hinged and gasketed device cover.

2.4 CORD REELS:

- A. Manufacturers:
 1. Cox Reels PC10 Series.
 2. Substitutions or approved equal: Section 016000 – Product Requirements.
- B. Description: External heavy gauge powder coated steel housing and components.
 1. ½” solid steel axle and lubricated precision bearings for smooth rotation.
 2. Solid, one piece, 12 ga base and support post.
 3. Spring driven cord reel.
 4. 5’ lead cable and grounding plug.
 5. 30’ cable length, 12 AWG, 115 volts.
 6. Provide 2 year manufacturer’s warranty.

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PART 3 EXECUTION

3.1 EXAMINATION

- A. Verify outlet boxes are installed at proper height.
- B. Verify wall openings are neatly cut and completely covered by wall plates.
- C. Verify branch circuit wiring installation is completed, tested, and ready for connection to wiring devices.

3.2 PREPARATION

- A. Clean debris from outlet boxes.

3.3 INSTALLATION

- A. Install devices plumb and level.
- B. Install switches with OFF position down.
- C. Install receptacles with grounding pole on top.
- D. Connect wiring device grounding terminal to outlet box with bonding jumper and branch circuit equipment grounding conductor.
- E. Install decorative plates on switch, receptacle, and blank outlets in finished areas.
- F. Connect wiring devices by wrapping solid conductor around screw terminal. Install stranded conductor for branch circuits 10 AWG and smaller. When stranded conductors are used in lieu of solid, use crimp on fork terminals for device terminations. Do not place bare stranded conductors directly under device screws.
- G. Use jumbo size plates for outlets installed in masonry walls.

3.4 INTERFACE WITH OTHER PRODUCTS

- A. Coordinate locations of outlet boxes provided under Section 260533 to obtain mounting heights as specified and as indicated on drawings.
- B. Install wall switch 48 inches above finished floor, unless noted otherwise on drawings.
- C. Install convenience receptacle 18 inches above finished floor, unless noted otherwise on drawings.
- D. Install convenience receptacle 6 inches above back splash of counter, unless noted otherwise on drawings.
- E. Do not install outlets or switches inside concrete walls.

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3.5 FIELD QUALITY CONTROL

- A. Inspect each wiring device for defects.
- B. Operate each wall switch with circuit energized and verify proper operation.
- C. Verify each receptacle device is energized.
- D. Test each receptacle device for proper polarity.
- E. Test each GFCI receptacle device for proper operation.

3.6 ADJUSTING

- A. Adjust devices and wall plates to be flush and level.

3.7 CLEANING

- A. Clean exposed surfaces to remove splatters and restore finish.

END OF SECTION

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SECTION 262819

ENCLOSED SWITCHES

PART 1 GENERAL

1.1 SUMMARY

- A. Section includes fractional horsepower switches and non-fusible switches.

1.2 REFERENCES

- A. National Electrical Manufacturers Association:
 - 1. NEMA FU 1 - Low Voltage Cartridge Fuses.
 - 2. NEMA KS 1 - Enclosed and Miscellaneous Distribution Equipment Switches (600 Volts Maximum).
- B. International Electrical Testing Association:
 - 1. NETA ATS - Acceptance Testing Specifications for Electrical Power Distribution Equipment and Systems.

1.3 SUBMITTALS

- A. Product Data: Submit switch ratings and enclosure dimensions.

1.4 CLOSEOUT SUBMITTALS

- A. Project Record Documents: Record actual locations of enclosed switches and ratings of installed fuses.

1.5 QUALIFICATIONS

- A. Manufacturer: Company specializing in manufacturing products specified in this section with minimum three years documented experience.

PART 2 PRODUCTS

2.1 FRACTIONAL HORSEPOWER DISCONNECT SWITCHES

- A. Product Description:
 - 1. Toggle switch rated for voltage, horsepower, phase, amperage and environment of switch shown on drawings.
 - 2. Lockable switches (not required for motors less than 1/8 HP).
 - 3. Interior Dry Locations: Type 1.
 - 4. Interior Wet Locations: Type 4X.
 - 5. Exterior Locations: Type 3R.

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2.2 NONFUSIBLE SWITCH ASSEMBLIES

- A. Manufacturers:
 - 1. Square D, Class 3110.
 - 2. GE Electrical.
- B. Product Description: NEMA KS 1, Type HD enclosed load interrupter knife switch. Handle lockable in OFF position.
- C. Enclosure: NEMA KS 1, to meet conditions. Fabricate enclosure from steel finished with manufacturer's standard gray enamel.
 - 1. Interior Dry Locations: Type 1.
 - 2. Exterior Locations: Type 3R.
- D. Furnish switches with entirely copper current carrying parts.

2.3 SWITCH RATINGS

- A. Switch Rating: Horsepower rated for AC or DC as indicated on Drawings.
- B. Short Circuit Current Rating: UL listed for 200,000 rms symmetrical amperes when used with or protected by Class R or Class J fuses.

PART 3 EXECUTION

3.1 INSTALLATION

- A. Install enclosed switches plumb. Provide supports in accordance with Section 260529.
- B. Height: 5 feet to operating handle.
- C. Install fuses for fusible disconnect switches. Install engraved plastic nameplates in accordance with Section 260553.
- D. Apply adhesive tag on inside door of each fused switch indicating NEMA fuse class and size installed.

3.2 FIELD QUALITY CONTROL

- A. Inspect and test in accordance with NETA ATS, except Section 4.
- B. Perform inspections and tests listed in NETA ATS, Section 7.5.

END OF SECTION

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SECTION 262826

ENCLOSED TRANSFER SWITCH

PART 1 GENERAL

1.1 SUMMARY

- A. Section includes open transition transfer switch in an individual enclosure
- B. ATS shall consist of a power transfer switch mechanism and a microprocessor controller to provide automatic operation. Transfer switch and controller shall be the products of the same manufacturer. The ATS shall transfer the load in open transition (break-before-make) mode.

1.2 REFERENCES

- A. National Electrical Manufacturers Association:
 - 1. NEMA ICS 10 - Industrial Control and Systems: AC Transfer Switch Equipment.
- B. International Electrical Testing Association:
 - 1. NETA ATS - Acceptance Testing Specifications for Electrical Power Distribution Equipment and Systems.
- C. Underwriters Laboratories Inc.:
 - 1. UL 1008 - Transfer Switch Equipment.
- D. IEC 47-6-1 Low-voltage Switchgear and Control gear; Multifunction equipment; Automatic Transfer Switching Equipment.
- E. NFPA 70 - National Electrical Code.
- F. IEEE Standard 446 - IEEE Recommended Practice for Emergency and Standby Power Systems for Commercial and Industrial Applications.
- G. UL 508 Industrial Control Equipment.

1.3 SUBMITTALS

- A. Section 013300 - Submittal Procedures: Submittal procedures.
- B. Product Data: Submit catalog sheets showing voltage, switch size, ratings and size of switching and overcurrent protective devices, operating logic, short circuit ratings, dimensions, and enclosure details.

1.4 CLOSEOUT SUBMITTALS

- A. Section 017000 - Execution Requirements: Closeout procedures.

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- B. Project Record Documents: Record actual locations of enclosed transfer switches.
- C. Operation and Maintenance Data: Submit routine preventative maintenance and lubrication schedule. List special tools, maintenance materials, and replacement parts.

1.5 QUALIFICATIONS

- A. Supplier: Authorized distributor of specified manufacturer with minimum three years documented experience.

1.6 WARRANTY MAINTENANCE SERVICE

- A. Section 017000 - Execution Requirements: Maintenance service.
- B. The ATS shall be guaranteed against defective material and workmanship in accordance with the manufacturer's published warranty for two years from date of start-up and acceptance of project by Owner. Warranty period includes costs of all labor, parts, and mileage.

PART 2 PRODUCTS

2.1 AUTOMATIC TRANSFER SWITCH

- A. ATS shall have the following characteristics:
 - 1. 100 amp continuous rating.
 - 2. 120/240 volt, single phase, 3 wire.
 - 3. Three pole configuration
 - 4. ATS shall be furnished in a NEMA 1 enclosure.
 - 5. The switch shall be 240 volt class.
 - 6. Field verification of existing generator starting requirements (2 or 4 wire).
- B. Product Description: NEMA ICS 10, automatic transfer switch.
- C. Configuration: Electrically operated, mechanically held transfer switch. The electrical operator shall be single solenoid mechanism, momentarily energized.
 - 1. All transfer switch sizes shall use only one type of main operator for ease of maintenance and commonality of parts.
 - 2. The switch shall be positively locked and unaffected by momentary outages, so that contact pressure is maintained at a constant value and contact temperature rise is minimized for maximum reliability and operating life.
 - 3. All main contacts shall be silver composition.
 - 4. Inspection of all contacts shall be possible from the front of the switch without disassembly of operating linkages and without disconnection of power conductors.
 - 5. Designs utilizing components of molded-case circuit breakers, contactors, or parts thereof, which are not intended for continuous duty, repetitive switching or transfer between two active power sources are not acceptable.

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6. Where neutral conductors are to be solidly connected as shown on the plans, a neutral conductor plate with fully rated AL-CU pressure connectors shall be provided.
- D. Microprocessor Controller:
1. The controller shall direct the operation of the transfer switch. The controller's sensing and logic shall be controlled by a built-in microprocessor for maximum reliability, minimum maintenance. The controller shall be connected to the transfer switch by an interconnecting wiring harness. The harness shall include a keyed disconnect plug to enable the controller to be disconnected from the transfer switch for routine maintenance.
 2. The controller shall be enclosed with a protective cover and be mounted separate from the transfer switch unit for safety and ease of maintenance. Sensing and control logic shall be provided on printed circuit boards. Interfacing relays shall be industrial grade plug-in type with dust covers.
 3. The controller shall meet or exceed the requirements for Electromagnetic Compatibility (EMC) as follows:
 - a. IEC801-2 Electrostatic discharge (ESD) immunity
 - b. ENV50140 and IEC 801 – 3 Radiated electromagnetic field immunity
 - c. IEC 801 – 4 Electrical fast transient (EFT) immunity
 - d. ENV50142 Surge transient immunity
 - e. ENV50141: Conducted radio-frequency field immunity
 - f. EN55011: Group 1, Class A conducted and radiated emissions
 4. All customer connections shall be wired to a common terminal block to simplify field-wiring connections.
- E. Controller Display:
1. Controller shall be a flush-mounted display with LED indicators for switch position, source availability, and for engine exerciser. It shall also include test and generator exerciser/bypass switches.
 2. The complete assembly shall be degreased, and thoroughly cleaned through a five-stage aqueous process. The finish shall be ANSI-61, light gray, electrostatically-charged polyester powder paint over a phosphate coating, at a minimum of 2.0 mils in density. Finish shall be suitable for indoor and outdoor environments.
 3. A ground bus shall be provided for connection of the grounding conductor to the grounding electrode. A pressure disconnect link for the neutral to ground bonding jumper shall be provided to connect the normal neutral connection to the ground bus.
 4. Control wiring shall be rated for 600 volt, UL 1015. Wires shall be placed in wire duct or harnessed, and shall be supported to prevent sagging or breakage from weight or vibration. All wiring to hinged doors shall be run through door terminal blocks or connection plugs).
- F. Voltage, Frequency and Phase Rotation Sensing:
1. The voltage of each phase of the normal source shall be monitored, with pickup adjustable to 95% of nominal and dropout adjustable from 70% to 90% of pickup setting.

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2. Single-phase voltage and frequency sensing of the emergency source shall be provided.

G. Time Delays:

1. A time delay shall be provided to ignore preferred (utility) source outages, adjustable to 1 or 3 second time periods.
2. A time delay shall be provided to ignore alternate (generator) source outages fixed at 4 seconds.
3. A time delay shall be provided to transfer to alternate (generator) source fixed at 10 seconds.
4. A time delay shall be provided to transfer to preferred (utility) source fixed at 5 minutes.
5. A time delay shall be provided for generator cooldown after retransfer to utility, adjustable to 2 or 5 minute periods.
6. A generator exerciser and bypass switch shall be provided. An optional programmable generator exerciser clock shall be available.

H. Additional Features:

1. The controller shall provide one set of form C contacts to be used to signal the generator to run. These contacts shall be rated at 1 A/ 30 V dc or 5A / 30 V dc.
2. A push-button type test switch shall be provided to simulate normal source failure.
3. A push-button type switch shall be provided to deactivate generator exerciser period.
4. Indicating lights shall be provided, one to indicate when the ATS is connected to the normal source (green), and one to indicate when the ATS is connected to the emergency source (red). Also provide indicating lights for both normal and emergency source availability.

- I. Rating: State voltage and current rating and number of poles or “as indicated on drawings”.

- J. Withstand Current Rating: 10,000 rms symmetrical amperes.

- K. Service Conditions: NEMA ICS 10.

1. Temperature: 50-90 degrees F.

- L. Enclosure:

1. Enclosure: ICS 10, NEMA 1.
2. Finish: Manufacturer's standard gray enamel.

2.2 SOURCE QUALITY CONTROL

- A. Furnish shop inspection and testing of each transfer switch.

- B. Allow witnessing of factory inspections and tests at manufacturer’s test facility. Notify Owner at least seven days before inspections and tests are scheduled.

1. The complete ATS shall be factory tested to ensure proper operation of the individual components and correct overall sequence of operation and to ensure

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that the operating transfer time, voltage, frequency and time delay settings are in compliance with the specification requirements.

2. Upon request, the manufacturer shall provide a notarized letter certifying compliance with all of the requirements of this specification including compliance with the above codes and standards, and withstand and closing ratings. The certification shall identify, by serial number(s), the equipment involved. No exceptions to the specifications, other than those stipulated at the time of the submittal, shall be included in the certification.
3. The ATS manufacturer shall be certified to ISO 9001 International Quality Standard and the manufacturer shall have third party certification verifying quality assurance in design/development, production, installation, and servicing in accordance with ISO 9001.

PART 3 EXECUTION

3.1 EXISTING WORK

- A. Disconnect and remove abandoned transfer switches.

3.2 INSTALLATION

- A. Install engraved plastic nameplates in accordance with Section 260553.

3.3 FIELD QUALITY CONTROL

- A. Section 014000 - Quality Requirements: Testing and Inspection Services.
- B. Inspect and test in accordance with NETA ATS, except Section 4.
- C. Perform inspections and tests listed in NETA ATS, Section 7.22.3.

3.4 MANUFACTURER'S FIELD SERVICES

- A. Section 014000 - Quality Requirements: Manufacturers' field services.
- B. Check out transfer switch connections and operations and place in service.

3.5 ADJUSTING

- A. Section 017000 - Execution Requirements: Testing, adjusting, and balancing.
- B. Adjust control and sensing devices to achieve specified sequence of operation.

3.6 DEMONSTRATION AND TRAINING

- A. Demonstrate operation of transfer switch in normal and emergency modes.

END OF SECTION

Enclosed Transfer Switches
262826

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SECTION 265100

INTERIOR AND EXTERIOR LIGHTING

PART 1 GENERAL

1.1 SUMMARY

- A. Section includes interior luminaires, lamps, ballasts, and accessories.
- B. Related Sections:
 - 1. Section 260526 - Grounding and Bonding for Electrical Systems.
 - 2. Section 260533 - Raceway and Boxes for Electrical Systems.
 - 3. Section 265200 - Emergency Lighting.

1.2 REFERENCES

- A. American National Standards Institute:
 - 1. ANSI C82.1 - American National Standard for Lamp Ballast-Line Frequency Fluorescent Lamp Ballast.
 - 2. ANSI C82.4 - American National Standard for Ballasts-for High-Intensity-Discharge and Low-Pressure Sodium Lamps (Multiple-Supply Type).

1.3 SUBMITTALS

- A. Shop Drawings: Indicate dimensions and components for each luminaire not standard product of manufacturer.
- B. Indicate in submittal that fixtures are prequalified for nonresidential customers for rebate. Prequalification information can be obtained from Designlights Consortium. Owner will submit documentation and obtain rebate directly from NYSEG. Contractor shall provide copies of invoices from contractor, within 14 days of purchase.
- C. Product Data: Submit dimensions, ratings, and performance data.

1.4 QUALIFICATIONS

- A. Manufacturer: Company specializing in manufacturing products specified in this section with minimum three years documented experience.

