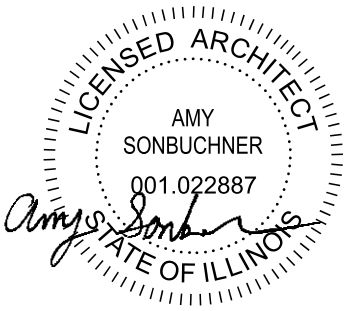
PROJECT MANUAL

CHICAGO EXECUTIVE AIRPORT RESIDENTIAL SOUND INSULATION PROGRAM
WHEELING, IL
Project Location: Wheeling, IL

PROJECT No.: PWKRSIP2019
AIP No.: *3-17-SBGP-223*

VOLUME NO. 1 OF 2
July 2026

PHASE 4



C&S ENGINEERS, INC.
499 COLEEN EILEEN COLLINS BLVD.
SYRACUSE, NY 13212
315-455-2000

CHICAGO EXECUTIVE AIRPORT

RESIDENTIAL SOUND INSULATION PROGRAM

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PART 1

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PART 1

NOTICE TO CONTRACTORS

OWNER: **CHICAGO EXECUTIVE AIRPORT**
1020 South Plant Road, Wheeling, Illinois 60090

PROJECT: **Residential Sound Insulation Program**

Sealed proposals will be received by the Chicago Executive Airport at 1020 South Plant Road, Chicago Executive Airport, Wheeling, Illinois 60090 until **11:00 AM on Thursday, August 20, 2026** for the construction of Residential Sound Insulation Program at which time bids will be publicly opened and read. Faxed proposals will **not** be accepted.

A brief description of the work to be performed (detailed descriptions of all work will be included in the bid documents):

Replacement of windows with acoustic windows, replacement of existing prime and/ or storm doors, with acoustic prime and storm doors, and providing positive air ventilation to sixteen (16) single-family residential properties in Wheeling, IL and nine (9) multi-family condos in Prospect Heights, IL. Replacement locations for each property are detailed in the bid documents.

Instruction to Bidders, form of proposals, form of agreement, specifications, and wage rate are on file and may be inspected at: Office of the Airport Manager, Chicago Executive Airport, 1020 South Plant Road, Wheeling, Illinois 60090, and Office of C&S Engineers, Inc. 204 Industrial Lane, Wheeling, IL 60090 or online at the website of Chicago Executive Airport (www.chiexec.com).

Instruction to Bidders, form of proposals, form of agreement, specifications, and wage rate will be available on **July 30, 2026**, and may only be obtained electronically at www.chiexec.com) **Hard copies of the documents are required for bidding purposes.** All addenda issued for this contract shall also be available through www.chiexec.com as they become available.

There will be a non-mandatory pre-bid meeting at C&S Engineers, Inc., 204 Industrial Lane, Wheeling, IL 60090 on Thursday, August 6, 2026 at 11 a.m.

Each prospective bidder, in evidence of competence, to perform the type of construction or related construction required by the project description, shall furnish to the Chicago Executive Airport Board of Directors as a prerequisite to the release of proposal forms, a current, certified or photostatic copy of a "Certificate of Eligibility" issued by the Illinois Department of Transportation in accordance with IDOT's instructions for Prequalification of Contractors.

As an alternative to Illinois Department of Transportation pre-qualification, a contractor may submit a statement of experience and financial capability to the Airport Manager along with their bid. Said statement shall provide information regarding the successful completion of a minimum of three projects of similar scope and magnitude within the last two (2) years including project reference who can verify the contractor's role. The statement will also provide a summary of any outstanding liens or judgments against the contractor or other factors that may interfere with the completion of this work. Finally, the Contractor shall provide a general summary of financial capability. Failure to demonstrate experience or financial capability will be considered cause for disqualification of a bidder.

PART 1

NOTICE TO CONTRACTORS

Additional information may be requested after the receipt of bids to further determine that a contemplated awardee is fully qualified to receive the award. Such statements and information shall be furnished immediately upon request.

A bid bond, cashier's check, or a certified check made payable to the order of the **Chicago Executive Airport** in the amount of ten percent (10%) of the total bid must be deposited by each bidder with his bid as guarantee that in case the contract is awarded to him, he will within fifteen (15) days thereafter, upon receipt of written notice of award, execute such contract and furnish a satisfactory performance bond. Upon failure to do so, he shall forfeit the deposit as liquidated damages and acceptance of the bid will be contingent upon the fulfillment of this requirement by the bidder.

The checks or bid bonds of all, except the three (3) lowest responsible bidders, will be returned within ten (10) days after the bids are opened and read. The remaining checks or bid bonds will be refunded as soon as the contract and bond have been properly executed and approved.

A visit to the project site can be arranged by contacting:

Chicago Executive Airport
Jeffrey Miller – Executive Director
1020 South Plant Road
Wheeling, Illinois 60090
Phone No.: 224-279-2061
Fax No.: 847-537-8183

The successful bidder, as determined by the Owner, will be required to agree that no less than the prevailing rate of wages will be paid to all workmen, laborers, and mechanics performing their work under this contract.

All proposals must be made on forms furnished within this set of Contract Documents.

The successful bidder will be required to furnish performance and payment bonds satisfactory to the owner in the amount of the contract.

The owner reserves the right to waive or not to waive any irregularities in the bids and to reject any or all bids and to determine which is the lowest and best bid or combination of bids for the improvements.

By order of: Chicago Executive Airport Board of Directors
(Name and Title)

July 30, 2026
Date

PART 1

INSTRUCTIONS TO BIDDERS

1. DEFINED TERMS

Terms used in these Instructions to Bidders which are defined in the STANDARD GENERAL CONDITIONS of the Construction Contract, Engineer Joint Contract Documents (2002 Edition) have the meanings assigned to them in the GENERAL CONDITIONS. The term "Successful Bidder" means the lowest, qualified, responsible Bidder to whom the owner (on the basis of Owner's evaluation as herein provided) makes an award. The terms Bid or Proposal as used herein are interchangeable.

2. COPIES OF BIDDING DOCUMENTS

2.1 Complete sets of the Bidding Documents in the number and for the deposit sum stated in the Notice to Contractors may be obtained from Owner (unless another issuing office is designated).

2.2 Complete sets of Bidding Documents shall be used in preparing Bids; neither Owner nor Engineer assume any responsibility for errors or misinterpretations resulting from the use of incomplete sets of Bidding Documents.

2.3 Owner and Engineer in making copies of Bidding Documents available on the above terms do so only for the purpose of obtaining Bids on the Work and do not confer a license or grant for any other use.

3. QUALIFICATIONS OF BIDDERS

To demonstrate qualifications to perform the Work, each Bidder must be prepared to submit within five days of Owner's request written evidence, such as financial data, previous experience and evidence of authority to conduct business in the jurisdiction where the Project is located. Each Bid must contain evidence of Bidder's qualification to do business in the state where the Project is located or covenant to obtain such qualification prior to award of the contract.

Each prospective Bidder, in evidence of competence, to perform the type of construction or related construction required by the project description, shall furnish the Owner, as a prerequisite to the release of proposal forms by the Owner, a current certified or photostatic copy of a "Certificate of Eligibility" issued by the Illinois Department of Transportation in accordance with IDOT's instructions for Prequalification of Contractors.

As an alternative to Illinois Department of Transportation pre-qualification, a contractor may submit a statement of experience and financial capability to the Airport Manager along with their bid. Said statement shall provide information regarding the successful completion of a minimum of three projects of similar scope and magnitude within the last two (2) years including project reference who can verify the contractor’s role. The statement will also provide a summary of any outstanding liens or judgments against the contractor or other factors that may interfere with the completion of this work. Finally, the Contractor shall provide a general summary of financial capability. Failure to demonstrate experience or financial capability will be considered cause for disqualification of a bidder.

4. EXAMINATION OF CONTRACT DOCUMENTS AND SITE

4.1 Before submitting a Bid, each Bidder must (a) examine the Contract Documents thoroughly, (b) visit the site to familiarize himself with local conditions that may in any manner affect cost, progress or performance of the Work, (c) familiarize himself with federal, state and local laws, ordinances, rules and regulations that may in any manner affect cost, progress or performance of the Work; and (d) study and carefully correlate Bidder's observations with the Contract Documents.

4.2 Reference is made to the Special Conditions for the identification of those reports of investigations and tests of subsurface and latent physical conditions at the site or otherwise affecting cost, progress or performance of the Work, which have been relied upon by Engineer in preparing the Drawings and Specifications. Owner will make copies of such reports available to any Bidder requesting them. These reports are not guaranteed as to accuracy or completeness, nor are they part of the Contract Documents. Before submitting his Bid, each Bidder will, at his own expense, make such additional investigations and tests as the Bidder may deem necessary to determine his Bid for performance of the Work in accordance with the time, price and other terms and conditions of the Contract Documents.

4.3 On request, Owner will provide each Bidder access to the site to conduct such investigations and tests as each Bidder deems necessary for submission of his Bid.

4.4 The lands upon which the Work is to be performed, rights-of-way for access thereto and other lands designated for use by Contractor in performing the Work are identified in the Special Conditions or Drawings.

4.5 The submission of a Bid will constitute an incontrovertible representation by the Bidder that he has complied with every requirement of this Article 4 and that the Contract Documents are sufficient in scope and detail to indicate and convey understanding of all terms and conditions for performance of the Work.

5. INTERPRETATIONS

All questions about the meaning or intent of the Contract Documents shall be submitted to Owner in writing. Replies will be issued by Addenda mailed or delivered to all parties recorded by Owner as having received the Bidding Documents. Questions received less than ten days prior to the date for opening of Bids may not be answered. Only questions answered by formal written Addenda will be binding. Oral and other interpretations or clarifications will be without legal effect.

6. BID SECURITY

6.1 Bid Security shall be made payable to Owner, in an amount of ten percent of the Bidder's maximum Bid price and in the form of a certified or bank check or a Bid Bond issued by a Surety meeting the requirements of paragraph 5.01 of the GENERAL CONDITIONS.

6.2 The Bid Security of the Successful Bidder will be retained until such Bidder has executed the AGREEMENT and furnished the required Contract Security, whereupon it will be returned; if the successful Bidder fails to execute and deliver the AGREEMENT and furnish the required contract Security within 15 days of the Notice of Award, owner may annul the Notice of

Award and the Bid Security of that Bidder will be forfeited. Bid Security of the next two (2) lowest responsible bidders will be returned as soon as the Contract and Bond of the lowest responsible bidder has been properly executed and returned. The Bid Security of all other bidders will be returned within ten (10) days after the bids are opened.

7. CONTRACT TIME

The number of days within which, or the date by which, the Work is to be completed (the Contract Time) is set forth in the Bid Form and will be included in the AGREEMENT.

8. LIQUIDATED DAMAGES

Provisions for liquidated damages are set forth in the SUPPLEMENTARY CONDITIONS.

9. ALTERNATE EQUIPMENT

Where specific material or equipment is mentioned in the Specifications, or on the Plans, the provisions of Alternate Equipment of paragraph 6.05 of the GENERAL CONDITIONS (substitutes or "or equal" items) will prevail unless modified by the SPECIAL CONDITIONS.

10. SUBCONTRACTORS, ETC.

10.1 If the SPECIAL CONDITIONS require the identity of certain Subcontractors and other persons and organizations to be submitted to Owner in advance of the Notice of Award, the apparent Successful Bidder, and any other Bidder so requested, will within seven days after the day of the Bid opening submit to Owner a list of all Subcontractors and other persons and organizations (including those who are to furnish the principal items of material and equipment) proposed for those portions of the Work as to which such identification is so required. Such list shall be accompanied by an experience statement with pertinent information as to similar projects and other evidence of qualification for each such Subcontractor, person and organization if requested by Owner.

If Owner or Engineer after due investigation has reasonable objection to any proposed Subcontractor, other person or organization, either may before giving the Notice of Award request the apparent Successful Bidder to submit an acceptable substitute without an increase in Bid price. If the apparent successful Bidder declines to make any such substitution, the contract shall not be awarded to such Bidder, but his declining to make any such substitution will not constitute grounds for sacrificing his Bid Security. Any Subcontractor, other person or organizations so listed and to whom Owner or Engineer does not make written objection prior to the giving of the Notice of Award will be deemed acceptable to Owner and Engineer.

10.2 No Contractor shall be required to employ any subcontractor, other person or organization against whom he has reasonable objection.

11. PROPOSAL

11.1 All proposals must be made on the accompanying blank form.

11.2 Proposal Forms must be completed in ink or by typewriter.

11.3 Bids by corporations must be executed in the corporate name by the president or a vice-president (or other corporate officer accompanied by evidence of authority to sign) and the corporate seal must be affixed or attested by the secretary or an assistant secretary. The corporate address and state of incorporation shall be shown below the signature.

11.4 Bids by partnerships must be executed in the partnership name and signed by a partner, whose title must appear under the signature and the official address of the partnership must be shown below the signature.

11.5 All names must be typed or printed below the signature.

11.6 The Bid shall contain an acknowledgment of receipt of all Addenda (the numbers of which shall be filled in on the Bid form).

11.7 The address to which communications regarding the proposal are to be directed must be shown.

12. SUBMISSION OF PROPOSALS

Bids shall be submitted at the time and place indicated in the Notice to Contractors and shall be included in an opaque sealed envelope, marked with the Project title and name and address of the Bidder and accompanied by the Bid Security and other required documents. If the Bid is sent through the mail or other delivery system the sealed envelope shall be enclosed in a separate envelope with the notation "BID ENCLOSED" on the face thereof.

13. MODIFICATION AND WITHDRAWAL OF BIDS

13.1 Bids may be modified or withdrawn by an appropriate document duly executed (in the manner that a Bid must be executed) and delivered to the place where Bids are to be submitted at any time prior to the opening of Bids. Not withstanding, no bid may be modified after the opening of bids.

13.2 If, any Bidder files a duly signed written notice with Owner within twenty-four hours of the Bids opening and promptly thereafter demonstrates to the reasonable satisfaction of the Owner that there was a material and substantial mistake in the preparation of his Bid, that Bidder may withdraw his Bid and the Bid Security will be returned. Thereafter, that Bidder will be disqualified from further bidding on the Work.

14. OPENING OF BIDS

Bids will be opened publicly unless otherwise herein indicated.

14.1 When Bids are publicly opened they will be read aloud, and an abstract of the amounts of the Base Bids and major alternates (if any) will be made available after the opening of Bids.

15. BIDS TO REMAIN OPEN

All Bids shall remain open for sixty days after the day of the Bid opening, but Owner may, in his sole discretion, release any Bid and return the Bid Security prior to that date.

16. AWARD OF CONTRACT

16.1 Owner reserves the right to reject any and all Bids, to waive any and all informalities and to negotiate contract terms with the Successful Bidder, and the right to disregard all nonconforming, nonresponsive or conditional Bids. Discrepancies between words and figures will be resolved in favor of words. Discrepancies between the indicated sum of any column and the correct sum thereof will be resolved in favor of the correct sum.

16.2 In evaluating Bids, Owner shall consider the qualifications of the Bidders, whether or not the Bids comply with the prescribed requirements, and alternates and unit prices if requested in the Bid forms. It is Owner's intent to accept additive alternates (if they are accepted) in the order in which they are listed in the Bid form but Owner may accept them in any order or combination.

16.3 Owner may consider the qualifications and experience of Subcontractors and other persons and organizations (including those who are to furnish the principal items of material or equipment) proposed for those portions of the Work as to which the identity of Subcontractors and other persons and organizations must be submitted as provided in the Special Conditions. Operating costs, maintenance considerations, performance data and guarantees of materials and equipment may also be considered by Owner.

16.4 Owner may conduct such investigations as he deems necessary to assist in the evaluation of any Bid and to establish the responsibility, qualifications and financial ability of the Bidders, proposed Subcontractors and other persons and organizations to do the Work in accordance with the Contract Documents to Owner's satisfaction within the prescribed time.

16.5 Owner reserves the right to reject the Bid of any Bidder who does not pass any such evaluation to Owner's satisfaction.

16.6 If the contract is to be awarded it will be awarded to the lowest responsible Bidder whose evaluation by Owner indicates to Owner that the award will be in the best interests of the Owner.

16.7 If the contract is to be awarded, Owner will give the Successful Bidder a Notice of Award within sixty days after the day of the Bid opening.

17. PERFORMANCE AND OTHER BONDS

Paragraph 5.01 of the GENERAL CONDITIONS and the SUPPLEMENTARY CONDITIONS set forth Owner's requirements as to performance and other Bonds. When the Successful Bidder delivers the executed AGREEMENT to Owner it shall be accompanied by the required Contract Security.

18. SIGNING OF AGREEMENT

When Owner gives a Notice of Award to the Successful Bidder, it will be accompanied by at least three unsigned counterparts of the AGREEMENT. Within fifteen days thereafter Contractor shall sign and deliver at least three counterparts of the AGREEMENT to Owner. Within thirty days thereafter Owner will deliver fully signed counterparts to Contractor.

PART 1

PROPOSAL

CHICAGO EXECUTIVE AIRPORT
RESIDENTIAL SOUND INSULATION PROGRAM

SUBMITTED BY: _____

_____

SUBMITTED TO: Chicago Executive Airport Board of Directors

1020 South Plant Road, Wheeling, Illinois 60090

1. The undersigned BIDDER proposes and agrees, if this Bid is accepted, to enter into an Agreement with OWNER in the form included in the Contract Documents to complete all Work as specified or indicated in the Contract Documents for the Contract Price and within the Contract Time indicated in this Bid and in accordance with the Contract Documents.

2. BIDDER accepts all of the terms and conditions of the Instructions to Bidders, including without limitation those dealing with the disposition of the Bid Security. This Bid will remain open for sixty days after the day of Bid opening. BIDDER will sign the Agreement and submit the Contract Security and other documents required by the Contract Documents within fifteen days after the date of OWNER's Notice of Award.

3. In submitting this Bid, BIDDER represents, as more fully set forth in the Agreement, that:

(a) BIDDER has examined copies of all the Contract Documents and of the following addenda:

NUMBER	DATE
_____	_____
_____	_____
_____	_____
_____	_____

(receipt of all which is hereby acknowledged) and also copies of the Notice to Contractors and the Instructions to Bidders.

(b) BIDDER has examined the site and locality where the Work is to be performed, the legal requirements (federal, state and local laws, ordinances, rules and regulations) and the conditions affecting cost, progress or performance of the Work and has made such independent investigations as BIDDER deems necessary.

c) This Bid is genuine and not made in the interest of or on behalf of any undisclosed person, firm or corporation and is not submitted in conformity with any agreement or rules of any group, association, organization or corporation; BIDDER has not directly or indirectly induced or solicited any other Bidder to submit a false or sham Bid; BIDDER has not solicited or induced any person, firm or a corporation to refrain from bidding; and BIDDER has not sought by collusion to obtain for himself any advantage over any other Bidder or over OWNER.

PART 1

PROPOSAL

4. The OWNER requires all BIDDERS to make the following certification as a part of their bids:

> "In conjunction with this bid or any other bid for a public contract within the State of Illinois, the BIDDER warrants and certifies that the BIDDER has not violated the bid-rigging prohibition of P.A. 85-1295 (Ill. Rev. Stat. ch. 38, par. 33E-3), within the last five (5) years, and has not violated the bid rotation prohibition of P.A. 85-1295 (Ill. Rev. Stat. ch 38, par 33E-4), at any time."

5. BIDDER will complete the Work for the prices stated in the Schedule of Prices Section of this proposal.

6. BIDDER agrees that the Work will be substantially completed within: **250 calendar days**

BIDDER accepts the provisions of the Agreement as to liquidated damages in the event of failure to complete the Work on time.

7. The following documents are attached to and made a condition of this Bid:

a) Required Bid Security in the form of _____
b) Affidavit of Experience
c) List of Alternate Equipment (if applicable)
d) Bidder's Certificate

PART 1

PROPOSAL

AFFIDAVIT OF EXPERIENCE
(This Affidavit Must Be Executed)

STATE OF _____)
ss
COUNTY OF _____)

_____ being duly sworn,

says that he is _____, of
(Sole Owner, Member of Firm, Corporate Official)

_____ which
(Individual, Firm or Corporate Name)
has done work for the following parties of the general kind and approximate magnitude required under this contract:

_____

_____

and that _____ owns or has available for
(He, Said Firm or Said Corporation)
immediate use on the proposed work the following plant and equipment:

_____

_____

and that _____ will be assigned to the work under
(Name of Superintendent)
this contract, and that his experience in this kind of work is as follows:

_____

_____

Signature_____

Subscribed and sworn to before me on this _____ day of _____ A.D. **2026**.

_____ (SEAL)
Notary Public

PART 1

PROPOSAL

ALTERNATE EQUIPMENT

Unit	Manufacturer	Type or Model No.	Amount to be added or deleted

Signature of bidder_____
Individual or Corporate Name

By _____

Address_____

_____

PART 1

PROPOSAL

BIDDER'S CERTIFICATE

I/We hereby certify that:

A. A complete set of bid papers as intended have been received and that I/We will abide by the contents and/or information received and/or contained therein.

B. I/We have not entered into any collusion or other unethical practices with any other person, firm, or employee of the Chicago Executive Airport, the Village of Wheeling or City of Prospect Heights which would in any way be construed as an unethical business practice.

C. I/We comply with all current Federal, State, and Local laws, statutes, rules, and regulations referencing equal opportunity employment practices.

D. I/We are in compliance with the most current "Prevailing Rate" of wages for laborers, mechanics and other workers for Cook County.

E. I/We will abide by all codes, rules, regulations, ordinances and statutes of the City of Prospect Heights, Village of Wheeling, Cook County and the State of Illinois.

COMPANY NAME _____

ADDRESS _____

CITY, STATE, ZIP _____

NAME OF CORPORATE OR COMPANY OFFICIAL _____
(Please Type)

AUTHORIZED OFFICIAL SIGNATURE _____

TITLE _____

DATE _____

PHONE _____

PART 1

PROPOSAL

SCHEDULE OF PRICES

CHICAGO EXECUTIVE AIRPORT

WHEELING/PROSPECT HEIGHTS, ILLINOIS

RESIDENTIAL SOUND INSULATION PROGRAM

August 20, 2026

RESIDENTIAL SOUND INSULATION PROGRAM

BID ITEMS	DESCRIPTION	UNIT	EST. QUANT.	UNIT PRICE	TOTAL
TOTAL CONSTRUCTION COST =					

Total Base Bid 1 Construction Cost (Written) _____

_____

_____

PART 1

PROPOSAL

8. Communications concerning this Bid shall be addressed to: _____

At the address of BIDDER indicated below:

_____

9. The terms used in this Bid, which are defined in the General Conditions of the Construction Contract included as part of the Contract Documents, have the meanings assigned to them in the General Conditions or as modified in the Supplementary Conditions.

SUBMITTED on _____, **2026**

IF BIDDER IS:

AN INDIVIDUAL

By _____(SEAL)
(Individual's Name)

doing business as _____

Business address: _____

_____

_____

Phone No. _____

PART 1

PROPOSAL

A PARTNERSHIP

By _____(SEAL)
(Firm Name)

_____
(General Partner)

Business address: _____

_____

Phone No. _____

A CORPORATION

By _____(SEAL)
(Corporation Name)

_____
(State of Corporation)

By_____
(Name of person authorized to sign)

_____
(Title)

(Corporate Seal)

Attest _____
(Secretary)

Business address: _____

_____

Phone No. _____

PART 1

PROPOSAL

A JOINT VENTURE

By _____(SEAL)
(Name)

_____
(Address)

By _____(SEAL)
(Name)

_____
(Address)

(Each joint venture must sign. The manner of signing for each individual, partnership and corporation that is a party to the joint venture should be in the manner indicated above).

PART 1

AGREEMENT

THIS AGREEMENT is dated as of the _____ day of _____ in the year 2026 by and between

CHICAGO EXECUTIVE AIRPORT BOARD OF DIRECTORS
(hereinafter called the OWNER) and

_____
(hereinafter called CONTRACTOR)

OWNER and CONTRACTOR, in consideration of the mutual covenants hereinafter set forth, agree as follows:

Article 1. WORK

Contractor shall complete all Work as specified or indicated in the Contract Documents, all generally described as follows:

Residential Sound Insulation Program

Article 2. ENGINEER

The Project Engineer is C&S Engineers, Inc., who is hereinafter called ENGINEER. The ENGINEER will have the rights and authority assigned to ENGINEER in the Contract Documents in connection with completion of the Work in accordance with the Contract Documents.

Article 3. CONTRACT TIME

3.1 The Contract Time shall be as follows:

The work shall be substantially completed within: **250 calendar days**

Contract time shall commence to run as provided in Paragraph 2.03 of the General Conditions or Liquidated Damages will be assessed in accordance with Section 26 of the Supplementary General Conditions.

3.2 Liquidated Damages. OWNER and CONTRACTOR recognize that time is of the essence in this Agreement and that OWNER will suffer financial loss if the Work is not substantially complete within the time specified in paragraph 3.1 above, plus any extensions thereof allowed in accordance with Article 12 of the General Conditions. They also recognize the delays, expense and difficulties involved in a legal or arbitration proceeding and the actual loss suffered by OWNER if the Work is not substantially complete on time. Accordingly, instead of requiring any such proof, OWNER and CONTRACTOR agree that as liquidated damages for delay (but not as a penalty) CONTRACTOR shall pay OWNER an amount as set forth in the Supplementary General Conditions for each calendar day that expires after the time specified in paragraph 3.1 for substantial completion until the Work is substantially complete.

Article 4. CONTRACT PRICE

4.1 OWNER shall pay CONTRACTOR for performance of the Work in accordance with the Contract Documents in current funds in the amounts as shown in the attached PROPOSAL, or as amended by approved change orders.

Article 5. PAYMENT PROCEDURES

Contractor shall submit Applications for Payment in accordance with Article 14 of the General Conditions. Applications for Payment will be reviewed by ENGINEER as provided in the General Conditions and forwarded to the OWNER for approval.

5.1 Progress Payments. There will be no progress payments. One final payment will be made upon completion and acceptance of the work.

5.2 Final Payment. Upon final completion and acceptance of the Work in accordance with paragraph 14.07 of the General Conditions, OWNER shall pay the Contract Price as recommended by ENGINEER as provided in said paragraph 14.07.

Article 6. CONTRACTOR'S REPRESENTATIONS

In order to induce OWNER to enter into this Agreement, CONTRACTOR makes the following representations:

6.1 CONTRACTOR has familiarized himself with the nature and extent of the Contract Documents, Work, locality, and with all local conditions and federal, state and local laws, ordinances, rules and regulations that in any manner may affect cost, progress or performance of the Work.

6.2 CONTRACTOR has studied carefully all reports of investigations and tests of subsurface and latent physical conditions at the site or otherwise affecting cost, progress or performance of the Work which were relied upon by ENGINEER in the preparation of the Drawings and Specifications and which have been identified in the Supplementary Conditions.

6.3 CONTRACTOR has made or caused to be made examinations, investigations and tests and studies of such reports and related data in addition to those referred to in paragraph 6.2 as he deems necessary for the performance of the Work at the Contract Price, within the Contract Time and in accordance with the other terms and conditions of the Contract Documents; and no additional examinations, investigations, tests, reports or similar data are or will be required by CONTRACTOR for such purposes.

6.4 CONTRACTOR has correlated the results of all such observations, examinations, investigations, tests, reports and data with the terms and conditions of the Contract Documents.

6.5 CONTRACTOR has given ENGINEER written notice of all conflicts, errors or discrepancies that he has discovered in the Contract Documents and the written resolution thereof by ENGINEER is acceptable to CONTRACTOR.

PART 1

AGREEMENT

Article 7. CONTRACT DOCUMENTS

The Contract Documents which comprise the entire agreement between OWNER and CONTRACTOR, made a part hereof and consists of the following:

7.1 This Agreement (pages **A-1 to A-5**)
7.2 Performance and Payment Bonds consisting of pages **B-1 to B-6**.
7.3 General Specifications (Consisting of divisions and pages as listed in the Table of Contents, thereof)
7.4 General Conditions (pages **1 to 56,** inclusive)
7.5 Supplementary General Conditions (pages **SGC-1 to SGC-15** inclusive)
7.6 Special Conditions (pages **SC-1 to SC-8**)
7.7 Special Provisions (pages **SP.1 to SP.25**)
7.8 Drawings with each sheet bearing the following general title:

Chicago Executive Airport
Wheeling/Prospect Heights, IL
Residential Sound Insulation Program

7.9 Addenda numbers ___ to ___, inclusive, contained in Attachment 'A'
7.10 Proposal (pages **P-1 to P-10**, inclusive)
7.11 Supplemental Information submitted by CONTRACTOR, contained in Attachment 'A'
7.12 Any Change Orders, duly delivered after execution of Agreement.
7.13 State of Illinois Department of Transportation Standards.
7.14 Instructions to Bidders (pages **IB-1 to IB-5**, inclusive)

There are no Contract Documents other than those listed above in this Article 7. The Contract Documents may only be altered, amended or repealed by a Change Order (as defined in Article 1 of the GENERAL CONDITIONS).

Article 8. MISCELLANEOUS

8.1 Terms used in this Agreement, which are defined in Article 1 of the GENERAL CONDITIONS, shall have the meanings indicated in the GENERAL CONDITIONS.

8.2 No assignment by a party hereto of any rights under or interests in the Contract Documents will be binding on another party hereto without the written consent of the party sought to be bound; and specifically but without limitation, moneys that may become due and moneys that are due may not be assigned without such consent (except to the extent that the effect of this restriction may be limited by law), and unless specifically stated to the contrary in any written consent to an assignment no assignment will release or discharge the assignor from any duty or responsibility under the Contract Documents.

8.3 OWNER and CONTRACTOR each binds himself, his partners, successors, assigns and legal representatives to the other party hereto, his partners, successors, assigns and legal representatives in respect to all covenants, agreements and obligations contained in the Contract Documents.

PART 1

AGREEMENT

Article 9. OTHER PROVISIONS

9.1 The CONTRACTOR will be required to agree that not less than the prevailing rate of wages will be paid to all workmen, laborers and mechanics performing work under this contract.

IN WITNESS WHEREOF, the parties hereto have signed this Agreement in triplicate. One counterpart each has been delivered to OWNER, CONTRACTOR and ENGINEER.

This Agreement will be effective on _____, **2026**.

A CORPORATION

OWNER Chicago Executive Airport

By _____
(CORPORATE SEAL)

Attest _____

Address for giving notices

1020 South Plant Road

Wheeling, IL 60090

CONTRACTOR _____

By _____
(CORPORATE SEAL)

Attest _____

Address for giving notices

AN INDIVIDUAL

By _____(SEAL)
Individual's Name

DBA _____

Business Address _____

Phone No. _____

PART 1

AGREEMENT

PARTNERSHIP

By _____(SEAL)
(Firm Name)

_____
(General Partner)

Business Address _____

_____

Phone No. _____

JOINT VENTURE

By _____
(Name)

_____
(Address)

By _____
(Name)

_____
(Address)

(Each joint venturer must sign. The manner of signing for each individual, partnership and corporation that is a party to the Joint Venture should be in the manner indicated above).

PART 1

PERFORMANCE BOND

KNOW ALL MEN BY THESE PRESENTS: that

_____
(Name of Contractor)

_____
(Address of Contractor)

a _____, hereinafter called Principal, and
(Corporation, Partnership or Individual)

_____
(Name of Surety)

_____
(Address of Surety)

hereinafter called Surety, are held and firmly bound unto _____

CHICAGO EXECUTIVE AIRPORT
(Name of Owner)

1020 SOUTH PLANT ROAD, WHEELING, ILLINOIS 60090
(Address of Owner)

hereinafter called Owner, in the penal sum of _____

_____ Dollars ($ _____)
in lawful money of the United States, for the payment of which sum well and truly to be made, we bind ourselves, successors, and assigns, jointly and severally, firmly by these presents.

THE CONDITION OF THIS OBLIGATION is such that whereas, the Principal entered into a certain contract with the OWNER, dated the _____ day of _____ **2026**, a copy of which is hereto attached and made a part hereof for the construction of:

RESIDENTIAL SOUND INSULATION PROGRAM

PART 1

PERFORMANCE BOND

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

PROVIDED, FURTHER, that the said surety, for value received hereby stipulates and agrees that no change, extension of time, alteration or addition to the terms of the contract or to WORK to be performed thereunder or the SPECIFICATIONS accompanying the same shall in any way affect its obligation on this BOND, and it does hereby waive notice of the contract or to the WORK or to the SPECIFICATIONS.

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

PART 1

PERFORMANCE BOND

IN WITNESS WHEREOF, this instrument is executed in _____ counterparts, each one of (number)

which shall be deemed an original, this the _____ day of _____ **2026**.

ATTEST:

_____	_____
(Principal) Secretary	Principal
(SEAL)	
_____	By _____/s/
(Witness as to Principal)	
_____	_____
(Address)	(Address)
_____	_____

ATTEST:

_____	_____
(Surety) Secretary	Surety
(SEAL)	
_____	By _____
Witness as to Surety	Attorney-in-fact
_____	_____
(Address)	(Address)
_____	_____

NOTE: Date of BOND must not be prior to date of Contract. If CONTRACTOR is Partnership, all partners should execute BOND.

IMPORTANT -- Surety companies executing BONDS must be named in current list of "Companies Holding Certificates of Authority as Acceptable Sureties on Federal Bonds and as Acceptable Reinsuring Companies" as published in Circular 570 (amended) by the Audit Staff Bureau of Accounts, U.S. Treasury Department, and be authorized to transact business in the State of Illinois.

PART 1

PAYMENT BOND

KNOW ALL MEN BY THESE PRESENTS: that

_____
(Name of Contractor)

_____
(Address of Contractor)

a _____, hereinafter called Principal, and
(Corporation, Partnership or Individual)

_____
(Name of Surety)

_____
(Address of Surety)

hereinafter called Surety, are held and firmly bound unto _____

CHICAGO EXECUTIVE AIRPORT
(Name of Owner)

1020 SOUTH PLANT ROAD, WHEELING, ILLINOIS 60090
(Address of Owner)

hereinafter called Owner, in the penal sum of _____

_____ Dollars ($ _____)
in lawful money of the United States, for the payment of which sum well and truly to be made, we bind ourselves, successors, and assigns, jointly and severally, firmly by these presents.

THE CONDITION OF THIS OBLIGATION is such that whereas, the Principal entered into a certain contract with the OWNER, dated the _____ day of _____ **2026**, a copy of which is hereto attached and made a part hereof for the construction of:

RESIDENTIAL SOUND INSULATION PROGRAM

PART 1

PAYMENT BOND

NOW THEREFORE, if the principal shall promptly make payment to all persons, firms, SUBCONTRACTORS, and corporations furnishing materials for or performing labor in the prosecution of the WORK provided for in such contract, and any authorized extension or modification thereof, including all amounts due for materials, lubricants, oil, gasoline, coal and coke, repairs on machinery, equipment and tools, consumed or used in connection with the construction of such WORK, and all insurance premiums on said WORK, and for all labor, performed in such WORK whether SUBCONTRACTOR or otherwise, then this obligation shall be void; otherwise to remain in full force and effect.

PROVIDED, FURTHER, that the said surety, for value received hereby stipulates and agrees that no change, extension of time, alteration or addition to the terms of the contract or to WORK to be performed thereunder or the SPECIFICATIONS accompanying the same shall in any wise affect its obligation on this BOND, and it does hereby waive notice of the contract or to the WORK or to the SPECIFICATIONS.

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

IN WITNESS WHEREOF, this instrument is executed in _____ counterparts, each one of
(number)

which shall be deemed an original, this the _____ day of _____ **2026**

ATTEST:

_____	_____
(Principal) Secretary	Principal
(SEAL)	
_____	By _____/s/
(Witness as to Principal)	
_____	_____
(Address)	(Address)
_____	_____

ATTEST:

_____	_____
(Surety) Secretary	Surety
(SEAL)	
_____	By _____
Witness as to Surety	Attorney-in-fact
_____	_____
(Address)	(Address)
_____	_____

NOTE: Date of BOND must not be prior to date of Contract. If CONTRACTOR is Partnership, all partners should execute BOND.

IMPORTANT -- Surety companies executing BONDS must be named in current list of "Companies Holding Certificates of Authority as Acceptable Sureties on Federal Bonds and as Acceptable Reinsuring Companies" as published in Circular 570 (amended) by the Audit Staff Bureau of Accounts, U.S. Treasury Department, and be authorized to transact business in the State of Illinois.

CHICAGO EXECUTIVE AIRPORT
RESIDENTIAL SOUND INSULATION PROGRAM

PART 2

GENERAL CONDITIONS OF THE CONTRACT

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SECTION 3

STANDARD GENERAL CONDITIONS OF THE CONSTRUCTION CONTRACT

Prepared by

ENGINEERS JOINT CONTRACT DOCUMENTS COMMITTEE

and

Issued and Published Jointly By

ACEC
American Council of Engineering Companies

National Society of Professional Engineers
Professional Engineers in Private Practice

ASCE American Society of Civil Engineers

PROFESSIONAL ENGINEERS IN PRIVATE PRACTICE
a practice division of the
NATIONAL SOCIETY OF PROFESSIONAL ENGINEERS

AMERICAN COUNCIL OF ENGINEERING COMPANIES

AMERICAN SOCIETY OF CIVIL ENGINEERS

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The Associated General Contractors of America

Knowledge for Creating and Sustaining the Built Environment

Construction Specifications Institute

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1420 King Street, Alexandria, VA 22314

American Council of Engineering Companies
1015 15th Street, N.W., Washington, DC 20005

American Society of Civil Engineers
1801 Alexander Bell Drive, Reston, VA 20201-4400

These General Conditions have been prepared for use with the Suggested Forms of Agreement Between Owner and Contractor Nos. C-520 or C-525 (2002 Editions). Their provisions are interrelated and a change in one may necessitate a change in the other. Comments concerning their usage are contained in the EJCDC Construction Documents, General and Instructions (No. C-001) (2002 Edition). For guidance in the preparation of Supplementary Conditions, see Guide to the Preparation of Supplementary Conditions (No. C-800) (2002 Edition).

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GENERAL CONDITIONS

ARTICLE 1 - DEFINITIONS AND TERMINOLOGY

1.01 Defined Terms

A. Wherever used in the Bidding Requirements or Contract Documents and printed with initial capital letters, the terms listed below will have the meanings indicated which are applicable to both the singular and plural thereof. In addition to terms specifically defined, terms with initial capital letters in the Contract Documents include references to identified articles and paragraphs, and the titles of other documents or forms.

1. *Addenda*--Written or graphic instruments issued prior to the opening of Bids which clarify, correct, or change the Bidding Requirements or the proposed Contract Documents.

2. *Agreement*--The written instrument which is evidence of the agreement between Owner and Contractor covering the Work.

3. *Application for Payment*--The form acceptable to Engineer which is to be used by Contractor during the course of the Work in requesting progress or final payments and which is to be accompanied by such supporting documentation as is required by the Contract Documents.

4. *Asbestos*--Any material that contains more than one percent asbestos and is friable or is releasing asbestos fibers into the air above current action levels established by the United States Occupational Safety and Health Administration.

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

SEE SC-2

6. *Bidder*--The individual or entity who submits a Bid directly to Owner.

7. *Bidding Documents*--The Bidding Requirements and the proposed Contract Documents (including all Addenda).

SEE SC-3

8. *Bidding Requirements* -- The Advertisement or Invitation to Bid, Instructions to Bidders, bid security of acceptable form, if any, and the Bid Form with any supplements.

SEE SC-4

9. *Change Order*--A document recommended by Engineer which is signed by Contractor and Owner and authorizes an addition, deletion, or revision in the Work or an adjustment in the Contract Price or the Contract Times, issued on or after the Effective Date of the Agreement.

10. *Claim*--A demand or assertion by Owner or Contractor seeking an adjustment of Contract Price or Contract Times, or both, or other relief with respect to the terms of the Contract. A demand for money or services by a third party is not a Claim.

11. *Contract*--The entire and integrated written agreement between the Owner and Contractor concerning the Work. The Contract supersedes prior negotiations, representations, or agreements, whether written or oral.

12. *Contract Documents*-- Those items so designated in the Agreement. Only printed or hard copies of the items listed in the Agreement are Contract Documents. ~~Approved~~ Shop Drawings, other Contractor's submittals, and the reports and drawings of subsurface and physical conditions are not Contract Documents.

SEE SC-5

13. *Contract Price*--The moneys payable by Owner to Contractor for completion of the Work in accordance with the Contract Documents as stated in the Agreement (subject to the provisions of

Paragraph 11.03 in the case of Unit Price Work).

14. *Contract Times*--The number of days or the dates stated in the Agreement to: ~~(i) achieve Milestones, if any, (ii) achieve Substantial Completion; and~~ (iii) complete the Work so that it is ready for final payment as evidenced by Engineer's written recommendation of final payment.

SEE SC-6

15. *Contractor*--The individual or entity with whom Owner has entered into the Agreement.

16. *Cost of the Work*--See Paragraph 11.01.A for definition.

17. *Drawings*--That part of the Contract Documents prepared or approved by Engineer which graphically shows the scope, extent, and character of the Work to be performed by Contractor. Shop Drawings and other Contractor submittals are not Drawings as so defined.

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

19. *Engineer*--The individual or entity named as such in the Agreement.

20. *Field Order*--A written order issued by Engineer which requires minor changes in the Work but which does not involve a change in the Contract Price or the Contract Times.

21. *General Requirements*--Sections of Division 1 of the Specifications. The General Requirements pertain to all sections of the Specifications.

22. *Hazardous Environmental Condition*--The presence at the Site of Asbestos, PCBs, Petroleum, Hazardous Waste, or Radioactive Material in such quantities or circumstances that may present a substantial danger to persons or property exposed thereto in connection with the Work.

23. *Hazardous Waste*--The term Hazardous Waste shall have the meaning provided in Section 1004 of the Solid Waste Disposal Act (42 USC Section 6903) as amended from time to time.

24. *Laws and Regulations; Laws or Regulations*--Any and all applicable laws, rules, regulations, ordinances, codes, and orders of any and all governmental bodies, agencies, authorities, and courts having jurisdiction.

25. *Liens*--Charges, security interests, or encumbrances upon Project funds, real property, or personal property.

26. *Milestone*--A principal event specified in the Contract Documents relating to an intermediate completion date or time prior to Substantial Completion of all the Work.

27. *Notice of Award*--The written notice by Owner to the Successful Bidder stating that upon timely compliance by the Successful Bidder with the conditions precedent listed therein, Owner will sign and deliver the Agreement.

28. *Notice to Proceed*--A written notice given by Owner to Contractor fixing the date on which the Contract Times will commence to run and on which Contractor shall start to perform the Work under the Contract Documents.

29. *Owner*--The individual or entity with whom Contractor has entered into the Agreement and for whom the Work is to be performed.

30. *PCBs*--Polychlorinated biphenyls.

31. *Petroleum*--Petroleum, including crude oil or any fraction thereof which is liquid at standard conditions of temperature and pressure (60 degrees Fahrenheit and

14.7 pounds per square inch absolute), such as oil, petroleum, fuel oil, oil sludge, oil refuse, gasoline, kerosene, and oil mixed with other non-Hazardous Waste and crude oils.

32. *Progress Schedule*--A schedule, prepared and maintained by Contractor, describing the sequence and duration of the activities comprising the Contractor's plan to accomplish the Work within the Contract Times.

33. *Project*--The total construction of which the Work to be performed under the Contract Documents may be the whole, or a part.

34. *Project Manual*--The bound documentary information prepared for bidding and constructing the Work. A listing of the contents of the Project Manual, which may be bound in one or more volumes, is contained in the table(s) of contents.

35. *Radioactive Material*--Source, special nuclear, or byproduct material as defined by the Atomic Energy Act of 1954 (42 USC Section 2011 et seq.) as amended from time to time.

36. *Related Entity* -- An officer, director, partner, employee, agent, consultant, or subcontractor.

37. *Resident Project Representative*--The authorized representative of Engineer who may be assigned to the Site or any part thereof.

38. *Samples*--Physical examples of materials, equipment, or workmanship that are representative of some portion of the Work and which establish the standards by which such portion of the Work will be judged.

39. *Schedule of Submittals*--A schedule, prepared and maintained by Contractor, of required submittals and the time requirements to support scheduled performance of related construction activities.

40. *Schedule of Values*--A schedule, prepared and maintained by Contractor, allocating portions of the Contract Price to various portions of the Work and used as the basis for reviewing Contractor's Applications for Payment.

41. *Shop Drawings*--All drawings, diagrams, illustrations, schedules, and other data or information which are specifically prepared or assembled by or for Contractor and submitted by Contractor to illustrate some portion of the Work.

42. *Site*--Lands or areas indicated in the Contract Documents as being furnished by Owner upon which the Work is to be performed, including rights-of-way and easements for access thereto, and such other lands furnished by Owner which are designated for the use of Contractor.

43. *Specifications*--That part of the Contract Documents consisting of written requirements for materials, equipment, systems, standards and workmanship as applied to the Work, and certain administrative requirements and procedural matters applicable thereto.

44. *Subcontractor*--An individual or entity having a direct contract with Contractor or with any other Subcontractor for the performance of a part of the Work at the Site.

45. *Substantial Completion*--The time at which the Work (or a specified part thereof) has progressed to the point where, in the opinion of Engineer, the Work (or a specified part thereof) is sufficiently complete, in accordance with the Contract Documents, so that the Work (or a specified part thereof) can be utilized for the purposes for which it is intended. The terms "substantially complete" and "substantially completed" as applied to all or part of the Work refer to Substantial Completion thereof.

46. *Successful Bidder*--The Bidder submitting a responsive Bid to whom Owner makes an award.

47. *Supplementary Conditions*--That part of the Contract Documents which amends or supplements these General Conditions.

48. Supplier--A manufacturer, fabricator, supplier, distributor, materialman, or vendor having a direct contract with Contractor or with any Subcontractor to furnish materials or equipment to be incorporated in the Work by Contractor or any Subcontractor.

49. *Underground Facilities*--All underground pipelines, conduits, ducts, cables, wires, manholes, vaults, tanks, tunnels, or other such facilities or attachments, and any encasements containing such facilities, including those that convey electricity, gases, steam, liquid petroleum products, telephone or other communications, cable television, water, wastewater, storm water, other liquids or chemicals, or traffic or other control systems.

50. *Unit Price Work*--Work to be paid for on the basis of unit prices.

51. *Work*--The entire construction or the various separately identifiable parts thereof required to be provided under the Contract Documents. Work includes and is the result of performing or providing all labor, services, and documentation necessary to produce such construction, and furnishing, installing, and incorporating all materials and equipment into such construction, all as required by the Contract Documents.

52. *Work Change Directive*--A written statement to Contractor issued on or after the Effective Date of the Agreement and signed by Owner and recommended by Engineer ordering an addition, deletion, or revision in the Work, or responding to differing or unforeseen subsurface or physical conditions under which the Work is to be performed or to emergencies. A Work Change Directive will not change the Contract Price or the Contract Times but is evidence that the parties expect that the change ordered or documented by a Work Change Directive will be incorporated in a subsequently issued Change Order following negotiations by the parties as to its effect, if any, on the Contract Price or Contract Times.

1.02 Terminology

A. The following words or terms are not defined but, when used in the Bidding Requirements or Contract Documents, have the following meaning.

B*. Intent of Certain Terms or Adjectives*

1. The Contract Documents include the terms “as allowed,” “as approved,” “as ordered”, “as directed” or terms of like effect or import to authorize an exercise of professional judgment by Engineer. In addition, the adjectives “reasonable,” “suitable,” “acceptable,” “proper,” “satisfactory,” or adjectives of like effect or import are used to describe an action or determination of Engineer as to the Work. It is intended that such exercise of professional judgment, action or determination will be solely to evaluate, in general, the Work for compliance with the requirements of and information in the Contract Documents and conformance with the design concept of the completed Project as a functioning whole as shown or indicated in the Contract Documents (unless there is a specific statement indicating otherwise). The use of any such term or adjective is not intended to and shall not be effective to assign to Engineer any duty or authority to supervise or direct the performance of the Work or any duty or authority to undertake responsibility contrary to the provisions of Paragraph 9.09 or any other provision of the Contract Documents.

C. *Day*

1. The word “day” means a calendar day of 24 hours measured from midnight to the next midnight.

D*. Defective*

1. The word “defective,” when modifying the word “Work,” refers to Work that is unsatisfactory, faulty, or deficient in that it:

a. does not conform to the Contract Documents, or

b. does not meet the requirements of any applicable inspection, reference standard, test, or approval referred to in the Contract Documents, or

c. has been damaged prior to Engineer’s recommendation of final payment (unless responsibility for the protection thereof has been assumed by Owner at Substantial Completion in accordance with Paragraph 14.04 or 14.05).

E. *Furnish, Install, Perform, Provide*

1. The word “furnish,” when used in connection with services, materials, or equipment, shall mean to supply and deliver said services, materials, or equipment to the Site (or some other specified location) ready for use or installation and in usable or operable condition.

2. The word “install,” when used in connection with services, materials, or equipment, shall mean to put into use or place in final position said services, materials, or equipment complete and ready for intended use.

3. The words “perform” or “provide,” when used in connection with services, materials, or equipment, shall mean to furnish and install said services, materials, or equipment complete and ready for intended use.

4. When “furnish,” “install,” “perform,” or “provide” is not used in connection with services, materials, or equipment in a context clearly requiring an obligation of Contractor, “provide” is implied.

F. Unless stated otherwise in the Contract Documents, words or phrases which have a well-known technical or construction industry or trade meaning are used in the Contract Documents in accordance with such recognized meaning.

ARTICLE 2 - PRELIMINARY MATTERS

2.01 Delivery of Bonds and Evidence of Insurance

A. When Contractor delivers the executed counterparts of the Agreement to Owner, Contractor shall also deliver to Owner such bonds as Contractor may be required to furnish.

~~B. *Evidence of Insurance:* Before any Work at the Site is started, Contractor and Owner shall each deliver to the other, with copies to each additional insured identified in the Supplementary Conditions, certificates of insurance (and other evidence of insurance which either of them or any additional insured may reasonably request) which Contractor and Owner respectively are required to purchase and maintain in accordance with Article 5.~~

SEE SC-7

2.02 Copies of Documents

A. Owner shall furnish to Contractor up to ten printed or hard copies of the - Drawings and Project Manual. Additional copies will be furnished upon request at the cost of reproduction.

2.03 Commencement of Contract Times; Notice to Proceed

A. The Contract Times will commence to run on the thirtieth day after the Effective Date of the Agreement or, if a Notice to Proceed is given, on the day indicated in the Notice to Proceed. A Notice to Proceed may be given at any time within 30 days after the Effective Date of the Agreement. In no event will the Contract Times commence to run later than the sixtieth day after the day of Bid opening or

the thirtieth day after the Effective Date of the Agreement, whichever date is earlier.

2.04 Starting the Work

A. Contractor shall start to perform the Work on the date when the Contract Times commence to run. No Work shall be done at the Site prior to the date on which the Contract Times commence to run.

2.05 Before Starting Construction

A. *Preliminary Schedules:* Within 10 days after the Effective Date of the Agreement (unless otherwise specified in the General Requirements), Contractor shall submit to Engineer for timely review**:**

1. a preliminary Progress Schedule; indicating the times (numbers of days or dates) for starting and completing the various stages of the Work, including any Milestones specified in the Contract Documents;

2. a preliminary Schedule of Submittals; and

3. a preliminary Schedule of Values for all of the Work which includes quantities and prices of items which when added together equal the Contract Price and subdivides the Work into component parts in sufficient detail to serve as the basis for progress payments during performance of the Work. Such prices will include an appropriate amount of overhead and profit applicable to each item of Work.

2.06 Preconstruction Conference

A. Before any Work at the Site is started, a conference attended by Owner, Contractor, Engineer, and others as appropriate will be held to establish a working understanding among the parties as to the Work and to discuss the schedules referred to in Paragraph 2.05.A, procedures for handling Shop Drawings and other submittals, processing Applications for Payment, and maintaining required records.

2.07 Initial Acceptance of Schedules

A. At least 10 days before submission of the first Application for Payment a conference attended by Contractor, Engineer, and others as appropriate will be held to review for acceptability to Engineer as provided below the schedules submitted in accordance with Paragraph 2.05.A. Contractor shall have an additional 10 days to make corrections and adjustments and to complete and resubmit the schedules. No progress payment shall be made to Contractor until acceptable schedules are submitted to Engineer.

1. The Progress Schedule will be acceptable to Engineer if it provides an orderly progression of the Work to completion within the Contract Times. Such acceptance will not impose on Engineer responsibility for the Progress Schedule, for sequencing, scheduling, or progress of the Work nor interfere with or relieve Contractor from Contractor's full responsibility therefor.

2. Contractor's Schedule of Submittals will be acceptable to Engineer if it provides a workable arrangement for reviewing and processing the required submittals.

3. Contractor's Schedule of Values will be acceptable to Engineer as to form and substance if it provides a reasonable allocation of the Contract Price to component parts of the Work.

ARTICLE 3 - CONTRACT DOCUMENTS: INTENT, AMENDING, REUSE

3.01 Intent

A. The Contract Documents are complementary; what is required by one is as binding as if required by all.

B. It is the intent of the Contract Documents to describe a functionally complete Project (or part thereof) to be constructed in accordance with the Contract Documents. Any labor, documentation,

services, materials, or equipment that may reasonably be inferred from the Contract Documents or from prevailing custom or trade usage as being required to produce the intended result will be provided whether or not specifically called for at no additional cost to Owner.

C. Clarifications and interpretations of the Contract Documents shall be issued by Engineer as provided in Article 9.

3.02 Reference Standards

A. Standards, Specifications, Codes, Laws, and Regulations

1. Reference to standards, specifications, manuals, or codes of any technical society, organization, or association, or to Laws or Regulations, whether such reference be specific or by implication, shall mean the standard, specification, manual, code, or Laws or Regulations in effect at the time of opening of Bids (or on the Effective Date of the Agreement if there were no Bids), except as may be otherwise specifically stated in the Contract Documents.

2. No provision of any such standard, specification, manual or code, or any instruction of a Supplier shall be effective to change the duties or responsibilities of Owner, Contractor, or Engineer, or any of their subcontractors, consultants, agents, or employees from those set forth in the Contract Documents. No such provision or instruction shall be effective to assign to Owner, or Engineer, or any of, their Related Entities, any duty or authority to supervise or direct the performance of the Work or any duty or authority to undertake responsibility inconsistent with the provisions of the Contract Documents.

3.03 Reporting and Resolving Discrepancies

A. Reporting Discrepancies

1. *Contractor's Review of Contract Documents Before Starting Work*: Before undertaking each part of the Work, Contractor shall carefully study and compare the Contract Documents and check and verify pertinent figures therein and all applicable field measurements. Contractor shall promptly report in writing to Engineer any conflict, error, ambiguity, or discrepancy which Contractor may discover and shall obtain a written interpretation or clarification from Engineer before proceeding with any Work affected thereby.

2. *Contractor's Review of Contract Documents During Performance of Work*: If, during the performance of the Work, Contractor discovers any conflict, error, ambiguity, or discrepancy within the Contract Documents or between the Contract Documents and any provision of any Law or Regulation applicable to the performance of the Work or of any standard, specification, manual or code, or of any instruction of any Supplier, Contractor shall promptly report it to Engineer in writing. Contractor shall not proceed with the Work affected thereby (except in an emergency as required by Paragraph 6.16.A) until an amendment or supplement to the Contract Documents has been issued by one of the methods indicated in Paragraph 3.04.

3. Contractor shall not be liable to Owner or Engineer for failure to report any conflict, error, ambiguity, or discrepancy in the Contract Documents unless Contractor knew or reasonably should have known thereof.

B. Resolving Discrepancies

1. Except as may be otherwise specifically stated in the Contract Documents, the provisions of the Contract Documents shall take precedence in resolving any conflict, error, ambiguity, or discrepancy between the provisions of the Contract Documents and:

a. the provisions of any standard, specification, manual, code, or instruction (whether or not specifically incorporated by reference in the Contract Documents); or

b. the provisions of any Laws or Regulations applicable to the performance of the Work (unless such an interpretation of the provisions of the Contract Documents would result in violation of such Law or Regulation).

SEE SC-8

3.04 Amending and Supplementing Contract Documents

A. The Contract Documents may be amended to provide for additions, deletions, and revisions in the Work or to modify the terms and conditions thereof by either a Change Order or a Work Change Directive.

B. The requirements of the Contract Documents may be supplemented, and minor variations and deviations in the Work may be authorized, by one or more of the following ways:

1. A Field Order;

2. Engineer's approval of a Shop Drawing or Sample; (Subject to the provisions of Paragraph 6.17.D.3); or

3. Engineer's written interpretation or clarification.

3.05 Reuse of Documents

A. Contractor and any Subcontractor or Supplier or other individual or entity performing or furnishing all of the Work under a direct or indirect contract with Contractor, shall not:

1. have or acquire any title to or ownership rights in any of the Drawings, Specifications, or other documents (or copies of any thereof) prepared by or bearing the seal of Engineer or Engineer's consultants, including electronic media editions; or

2. reuse any of such Drawings, Specifications, other documents, or copies thereof on extensions of the Project or any other project without written consent of Owner and Engineer and specific written verification or adaption by Engineer.

B. The prohibition of this Paragraph 3.05 will survive final payment, or termination of the Contract. Nothing herein shall preclude Contractor from retaining copies of the Contract Documents for record purposes.

3.06 Electronic Data

A. Copies of data furnished by Owner or Engineer to Contractor or Contractor to Owner or Engineer that may be relied upon are limited to the printed copies (also known as hard copies). Files in electronic media format of text, data, graphics, or other types are furnished only for the convenience of the receiving party. Any conclusion or information obtained or derived from such electronic files will be at the user's sole risk. If there is a discrepancy between the electronic files and the hard copies, the hard copies govern.

B. Because data stored in electronic media format can deteriorate or be modified inadvertently or otherwise without authorization of the data's creator, the party receiving electronic files agrees that it will perform acceptance tests or procedures within 60 days, after which the receiving party shall be deemed to have accepted the data thus transferred. Any errors detected within the 60-day acceptance period will be corrected by the transferring party..

C. When transferring documents in electronic media format, the transferring party makes no representations as to long term compatibility, usability, or readability of documents resulting from the use of software application packages, operating systems, or computer hardware differing from those used by the data's creator.

ARTICLE 4 - AVAILABILITY OF LANDS; SUBSURFACE AND PHYSICAL CONDITIONS; HAZARDOUS ENVIRONMENTAL CONDITIONS; REFERENCE POINTS

4.01 Availability of Lands

A. Owner shall furnish the Site. Owner shall notify Contractor of any encumbrances or restrictions not of general application but specifically related to use of the Site with which Contractor must comply in performing the Work. Owner will obtain in a timely manner and pay for easements for permanent structures or permanent changes in existing facilities. If Contractor and Owner are unable to agree on entitlement to or on the amount or extent, if any, of any adjustment in the Contract Price or Contract Times, or both, as a result of any delay in Owner's furnishing the Site or a part thereof, Contractor may make a Claim therefor as provided in Paragraph 10.05.

B. Upon reasonable written request, Owner shall furnish Contractor with a current statement of record legal title and legal description of the lands upon which the Work is to be performed and Owner's interest therein as necessary for giving notice of or filing a mechanic's or construction lien against such lands in accordance with applicable Laws and Regulations.

C. Contractor shall provide for all additional lands and access thereto that may be required for temporary construction facilities or storage of materials and equipment.

~~*4.02 Subsurface and Physical Conditions*~~

~~A. *Reports and Drawings:* The Supplementary Conditions identify:~~

~~1. those reports of explorations and tests of subsurface conditions at or contiguous to the Site that Engineer has used in preparing the Contract Documents; and~~

~~2. those drawings of physical conditions in or relating to existing surface or subsurface structures at or contiguous to the Site (except Underground Facilities) that Engineer has used in preparing the Contract Documents.~~

~~B. *Limited Reliance by Contractor on Technical Data Authorized:* Contractor may rely upon the general accuracy of the "technical data" contained in such reports and drawings, but such reports and drawings are not Contract Documents. Such "technical data" is identified in the Supplementary Conditions. Except for such reliance on such "technical data," Contractor may not rely upon or make any claim against Owner or Engineer, or any of their Related Entities with respect to:~~

~~1. the completeness of such reports and drawings for Contractor's purposes, including, but not limited to, any aspects of the means, methods, techniques, sequences, and procedures of construction to be employed by Contractor, and safety precautions and programs incident thereto; or~~

~~2. other data, interpretations, opinions, and information contained in such reports or shown or indicated in such drawings; or~~

~~3. any Contractor interpretation of or conclusion drawn from any "technical data" or any such other data, interpretations, opinions, or information.~~

SEE SC-9

4.03 Differing Subsurface or Physical Conditions

A. *Notice:* If Contractor believes that any subsurface or physical condition at or contiguous to the Site that is uncovered or revealed either:

1. is of such a nature as to establish that any "technical data" on which Contractor is entitled to rely as provided in Paragraph 4.02 is materially inaccurate; or

2. is of such a nature as to require a change in the Contract Documents; or

3. differs materially from that shown or indicated in the Contract Documents; or

4. is of an unusual nature, and differs materially from conditions ordinarily encountered and generally recognized as inherent in work of the character provided for in the Contract Documents;

then Contractor shall, promptly after becoming aware thereof and before further disturbing the subsurface or physical conditions or performing any Work in connection therewith (except in an emergency as required by Paragraph 6.16.A), notify Owner and Engineer in writing about such condition. Contractor shall not further disturb such condition or perform any Work in connection therewith (except as aforesaid) until receipt of written order to do so.