1.5 MAINTENANCE MATERIALS

- A. Refer to each fixture specification for spare lamps and ballasts.

PART 2 PRODUCTS

2.1 INTERIOR LUMINAIRES

- A. Manufacturers:

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1. Lithonia Lighting.
 2. Columbia Lighting.
 3. Hubbell Lighting
- B. Product Description: Complete interior luminaire assemblies, with features, options, and accessories as scheduled.
- C. Correlated Color Temperature Requirements: 3,500 K.

PART 3 EXECUTION

3.1 INSTALLATION

- A. Install suspended luminaires using pendants supported from swivel hangers. Install pendant length required to suspend luminaire at indicated height.
- B. Support luminaires larger than 2 x 4 foot size independent of ceiling framing.
- C. Install surface mounted luminaires plumb and adjust to align with building lines and with each other. Secure to prevent movement.
- D. Install recessed luminaires to permit removal from below.
- E. Install wall-mounted luminaires at height as indicated on Drawings.
- F. Install accessories furnished with each luminaire.
- G. Connect luminaires to branch circuit outlets provided under Section 260533 using flexible conduit.
- H. Make wiring connections to branch circuit using building wire with insulation suitable for temperature conditions within luminaire.
- I. Install specified lamps in each luminaire.
- J. Ground and bond interior luminaires in accordance with Section 260526.

3.2 FIELD QUALITY CONTROL

- A. Operate each luminaire after installation and connection. Inspect for proper connection and operation.

3.3 ADJUSTING

- A. Aim and adjust luminaires as indicated on Drawings.

3.4 CLEANING

- A. Remove dirt and debris from enclosures.

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- B. Clean photometric control surfaces as recommended by manufacturer.
- C. Clean finishes and touch up damage.

3.5 SCHEDULES

- A. Type A Interior Luminaire:
 - 1. Lithonia ZLIN or equal
 - 2. Description: Industrial LED strip fixture intended for low to medium mounting heights. Heavy duty cold rolled steel with snap on frosted polycarbonate diffuser.
 - 3. Material: Steel.
 - 4. Size: 4' length x 2.125" width x 2.125" height.
 - 5. Mounting: Suspended with mfr supplied hanger chain.
 - 6. Light Engine: High output LED's integrated into a two later circuit board for cool running operation. Nominal lumens: 7,000. Color temperature 3500K at 83 CRI.
 - 7. Wattage: 72 watts each.
 - 8. Finish: Baked enamel, white.
 - 9. Voltage: 120V single phase.
 - 10. Listings: Underwriters Laboratories (UL) and damp locations to 30 degrees C.
 - 11. Accessories: Wireguard, white.
 - 12. Pre-qualified for nonresidential rebate through NYSEG.

- B. Type B Exterior Luminaire:
 - 1. Lithonia WST LED or equal.
 - 2. Description: Rugged single piece aluminum housing in the form of a trapezoidal rectangle, die-cast door and frame, fully gasketed. Segmented reflectors, forward throw distribution, full cutoff.
 - 3. Material: Aluminum.
 - 4. Size: 16.25"long x 9.125" wide x 7.25" high
 - 5. Mounting: Wall.
 - 6. Light Engine: Two LED engines (20 LED total), type IV distribution.
 - 7. Voltage: 120V single phase.
 - 8. Finish: Corrosion resistant powder coated finish, color chosen by architect.
 - 9. Listings: Underwriters Laboratories (UL), Wet Locations.
 - 10. Options: Photoelectric control, emergency battery backup.
 - 11. Pre-qualified for nonresidential rebate through NYSEG.

- C. Type C Interior Luminaire (ADD ALTERNATE):
 - 1. Lithonia IBH 12L or equal.
 - 2. Description: Industrial LED bay fixture intended for replacement of conventional HID lighting in medium to high bay areas. Die formed aluminum alloy chassis with integrated fins for optimal cooling. Polycarbonate diffuser.
 - 3. Material: Steel.
 - 4. Size: 22" length x 15.25" width x 4.75" height.
 - 5. Mounting: Pendant monopoint.
 - 6. Light Engine: High output LED's, precision formed reflectors. Nominal lumens: 11,200.
 - 7. Wattage: 125 each.
 - 8. Finish: Baked enamel, white.

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9. Voltage: 240V single phase.
10. Listings: Underwriters Laboratories (UL) and damp locations to 40 degrees C.
11. Accessories: Wireguard, white.
12. Prequalified for nonresidential rebate through NYSEG.

END OF SECTION

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SECTION 265200

EMERGENCY LIGHTING

PART 1 GENERAL

1.1 SUMMARY

- A. Section includes emergency lighting units and exit signs.
- B. Related Sections:
 - 1. Section 260526 - Grounding and Bonding for Electrical Systems.
 - 2. Section 260533 - Raceway and Boxes for Electrical Systems.

1.2 REFERENCES

- A. National Electrical Manufacturers Association:
 - 1. NEMA WD 6 - Wiring Devices-Dimensional Requirements.

1.3 SYSTEM DESCRIPTION

- A. Emergency lighting to comply with requirements.

1.4 SUBMITTALS

- A. Product Data: Submit dimensions, ratings, and performance data.

1.5 QUALIFICATIONS

- A. Manufacturer: Company specializing in manufacturing products specified in this section with minimum three years documented experience.

PART 2 PRODUCTS

2.1 EMERGENCY LIGHTING UNITS

- A. Manufacturers:
 - 1. Lithonia Lighting, Model IND654 – H2006.
 - 2. Columbia.
 - 3. Lightalarms.
- B. Product Description: Heavy-duty, sealed, gasketed, impact-resistant, injection molded thermoplastic housed fixture with view-through window for indicators. Fixture has two lamp heads and is designed for emergency backup lighting.
- C. Mounting: Wall, indicated on drawings.
- D. Battery: 6 volt, maintenance free lead calcium type with 1.5 hour capacity.

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- E. Battery Charger: Dual-rate type, with sufficient capacity to recharge discharged battery to full charge within (12) hours.
- F. Lamps: (2) 6V 20W halogen.
- G. Indicators: Lamps to indicate AC ON and RECHARGING.
- H. Test Switch: Transfers unit from external power supply to integral battery supply.
- I. Electrical Connection: Conduit connection.
- J. Input Voltage: 120 volts single phase.
- K. Listings: UL listed, damp locations and NFPA 101 approved.

2.2 EXIT SIGNS

- A. Manufacturers:
 - 1. Lithonia Quantum Series, Model LHQM
 - 2. Columbia Lighting.
 - 3. Lightalarms.
- B. Product Description: Low profile compact design with thermoplastic housing.
- C. Face: Plastic with red letters on white background.
- D. Directional Arrows: As indicated on drawings.
- E. Mounting: As indicated on drawings.
- F. Battery: Lead calcium. Battery sized to provide minimum 90 minutes of emergency illumination to exit light.
- G. Battery Charger: Dual-rate type with sufficient capacity to recharge discharged battery to full charge within twelve hours.
- H. Lamps: LED. High output battery less lamp heads.
- I. Input voltage: 120 volts single phase.
- J. Listings: UL listed, damp locations and NFPA 101 approved.

PART 3 EXECUTION

3.1 INSTALLATION

- A. Install suspended exit signs using pendants supported from swivel hangers. Install pendant length required to suspend sign at indicated height.

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- B. Install surface-mounted emergency lighting units and exit signs plumb and adjust to align with building lines and with each other. Secure to prevent movement.
- C. Install wall-mounted emergency lighting units and exit signs at height as indicated on Drawings.
- D. Install accessories furnished with each emergency lighting unit and exit sign.
- E. Connect emergency lighting units and exit signs to branch circuit outlets provided in Section 260533 as indicated on Drawings.
- F. Make wiring connections to branch circuit using building wire with insulation suitable for temperature conditions within unit.
- G. Install specified lamps in each emergency lighting unit and exit sign.
- H. Ground and bond emergency lighting units and exit signs in accordance with Section 260526.

3.2 ADJUSTING

- A. Aim and adjust lamp fixtures.
- B. Position exit sign directional arrows as indicated on Drawings.

3.3 PROTECTION OF FINISHED WORK

- A. Relamp emergency lighting units and exit signs having failed lamps at Substantial Completion.

END OF SECTION

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SECTION 266000

ELECTRICAL UTILITY SERVICES

PART 1 GENERAL

1.1 SUMMARY

- A. Section includes arrangement with Utility Company for permanent electric service; payment of Utility Company charges for service; service provisions; and utility metering equipment.

1.2 SYSTEM DESCRIPTION – WASTEWATER TREATMENT PLANT SITE

- A. Utility Company – NYSEG
- B. Utility Company Notification Number: 301264407
- C. System Characteristics: 120/240, single phase, three wire, 60 Hertz.
- D. Service Entrance: Overhead to building mounted weatherhead.
- E. Overhead Service Provisions: Overhead service entrance to building service entrance equipment.
 - 1. Utility Service-Entrance Conductor Connection: At customers building mounted weatherhead.

1.3 SUBMITTALS

- A. Section 013300 - Submittal Procedures: Submittal procedures.
- B. Submit Utility-Company-prepared drawings.

1.4 QUALITY ASSURANCE

- A. Perform Work in accordance with Utility Company written requirements.
- B. Maintain one copy of each document on site.

1.5 FIELD MEASUREMENTS

- A. Verify field measurements are as indicated on Drawings.

1.6 COORDINATION

- A. Coordinate with utility company, relocation of overhead or underground lines interfering with construction. Where power lines are to be relocated, bill utility costs, directly to Owner.

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- B. Utility company charges for service installation will be paid by Owner and are not part of this contract.

PART 2 PRODUCTS

2.1 UTILITY METERS

- A. Furnished and installed by Utility Company.

2.2 UTILITY METER SOCKET TROUGH

- A. Furnished by NYSEG, installed by Contractor.
- B. Product Description: Meter base rated 320 amperes continuous duty with 4 jaws, manual circuit closing type.

2.3 UTILITY TRANSFORMERS

- A. Fire Station”: Pole mounted, single phase.

PART 3 EXECUTION

3.1 EXAMINATION

- A. Section 013000 - Administrative Requirements: Coordination and project conditions.
- B. Verify service equipment is ready to be connected and energized.

3.2 INSTALLATION

- A. Install service entrance conduits to building service entrance equipment.

END OF SECTION

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SECTION 310513

SOILS FOR EARTHWORK

PART 1 GENERAL

1.1 SUMMARY

- A. Section Includes:
 - 1. Subsoil materials.
 - 2. Topsoil materials.
- B. Related Sections:
 - 1. Section 310516 - Aggregates for Earthwork

1.2 REFERENCES

- A. American Association of State Highway and Transportation Officials:
 - 1. AASHTO T180 - Standard Specification for Moisture-Density Relations of Soils Using a 4.54-kg (10-lb) Rammer and a 457-mm (18-in.) Drop.
- B. ASTM International:
 - 1. ASTM D698 - Standard Test Method for Laboratory Compaction Characteristics of Soil Using Standard Effort (12,400 ft-lbf/ft³ (600 kN-m/m³)).
 - 2. ASTM D1556 - Test Method for Density of Soil in Place by the Sand-Cone Method.
 - 3. ASTM D1557 - Standard Test Methods for Laboratory Compaction Characteristics of Soil Using Modified Effort (56,000 ft-lbf/ft³ (2,700 kN-m/m³)).
 - 4. ASTM D2167 - Test Method for Density and Unit Weight of Soil in Place by the Rubber Balloon Method.
 - 5. ASTM D2487 - Standard Classification of Soils for Engineering Purposes (Unified Soil Classification System).
 - 6. ASTM D6938 – In place Density and Water Content of Soil and Soil–Aggregate by Nuclear Methods (Shallow Depth).
- C. The term "Standard Specification" as used in this section shall mean the Standard Specifications, Construction and Materials, New York State Department of Transportation, Design and Construction Division, latest version and including all addendums thereto. Where the Standard Specifications are cited such work or material shall conform in every respect except for "Method of Payment" or if cited otherwise herein.
- D. The term "NYS DEC Best Management Practices," "Best Management Practices," and/or "BPM's" shall refer to New York Standards and Specifications for Erosion and Sediment Control and New York State Stormwater Management Design Manual, latest version, and including all addendums thereto.

1.3 SUBMITTALS

- A. Section 013300 - Submittal Procedures Requirements for submittals.

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- B. Samples: Submit, in air-tight containers, 50 lb sample of each type of fill to testing laboratory.
- C. Materials Source: Submit name of imported materials source.

PART 2 PRODUCTS

2.1 SUBSOIL MATERIALS

- A. Common Fill:
 - 1. Excavated and re-used material.
 - 2. Graded.
 - 3. Free of lumps larger than 2 inches, rocks larger than 2 inches, organics and debris.
 - 4. Conforming to ASTM D2487, Group Symbol CL.
 - 5. Approved by Engineer.

2.2 TOPSOIL MATERIALS

- A. Excavated and Reused Topsoil:
 - 1. Excavated and reused material. Graded/screened prior to reuse.
 - 2. Free of roots, rocks larger than ¼ inch, subsoil, debris, large weeds and foreign matter.
 - 3. Conforming to ASTM D2487, Group Symbol OH.
- B. Imported Topsoil:
 - 1. Imported borrow. Graded/screened prior to reuse.
 - 2. Friable loam.
 - 3. Reasonably free of roots, rocks larger than 1/4 inch, subsoil, debris, large weeds, and foreign matter.
 - 4. Acidity range (pH) of 5.5 to 7.5.
 - 5. Containing minimum of 4 percent and maximum of 25 percent inorganic matter.
 - 6. Conforming to ASTM D2487 Group Symbol OH.

2.3 SOURCE QUALITY CONTROL

- A. Section 014000 - Quality Requirements: Testing and Inspection Services Testing and analysis of soil material.
- B. Testing and Analysis of Subsoil Material: Perform in accordance with ASTM D1557.
- C. Testing and Analysis of Topsoil Material: Perform in accordance with ASTM D1557.
- D. When tests indicate materials do not meet specified requirements, change material and retest.
- E. Furnish materials of each type from same source throughout the Work.
- F. Testing costs will be paid from the Testing Allowance. Retesting for failed test results will be at contractor's expense.

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PART 3 EXECUTION

3.1 EXCAVATION

- A. Excavate subsoil and topsoil from areas designated. Strip topsoil to full depth of topsoil in designated areas.
- B. Remove lumped soil, boulders, and rock.
- C. Stockpile excavated material meeting requirements for subsoil materials and topsoil materials.
- D. Remove excess excavated materials not intended for reuse, from site within 2 weeks of excavation.
- E. Remove excavated materials not meeting requirements for subsoil materials or topsoil materials from site.
- F. At Engineer's discretion, excavated subsoils may be used for common fill areas on-site.

3.2 STOCKPILING

- A. Stockpile materials on site at locations indicated or approved of by Engineer.
- B. Stockpile in sufficient quantities to meet Project schedule and requirements.
- C. Stockpiles not to exceed 8 feet in height.
- D. Separate differing materials with dividers or stockpile apart to prevent mixing.
- E. Prevent intermixing of soil types or contamination.
- F. Direct surface water away from stockpile site to prevent erosion or deterioration of materials.
- G. Any unsuitable or hazardous materials to be stockpiled must be done so on impervious material and covered to prevent erosion and leaching, until disposed of.
- H. Provide temporary Erosion and Sediment Controls (E&SC) as per NYS DEC Best Management Practices (BPM's) around stockpile(s) to prevent degradation of drainage-ways and waters of the U.S. Maintain temporary E&SC measures until all stock pile(s) have been removed from the project area and site has been completely re-vegetated. All stockpiled material to remain idle for 10 days or more shall be stabilized with vegetation or covered. Silt fence shall be installed and maintained around the base of all stockpiles, until used or removed from the project site.

3.3 STOCKPILE CLEANUP

- A. Remove stockpile, grade site surface to prevent free standing surface water, leave area in clean and neat condition, and establish vegetation per specifications.

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- B. If it is applicable to leave stockpiles on site, leave unused materials in neat, compact stockpile, fully stabilized or covered, with silt fence remaining around base.