B. *Engineer's Review*: After receipt of written notice as required by Paragraph 4.03.A, Engineer will promptly review the pertinent condition, determine the necessity of Owner's obtaining additional exploration or tests with respect thereto, and advise Owner in writing (with a copy to Contractor) of Engineer's findings and conclusions.

C. Possible Price and Times Adjustments

1. The Contract Price or the Contract Times, or both, will be equitably adjusted to the extent that the existence of such differing subsurface or physical condition causes an increase or decrease in Contractor's cost of, or time required for, performance of the Work; subject, however, to the following:

a. such condition must meet any one or more of the categories described in Paragraph 4.03.A; and

b. with respect to Work that is paid for on a Unit Price Basis, any adjustment in Contract Price will be subject to the provisions of Paragraphs 9.07 and 11.03.

2. Contractor shall not be entitled to any adjustment in the Contract Price or Contract Times if:

a. Contractor knew of the existence of such conditions at the time Contractor made a final commitment to Owner with respect to Contract Price and Contract Times by the submission of a Bid or becoming bound under a negotiated contract; or

b. the existence of such condition could reasonably have been discovered or revealed as a result of any examination, investigation, exploration, test, or study of the Site and contiguous areas required by the Bidding Requirements or Contract Documents to be conducted by or for Contractor prior to Contractor's making such final commitment; or

c. Contractor failed to give the written notice as required by Paragraph 4.03.A.

3. If Owner and Contractor are unable to agree on entitlement to or on the amount or extent, if any, of any adjustment in the Contract Price or Contract Times, or both, a Claim may be made therefor as provided in Paragraph 10.05. However, Owner and Engineer, and any of their Related Entities shall not be liable to Contractor for any claims, costs, losses, or damages (including but not limited to all fees and charges of engineers, architects, attorneys, and other professionals and all court or arbitration or other dispute resolution costs) sustained by Contractor on or in connection with any other project or anticipated project.

~~*4.04 Underground Facilities*~~

~~A. *Shown or Indicated:* The information and data shown or indicated in the Contract Documents with respect to existing Underground Facilities at or contiguous to the Site is based on information and data furnished to Owner or Engineer by the owners of such Underground Facilities,~~

~~including Owner, or by others. Unless it is otherwise expressly provided in the Supplementary Conditions:~~

~~1. Owner and Engineer shall not be responsible for the accuracy or completeness of any such information or data; and~~

~~2. the cost of all of the following will be included in the Contract Price, and Contractor shall have full responsibility for:~~

~~a. reviewing and checking all such information and data,~~

~~b. locating all Underground Facilities shown or indicated in the Contract Documents,~~

~~c. coordination of the Work with the owners of such Underground Facilities, including Owner, during construction, and~~

~~d. the safety and protection of all such Underground Facilities and repairing any damage thereto resulting from the Work.~~

B. Not Shown or Indicated

~~1. If an Underground Facility is uncovered or revealed at or contiguous to the Site which was not shown or indicated, or not shown or indicated with reasonable accuracy in the Contract Documents, Contractor shall, promptly after becoming aware thereof and before further disturbing conditions affected thereby or performing any Work in connection therewith (except in an emergency as required by Paragraph 6.16.A), identify the owner of such Underground Facility and give written notice to that owner and to Owner and Engineer. Engineer will promptly review the Underground Facility and determine the extent, if any, to which a change is required in the Contract Documents to reflect and document the consequences of the existence or location of the Underground Facility. During such time, Contractor shall be responsible for the safety and protection of such Underground Facility.~~

~~2. If Engineer concludes that a change in the Contract Documents is required, a Work Change Directive or a Change Order will be issued to reflect and document such consequences. An equitable adjustment shall be made in the Contract Price or Contract Times, or both, to the extent that they are attributable to the existence or location of any Underground Facility that was not shown or indicated or not shown or indicated with reasonable accuracy in the Contract Documents and that Contractor did not know of and could not reasonably have been expected to be aware of or to have anticipated. If Owner and Contractor are unable to agree on entitlement to or on the amount or extent, if any, of any such adjustment in Contract Price or Contract Times, Owner or Contractor may make a Claim therefor as provided in Paragraph 10.05.~~

SEE SC-10

4.05 Reference Points

A. Owner shall provide engineering surveys to establish reference points for construction which in Engineer's judgment are necessary to enable Contractor to proceed with the Work. Contractor shall be responsible for laying out the Work, shall protect and preserve the established reference points and property monuments, and shall make no changes or relocations without the prior written approval of Owner. Contractor shall report to Engineer whenever any reference point or property monument is lost or destroyed or requires relocation because of necessary changes in grades or locations, and shall be responsible for the accurate replacement or relocation of such reference points or property monuments by professionally qualified personnel.

4.06 Hazardous Environmental Condition at Site

A. *Reports and Drawings:* Reference is made to the Supplementary Conditions for the identification of those reports and drawings relating to a Hazardous

Environmental Condition identified at the Site, if any, that have been utilized by the Engineer in the preparation of the Contract Documents.

B. *Limited Reliance by Contractor on Technical Data Authorized:* Contractor may rely upon the general accuracy of the "technical data" contained in such reports and drawings, but such reports and drawings are not Contract Documents. Such "technical data" is identified in the Supplementary Conditions. Except for such reliance on such "technical data," Contractor may not rely upon or make any claim against Owner or Engineer, or any of their Related Entities with respect to:

1. the completeness of such reports and drawings for Contractor's purposes, including, but not limited to, any aspects of the means, methods, techniques, sequences and procedures of construction to be employed by Contractor and safety precautions and programs incident thereto; or

2. other data, interpretations, opinions and information contained in such reports or shown or indicated in such drawings; or

3. any Contractor interpretation of or conclusion drawn from any "technical data" or any such other data, interpretations, opinions or information.

C. Contractor shall not be responsible for any Hazardous Environmental Condition uncovered or revealed at the Site which was not shown or indicated in Drawings or Specifications or identified in the Contract Documents to be within the scope of the Work. Contractor shall be responsible for a Hazardous Environmental Condition created with any materials brought to the Site by Contractor, Subcontractors, Suppliers, or anyone else for whom Contractor is responsible.

D. If Contractor encounters a Hazardous Environmental Condition or if Contractor or anyone for whom Contractor is responsible creates a Hazardous Environmental Condition, Contractor shall immediately: (i) secure or otherwise isolate such condition; (ii) stop all Work in connection with such condition and in any area affected thereby (except in an emergency as required by Paragraph 6.16.A); and (iii) notify Owner and Engineer (and promptly thereafter confirm such notice in writing). Owner shall promptly consult with Engineer concerning the necessity for Owner to retain a qualified expert to evaluate such condition or take corrective action, if any.

E. Contractor shall not be required to resume Work in connection with such condition or in any affected area until after Owner has obtained any required permits related thereto and delivered to Contractor written notice: (i) specifying that such condition and any affected area is or has been rendered safe for the resumption of Work; or (ii) specifying any special conditions under which such Work may be resumed safely. If Owner and Contractor cannot agree as to entitlement to or on the amount or extent, if any, of any adjustment in Contract Price or Contract Times, or both, as a result of such Work stoppage or such special conditions under which Work is agreed to be resumed by Contractor, either party may make a Claim therefor as provided in Paragraph 10.05.

F. If after receipt of such written notice Contractor does not agree to resume such Work based on a reasonable belief it is unsafe, or does not agree to resume such Work under such special conditions, then Owner may order the portion of the Work that is in the area affected by such condition to be deleted from the Work. If Owner and Contractor cannot agree as to entitlement to or on the amount or extent, if any, of an adjustment in Contract Price or Contract Times as a result of deleting such portion of the Work, then either party may make a Claim therefor as provided in Paragraph 10.05. Owner may have such deleted portion of the Work performed by Owner's own forces or others in accordance with Article 7.

G. To the fullest extent permitted by Laws and Regulations, Owner shall indemnify and hold harmless Contractor, Subcontractors, and Engineer, and the officers, directors, partners, employees, agents, consultants, and subcontractors of each and any of them from and against all claims, costs, losses, and damages (including but not limited to all fees and charges of engineers, architects, attorneys, and other professionals and all court or arbitration or other dispute resolution costs) arising out of or relating to a Hazardous Environmental Condition, provided that such Hazardous Environmental Condition: (i) was not shown or indicated in the Drawings or Specifications or identified in the Contract Documents to be included within the scope of the Work, and (ii) was not created by Contractor or by anyone for whom Contractor is responsible. Nothing in this Paragraph 4.06. G shall obligate Owner to indemnify any individual or entity from and against the consequences of that individual's or entity's own negligence.

H. To the fullest extent permitted by Laws and Regulations, Contractor shall indemnify and hold harmless Owner and Engineer, and the officers, directors, partners, employees, agents, consultants, and subcontractors of each and any of them from and against all claims, costs, losses, and damages (including but not limited to all fees and charges of engineers, architects, attorneys, and other professionals and all court or arbitration or other dispute resolution costs) arising out of or relating to a Hazardous Environmental Condition created by Contractor or by anyone for whom Contractor is responsible. Nothing in this Paragraph 4.06.H shall obligate Contractor to indemnify any individual or entity from and against the consequences of that individual's or entity's own negligence.

I. The provisions of Paragraphs 4.02, 4.03, and 4.04 do not apply to a Hazardous Environmental Condition uncovered or revealed at the Site.

SEE SC-11

ARTICLE 5 - BONDS AND INSURANCE

5.01 Performance, Payment, and Other Bonds

A. Contractor shall furnish performance and payment bonds, each in an amount at least equal to the Contract Price as security for the faithful performance and payment of all of Contractor's obligations under the Contract Documents. These bonds shall remain in effect until one year after the date when final payment becomes due or until completion of the correction period specified in Paragraph 13.07, whichever is later, except as provided otherwise by Laws or Regulations or by the Contract Documents. Contractor shall also furnish such other bonds as are required by the Contract Documents.

B. All bonds shall be in the form prescribed by the Contract Documents except as provided otherwise by Laws or Regulations, and shall be executed by such sureties as are named in the current list of "Companies Holding Certificates of Authority as Acceptable Sureties on Federal Bonds and as Acceptable Reinsuring Companies" as published in Circular 570 (amended) by the Financial Management Service, Surety Bond Branch, U.S. Department of the Treasury. All bonds signed by an agent must be accompanied by a certified copy of the agent's authority to act.

C. If the surety on any bond furnished by Contractor is declared bankrupt or becomes insolvent or its right to do business is terminated in any state where any part of the Project is located or it ceases to meet the requirements of Paragraph 5.01.B, Contractor shall promptly notify Owner and Engineer and shall, within 20 days after the event giving rise to such notification, provide another bond and surety, both of which shall comply with the requirements of Paragraphs 5.01.B and 5.02.

5.02 Licensed Sureties and Insurers

A. All bonds and insurance required by the Contract Documents to be purchased and maintained by Owner or Contractor shall be obtained from surety or insurance companies that are duly licensed or authorized in the jurisdiction in which the Project is located to issue bonds or insurance policies for the limits and coverages so required. Such surety and insurance companies shall also meet such additional requirements and qualifications as may be provided in the Supplementary Conditions.

5.03 Certificates of Insurance

A. Contractor shall deliver to Owner, with copies to each additional insured identified in the Supplementary Conditions, certificates of insurance (and other evidence of insurance requested by Owner or any other additional insured) which Contractor is required to purchase and maintain.

B. Owner shall deliver to Contractor, with copies to each additional insured identified in the Supplementary Conditions, certificates of insurance (and other evidence of insurance requested by Contractor or any other additional insured) which Owner is required to purchase and maintain.

5.04 Contractor's Liability Insurance

SEE SC-12

A. Contractor shall purchase and maintain such liability and other insurance as is appropriate for the Work being performed and as will provide protection from claims set forth below which may arise out of or result from Contractor's performance of the Work and Contractor's other obligations under the Contract Documents, whether it is to be performed by Contractor, any Subcontractor or Supplier, or by anyone directly or indirectly employed by any of them to perform any of the Work, or by anyone for whose acts any of them may be liable:

1. claims under workers' compensation, disability benefits, and other similar employee benefit acts;

2. claims for damages because of bodily injury, occupational sickness or disease, or death of Contractor's employees;

3. claims for damages because of bodily injury, sickness or disease, or death of any person other than Contractor's employees;

4. claims for damages insured by reasonably available personal injury liability coverage which are sustained:

a. by any person as a result of an offense directly or indirectly related to the employment of such person by Contractor, or

b. by any other person for any other reason;

5. claims for damages, other than to the Work itself, because of injury to or destruction of tangible property wherever located, including loss of use resulting therefrom; and

6. claims for damages because of bodily injury or death of any person or property damage arising out of the ownership, maintenance or use of any motor vehicle.

B. The policies of insurance required by this Paragraph 5.04 shall:

1. with respect to insurance required by Paragraphs 5.04.A.3 through 5.04.A.6 inclusive, include as additional insured (subject to any customary exclusion regarding professional liability) Owner and Engineer, and any other individuals or entities identified in the Supplementary Conditions, all of whom shall be listed as additional insureds, and include coverage for the respective officers, directors, partners, employees, agents, consultants and subcontractors of each and any of all such additional insureds, and the insurance afforded to these additional insureds shall provide primary coverage for all claims covered thereby;

2. include at least the specific coverages and be written for not less than the limits of liability provided in the Supplementary Conditions or required by Laws or Regulations, whichever is greater;

3. include completed operations insurance;

4. include contractual liability insurance covering Contractor's indemnity obligations under Paragraphs 6.11 and 6.20;

SEE SC-13

5. contain a provision or endorsement that the coverage afforded will not be canceled, materially changed or renewal refused until at least 30 days prior written notice has been given to Owner and Contractor and to each other additional insured identified in the Supplementary Conditions to whom a certificate of insurance has been issued (and the certificates of insurance furnished by the Contractor pursuant to Paragraph 5.03 will so provide);

6. remain in effect at least until final payment and at all times thereafter when Contractor may be correcting, removing, or replacing defective Work in accordance with Paragraph 13.07; and

7. with respect to completed operations insurance, and any insurance coverage written on a claims-made basis, remain in effect for at least two years after final payment.

a. Contractor shall furnish Owner and each other additional insured identified in the Supplementary Conditions, to whom a certificate of insurance has been issued, evidence satisfactory to Owner and any such additional insured of continuation of such insurance at final payment and one year thereafter.

5.05 Owner's Liability Insurance

~~A. In addition to the insurance required to be provided by Contractor under Paragraph 5.04, Owner, at Owner's option, may purchase and maintain at Owner's expense Owner's own liability insurance as will protect Owner against claims which may arise from operations under the Contract Documents.~~

SEE SC-14

5.06 Property Insurance

~~A. Unless otherwise provided in the Supplementary Conditions, Owner shall purchase and maintain property insurance upon the Work at the Site in the amount of the full replacement cost thereof (subject to such deductible amounts as may be provided in the Supplementary Conditions or required by Laws and Regulations). This insurance shall:~~

~~1. include the interests of Owner, Contractor, Subcontractors, and Engineer, and any other individuals or entities identified in the Supplementary Conditions, and the officers, directors, partners, employees, agents, consultants and subcontractors of each and any of them, each of whom is deemed to have an insurable interest and shall be listed as an insured or additional insured;~~

~~2. be written on a Builder's Risk "all-risk" or open peril or special causes of loss policy form that shall at least include insurance for physical loss or damage to the Work, temporary buildings, false work, and materials and equipment in transit, and shall insure against at least the following perils or causes of loss: fire, lightning, extended coverage, theft, vandalism and malicious mischief, earthquake, collapse, debris removal, demolition occasioned by enforcement of Laws and Regulations, water damage, (other than caused by flood) and such other perils or causes of loss as may be specifically required by the Supplementary Conditions;~~

~~3. include expenses incurred in the repair or replacement of any insured property (including but not limited to fees and charges of engineers and architects);~~

4. cover materials and equipment stored at the Site or at another location that was agreed to in writing by Owner prior to being incorporated in the Work, provided that such materials and equipment have been included in an Application for Payment recommended by Engineer;

5. allow for partial utilization of the Work by Owner;

6. include testing and startup; and

7. be maintained in effect until final payment is made unless otherwise agreed to in writing by Owner, Contractor, and Engineer with 30 days written notice to each other additional insured to whom a certificate of insurance has been issued.

SEE SC-15

B. Owner shall purchase and maintain such boiler and machinery insurance or additional property insurance as may be required by the Supplementary Conditions or Laws and Regulations which will include the interests of Owner, Contractor, Subcontractors, and Engineer, and any other individuals or entities identified in the Supplementary Conditions, and the officers, directors, partners, employees, agents, consultants and subcontractors of each and any of them, each of whom is deemed to have an insurable interest and shall be listed as an insured or additional insured.

SEE SC-16

C. All the policies of insurance (and the certificates or other evidence thereof) required to be purchased and maintained in accordance with Paragraph 5.06 will contain a provision or endorsement that the coverage afforded will not be canceled or materially changed or renewal refused until at least 30 days prior written notice has been given to Owner and Contractor and to each other additional insured to whom a certificate of insurance has been issued and will contain waiver provisions in accordance with Paragraph 5.07.

D. Owner shall not be responsible for purchasing and maintaining any property insurance specified in this Paragraph 5.06 to protect the interests of Contractor, Subcontractors, or others in the Work to the extent of any deductible amounts that are identified in the Supplementary Conditions. The risk of loss within such identified deductible amount will be borne by Contractor, Subcontractors, or others suffering any such loss, and if any of them wishes property insurance coverage within the limits of such amounts, each may purchase and maintain it at the purchaser's own expense.

E. If Contractor requests in writing that other special insurance be included in the property insurance policies provided under Paragraph 5.06, Owner shall, if possible, include such insurance, and the cost thereof will be charged to Contractor by appropriate Change Order. Prior to commencement of the Work at the Site, Owner shall in writing advise Contractor whether or not such other insurance has been procured by Owner.

5.07 Waiver of Rights

A. Owner and Contractor intend that all policies purchased in accordance with Paragraph 5.06 will protect Owner, Contractor, Subcontractors, and Engineer, and all other individuals or entities identified in the Supplementary Conditions to be listed as insureds or additional insureds (and the officers, directors, partners, employees, agents, consultants and subcontractors of each and any of them) in such policies and will provide primary coverage for all losses and damages caused by the perils or causes of loss covered thereby. All such policies shall contain provisions to the effect that in the event of payment of any loss or damage the insurers will have no rights of recovery against any of the insureds or additional insureds thereunder. Owner and Contractor waive all rights against each other and their respective officers, directors, partners,

employees, agents, consultants and subcontractors of each and any of them for all losses and damages caused by, arising out of or resulting from any of the perils or causes of loss covered by such policies and any other property insurance applicable to the Work; and, in addition, waive all such rights against Subcontractors, and Engineer, and all other individuals or entities identified in the Supplementary Conditions to be listed as insured or additional insured (and the officers, directors, partners, employees, agents, consultants and subcontractors of each and any of them) under such policies for losses and damages so caused. None of the above waivers shall extend to the rights that any party making such waiver may have to the proceeds of insurance held by Owner as trustee or otherwise payable under any policy so issued.

SEE SC-17

B. Owner waives all rights against Contractor, Subcontractors, and Engineer, and the officers, directors, partners, employees, agents, consultants and subcontractors of each and any of them for:

1. loss due to business interruption, loss of use, or other consequential loss extending beyond direct physical loss or damage to Owner's property or the Work caused by, arising out of, or resulting from fire or other perils whether or not insured by Owner; and

2. loss or damage to the completed Project or part thereof caused by, arising out of, or resulting from fire or other insured peril or cause of loss covered by any property insurance maintained on the completed Project or part thereof by Owner during partial utilization pursuant to Paragraph 14.05, after Substantial Completion pursuant to Paragraph 14.04, or after final payment pursuant to Paragraph 14.07.

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C. Any insurance policy maintained by Owner covering any loss, damage or consequential loss referred to in Paragraph 5.07.B shall contain provisions to the effect that in the event of payment of any such loss, damage, or consequential loss, the insurers will have no rights of recovery against Contractor, Subcontractors, or Engineer, and the officers, directors, partners, employees, agents, consultants and subcontractors of each and any of them.

5.08 Receipt and Application of Insurance Proceeds

A. Any insured loss under the policies of insurance required by Paragraph 5.06 will be adjusted with Owner and made payable to Owner as fiduciary for the insureds, as their interests may appear, subject to the requirements of any applicable mortgage clause and of Paragraph 5.08.B. Owner shall deposit in a separate account any money so received and shall distribute it in accordance with such agreement as the parties in interest may reach. If no other special agreement is reached, the damaged Work shall be repaired or replaced, the moneys so received applied on account thereof, and the Work and the cost thereof covered by an appropriate Change Order .

B. Owner as fiduciary shall have power to adjust and settle any loss with the insurers unless one of the parties in interest shall object in writing within 15 days after the occurrence of loss to Owner's exercise of this power. If such objection be made, Owner as fiduciary shall make settlement with the insurers in accordance with such agreement as the parties in interest may reach. If no such agreement among the parties in interest is reached, Owner as fiduciary shall adjust and settle the loss with the insurers and, if required in writing by any party in interest, Owner as fiduciary shall give bond for the proper performance of such duties.

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5.09 Acceptance of Bonds and Insurance; Option to Replace

A. If either Owner or Contractor has any objection to the coverage afforded by or other provisions of the bonds or insurance

~~required to be purchased and maintained by the other party in accordance with Article 5 on the basis of non-conformance with the Contract Documents, the objecting party shall so notify the other party in writing within 10 days after receipt of the certificates (or other evidence requested) required by Paragraph 2.01.B. Owner and Contractor shall each provide to the other such additional information in respect of insurance provided as the other may reasonably request. If either party does not purchase or maintain all of the bonds and insurance required of such party by the Contract Documents, such party shall notify the other party in writing of such failure to purchase prior to the start of the Work, or of such failure to maintain prior to any change in the required coverage. Without prejudice to any other right or remedy, the other party may elect to obtain equivalent bonds or insurance to protect such other party's interests at the expense of the party who was required to provide such coverage, and a Change Order shall be issued to adjust the Contract Price accordingly.~~

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~~*5.10 Partial Utilization, Acknowledgment of Property Insurer*~~

~~A. If Owner finds it necessary to occupy or use a portion or portions of the Work prior to Substantial Completion of all the Work as provided in Paragraph 14.05, no such use or occupancy shall commence before the insurers providing the property insurance pursuant to Paragraph 5.06 have acknowledged notice thereof and in writing effected any changes in coverage necessitated thereby. The insurers providing the property insurance shall consent by endorsement on the policy or policies, but the property insurance shall not be canceled or permitted to lapse on account of any such partial use or occupancy.~~

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ARTICLE 6 - CONTRACTOR'S RESPONSIBILITIES

6.01 Supervision and Superintendence

A. Contractor shall supervise, inspect, and direct the Work competently and efficiently, devoting such attention thereto and applying such skills and expertise as may be necessary to perform the Work in accordance with the Contract Documents. Contractor shall be solely responsible for the means, methods, techniques, sequences, and procedures of construction. Contractor shall not be responsible for the negligence of Owner or Engineer in the design or specification of a specific means, method, technique, sequence, or procedure of construction which is shown or indicated in and expressly required by the Contract Documents.

B. At all times during the progress of the Work, Contractor shall assign a competent resident superintendent who shall not be replaced without written notice to Owner and Engineer except under extraordinary circumstances. The superintendent will be Contractor's representative at the Site and shall have authority to act on behalf of Contractor. All communications given to or received from the superintendent shall be binding on Contractor.

6.02 Labor; Working Hours

A. Contractor shall provide competent, suitably qualified personnel to survey and lay out the Work and perform construction as required by the Contract Documents. Contractor shall at all times maintain good discipline and order at the Site.

B. Except as otherwise required for the safety or protection of persons or the Work or property at the Site or adjacent thereto, and except as otherwise stated in the Contract Documents, all Work at the Site shall be performed during regular working hours. Contractor will not permit the performance of Work on a Saturday, Sunday, or any legal holiday without Owner's

written consent (which will not be unreasonably withheld) given after prior written notice to Engineer.

6.03 Services, Materials, and Equipment

A. Unless otherwise specified in the Contract Documents, Contractor shall provide and assume full responsibility for all services, materials, equipment, labor, transportation, construction equipment and machinery, tools, appliances, fuel, power, light, heat, telephone, water, sanitary facilities, temporary facilities, and all other facilities and incidentals necessary for the performance, testing, start-up, and completion of the Work.

B. All materials and equipment incorporated into the Work shall be as specified or, if not specified, shall be of good quality and new, except as otherwise provided in the Contract Documents. All special warranties and guarantees required by the Specifications shall expressly run to the benefit of Owner. If required by Engineer, Contractor shall furnish satisfactory evidence (including reports of required tests) as to the source, kind, and quality of materials and equipment.

C. All materials and equipment shall be stored, applied, installed, connected, erected, protected, used, cleaned, and conditioned in accordance with instructions of the applicable Supplier, except as otherwise may be provided in the Contract Documents.

6.04 Progress Schedule

A. Contractor shall adhere to the Progress Schedule established in accordance with Paragraph 2.07 as it may be adjusted from time to time as provided below.

1. Contractor shall submit to Engineer for acceptance (to the extent indicated in Paragraph 2.07) proposed adjustments in the Progress Schedule that will not result in changing the Contract Times. Such adjustments will comply with any provisions of the General Requirements applicable thereto.

2. Proposed adjustments in the Progress Schedule that will change the Contract Times shall be submitted in accordance with the requirements of Article 12. Adjustments in Contract Times may only be made by a Change Order.

6.05 Substitutes and "Or-Equals"

A. Whenever an item of material or equipment is specified or described in the Contract Documents by using the name of a proprietary item or the name of a particular Supplier, the specification or description is intended to establish the type, function, appearance, and quality required. Unless the specification or description contains or is followed by words reading that no like, equivalent, or "or-equal" item or no substitution is permitted, other items of material or equipment or material or equipment of other Suppliers may be submitted to Engineer for review under the circumstances described below.

1. *"Or-Equal" Items:* If in Engineer's sole discretion an item of material or equipment proposed by Contractor is functionally equal to that named and sufficiently similar so that no change in related Work will be required, it may be considered by Engineer as an "or-equal" item, in which case review and approval of the proposed item may, in Engineer's sole discretion, be accomplished without compliance with some or all of the requirements for approval of proposed substitute items. For the purposes of this Paragraph 6.05.A.1, a proposed item of material or equipment will be considered functionally equal to an item so named if:

a. in the exercise of reasonable judgment Engineer determines that:

1) it is at least equal in materials of construction, quality, durability, appearance, strength, and design characteristics;

2) it will reliably perform at least equally well the function and achieve the results imposed by the design concept of the completed Project as a functioning whole,

3) it has a proven record of performance and availability of responsive service; and

b. Contractor certifies that, if approved and incorporated into the Work:

1) there will be no increase in cost to the Owner or increase in Contract Times, and

2) it will conform substantially to the detailed requirements of the item named in the Contract Documents.

2. Substitute Items

a. If in Engineer's sole discretion an item of material or equipment proposed by Contractor does not qualify as an "or-equal" item under Paragraph 6.05.A.1, it will be considered a proposed substitute item.

b. Contractor shall submit sufficient information as provided below to allow Engineer to determine that the item of material or equipment proposed is essentially equivalent to that named and an acceptable substitute therefor. Requests for review of proposed substitute items of material or equipment will not be accepted by Engineer from anyone other than Contractor.

c. The requirements for review by Engineer will be as set forth in Paragraph 6.05.A.2.d, as supplemented in the General Requirements and as Engineer may decide is appropriate under the circumstances.

d. Contractor shall make written application to Engineer for review of a proposed substitute item of material or equipment that Contractor seeks to furnish or use. The application:

1) shall certify that the proposed substitute item will:

a) perform adequately the functions and achieve the results called for by the general design,

b) be similar in substance to that specified, and

c) be suited to the same use as that specified;

2) will state:

a) the extent, if any, to which the use of the proposed substitute item will prejudice Contractor's achievement of Substantial Completion on time;

b) whether or not use of the proposed substitute item in the Work will require a change in any of the Contract Documents (or in the provisions of any other direct contract with Owner for other work on the Project) to adapt the design to the proposed substitute item; and

c) whether or not incorporation or use of the proposed substitute item in connection with the Work is subject to payment of any license fee or royalty;

3) will identify:

a) all variations of the proposed substitute item from that specified , and

b) available engineering, sales, maintenance, repair, and replacement services;

4) and shall contain an itemized estimate of all costs or credits that will result directly or indirectly from use of such substitute item, including costs of redesign and claims of other contractors affected by any resulting change,

B. *Substitute Construction Methods or Procedures:* If a specific means, method, technique, sequence, or procedure of construction is expressly required by the Contract Documents, Contractor may furnish or utilize a substitute means, method, technique, sequence, or procedure of construction approved by Engineer. Contractor shall submit sufficient information to allow Engineer, in Engineer's sole discretion, to determine that the substitute proposed is equivalent to that expressly called for by the Contract Documents. The requirements for review by Engineer will be similar to those provided in Paragraph 6.05.A.2.

C. *Engineer's Evaluation:* Engineer will be allowed a reasonable time within which to evaluate each proposal or submittal made pursuant to Paragraphs 6.05.A and 6.05.B. Engineer may require Contractor to furnish additional data about the proposed substitute item. Engineer will be the sole judge of acceptability. No "or equal" or substitute will be ordered, installed or utilized until Engineer's review is complete, which will be evidenced by either a Change Order for a substitute or an approved Shop Drawing for an "or equal." Engineer will advise Contractor in writing of any negative determination.

D. *Special Guarantee:* Owner may require Contractor to furnish at Contractor's expense a special performance guarantee or other surety with respect to any substitute.

E. *Engineer's Cost Reimbursement*: Engineer will record Engineer's costs in evaluating a substitute proposed or submitted by Contractor pursuant to Paragraphs 6.05.A.2 and 6.05.B Whether or not Engineer approves a substitute item so proposed or submitted by Contractor, Contractor shall reimburse Owner for the charges of Engineer for evaluating each such proposed substitute. Contractor shall also reimburse Owner for the charges of Engineer for making changes in the Contract Documents (or in the provisions of any other direct contract with Owner) resulting from the acceptance of each proposed substitute.

F. *Contractor's Expense*: Contractor shall provide all data in support of any proposed substitute or "or-equal" at Contractor's expense.

6.06 Concerning Subcontractors, Suppliers, and Others

A. Contractor shall not employ any Subcontractor, Supplier, or other individual or entity (including those acceptable to Owner as indicated in Paragraph 6.06.B), whether initially or as a replacement, against whom Owner may have reasonable objection. Contractor shall not be required to employ any Subcontractor, Supplier, or other individual or entity to furnish or perform any of the Work against whom Contractor has reasonable objection.

B. If the Supplementary Conditions require the identity of certain Subcontractors, Suppliers, or other individuals or entities to be submitted to Owner in advance for acceptance by Owner by a specified date prior to the Effective Date of the Agreement, and if Contractor has submitted a list thereof in accordance with the Supplementary Conditions, Owner's acceptance (either in writing or by failing to make written objection thereto by the date indicated for acceptance or objection in the Bidding Documents or the Contract Documents) of any such Subcontractor, Supplier, or other individual or entity so identified may be revoked on the basis of reasonable objection after due investigation. Contractor shall submit an acceptable replacement for the rejected Subcontractor, Supplier, or other individual or entity, and the Contract Price will be adjusted by the difference in the cost occasioned by such

replacement, and an appropriate Change Order will be issued . No acceptance by Owner of any such Subcontractor, Supplier, or other individual or entity, whether initially or as a replacement, shall constitute a waiver of any right of Owner or Engineer to reject defective Work.

C. Contractor shall be fully responsible to Owner and Engineer for all acts and omissions of the Subcontractors, Suppliers, and other individuals or entities performing or furnishing any of the Work just as Contractor is responsible for Contractor's own acts and omissions. Nothing in the Contract Documents:

1. shall create for the benefit of any such Subcontractor, Supplier, or other individual or entity any contractual relationship between Owner or Engineer and any such Subcontractor, Supplier or other individual or entity, nor

2. shall anything in the Contract Documents create any obligation on the part of Owner or Engineer to pay or to see to the payment of any moneys due any such Subcontractor, Supplier, or other individual or entity except as may otherwise be required by Laws and Regulations.

D. Contractor shall be solely responsible for scheduling and coordinating the Work of Subcontractors, Suppliers, and other individuals or entities performing or furnishing any of the Work under a direct or indirect contract with Contractor.

E. Contractor shall require all Subcontractors, Suppliers, and such other individuals or entities performing or furnishing any of the Work to communicate with Engineer through Contractor.

F. The divisions and sections of the Specifications and the identifications of any Drawings shall not control Contractor in dividing the Work among Subcontractors or Suppliers or delineating the Work to be performed by any specific trade.

~~G. All Work performed for Contractor by a Subcontractor or Supplier will be pursuant to an appropriate agreement between Contractor and the Subcontractor or Supplier which specifically binds the Subcontractor or Supplier to the applicable terms and conditions of the Contract Documents for the benefit of Owner and Engineer. Whenever any such agreement is with a Subcontractor or Supplier who is listed as an additional insured on the property insurance provided in Paragraph 5.06, the agreement between the Contractor and the Subcontractor or Supplier will contain provisions whereby the Subcontractor or Supplier waives all rights against Owner, Contractor, and Engineer,, and all other individuals or entities identified in the Supplementary Conditions to be listed as insureds or additional insureds (and the officers, directors, partners, employees, agents, consultants and subcontractors of each and any of them) for all losses and damages caused by, arising out of, relating to, or resulting from any of the perils or causes of loss covered by such policies and any other property insurance applicable to the Work. If the insurers on any such policies require separate waiver forms to be signed by any Subcontractor or Supplier, Contractor will obtain the same.~~

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6.07 Patent Fees and Royalties

A. Contractor shall pay all license fees and royalties and assume all costs incident to the use in the performance of the Work or the incorporation in the Work of any invention, design, process, product, or device which is the subject of patent rights or copyrights held by others. If a particular invention, design, process, product, or device is specified in the Contract Documents for use in the performance of the Work and if to the actual knowledge of Owner or Engineer its use is subject to patent rights or copyrights calling for the payment of any license fee or royalty to others, the existence of such rights shall be disclosed by Owner in the Contract Documents.

B. To the fullest extent permitted by Laws and Regulations, Contractor shall indemnify and hold harmless Owner and Engineer, and the officers, directors, partners, employees, agents, consultants and subcontractors of each and any of them from and against all claims, costs, losses, and damages (including but not limited to all fees and charges of engineers, architects, attorneys, and other professionals and all court or arbitration or other dispute resolution costs) arising out of or relating to any infringement of patent rights or copyrights incident to the use in the performance of the Work or resulting from the incorporation in the Work of any invention, design, process, product, or device not specified in the Contract Documents.

6.08 Permits

A. Unless otherwise provided in the Supplementary Conditions, Contractor shall obtain and pay for all construction permits and licenses. Owner shall assist Contractor, when necessary, in obtaining such permits and licenses. Contractor shall pay all governmental charges and inspection fees necessary for the prosecution of the Work which are applicable at the time of opening of Bids, or, if there are no Bids, on the Effective Date of the Agreement. Owner shall pay all charges of utility owners for connections for providing permanent service to the Work.

6.09 Laws and Regulations

A. Contractor shall give all notices required by and shall comply with all Laws and Regulations applicable to the performance of the Work. Except where otherwise expressly required by applicable Laws and Regulations, neither Owner nor Engineer shall be responsible for monitoring Contractor's compliance with any Laws or Regulations.

~~B. If Contractor performs any Work knowing or having reason to know that it is contrary to Laws or Regulations, Contractor shall bear all claims, costs, losses, and damages (including but not limited to all fees and charges of engineers, architects, attorneys, and other professionals and all court or arbitration or other dispute resolution costs) arising out of or relating to such Work. However, it shall not be Contractor's primary responsibility to make certain that the Specifications and Drawings are in accordance with Laws and Regulations, but this shall not relieve Contractor of Contractor's obligations under Paragraph 3.03.~~

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C. Changes in Laws or Regulations not known at the time of opening of Bids (or, on the Effective Date of the Agreement if there were no Bids) having an effect on the cost or time of performance of the Work shall be the subject of an adjustment in Contract Price or Contract Times. If Owner and Contractor are unable to agree on entitlement to or on the amount or extent, if any, of any such adjustment, a Claim may be made therefor as provided in Paragraph 10.05.

6.10 Taxes

A. Contractor shall pay all sales, consumer, use, and other similar taxes required to be paid by Contractor in accordance with the Laws and Regulations of the place of the Project which are applicable during the performance of the Work.

6.11 Use of Site and Other Areas

A. Limitation on Use of Site and Other Areas

1. Contractor shall confine construction equipment, the storage of materials and equipment, and the operations of workers to the Site and other areas permitted by Laws and Regulations, and shall not unreasonably encumber the Site and other areas with construction equipment or other materials or equipment. Contractor shall assume full responsibility for any damage to any such land or area, or to the owner or occupant thereof, or of any

adjacent land or areas resulting from the performance of the Work.

2. Should any claim be made by any such owner or occupant because of the performance of the Work, Contractor shall promptly settle with such other party by negotiation or otherwise resolve the claim by arbitration or other dispute resolution proceeding or at law.

3. To the fullest extent permitted by Laws and Regulations, Contractor shall indemnify and hold harmless Owner and Engineer, and the officers, directors, partners, employees, agents, consultants and subcontractors of each and any of them from and against all claims, costs, losses, and damages (including but not limited to all fees and charges of engineers, architects, attorneys, and other professionals and all court or arbitration or other dispute resolution costs) arising out of or relating to any claim or action, legal or equitable, brought by any such owner or occupant against Owner, Engineer, or any other party indemnified hereunder to the extent caused by or based upon Contractor's performance of the Work.

B. *Removal of Debris During Performance of the Work:* During the progress of the Work Contractor shall keep the Site and other areas free from accumulations of waste materials, rubbish, and other debris. Removal and disposal of such waste materials, rubbish, and other debris shall conform to applicable Laws and Regulations.

C. *Cleaning:* Prior to Substantial Completion of the Work Contractor shall clean the Site and the Work and make it ready for utilization by Owner. At the completion of the Work Contractor shall remove from the Site all tools, appliances, construction equipment and machinery, and surplus materials and shall restore to original condition all property not designated for alteration by the Contract Documents.

D. *Loading Structures:* Contractor shall not load nor permit any part of any structure to be loaded in any manner that will endanger the structure, nor shall Contractor subject any part of the Work or adjacent property to stresses or pressures that will endanger it.

6.12 Record Documents

A. Contractor shall maintain in a safe place at the Site one record copy of all Drawings, Specifications, Addenda, Change Orders, Work Change Directives, Field Orders, and written interpretations and clarifications in good order and annotated to show changes made during construction. These record documents together with all approved Samples and a counterpart of all approved Shop Drawings will be available to Engineer for reference. Upon completion of the Work, these record documents, Samples, and Shop Drawings will be delivered to Engineer for Owner.

6.13 Safety and Protection

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

1. all persons on the Site or who may be affected by the Work;

2. all the Work and materials and equipment to be incorporated therein, whether in storage on or off the Site; and

3. other property at the Site or adjacent thereto, including trees, shrubs, lawns, walks, pavements, roadways, structures, utilities, and Underground Facilities not designated for removal, relocation, or replacement in the course of construction.

B. Contractor shall comply with all applicable Laws and Regulations relating to the safety of persons or property, or to the protection of persons or property from damage, injury, or loss; and shall erect and maintain all necessary safeguards for such safety and protection. Contractor shall notify

owners of adjacent property and of Underground Facilities and other utility owners when prosecution of the Work may affect them, and shall cooperate with them in the protection, removal, relocation, and replacement of their property.

C. All damage, injury, or loss to any property referred to in Paragraph 6.13.A.2 or 6.13.A.3 caused, directly or indirectly, in whole or in part, by Contractor, any Subcontractor, Supplier, or any other individual or entity directly or indirectly employed by any of them to perform any of the Work, or anyone for whose acts any of them may be liable, shall be remedied by Contractor (except damage or loss attributable to the fault of Drawings or Specifications or to the acts or omissions of Owner or Engineer or , or anyone employed by any of them, or anyone for whose acts any of them may be liable, and not attributable, directly or indirectly, in whole or in part, to the fault or negligence of Contractor or any Subcontractor, Supplier, or other individual or entity directly or indirectly employed by any of them).

D. Contractor's duties and responsibilities for safety and for protection of the Work shall continue until such time as all the Work is completed and Engineer has issued a notice to Owner and Contractor in accordance with Paragraph 14.07.B that the Work is acceptable (except as otherwise expressly provided in connection with Substantial Completion).

6.14 Safety Representative

A. Contractor shall designate a qualified and experienced safety representative at the Site whose duties and responsibilities shall be the prevention of accidents and the maintaining and supervising of safety precautions and programs.

6.15 Hazard Communication Programs

A. Contractor shall be responsible for coordinating any exchange of material safety data sheets or other hazard communication information required to be made available to or exchanged between or among employers at the Site in accordance with Laws or Regulations.

6.16 Emergencies

A. In emergencies affecting the safety or protection of persons or the Work or property at the Site or adjacent thereto, Contractor is obligated to act to prevent threatened damage, injury, or loss. Contractor shall give Engineer prompt written notice if Contractor believes that any significant changes in the Work or variations from the Contract Documents have been caused thereby or are required as a result thereof. If Engineer determines that a change in the Contract Documents is required because of the action taken by Contractor in response to such an emergency, a Work Change Directive or Change Order will be issued.

6.17 Shop Drawings and Samples

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A. Contractor shall submit Shop Drawings and Samples to Engineer for review ~~and approval~~ in accordance with the acceptable Schedule of Submittals (as required by Paragraph 2.07). Each submittal will be identified as Engineer may require.

1. Shop Drawings

a. Submit number of copies specified in the General Requirements.

b. Data shown on the Shop Drawings will be complete with respect to quantities, dimensions, specified performance and design criteria, materials, and similar data to show Engineer the services, materials, and equipment Contractor proposes to provide and to enable Engineer to review the information for the limited purposes required by Paragraph 6.17.D.

2. *Samples:* Contractor shall also submit Samples to Engineer for review ~~and~~

~~approval~~ in accordance with the acceptable schedule of Shop Drawings and Sample submittals.

a. Submit number of Samples specified in the Specifications.

b. Clearly identify each Sample as to material, Supplier, pertinent data such as catalog numbers, the use for which intended and other data as Engineer may require to enable Engineer to review the submittal for the limited purposes required by Paragraph 6.17.D.

B. Where a Shop Drawing or Sample is required by the Contract Documents or the Schedule of Submittals , any related Work performed prior to Engineer's review ~~and approval~~ of the pertinent submittal will be at the sole expense and responsibility of Contractor.

C. Submittal Procedures

1. Before submitting each Shop Drawing or Sample, Contractor shall have determined and verified:

a. all field measurements, quantities, dimensions, specified performance and design criteria, installation requirements, materials, catalog numbers, and similar information with respect thereto;

b. the suitability of all materials with respect to intended use, fabrication, shipping, handling, storage, assembly, and installation pertaining to the performance of the Work;

c. all information relative to Contractor's responsibilities for means, methods, techniques, sequences, and procedures of construction, and safety precautions and programs incident thereto; and

d. shall also have reviewed and coordinated each Shop Drawing or Sample with other Shop Drawings and Samples and with the requirements of the Work and the Contract Documents.

2. Each submittal shall bear a stamp or specific written certification that Contractor has satisfied Contractor's obligations under the Contract Documents with respect to Contractor's review and approval of that submittal.

3. With each submittal, Contractor shall give Engineer specific written notice of any variations, that the Shop Drawing or Sample may have from the requirements of the Contract Documents. This notice shall be both a written communication separate from the Shop Drawing's or Sample Submittal; and, in addition, by a specific notation made on each Shop Drawing or Sample submitted to Engineer for review ~~and approval~~ of each such variation.

D. *Engineer's Review*

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1. Engineer will provide timely review of Shop Drawings and Samples in accordance with the Schedule of Submittals acceptable to Engineer. Engineer's review ~~and approval~~ will be only to determine if the items covered by the submittals will, after installation or incorporation in the Work, conform to the information given in the Contract Documents and be compatible with the design concept of the completed Project as a functioning whole as indicated by the Contract Documents.

2. Engineer's review ~~and approval~~ will not extend to means, methods, techniques, sequences, or procedures of construction (except where a particular means, method, technique, sequence, or procedure of construction is specifically and expressly called for by the Contract Documents) or to safety precautions or programs incident thereto. The review ~~and approval~~ of a separate item as such will not indicate approval of the assembly in which the item functions.

3. Engineer's review ~~and approval~~ shall not relieve Contractor from responsibility for any variation from the requirements of the Contract Documents unless Contractor has complied with the requirements of Paragraph 6.17.C.3 and Engineer has given written approval of each such variation by specific written notation thereof incorporated in or accompanying the Shop Drawing or Sample. Engineer's review ~~and approval~~ shall not relieve Contractor from responsibility for complying with the requirements of Paragraph 6.17.C.1.

E. *Resubmittal Procedures*

1. Contractor shall make corrections required by Engineer and shall return the required number of corrected copies of Shop Drawings and submit, as required, new Samples for review and approval. Contractor shall direct specific attention in writing to revisions other than the corrections called for by Engineer on previous submittals.

6.18 Continuing the Work

A. Contractor shall carry on the Work and adhere to the Progress Schedule during all disputes or disagreements with Owner. No Work shall be delayed or postponed pending resolution of any disputes or disagreements, except as permitted by Paragraph 15.04 or as Owner and Contractor may otherwise agree in writing.

6.19 Contractor's General Warranty and Guarantee

A. Contractor warrants and guarantees to Owner that all Work will be in accordance with the Contract Documents and will not be defective. Engineer and its Related Entities shall be entitled to rely on representation of Contractor's warranty and guarantee.

B. Contractor's warranty and guarantee hereunder excludes defects or damage caused by:

1. abuse, modification, or improper maintenance or operation by persons other than Contractor, Subcontractors, Suppliers, or any other individual or entity for whom Contractor is responsible; or

2. normal wear and tear under normal usage.

C. Contractor's obligation to perform and complete the Work in accordance with the Contract Documents shall be absolute. None of the following will constitute an acceptance of Work that is not in accordance with the Contract Documents or a release of Contractor's obligation to perform the Work in accordance with the Contract Documents:

1. observations by Engineer;

2. recommendation by Engineer or payment by Owner of any progress or final payment;

3. the issuance of a certificate of Substantial Completion by Engineer or any payment related thereto by Owner;

4. use or occupancy of the Work or any part thereof by Owner;

5. any review and approval of a Shop Drawing or Sample submittal or the issuance of a notice of acceptability by Engineer;

6. any inspection, test, or approval by others; or

7. any correction of defective Work by Owner.

6.20 Indemnification

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A. To the fullest extent permitted by Laws and Regulations, Contractor shall indemnify and hold harmless Owner and Engineer, and the officers, directors, partners, employees, agents, consultants and subcontractors of each and any of them from and against all claims, costs, losses, and damages (including but not limited to all fees and charges of engineers, architects, attorneys, and other professionals and all

court or arbitration or other dispute resolution costs) arising out of or relating to the performance of the Work, provided that any such claim, cost, loss, or damage is attributable to bodily injury, sickness, disease, or death, or to injury to or destruction of tangible property (other than the Work itself), including the loss of use resulting therefrom but only to the extent caused by any negligent act or omission of Contractor, any Subcontractor, any Supplier, or any individual or entity directly or indirectly employed by any of them to perform any of the Work or anyone for whose acts any of them may be liable .

B. In any and all claims against Owner or Engineer or any of their respective consultants, agents, officers, directors, partners, or employees by any employee (or the survivor or personal representative of such employee) of Contractor, any Subcontractor, any Supplier, or any individual or entity directly or indirectly employed by any of them to perform any of the Work, or anyone for whose acts any of them may be liable, the indemnification obligation under Paragraph 6.20.A shall not be limited in any way by any limitation on the amount or type of damages, compensation, or benefits payable by or for Contractor or any such Subcontractor, Supplier, or other individual or entity under workers' compensation acts, disability benefit acts, or other employee benefit acts.

C. The indemnification obligations of Contractor under Paragraph 6.20.A shall not extend to the liability of Engineer and Engineer's officers, directors, partners, employees, agents, consultants and subcontractors arising out of:

1. the preparation or approval of, or the failure to prepare or approve, maps, Drawings, opinions, reports, surveys, Change Orders, designs, or Specifications; or

2. giving directions or instructions, or failing to give them, if that is the primary cause of the injury or damage.

6.21 Delegation of Professional Design Services

A. Contractor will not be required to provide professional design services unless such services are specifically required by the Contract Documents for a portion of the Work or unless such services are required to carry out Contractor's responsibilities for construction means, methods, techniques, sequences and procedures. Contractor shall not be required to provide professional services in violation of applicable law.

B. If professional design services or certifications by a design professional related to systems, materials or equipment are specifically required of Contractor by the Contract Documents, Owner and Engineer will specify all performance and design criteria that such services must satisfy. Contractor shall cause such services or certifications to be provided by a properly licensed 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 Engineer.

C. Owner and Engineer shall be entitled to rely upon the adequacy, accuracy and completeness of the services, certifications or approvals performed by such design professionals, provided Owner and Engineer have specified to Contractor all performance and design criteria that such services must satisfy.

D. Pursuant to this Paragraph 6.21, Engineer's review and approval of design calculations and design drawings will be only for the limited purpose of checking for conformance with performance and design criteria given and the design concept expressed in the Contract Documents. Engineer's review and approval of Shop Drawings and other submittals (except design calculations and design drawings) will

be only for the purpose stated in Paragraph 6.17.D.1.

E. Contractor shall not be responsible for the adequacy of the performance or design criteria required by the Contract Documents.

ARTICLE 7 - OTHER WORK AT THE SITE

7.01 Related Work at Site

A. Owner may perform other work related to the Project at the Site with Owner's employees, or via other direct contracts therefor, or have other work performed by utility owners. If such other work is not noted in the Contract Documents, then:

1. written notice thereof will be given to Contractor prior to starting any such other work; and

2. if Owner and Contractor are unable to agree on entitlement to or on the amount or extent, if any, of any adjustment in the Contract Price or Contract Times that should be allowed as a result of such other work, a Claim may be made therefor as provided in Paragraph 10.05.

B. Contractor shall afford each other contractor who is a party to such a direct contract, each utility owner and Owner, if Owner is performing other work with Owner's employees, proper and safe access to the Site, a reasonable opportunity for the introduction and storage of materials and equipment and the execution of such other work, and shall properly coordinate the Work with theirs. Contractor shall do all cutting, fitting, and patching of the Work that may be required to properly connect or otherwise make its several parts come together and properly integrate with such other work. Contractor shall not endanger any work of others by cutting, excavating, or otherwise altering their work and will only cut or alter their work with the written consent of Engineer and the others whose work will be affected. The duties and responsibilities of Contractor under this Paragraph are for the benefit of such utility owners and other contractors to the extent that there are comparable provisions for the benefit of Contractor in said direct contracts between Owner and such utility owners and other contractors.

C. If the proper execution or results of any part of Contractor's Work depends upon work performed by others under this Article 7, Contractor shall inspect such other work and promptly report to Engineer in writing any delays, defects, or deficiencies in such other work that render it unavailable or unsuitable for the proper execution and results of Contractor's Work. Contractor's failure to so report will constitute an acceptance of such other work as fit and proper for integration with Contractor's Work except for latent defects and deficiencies in such other work.

7.02 Coordination

A. If Owner intends to contract with others for the performance of other work on the Project at the Site, the following will be set forth in Supplementary Conditions:

1. the individual or entity who will have authority and responsibility for coordination of the activities among the various contractors will be identified;

2. the specific matters to be covered by such authority and responsibility will be itemized; and

3. the extent of such authority and responsibilities will be provided.

B. Unless otherwise provided in the Supplementary Conditions, Owner shall have sole authority and responsibility for such coordination.

7.03 Legal Relationships

A. Paragraphs 7.01.A and 7.02 are not applicable for utilities not under the control of Owner.

B. Each other direct contract of Owner under Paragraph 7.01.A shall provide that the other contractor is liable to Owner and Contractor for the reasonable direct delay and disruption costs incurred by Contractor as a result of the other contractor's actions or inactions.

C. Contractor shall be liable to Owner and any other contractor for the reasonable direct delay and disruption costs incurred by such other contractor as a result of Contractor's action or inactions.

ARTICLE 8 - OWNER'S RESPONSIBILITIES

8.01 Communications to Contractor

A. Except as otherwise provided in these General Conditions, Owner shall issue all communications to Contractor through Engineer.

8.02 Replacement of Engineer

A. In case of termination of the employment of Engineer, Owner shall appoint an engineer to whom Contractor makes no reasonable objection, whose status under the Contract Documents shall be that of the former Engineer.

8.03 Furnish Data

A. Owner shall promptly furnish the data required of Owner under the Contract Documents.

8.04 Pay When Due

A. Owner shall make payments to Contractor when they are due as provided in Paragraphs 14.02.C and 14.07.C.

8.05 Lands and Easements; Reports and Tests

A. Owner's duties in respect of providing lands and easements and providing engineering surveys to establish reference points are set forth in Paragraphs 4.01 and 4.05. Paragraph 4.02 refers to Owner's identifying and making available to Contractor copies of reports of explorations and tests of subsurface conditions and drawings of physical conditions in or relating to existing surface or subsurface structures at or contiguous to the Site that have been utilized by Engineer in preparing the Contract Documents.

~~*8.06 Insurance*~~

~~A. Owner's responsibilities, if any, in respect to purchasing and maintaining liability and property insurance are set forth in Article 5.~~

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8.07 Change Orders

A. Owner is obligated to execute Change Orders as indicated in Paragraph 10.03.

8.08 Inspections, Tests, and Approvals

A. Owner's responsibility in respect to certain inspections, tests, and approvals is set forth in Paragraph 13.03.B.

8.09 Limitations on Owner's Responsibilities

A. The Owner shall not supervise, direct, or have control or authority over, nor be responsible for, Contractor's means, methods, techniques, sequences, or procedures of construction, or the safety precautions and programs incident thereto, or for any failure of Contractor to comply with Laws and Regulations applicable to the performance of the Work. Owner will not be responsible for Contractor's failure to perform the Work in accordance with the Contract Documents.

8.10 Undisclosed Hazardous Environmental Condition

A. Owner's responsibility in respect to an undisclosed Hazardous Environmental Condition is set forth in Paragraph 4.06.

8.11 Evidence of Financial Arrangements

A. If and to the extent Owner has agreed to furnish Contractor reasonable evidence that financial arrangements have been made to satisfy Owner's obligations under the Contract Documents, Owner's responsibility in respect thereof will be as set forth in the Supplementary Conditions.

ARTICLE 9 - ENGINEER'S STATUS DURING CONSTRUCTION

9.01 Owner's Representative

A. Engineer will be Owner's representative during the construction period. The duties and responsibilities and the limitations of authority of Engineer as Owner's representative during construction are set forth in the Contract Documents and will not be changed without written consent of Owner and Engineer.

9.02 Visits to Site

A. Engineer will make visits to the Site at intervals appropriate to the various stages of construction as Engineer deems necessary in order to observe as an experienced and qualified design professional the progress that has been made and the quality of the various aspects of Contractor's executed Work. Based on information obtained during such visits and observations, Engineer, for the benefit of Owner, will determine, in general, if the Work is proceeding in accordance with the Contract Documents. Engineer will not be required to make exhaustive or continuous inspections on the Site to check the quality or quantity of the Work. Engineer's efforts will be directed toward providing for Owner a greater degree of confidence that the completed Work will conform generally to the Contract Documents. On the basis of such visits and observations, Engineer will keep Owner informed of the progress of the Work and will endeavor to guard Owner against defective Work.

B. Engineer's visits and observations are subject to all the limitations on Engineer's authority and responsibility set forth in Paragraph 9.09. Particularly, but without limitation, during or as a result of Engineer's visits or observations of Contractor's Work Engineer will not supervise, direct, control, or have authority over or be responsible for Contractor's means, methods, techniques, sequences, or procedures of construction, or the safety precautions and programs incident thereto, or for any failure of Contractor to comply with Laws and Regulations applicable to the performance of the Work.

9.03 Project Representative

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A. If Owner and Engineer agree, Engineer will furnish a Resident Project Representative to assist Engineer in providing more extensive observation of the Work. The authority and responsibilities of any such Resident Project Representative and assistants will be as provided in the Supplementary Conditions, and limitations on the responsibilities thereof will be as provided in Paragraph 9.09. If Owner designates another representative or agent to represent Owner at the Site who is not Engineer's consultant, agent or employee, the responsibilities and authority and limitations thereon of such other individual or entity will be as provided in the Supplementary Conditions.

9.04 Authorized Variations in Work

A. Engineer may authorize minor variations in the Work from the requirements of the Contract Documents which do not involve an adjustment in the Contract Price or the Contract Times and are compatible with the design concept of the completed Project as a functioning whole as indicated by the Contract Documents. These may be accomplished by a Field Order and will be binding on Owner and also on Contractor,

who shall perform the Work involved promptly. If Owner or Contractor believes that a Field Order justifies an adjustment in the Contract Price or Contract Times, or both, and the parties are unable to agree on entitlement to or on the amount or extent, if any, of any such adjustment, a Claim may be made therefor as provided in Paragraph 10.05.

9.05 Rejecting Defective Work

A. Engineer will have authority to reject Work which Engineer believes to be defective, or that Engineer believes will not produce a completed Project that conforms to the Contract Documents or that will prejudice the integrity of the design concept of the completed Project as a functioning whole as indicated by the Contract Documents. Engineer will also have authority to require special inspection or testing of the Work as provided in Paragraph 13.04, whether or not the Work is fabricated, installed, or completed.

9.06 Shop Drawings, Change Orders and Payments

A. In connection with Engineer's authority, and limitations thereof, as to Shop Drawings and Samples, see Paragraph 6.17.

B. In connection with Engineer's authority, and limitations thereof, as to design calculations and design drawings submitted in response to a delegation of professional design services, if any, see Paragraph 6.21.

C. In connection with Engineer's authority as to Change Orders, see Articles 10, 11, and 12.

D. In connection with Engineer's authority as to Applications for Payment, see Article 14.

9.07 Determinations for Unit Price Work

A. Engineer will determine the actual quantities and classifications of Unit Price Work performed by Contractor. Engineer will review with Contractor the Engineer's preliminary determinations on such matters before rendering a written decision thereon (by recommendation of an Application for Payment or otherwise). Engineer's written decision thereon will be final and binding (except as modified by Engineer to reflect changed factual conditions or more accurate data) upon Owner and Contractor, subject to the provisions of Paragraph 10.05.

9.08 Decisions on Requirements of Contract Documents and Acceptability of Work

A. Engineer will be the initial interpreter of the requirements of the Contract Documents and judge of the acceptability of the Work thereunder. All matters in question and other matters between Owner and Contractor arising prior to the date final payment is due relating to the acceptability of the Work, and the interpretation of the requirements of the Contract Documents pertaining to the performance of the Work, will be referred initially to Engineer in writing within 30 days of the event giving rise to the question

B. Engineer will, with reasonable promptness, render a written decision on the issue referred. If Owner or Contractor believe that any such decision entitles them to an adjustment in the Contract Price or Contract Times or both, a Claim may be made under Paragraph 10.05. The date of Engineer's decision shall be the date of the event giving rise to the issues referenced for the purposes of Paragraph 10.05.B.

C. Engineer's written decision on the issue referred will be final and binding on Owner and Contractor, subject to the provisions of Paragraph 10.05.