END OF SECTION

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SECTION 310516

AGGREGATES FOR EARTHWORK

PART 1 GENERAL

1.1 SUMMARY

- A. Section Includes:
 - 1. Coarse aggregate materials.
 - 2. Fine aggregate materials.
- B. Related Sections:
 - 1. Section 310513 - Soils for Earthwork.
 - 2. Section 312323 – Fill.
 - 3. Section 321123 - Aggregate Base Courses.

1.2 REFERENCES

- A. American Association of State Highway and Transportation Officials:
 - 1. AASHTO M147 - Standard Specification for Materials for Aggregate and Soil-Aggregate Subbase, Base and Surface Courses.
 - 2. AASHTO T180 - Standard Specification for Moisture-Density Relations of Soils Using a 4.54-kg (10-lb) Rammer and a 457-mm (18-in.) Drop.
- B. ASTM International:
 - 1. ASTM C136 - Standard Test Method for Sieve Analysis of Fine and Coarse Aggregates.
 - 2. ASTM D698 - Standard Test Method for Laboratory Compaction Characteristics of Soil Using Standard Effort (12,400 ft-lbf/ft³ (600 kN-m/m³)).
 - 3. ASTM D1557 - Standard Test Methods for Laboratory Compaction Characteristics of Soil Using Modified Effort (56,000 ft-lbf/ft³ (2,700 kN-m/m³)).
 - 4. ASTM D2487 - Standard Classification of Soils for Engineering Purposes (Unified Soil Classification System).
 - 5. ASTM D4318 - Standard Test Method for Liquid Limit, Plastic Limit, and Plasticity Index of Soils.
- C. The term "Standard Specification" as used in this section shall mean the Standard Specifications, Construction and Materials, New York State Department of Transportation, Design and Construction Division, latest version and including all addendums thereto. Where the Standard Specifications are cited such work or material shall conform in every respect except for "Method of Payment" or if cited otherwise herein.
- D. The term "NYS DEC Best Management Practices," "Best Management Practices," and/or "BPM's" shall refer to New York Standards and Specifications for Erosion and Sediment Control and New York State Stormwater Management Design Manual, latest version, and including all addendums thereto.

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1.3 SUBMITTALS

- A. Section 013300 - Submittal Procedures: Requirements for submittals.
- B. Samples: Submit, in air-tight containers, 50 lb sample of each type of fill to testing laboratory.
- C. Materials Source: Submit name of imported materials suppliers.

1.4 QUALITY ASSURANCE

- A. Furnish each aggregate material from single source throughout the Work.
- B. Perform Work in accordance with the Standard Specifications.

PART 2 PRODUCTS

2.1 COARSE AGGREGATE MATERIALS

- A. NYS DOT Item 304.12, Type 2, Sub-base Course: Conforming to the Standard Specifications, graded in accordance with ASTM C136, conforming to the following gradation:

<u>Sieve Size</u>	<u>Percent Passing</u>
2 inches	100
¼ inch	25-60
# 40	5-40
# 200	0-10
PAN	0

- B. NYS DOT 703.4 (#2's): Crushed or Gravel: Pit run, Angular crushed or natural stone; free of shale, clay, friable material and debris; graded in accordance with ASTM C136, conforming to the Standard Specifications with the following gradation:

<u>Sieve Size</u>	<u>Percent Passing</u>
1 ½ inches	100
1 inch	90-100
½ inch	0-15

- C. Engineered Structural Fill: Screened, crushed gravel or crushed ledge rock, conforming to the following gradation:

<u>Sieve Size</u>	<u>Percent Passing</u>
3 inches	100
1 inch	80-95
½ inch	45-75
# 4	30-60
# 40	10-40
# 200	0-7

- D. NYS DOT #1a's: Washed Stone, Pit run, Angular crushed or natural stone; free of shale, clay, friable material and debris; graded in accordance with ASTM C136, conforming to the Standard Specification with the following gradation:

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<u>Sieve Size</u>	<u>Percent Passing</u>
½"	100
¼"	20-100
#10	0-15
#20	0-5
PAN	0

- E. NYS DOT Item 733.1101 Select Granular Fill: Conforming to the Standard Specifications conforming to the following gradation:

<u>Sieve Size</u>	<u>Percent Passing</u>
4 inches	100
¼ inch	0-70
# 200	0-15

- F. Common Fill: Sands and gravels which do not contain wood, rubbish, organics, clay or silts (in excess of 10% of clays or silts by weight), stones larger than 2" in diameter and is capable of compaction of 92% of maximum dry density.

2.2 FINE AGGREGATE MATERIALS

- A. Fine Aggregate Type: Conforming to the NYS DOT Standard Specifications.
- B. NYS DOT Sand Backfill (AKA "Sand") : NYS DOT Item 733-15 "Sand Backfill" Conforming to the Standard Specifications graded in accordance with ASTM C136; conforming to the following gradation:

<u>Sieve Size</u>	<u>Percent Passing</u>
½"	100
¼"	90-100
No. 200	0-5

- C. NYS DOT Item 203.20: Select Granular Subgrade: Conforming to the Standard Specifications, graded in accordance with ASTM C136, conforming to the following gradation:

<u>Sieve Size</u>	<u>Percent Passing</u>
¼" inch	30-100
No. 40	0-50
No. 200	0-10

2.3 SOURCE QUALITY CONTROL

- A. Section 014000 - Quality Requirements: Testing and inspection services.
- B. Coarse Aggregate Material - Testing and Analysis: Perform in accordance with applicable ASTM Standard (i.e., ASTM D698, ASTM D1557, ASTM D4318, ASTM C136).
- C. Fine Aggregate Material - Testing and Analysis: Perform in accordance with applicable ASTM Standard (i.e., ASTM D698, ASTM D1557, ASTM D4318, ASTM C136).
- D. When tests indicate materials do not meet specified requirements, change material and retest.

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- E. With the exception of D above, furnish materials of each type from the same source throughout the Work.

PART 3 EXECUTION

3.1 EXCAVATION

- A. Stockpile excavated material meeting requirements for coarse aggregate materials and fine aggregate materials.

3.2 STOCKPILING

- A. Stockpile materials on site at locations designated by Engineer.
- B. Stockpile in sufficient quantities to meet Project schedule and requirements.
- C. Separate different aggregate materials with dividers or stockpile individually to prevent mixing.
- D. Direct surface water away from stockpile site to prevent erosion or deterioration of materials.
- E. Stockpile hazardous materials on impervious material and cover to prevent erosion and leaching, until disposed of.
- F. Provide temporary Erosion and Sediment Controls (E&SC) as per NYS DEC Best Management Practices (BPM's) around stockpile(s) to prevent degradation of drainage-ways and waters of the U.S. Maintain temporary E&SC measures until all stock pile(s) have been removed from the project area and site has been completely re-vegetated. All stockpiled material to remain idle for 10 days or more shall be stabilized with vegetation or covered. Silt fence shall be installed and maintained around the base of all stockpiles, until used or removed from the project site.

3.3 STOCKPILE CLEANUP

- A. Remove stockpile, leave area in clean and neat condition. Grade site surface to prevent free standing surface water.
- B. When borrow area is indicated, leave area in clean and neat condition. Grade site surface to prevent free standing surface water.

END OF SECTION

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SECTION 311000

SITE CLEARING

PART 1 GENERAL

1.1 SUMMARY

- A. Section Includes:
 - 1. Removing surface debris and structures.
 - 2. Removing designated paving, curbs, and gutters, sidewalks and fences.
 - 3. Removing designated trees, shrubs, and other plant life.
 - 4. Removing abandoned utilities and structures.
 - 5. Excavating topsoil and sub-base materials.

1.2 SUBMITTALS

- A. Section 013300 - Submittal Procedures: Requirements for submittals.
- B. Product Data: Submit data for herbicide. Indicate compliance with applicable codes for environmental protection.

1.3 QUALITY ASSURANCE

- A. Conform to NYS DEC and APA requirements for the disposal of debris.

1.4 REFERENCES

- A. The term "NYS DEC Best Management Practices," "Best Management Practices," and/or "BPM's" shall refer to New York Standards and Specifications for Erosion and Sediment Control and New York State Stormwater Management Design Manual, latest version, and including all addendums thereto.

PART 2 PRODUCTS - NOT USED

PART 3 EXECUTION

3.1 EXAMINATION

- A. Section 013000 - Administrative Requirements Verification of existing conditions before starting work.
- B. Verify existing plant life designated to remain is tagged or identified.

3.2 PROTECTION

- A. Locate, identify, and protect utilities indicated to remain from damage.

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- B. Protect trees, plant growth, and features designated to remain as final landscaping.
- C. Protect bench marks, survey control points, and existing structures from damage or displacement. Contractor to hire NYS licensed Land Surveyor acceptable to the property owner and the Town to replace any displaced property pins.

3.3 CLEARING

- A. Prior to start of clearing and grubbing provide all stormwater management practices shown on the plans and as required as per SWPPP or NYS DEC Best Management Practices as applicable.
- B. Clear areas required for access to site and execution of Work.
- C. Remove trees and shrubs indicated on plans by the "Clearing Limits". Remove stumps and root system completely.
- D. Clear undergrowth and deadwood, without disturbing subsoil.

3.4 REMOVAL

- A. Remove debris, rock, and extracted plant life from site.
- B. Remove paving, curbs, gutters, sidewalks, and other structures from construction work areas as necessary to install new work. Neatly saw cut paving and curb edges at right angle to surface as indicated on Drawings.
- C. Remove abandoned utilities. Indicated removal termination point for underground utilities on Record Documents.
- D. Continuously clean-up and remove waste materials from site. Do not allow materials to accumulate on site.
- E. Do not burn or bury materials on site. Leave site in clean condition.
- F. Dispose of all debris at a disposal site approved by NYS DEC and APA for the type of spoils/debris.
- G. It is the contractor's responsibility to obtain any NYS DEC and APA permits for disposal of tree stumps and other debris are required by NYS DEC and APA. Provide copy of permit(s) prior to initiating site clearing and grubbing.

3.5 TOPSOIL EXCAVATION

- A. Excavate topsoil from areas to be further excavated, re-landscaped, or re-graded, without mixing with foreign materials for use in finish grading.

END OF SECTION

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SECTION 312213

ROUGH GRADING

PART 1 GENERAL

1.1 SUMMARY

- A. Section Includes:
1. Excavating topsoil.
 2. Excavating subsoil.
 3. Cutting, grading, filling, rough contouring and compacting site for site structures, and other site improvements.
- B. Related Sections:
1. Section 310513 - Soils for Earthwork.
 2. Section 310516 - Aggregates for Earthwork.
 3. Section 311000 - Site Clearing.
 4. Section 312316 – Excavation.

1.2 REFERENCES

- A. American Association of State Highway and Transportation Officials:
1. AASHTO T180 - Standard Specification for Moisture-Density Relations of Soils Using a 4.54-kg (10-lb) Rammer and a 457-mm (18-in.) Drop.
- B. ASTM International:
1. ASTM C136 - Standard Test Method for Sieve Analysis of Fine and Coarse Aggregates.
 2. ASTM D698 - Standard Test Method for Laboratory Compaction Characteristics of Soil Using Standard Effort (12,400 ft-lbf/ft³ (600 kN-m/m³)).
 3. ASTM D1556 - Standard Test Method for Density and Unit Weight of Soil in Place by the Sand-Cone Method.
 4. ASTM D1557 - Standard Test Methods for Laboratory Compaction Characteristics of Soil Using Modified Effort (56,000 ft-lbf/ft³ (2,700 kN-m/m³)).
 5. ASTM D2167 - Standard Test Method for Density and Unit Weight of Soil in Place by the Rubber Balloon Method.
 6. ASTM D2419 - Standard Test Method for Sand Equivalent Value of Soils and Fine Aggregate.
 7. ASTM D2434 - Standard Test Method for Permeability of Granular Soils (Constant Head).
 8. ASTM D2922 - Standard Test Method for Density of Soil and Soil-Aggregate in Place by Nuclear Methods (Shallow Depth).
 9. ASTM D3017 - Standard Test Method for Water Content of Soil and Rock in Place by Nuclear Methods (Shallow Depth).

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- C. The term "Standard Specification" as used in this section shall mean the Standard Specifications, Construction and Materials, New York State Department of Transportation, Design and Construction Division, latest version and including all addendums thereto. Where the Standard Specifications are cited such work or material shall conform in every respect except for "Method of Payment" or if cited otherwise herein.

1.3 SUBMITTALS

- A. Section 013300 - Submittal Procedures: Requirements for submittals.
- B. Samples: Submit, in air-tight containers, 50 lb sample of each type of fill to testing laboratory.
- C. Materials Source: Submit name of imported materials suppliers.

1.4 CLOSEOUT SUBMITTALS

- A. Section 017000 - Execution and Closeout Requirements: Requirements for submittals.
- B. Project Record Documents: Accurately record actual locations of utilities remaining by horizontal dimensions, elevations or inverts, and slope gradients.

1.5 QUALITY ASSURANCE

- A. Perform Work in accordance with ASTM C136, ASTM D2419, and ASTM D2434, as applicable.

PART 2 PRODUCTS

2.1 MATERIALS

- A. Topsoil: As specified in Section 310513.
- B. Subsoil Fill: As specified in Section 310513.
- C. Engineered Structural Fill: As specified in Section 310516.
- D. Granular Fill: As specified in Section 310516.

PART 3 EXECUTION

3.1 EXAMINATION

- A. Section 013000 - Administrative Requirements: Verification of existing conditions before starting work.

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- B. Verify site conditions under provisions of Section 013000.
- C. Verify survey bench mark and intended elevations for the Work are as indicated on Drawings.

3.2 PREPARATION

- A. Contact Local Utility Line Information service at “Dig Safely New York” (www.digsafelyny.org), not less than five working days before performing Work.
 - 1. Request underground utilities to be located and marked within and surrounding construction areas.
 - 2. When located beyond “Dig Safely New York” jurisdiction (i.e., private property), contract locating service to identify underground utilities beyond “Dig Safely New York” jurisdiction.
- B. Identify required lines, levels, contours, and datum.
- C. Notify utility company to remove and relocate utilities.
- D. Protect utilities indicated to remain from damage.
- E. Protect plant life, lawns, and other features remaining as portion of final landscaping.
- F. Protect bench marks, survey control point, existing structures, fences, sidewalks, paving, and curbs from excavating equipment and vehicular traffic.

3.3 TOPSOIL EXCAVATION

- A. Excavate topsoil from areas to be further excavated, re-landscaped, or re-graded, without mixing with foreign materials for use in finish grading.
- B. Do not excavate wet topsoil.
- C. Stockpile in area designated on site to depth not exceeding 8 feet and protect from erosion. Stockpile material and cover over with impervious material, until disposal.
- D. Remove excess topsoil not intended for reuse, from site.

3.4 SUBSOIL EXCAVATION

- A. Excavate subsoil from areas to be further excavated, re-landscaped, or re-graded.
- B. Do not excavate wet subsoil or excavate and process wet material to obtain optimum moisture content.
- C. When excavating through roots, perform Work by hand and cut roots with sharp axe.
- D. Remove excess subsoil not intended for reuse from site.

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- E. Stockpile subsoil to be reused in area designated on site by Engineer to depth not exceeding 8 feet and protect from erosion.
- F. Stockpile excavated material in area designated on site in accordance with Sections 310513 and 310516.
- G. Benching Slopes: Horizontally bench existing slopes greater than 1: 4 to key placed fill material to slope to provide firm bearing.
- H. Stability: Replace damaged or displaced subsoil as specified for fill.

3.5 FILLING

- A. Fill areas to contours and elevations with unfrozen materials.
- B. Place material in continuous layers as follows:
 - 1. Subsoil Fill: Maximum 8 inches compacted depth.
 - 2. Granular Fill: Maximum 6 inches compacted depth.
- C. Maintain optimum moisture content of fill materials to attain required compaction density.
- D. Slope grade away from building minimum 2 percent slope for minimum distance of 10 ft, unless noted otherwise.
- E. Make grade changes gradual. Blend slope into level areas.
- F. Repair or replace items indicated to remain damaged by excavation or filling.

3.6 TOLERANCES

- A. Section 014000 - Quality Requirements: Tolerances.
- B. Top Surface of Subgrade: Plus or minus 1/10 foot from required elevation.