D. When functioning as interpreter and judge under this Paragraph 9.08, Engineer will not show partiality to Owner or Contractor and will not be liable in connection with any interpretation or decision rendered in good faith in such capacity.

9.09 Limitations on Engineer's Authority and Responsibilities

A. Neither Engineer's authority or responsibility under this Article 9 or under any other provision of the Contract Documents nor any decision made by Engineer in good faith either to exercise or not exercise such authority or responsibility or the undertaking, exercise, or performance of any authority or responsibility by Engineer shall create, impose, or give rise to any duty in contract, tort, or otherwise owed by Engineer to Contractor, any Subcontractor, any Supplier, any other individual or entity, or to any surety for or employee or agent of any of them.

B. Engineer will not supervise, direct, control, or have authority over or be responsible for Contractor's means, methods, techniques, sequences, or procedures of construction, or the safety precautions and programs incident thereto, or for any failure of Contractor to comply with Laws and Regulations applicable to the performance of the Work. Engineer will not be responsible for Contractor's failure to perform the Work in accordance with the Contract Documents.

C. Engineer will not be responsible for the acts or omissions of Contractor or of any Subcontractor, any Supplier, or of any other individual or entity performing any of the Work.

D. Engineer's review of the final Application for Payment and accompanying documentation and all maintenance and operating instructions, schedules, guarantees, bonds, certificates of inspection, tests and approvals, and other documentation required to be delivered by Paragraph 14.07.A will only be to determine generally that their content complies with the requirements of, and in the case of certificates of inspections, tests, and approvals that the results certified indicate compliance with the Contract Documents.

E. The limitations upon authority and responsibility set forth in this Paragraph 9.09 shall also apply to, the Resident Project Representative, if any, and assistants, if any.

ARTICLE 10 - CHANGES IN THE WORK; CLAIMS

10.01 Authorized Changes in the Work

A. Without invalidating the Contract and without notice to any surety, Owner may, at any time or from time to time, order additions, deletions, or revisions in the Work by a Change Order, or a Work Change Directive. Upon receipt of any such document, Contractor shall promptly proceed with the Work involved which will be performed under the applicable conditions of the Contract Documents (except as otherwise specifically provided).

B. If Owner and Contractor are unable to agree on entitlement to, or on the amount or extent, if any, of an adjustment in the Contract Price or Contract Times, or both, that should be allowed as a result of a Work Change Directive, a Claim may be made therefor as provided in Paragraph 10.05.

10.02 Unauthorized Changes in the Work

A. Contractor shall not be entitled to an increase in the Contract Price or an extension of the Contract Times with respect to any work performed that is not required by the Contract Documents as amended, modified, or supplemented as provided in Paragraph 3.04, except in the case of an emergency as provided in Paragraph 6.16 or in the case of uncovering Work as provided in Paragraph 13.04.B.

10.03 Execution of Change Orders

A. Owner and Contractor shall execute appropriate Change Orders recommended by Engineer covering:

1. changes in the Work which are: (i) ordered by Owner pursuant to Paragraph 10.01.A, (ii) required because of acceptance

of defective Work under Paragraph 13.08.A or Owner's correction of defective Work under Paragraph 13.09, or (iii) agreed to by the parties;

2. changes in the Contract Price or Contract Times which are agreed to by the parties, including any undisputed sum or amount of time for Work actually performed in accordance with a Work Change Directive; and

3. changes in the Contract Price or Contract Times which embody the substance of any written decision rendered by Engineer pursuant to Paragraph 10.05; provided that, in lieu of executing any such Change Order, an appeal may be taken from any such decision in accordance with the provisions of the Contract Documents and applicable Laws and Regulations, but during any such appeal, Contractor shall carry on the Work and adhere to the Progress Schedule as provided in Paragraph 6.18.A.

10.04 Notification to Surety

A. If notice of any change affecting the general scope of the Work or the provisions of the Contract Documents (including, but not limited to, Contract Price or Contract Times) is required by the provisions of any bond to be given to a surety, the giving of any such notice will be Contractor's responsibility. The amount of each applicable bond will be adjusted to reflect the effect of any such change.

10.05 Claims

A. *Engineer's Decision Required*: All Claims, except those waived pursuant to Paragraph 14.09, shall be referred to the Engineer for decision. A decision by Engineer shall be required as a condition precedent to any exercise by Owner or Contractor of any rights or remedies either may otherwise have under the Contract Documents or by Laws and Regulations in respect of such Claims.

B. *Notice:* Written notice stating the general nature of each Claim, shall be delivered by the claimant to Engineer and the other party to the Contract promptly (but in no event later than 30 days) after the start of the event giving rise thereto. The responsibility to substantiate a Claim shall rest with the party making the Claim. Notice of the amount or extent of the Claim, with supporting data shall be delivered to the Engineer and the other party to the Contract within 60 days after the start of such event (unless Engineer allows additional time for claimant to submit additional or more accurate data in support of such Claim). A Claim for an adjustment in Contract Price shall be prepared in accordance with the provisions of Paragraph 12.01.B. A Claim for an adjustment in Contract Time shall be prepared in accordance with the provisions of Paragraph 12.02.B. Each Claim shall be accompanied by claimant's written statement that the adjustment claimed is the entire adjustment to which the claimant believes it is entitled as a result of said event. The opposing party shall submit any response to Engineer and the claimant within 30 days after receipt of the claimant's last submittal (unless Engineer allows additional time).

C. *Engineer's Action*: Engineer will review each Claim and, within 30 days after receipt of the last submittal of the claimant or the last submittal of the opposing party, if any, take one of the following actions in writing:

1. deny the Claim in whole or in part,

2. approve the Claim, or

3. notify the parties that the Engineer is unable to resolve the Claim if, in the Engineer's sole discretion, it would be inappropriate for the Engineer to do so. For purposes of further resolution of the Claim, such notice shall be deemed a denial.

D. In the event that Engineer does not take action on a Claim within said 30 days, the Claim shall be deemed denied.

E. Engineer's written action under Paragraph 10.05.C or denial pursuant to Paragraphs 10.05.C.3 or 10.05.D will be final

and binding upon Owner and Contractor, unless Owner or Contractor invoke the dispute resolution procedure set forth in Article 16 within 30 days of such action or denial.

F. No Claim for an adjustment in Contract Price or Contract Times will be valid if not submitted in accordance with this Paragraph 10.05.

ARTICLE 11 - COST OF THE WORK; ALLOWANCES; UNIT PRICE WORK

11.01 Cost of the Work

A. *Costs Included:* The term Cost of the Work means the sum of all costs, except those excluded in Paragraph 11.01.B, necessarily incurred and paid by Contractor in the proper performance of the Work. When the value of any Work covered by a Change Order or when a Claim for an adjustment in Contract Price is determined on the basis of Cost of the Work, the costs to be reimbursed to Contractor will be only those additional or incremental costs required because of the change in the Work or because of the event giving rise to the Claim. Except as otherwise may be agreed to in writing by Owner, such costs shall be in amounts no higher than those prevailing in the locality of the Project, shall include only the following items, and shall not include any of the costs itemized in Paragraph 11.01 B.

1. Payroll costs for employees in the direct employ of Contractor in the performance of the Work under schedules of job classifications agreed upon by Owner and Contractor. Such employees shall include, without limitation, superintendents, foremen, and other personnel employed full time at the Site. Payroll costs for employees not employed full time on the Work shall be apportioned on the basis of their time spent on the Work. Payroll costs shall include, but not be limited to, salaries and wages plus the cost of fringe benefits, which shall include social security contributions, unemployment, excise, and payroll taxes, workers' compensation, health and retirement benefits, bonuses, sick leave, vacation and holiday pay applicable thereto. The expenses of performing Work outside of regular working hours, on Saturday, Sunday, or legal holidays, shall be included in the above to the extent authorized by Owner.

2. Cost of all materials and equipment furnished and incorporated in the Work, including costs of transportation and storage thereof, and Suppliers' field services required in connection therewith. All cash discounts shall accrue to Contractor unless Owner deposits funds with Contractor with which to make payments, in which case the cash discounts shall accrue to Owner. All trade discounts, rebates and refunds and returns from sale of surplus materials and equipment shall accrue to Owner, and Contractor shall make provisions so that they may be obtained.

3. Payments made by Contractor to Subcontractors for Work performed by Subcontractors. If required by Owner, Contractor shall obtain competitive bids from subcontractors acceptable to Owner and Contractor and shall deliver such bids to Owner, who will then determine, with the advice of Engineer, which bids, if any, will be acceptable. If any subcontract provides that the Subcontractor is to be paid on the basis of Cost of the Work plus a fee, the Subcontractor's Cost of the Work and fee shall be determined in the same manner as Contractor's Cost of the Work and fee as provided in this Paragraph 11.01.

4. Costs of special consultants (including but not limited to Engineers, architects, testing laboratories, surveyors, attorneys, and accountants) employed for services specifically related to the Work.

5. Supplemental costs including the following:

a. The proportion of necessary transportation, travel, and subsistence expenses of Contractor's employees incurred in discharge of duties connected with the Work.

b. Cost, including transportation and maintenance, of all materials, supplies, equipment, machinery, appliances, office, and temporary facilities at the Site, and hand tools not owned by the workers, which are consumed in the performance of the Work, and cost, less market value, of such items used but not consumed which remain the property of Contractor.

c. Rentals of all construction equipment and machinery, and the parts thereof whether rented from Contractor or others in accordance with rental agreements approved by Owner with the advice of Engineer, and the costs of transportation, loading, unloading, assembly, dismantling, and removal thereof. All such costs shall be in accordance with the terms of said rental agreements. The rental of any such equipment, machinery, or parts shall cease when the use thereof is no longer necessary for the Work.

d. Sales, consumer, use, and other similar taxes related to the Work, and for which Contractor is liable, imposed by Laws and Regulations.

e. Deposits lost for causes other than negligence of Contractor, any Subcontractor, or anyone directly or indirectly employed by any of them or for whose acts any of them may be liable, and royalty payments and fees for permits and licenses.

f. Losses and damages (and related expenses) caused by damage to the Work, not compensated by insurance or otherwise, sustained by Contractor in connection with the performance of the Work (except losses and damages within the deductible amounts of property insurance established in accordance with Paragraph 5.06.D), provided such losses and damages have resulted from causes other than the negligence of Contractor, any Subcontractor, or anyone directly or indirectly employed by any of them or for whose acts any of them may be liable. Such losses shall include settlements made with the written consent and approval of Owner. No such losses, damages, and expenses shall be included in the Cost of the Work for the purpose of determining Contractor's fee.

g. The cost of utilities, fuel, and sanitary facilities at the Site.

h. Minor expenses such as telegrams, long distance telephone calls, telephone service at the Site, expresses, and similar petty cash items in connection with the Work.

i. The costs of premiums for all bonds and insurance Contractor is required by the Contract Documents to purchase and maintain.

B. *Costs Excluded:* The term Cost of the Work shall not include any of the following items:

1. Payroll costs and other compensation of Contractor's officers, executives, principals (of partnerships and sole proprietorships), general managers, safety managers, engineers, architects, estimators, attorneys, auditors, accountants, purchasing and contracting agents, expediters, timekeepers, clerks, and other personnel employed by Contractor, whether at the Site or in Contractor's principal or branch office for general administration of the Work and not specifically included in the agreed upon schedule of job classifications referred to in Paragraph 11.01.A.1 or specifically covered by Paragraph 11.01.A.4, all of which are to be considered administrative costs covered by the Contractor's fee.

2. Expenses of Contractor's principal and branch offices other than Contractor's office at the Site.

3. Any part of Contractor's capital expenses, including interest on Contractor's capital employed for the Work and charges against Contractor for delinquent payments.

4. Costs due to the negligence of Contractor, any Subcontractor, or anyone directly or indirectly employed by any of them or for whose acts any of them may be liable, including but not limited to, the correction of defective Work, disposal of materials or equipment wrongly supplied, and making good any damage to property.

5. Other overhead or general expense costs of any kind and the costs of any item not specifically and expressly included in Paragraphs 11.01.A and 11.01.B.

C. *Contractor's Fee:* When all the Work is performed on the basis of cost-plus, Contractor's fee shall be determined as set forth in the Agreement. When the value of any Work covered by a Change Order or when a Claim for an adjustment in Contract Price is determined on the basis of Cost of the Work, Contractor's fee shall be determined as set forth in Paragraph 12.01.C.

D. *Documentation:* Whenever the Cost of the Work for any purpose is to be determined pursuant to Paragraphs 11.01 A and 11.01 B, Contractor will establish and maintain records thereof in accordance with generally accepted accounting practices and submit in a form acceptable to Engineer an itemized cost breakdown together with supporting data.

11.02 Allowances

A. It is understood that Contractor has included in the Contract Price all allowances so named in the Contract Documents and shall cause the Work so covered to be performed for such sums and by such persons or entities as may be acceptable to Owner and Engineer.

B. *Cash Allowances*

1. Contractor agrees that:

a. the cash allowances include the cost to Contractor (less any applicable trade discounts) of materials and equipment required by the allowances to be delivered at the Site, and all applicable taxes; and

b. Contractor's costs for unloading and handling on the Site, labor, installation , overhead, profit, and other expenses contemplated for the cash allowances have been included in the Contract Price and not in the allowances, and no demand for additional payment on account of any of the foregoing will be valid.

C. Contingency Allowance

1. Contractor agrees that a contingency allowance, if any, is for the sole use of Owner to cover unanticipated costs.

D. Prior to final payment, an appropriate Change Order will be issued as recommended by Engineer to reflect actual amounts due Contractor on account of Work covered by allowances, and the Contract Price shall be correspondingly adjusted.

11.03 Unit Price Work

A. Where the Contract Documents provide that all or part of the Work is to be Unit Price Work, initially the Contract Price will be deemed to include for all Unit Price Work an amount equal to the sum of the unit price for each separately identified item of Unit Price Work times the estimated quantity of each item as indicated in the Agreement.

B. The estimated quantities of items of Unit Price Work are not guaranteed and are solely for the purpose of comparison of Bids and determining an initial Contract Price. Determinations of the actual quantities and classifications of Unit Price Work performed by Contractor will be made by Engineer subject to the provisions of Paragraph 9.07.

C. Each unit price will be deemed to include an amount considered by Contractor to be adequate to cover Contractor's overhead and profit for each separately identified item.

D. Owner or Contractor may make a Claim for an adjustment in the Contract Price in accordance with Paragraph 10.05 if:

1. the quantity of any item of Unit Price Work performed by Contractor differs materially and significantly from the estimated quantity of such item indicated in the Agreement; and

2. there is no corresponding adjustment with respect any other item of Work; and

3. Contractor believes that Contractor is entitled to an increase in Contract Price as a result of having incurred additional expense or Owner believes that Owner is entitled to a decrease in Contract Price and the parties are unable to agree as to the amount of any such increase or decrease.

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ARTICLE 12 - CHANGE OF CONTRACT PRICE; CHANGE OF CONTRACT TIMES

12.01 Change of Contract Price

A. The Contract Price may only be changed by a Change Order. Any Claim for an adjustment in the Contract Price shall be based on written notice submitted by the party making the Claim to the Engineer and the other party to the Contract in accordance with the provisions of Paragraph 10.05.

B. The value of any Work covered by a Change Order or of any Claim for an adjustment in the Contract Price will be determined as follows:

1. where the Work involved is covered by unit prices contained in the Contract Documents, by application of such unit prices to the quantities of the items involved (subject to the provisions of Paragraph 11.03); or

2. where the Work involved is not covered by unit prices contained in the Contract Documents, by a mutually agreed lump sum (which may include an allowance for overhead and profit not necessarily in accordance with Paragraph 12.01.C.2); or

3. where the Work involved is not covered by unit prices contained in the Contract Documents and agreement to a lump sum is not reached under Paragraph 12.01.B.2, on the basis of the Cost of the Work (determined as provided in Paragraph 11.01) plus a Contractor's fee for overhead and profit (determined as provided in Paragraph 12.01.C).

C. *Contractor's Fee:* The Contractor's fee for overhead and profit shall be determined as follows:

1. a mutually acceptable fixed fee; or

2. if a fixed fee is not agreed upon, then a fee based on the following percentages of the various portions of the Cost of the Work:

a. for costs incurred under Paragraphs 11.01.A.1 and 11.01.A.2, the Contractor's fee shall be 15 percent;

b. for costs incurred under Paragraph 11.01.A.3, the Contractor's fee shall be five percent;

c. where one or more tiers of subcontracts are on the basis of Cost of the Work plus a fee and no fixed fee is agreed upon, the intent of Paragraph 12.01.C.2.a is that the Subcontractor who actually performs the Work, at whatever tier, will be paid a fee of 15 percent of the costs incurred by such Subcontractor under Paragraphs 11.01.A.1 and 11.01.A.2 and that any higher tier Subcontractor and Contractor will each be paid a fee of

five percent of the amount paid to the next lower tier Subcontractor;

d. no fee shall be payable on the basis of costs itemized under Paragraphs 11.01.A.4, 11.01.A.5, and 11.01.B;

e. the amount of credit to be allowed by Contractor to Owner for any change which results in a net decrease in cost will be the amount of the actual net decrease in cost plus a deduction in Contractor's fee by an amount equal to five percent of such net decrease; and

f. when both additions and credits are involved in any one change, the adjustment in Contractor's fee shall be computed on the basis of the net change in accordance with Paragraphs 12.01.C.2.a through 12.01.C.2.e, inclusive.

12.02 Change of Contract Times

A. The Contract Times may only be changed by a Change Order. Any Claim for an adjustment in the Contract Times shall be based on written notice submitted by the party making the Claim to the Engineer and the other party to the Contract in accordance with the provisions of Paragraph 10.05.

B. Any adjustment of the Contract Times covered by a Change Order or any Claim for an adjustment in the Contract Times will be determined in accordance with the provisions of this Article 12.

12.03 Delays

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A. Where Contractor is prevented from completing any part of the Work within the Contract Times due to delay beyond the control of Contractor, the Contract Times will be extended in an amount equal to the time lost due to such delay if a Claim is made therefor as provided in Paragraph 12.02.A. Delays beyond the control of Contractor shall include, but not be limited to, acts or neglect by Owner, acts or neglect of utility owners or other contractors performing other work as contemplated by Article 7, fires, floods, epidemics, ~~abnormal weather conditions~~, or acts of God.

B. If Owner, Engineer, or other contractors or utility owners performing other work for Owner as contemplated by Article 7, or anyone for whom Owner is responsible, delays, disrupts, or interferes with the performance or progress of the Work, then Contractor shall be entitled to an equitable adjustment in the Contract Price or the Contract Times , or both. Contractor's entitlement to an adjustment of the Contract Times is conditioned on such adjustment being essential to Contractor's ability to complete the Work within the Contract Times.

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C If Contractor is delayed in the performance or progress of the Work by fire, flood, epidemic, ~~abnormal weather conditions~~, acts of God, acts or failures to act of utility owners not under the control of Owner, or other causes not the fault of and beyond control of Owner and Contractor, then Contractor shall be entitled to an equitable adjustment in Contract Times, if such adjustment is essential to Contractor's ability to complete the Work within the Contract Times. Such an adjustment shall be Contractor's sole and exclusive remedy for the delays described in this Paragraph 12.03.C.

D. Owner, Engineer and the Related Entities of each of them shall not be liable to Contractor for any claims, costs, losses, or damages (including but not limited to all fees and charges of Engineers, architects, attorneys, and other professionals and all court or arbitration or other dispute resolution costs) sustained by Contractor on or in connection with any other project or anticipated project.

E. Contractor shall not be entitled to an adjustment in Contract Price or Contract

Times for delays within the control of Contractor. Delays attributable to and within the control of a Subcontractor or Supplier shall be deemed to be delays within the control of Contractor.

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ARTICLE 13 - TESTS AND INSPECTIONS; CORRECTION, REMOVAL OR ACCEPTANCE OF DEFECTIVE WORK

13.01 Notice of Defects

A. Prompt notice of all defective Work of which Owner or Engineer has actual knowledge will be given to Contractor. All defective Work may be rejected, corrected, or accepted as provided in this Article 13.

13.02 Access to Work

A. Owner, Engineer, their consultants and other representatives and personnel of Owner, independent testing laboratories, and governmental agencies with jurisdictional interests will have access to the Site and the Work at reasonable times for their observation, inspecting, and testing. Contractor shall provide them proper and safe conditions for such access and advise them of Contractor's Site safety procedures and programs so that they may comply therewith as applicable.

13.03 Tests and Inspections

A. Contractor shall give Engineer timely notice of readiness of the Work for all required inspections, tests, or approvals and shall cooperate with inspection and testing personnel to facilitate required inspections or tests.

B. Owner shall employ and pay for the services of an independent testing laboratory to perform all inspections, tests, or approvals required by the Contract Documents except:

1. for inspections, tests, or approvals covered by Paragraphs 13.03.C and 13.03.D below;

2. that costs incurred in connection with tests or inspections conducted pursuant to Paragraph 13.04.B shall be paid as provided in said Paragraph 13.04.C; and

3. as otherwise specifically provided in the Contract Documents.

C. If Laws or Regulations of any public body having jurisdiction require any Work (or part thereof) specifically to be inspected, tested, or approved by an employee or other representative of such public body, Contractor shall assume full responsibility for arranging and obtaining such inspections, tests, or approvals, pay all costs in connection therewith, and furnish Engineer the required certificates of inspection or approval.

D. Contractor shall be responsible for arranging and obtaining and shall pay all costs in connection with any inspections, tests, or approvals required for Owner's and Engineer's acceptance of materials or equipment to be incorporated in the Work; or acceptance of materials, mix designs, or equipment submitted for approval prior to Contractor's purchase thereof for incorporation in the Work. Such inspections, tests, or approvals shall be performed by organizations acceptable to Owner and Engineer.

E. If any Work (or the work of others) that is to be inspected, tested, or approved is covered by Contractor without written concurrence of Engineer, it must, if requested by Engineer, be uncovered for observation.

F. Uncovering Work as provided in Paragraph 13.03.E shall be at Contractor's expense unless Contractor has given Engineer timely notice of Contractor's intention to cover the same and Engineer has not acted with reasonable promptness in response to such notice.

13.04 Uncovering Work

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

B. If Engineer considers it necessary or advisable that covered Work be observed by Engineer or inspected or tested by others, Contractor, at Engineer's request, shall uncover, expose, or otherwise make available for observation, inspection, or testing as Engineer may require, that portion of the Work in question, furnishing all necessary labor, material, and equipment.

C. If it is found that the uncovered Work is defective, Contractor shall pay all claims, costs, losses, and damages (including but not limited to all fees and charges of engineers, architects, attorneys, and other professionals and all court or arbitration or other dispute resolution costs) arising out of or relating to such uncovering, exposure, observation, inspection, and testing, and of satisfactory replacement or reconstruction (including but not limited to all costs of repair or replacement of work of others); and Owner shall be entitled to an appropriate decrease in the Contract Price. If the parties are unable to agree as to the amount thereof, Owner may make a Claim therefor as provided in Paragraph 10.05.

D. If, the uncovered Work is not found to be defective, Contractor shall be allowed an increase in the Contract Price or an extension of the Contract Times, or both, directly attributable to such uncovering, exposure, observation, inspection, testing, replacement, and reconstruction. If the parties are unable to agree as to the amount or extent thereof, Contractor may make a Claim therefor as provided in Paragraph 10.05.

13.05 Owner May Stop the Work

A. If the Work is defective, or Contractor fails to supply sufficient skilled workers or suitable materials or equipment, or fails to perform the Work in such a way that the completed Work will conform to the Contract Documents, Owner may order Contractor to stop the Work, or any portion thereof, until the cause for such order has been eliminated; however, this right of Owner to stop the Work shall not give rise to any duty on the part of Owner to exercise this right for the benefit of Contractor, any Subcontractor, any Supplier, any other individual or entity, or any surety for, or employee or agent of any of them.

13.06 Correction or Removal of Defective Work

A. Promptly after receipt of notice, Contractor shall correct all defective Work, whether or not fabricated, installed, or completed, or, if the Work has been rejected by Engineer, remove it from the Project and replace it with Work that is not defective. Contractor shall pay all claims, costs, losses, and damages (including but not limited to all fees and charges of engineers, architects, attorneys, and other professionals and all court or arbitration or other dispute resolution costs) arising out of or relating to such correction or removal (including but not limited to all costs of repair or replacement of work of others).

B. When correcting defective Work under the terms of this Paragraph 13.06 or Paragraph 13.07, Contractor shall take no action that would void or otherwise impair Owner's special warranty and guarantee, if any, on said Work.

13.07 Correction Period

A. If within one year after the date of Substantial Completion (or such longer period of time as may be prescribed by the terms of any applicable special guarantee required by the Contract Documents) or by any specific provision of the Contract Documents, any Work is found to be defective, or if the repair of any damages to the land or areas made available for Contractor's use by Owner or permitted by Laws and Regulations as contemplated in Paragraph 6.11.A is found to be defective,

Contractor shall promptly, without cost to Owner and in accordance with Owner's written instructions:

1. repair such defective land or areas; or

2. correct such defective Work; or

3. if the defective Work has been rejected by Owner, remove it from the Project and replace it with Work that is not defective, and

4. satisfactorily correct or repair or remove and replace any damage to other Work, to the work of others or other land or areas resulting therefrom.

B. If Contractor does not promptly comply with the terms of Owner's written instructions, or in an emergency where delay would cause serious risk of loss or damage, Owner may have the defective Work corrected or repaired or may have the rejected Work removed and replaced. All claims, costs, losses, and damages (including but not limited to all fees and charges of engineers, architects, attorneys, and other professionals and all court or arbitration or other dispute resolution costs) arising out of or relating to such correction or repair or such removal and replacement (including but not limited to all costs of repair or replacement of work of others) will be paid by Contractor.

C. In special circumstances where a particular item of equipment is placed in continuous service before Substantial Completion of all the Work, the correction period for that item may start to run from an earlier date if so provided in the Specifications .

D. Where defective Work (and damage to other Work resulting therefrom) has been corrected or removed and replaced under this Paragraph 13.07, the correction period hereunder with respect to such Work will be extended for an additional period of one year after such correction or removal and replacement has been satisfactorily completed.

E. Contractor's obligations under this Paragraph 13.07 are in addition to any other obligation or warranty. The provisions of this Paragraph 13.07 shall not be construed as a substitute for or a waiver of the provisions of any applicable statute of limitation or repose.

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13.08 Acceptance of Defective Work

A. If, instead of requiring correction or removal and replacement of defective Work, Owner (and, prior to Engineer's recommendation of final payment, Engineer) prefers to accept it, Owner may do so. Contractor shall pay all claims, costs, losses, and damages (including but not limited to all fees and charges of engineers, architects, attorneys, and other professionals and all court or arbitration or other dispute resolution costs) attributable to Owner's evaluation of and determination to accept such defective Work (such costs to be approved by Engineer as to reasonableness) and the diminished value of the Work to the extent not otherwise paid by Contractor pursuant to this sentence. If any such acceptance occurs prior to Engineer's recommendation of final payment, a Change Order will be issued incorporating the necessary revisions in the Contract Documents with respect to the Work, and Owner shall be entitled to an appropriate decrease in the Contract Price, reflecting the diminished value of Work so accepted. If the parties are unable to agree as to the amount thereof, Owner may make a Claim therefor as provided in Paragraph 10.05. If the acceptance occurs after such recommendation, an appropriate amount will be paid by Contractor to Owner.

13.09 Owner May Correct Defective Work

A. If Contractor fails within a reasonable time after written notice from Engineer to correct defective Work or to remove and replace rejected Work as required by Engineer in accordance with Paragraph 13.06.A, or if Contractor fails to perform the

Work in accordance with the Contract Documents, or if Contractor fails to comply with any other provision of the Contract Documents, Owner may, after seven days written notice to Contractor, correct or remedy any such deficiency.

B. In exercising the rights and remedies under this Paragraph 13.09, Owner shall proceed expeditiously. In connection with such corrective or remedial action, Owner may exclude Contractor from all or part of the Site, take possession of all or part of the Work and suspend Contractor's services related thereto, take possession of Contractor's tools, appliances, construction equipment and machinery at the Site, and incorporate in the Work all materials and equipment stored at the Site or for which Owner has paid Contractor but which are stored elsewhere. Contractor shall allow Owner, Owner's representatives, agents and employees, Owner's other contractors, and Engineer and Engineer's consultants access to the Site to enable Owner to exercise the rights and remedies under this Paragraph.

C. All claims, costs, losses, and damages (including but not limited to all fees and charges of engineers, architects, attorneys, and other professionals and all court or arbitration or other dispute resolution costs) incurred or sustained by Owner in exercising the rights and remedies under this Paragraph 13.09 will be charged against Contractor, and a Change Order will be issued incorporating the necessary revisions in the Contract Documents with respect to the Work; and Owner shall be entitled to an appropriate decrease in the Contract Price. If the parties are unable to agree as to the amount of the adjustment, Owner may make a Claim therefor as provided in Paragraph 10.05. Such claims, costs, losses and damages will include but not be limited to all costs of repair, or replacement of work of others destroyed or damaged by correction, removal, or replacement of Contractor's defective Work.

D. Contractor shall not be allowed an extension of the Contract Times because of any delay in the performance of the Work attributable to the exercise by Owner of Owner's rights and remedies under this Paragraph 13.09.

ARTICLE 14 - PAYMENTS TO CONTRACTOR AND COMPLETION

14.01 Schedule of Values

A. The Schedule of Values established as provided in Paragraph 2.07.A will serve as the basis for progress payments and will be incorporated into a form of Application for Payment acceptable to Engineer. Progress payments on account of Unit Price Work will be based on the number of units completed.

14.02 Progress Payments

A. Applications for Payments

1. At least 20 days before the date established in the Agreement for each progress payment (but not more often than once a month), Contractor shall submit to Engineer for review an Application for Payment filled out and signed by Contractor covering the Work completed as of the date of the Application and accompanied by such supporting documentation as is required by the Contract Documents. If payment is requested on the basis of materials and equipment not incorporated in the Work but delivered and suitably stored at the Site or at another location agreed to in writing, the Application for Payment shall also be accompanied by a bill of sale, invoice, or other documentation warranting that Owner has received the materials and equipment free and clear of all Liens and evidence that the materials and equipment are covered by appropriate property insurance or other arrangements to protect Owner's interest therein, all of which must be satisfactory to Owner.

2. Beginning with the second Application for Payment, each Application shall include an affidavit of Contractor stating that all previous progress payments received

on account of the Work have been applied on account to discharge Contractor's legitimate obligations associated with prior Applications for Payment.

3. The amount of retainage with respect to progress payments will be as stipulated in the Agreement.

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B. Review of Applications

1. Engineer will, within 10 days after receipt of each Application for Payment, either indicate in writing a recommendation of payment and present the Application to Owner or return the Application to Contractor indicating in writing Engineer's reasons for refusing to recommend payment. In the latter case, Contractor may make the necessary corrections and resubmit the Application.

2. Engineer's recommendation of any payment requested in an Application for Payment will constitute a representation by Engineer to Owner, based on Engineer's observations on the Site of the executed Work as an experienced and qualified design professional and on Engineer's review of the Application for Payment and the accompanying data and schedules, that to the best of Engineer's knowledge, information and belief:

a. the Work has progressed to the point indicated;

b. the quality of the Work is generally in accordance with the Contract Documents (subject to an evaluation of the Work as a functioning whole prior to or upon Substantial Completion, to the results of any subsequent tests called for in the Contract Documents, to a final determination of quantities and classifications for Unit Price Work under Paragraph 9.07, and to any other qualifications stated in the recommendation); and

c. the conditions precedent to Contractor's being entitled to such payment appear to have been fulfilled in so far as it is Engineer's responsibility to observe the Work.

3. By recommending any such payment Engineer will not thereby be deemed to have represented that:

a. inspections made to check the quality or the quantity of the Work as it has been performed have been exhaustive, extended to every aspect of the Work in progress, or involved detailed inspections of the Work beyond the responsibilities specifically assigned to Engineer in the Contract Documents; or

b. that there may not be other matters or issues between the parties that might entitle Contractor to be paid additionally by Owner or entitle Owner to withhold payment to Contractor.

4. Neither Engineer's review of Contractor's Work for the purposes of recommending payments nor Engineer's recommendation of any payment, including final payment, will impose responsibility on Engineer:

a. to supervise, direct, or control the Work, or

b. for the means, methods, techniques, sequences, or procedures of construction, or the safety precautions and programs incident thereto, or

c. for Contractor's failure to comply with Laws and Regulations applicable to Contractor's performance of the Work, or

d. to make any examination to ascertain how or for what purposes Contractor has used the moneys paid on account of the Contract Price, or

e. to determine that title to any of the Work, materials, or equipment has

passed to Owner free and clear of any Liens.

5. Engineer may refuse to recommend the whole or any part of any payment if, in Engineer's opinion, it would be incorrect to make the representations to Owner stated in Paragraph 14.02.B.2. Engineer may also refuse to recommend any such payment or, because of subsequently discovered evidence or the results of subsequent inspections or tests, revise or revoke any such payment recommendation previously made, to such extent as may be necessary in Engineer's opinion to protect Owner from loss because:

a. the Work is defective, or completed Work has been damaged, requiring correction or replacement;

b. the Contract Price has been reduced by Change Orders;

c. Owner has been required to correct defective Work or complete Work in accordance with Paragraph 13.09; or

d. Engineer has actual knowledge of the occurrence of any of the events enumerated in Paragraph 15.02.A.

C. Payment Becomes Due

~~1. Ten days after presentation of the Application for Payment to Owner with Engineer's recommendation, the amount recommended will (subject to the provisions of Paragraph 14.02.D) become due, and when due will be paid by Owner to Contractor.~~

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D. Reduction in Payment

1. Owner may refuse to make payment of the full amount recommended by Engineer because:

a. claims have been made against Owner on account of Contractor's performance or furnishing of the Work;

b. Liens have been filed in connection with the Work, except where Contractor has delivered a specific bond satisfactory to Owner to secure the satisfaction and discharge of such Liens;

c. there are other items entitling Owner to a set-off against the amount recommended; or

d. Owner has actual knowledge of the occurrence of any of the events enumerated in Paragraphs 14.02.B.5.a through 14.02.B.5.c or Paragraph 15.02.A.

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2. If Owner refuses to make payment of the full amount recommended by Engineer, Owner will give Contractor immediate written notice (with a copy to Engineer) stating the reasons for such action and promptly pay Contractor any amount remaining after deduction of the amount so withheld. Owner shall promptly pay Contractor the amount so withheld, or any adjustment thereto agreed to by Owner and Contractor, when Contractor corrects to Owner's satisfaction the reasons for such action.

3. If it is subsequently determined that Owner's refusal of payment was not justified, the amount wrongfully withheld shall be treated as an amount due as determined by Paragraph 14.02.C.1.

14.03 Contractor's Warranty of Title

A. Contractor warrants and guarantees that title to all Work, materials, and equipment covered by any Application for Payment, whether incorporated in the Project or not, will pass to Owner no later than the time of payment free and clear of all Liens.

14.04 Substantial Completion

A. When Contractor considers the entire Work ready for its intended use Contractor shall notify Owner and Engineer in writing that the entire Work is substantially complete (except for items specifically listed by Contractor as incomplete) and request that Engineer issue a certificate of Substantial Completion.

B. Promptly after Contractor's notification, Owner, Contractor, and Engineer shall make an inspection of the Work to determine the status of completion. If Engineer does not consider the Work substantially complete, Engineer will notify Contractor in writing giving the reasons therefor.

C. If Engineer considers the Work substantially complete, Engineer will deliver to Owner a tentative certificate of Substantial Completion which shall fix the date of Substantial Completion. There shall be attached to the certificate a tentative list of items to be completed or corrected before final payment. Owner shall have seven days after receipt of the tentative certificate during which to make written objection to Engineer as to any provisions of the certificate or attached list. If, after considering such objections, Engineer concludes that the Work is not substantially complete, Engineer will within 14 days after submission of the tentative certificate to Owner notify Contractor in writing, stating the reasons therefor. If, after consideration of Owner's objections, Engineer considers the Work substantially complete, Engineer will within said 14 days execute and deliver to Owner and Contractor a definitive certificate of Substantial Completion (with a revised tentative list of items to be completed or corrected) reflecting such changes from the tentative certificate as Engineer believes justified after consideration of any objections from Owner.

D. At the time of delivery of the tentative certificate of Substantial Completion, Engineer will deliver to Owner and Contractor a written recommendation as to division of responsibilities pending final payment between Owner and Contractor with respect to security, operation, safety, and protection of the Work, maintenance, heat, utilities, insurance, and warranties and guarantees. Unless Owner and Contractor agree otherwise in writing and so inform Engineer in writing prior to Engineer's issuing the definitive certificate of Substantial Completion, Engineer's aforesaid recommendation will be binding on Owner and Contractor until final payment.

E. Owner shall have the right to exclude Contractor from the Site after the date of Substantial Completion subject to allowing Contractor reasonable access to complete or correct items on the tentative list.

14.05 Partial Utilization

A. Prior to Substantial Completion of all the Work, Owner may use or occupy any substantially completed part of the Work which has specifically been identified in the Contract Documents, or which Owner, Engineer, and Contractor agree constitutes a separately functioning and usable part of the Work that can be used by Owner for its intended purpose without significant interference with Contractor's performance of the remainder of the Work, subject to the following conditions.

1. Owner at any time may request Contractor in writing to permit Owner to use or occupy any such part of the Work which Owner believes to be ready for its intended use and substantially complete. If and when Contractor agrees that such part of the Work is substantially complete, Contractor will certify to Owner and Engineer that such part of the Work is substantially complete and request Engineer to issue a certificate of Substantial Completion for that part of the Work.

2. Contractor at any time may notify Owner and Engineer in writing that Contractor considers any such part of the Work ready for its intended use and substantially complete and request Engineer to issue a certificate of Substantial Completion for that part of the Work.

3. Within a reasonable time after either such request, Owner, Contractor, and Engineer shall make an inspection of that part of the Work to determine its status of completion. If Engineer does not consider that part of the Work to be substantially complete, Engineer will notify Owner and Contractor in writing giving the reasons therefor. If Engineer considers that part of the Work to be substantially complete, the provisions of Paragraph 14.04 will apply with respect to certification of Substantial Completion of that part of the Work and the division of responsibility in respect thereof and access thereto.

4. No use or occupancy or separate operation of part of the Work may occur prior to compliance with the requirements of Paragraph 5.10 regarding property insurance.

14.06 Final Inspection

A. Upon written notice from Contractor that the entire Work or an agreed portion thereof is complete, Engineer will promptly make a final inspection with Owner and Contractor and will notify Contractor in writing of all particulars in which this inspection reveals that the Work is incomplete or defective. Contractor shall immediately take such measures as are necessary to complete such Work or remedy such deficiencies.

14.07 Final Payment

A. Application for Payment

1. After Contractor has, in the opinion of Engineer, satisfactorily completed all corrections identified during the final inspection and has delivered, in accordance with the Contract Documents, all maintenance and operating instructions, schedules, guarantees, bonds, certificates or other evidence of insurance certificates of inspection, marked-up record documents (as provided in Paragraph 6.12), and other documents, Contractor may make application for final payment following the procedure for progress payments.

2. The final Application for Payment shall be accompanied (except as previously delivered) by:

a. all documentation called for in the Contract Documents, including but not limited to the evidence of insurance required by Paragraph 5.04.B.7;

b. consent of the surety, if any, to final payment;

c. a list of all Claims against Owner that Contractor believes are unsettled; and

d. complete and legally effective releases or waivers (satisfactory to Owner) of all Lien rights arising out of or Liens filed in connection with the Work.

3. In lieu of the releases or waivers of Liens specified in Paragraph 14.07.A.2 and as approved by Owner, Contractor may furnish receipts or releases in full and an affidavit of Contractor that: (i) the releases and receipts include all labor, services, material, and equipment for which a Lien could be filed; and (ii) all payrolls, material and equipment bills, and other indebtedness connected with the Work for which Owner or Owner's property might in any way be responsible have been paid or otherwise satisfied. If any Subcontractor or Supplier fails to furnish such a release or receipt in full, Contractor may furnish a bond or other collateral satisfactory to Owner to indemnify Owner against any Lien.

B. *Engineer's Review of Application and Acceptance*

1. If, on the basis of Engineer's observation of the Work during construction and final inspection, and Engineer's review of the final Application for Payment and accompanying documentation as required by the Contract Documents, Engineer is satisfied that the Work has been completed and Contractor's other obligations under the

Contract Documents have been fulfilled, Engineer will, within ten days after receipt of the final Application for Payment, indicate in writing Engineer's recommendation of payment and present the Application for Payment to Owner for payment. At the same time Engineer will also give written notice to Owner and Contractor that the Work is acceptable subject to the provisions of Paragraph 14.09. Otherwise, Engineer will return the Application for Payment to Contractor, indicating in writing the reasons for refusing to recommend final payment, in which case Contractor shall make the necessary corrections and resubmit the Application for Payment.

C. Payment Becomes Due

1. Thirty days after the presentation to Owner of the Application for Payment and accompanying documentation, the amount recommended by Engineer, less any sum Owner is entitled to set off against Engineer's recommendation, including but not limited to liquidated damages, will become due and , will be paid by Owner to Contractor.

14.08 Final Completion Delayed

A. If, through no fault of Contractor, final completion of the Work is significantly delayed, and if Engineer so confirms, Owner shall, upon receipt of Contractor's final Application for Payment (for Work fully completed and accepted) and recommendation of Engineer, 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 to be held by Owner for Work not fully completed or corrected is less than the retainage stipulated in the Agreement, and if bonds have been furnished as required in Paragraph 5.01, the written consent of the surety to the payment of the balance due for that portion of the Work fully completed and accepted shall be submitted by Contractor to Engineer with the Application for such payment. Such payment shall be made under the terms and conditions governing final payment, except that it shall not constitute a waiver of Claims.

14.09 Waiver of Claims

A. The making and acceptance of final payment will constitute:

1. a waiver of all Claims by Owner against Contractor, except Claims arising from unsettled Liens, from defective Work appearing after final inspection pursuant to Paragraph 14.06, from failure to comply with the Contract Documents or the terms of any special guarantees specified therein, or from Contractor's continuing obligations under the Contract Documents; and

2. a waiver of all Claims by Contractor against Owner other than those previously made in accordance with the requirements herein and expressly acknowledged by Owner in writing as still unsettled.

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ARTICLE 15 - SUSPENSION OF WORK AND TERMINATION

15.01 Owner May Suspend Work

A. At any time and without cause, Owner may suspend the Work or any portion thereof for a period of not more than 90 consecutive days by notice in writing to Contractor and Engineer which will fix the date on which Work will be resumed. Contractor shall resume the Work on the date so fixed. Contractor shall be granted an adjustment in the Contract Price or an extension of the Contract Times, or both, directly attributable to any such suspension if Contractor makes a Claim therefor as provided in Paragraph 10.05.

15.02 Owner May Terminate for Cause

A. The occurrence of any one or more of the following events will justify termination for cause:

1. Contractor's persistent failure to perform the Work in accordance with the Contract Documents (including, but not

limited to, failure to supply sufficient skilled workers or suitable materials or equipment or failure to adhere to the Progress Schedule established under Paragraph 2.07 as adjusted from time to time pursuant to Paragraph 6.04);

2. Contractor's disregard of Laws or Regulations of any public body having jurisdiction.

3. Contractor's disregard of the authority of Engineer; or

4. Contractor's violation in any substantial way of any provisions of the Contract Documents.

B. If one or more of the events identified in Paragraph 15.02.A occur, Owner may, after giving Contractor (and surety) seven days written notice of its intent to terminate the services of Contractor:

1. exclude Contractor from the Site, and take possession of the Work and of all Contractor's tools, appliances, construction equipment, and machinery at the Site, and use the same to the full extent they could be used by Contractor (without liability to Contractor for trespass or conversion),

2. incorporate in the Work all materials and equipment stored at the Site or for which Owner has paid Contractor but which are stored elsewhere, and

3. complete the Work as Owner may deem expedient.

C. If Owner proceeds as provided in Paragraph 15.02.B, Contractor shall not be entitled to receive any further payment until the Work is completed. If the unpaid balance of the Contract Price exceeds all claims, costs, losses, and damages (including but not limited to all fees and charges of engineers, architects, attorneys, and other professionals and all court or arbitration or other dispute resolution costs) sustained by Owner arising out of or relating to completing the Work, such excess will be paid to Contractor. If such claims, costs, losses, and damages exceed such unpaid balance, Contractor shall pay the difference to Owner. Such claims, costs, losses, and damages incurred by Owner will be reviewed by Engineer as to their reasonableness and, when so approved by Engineer, incorporated in a Change Order. When exercising any rights or remedies under this Paragraph Owner shall not be required to obtain the lowest price for the Work performed.

D. Notwithstanding Paragraphs 15.02.B and 15.02.C, Contractor's services will not be terminated if Contractor begins within seven days of receipt of notice of intent to terminate to correct its failure to perform and proceeds diligently to cure such failure within no more than 30 days of receipt of said notice.

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

F. If and to the extent that Contractor has provided a performance bond under the provisions of Paragraph 5.01.A, the termination procedures of that bond shall supersede the provisions of Paragraphs 15.02.B, and 15.02.C.

15.03 Owner May Terminate For Convenience

A. Upon seven days written notice to Contractor and Engineer, Owner may, without cause and without prejudice to any other right or remedy of Owner, terminate the Contract. In such case, Contractor shall be paid for (without duplication of any items):

1. completed and acceptable Work executed in accordance with the Contract Documents prior to the effective date of termination, including fair and reasonable sums for overhead and profit on such Work;

2. expenses sustained prior to the effective date of termination in performing services and furnishing labor, materials, or equipment as required by the Contract Documents in connection with uncompleted Work, plus fair and reasonable sums for overhead and profit on such expenses;

3. all claims, costs, losses, and damages (including but not limited to all fees and charges of engineers, architects, attorneys, and other professionals and all court or arbitration or other dispute resolution costs) incurred in settlement of terminated contracts with Subcontractors, Suppliers, and others; and

4. reasonable expenses directly attributable to termination.

B. Contractor shall not be paid on account of loss of anticipated profits or revenue or other economic loss arising out of or resulting from such termination.

15.04 Contractor May Stop Work or Terminate

A. If, through no act or fault of Contractor, (i) the Work is suspended for more than 90 consecutive days by Owner or under an order of court or other public authority, or (ii) Engineer fails to act on any Application for Payment within 30 days after it is submitted, or (iii) Owner fails for 30 days to pay Contractor any sum finally determined to be due, then Contractor may, upon seven days written notice to Owner and Engineer, and provided Owner or Engineer do not remedy such suspension or failure within that time, terminate the Contract and recover from Owner payment on the same terms as provided in Paragraph 15.03.

B. In lieu of terminating the Contract and without prejudice to any other right or remedy, if Engineer has failed to act on an Application for Payment within 30 days after it is submitted, or Owner has failed for 30 days to pay Contractor any sum finally determined to be due, Contractor may, seven days after written notice to Owner and Engineer, stop the Work until payment is made of all such amounts due Contractor, including interest thereon. The provisions of this Paragraph 15.04 are not intended to preclude Contractor from making a Claim under Paragraph 10.05 for an adjustment in Contract Price or Contract Times or otherwise for expenses or damage directly attributable to Contractor's stopping the Work as permitted by this Paragraph.

ARTICLE 16 - DISPUTE RESOLUTION

16.01 Methods and Procedures

A. Either Owner or Contractor may request mediation of any Claim submitted to Engineer for a decision under Paragraph 10.05 before such decision becomes final and binding. The mediation will be governed by the Construction Industry Mediation Rules of the American Arbitration Association in effect as of the Effective Date of the Agreement. The request for mediation shall be submitted in writing to the American Arbitration Association and the other party to the Contract. Timely submission of the request shall stay the effect of Paragraph 10.05.E.

B. Owner and Contractor shall participate in the mediation process in good faith. The process shall be concluded within 60 days of filing of the request. The date of termination of the mediation shall be determined by application of the mediation rules referenced above.

C. If the Claim is not resolved by mediation, Engineer's action under Paragraph 10.05.C or a denial pursuant to Paragraphs 10.05.C.3 or 10.05.D shall become final and binding 30 days after termination of the mediation unless, within that time period, Owner or Contractor:

1. elects in writing to invoke any dispute resolution process provided for in the Supplementary Conditions, or

2. agrees with the other party to submit the Claim to another dispute resolution process, or

3. gives written notice to the other party of their intent to submit the Claim to a court of competent jurisdiction.

ARTICLE 17 - MISCELLANEOUS

17.01 Giving Notice

A. Whenever any provision of the Contract Documents requires the giving of written notice, it will be deemed to have been validly given if:

1. delivered in person to the individual or to a member of the firm or to an officer of the corporation for whom it is intended, or

2. delivered at or sent by registered and licensed or certified mail, postage prepaid, to the last business address known to the giver of the notice.

17.02 Computation of Times

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

17.03 Cumulative Remedies

A. The duties and obligations imposed by these General Conditions and the rights and remedies available hereunder to the parties hereto are in addition to, and are not to be construed in any way as a limitation of, any rights and remedies available to any or all of them which are otherwise imposed or available by Laws or Regulations, by special warranty or guarantee, or by other provisions of the Contract Documents. The provisions of this Paragraph will be as effective as if repeated specifically in the Contract Documents in connection with each particular duty, obligation, right, and remedy to which they apply.

17.04 Survival of Obligations

A. All representations, indemnifications, warranties, and guarantees made in, required by, or given in accordance with the Contract Documents, as well as all continuing obligations indicated in the Contract Documents, will survive final payment, completion, and acceptance of the Work or termination or completion of the Contract or termination of the services of Contractor.

17.05 Controlling Law

A. This Contract is to be governed by the law of the state in which the Project is located.

17.06 Headings

A. Article and paragraph headings are inserted for convenience only and do not constitute parts of these General Conditions.

PART 3

SUPPLEMENTARY GENERAL CONDITIONS

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PART 3

SUPPLEMENTARY GENERAL CONDITIONS

CONTRACTING REQUIREMENTS

PART 1 GENERAL SUPPLEMENTARY CONDITIONS

SC-1 Supplementary Conditions:

These Supplementary Conditions amend or supplement the General Conditions of the Construction Contract (2002 Edition) and other provisions of the Contract Documents as indicated below. All provisions which are not so amended or supplemented remain in full force and effect. The terms used in these Supplementary Conditions which are defined in the General Conditions of the Construction Contract (2002 Edition) have the meanings assigned to them in the General Conditions.

SC-2 Bid (Re: GC-1.01 A 5)

Amend the definition of BID contained in Article 1 of the General Conditions to read as follows:

The terms “Bid” and “Proposal” will be used interchangeable.

SC-3 Bidding Documents (Re: GC-1.01 A 7)

Amend the definition of BIDDING DOCUMENTS contained in Article 1 of the General Conditions to read as follows:

The terms “Bid” and “Proposal” will be used interchangeable.

SC-4 Bidding Requirements (Re: GC-1.01 A 8)

Amend the definition of BIDDING REQUIREMENTS contained in Article 1 of the General Conditions to read as follows:

The terms “Bid” and “Proposal” will be used interchangeable.

SC-5 Contract Documents (Re: GC-1.01 A 12)

Amend the definition of CONTRACT DOCUMENTS contained in Article 1 of the General Conditions to read as follows:

The terms "Bid" and "Proposal" as used herein are interchangeable.

SC-6 Contract Times (Re: GC-1.01 A 14)

Delete references to milestones (i) and substantial completion (ii) from this paragraph. The contract time shall run until the proposed work, including the performance of the punch list, is complete.

PART 3

SUPPLEMENTARY GENERAL CONDITIONS

SC-7 Delivery of Bonds and Evidence of Insurance (Re: GC-2.01 B)

Delete paragraph 2.01.B. of the General Provisions in its entirety and insert the following in its place:

2.01B. Before any Work at the site is started, CONTRACTOR shall deliver to OWNER, with a copy to each additional insured identified in the Supplementary Conditions, certificates of insurance (and other evidence of insurance requested by OWNER) which CONTRACTOR is required to purchase and maintain in accordance with Article 5 of the General Conditions and in accordance with Supplementary Conditions 21, 22, 23, 24, 25 and 26.

SC-8 Conflict of Documents (Re: GC-3.03B)

A. Add a new paragraph 3.03B.1.c. immediately following paragraph 3.03.B.1.b. of the General Conditions which is to read as follows:

3.03.B.1.c. In the event that any of the provisions contained in the General Conditions, Supplementary Conditions, General Specifications or Special Provisions conflict, it is understood and agreed by both parties hereto that the Special Provisions will govern. When instructions or information on the plans conflict with the General Conditions, Supplementary Conditions, Special Conditions or Special Provisions, information and instruction on the plans shall prevail.

SC-9 Subsurface Conditions (Re: GC-4.02)

Delete paragraphs 4.02 and 4.04 of the General Conditions in its entirety and insert the following in their place:

4.02 SUBSURFACE CONDITIONS - When the Drawings, other Contract Documents, or other information made available to the contractor and bidders, include information pertaining to sub-surface exploration, borings, test pits, and other preliminary investigations, such information is included only for the convenience of the Bidder. The OWNER or ENGINEER assumes no responsibility whatsoever with respect to the sufficiency of the information, and there is no guaranty, either expressed or implied, that the conditions indicated are representative of those existing throughout the WORK, or that unanticipated developments may not occur. The nature and character of soils actually encountered and ground water elevations actually encountered in performing the work shall not be a basis for any claim or additional payment to the Contractor.

SC-10 Physical Conditions (Re: GC-4.04)

4.04 PHYSICAL CONDITION - UNDERGROUND FACILITIES - When the drawings or other Contract Documents include information pertaining to the location, size, material, description or type of underground utility facilities, such information is only included for the convenience of the Bidder. The OWNER or ENGINEER assumes no responsibility whatever in respect to the sufficiency or

accuracy of the information, or lack of information shown on the plans relative to the location, size, material, description or type of underground utility facilities.

Where underground main distribution conduits such as water, gas, sewer, electric power, telephone or cable television are shown on the plans, the Contractor, for the purpose of preparing a bid, shall assume that every property parcel will be served by a service connection for each type of utility.

It shall be the Contractor's responsibility to determine the actual location of all existing underground facilities, including service connections to underground utilities. Prior to construction, the Contractor shall notify the utility company of his operational plans and shall obtain from the respective utility companies detailed information and assistance relative to the location of their facilities and the working schedule of the utility companies for removal or adjustment where removal or adjustment is required. In the event an unexpected utility interference is encountered during construction, the Contractor shall immediately notify the utility company of jurisdiction. The engineer shall also be immediately notified. Any such mains and services disturbed by the Contractor's operations shall be restored to service at once. Whenever possible, residents shall be notified in advance if their service is to be disconnected and no house shall be left without service overnight. The Contractor shall not interrupt the service function or disturb the supporting base of any utility without authority from the owner of the utility. Where protection is required to insure support of utilities, the Contractor shall, unless otherwise provided, furnish and place the necessary protection at its expense.

SC-11 Difficulties Encountered (Re: GC-4.07)

Add a new paragraph 4.07 immediately following paragraph 4.06.I. of the General Conditions which is to read as follows:

4.07 All bidders for the work under this Contract are required before submitting all proposals, to examine the site of the work and adjacent premises, and the various means of approach to the site, and to make all necessary investigations in order to inform themselves thoroughly as to the character and magnitude of all work involved in the complete execution of this contract, and as to the facilities for delivering, handling and installing the construction equipment and the conditions and difficulties that will be encountered in the performance of the work specified herein. No pleas of ignorance of conditions that exist or that may hereafter exist, or of difficulties that will be encountered in the execution of the work hereunder as a result of failure to make necessary examinations and investigations, will be accepted as a sufficient excuse for any failure or omission on the part of the Contractor to fulfill, in every detail, all of the requirements of this contract, or will be accepted as a basis for any claim whatsoever for extra compensation.

PART 3

SUPPLEMENTARY GENERAL CONDITIONS

SC-12 Contractor's Liability Insurance (Re: GC-5.04)

The limits of liability for the insurance required by paragraph 5.04 of the General Conditions shall provide coverage for not less than the following amounts or greater where required by law:

5.04 A 1 and 5.04 A 2 Workers' Compensation, etc. under paragraphs 5.04 A 1 and 5.04 A 2 of the General Conditions:

(1) State: Statutory

(2) Applicable Federal (e.g. Longshoreman's): Statutory

(3) Employer's Liability: $500,000

5.04 A 3, 5.04 A 4 and 5.04 A 5 Comprehensive General Liability (under paragraphs 5.04 A 2 through 5.04 A 5 of the General Conditions):

(1) Bodily Injury:

$2,500,000 General Aggregate, (Except Products & Completed Operations)

(2) $2,000,000 Products - Completed Operations Aggregate

(3) $1,000,000 Personal & Advertising Injury (Per Person/Organization)

(4) $1,000,000 Each Occurrence (Bodily Injury & Property Damage)

(5) Property Damage Liability Insurance will provide Explosion, Collapse and Underground Coverage's Where Applicable

(6) $3,000,000 General Aggregate
$1,000,000 Each Occurrence

5.04 A 6 Automobile Liability:

(1) $1,000,000 Each Person
(2) $3,000,000 Each Accident

Property Damage:

$500,000 Each Accident

PART 3

SUPPLEMENTARY GENERAL CONDITIONS

SC-13 Contractual Liability Insurance (Re: GC-5.04 B 4)

The Contractual Liability required by paragraph 5.04 B 4 of the General Conditions shall provide coverage for not less than the following amounts:

(1) $3,000,000	General Aggregate
(2) $1,000,000	Each Occurrence (Bodily Injury & Property Damage)

SC-14 Owner's Liability Insurance (Re: GC-5.05)

Delete paragraph 5.05 of the General Conditions in its entirety and insert the following in its place:

5.05 The CONTRACTOR shall purchase and maintain, at his expense, a separate Owners' Protective Liability Policy naming both the OWNER and CMT as the insured. Said insurance shall afford the OWNER and CMT the same protection and in the same amounts as required for the Contractor's Comprehensive General Liability policy and shall protect the OWNER and the CMT from all claims for bodily injury and property damage arising from work performed by the Contractor including employees of the Contractor and Subcontractor.

SC-15 Property Insurance (Re: GC-5.06 A)

Delete paragraph 5.06 A of the General Conditions in its entirety and insert the following in its place:

5.06 A. Unless otherwise provided in these Supplementary Conditions, CONTRACTOR shall purchase and maintain property insurance upon the work at the site to the full insurable value thereof (subject to such deductible amounts as may be provided in these Supplementary Conditions or required by law). This insurance shall include the interest of OWNER, CONTRACTOR and Subcontractors in the work, shall insure against the perils of fire and extended coverage, shall include "all risk" insurance for physical loss and damage including theft, vandalism and malicious mischief, collapse and water damage, and such other perils as may be provided in these Supplementary Conditions, and shall include damages, losses and expenses arising out of or resulting from any insured loss or incurred in the repair or replacement of any insured property (including fees and charges of engineers, architects, attorneys and other professionals). If not covered under the "all risk" insurance or otherwise provided, CONTRACTOR shall purchase and maintain similar property insurance on portions of the work stored on and off the site or in transit when such portions of the work are to be included in an Application for Payment. The policies of insurance required to be purchased and maintained by CONTRACTOR in accordance with this paragraph shall contain a provision that the coverage afforded will not be cancelled or materially changed until at least thirty days prior written notice has been given to OWNER.

PART 3

SUPPLEMENTARY GENERAL CONDITIONS

SC-16 Insurance - General (Re: GC-5)

Delete paragraphs 5.06 B, 5.07 B, 5.08, 5.09, 5.10 and 8.06 of the General Conditions in their entirety.

Add to paragraph 5.06 of the General Conditions:

All policies of insurance shall contain a provision that the coverage afforded will not be canceled or materially changed until at least thirty days prior written notice has been given to OWNER.

Before commencement of work, the Contractor shall submit written evidence that he and all his subcontractors have obtained for the period of the contract, full Comprehensive General Liability Insurance Coverage. This coverage shall provide for both bodily injury and property damage. The Comprehensive General Liability Insurance will include as additional named insureds: the City of Prospect Heights, Village of Wheeling, Chicago Executive Airport Board of Directors, the Engineer and his Consultants, and each of their officers, agents and employees.

Deductible Clause: Such insurance may have a deductible clause but amount of deductible shall not exceed $250.

In addition, the Contractor shall indemnify and hold harmless the City of Prospect Heights, Village of Wheeling, Chicago Executive Airport Board of Directors, the Engineer and his Consultants and each of their officers, agents and employees from any damage or claims arising from the Contractor's activities.

SC-17 Waiver of Rights and Subrogation (Re: GC-5.07A.)