3.7 FIELD QUALITY CONTROL

- A. Sections 014000 - Quality Requirements and 017000 - Execution and Closeout Requirements: Field inspecting, testing, adjusting, and balancing.
- B. Perform laboratory material tests in accordance with ASTM D1557, ASTM D698, AASHTO T180, (as applicable).
- C. Perform in place compaction tests in accordance with the following:
 - 1. Density Tests: ASTM D1556, ASTM D2167, or ASTM D2922, (as applicable).
 - 2. Moisture Tests: ASTM D3017.
- D. When tests indicate Work does not meet specified requirements, remove Work, replace and retest.

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E. Frequency of Tests: One test per 200 cubic yards of each type of fill material.

3.8 SCHEDULES

A. NYS DOT Item 304.12, Type 2:

1. Compact uniformly to minimum 98 percent of maximum density.

B. Subsoil Fill:

1. Select Granular Fill or Reusable (Common) Fill: To subgrade elevation.

2. Compact uniformly to minimum 92 percent of maximum density.

C. Topsoil Fill:

1. Topsoil: Six (6) inches thick.

2. Compact uniformly to minimum 90 percent of maximum density.

END OF SECTION

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SECTION 312316

EXCAVATION

PART 1 GENERAL

1.1 SUMMARY

- A. Section Includes:
 - 1. Soil densification.
 - 2. Excavating for foundations.
 - 3. Excavating for paving, roads, walks, and parking areas.
 - 4. Excavating for slabs-on-grade.
 - 5. Excavating for site structures and manholes.
 - 6. Excavating for landscaping.
 - 7. Excavating for underground utilities.

- B. Related Sections:
 - 1. Section 310513 - Soils for Earthwork.
 - 2. Section 310516 - Aggregates for Earthwork.

1.2 REFERENCES

- A. Local utility standards when working within 24 inches of utility lines.
- B. ASTM D698, Moisture-Density Relations of Soils and Soil Aggregate Mixtures, Using a 5.5-lb Rammer and a 12 inch Drop.
- C. ASTM D1556, Density of Soil In-Place by the Sand-Cone Method.
- D. ASTM D2049, Relative Density of Cohesionless Soils.
- E. ASTM D2167, Density of Soil in Place by the Rubber-Balloon Method.
- F. ASTM D2922, Density of Soil and Soil Aggregate in Place by Nuclear Methods (Shallow Depth).
- G. The term "Standard Specification" as used in this section shall mean the Standard Specifications, Construction and Materials, New York State Department of Transportation, Design and Construction Division, latest version and including all addendums thereto. Where the Standard Specifications are cited such work or material shall conform in every respect except for "Method of Payment" or if cited otherwise herein.

1.3 SUBMITTALS

- A. Section 013300 - Submittal Procedures: Requirements for submittals.

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- B. Excavation Protection Plan: Describe sheeting, shoring, and bracing materials and installation required to protect excavations and adjacent structures and property; include structural calculations to support plan.
- C. Samples: Submit, in air-tight containers, 50 lb sample of each type of excavated material to testing laboratory to determine suitability for use as fill material.
- D. Contractor shall submit an excavation plan signed and sealed by a New York State Professional Engineer prior to beginning excavations. The plan must include detailed provisions for controlling groundwater and providing excavation stability at each structure, roadway and general provisions for same at typical underground utility lines. Geotechnical report(s) that are available are included in the Appendices of this project manual.
- E. Shop Drawings: Indicate soil densification grid for each size and configuration footing requiring soils densification.

1.4 QUALITY ASSURANCE

- A. It is the Contractor's responsibility to advise the Engineer, Geotechnical Engineer, and Owner sufficiently in advance of work to allow scheduling of required resident project representatives. Contractor must also coordinate daily testing with the testing agency which is engaged by the Owner.
- B. Do not proceed with filling operations or foundation construction until the subgrade has been approved by the Geotechnical Engineer.
- C. The Contractor must be cognizant of impending weather conditions and schedule the work in order to avoid disturbances of subgrade by precipitation or freezing. No additional compensation will be provided for correction of saturated or frozen subgrades.
- D. Compacted material which does not meet density requirements shall be re-compacted or removed and replaced at contractor's total expense. It shall be retested at the contractor's total expense until it meets the requirements.
- E. Testing costs will be paid from the Testing Allowance. Retesting for failed test results will be at contractor's expense.

PART 2 PRODUCTS

Not Used.

PART 3 EXECUTION

3.1 PREPARATION

- A. Identify required lines, levels, contours, and datum locations.

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- B. Notify utility company to remove and relocate utilities.
- C. Protect utilities indicated to remain from damage.
- D. Protect plant life, lawns, and other features remaining as portion of final landscaping.
- E. Protect bench marks, survey control points, existing structures, fences, sidewalks, paving, and curbs from excavating equipment and vehicular traffic.

3.2 EXCAVATION

- A. Review Geotechnical Reports (if applicable) provided as an Appendix to these specifications.
- B. Underpin adjacent structures which may be damaged by excavation work. Provide sheeting, shoring or bracing to protect excavations from failing or settlements of adjacent structures.
- C. Excavate subsoil to accommodate site structure foundations, paving, manholes and construction operations.
- D. Strip footings or foundation mats bearing near or below the water table shall bear on 6 inches of NYS DOT # 2 crushed stone. Crushed stone shall be placed on undisturbed in-situ soils as the excavation progresses and compacted with a minimum of four passes of a diesel powered vibratory plate tamper. It shall extend a minimum of 2 feet beyond the edges of the foundation mat or footings. This work must be performed under the observation of the Engineer. There is a possibility that liquefaction and/or pumping of in-situ soils could occur due to the vibratory action. In this case, vibrating compaction will be waived.
- E. Slope banks with machine to angle of repose or less until shored.
- F. Do not interfere with 45 degree bearing splay of foundations.
- G. Grade top perimeter of excavation to prevent surface water from draining into excavation.
- H. Hand trim excavation. Remove loose matter.
- I. Remove lumped subsoil, boulders, and rock up to 1½ cu yd measured by volume.
- J. Notify Engineer of unexpected subsurface conditions and discontinue affected Work in area until notified to resume Work.
- K. Excavated material may be used as structural backfill provided it complies with specification requirements. Remove excess excavated materials from the site.
- L. Correct areas over excavated within the building footprint with structural fill or concrete as directed by Engineer.
- M. Remove excess and unsuitable material from site and dispose of at a permitted site.

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N. Stockpile excavated material in area designated on site in accordance with Section 310513.

O. Repair or replace items indicated to remain damaged by excavation.

3.3 FIELD QUALITY CONTROL

A. Section 017000 - Execution and Closeout Requirements: Field inspecting, testing, adjusting, and balancing.

B. Request visual inspection of bearing surfaces by Geotechnical Engineer before installing subsequent work.

3.4 PROTECTION

A. Prevent displacement or loose soil from falling into excavation; maintain soil stability.

B. Protect bottom of excavations and soil adjacent to and beneath foundation from freezing.

C. Protect structures, utilities and other facilities from damage caused by settlement, lateral movement, undermining, washout, and other hazards created by earth operations.

END OF SECTION

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SECTION 312319

DEWATERING

PART 1 GENERAL

1.1 SUMMARY

- A. Section Includes:
 - 1. Dewatering system.
 - 2. Surface water control system.
 - 3. Water disposal.

1.2 REFERENCES

- A. ASTM International:
 - 1. ASTM C33 - Standard Specification for Concrete Aggregates.
- B. The term "Standard Specification" as used in this section shall mean the Standard Specifications, Construction and Materials, New York State Department of Transportation, Design and Construction Division, latest version and including all addendums thereto. Where the Standard Specifications are cited such work or material shall conform in every respect except for "Method of Payment" or if cited otherwise herein.
- C. The term "NYS DEC Best Management Practices," "Best Management Practices," and/or "BPM's" shall refer to New York Standards and Specifications for Erosion and Sediment Control and New York State Stormwater Management Design Manual, latest version, and including all addendums thereto.

1.3 DEFINITIONS

- A. Dewatering includes the following:
 - 1. Lowering of ground water table and intercepting horizontal water seepage to prevent ground water from entering excavations and trenches.
 - 2. Reducing piezometric pressure within strata to prevent failure or heaving of excavations and trenches.
 - 3. Disposing of removed water.
- B. Surface Water Control: Removal of surface water within open excavations.

1.4 SYSTEM DESCRIPTION

- A. Provide dewatering and surface water control systems where indicated on the drawings and/or where required to permit Work to be completed on dry and stable subgrade.
 - 1. Provide well points to dewater and relieve hydrostatic pressure within strata.

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- B. Provide monitoring wells and monitoring equipment to obtain meaningful observations of conditions affecting excavation and adjacent structures.
 - 1. Provide monitoring wells to observe ground water conditions.
- C. Provide standby equipment stored at Project site and ready for immediate use upon failure of dewatering equipment. Provide the following standby equipment, but not less than one of each type:
 - 1. Dewatering Centrifugal Pump.
 - 2. Dewatering Turbine Pump.
 - 3. Pump Power Unit.
 - 4. Dewatering Jet Eductor Pressure Pump.
 - 5. Portable Electric Generator.

1.5 PERFORMANCE REQUIREMENTS

- A. Design dewatering systems to:
 - 1. Lower water table within areas of excavation to minimum 2 feet below bottom of excavation to permit Work to be completed on dry and stable subgrade.
 - 2. Relieve hydrostatic pressures in confined water bearing strata below excavation to eliminate risk of uplift or other instability of excavation.
 - 3. Prevent damage to adjacent properties, buildings, structures, utilities, and facilities from construction operations.
 - 4. Prevent loss of fines, quick condition, or softening of foundation subgrade.
 - 5. Maintain stability of sides and bottoms of excavations and trenches.
- B. Design surface water control systems to:
 - 1. Collect and remove surface water and seepage entering excavations.

1.6 SUBMITTALS

- A. Section 013300 - Submittal Procedures: Requirements for submittals.
- B. Shop Drawings: Signed and sealed by NYS Licensed Professional Engineer.
 - 1. Indicate dewatering system layout, well depths, well screen lengths, dewatering pump locations, pipe sizes and capacities, grades, filter sand gradations, surface water control devices, valves, and water disposal method and location.
 - 2. Indicate primary and standby power system location and capacity.
 - 3. Indicate layout and depth of monitoring wells, piezometers and flow measuring devices for system performance measurement.
 - 4. Include detailed description of dewatering and monitoring system installation procedures and maintenance of equipment.
 - 5. Include description of emergency procedures to follow when problems arise.
- C. Product Data: Submit data for each of the following:
 - 1. Dewatering Pumps: Indicate sizes, capacities, priming method, engine or motor characteristics.
 - 2. Pumping equipment for control of surface water within excavation.

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- D. Design Data: Signed and sealed by NYS Licensed Professional Engineer.
 - 1. Indicate design values, analyses, and calculations to support design.
 - 2. Include description and profile of geology, soil, and groundwater conditions.
- E. Field Reports: Test and monitoring reports as specified in Field Quality Control article.

1.7 CLOSEOUT SUBMITTALS

- A. Section 017000 - Execution and Closeout Requirements: Requirements for submittals.
- B. Project Record Documents: Record actual locations and depths of capped wells and piping abandoned in place.

1.8 QUALITY ASSURANCE

- A. Comply with authorities having jurisdiction for the following:
 - 1. Drilling and abandoning of wells used for dewatering systems, (NYS DOH).
 - 2. Water discharge and disposal from pumping operations, (NYS DEC and APA).
- B. Perform Work in accordance with NYS DEC Best Management Practices (BMPs).

1.9 QUALIFICATIONS

- A. Installer: Company specializing in performing work of this section with minimum ten years documented experience and responsible for design, operation, and maintenance of dewatering system.
 - 1. Assume sole responsibility for dewatering and surface water control systems and for loss or damage resulting from partial or complete failure of protective measures and settlement or resultant damage caused by ground water control operations.
- B. Design, install, and monitor operation of dewatering under direct supervision of a NYS Licensed Professional Engineer experienced in design of this Work.

1.10 PRE-INSTALLATION MEETINGS

- A. Section 013000 - Administrative Requirements: Pre-installation meeting.
- B. Convene minimum one week prior to commencing work of this section.

1.11 SEQUENCING

- A. Section 011000 - Summary: Requirements for sequencing.
- B. Sequence work to obtain required permits before start of dewatering operations.
- C. Sequence work to install and test monitoring systems minimum 7 days before testing and operating dewatering systems.

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- D. Sequence work to install and test dewatering and surface water control systems minimum 7 days before starting excavation and trenching.

1.12 COORDINATION

- A. Section 013000 - Administrative Requirements: Requirements for coordination.
- B. Coordinate work to permit the following construction operations to be completed on dry stable substrate.

PART 2 PRODUCTS

2.1 DEWATERING EQUIPMENT

- A. Select dewatering equipment to meet specified performance requirements.

2.2 MONITORING EQUIPMENT

- A. Piezometers: Standpipe type for installation to monitor water elevation.

2.3 ACCESSORIES

- A. Valves and Fittings: Furnish valves and fittings to isolate each well from header pipe and to prevent loss of pump prime.

PART 3 EXECUTION

3.1 EXAMINATION

- A. Section 013000 - Administrative Requirements: Verification of existing conditions before starting work.
- B. Conduct additional borings and investigations of existing subsurface conditions as required to complete a dewatering system design.
- C. Contact Local Utility Line Information service at “Dig Safely New York” (www.digsafelyny.org) not less than five working days before performing Work.
 - 1. Request underground utilities to be located and marked within and surrounding construction areas.
 - 2. When located beyond “Dig Safely New York” jurisdiction (i.e., private property), contract locating service to identify underground utilities beyond “Dig Safely New York” jurisdiction.
- D. Employ NYS Licensed Land Surveyor to provide following documentation:
 - 1. Survey existing adjacent buildings, structures, and improvements for position and elevation of principal elements before and after completion of dewatering operations.

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3.2 PREPARATION

- A. Protect existing adjacent buildings, structures, and improvements from damage caused by dewatering operations.

3.3 MONITORING WELLS

- A. Install monitoring wells at locations required by Contractor's employed NYS Licensed Professional Engineer.
- B. Test each monitoring well point to verify installation is performing properly.
- C. Install piezometers, calibrate, and test for proper operation.
- D. Protect monitoring well standpipes from damage by construction operations.
- E. Maintain accessibility to monitoring wells continuously during construction operations.
- F. Maintain monitoring wells until groundwater is allowed to return to normal level.

3.4 DEWATERING SYSTEM

- A. Install dewatering system in accordance with shop drawings.
- B. Locate system components to allow continuous dewatering operations without interfering with installation of permanent Work and existing public rights-of-way, drives, parking lots, sidewalks, and adjacent buildings, structures, and improvements.
- C. Drill wells in sizes and to depth necessary to maintain dry excavations.
- D. While drilling and installing well keep bore hole filled with natural or organic drilling fluid. Bentonite clay drilling fluid is not permitted.
- E. Attach well screen to riser pipe. Attach centralizers to riser pipe at maximum 20 feet spacing to keep screen and riser centered in bore hole. Insert well screen and riser pipe into well.
- F. Develop wells by surging water to remove clay, silt, and sand from well screen and immediate vicinity of bore hole.
- G. Test well for proper water flow through well screen and pumping rate for dewatering system operation. Repeat development until well meets performance requirements.
- H. Cover and seal top of well until pump is installed.
- I. Install pumps in accordance with manufacturer's instructions.

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- J. Connect pumps to discharge header. Install valves to permit pump isolation.

3.5 SURFACE WATER CONTROL SYSTEM

- A. Provide ditches, berms, and other devices to divert and drain surface water from excavation area.
- B. Divert surface water and seepage water within excavation areas into sumps and pump water into settling basins in accordance with NYS DEC Approved Stormwater Management Practices.
- C. Control and remove unanticipated water seepage into excavation.

3.6 SYSTEM OPERATION AND MAINTENANCE

- A. Operate dewatering system continuously until backfilling is complete.
- B. Provide 24-hour supervision of dewatering system by personnel skilled in operation, maintenance, and replacement of system components.
- C. Conduct daily observation of dewatering system and monitoring system. Make required repairs and perform scheduled maintenance.
- D. Fill fuel tanks before tanks reach 25 percent capacity. Pay for all fuels used.
- E. Start emergency generators at least once each week to check operating condition.
- F. When dewatering system cannot control water within excavation, notify Engineer and stop excavation work.
 - 1. Supplement or modify dewatering system and provide other remedial measures to control water within excavation.
 - 2. Demonstrate dewatering system operation complies with performance requirements before resuming excavation operations.
- G. Modify dewatering and surface water control systems when operation causes or threatens to cause damage to new construction, existing site improvements, adjacent property, or adjacent water wells.
- H. Correct unanticipated pressure conditions affecting dewatering system performance.
- I. Do not discontinue dewatering operations without Engineer's approval.