Paragraph 5.07 A of the General Conditions shall be deleted in its entirety and replaced with the following:

5.07 A. Owner and Contractor hereby waive all rights of action and subrogation against each other and against Contractor's subcontractors and the officers, agents and employees of any of them to the extent of any insurance recoveries that may be obtained by the waiving party for damages caused by fire or other "All Risk" perils covered by insurance, except such rights as such party may have to the proceeds of insurance held by any other person as trustee or otherwise in behalf of such party."

SC-18 Subcontracts (Re: GC-6.06 G)

Delete paragraph 6.06 G of the General Conditions in its entirety and insert the following in its place:

6.06 G. All Work performed for CONTRACTOR by a Subcontractor will be pursuant to an appropriate agreement between CONTRACTOR and the Subcontractor which specifically binds the Subcontractor or Supplier to the applicable terms and conditions of the Contract Documents for the benefit of OWNER and ENGINEER and contains waiver provisions as required by paragraph

5.07A. (as amended by these Supplementary Conditions). CONTRACTOR shall pay each Subcontractor a just share of any insurance moneys received by CONTRACTOR on account of losses under policies issued pursuant to paragraph 5.06.

SC-19 Laws and Regulations (Re: GC-6.09 B)

Delete paragraph 6.09 B of the General Conditions in its entirety and insert the following in its place:

6.09 B. If Contractor performs any Work that is contrary to Laws, Regulations or Codes, Contractor shall bear all claims, costs, losses, damages (including but not limited to all fees and charges of engineers, architects, attorneys and other professionals and all court or arbitration or other dispute resolution costs) arising out of or relating to such work.

SC-20 Shop Drawings and Samples (Re: GC-6.17 A)

Delete all references to “approve” or “approval” from paragraphs 6.17 A, A-2, B, C-3 of this section:

Review by the ENGINEER is only for general conformance with the design concept of the project and general compliance with information given in the contract documents.

SC-21 Shop Drawings and Samples (Re: GC-6.17 D)

Delete all references to “approve” or “approval” from paragraphs 6.17 D-1, 2, 3 of this section:

Review by the ENGINEER is only for general conformance with the design concept of the project and general compliance with the information given in the contract documents.

SC-22 Indemnification (Re: GC-6.20)

Add reference to C&S Engineers, Inc., following the term “ENGINEER” in the first sentence of paragraph 6.20 A, paragraph 6.20 B and 6.20 C of the General Conditions.

SC-23 Resident Project Representative (Re: GC-9.03)

Add a new paragraph 9.03 B after 9.03 A of the General Conditions to read as follows:

9.03 B. If a Resident Project Representative is furnished by the Owner to assist in observing the performance of the work as provided in Paragraph 9.03, the duties, responsibilities and authority of any such Project Representative and his assistants

shall be as set forth in "Duties, Responsibilities and Limitation of Authority of Resident Project Representative" attached.

SC-24 Adjustment of Unit Prices (Re: GC-11.03 E)

Add paragraph 11.03 E after 11.03 D of the General Conditions:

11.03E. No adjustment in contract unit prices will be allowed unless there is a net increase or net decrease in the amount of the Contract of more than 30 percent of the Contract award amount. In the event that unit prices are subject to adjustment pursuant to the above criteria, then any adjustments in unit prices shall be limited to those specific unit price items for which there is net increase or net decrease of more than 30 percent of the estimated quantity of such item indicated in the Agreement. Claims for adjustment of unit prices pursuant to this provision may be made by either the Contractor or the Owner. If an adjusted unit price or prices for such work cannot be agreed upon then payment for such work shall be as provided in paragraph 12.01 B 3.

SC-25 Delays (Re: GC-12.03)

Delete all references to the words "abnormal weather conditions" from paragraph 12.03 A and 12.03 C of the General Conditions.

SC-26 Liquidated Damages (Re: GC-12.03 F.)

Add a new paragraph immediately following paragraph 12.03 E of the General Conditions to read as follows:

12.03 F. It is understood and agreed that TIME is of the essence on this Contract, and that a failure on the part of the Contractor to complete the work under this Contract within the time specified will result in loss and damage to the Owner; and that on account of the peculiar nature of such loss or damage, it is difficult, if not impossible, to accurately ascertain and definitely determine the amount thereof. It is, therefore, covenanted and agreed that in case the Contractor shall fail or neglect to complete the work herein specified on or before the date herein fixed for completion, together with any extensions of time which may be granted under paragraph 12.02 of the General Conditions, the said Contractor shall and will pay to the Owner one thousand dollars ($1,000.00) for each half hour over the mutually agreed closure time limits until the specified work is completed and the Runway reopened to Aircraft traffic. Liquidated damages may be assessed starting at 8:01 PM on any day the Runway is not reopened. Every half hour increment the Contractor shall be in default in the time of completion of this contract the sum set forth below. Further, should the Contractor fail to complete the work in the specified number of calendar days, he shall be liable to the Owner in the amount of $500.00 per calendar day for each day in excess of the time specified. The liquidated damages will be deducted as a reasonable portion of damages that will be incurred by the airport should the contractor fail to complete the work in the time provided in the contract.

In fixing the damages as set forth herein, the desire is to establish a certain mode of calculation for the work since the Owner's actual loss, in the event of delay, cannot be predetermined, it would be difficult to ascertain, and a matter of argument and unprofitable litigation. This said mode is an equitable rule for measurement of the Owner's actual loss and fairly takes into account the loss of use of the facilities if the project is delayed in completion.

The sum specified in the General Requirements of the Specifications is hereby agreed upon, fixed and determined by the parties hereto as the liquidated damages which the Owner will suffer by reason of such defaults, and not by way of a penalty.

In case the Contractor does not complete the work covered by this Agreement on or before the time specified herein for the completion of the said work, together with any extensions of time which may be granted under paragraph 12.03 of the General Conditions, the Engineer shall determine the number of days the Contractor is in default, and the decision of the Engineer shall be final and binding upon both parties hereto. It is further agreed that if the Owner shall accept any work or make any payments under this Contract after any such default, such acceptance, payment or payments shall not in any respect constitute a waiver or modification of any of the provisions hereof, and particularly the provisions in regard to LIQUIDATED DAMAGES for delays.

SC-27 Correction Period (Re: GC-13)

Add a new paragraph immediately after paragraph 13.07 of the General Conditions to read as follows:

The Contractor shall warrant all material furnished and work performed for a period of one (1) year from date of final acceptance by the Chicago Executive Airport Board of Directors. Such final acceptance will occur when approval of final payment is given.

SC-28 Application for Payments (Re: GC-14.02 A 3)

Delete paragraph 14.02 A 3. in its entirety and insert the following in its place:

From the amounts determined to have been earned by the CONTRACTOR, there shall be deducted ten percent (10%) to be retained until after completion of 50% of the WORK. After 50% or more of the WORK has been completed, there shall be no further retainage provided that satisfactory progress is being made, and provided that the amount retained is not less than 5 percent (5%) of the total adjusted contract price.

SC-29 Payment Becomes Due (Re: GC-14.02 C 1)

Delete paragraph 14.02C.1 in its entirety and insert the following in its place:

Fifty (50) days after the established due date of the Application for Payment to Owner, the amount as approved by Owner will (subject to the provisions of

paragraph 14.02 D) become due, and when due will be paid by Owner to Contractor.

SC-30 Reduction in Payment (Re: GC-14.02 D 1 e.)

Add a new paragraph immediately after paragraph 14.02D 1 d of the General Conditions to read as follows:

14.02D 1 e. Liability for liquidated damages has been incurred by Contractor.

SC-31 Waiver of Claims (Re: GC-14.09)

Add the following language at the end of the final sentence of paragraph 14.09 of the General Conditions:

Payment will not be made until satisfactory waivers of lien are received by the Chicago Executive Airport and approved. Final waivers will be required before the final payment is made.

SC-32 General Indemnification

Add a new paragraph immediately following paragraph 17.06 of the General Conditions which is to read as follows:

17.07 General Indemnification

In the event that, as a result of any agreement or actions taken, the Owner is made a party defendant in any litigation arising by reason of any agreement, the Contractor agrees to defend and hold harmless the Engineer, its officers and agents, from any suits, claims, demands, setoffs or other action reduced to judgment arising there-from. The obligation of the Contractor therefore shall include and extend to payment of reasonable attorneys' fees for the representation of the Owner and its said officers and agents in such litigation and include expenses, court cost and fees; it being understood that the Contractor shall have the right to comply with such attorneys to represent the Owner and its officers and agents in such litigation subject to the approval of the Owner, which approval shall not be unreasonably withheld. The Contractor shall have the right to appeal to courts appellate jurisdiction any judgment taken against the Owner or its officers or agents in the respect, and the Owner shall join in any such appeal taken by the Contractor. The Contractor shall hold the Owner harmless for any and all claims for labor, material, apparatus, equipment, fixtures or machinery furnished to the Contractor for the purpose of performing the work under the contract; and the payment of all direct and indirect damages to any person, firm, company or corporation suffered or sustained on account of the performance of such work during the time the contract is in force.

SC-33 Extended Liability and Umbrella Coverage

Add a new paragraph immediately following paragraph 17.07 of the General Conditions which is to read as follows:

17.08 Extended Liability and Umbrella Coverage

The Contractor shall purchase, at his expense, during the life of the contract, extended liability and umbrella coverage with a limit of liability of no less than two million dollars ($2,000,000.00).

SC-34 Wage Rates

Add new paragraphs immediately following paragraph 17.08 of the General Conditions which are to read as follows:

17.09 Wage Rates

The general prevailing rate for legal holiday and overtime work as last found by Cook County and Department of Labor of the State of Illinois shall be paid to all laborers, workmen and mechanics performing work under this Contract.

Prevailing wages for construction trades as determined by the Illinois Department of Labor shall be paid for labor on this project. A new wage rate determination may be released by the Illinois Department of Labor during the contract for this project, and the new prevailing rates will apply after the issuance of the new rates.

See Part 8 for Cook County Prevailing Wage Rates, January 6, 2024.

SC-35 Federal and State Occupational Safety and Health Acts

Add new paragraphs immediately following paragraph 17.09 of the General Conditions which are to read as follows:

17.10 Federal and State Occupational Safety and Health Acts

Attention is called to the U.S. and State of Illinois Occupational Safety and Health Acts (OSHA) and to the administrative regulations which have been issued as a result of these laws.

All construction activities shall be performed in a manner which will comply with the provisions of the OSHA laws and regulations. In the event of any conflict between construction procedures permitted by the specifications and those required by the Federal and State OSHA laws and regulations, the latter shall prevail.

The cost of compliance with OSHA laws and regulations shall not be paid for separately but shall be included as an incidental expense in the contract prices for work to be performed.

PART 3

SUPPLEMENTARY GENERAL CONDITIONS

PART 2 RESIDENT PROJECT REPRESENTATIVE

DUTIES, RESPONSIBILITIES AND LIMITATIONS OF AUTHORITY
OF RESIDENT PROJECT REPRESENTATIVE

A. GENERAL.

Resident Project Representative as Owner's Agent, will act as directed by and under the supervision of Owner, and will confer with Owner regarding his actions. Resident Project Representative's dealings in matters pertaining to the on-site Work shall in general be only with Owner and CONTRACTOR, and dealings with subcontractors shall only be through or with the full knowledge of CONTRACTOR. Written communication with OWNER will be only through or as directed by Owner's Representative.

B. DUTIES AND RESPONSIBILITIES.

Resident Project Representative will:

1. Schedules. Review the progress schedule, schedule of Shop Drawing submissions and schedule of values prepared by CONTRACTOR and consult with Owner concerning their acceptability.

2. Conferences and Meetings: Attend preconstruction conferences. Arrange a schedule of progress meetings and other job conferences as required in consultation with Owner and notify those expected to attend in advance. Attend meetings, and maintain and circulate copies of minutes thereof.

3. Liaison:

   a. Serve as Owner's liaison with CONTRACTOR, working principally through CONTRACTOR's superintendent and assist him in understanding the intent of the Contract Documents.
   b. As requested, assist in obtaining from OWNER additional details or information, when required at the job site for proper execution of the Work.

4. Shop Drawings and Samples:

   a. Receive and record date of receipt of Shop Drawings and samples, receive samples which are furnished at the site by CONTRACTOR, and notify Owner of their availability for examination.
   b. Advise Owner and CONTRACTOR or its superintendent immediately of the commencement of any Work requiring a Shop Drawing or sample submission if the submission has not been reviewed by Owner.

5. Review of Work, Rejection of Defective Work, Inspections and Tests:

    a. Conduct on-site observations of the Work in progress to assist Owner in determining if the Work is proceeding in accordance with the Contract Documents and that completed Work will conform to the Contract Documents.
    b. Report to Owner whenever he believes that any Work is unsatisfactory, faulty or defective or does not conform to the Contract Documents, or does not meet the requirements of any inspections, tests or approval required to be made or has been damaged prior to final payment; and advise Owner, or requires special testing, inspection or approval.
    c. Verify that tests, equipment and systems startups and operating and maintenance instructions are conducted as required by the Contract Documents and in presence of the required personnel, and that CONTRACTOR maintains adequate records thereof; observe, record and report to Owner appropriate details relative to the test procedures and startups.
    d. Accompany visiting inspectors representing public or other agencies having jurisdiction over the Project, record the outcome of these inspections and report to OWNER and ENGINEER.

6. Interpretation of Contract Documents: Transmit to CONTRACTOR Owner's clarifications and interpretations of the Contract Documents.

7. Modifications: Consider and evaluate CONTRACTOR's suggestions for modifications in Drawings or Specifications and report them with recommendations to owner.

8. Records:

    a. Maintain at the job site orderly files for correspondence, reports of job conferences, Shop Drawings and samples submissions, reproductions of original Contract Documents including all addenda, change orders, field orders, additional Drawings issued subsequent to the execution of the Contract, clarifications and interpretations of the Contract Documents, progress report, and other Project related documents.
    b. Keep a diary or log book, recording hours on the job site, weather conditions, data relative to questions of extras or deductions, list of visiting officials and representatives of manufacturers, fabricators, suppliers and distributors, daily activities, decisions, observations in general and specific observations in more detail as in the case of observing test procedures.
    c. Record names, addresses and telephone numbers of all CONTRACTORS, subcontractors and major suppliers of materials and equipment.

9. Reports:

    a. Furnish periodic reports as required of progress of the Work and CONTRACTOR's compliance with the approved progress schedule and schedule of Shop Drawing submissions.
    b. Consult with contractor in advance of scheduled major tests, inspections or start of important phases of the work.
    c. Report immediately to owner upon the occurrence of any accident.

10. Payment Requisitions: Review applications for payment with CONTRACTOR for compliance with the established procedure for their submission and forward them with recommendations, noting particularly their relation to the schedule of values, Work completed and materials and equipment delivered at the site but not incorporated in the Work.

11. Certificates, Maintenance and Operation Manuals: During the course of the Work, verify that certificates, maintenance and operation manuals and other data required to be assembled and furnished by CONTRACTOR are applicable to the items actually installed; and deliver this material to owner for his review.

12. Completion:

    a. Submit to CONTRACTOR a list of observed items requiring completion or correction prior to final inspection.
    b. Conduct final inspection in the company of CONTRACTOR and prepare a final list of items to be completed or corrected.
    c. Verify that all items on final list have been completed or corrected and make recommendations concerning acceptance.

C. LIMITATIONS OF AUTHORITY.
(See also GC-9.10)

1. Is not authorized to make any deviation from the Contract Documents or approve any substitute materials or equipment.
2. Is not authorized to exceed limitations on ENGINEER's authority as set forth in the Contract Documents.
3. Is not authorized to undertake any of the responsibilities of CONTRACTOR, subcontractors or CONTRACTOR's superintendent, or expedite the Work.
4. Is not authorized to advise on or issue directions relative to any aspect of the means, methods, techniques, sequences or procedures of construction unless such is specifically called for in the Contract Documents.
5. Is not authorized to advise on or issue directions as to safety precautions and programs in connection with the Work.
7. Is not authorized to accept shop drawings or sample submittals from anyone other than Contractor.
8. Is not authorized to authorize OWNER to occupy the Project in whole or in part.
9. Is not authorized to participate in specialized field or laboratory tests.

CHICAGO EXECUTIVE AIRPORT
RESIDENTIAL SOUND INSULATION PROGRAM

PART 4

SPECIAL CONDITIONS

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PART 4

SPECIAL CONDITIONS

1. Scope of Work

The project consists of twenty-two (22) single-family residential properties as well as all incidental and collateral work necessary to complete the improvements shown on the plans and as described herein.

It is the intent that payment under the unit items as set forth in the proposal shall include all labor, material and equipment necessary to construct the work as shown on the drawings and as specified herein. No additional payment will be made for construction of the work shown and specified.

The Owner reserves the unrestricted right to increase or decrease the amount of the work under this contract by an amount not exceeding 30% of the total value without adjustment in prices of items not affected by deletion or addition as provided in paragraph 11.03 of the General Conditions or amended (see SC-24 of Supplemental Conditions).

2. Location of Improvement

The project lies within the corporate limits of the Village of Wheeling and City of Prospect Heights, Cook County, Illinois.

3. Contract Drawings and Specifications

Should there be a conflict between the drawings and the specifications, the drawings shall take precedence and govern. This Special Condition shall supersede any conflicting provisions of the General Conditions. The List of Drawings (plan sheets) are included as part of the contract documents for this improvement and are shown in Part 5 of this document.

4. Standard Specifications for Construction of Airports

The **"Illinois Standard Specifications for Construction of Airports" prepared by the Department of Transportation of the State of Illinois, Division of Aeronautics dated April 1, 2012**, henceforth referred to Standard Specifications, shall serve as General Specifications for the referenced project unless otherwise modified by these contract documents.

All materials and each part of the work may be subject at all times to observation by the Owner and Engineer. The Engineer will visit the site and determine if the work is proceeding in accordance with the plans and specifications. The Engineer's duty to conduct observations and construction review of the Contractor's performance does not include supervision of the work or review of the adequacy of the Contractor's safety measures in or near the construction site.

The Contractor shall supervise and direct the work. He will be solely responsible for the means, methods, techniques, sequences, and procedures of construction except as limited by the specifications.

Any reference to "inspection" or "supervision" by the Engineer in the Standard Specifications shall be changed to "observation".

PART 4

SPECIAL CONDITIONS

Any work shown on the project drawings or specified herein for which there is no bid item in the schedule of prices of the proposal shall not be paid for separately, but shall be considered incidental to a logical bid item.

5. Standards

The standards with the revision number included in the plans shall hold precedence over the standard numbers listed in the Special Provisions of this contract.

6. Schedule of Progress and Completion

Bidders shall note the amount of time in which they are required to complete the work. Before the start of construction, the Contractor shall submit to the Owner a tentative construction schedule showing the order of the work, the time for starting each portion, and the approximate time for construction of each portion. Progress schedule shall be submitted prior to any work proceeding.

7. Easement and Permits

The Owner will, prior to the start of construction, obtain necessary State, County and Township permits for work within ROW and easements on public and private properties, as required to perform the work outlined under this contract. It shall be the Contractor's responsibility to conduct his operations in such a manner so as to comply with all provisions and conditions of the permits and easements. The Contractor shall also provide performance bonds and insurance and the compliance with the provisions and conditions of the permits and easements shall be considered incidental to the cost of construction.

The Contractor shall be furnished with copies of all applicable easement agreements as executed by the Owner. It shall be the Contractor's responsibility to keep all materials and machinery within easements that have been provided, as shown on the plans, and liability rests with him for damage to any areas outside of said easements.

8. Acceptance of Subcontractors & Material Suppliers

The General Contractor shall submit a list of subcontractors and material suppliers to the Owner for approval at least two weeks prior to the beginning of work by the subcontractor or delivery of the materials.

9. Shop Drawings

Prior to fabrication of equipment, the Contractor shall submit shop drawings of the equipment to the Engineer for review. Shop drawings shall consist of complete descriptive literature on the equipment including all pertinent dimensions, material specifications, operational maintenance data and performance curves and data. Prior to submitting shop drawings to the Engineer, the Contractor shall first review the shop drawings and make corrections or revisions that are appropriate. A minimum of five (5) copies of shop drawings must be submitted. Four (4) of the copies submitted shall be retained for use by the Engineer and Owner, and the remaining copies shall be returned to the Contractor. The Contractor shall be required to maintain a complete set of shop drawings on the jobsite at all times while work is in progress and shall make

them available to the Engineer upon request. Submittal of shop drawings shall be required where specifically requested in the equipment specification and for all equipment where deemed appropriate by the Engineer. In addition to shop drawings, Contractor shall submit sources of all material to brought onsite for use in the project. All material shall be from IDOT approved sources and be approved for the use intended.

10. Alternate Materials and Equipment

In any case, where a specific material or equipment is mentioned in the specifications or on the plans, it is understood and construed as meaning to indicate only the type of material on equipment desired, and is not intended in any way to bar the use of any material or equipment or makes of equal quality.

IN ORDER THAT ALL BIDS MAY BE EVALUATED ON THE SAME BASIS, HOWEVER, THE CONTRACTORS SHALL USE MATERIAL OR EQUIPMENT MENTIONED IN THE SPECIFICATIONS OR ON THE PLANS IN ARRIVING AT THEIR BASIC BID ON EACH ITEM, BUT MAY SUBMIT PRICES ON ALTERNATE EQUIPMENT IF THEY SO DESIRE. EVALUATION OF BIDS WILL BE ON THE BASIS OF THE EQUIPMENT OR MATERIALS SPECIFIED. THE APPROVAL OF ANY MATERIAL OR EQUIPMENT OTHER THAN THAT SPECIFIED SHALL BE OBTAINED IN WRITING FROM THE ENGINEER BEFORE THE CONTRACT IS AWARDED; OTHERWISE, IT SHALL BE ASSUMED THAT THE CONTRACTOR WILL FURNISH THE MATERIAL OR EQUIPMENT SPECIFIED.

Should the Contractor desire to use material or equipment other than that specified, he shall indicate in the place provided in the proposal the alternate material or equipment he proposes to use and the amount to be added to or deducted from the base bid if that item of material or equipment is used. All information required on the proposal shall be furnished. Full particulars on alternate equipment shall be submitted with the bids.

11. Existing Utilities

The Contractor shall make his own investigation to determine the existence, nature and location of all utility lines and appurtenances within the limits of the improvement.

12. Utility Protection and Relocation

The location, size, material, description or type of existing underground utilities indicated on the plans are not represented as being accurate, sufficient or complete.

Prior to the start of construction, the Contractor shall arrange to have all underground utilities including water, gas, electric, sewer, communication and cable TV located and suitably marked. Should a utility be in conflict with the proposed construction, the Engineer shall be notified at once. If utilities will interfere with the construction alignment, the Engineer may alter the alignment of the proposed facility, or arrange to have the utility to be relocated. Should the alignment be altered in the field, the Contractor shall be paid for the quantities of work performed in accordance with these specifications and no additional payment shall be made.

13. J.U.L.I.E. System

PART 4

SPECIAL CONDITIONS

The toll free telephone number for joint utility locating information for excavation is 811.

14. Temporary Utilities

Should the Contractor wish to use utilities (including electric and water) on a temporary basis to carry out the work specified herein, the Contractor shall make all arrangements necessary and shall pay all costs associated with connection to the utility. The Contractor shall also arrange to meter and to pay for all electric service. The Contractor shall receive written permission from the City of Prospect Heights or the Village of Wheeling for municipal water usage.

15. Cooperation Between Contractors

The Contractor shall plan and conduct his work so as not to interfere or hinder the progress or work being performed by other contractors. Prior to bidding, the Contractor shall review the plans for other work to be completed on the site concurrent with the work on this contract. Plans are available for viewing in the Chicago Executive Airport office. The timely prosecution of the overall project is dependent upon the proper coordination between contractors. It is to be fully understood by the Contractor that the prosecution of the overall project and the safety and convenience of the aviation public are the governing criteria for resolving conflicts which may arise between his schedule and the schedule of other contractors. When conflicts arise, resolution of such conflicts will be made by the Engineer in the best interest of the Airport. Delays, changes in scheduling, or expedition of work under this contract to coordinate with the timely prosecution of work will be considered incidental to the Contract and no additional compensation will be allowed.

16. Maintenance of Roadways

Beginning on the date that the Contractor begins work on this project, he shall assume responsibility for the normal maintenance of all existing airport pavements used for site access. This normal maintenance shall include all repair work deemed necessary by the Owner. Traffic control and protection for this work will be provided by the Contractor as required by the Owner.

The traffic control and protection required for this work shall be considered incidental to the contract.

17. Record Drawings

The Contractor shall, during the progress of the job, note any and all changes or deviations from the original drawing, and shall notify the Engineer so that the Engineer can prepare "Record Drawings".

18. Sanitary Facilities

The Contractors shall note that portable toilet facilities must be provided for their workmen.

19. Patents and Royalties

Contractors and equipment suppliers shall note the provisions of paragraph 6.07 of the General Conditions regarding Patents and Royalties.

PART 4

SPECIAL CONDITIONS

20. Surveys and Layout Work

The Engineer shall furnish construction survey control points necessary for the project. The Engineer will also furnish such control benchmarks as may be necessary to layout out the work included in the project. The Contractor shall be responsible for preserving and maintaining these lines and benchmarks, and shall layout there from the project work to be performed under the contract.

The Contractor shall establish centerlines, offset baselines, reference points, and grades at sufficient intervals at the centerline and/or each side to ensure the tolerances are met for the work herein specified.

Before commencement of work, the Contractor shall notify the Engineer so that all construction survey work performed by the Contractor may be checked by the Engineer before work based on said survey begins. The cost to the Contractor laying out the project, as herein described, shall be considered as included in the prices bid for the various pay items of the Contract, and no additional compensation will be allowed.

The Contractor shall provide all stakes, templates, straightedges, and other material necessary for checking, marking and maintaining points, lines and gradients.

The Contractor shall provide and maintain at the site such qualified personnel and equipment as may be necessary to establish the dimensions of the work to the specified tolerances.

21. Correction Period

Attention is invited to the provisions of paragraph 13.07 of the General Conditions pertaining to correct any defective work for a period of one year. The guarantee applies to mechanical equipment furnished as well as to all other work and materials.

22. Payment for Items on Lump Sum or Unit Price Basis

Should there be construction shown on the plans or described in the specifications for which no method of payment is outlined in the detailed specifications, that work shall be considered incidental to a logical lump sum or unit price item. The total price bid shall be made for the work complete, and no additional payment shall be made for any unlisted work.

23. Payment for Change Order Work Involving Subcontractors

When changes from the plans and specifications are made and the issuance of change orders are involved, the Contractor shall submit a written proposal in accordance with Article 109.04.

24. Damage of Existing Facilities, Known or Otherwise

The location of any utility not shown on the Plans shall be called to the attention of the Engineer. All such facilities, if damaged, shall be restored and approved by the Engineer before

backfilling the location. No extra compensation will be allowed for this work or for any delays resulting from it. Likewise, any other item not shown to be removed on the Plans, which is damaged by the Contractor's operations, shall be replaced at the Contractor's expense.

25. Clean Up

The cost of cleanup operations shall be spread evenly through the bid items on the proposal. Clean up shall consist of removing all debris from under the jobsite, to include removal of all excess dirt, pipe pieces, lumber scraps, paper cups, etc., left by the Contractor's forces. The Contractor shall remove all debris, broken or damaged equipment and unused material upon completion of the work, and shall leave the premises in a neat, presentable condition that is equal to that prior to the start of construction.

26. Failure to Complete the Work on Time

Should the Contractor fail to complete the work in the specified number of calendar days, he shall be liable to the Owner in the amount of $500.00 per calendar day for each day in excess of the time specified. The liquidated damages will be deducted as a reasonable portion of damages that will be incurred by the airport should the contractor fail to complete the work in the time provided in the contract.

27. Soil Erosion and Sediment Control

The Contractor shall conduct his construction operations in accordance with the latest revision of the Illinois Environmental Protection Agency publication "Illinois Urban Manual." Copies of this manual can be obtained from:

Illinois Environmental Protection Agency
2200 Churchill Road, P.O. Box 19276
Springfield, Illinois 62794-9276

28. Load Restrictions

Contractor's use of the existing airfield and perimeter pavements with equipment and loaded trucks shall be minimized. Any damage to existing airfield and perimeter pavements shall be repaired by the Contractor at his own expense.

The Contractor shall acquaint himself with the load restriction of all local perimeter roadways intended for use as haul roads.

29. Notice To Proceed

The Notice to Proceed will not be given until all materials are certified by the Contractor to be available and on hand.

PART 5

LIST OF DRAWINGS

CHICAGO EXECUTIVE AIRPORT

RESIDENTIAL SOUND INSULATION PROGRAM

HOMEOWNER DESIGN PACKAGES

SEE VOLUME 2 FOR COMPLETE DESIGNS

PART 6

SPECIAL PROVISIONS

CHICAGO EXECUTIVE AIRPORT
RESIDENTIAL SOUND INSULATION PROGRAM

GENERAL

These Special Provisions, together with applicable Standard Specifications, Rules and Regulations, Contract Requirements for Airport Improvement Projects, Payroll Requirements and Minimum Wage Rates which are hereto attached or which by reference are herein incorporated, cover the requirements of the State of Illinois, Department of Transportation, Division of Aeronautics for the construction of the subject project at the Chicago Executive Airport, Wheeling/Prospect Heights, Illinois.

GOVERNING SPECIFICATIONS AND RULES AND REGULATIONS

The **"Standard Specifications for Construction of Airports" dated April 1, 2012**, State of Illinois Department of Transportation, Division of Aeronautics shall govern the project except as otherwise noted in these Special Provisions. In cases of conflict with any part or parts of said specifications, the said Special Provisions shall take precedence and shall govern. When noted within the Special Provisions, the Illinois Department of Transportation **"Standard Specifications for Road and Bridge Construction", Adopted April 1, 2016**, shall also apply.

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PART 6

SPECIAL PROVISIONS

DIVISION I – GENERAL PROVISIONS

SECTION 50 – CONTROL OF WORK

50-18 PLANS AND WORK DRAWINGS

DELETE:

References to “approval” in first paragraph and replace with “review”.

REVISE the fifth paragraph to read:

Shop drawings submitted by the Contractor for materials and/or equipment to be provided as a part of the contract shall be reviewed by the Project Engineer for substantial conformance of said materials and/or equipment, to contract requirements. Shop drawings shall be fully descriptive, complete and of sufficient detail for ready determination of compliance.