3.7 WATER DISPOSAL

- A. Discharge water to settling basins or other NYS DEC approved device acceptable to Engineer.

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3.8 SYSTEM REMOVAL

- A. Remove dewatering and surface water control systems after dewatering operations are discontinued.
- B. Remove piezometers and monitoring wells.
- C. Fill abandoned wells with Class "A" concrete.
- D. Cut off and weld steel cap on abandoned wells minimum 36 inches below completed subgrade elevation.
- E. Repair damage caused by dewatering and surface water control systems or resulting from failure of systems to protect property.

3.9 FIELD QUALITY CONTROL

- A. Section 014000 - Quality Requirements and 017000 - Execution and Closeout Requirements: Field inspecting, testing, adjusting, and balancing.
- B. After dewatering system is installed, perform pumping test to determine when selected pumping rate lowers water level in well below pump intake. Adjust pump speed, discharge volume, or both to ensure proper operation of each pump.
- C. Monitor and record the following, daily, until steady state conditions occur. Then monitor and record conditions twice each week.
 - 1. Average discharge flow rate for each deep well, eductor header, and well point.
- D. Monitor and record the following, daily, until dewatering system is discontinued.
 - 1. Groundwater elevation.
- E. Monitor ground water discharge for sand content. Sample and test water from each well weekly for sand content. Maximum permitted sand content is 5 parts per million.
- F. Survey existing adjacent buildings, structures, and improvements weekly to detect movement in comparison to original elevations during dewatering operations.
 - 1. Notify Engineer immediately of measured movement.
- G. Submit initial installation reports including the following:
 - 1. Installation and development reports for well points and pumps.
 - 2. Installation and baseline reports for monitoring wells and piezometers.
 - 3. Test reports of monitoring well water analysis.
 - 4. Initial dewatering flow rates.
- H. Submit weekly monitoring reports including the following:
 - 1. Dewatering flow rates.
 - 2. Piezometer readings.

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3. Test reports of discharge water analysis.
4. Maintenance records for dewatering and surface water control systems.

END OF SECTION

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SECTION 312320

EXCAVATION SUPPORT AND PROTECTION

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

- A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 1 Specification Sections, apply to this Section.

1.2 SUMMARY

- A. This Section includes temporary excavation support and protection systems.

1.3 PERFORMANCE REQUIREMENTS

- A. Design, furnish, install, monitor, and maintain excavation support and protection system capable of supporting excavation sidewalls and of resisting soil and hydrostatic pressure and superimposed and construction loads.
 - 1. Provide professional engineering services needed to assume engineering responsibility, including preparation of Shop Drawings and a comprehensive engineering analysis by a qualified New York State Professional Engineer.
 - 2. Prevent surface water from entering excavations by grading, dikes, or other means.
 - 3. Install excavation support and protection systems without damaging existing buildings, pavements, and other improvements adjacent to excavation.

1.4 SUBMITTALS

- A. Shop Drawings for Information: Prepared by or under the supervision of a qualified professional engineer for excavation support and protection systems.
 - 1. Include Shop Drawings signed and sealed by the qualified New York State Professional Engineer responsible for their preparation.
- B. Qualification Data: For Installer and Professional Engineer.
- C. Photographs or videotape, sufficiently detailed, of existing conditions of adjoining construction and site improvements that might be misconstrued as damage caused by the absence of, the installation of, or the performance of excavation support and protection systems.

1.5 PROJECT CONDITIONS

- A. Existing Utilities: Do not interrupt utilities serving facilities occupied by Owner or others unless permitted in writing by Engineer and then only after arranging to provide temporary utility services according to requirements indicated.

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- B. Project-Site Information: A geotechnical investigation has been completed for this Project and is available for information only. Owner will not be responsible for interpretations or conclusions drawn from results of the investigation.
 - 1. The Contractor may make additional test probes/borings and conduct other exploratory operations necessary for excavation support and protection design.
 - 2. The geotechnical probe results are included in the Appendices.
- C. Survey adjacent structures and improvements, employing a qualified NYS Land Surveyor; establish exact elevations at fixed points to act as benchmarks. Clearly identify benchmarks and record existing elevations.
 - 1. During installation of excavation support and protection systems, regularly resurvey benchmarks, maintaining an accurate log of surveyed elevations and positions for comparison with original elevations and positions. Promptly notify Engineer if changes in elevations or positions occur or if cracks, sags, or other damage is evident in adjacent construction.

PART 2 - PRODUCTS

2.1 MATERIALS

- A. General: Provide materials that are either new or in serviceable condition.
- B. Structural Steel: ASTM A 36/A 36M.
- C. Steel Sheet Piling: ASTM A 328/A 328M, with continuous interlocks.
- D. Wood Lagging: Lumber, mixed hardwood, nominal rough thickness of 4 inches.
- E. Shotcrete: Comply with Division 3 Section "Shotcrete" for shotcrete materials and mixes, reinforcing, and shotcrete application.
- F. Cast-in-Place Concrete: ACI 301, of compressive strength required for application.
- G. Reinforcing Bars: ASTM A 615/A 615M, deformed.

PART 3 - EXECUTION

3.1 PREPARATION

- A. Protect structures, utilities, sidewalks, pavements, and other facilities from damage caused by settlement, lateral movement, undermining, washout, and other hazards that could develop during excavation support and protection system operations.
 - 1. Shore, support, and protect utilities encountered.
- B. Install excavation support and protection systems to ensure minimum interference with roads, streets, walks, and other adjacent occupied and used facilities.
 - 1. Do not close or obstruct streets, walks, or other adjacent occupied or used facilities without permission from Owner and authorities having jurisdiction. Provide alternate

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routes around closed or obstructed traffic ways if required by authorities having jurisdiction.

- C. Locate excavation support and protection systems clear of permanent construction so that forming and finishing of concrete surfaces is not impeded.
- D. Monitor excavation support and protection systems daily during excavation progress and for as long as excavation remains open. Promptly correct bulges, breakage, or other evidence of movement to ensure that excavation support and protection systems remain stable.
- E. Promptly repair damages to adjacent facilities caused by installing excavation support and protection systems.

3.2 SOLDIER BEAMS AND LAGGING

- A. Install steel soldier beams before starting excavation. Space soldier beams at regular intervals not to exceed allowable flexural strength of wood lagging. Accurately align exposed faces of flanges to vary not more than 2 inches from a horizontal line and not more than 1:120 out of vertical alignment.
- B. Install wood lagging within flanges of soldier beams as excavation proceeds. Trim excavation as required to install lagging. Fill voids behind lagging with soil, and compact.
- C. Install walls horizontally at centers indicated and secure to soldier beams.

3.3 SHEET PILING

- A. Before starting excavation, install one-piece sheet piling lengths and tightly interlock to form a continuous barrier. Limit vertical offset of adjacent sheet piling to 60 inches. Accurately align exposed faces of sheet piling to vary not more than 2 inches from a horizontal line and not more than 1:120 out of vertical alignment. Cut tops of sheet piling to uniform elevation at top of excavation or as designed by contractor's NYS Professional Engineer.

3.4 TIEBACKS

- A. Tiebacks: Drill for, install, grout, and tension tiebacks into position. Test load-carrying capacity of each tieback and replace and retest deficient tiebacks.
 - 1. Test loading shall be observed by a qualified professional engineer responsible for design of excavation support and protection system.
 - 2. Maintain tiebacks in place until permanent construction is able to withstand lateral earth and hydrostatic pressures.

3.5 BRACING

- A. Bracing: Locate bracing to clear columns, floor framing construction, and other permanent work. If necessary to move brace, install new bracing before removing original brace.
 - 1. Do not place bracing where it will be cast into or included in permanent concrete work, unless otherwise approved by Engineer.
 - 2. Install internal bracing, if required, to prevent spreading or distortion of braced frames.

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3. Maintain bracing until structural elements are supported by other bracing or until permanent construction is able to withstand lateral earth and hydrostatic pressures.

3.6 REMOVAL AND REPAIRS

- A. Remove excavation support and protection systems when construction has progressed sufficiently to support excavation and bear soil and hydrostatic pressures. Remove in stages to avoid disturbing underlying soils or damaging structures, pavements, facilities, and utilities.
 1. Remove excavation support and protection systems to a minimum depth of 48 inches below overlying construction and abandon remainder.
 2. Repair or replace, as approved by Engineer, adjacent work damaged or displaced by removing excavation support and protection systems.
- B. Leave excavation support and protection systems permanently in place for portions shown.

END OF SECTION

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SECTION 312323

BACKFILL

PART 1 GENERAL

1.1 SUMMARY

- A. Section Includes:
 - 1. Backfilling site structures to subgrade elevations.
 - 2. Fill under slabs-on-grade.
 - 3. Fill for over-excavation.
- B. Related Sections:
 - 1. Section 310513 - Soils for Earthwork.
 - 2. Section 310516 - Aggregates for Earthwork.
 - 3. Section 312316 – Excavation.

1.2 REFERENCES

- A. American Association of State Highway and Transportation Officials:
 - 1. AASHTO T180 - Standard Specification for Moisture-Density Relations of Soils Using a 4.54-kg (10-lb) Rammer and a 457-mm (18-in.) Drop.
- B. ASTM International:
 - 1. ASTM D698 - Standard Test Method for Laboratory Compaction Characteristics of Soil Using Standard Effort (12,400 ft-lbf/ft³ (600 kN-m/m³)).
 - 2. ASTM D1556 - Standard Test Method for Density and Unit Weight of Soil in Place by the Sand-Cone Method.
 - 3. ASTM D1557- Standard Test Methods for Laboratory Compaction Characteristics of Soil Using Modified Effort (56,000 ft-lbf/ft³ (2,700 kN-m/m³)).
 - 4. ASTM D2167 - Standard Test Method for Density and Unit Weight of Soil in Place by the Rubber Balloon Method.
 - 5. ASTM D2922 - Standard Test Method for Density of Soil and Soil-Aggregate in Place by Nuclear Methods (Shallow Depth).
 - 6. ASTM D3017 - Standard Test Method for Water Content of Soil and Rock in Place by Nuclear Methods (Shallow Depth).
- C. The term "Standard Specification" as used in this section shall mean the Standard Specifications, Construction and Materials, New York State Department of Transportation, Design and Construction Division, latest version and including all addendums thereto. Where the Standard Specifications are cited such work or material shall conform in every respect except for "Method of Payment" or if cited otherwise herein.

1.3 SUBMITTALS

- A. Section 013300 - Submittal Procedures: Requirements for submittals.
- B. Product Data: Submit data for geotextile fabric indicating fabric and construction.

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- C. Samples: Submit, in air-tight containers, 50 lb sample of each type of fill to testing laboratory.
- D. Materials Source: Submit name of imported fill materials suppliers.

1.4 QUALITY ASSURANCE

- A. It is the Contractor's responsibility to advise the Engineer and Owner sufficiently in advance of work to allow scheduling of required resident project representatives (RPR's). Contractor must also coordinate daily testing with the testing agency.
- B. The Contractor must be cognizant of impending weather conditions and schedule the work in order to avoid disturbances of subgrade by precipitation or freezing. No additional compensation will be provided for correction of saturated or frozen subgrades.
- C. Compacted material which does not meet density requirements shall be re-compacted or removed and replaced at contractor's total expense. It shall be retested at the contractor's total expense until it meets the requirements.

PART 2 PRODUCTS

2.1 FILL MATERIALS

- A. Section 013300 - Submittal Procedures: Requirements for submittals.
- B. NYS DOT: #2's: As specified in Section 310516.
- C. Engineered Structural Fill: As specified in Section 310516.
- D. NYS DOT 304.12, Type 2: As specified in Section 310516.
- E. Concrete: Class A conforming to the Standard Specifications.
- F. Flowable Fill: Cementitious flowable backfill material conforming to the Standard Specifications, having compressive strength of 50 to 100 psi at 28 days. Fill shall be excavatable and the mix design shall use a large sized aggregate and include additional provisions as required to minimize shrinkage.
- G. Common Fill: As specified in Section 310516.

PART 3 EXECUTION

3.1 EXAMINATION

- A. Section 013000 - Administrative Requirements: Coordination and project conditions.
- B. Verify subdrainage, dampproofing, or waterproofing installation has been inspected.
- C. Verify underground tanks are anchored to their own foundations to avoid flotation after backfilling.
- D. Verify structural ability of unsupported walls to support loads imposed by fill.

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3.2 PREPARATION

- A. Compact subgrade to density requirements for subsequent backfill materials.
- B. Cut out soft areas of subgrade not capable of compaction in place. Backfill with fill and compact to density equal to or greater than requirements for subsequent fill material.
- C. Proof roll to identify soft spots; fill and compact to density equal to or greater than requirements for subsequent fill material.

3.3 BACKFILLING

- A. Backfill areas to contours and elevations with unfrozen materials.
- B. Do not allow previously placed fill or in-situ soils to freeze. Systematically backfill to allow maximum time for natural settlement. Do not backfill over porous, wet, frozen or spongy subgrade surfaces.
- C. Place and compact backfill materials in equal continuous layers not exceeding 8 inches in loose thickness, at a moisture content of $\pm 2\%$ of the optimum moisture content, and to densities in excess of the following, as determined by ASTM D1557:

Minimum Density	Area Affected
98%	Under utility mains, duct banks, structures and pavement.
92%	All other areas.

- D. Employ placement method that does not disturb or damage other work.
- E. Maintain optimum moisture content of backfill materials to attain required compaction density.
- F. Backfill against supported foundation walls. Do not backfill against unsupported foundation walls unless specifically allowed to do so by the Engineer.
- G. Backfill simultaneously on each side of unsupported foundation walls until supports are in place.
- H. Slope grade away from structures minimum 2 inches in 10 ft, unless noted otherwise.
- I. Employ placement method that does not disturb or damage foundation perimeter, utilities in trench, and other utilities and/or site structures or buildings.
- J. Make gradual grade changes. Blend slope into level areas.
- K. Do not leave any trench open at end of the working day.
- L. Protect open trench to prevent danger to Owner and the public.
- M. Remove surplus backfill materials from site and dispose of at a permitted site.

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- N. Backfill simultaneously on both sides of a utility main to prevent stresses on utility main or displacement of utility main.

3.4 UTILITY LINE BEDDING

- A. Install bedding per Backfilling requirements above.

3.5 TOLERANCES

- A. Section 014000 - Quality Requirements: Tolerances.
- B. Top Surface of Backfilling Within Building Areas: Plus or minus 1/4 inch from required elevations.
- C. Top Surface of Backfilling Within Paved Areas: Plus or minus 1/2 inch from required elevations.
- D. Top Surface of General Backfilling: Plus or minus 1 inch from required elevations.

3.6 FIELD QUALITY CONTROL

- A. Section 017000 - Execution and Closeout Requirements: Field inspecting, testing, adjusting, and balancing.
- B. Perform laboratory material tests in accordance with ASTM D1557 or as directed by Geotechnical Engineer.
- C. Perform in place compaction tests in accordance with the following or as directed by Geotechnical Engineer:
 - 1. Density Tests: ASTM D2922.
 - 2. Moisture Tests: ASTM D3017.
- D. When tests indicate Work does not meet specified requirements, remove Work, replace and retest at no additional cost to Owner.
- E. Frequency of Tests:
 - 1. As specified in individual Sections of the specifications.

3.7 PROTECTION OF FINISHED WORK

- A. Section 017000 - Execution and Closeout Requirements: Protecting finished work.
- B. Reshape and re-compact fills subjected to vehicular traffic.

3.8 SCHEDULE

- A. Grass Areas:
 - 1. Common Fill to 6 inches below finish grade.
- B. Asphalt Paving or Concrete Sidewalk:
 - 1. NYS DOT Item 304.12, Type 2.

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- C. Correct Over-Excavations:
 - 1. Engineered Structural fill or as recommended by Owner's Geotechnical Engineer for specific application.

- D. Correct Over-Excavation (Rock):
 - 1. Flowable Fill.

- E. Wet Areas (Trenches):
 - 1. NYS DOT #2's compacted to area requirements being backfilled and/or as directed by Engineer.

END OF SECTION

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SECTION 312514

TEMPORARY SILT FENCE

PART 1 GENERAL

1.1 WORK INCLUDED

- A. This work shall consist of furnishing, installing, maintaining, and removing a temporary water permeable filter fence (silt fence) to remove suspended particles from the drainage water passing through it.
- B. The quantity of temporary silt fence to be installed will be affected by the actual conditions which occur during the construction of the project. The quantity of temporary silt fence may be increased or decreased at the direction of the engineer. Such variations in quantity will not be considered as alterations in the details of construction or a change in the character of the work.

1.2 REFERENCES

- A. ASTM D 4491 – Permittivity.
- B. ASTM D 4751 – Apparent Opening Size.
- C. ASTM D 4632 – Grab Tensile Strength.
- D. ASTM D 4833 – Puncture Resistance.
- E. ASTM D 4533 – Trapezoidal Tear.
- F. ASTM D 3786 – Mullen Burst.
- G. ASTM D 4353 – Sampling of Geotextiles for Testing.
- H. ASTM D 4355 – Ultraviolet Stability.
- I. ASTM D 4873 – Guide for Identification, Storage, and Handling of Geosynthetics.
- J. ASTM D 698 – Standard Test Method for Moisture-Density Relations of Soil and Soil-Aggregate Mixtures (Standard Proctor).
- K. The term “NYS DEC Best Management Practices,” “Best Management Practices,” and/or “BPM’s” shall refer to New York Standards and Specifications for Erosion and Sediment Control and New York State Stormwater Management Design Manual, latest version, and including all addendums thereto.

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PART 2 PRODUCTS

2.1 MATERIALS

- A. Fibers used in the manufacture of geotextiles shall consist of a material composed of at least 85 percent by weight polyolefins, polyesters, or polyamides.
- B. The geotextile and the threads used in sewing geotextiles shall be resistant to chemical attack, rot and mildew.
- C. The geotextile shall have no tears or defects which adversely alter its physical properties.
- D. Silt fence geotextiles shall meet the geotechnical requirements of AASHTO M-288-00.
- E. Edges of the geotextile shall be finished to prevent the outer fibers from pulling away from the geotextile.
- F. The geotextile shall be free of defects or flaws which significantly affect its physical and/or filtering properties.
- G. Geotextile rolls shall be stored in manner which protects them from the elements. If stored outdoors, they shall be elevated and protected with a waterproof cover. The geotextile shall be labeled as per ASTM D 4873, "Guide for Identification, Stored and Handling of Geotextiles."
- H. The geotextile shall be protected from the elements prior to installation. The geotextile shall not be exposed to temperatures greater than 140°F.

2.2 POSTS

- A. Posts shall be a minimum of 4 ft. long and pointed at one end.
- B. Wood or steel posts may be used. The post type selected shall be based on anticipated drainage conditions and silt loading.
- C. Maximum post spacing shall be between 4 ft. and 6 ft. depending on anticipated drainage conditions and silt loading.
- D. Soft wood posts shall be at least 3-in. in diameter, or nominal 2 in. x 4 in. and straight enough to provide a fence without noticeable misalignment. If oak posts are used, the size may be reduced to a minimum of 1 ½ in. x 1 ½ in. with a tolerance of minus 1/8 in. providing the cross-sectional area is a nominal of 2.25 in. Steel posts shall be round, "U", "T", "L", or "C" shaped with a minimum weight of 0.75 lb/ft. Higher post weights may be required as directed by the Engineer.

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2.3 SUPPORT

- A. When required, wire or another type of support shall be used to improve the load carrying capacity of the silt fence. Support is required for silt fence constructed with non-woven geosynthetic.
- B. Support shall be at least 34-in. high and strong enough to support applied loads. The support shall be fastened securely between the geotextile and the post.
- C. Prefabricated fence systems may be used provided they meet all of the above material requirements.

2.4 FASTENERS

- A. The geotextile may be attached to the posts using geotextile pockets, staples or nails. Wire staples shall be a No. 17 gauge minimum and shall have a minimum 0.75 in. wide crown and 0.5 in. long legs.
- B. Staples shall be evenly spaced with at least 4 per post. Nails shall be a minimum of 14 gauge, 1 inch long, with 0.75 in. button heads. Nails shall be evenly spaced with at least 4 per post.

2.5 SILT FENCE

- A. The silt fence shall be constructed of a minimum 36-in. wide geotextile securely fastened to posts.
- B. The geotextile shall be attached to the up-gradient side of the posts such that a 6-in. to 8-in. length of geotextile is left unattached at the bottom to be buried in soil. The silt fence shall be constructed to withstand the forces induced by sediment loading. When required, wire or another type of support shall be constructed between the geotextile and the posts to improve the load carrying capacity of the silt fence.

PART 3 EXECUTION

3.1 INSTALLATION

- A. The contractor shall install silt fence in accordance with this specification, in accordance with NYS DEC Best Management Practices (BMPs) and as shown in the contract drawings or as directed by the engineer.
- B. Silt fence construction shall be adequate to handle the stress due to sediment loading.
- C. Posts shall be installed at least 18-in. deep into the ground. Where an 18-in. depth is impossible to achieve, the posts should be adequately secured to prevent overturning of the fence due to sediment loading.
- D. All geotextile splice joints shall be sewn. Silt fence splice joints shall be constructed with a minimum overlap of 18 in.

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- E. The bottom geotextile edge of the silt fence shall be buried to a minimum depth of 6 in. such that no water flow can pass beneath the silt fence. The geotextile shall be buried as shown in the details.
- F. When wire support fence is used, the wire shall also be buried a minimum of 2 in. and extend a maximum of 32 in. above original ground surface.

3.2 MAINTENANCE AND REMOVAL

- A. The silt fence shall remain in place until project completion and site have been stabilized.
- B. The contractor shall maintain the silt fence until it is removed, and shall remove and dispose of soil accumulations at a permitted site.
- C. The contractor shall inspect all silt fences immediately after each rainfall and at least daily during prolonged rainfall. Any deficiencies shall be immediately corrected by the contractor.
- D. The contractor shall make a daily review of the location of silt fences or posts in areas where construction activities have changed the natural contour and drainage runoff to ensure that the silt fences are properly located for effectiveness. Where deficiencies exist, additional silt fences or posts shall be installed in accordance with NYS DEC Best Management Practices (BMPs). The silt fence should be promptly repaired or replaced should it become damaged or otherwise ineffective.
- E. Sediment deposits shall either be removed when the deposit reaches approximately ½ of the height of the silt. Silt fence which has been removed will remain the property of the contractor. Upon removal of the silt fence, the contractor shall remove and dispose of excess soil accumulations, regrade area to match existing or proposed finished grades and vegetate all bare areas. Perform all work in accordance with NYS DEC BMPs

END OF SECTION

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SECTION 321123

AGGREGATE BASE COURSES

PART 1 GENERAL

1.1 SUMMARY

- A. Section Includes:
1. Aggregate base course in paved areas.

1.2 REFERENCES

- A. American Association of State Highway and Transportation Officials:
1. AASHTO T180 (American Association of State Highway and Transportation Officials) - Moisture-Density Relations of Soils Using a 10-lb Rammer and an 18-inch Drop.
 2. AASHTO M288 - Standard Specification for Geotextile Specification for Highway Applications.
- B. ASTM International:
1. ASTM D1556 - Standard Test Method for Density and Unit Weight of Soil in Place by the Sand-Cone Method.
 2. ASTM D1557 - Test Methods for Moisture-Density Relations of Soils and Soil-Aggregate Mixtures Using 10-lb Rammer and an 18-inch Drop.
 3. ASTM D2167 - Standard Test Method for Density and Unit Weight of Soil in Place by the Rubber Balloon Method.
 4. ASTM D2922 - Standard Test Method for Density of Soil and Soil-Aggregate in Place by Nuclear Methods (Shallow Depth).
 5. ASTM D2940 - Standard Specification for Graded Aggregate Material For Bases or Subbases for Highways or Airports.
 6. ASTM D3017 - Standard Test Method for Water Content of Soil and Rock in Place by Nuclear Methods (Shallow Depth).
- C. The term "Standard Specification" as used in this section shall mean the Standard Specifications, Construction and Materials, New York State Department of Transportation, Design and Construction Division, latest version and including all addendums thereto. Where the Standard Specifications are cited such work or material shall conform in every respect except for "Method of Payment" or if cited otherwise herein.

1.3 SUBMITTALS

- A. Section 013300 - Submittal Procedures: Requirements for submittals.
- B. Product Data: Submit data for geotextile fabric
- C. Samples: Submit, in air-tight containers, 50-lb sample of each type of aggregate fill to testing laboratory.

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D. Materials Source: Submit name of aggregate materials suppliers.

1.4 QUALITY ASSURANCE

A. Furnish each aggregate material from single source throughout the Work.

B. Perform Work in accordance with State of New York Department of Transportation's standard.

PART 2 PRODUCTS

2.1 AGGREGATE MATERIALS

A. NYS DOT Item 304.12; Type 2: as specified in Section 310516.

2.2 ACCESSORIES

A. Geotextile Fabric: AASHTO M288; non-woven, polypropylene –Only for use where indicated on drawings

B. Road Fabric:

1. Woven
2. For use where shown on Drawings and Details and for use under paved areas.
3. The geotextiles shall have woven slit film polypropylene providing separation for good subgrades by preventing mixing of subgrade soils and base aggregates. The geotextiles shall be composed of high-tenacity polypropylene yarns, which are woven into a stable network such that the yarns retain their relative position. The geotextiles shall be inert to biological degradation and resistant to naturally encountered chemicals, alkalis, and acids.
4. The geotextile fabric shall meet the specifications of the following table:

Mechanical Properties	Test Method	Unit	Minimum Average Roll Value	
			MD	CD
Grab Tensile Strength	ASTM D4632	lbs (N)	200 (890)	200 (890)
Grab Tensile Elongation	ASTM D4632	%	15	10
Trapezoid Tear Strength	ASTM D4533	lbs (N)	75 (334)	75 (334)
CBR Puncture Strength	ASTM D6241	lbs (N)	700 (3115)	
Apparent Opening Size (AOS) ¹	ASTM D4751	US Sieve (mm)	40 (0.43)	
Permittivity	ASTM D4491	sec ⁻¹	0.05	
UV Resistance (at 500 hours)	ASTM D4355	% strength retained	70	

¹ ASTM D4751: AOS is a Maximum Opening Diameter Value

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Physical Properties	Test Method	Unit	Typical Value	
Weight	ASTM D5261	oz/yd ² (g/m ²)	4.0 (136)	
Thickness	ASTM D5199	mils (mm)	20 (0.5)	
Roll Dimensions (width x length)	--	ft (m)	12.5 x 432 (3.8 x 132)	17.5 x 309 (5.3 x 94.2)
Roll Area	--	yd ² (m ²)	600 (502)	
Estimated Roll Weight	--	lb (kg)	210 (95)	

PART 3 EXECUTION

3.1 EXAMINATION

- A. Section 013000 - Administrative Requirements: Verification of existing conditions before starting work.
- B. Verify compacted substrate has been inspected, gradients and elevations are correct, and is dry and ready to support paving and imposed loads.
 - 1. Proof roll substrate with a vibrating compactor weighing at least (5) tons, with a minimum of two perpendicular passes to identify soft spots.
 - 2. Remove soft substrate and replace with compacted fill as specified in Section 312323.
- C. Verify substrate has been inspected, gradients and elevations are correct.

3.2 PREPARATION

- A. Correct irregularities in substrate gradient and elevation by scarifying, reshaping, and re-compacting.
- B. Do not place fill on soft, muddy, or frozen surfaces.

3.3 AGGREGATE PLACEMENT

- A. Place geotextile fabric or road fabric (if required) per manufactures recommended installation instructions.
- B. Spread aggregate over prepared substrate to total compacted thicknesses as shown below, in Schedules.
- C. Place aggregate in maximum 6" loose thickness layers and vibratory compact to specified density.
- D. Roller compact aggregate to 98 percent maximum density.
- E. Level and contour surfaces to elevations, profiles, and gradients indicated.
- F. Add small quantities of fine aggregate to coarse aggregate when required to assist compaction.

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- G. Maintain optimum moisture content of fill materials to attain specified compaction density.
- H. Use mechanical tamping equipment in areas inaccessible to compaction equipment.

3.4 TOLERANCES

- A. Section 014000 - Quality Requirements Tolerances.
- B. Maximum Variation From Flat Surface: 1/4 inch measured with 10 foot straight edge.
- C. Maximum Variation From Thickness: 1/4 inch.
- D. Maximum Variation From Elevation: 1/2 inch.

3.5 FIELD QUALITY CONTROL

- A. Section 017000 - Execution and Closeout Requirements: Field inspecting, testing, adjusting, and balancing.
- B. Compaction testing will be performed in accordance with ASTM standards; including but not limited to: ASTM D1556, ASTM D1557, ASTM D698, AASHTO T180, ASTM D2167, ASTM D2922, ASTM D3017, as applicable.
- C. When tests indicate Work does not meet specified requirements, remove Work, replace and retest.
- D. Frequency of Tests: One test for every 1000 square yards of each layer of compacted aggregate.

3.6 SCHEDULES

- A. Flexible Paving Subbase for Roadways: 12 inches thick placed in two equal layers.
 - 1. Geotextile Fabric or Road Fabric as shown on Drawings and Details.
 - 2. Compact placed aggregate materials uniformly to achieve 98 percent of maximum dry density.
- B. Flexible Paving Subbase for Driveways: 6 inches thick placed in single layer.
 - 1. Compact placed aggregate materials uniformly to achieve 98 percent of maximum dry density.
- C. Rigid Paving Subbase for Sidewalks, Sidewalks within Driveways and Curbs: 6 inches thick placed in single layer.
 - 1. Compact placed aggregate materials uniformly to achieve 98 percent of maximum dry density.

END OF SECTION

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SECTION 321216

ASPHALT PAVING

PART 1 GENERAL

1.1 SUMMARY

- A. Section Includes:
 - 1. Asphalt materials.
 - 2. Aggregate materials.
 - 3. Aggregate subbase.
 - 4. Asphalt paving base course, binder course, and wearing course.
 - 5. Asphalt paving overlay for existing paving.
 - 6. Surface slurry.
- B. Related Requirement:
 - 1. Section 312323 – Backfill.
 - 2. Section 321123 - Aggregate Base Courses.

1.2 DESCRIPTION

- A. Work included: Paving required for this Work is indicated on the drawings and includes, but is not necessarily limited to, the following:
 - 1. Placement of geotextile fabric.
 - 2. Placement and fine grading of subbase course.
 - 3. Placement of fine grading base course.
 - 4. Placement of fine grading binder course.
 - 5. Placement of fine grading top course.
 - 6. Adjustment of utilities.

1.3 PRICE AND PAYMENT PROCEDURES

- A. Section 012000 - Price and Payment Procedures Contract Sum. Include in your unit priced bid the cost of asphalt paving based on the New York State Average Posted Price Index, as listed on the NYS DOT website, of the month of the bid opening date per ton plus labor and equipment A Contract price adjustment (increase or decrease) will be per the change of the NYS DOT Average Posted Price Index (PGB Index Price) at the time of asphalt paving. The adjustment will be made through a Change Order as computed below.
- B. Payment for asphalt paving shall be for the volume of asphalt shown on the Contract drawings. The Contractor shall get prior approval for placement of asphalt exceeding the amounts shown.
- C. Asphalt Price Adjustment
 - 1. The quantity of asphalt (tons) considered for adjustment will be determined by multiplying the quantity of eligible work placed by their conversion factors which are indicated in the Proposal asphalt price adjustment note.
 - 2. Asphalt price adjustment will be based on the following formula:
 - a. When Price increases:

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Price Adjustment = Quantity of Asphalt X (Average Posted Price – PGB Index Price - \$10.00)

b. When Price decreases:

Price Adjustment = Quantity of Asphalt X (Average Posted Price – PGB Index Price + \$10.00)

3. The PGB Index Price is defined as follows:

a. Performance Graded Binder (PGB) Index Price. A fixed price per ton of asphalt. This price is used solely as a base from which to compute asphalt price adjustments.

b. The asphalt price adjustment will be based solely on the price changes for asphalt as determined by the above formulas. No consideration will be given to the situation where an individual supplier's price exceeds the Average Posted Price, nor will any adjustment be made unless the Average Posted Price is either \$10.00 greater than or less than the PGB Index Price.

D. Basis of Payment

1. The actual price adjustments will be based on the methods of computation previously described in this specification. No adjustments, wither positive or negative, will be made until payment of the final estimate, except that if the accumulated adjustment amount exceeds \$5,000, adjustments will be included in progress estimates.

2. The adjustment will be based on the quantity of eligible work placed and the PGB Posted Price Index in effect at the time of placement.

3. If the Contract completion date is extended without the assessment of engineering charges, price adjustments for items incorporated during such extensions shall be based on the appropriate updated PGB Posted Price Index.

4. If eligible items are placed after the scheduled Contract completion date specified in the Proposal and during which time there are assessed engineering charges and/or liquidated damages, the Average Posted Price used to compute price adjustments shall not exceed, but may be less than the Average Posted Price in effect on the last Contract completion date without assessed engineering charges, or on the completion date of the last extension without assessed engineering charges, whichever is later.

1.4 REFERENCE STANDARDS

A. The term "Standard Specification" as used in this section shall mean the Standard Specifications, Construction and Materials, New York State Department of Transportation, Design and Construction Division, latest version and including all addendums thereto. Where the Standard Specifications are cited such work or material shall conform in every respect except for "Method of Payment" or if cited otherwise herein.

1.5 SUBMITTALS

A. Section 013300 - Submittal Procedures: Requirements for submittals.

B. Product Data:

1. Submit product information for asphalt and aggregate materials.

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1.6 QUALITY ASSURANCE

- A. All materials, placement, and testing shall be in strict accordance with New York State Department of Transportation's Standard Specifications latest version and addendums thereto.
- B. Qualifications of workers: Provide at least one person who shall be thoroughly trained and experienced in skills required, who shall be completely familiar with the design and application of work described for this Section, and who shall be present at all times during progress of the work of this Section and shall direct all work performed under this Section.
- C. For actual finishing of bituminous concrete surfaces and operation of the required equipment, use only personnel who are thoroughly trained and experienced in the skills required.
- D. Mixing Plant: Certified by New York State DOT.
- E. Obtain materials from same source throughout.

1.7 PRODUCT HANDLING/AMBIENT CONDITIONS

- A. Section 015000 - Temporary Facilities and Controls: Ambient conditions control facilities for product storage and installation.
- B. No material shall be placed on wet or frozen surface.
- C. Material shall be placed only when the surface temperature is:
 - 1. 50° F, or greater, for a 1" surfacing layer;
 - 2. 45° F, or greater, for a 2" or thicker layer;
 - 3. Paving shall be discontinued as soon as the temperature falls below the above requirements. Top course paving shall be further limited to placement only during the period of May 1 to October 15, unless approved by Engineer.
- D. The Engineer shall have the right to cancel or postpone paving operations, if, in his or her opinion, the weather condition or forecast will prevent the proper handling or finishing of the bituminous mixtures.
- E. The Owner shall not be responsible for any costs incurred by the Contractor due to delays or extra work as a result of weather conditions. If the Contractor fails to complete the necessary paving operations prior to weather and seasonal limitations, all temporary materials and work which become necessary as a result of such failure, such as the shimming of castings and protrusions, drainage of the roadways, providing acceptable ride ability, and other work needed for the adequate maintenance and protection of traffic until paving operations can be completed the following paving season, shall not be reimbursable by the owner.
- F. Any pavement damage which occurs as a result of the Contractor either not protecting previously laid courses of his constructing any pavement course outside the specified weather and seasonal requirements whether or not a waiver was granted, shall be repaired by the Contractor at no expense to the Owner. All repairs shall be performed to the satisfaction to the Engineer.

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PART 2 PRODUCTS

2.1 ASPHALT PAVING

- A. Hot Mix Asphalt Materials:
 - 1. Base Course; such material shall conform to the NYS DOT Standard Specifications, NYS DOT Item 403.128902
 - 2. Binder Course; such material shall conform to the NYS DOT Standard Specifications, Type 3
 - 3. Top Course; such material shall conform to the NYS DOT Standard Specifications, Type 6
- B. Geotextile Fabric: AASHTO M288; non-woven, polypropylene.
- C. SUB-BASE: such material shall conform to the NYS DOT Standard Specifications, Item 304.12, TYPE 2

PART 3 EXECUTION

3.1 SUB-BASE: ITEM 304.12, TYPE 2

- A. Shape sub-base course to grade as shown on the plans and re-compact to 98% maximum density (Standard Proctor Method).
- B. Check grade with string line at 50' on center and adjust with NYS DOT Item 304.12, Type 2, conforming to the standard specifications, as necessary prior to placing any pavement courses.
- C. Minimum compacted thickness of 12" (or per schedule, whichever is greater), utilizing Option C placement method per the NYS DOT Standard Specifications.

3.2 HAULING EQUIPMENT

- A. The bituminous mixture shall be transported from the plant to the work site in tight vehicles having clean and smooth metal beds. Each load shall be covered with canvas or other suitable material of such size as to protect the mixture from the weather.
- B. The inside surface of the haul vehicles shall be coated, just before the vehicles are loaded, with a NYS DOT approved asphalt release agent applied by a high pressure fog system or other material as approved by the Engineer. After proper application, the truck bodies shall be raised for a sufficient time to allow the excess fluid to drain.

3.3 BITUMINOUS PAVERS

- A. Bituminous pavers shall be self-powered units, provided with an activated screed or strike-off assembly. The machine shall be capable of spreading and finishing courses of bituminous plant mix material in lane widths applicable to the widths of roadways to be paved on this project and as approved by the Engineer. When screed extensions are permitted by the Engineer for placement of mainline pavement, such extensions shall be of the same design as the main screed. The paver shall have a receiving hopper with sufficient capacity for uniform spreading

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operation and with automatic flow controls to place the mixture uniformly in front of the screed. The screed or strike-off assembly shall be heated as necessary to produce a finished surface of the required evenness and texture without tearing, shoving or gouging the mixture. When laying mixtures, the paver shall be capable of operating at forward speeds consistent with satisfactory placement of the mixtures.

- B. All bituminous pavers, used to place base, binder, and surface courses shall be equipped with approved automatic transverse slope and longitudinal grade screed controls. The controls shall automatically adjust the screed and increase or decrease the mat thickness to compensate for irregularities that are in the surface being paved. The controls shall be capable of maintaining the proper transverse slope and be readily adjustable so transitions and super-elevated curves can be satisfactorily paved. The controls shall operate from suitable fixed or moving references as prescribed in the NYS DOT Standard Specifications, Section 403-3.06.
- C. The bituminous paver shall be at the job site sufficiently ahead of the start of paving operations to pre-examine and approved by the Engineer. Any paver found worn or defective either before or during its use shall be immediately repaired to the satisfaction of the Engineer or replaced.

3.4 ROLLERS

- A. All rollers shall be either an approved vibrator type or static steel wheel or pneumatic tire type. The rollers shall be in good mechanical condition, free from excessive backlash, and capable of operating at speeds slow enough to avoid displacement of the mixture while it is still in a workable condition. The use of equipment which results in excessive crushing of aggregate will not be permitted.
- B. The roller supplied shall comply with the requirements of the NYS DOT Standard Specifications, Section 402-3.04.

3.5 CLEANING EXISTING PAVEMENT

- A. Prior to placing any pavement courses the Contractor shall saw cut and clean the existing pavement to the satisfaction of the Engineer. The cleaning shall be sufficient to remove all mud, debris, dust, dirt, loose material and so on. The Contractor shall use mechanical sweepers, hand brooms, shovels, etc., to clean the pavement.
- B. Apply a tack coat to all existing butt edges of existing pavement as well as any prior laid or existing pavement mat prior to paving top course. Tack coat to be applied in accordance with the NYS DOT Standard Specifications, Section 407-Tack Coat.

3.6 SPREADING AND FINISHING

- A. The mixture shall be laid upon an approved clean, dry surface, spread and struck off to the established grade and elevation. Approved bituminous pavers shall be used to distribute the mixture either over the entire width or over such partial width as may be practicable. The paver shall be guided by a measured and painted line on the existing surface where partial widths are placed. Bituminous pavers shall be in charge of an experienced operator. Placing of the mixture shall be continuous at a desired rate of not less than 50 tons per hour. The Engineer

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may permit a lesser rate if satisfactory results are achieved. Upon arrival at the site, the mixture shall be dumped into the paver and immediately spread and struck off to the width required and to such appropriate loose depth that when the work is completed, the required compacted thickness of mixture will be obtained.

- B. The reference line shall be supported at approximately 25 foot intervals on tangent sections and at closer intervals on curves. The line shall be tensioned sufficiently to remove any sags. The Contractor shall erect and maintain the reference line to the satisfaction of the Engineer. A moving reference of at least 30 feet in length, unless otherwise permitted by the Engineer, such as a floating beam, ski, or other suitable type may be substituted for the reference line if the surface to be paved is sufficiently even and satisfactory results can be achieved. A short ski or shoe may also be used for the initial course with the permission of the Engineer is a satisfactory fixed reference such as a curb, gutter or other fixed reference is adjacent to the pavement. When the Contractor proposes to use either the floating beam or short ski in the place of the taut reference line, the Engineer may disapprove of the substitution if results are not similar to those obtained using the taut reference.
- C. Subsequent pavement courses placed over the initial course shall be placed using one of the above methods. In addition, any course in an adjacent lane may be used as the reference for the use of a short ski. Whatever method the Contractor uses must be approved by the Engineer.
- D. The automatic screed controls are not required where existing grades at roadway intersections or drainage structures must be met or in other areas where its use is impractical as determined by the Engineer.
- E. The paving operation shall provide the required cross-slope shown on the site plan in the pavement unless otherwise directed by the Engineer.
- F. Before any rolling is started, the loose mat shall be checked, any irregularities shall be adjusted by raking, adding more material (dusting) or similar as required. Any unsatisfactory material shall be removed and replaced. The Contractor shall employ sufficient personnel to perform these operations while operating the paver at the required placement rate.
- G. The Contractor shall cover all catch basins when the paver passes over the top to insure asphalt does not enter them. Manholes and water valve covers shall be coated with fuel oil and immediately raked off to a uniform surrounding grade before compaction.

3.7 COMPACTION

- A. Immediately after the bituminous mixture has been spread, struck off and surface irregularities adjusted, it shall be thoroughly and uniformly compacted by rolling. The surface shall be rolled when the mixture is in proper condition and when the rolling does not cause undue displacement, cracking or shoving. All courses shall be initially rolled with the roller traveling parallel to the centerline of the pavement beginning at each edge and working toward the center. Banked curves shall be rolled starting at the low side edge and working toward the super-elevated edge. When the compaction procedure used by the Contractor fails to produce results acceptable to the Engineer, the procedure shall be adjusted to obtain the desired results. Rollers shall move at a slow and uniform speed. The roller drive roll or wheel shall be nearest the paver.

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- B. Any displacement occurring as a result of the reversing of the direction of a roller, or from other causes, shall be corrected at once by the use of rakes and addition of fresh mixture as required. Care shall be exercised so as not to displace the line and grade of the edges of the bituminous mixture. To prevent adhesion of the mixture to the rollers, the wheels shall be kept properly moistened with water or water mixed with small quantities of detergent, but in no case shall a solvent having affect upon bituminous pavement be used.
- C. Along forms, curbs, headers, walls and other areas not accessible to the rollers, the mixtures shall be thoroughly compacted with mechanical tampers as directed by the Engineer. On depressed areas, a trench roller or a small vibratory roller approved by the Engineer may be used.
- D. Any mixture that becomes loose and broken, mixed with dirt, or is in any way defective shall be removed and replaced with fresh hot mixture which shall be compacted to conform with the surrounding area.
- E. The Contractor shall initially roll the pavement with an approved steel wheeled roller. The roller shall overlap the previous roller pass by one-half (except at the crown where it shall overlap by 6"). Immediately following the initial rolling the Contractor shall finish roll the pavement course. Where the Contractor uses an approved vibratory compaction roller, the one roller shall suffice for initial and final compaction rolling. Where a static roller is used by the Contractor two approved rollers shall be employed for compaction. Where the paving course exceeds 12 feet in width additional rollers shall be used as directed by the Engineer. The required minimum number of passes for compaction shall be as per Table 403-2 of the NYS DOT Standard Specifications.
- F. No roller shall exceed the operating speed listed in the Standard Specifications for Option A or B. If the Engineer determines that unsatisfactory compaction is being obtained or damage to highway components and or adjacent property is occurring using vibratory compaction equipment, the Contractor shall immediately cease using this equipment and proceed with the work using the two static wheel rollers as specified at no additional cost. The contractor should note that if he elects to use vibratory compaction equipment, he assumes full responsibility for the cost of repairing all damages which may occur to highway components and adjacent property.

3.8 JOINTS

- A. Joints shall comply with the NYS DOT Standard Specification Section 402-3.09.
- B. The finished pavement at joints shall comply with the surface smoothness requirements and exhibit the same uniformity of texture and compaction as other sections of the course. Rollers shall not pass over the unprotected edges of a freshly laid mixture unless permitted by the Engineer.
- C. In the formation of all joints, the exposed edge of the existing layer that will become part of the joint shall be the full thickness of the layer and straight. If the existing edge is unacceptable, the edge shall be corrected by using a power driven saw or other approved tools to cut a neat line.

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- D. Transverse. The placing of the course shall be as continuous as possible. When continuing from a previously placed course the joint shall be formed by cutting back on the previous run to expose the full depth of the course
- E. Longitudinal. Longitudinal joints in the surface course shall correspond with the edges of proposed traffic lanes unless otherwise directed by the Engineer.

3.9 BINDER COURSES

- A. Place the binder course on the prepared sub-base aggregate course in a manner as specified herein. The Contractor shall use paving equipment as specified herein unless otherwise authorized by the Engineer.
- B. The binder course shall have a nominal compacted thickness as listed in the schedule below.

3.10 UTILITY COVER ADJUSTMENTS

- A. The Contractor shall raise or lower all manhole, cleanouts, and catch basin covers and water valve boxes to meet the final binder finish grades.
- B. All work and materials shall conform to the requirements of the Standard Specifications. The Contractor shall notify the Engineer in advance of the work and shall schedule the work so that an Engineer's representative may be present to review all work.
- C. Manholes shall be adjusted to be the final elevation of the top course and shall be sloped as appropriate (1/4"/1') to follow the cross-slope of the pavement. Catch basins shall be adjusted to be 1/2" below the final elevation of the top course. Catch basins shall be sloped to follow the cross-slope of the pavement. Concrete grade adjustment rings shall be used to adjust the manhole elevation. Bricks and concrete bricks shall not be allowed. Use mortar for fine adjustment. Manhole riser sections shall not be permitted for adjusting the elevation of the manhole cover. Manhole and catch basin covers shall be adjusted by excavating and breaking out the concrete and shimming the cover with wood wedges to the proper elevation and then filling the shimmed area with mortar. Reflective barrels shall be placed at all covers in the traffic lanes until traffic can safely drive over. The asphalt patch around the cover shall allow traffic to safely pass over the cover and then shall be cut down to allow the full top course layer. A string line shall be used to check the cover elevation in both the longitudinal and transverse direction.
- D. Water valve boxes shall be raised to be 1/2" below the final elevation of the top course. The boxes shall be raised by either excavating and freeing up the telescoping risers to adjust to final grade or by installing an approved valve box riser to meet the final grade. The Contractor shall use either method as he chooses so long as the results are satisfactory as determined by the Engineer. Only standard and approved risers shall be used for adjustments.
- E. Any utility cover damaged by the Contractor shall be replaced at the Contractors expense.

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3.11 TOP COURSE

- A. Apply Tack Coat over entire area to receive top coat in accordance with the Standard Specifications.
- B. Place the top course in the manner as specified herein. The top course shall have a nominal compacted thickness as listed in the schedule below.
- C. Before placing the finishing course, the Contractor shall secure the approval from the Engineer that the area is acceptable (clean surface, proper adjustment of covers, proper grades, etc.). The Contractor shall supply a crown board and make a joint inspection of the binder course with the Engineer. If sections of the binder course exceed the specified tolerance, the Contractor shall mark out these areas and place true and leveling (T&L) course material complying with the Standard Specifications. Adjust low areas or cut-out and remove/replace high spots prior to placing the finish course with the bituminous paver.
- D. All costs involved in traffic control, cleaning of the roadway, hauling and placing the top course as specified and final clean-up shall be included in the price of Hot Mix Asphalt Pavement.

3.12 SURFACE TOLERANCE

- A. Each pavement surface shall be constructed to a 1/4" tolerance. If, in the opinion of the Engineer, the pavement surface is not being constructed or has not been constructed to this tolerance based upon visual observation or upon riding quality, he may test the surface with a 16 foot straight edge of string line placed parallel to the centerline of the pavement and with a 10 foot straight edge or string line placed transversely to the centerline of the pavement on any portion of the pavement. Variations exceeding 1/4" shall be satisfactorily corrected or the pavement re-laid at no additional cost to the Owner as ordered by the Engineer.

3.13 THICKNESS TOLERANCE

- A. The required pavement thickness as shown on the drawings is the nominal thickness. The pavement shall be so constructed that the final compacted thickness is as near to the nominal thickness as practical and within the tolerances specified below.
- B. The Owner will, at the Owner's expense, take core samples as deemed necessary by the Engineer to evaluate the course thickness if the actual paving quantities deviate significantly from the Engineer's estimated quantities.
- C. The Contractor shall provide the Engineer with truck tickets for all bituminous concrete products brought to the site. Quantities used for each course shall not be less than 5% of the theoretical tonnages (Paving Area in S.Y. x Course Thickness in inches x 0.055 Tons/S.Y./inch of thickness equals the theoretical tonnage for this Work).
- D. A tolerance not to exceed 1/4" from the required nominal thickness will be acceptable. No payment will be made for any extra thickness over and above the permissible tolerance except if the Engineer determines the extra thickness necessary to achieve a smooth riding surface. Where the pavement course is less than specified thickness, including tolerance, the Contractor

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shall take action, at his expense, as deemed appropriate by the Engineer to correct such condition (including entire resurfacing).

3.14 PAVEMENT SCHEDULE

A. Parking Lot Areas:

1. Geotextile Fabric: Woven per Specification Section 321123
2. Sub-base course: 12" (compacted thickness): NYS DOT Item 304.12.
3. Binder course: (1) 2.5" lift (compacted thickness): NYS DOT Type 3.
4. Top course: (1) 1.5" lift (compacted thickness): NYS DOT Type 6.

END OF SECTION

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SECTION 329219

SEEDING

PART 1 GENERAL

1.1 SUMMARY

- A. Section Includes:
 - 1. Fertilizing.
 - 2. Seeding.
 - 3. Hydroseeding.
 - 4. Mulching.
 - 5. Maintenance.
- B. Related Sections:
 - 1. Section 312213 - Rough Grading.

1.2 REFERENCES

- A. The term "Standard Specification" as used in this section shall mean the Standard Specifications, Construction and Materials, New York State Department of Transportation, Design and Construction Division, latest version and including all addendums thereto. Where the Standard Specifications are cited such work or material shall conform in every respect except for "Method of Payment" or if cited otherwise herein.

1.3 DEFINITIONS

- A. Weeds: Include Dandelion, Jimsonweed, Quackgrass, Horsetail, Morning Glory, Rush Grass, Mustard, Lambsquarter, Chickweed, Cress, Crabgrass, Canadian Thistle, Nutgrass, Poison Oak, Blackberry, Tansy Ragwort, Bermuda Grass, Johnson Grass, Poison Ivy, Nut Sedge, Nimble Will, Bindweed, Bent Grass, Wild Garlic, Perennial Sorrel, and Brome Grass and vegetative species other than specified species to be established in given area..

1.4 SUBMITTALS

- A. Section 013300 - Submittal Procedures: Requirements for submittals.
- B. Product Data: Submit data for seed mix, fertilizer, mulch, and other accessories.

1.5 JOB CONDITIONS

- A. Seeding Season: All final seeding shall be done within the following dates:
 - 1. Fall: August 15 to October 15.
 - 2. Spring: April 15 to June 15.
- B. Temporary annual rye grass seeding to provide compliance with the SWPPP (if applicable) shall be applied within seven (7) calendar days of backfilling and rough grading of disturbed

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areas. This seeding will establish a temporary grass vegetation until permanent seeding is provided as specified herein.

- C. If special conditions exist, which may warrant a variance in the above dates, submit a written request to the Engineer stating the conditions and proposed variance. Permission for the variance will be given if the Engineer's opinion, the variance is warranted.

1.6 SOURCE QUALITY CONTROL -TOP SOIL

- A. Section 014000 - Quality Requirements: Testing, inspection and analysis requirements.
- B. Analyze to ascertain percentage of nitrogen, phosphorus, potash, soluble salt content, organic matter content, and pH value.
- C. Provide recommendation for fertilizer and lime application rates for specified seed mix as result of testing.
- D. Testing is not required when recent tests and certificates are available for imported topsoil. Submit these test results to testing laboratory. Indicate, by test results, information necessary to determine suitability.

PART 2 PRODUCTS

2.1 TOPSOIL

- A. Topsoil shall be the surface layer of soil and shall be free from refuse, any material toxic to plant growth, subsoil, woody vegetation, stumps, roots, brush, stones, clay lumps or similar objects larger than 1/2" in greatest dimension. Sod and herbaceous growth such as grass and weeds need not be removed but shall be thoroughly broken up and mixed with the soil during handling.
- B. Topsoil shall meet the requirements of the Standard Specifications (Section 713-01, Type A) with the following requirements, unless otherwise specifically stated on the plans.
 - 1. The pH of the material shall be between 5.5 and 7.6. Verify pH at site and adjust with ground limestone to raise or with aluminum sulfate to lower pH. Add limestone or aluminum sulfate at rate of 2-1/2 pounds per cubic yard of topsoil to raise pH one full point. Submit copy of test results to Engineer. Do not mix limestone with fertilizer.
 - 2. The organic content shall be not less than 6% nor more than 12% (dry weight basis).
 - 3. Gradation shall be:

<u>SIEVE SIZE</u>	<u>PERCENT PASSING BY WEIGHT</u>
2"	100
1"	85 - 100
1/4"	65 - 100
No. 200	20 - 65
2 Micron Particle	0 - 20

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2.2 FERTILIZER

- A. Commercial fertilizer 10-6-4 mixture shall be a complete fertilizer the elements of which are derived from organic sources and shall contain the following percentages by weight:
 - 1. 5% Nitrogen.
 - 2. 10% Phosphoric Acid.
 - 3. 5% Potash.
 - 4. Shall meet the Standard Specifications, Section 713-03.

2.3 GRASS SEED (TEMPORARY)

- A. Seed shall be fresh, reclaimed seed of the latest crop year.
- B. Grass seed may be entirely annual rye grass or a mixture of annual rye grass and perennial rye grass.

2.4 GRASS SEED (PERMANENT)

- A. Seed shall be fresh, reclaimed seed of the latest crop year.
- B. Grass seed mixture shall be composed of the following seeds mixed in the proportions by weight and testing for the minimum percentages of purity as indicated for same.

<u>PROPORTION BY WEIGHT PURITY</u>			<u>GERMINATION</u>
5%	Colonial Bent	90%	90%
30%	Chewings Fescue	90%	80%
30%	NK-100/Manhattan Rye	90%	85%
10%	Merion Bluegrass	90%	85%
12.5%	RED Top	95%	90%
12.5%	Gen. Perennial Rye Grass	98%	90%
Weed seed content shall not exceed 0.25%			
Inert matter shall not exceed 3%.			

- C. Shall meet the Standard Specifications, Section 713-04.

2.5 MULCHING MATERIAL

- A. Oat or wheat straw, free from weeds, foreign matter detrimental to plant life, and dry. Hay or chopped cornstalks are not acceptable.

PART 3 EXECUTION

3.1 PREPARATION OF SUBGRADE

- A. Loosen or scarify the subgrade to a 3 inch minimum depth immediately prior to dumping and spreading topsoil. Bring subgrade to a true uniform grade and clear it of all stumps, sticks and stones larger than one-half inch in diameter.

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- B. Maximum lawn grade shall not exceed 6 horizontal to 1 vertical unless otherwise approved by the Engineer.

3.2 SPREADING OF TOPSOIL

- A. During the spreading operation, rake topsoil and remove all stones in excess of ¼” in diameter and all rubbish.
- B. Topsoil shall have a minimum thickness of six (6) inches after natural settlement and light rolling, and shall conform to grades and elevations shown on the drawings or to match existing grades.
- C. Deposit additional topsoil as may be required to correct all settlement and erosion up to the date of final acceptance.
- D. After the topsoil is spread, all large stiff clods, rocks, or other foreign matter shall be cleared and disposed of by the Contractor so that the finished surface will be acceptable for seeding and mulching.
- E. Grade topsoil to eliminate rough, low or soft areas, and to ensure positive drainage across walkways and paths.
- F. Do not spread topsoil while in a frozen or muddy condition.

3.3 FERTILIZING

- A. Apply lime at application rate recommended by soil analysis
- B. Apply fertilizer at application rate recommended by soil analysis.
- C. Apply after smooth raking of topsoil and prior to roller compaction.
- D. Do not apply fertilizer at same time or with same machine used to apply seed.
- E. Mix fertilizer thoroughly into upper 2 inches of topsoil.
- F. Lightly water soil to aid dissipation of fertilizer. Irrigate top level of soil uniformly.

3.4 SEEDING

- A. Do not seed areas in excess of that which can be mulched on same day.
- B. Do not sow immediately following rain, when ground is too dry, or when winds are over 12 mph.
- C. Immediately before seeding, restore ground as necessary to a loose friable condition by discing or other approved method to a depth of not less than two inches. Clear surface of all debris and stones one inch or more in diameter.

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- D. Seed all areas to be seeded with an approved mechanical seeder at a rate of 5 lbs. of grass seed per 1,000 square feet. Sow one half the seed in one direction and the other half at right angles to the first seeding. Cultipacker or approved similar equipment may be used to cover the seed and to firm the seed bed in one operation. In areas inaccessible to cultipacker, lightly rake seeded ground and roll in two directions with a water ballast roller.
- E. Take extreme care during seeding and raking to insure that no change occurs in finished grades and that the seed is not raked from one spot to another.
- F. Immediately following seeding, apply mulch to thickness of 1/8 inches. Maintain clear of shrubs and trees.
- G. Apply water with fine spray immediately after each area has been mulched. Saturate to 4 inches of soil.

3.5 SUMMER SEEDING

- A. If seeding is authorized between June 1 and August 15, sow annual and/or perennial rye grass at the rate of 60 pounds per acre.

3.6 SEED PROTECTION

- A. Identify seeded areas with stakes and string around area periphery.
- B. Cover seeded slopes where grade is steeper than 3:1 with erosion fabric. Roll fabric onto slopes without stretching or pulling.
- C. Lay fabric smoothly on surface, bury top end of each section in 6 inch deep excavated topsoil trench. Overlap edges and ends of adjacent rolls minimum 12 inches. Backfill trench and rake smooth, level with adjacent soil.
- D. Secure outside edges and overlaps at 36 inch intervals with stakes.
- E. Lightly dress slopes with topsoil to ensure close contact between fabric and soil.
- F. At sides of ditches, lay fabric laps in direction of water flow. Lap ends and edges minimum 6 inches.

3.7 MULCHING

- A. Seeded areas shall be mulched with straw within 48 hours after seeding. Spread thoroughly fluffed straw to a uniform depth at the rate of approximately 3 tons per acre. Prevent mulch from blowing away by using a light covering of loose branches, a system of pegs and strings, or other approved method.
- B. Maintain erosion control in place until establishment of a uniform stand of grass and acceptance of same by the Engineer.

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3.8 MAINTENANCE

- A. Maintenance of grass areas shall consist of watering, weeding, cutting, repair of all erosion and reseeding as necessary to establish a uniform stand of specified grasses, and shall continue until acceptance by the Owner. After grass has started, all areas greater than 8 inches square which fail to show a uniform stand of grass for any reason whatsoever, shall be reseeded repeatedly until all areas are covered with a satisfactory growth of grass.
- B. Maintenance also includes temporary protection of fences, barriers and signs, and all other work incidental to proper maintenance.
- C. Use of Herbicides are not allowed.

3.9 INSPECTION AND ACCEPTANCE

- A. The Engineer shall inspect all work for substantial completion upon written request of the contractor. The request shall be received at least ten (10) calendar days before the anticipated date of inspection.
- B. Upon completion and re-inspection of all repairs and renewals necessary in the Engineer's judgment, the Engineer shall certify in writing to the Owner as to the substantial completion of lawn work.
- C. Contractor's Notice of Termination (NOT) for SWPPP (if Applicable) will not be accepted by the Owner until a minimum of 80% of disturbed soils are fully revegetated.

3.10 SOD

- A. SOD shall contain a mixture of Kentucky Bluegrass/Fine Fescue mixtures. SOD shall be fully growing grass with a complete root base. No brown or dead patches shall be allowed in any role of sod to be installed.

3.11 SOD Installation

- A. Preparation
 1. TOPSOIL: Provide 3 inches of topsoil under all areas of sod to be installed.
 2. PEAT - MOSS/COMPOST: For sandy, light or paddy soils, apply either 1 inch of compost material or 2-4 bales of peat-moss per 1,000 sq. ft and work into the top 2 inches of soil.
 3. LIME: The optimum growing conditions for turfgrass usually exist where the soil is neutral to slightly acid (7.0-6.0). Provide lime as required by soil testing or at a minimum provide 80 lbs.of limestone/1,000 sq.ft.
 4. FERTILIZER: Provide a complete lawn fertilizer into the soil before sod installation (18-24-12 or a similar 1-2-1 ratio) and spread at 5 pounds per 1000 square feet.
 5. TILLING: Rototill or spade these materials to a depth of about 3-5 inches.
 6. GRADING: Rough grade to remove stones, roots, and debris, and to provide a slope away from foundations to eliminate drainage problems. Fine grade, using wood rake or equivalent.
 7. WATERING: Where the prepared ground is exceptionally dry, moisten prior to sodding, but do not saturate the soil so it cannot be walked on without making imprints and disturbing final grade when sodding.

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B. Installation

1. Starting: Locate a straight line, such as a curb or driveway, or run a taut string up the middle of the area to be sodded. Work along the line to establish the first row.
2. Laying the Sod: Lay the sod in brickwork fashion, smoothing the soil in advance of sod laying. Make sure the joints are butted together snugly without overlapping. If laying sod on slopes, lay the slabs perpendicular to the direction of the slope. Use sod staples to secure the sod on steep slopes if necessary.
3. Shaping: Use a sharp knife or spade for shaping the non-rectangular edges and small areas such as flower bed, hedges, etc.
4. Rolling: Roll the installed sod with a roller one-third filled with water. This will smooth out small bumps and assure good contact with the soil. Avoid a heavy roller that will compact the site.
5. Watering: Completely saturate the sodded area when finished. Be sure to soak the entire sod area at the end of each day's work.

C. Protection of Work

1. TRAFFIC: Heavy traffic shall
2. not be permitted for two weeks following installation.
3. MOWING: Provide a minimum of (2) mowings of the new sod, the first one week after installation and the second, two weeks after installation. Use a walk behind power mower, of reel type, with the cutting height set at 2-3 inches. Never cut more than 1/3 of the grass blade per cutting. Cut to 1 1/2-2 inches in height and maintain sharp mowing blades.
4. FEEDING: Provide a minimum of (2) fertilizer applications, one in the fall and one in the spring based on the following schedule for application type: Memorial Day (20-3-14), Labor Day (25-3-15) and Halloween (30-3-10). A slow release or controlled release form of Nitrogen shall be used An application on April 1 shall be added if a late fall fertilization was not made. Always follow the manufacturer's recommendations. Apply lawn food on dry grass only and always water it in after every feeding.

D. Application Timeline

- a. SOD shall be installed as soon as possible after work has been completed in an area. SOD shall be installed per manufacture's requirements and shall not be installed if the ground is thoroughly frozen.

END OF SECTION