REVISE the last paragraph to read:

The following information shall be clearly marked on each shop, working, and layout drawing, catalog cut, pamphlet specifications sheet, etc., submitted.

PROJECT LOCATION:	**Chicago Executive Airport**
PROJECT TITLE:	**Residential Sound Insulation Program**
PROJECT NUMBERS	**PWKRSIP2019**
CONTRACT ITEM:	**(i.e. AR705506 6” Perforated Underdrain)**
SUBMITTED BY:	**(Contractor/Subcontractor Name)**
DATE:	**(Date Submitted)**

SECTION 60 – CONTROL OF MATERIALS

60-01 SOURCE OF SUPPLY AND QUALITY REQUIREMENTS

ADD: After the last paragraph

The Contractor shall certify all materials contained in the contract. Certification documentation shall be submitted to the Engineer. It shall be the sole responsibility of the Contractor to ensure the delivery of adequate and accurate documentation prior to the delivery of the materials.

If, upon delivery and incorporation of any materials, the Contractor has failed to provide the necessary submittals as required by Sections 50-18, 60-01, 60-03 and 60-11 of the Standard

Specifications and Special Provisions, the pay item shall not be included on the Construction Progress Payment report until such submittals have been furnished.

60-03 CERTIFICATION OF COMPLIANCE

ADD:

Additional requirements are specified in Section 60-11 Certification of Materials.

60-11 CERTIFICATION OF MATERIALS

ADD:

The Contractor shall certify all materials incorporated into the contract. Certification documentation shall be submitted to the Resident Engineer. It shall be the **sole** responsibility of the Contractor to ensure the submittal of adequate and accurate documentation in order to satisfy the contract material certification requirements **prior** to the delivery of the materials. Materials without certification or those with certification that demonstrates the materials do not meet the requirements of the plans and specifications shall be considered nonconforming and subject to the provisions of Section 50-02.

As a guide to the certification process and requirements, the Contractor shall use the Illinois Department of Transportation/Division of Aeronautics MANUAL FOR DOCUMENTATION OF AIRPORT MATERIALS dated April 1, 2010 or latest edition including any addendums. Copies of this manual are available by contacting the Division of Aeronautics – Construction Section at (217) 785-8500 or from their website at:

http://www.idot.illinois.gov/Assets/uploads/files/Doing-Business/Manuals-Guides-&-Handbooks/Aero/2010%20Man%20for%20Doc%20of%20Air%20Matls%20revision.pdf

The cost of providing the required material documentation and certifications shall not be paid for separately, but shall be considered incidental to the associated item.

SECTION 70 – LEGAL REGULATIONS AND RESPONSIBILITY TO PUBLIC

70-17 CONTRACTOR'S RESPONSIBILITY FOR UTILITY SERVICE AND FACILITIES OF OTHERS

ADD:

Special care shall be taken on all operations and particularly near pavement edges to avoid damage to edge lights and all underground electrical cable on the airport. The approximate location of existing underground cable is shown on drawings. Any airfield lights or cable that are broken and require replacement because of the Contractor's operations will be replaced by the contractor at his own expense.

Any airfield cable repairs or replacement to any part of the electrical system made necessary by the Contractor's operations will be made by him in the manner specified in Sections 108 and 125 at no cost to the airport. Cost of replacement to be borne by the Contractor shall include any expense incurred in locating as well as repairing or replacing damaged parts of the system by the owning agency.

It shall be the Contractor's responsibility to locate and protect all airport-owned utilities within the construction limits. This includes all electrical cables, storm sewer, drain tile, sanitary sewer and water main.

PART 6

SPECIAL PROVISIONS

Special attention is necessary when working near FAA power and control cables. Any FAA utility that is damaged or cut during construction shall be repaired immediately. FAA requires that any damaged cable be replaced in its entirety, from power/control source to the equipment/service. Splices of any kind will not be permitted. Exposures of any FAA cables must be done by hand digging or hydro-excavation. No additional compensation will be made for locating, replacement or repair of FAA facilities or cables but, shall be incidental to the contract.

When FAA cables are required to be located, or the contractor is planning on working on or around FAA cables, conduits or equipment, a 10 working day advanced notice shall be given to the FAA before any such markings are required. Once FAA marks the cables, the contractor will be required to survey the FAA utilities so they can be replaced during construction without remarking by the FAA. This shall be incidental to the contract. The FAA personnel are only available from 9 am to 3 pm, Monday through Friday with advanced notice.

Should any utilities or cables require location, the following people shall be contacted:

CHICAGO EXECUTIVE AIRPORT

Utility Service or Facility	**Contact (Person)**	**Contact (Phone)**
AT&T – Telephone Cables	J.U.L.I.E. (Joint Utility Locating Information for Excavators)	1-800-892-0123
ComEd - Electric Cables	J.U.L.I.E. (Joint Utility Locating Information for Excavators)	1-800-892-0123
City Of Prospect Heights Water, Sanitary and Storm Sewer	Operations and Maintenance – City of Prospect Heights	1-847-459-0588
NICOR - Gas Lines	J.U.L.I.E. (Joint Utility Locating Information for Excavators)	1-800-892-0123
FAA Control and Communication Cables	FAA Sector Office	1-630-587-7801
Illinois-American Water Company – Water, Sanitary and Storm Sewer	Supervisor of Construction	1-630-739-8810
Village of Wheeling – Water, Sanitary and Storm Sewer	Operations and Maintenance	1-847-459-2985
Metropolitan Water Reclamation District of Greater Chicago	Field Office Personnel	1-708-588-4055
Miscellaneous Communication Cables	Signature Flight Group Steve Bongiorno Atlantic Aviation David Kaufman Hawthorne Global Aviation	1-847-537-1200 1-847-808-0812 1-847-325-0566

PART 6

SPECIAL PROVISIONS

SECTION 80 – PROSECUTION AND PROGRESS

80-03 NOTICE TO PROCEED

ADD:

The Notice to Proceed will not be given until all materials are certified by the Contractor to be available and on hand and meeting the certification requirements per the Contract Documents.

80-05 LIMITATION OF OPERATIONS

ADD:

The Contractor shall not have access to any part of the active airfield (runways or taxiways) for any equipment or personnel without approval of the Airport Executive Director.

80-07 TEMPORARY SUSPENSION OF THE WORK

REVISE the second paragraph to read:

In the event that the Contractor is ordered by the Airport to suspend work for some unforeseen cause not otherwise provided for in the contract and over which the Contractor has no control, the Contractor may be reimbursed for actual money expended on the work during the period of shutdown. No allowance will be made for anticipated profits. The period of shutdown shall be computed from the effective date of the Airport's order to suspend work to the effective date of the Airport's order to resume the work. Claims for such compensation shall be filed with the Resident Engineer within the time period stated in the Airport's order to resume work. The Contractor shall submit with his/her claim information substantiating the amount shown on the claim. The Resident Engineer will forward the Contractor's claim to the Airport for the consideration in accordance with local laws or ordinances. No provision of this article shall be construed as entitling the Contractor to compensation for delays due to inclement weather, for suspension made at the request of the Airport, or for any other delay provided for in the contract, plans, or specifications.

80-10 DEFAULT AND TERMINATION OF CONTRACT

DELETE: "and the Contractor's surety" from the first sentence.

Replace references to "Project Engineer" with "Engineer" throughout this section.

SECTION 90 – MEASUREMENT AND PAYMENT

90-05 PAYMENT FOR EXTRA AND FORCE ACCOUNT WORK

ADD the following to subsection B.7. Statements:

PART 6

SPECIAL PROVISIONS

All statements of the cost of force account work shall be furnished to the Engineer not later than 60 days after completion of the force account work. If the statement is not received within the specified time frame, all demands for payment for the extra work are waived and the Airport Owner is released from any and all such demands. It is the responsibility of the Contractor to ensure that all statements are received within the specified time regardless of the manner or method of delivery.

PART 7

COOK COUNTY PREVAILING WAGES
AND
DAVIS BACON WAGE RATES

Cook County Prevailing Wage Rates posted on 5/21/2026

						Overtime											
Trade Title	**Rg**	**Type**	**C**	**Base**	**Foreman**	**M-F**	**Sa**	**Su**	**Hol**	**H/W**	**Pension**	**Vac**	**Trng**	**Other Ins**	**Add OT 1.5x owed**	**Add OT 2.0x owed**
ASBESTOS ABT-GEN	All	ALL		51.40	52.40	1.5	1.5	2.0	2.0	18.32	17.71	0.00	0.91	0.00	0.00	0.00
ASBESTOS ABT-MEC	All	BLD		42.02	45.38	1.5	1.5	2.0	2.0	16.44	16.64	0.00	0.92		3.37	6.73
BOILERMAKER	All	BLD		62.06	67.64	2.0	2.0	2.0	2.0	7.07	27.81	0.00	3.69	2.72	0.00	39.95
BRICK MASON	All	BLD		53.06	58.37	1.5	1.5	2.0	2.0	12.95	26.26	0.00	1.57	0.00	4.23	8.45
CARPENTER	All	ALL		56.71	58.71	1.5	1.5	2.0	2.0	13.64	27.26	2.61	1.04		0.00	0.00
CEMENT MASON	All	ALL		53.10	55.10	2.0	1.5	2.0	2.0	18.43	24.00	0.00	1.25		2.50	5.00
CERAMIC TILE FINISHER	All	BLD		49.09	49.09	1.5	1.5	2.0	2.0	13.25	17.61	0.00	1.37	0.00	5.57	11.14
CERAMIC TILE LAYER	All	BLD		57.04	62.04	1.5	1.5	2.0	2.0	13.25	21.60	0.00	1.50	0.00	7.63	15.26
COMMUNICATION ELECTRICIAN	All	BLD		51.14	56.25	1.5	1.5	2.0	2.0	16.70	14.48	1.40	1.27	0.10	0.00	0.00
CONCRETE SPECIALIST	All	BLD		51.81	58.21	1.5	1.5	2.0	2.0	12.95	27.56	0.00	1.57	0.00	4.88	9.75
CONCRETE SPECIALIST WELDER	All	BLD		54.40	58.21	1.5	1.5	2.0	2.0	12.95	27.56	0.00	1.57	0.00	4.88	9.75
ELECTRIC PWR EQMT OP	All	ALL		64.58	70.87	1.5	1.5	2.0	2.0	12.99	22.45	0.00	3.66	0.00	0.00	0.00
ELECTRIC PWR GRNDMAN	All	ALL		50.37	70.87	1.5	1.5	2.0	2.0	10.13	17.51	0.00	2.85	0.00	0.00	0.00
ELECTRIC PWR LINEMAN	All	ALL		64.58	70.87	1.5	1.5	2.0	2.0	12.99	22.45	0.00	3.66	0.00	0.00	0.00
ELECTRICIAN	All	ALL		57.75	63.53	1.5	1.5	2.0	2.0	19.34	21.13	1.60	1.87	0.30	0.00	0.00
ELEVATOR CONSTRUCTOR	All	BLD		70.68	79.52	2.0	2.0	2.0	2.0	16.28	21.36	5.65	0.80		0.00	0.00
FENCE ERECTOR	All	ALL		52.25	54.75	1.5	1.5	2.0	2.0	14.29	19.02	0.00	1.00	0.00	0.00	0.00
GLAZIER	All	BLD		53.55	55.05	1.5	2.0	2.0	2.0	16.04	26.64	0.00	2.30	0.00	0.00	0.00
HEAT/FROST INSULATOR	All	BLD		56.02	59.38	1.5	1.5	2.0	2.0	16.44	19.88	0.00	0.92		4.99	9.97
IRON WORKER	All	ALL		62.46	65.96	2.0	2.0	2.0	2.0	19.05	27.04	0.00	0.49	0.00	0.00	0.00
LABORER	All	ALL		51.40	52.15	1.5	1.5	2.0	2.0	18.32	17.71	0.00	0.91	0.00	0.00	0.00
LATHER	All	ALL		56.71	58.71	1.5	1.5	2.0	2.0	13.64	27.26	2.61	1.04		0.00	0.00
MACHINIST	All	BLD		60.39	64.39	1.5	1.5	2.0	2.0	11.43	9.95	1.85	1.47	0.00	0.00	0.00
MARBLE FINISHER	All	ALL		40.21	54.60	1.5	1.5	2.0	2.0	12.95	23.81	0.00	0.98	0.00	3.00	6.00
MARBLE SETTER	All	BLD		52.00	57.20	1.5	1.5	2.0	2.0	12.95	25.57	0.00	1.25	0.00	3.88	7.76
MATERIAL TESTER I	All	ALL		41.40		1.5	1.5	2.0	2.0	18.32	17.71	0.00	0.91	0.00	0.00	0.00

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MATERIALS TESTER II	All	ALL		46.40		1.5	1.5	2.0	2.0	18.32	17.71	0.00	0.91	0.00	0.00	0.00
MILLWRIGHT	All	ALL		56.71	58.71	1.5	1.5	2.0	2.0	13.64	27.26	2.61	1.04		0.00	0.00
OPERATING ENGINEER	All	BLD	1	64.80	68.80	2.0	2.0	2.0	2.0	24.70	21.55	2.00	2.75		0.00	0.00
OPERATING ENGINEER	All	BLD	2	63.50	68.80	2.0	2.0	2.0	2.0	24.70	21.55	2.00	2.75	0.00	0.00	0.00
OPERATING ENGINEER	All	BLD	3	60.95	68.80	2.0	2.0	2.0	2.0	24.70	21.55	2.00	2.75		0.00	0.00
OPERATING ENGINEER	All	BLD	4	59.20	68.80	2.0	2.0	2.0	2.0	24.70	21.55	2.00	2.75		0.00	0.00
OPERATING ENGINEER	All	BLD	5	68.55	68.80	2.0	2.0	2.0	2.0	24.70	21.55	2.00	2.75		0.00	0.00
OPERATING ENGINEER	All	BLD	6	65.80	68.80	2.0	2.0	2.0	2.0	24.70	21.55	2.00	2.75		0.00	0.00
OPERATING ENGINEER	All	BLD	7	67.80	68.80	2.0	2.0	2.0	2.0	24.70	21.55	2.00	2.75		0.00	0.00
OPERATING ENGINEER	All	FLT	1	73.95	73.95	1.5	1.5	2.0	2.0	24.70	21.55	2.00	2.75		0.00	0.00
OPERATING ENGINEER	All	FLT	2	72.45	73.95	1.5	1.5	2.0	2.0	24.70	21.55	2.00	2.75		0.00	0.00
OPERATING ENGINEER	All	FLT	3	67.95	73.95	1.5	1.5	2.0	2.0	24.70	21.55	2.00	2.75		0.00	0.00
OPERATING ENGINEER	All	FLT	4	63.45	73.95	1.5	1.5	2.0	2.0	24.70	21.55	2.00	2.75		0.00	0.00
OPERATING ENGINEER	All	FLT	5	75.45	73.95	1.5	1.5	2.0	2.0	24.70	21.55	2.00	2.75		0.00	0.00
OPERATING ENGINEER	All	FLT	6	63.45	73.95	1.5	1.5	2.0	2.0	24.70	21.55	2.00	2.75		0.00	0.00
OPERATING ENGINEER	All	HWY	1	63.00	67.00	1.5	1.5	2.0	2.0	24.70	21.55	2.00	2.75		0.00	0.00
OPERATING ENGINEER	All	HWY	2	62.45	67.00	1.5	1.5	2.0	2.0	24.70	21.55	2.00	2.75		0.00	0.00
OPERATING ENGINEER	All	HWY	3	60.40	67.00	1.5	1.5	2.0	2.0	24.70	21.55	2.00	2.75		0.00	0.00
OPERATING ENGINEER	All	HWY	4	59.00	67.00	1.5	1.5	2.0	2.0	24.70	21.55	2.00	2.75		0.00	0.00
OPERATING ENGINEER	All	HWY	5	57.80	67.00	1.5	1.5	2.0	2.0	24.70	21.55	2.00	2.75		0.00	0.00
OPERATING ENGINEER	All	HWY	6	66.00	67.00	1.5	1.5	2.0	2.0	24.70	21.55	2.00	2.75		0.00	0.00
OPERATING ENGINEER	All	HWY	7	64.00	67.00	1.5	1.5	2.0	2.0	24.70	21.55	2.00	2.75		0.00	0.00
ORNAMENTAL IRON WORKER	All	ALL		59.26	62.76	2.0	2.0	2.0	2.0	14.86	27.70	0.00	2.25	0.00	0.00	0.00
PAINTER	All	ALL		54.30	61.09	1.5	1.5	1.5	2.0	16.26	17.59	0.00	1.86	0.00	0.00	0.00
PAINTER - SIGNS	All	BLD		48.16	54.11	1.5	1.5	2.0	2.0	8.20	16.81	0.00	0.00	0.00	0.00	0.00
PILEDRIVER	All	ALL		56.71	58.71	1.5	1.5	2.0	2.0	13.64	27.26	2.61	1.04		0.00	0.00
PIPEFITTER	All	BLD		58.50	61.50	1.5	1.5	2.0	2.0	15.15	22.85	0.00	3.12	0.00	0.00	0.00
PLASTERER	All	BLD		51.10	54.17	1.5	1.5	2.0	2.0	18.43	22.10	0.00	1.25	0.00	0.00	0.00
PLUMBER	All	BLD		60.50	64.15	1.5	1.5	2.0	2.0	19.10	17.94	0.00	1.98		0.00	0.00

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ROOFER	All	BLD		52.00	57.00	1.5	1.5	2.0	2.0	12.80	18.19	0.00	1.14	0.00	0.00	0.00
SHEETMETAL WORKER	All	BLD		54.58	58.95	1.5	1.5	2.0	2.0	15.88	28.92	0.00	1.20	0.00	0.00	0.00
SIGN HANGER	All	BLD		37.62	40.63	1.5	1.5	2.0	2.0	7.85	4.90	0.00	0.00	0.00	0.00	0.00
SPRINKLER FITTER	All	BLD		63.20	65.95	1.5	1.5	2.0	2.0	15.45	19.95	0.00	1.15	0.00	0.00	0.00
STEEL ERECTOR	All	ALL		62.46	65.96	2.0	2.0	2.0	2.0	19.05	27.04	0.00	0.49	0.00	0.00	0.00
STONE MASON	All	BLD		53.06	58.37	1.5	1.5	2.0	2.0	12.95	26.26	0.00	1.57	0.00	4.23	8.45
SURVEY WORKER	All	BLD		58.45	59.45	1.5	1.5	2.0	2.0	19.10	14.40	0.00	1.59		0.00	0.00
SURVEY WORKER	All	HWY		58.45	59.45	1.5	1.5	2.0	2.0	19.10	14.40	0.00	1.59		0.00	0.00
TERRAZZO FINISHER	All	BLD		51.44	51.44	1.5	1.5	2.0	2.0	13.25	18.87	0.00	1.41	0.00	4.45	8.89
TERRAZZO MECHANIC	All	BLD		55.35	58.85	1.5	1.5	2.0	2.0	13.25	20.26	0.00	1.46	0.00	4.70	9.39
TRAFFIC SAFETY WORKER I	All	HWY		43.40	45.40	1.5	1.5	2.0	2.0	10.08	10.08	0.00	1.05	0.00	0.00	0.00
TRAFFIC SAFETY WORKER II	ALL	HWY		44.40	46.40	1.5	1.5	2.0	2.0	10.08	10.08	0.00	1.05	0.00	0.00	0.00
TRUCK DRIVER	E	ALL	1	45.55	46.20	1.5	1.5	2.0	2.0	13.35	16.09	0.00	0.30	0.00	0.00	0.00
TRUCK DRIVER	E	ALL	2	45.80	46.20	1.5	1.5	2.0	2.0	13.35	16.09	0.00	0.30	0.00	0.00	0.00
TRUCK DRIVER	E	ALL	3	46.00	46.20	1.5	1.5	2.0	2.0	13.35	16.09	0.00	0.30	0.00	0.00	0.00
TRUCK DRIVER	E	ALL	4	46.20	46.20	1.5	1.5	2.0	2.0	13.35	16.09	0.00	0.30	0.00	0.00	0.00
TRUCK DRIVER	W	ALL	1	44.83	45.38	1.5	1.5	2.0	2.0	12.20	16.61	0.00	0.30	0.00	0.00	0.00
TRUCK DRIVER	W	ALL	2	44.98	45.38	1.5	1.5	2.0	2.0	12.20	16.61	0.00	0.30	0.00	0.00	0.00
TRUCK DRIVER	W	ALL	3	45.18	45.38	1.5	1.5	2.0	2.0	12.20	16.61	0.00	0.30	0.00	0.00	0.00
TRUCK DRIVER	W	ALL	4	45.38	45.38	1.5	1.5	2.0	2.0	12.20	16.61	0.00	0.30	0.00	0.00	0.00
TUCKPOINTER	All	BLD		52.53	53.53	1.5	1.5	2.0	2.0	11.05	23.16	0.00	1.46	0.00	0.00	0.00

Legend

Rg Region

Type Trade Type - All,Highway,Building,Floating,Oil & Chip,Rivers

C Class

Base Base Wage Rate

OT M-F Unless otherwise noted, OT pay is required for any hour greater than 8 worked each day, Mon through Fri. The number listed is the multiple of the base wage.

OT Sa Overtime pay required for every hour worked on Saturdays

OT Su Overtime pay required for every hour worked on Sundays

OT Hol Overtime pay required for every hour worked on Holidays

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H/W Health/Welfare benefit
Vac Vacation
Trng Training
Other Ins Employer hourly cost for any other type(s) of insurance provided for benefit of worker.

Explanations COOK COUNTY

The following list is considered as those days for which holiday rates of wages for work performed apply: New Years Day, Memorial Day, Fourth of July, Labor Day, Thanksgiving Day, Christmas Day and Veterans Day in some classifications/counties. Generally, any of these holidays which fall on a Sunday is celebrated on the following Monday. This then makes work performed on that Monday payable at the appropriate overtime rate for holiday pay. Common practice in a given local may alter certain days of celebration. If in doubt, please check with IDOL.

TRUCK DRIVERS (WEST) - That part of the county West of Barrington Road.

EXPLANATION OF CLASSES

ASBESTOS - GENERAL - removal of asbestos material/mold and hazardous materials from any place in a building, including mechanical systems where those mechanical systems are to be removed. This includes the removal of asbestos materials/mold and hazardous materials from ductwork or pipes in a building when the building is to be demolished at the time or at some close future date. ASBESTOS - MECHANICAL - removal of asbestos material from mechanical systems, such as pipes, ducts, and boilers, where the mechanical systems are to remain.

CERAMIC TILE FINISHER

The grouting, cleaning, and polishing of all classes of tile, whether for interior or exterior purposes, all burned, glazed or unglazed products; all composition materials, granite tiles, warning detectable tiles, cement tiles, epoxy composite materials, pavers, glass, mosaics, fiberglass, and all substitute materials, for tile made in tile-like units; all mixtures in tile like form of cement, metals, and other materials that are for and intended for use as a finished floor surface, stair treads, promenade roofs, walks, walls, ceilings, swimming pools, and all other places where tile is to form a finished interior or exterior. The mixing of all setting mortars including but not limited to thin-set mortars, epoxies, wall mud, and any other sand and cement mixtures or adhesives when used in the preparation, installation, repair, or maintenance of tile and/or similar materials. The handling and unloading of all sand, cement, lime, tile, fixtures, equipment, adhesives, or any other materials to be used in the preparation, installation, repair, or maintenance of tile and/or similar materials. Ceramic Tile Finishers shall fill all joints and voids regardless of method on all tile work, particularly and especially after installation of said tile work. Application of any and all protective coverings to all types of tile installations including, but not be limited to, all soap compounds, paper products, tapes, and all polyethylene coverings, plywood, masonite, cardboard, and any new type of products that may be used to protect tile installations, Blastrac equipment, and all floor scarifying equipment used in preparing floors to receive tile. The clean up and removal of all waste and materials. All demolition of existing tile floors and walls to be re-tiled.

COMMUNICATIONS ELECTRICIAN

Installation, operation, inspection, maintenance, repair and service of radio, television, recording, voice sound vision production and reproduction, telephone and telephone interconnect, facsimile, data apparatus, coaxial, fibre optic and wireless equipment, appliances and systems used for the transmission and reception of signals of any nature, business, domestic, commercial, education, entertainment, and residential purposes, including but not limited to, communication and telephone, electronic and sound equipment, fibre optic and data communication systems, and the performance of any task directly related to such installation or service whether at new or existing sites, such tasks to include the placing of wire and cable and electrical power conduit or other raceway work within the equipment room and pulling wire and/or cable through conduit and the installation of any incidental conduit, such that the employees covered hereby can complete any job in full.

MARBLE FINISHER

Loading and unloading trucks, distribution of all materials (all stone, sand, etc.), stocking of floors with material, performing all rigging for heavy work, the handling of all material that may be needed for the installation of such materials, building of scaffolding, polishing if needed, patching, waxing of material if damaged, pointing up, caulking, grouting and cleaning of marble, holding water on diamond or Carborundum blade or saw for setters cutting, use of tub saw or any other saw needed for preparation of material, drilling of holes for wires that anchor material set by setters, mixing up of molding plaster for installation of material, mixing up thin set for the installation of material, mixing up of sand to cement for the installation of material and such other work as may be required in helping a Marble Setter in the handling of all material in the erection or installation of interior marble, slate, travertine, art marble, serpentine, alberene stone, blue stone, granite and other stones (meaning as to stone any foreign or domestic materials as are specified and used in building interiors and exteriors and customarily known as stone in the trade), carrara, sanionyx, vitrolite and similar opaque glass and the laying of all marble tile, terrazzo tile, slate tile and precast tile, steps, risers treads, base, or any other materials that may be used as substitutes for any of the aforementioned materials and which are used on interior and exterior which are installed in a similar manner.

MATERIAL TESTER I: Hand coring and drilling for testing of materials; field inspection of uncured concrete and asphalt.

MATERIAL TESTER II: Field inspection of welds, structural steel, fireproofing, masonry, soil, facade, reinforcing steel, formwork, cured concrete, and concrete and asphalt batch plants; adjusting proportions of bituminous mixtures.

OPERATING ENGINEER - BUILDING

Class 1. Asphalt Plant; Asphalt Spreader; Autograde; Backhoes with Caisson Attachment; Batch Plant; Benoto (requires Two Engineers); Boiler and Throttle Valve; Caisson Rigs; Central Redi-Mix Plant; Combination Back Hoe Front End-loader Machine; Compressor and Throttle Valve; Concrete Breaker (Truck Mounted); Concrete Conveyor; Concrete Conveyor (Truck Mounted); Concrete Paver Over 27E cu. ft; Concrete Paver 27E cu. ft. and Under: Concrete Placer; Concrete Placing Boom; Concrete Pump (Truck Mounted); Concrete Tower; Cranes, All; Cranes, Hammerhead; Cranes, (GCI and similar Type); Creter Crane; Spider Crane; Crusher, Stone, etc.; Derricks, All; Derricks, Traveling; Formless Curb and Gutter Machine; Grader, Elevating; Grouting Machines; Heavy Duty Self-Propelled Transporter or Prime Mover; Highlift Shovels or Front Endloader 2-1/4 yd. and over; Hoists, Elevators, outside type rack and pinion and similar machines; Hoists, One, Two and Three Drum; Hoists, Two Tugger One Floor; Hydraulic Backhoes; Hydraulic Boom Trucks; Hydro Vac (and similar equipment); Locomotives, All; Motor Patrol; Lubrication Technician; Manipulators; Pile Drivers and Skid Rig; Post Hole Digger; Pre-Stress Machine; Pump Cretes Dual Ram; Pump Cretes: Squeeze Cretes-Screw Type Pumps; Gypsum Bulker and Pump; Raised and Blind Hole Drill; Roto Mill Grinder; Scoops - Tractor Drawn; Slip-

Form Paver; Straddle Buggies; Operation of Tie Back Machine; Tournapull; Tractor with Boom and Side Boom; Trenching Machines.

Class 2. Boilers; Broom, All Power Propelled; Bulldozers; Concrete Mixer (Two Bag and Over); Conveyor, Portable; Forklift Trucks; Highlift Shovels or Front Endloaders under 2-1/4 yd.; Hoists, Automatic; Hoists, Inside Elevators; Hoists, Sewer Dragging Machine; Hoists, Tugger Single Drum; Laser Screed; Rock Drill (Self-Propelled); Rock Drill (Truck Mounted); Rollers, All; Steam Generators; Tractors, All; Tractor Drawn Vibratory Roller; Winch Trucks with "A" Frame.

Class 3. Air Compressor; Combination Small Equipment Operator; Generators; Heaters, Mechanical; Hoists, Inside Elevators (remodeling or renovation work); Hydraulic Power Units (Pile Driving, Extracting, and Drilling); Pumps, over 3" (1 to 3 not to exceed a total of 300 ft.); Low Boys; Pumps, Well Points; Welding Machines (2 through 5); Winches, 4 Small Electric Drill Winches.

Class 4. Bobcats and/or other Skid Steer Loaders; Oilers; and Brick Forklift.

Class 5. Assistant Craft Foreman.

Class 6. Gradall.

Class 7. Mechanics; Welders.

OPERATING ENGINEERS - HIGHWAY CONSTRUCTION

Class 1. Asphalt Plant; Asphalt Heater and Planer Combination; Asphalt Heater Scarfire; Asphalt Spreader; Autograder/GOMACO or other similar type machines: ABG Paver; Backhoes with Caisson Attachment; Ballast Regulator; Belt Loader; Caisson Rigs; Car Dumper; Central Redi-Mix Plant; Combination Backhoe Front Endloader Machine, (1 cu. yd. Backhoe Bucket or over or with attachments); Concrete Breaker (Truck Mounted); Concrete Conveyor; Concrete Paver over 27E cu. ft.; Concrete Placer; Concrete Tube Float; Cranes, all attachments; Cranes, Tower Cranes of all types: Creter Crane: Spider Crane; Crusher, Stone, etc.; Derricks, All; Derrick Boats; Derricks, Traveling; Dredges; Elevators, Outside type Rack & Pinion and Similar Machines; Formless Curb and Gutter Machine; Grader, Elevating; Grader, Motor Grader, Motor Patrol, Auto Patrol, Form Grader, Pull Grader, Subgrader; Guard Rail Post Driver Truck Mounted; Hoists, One, Two and Three Drum; Heavy Duty Self-Propelled Transporter or Prime Mover; Hydraulic Backhoes; Backhoes with shear attachments up to 40' of boom reach; Lubrication Technician; Manipulators; Mucking Machine; Pile Drivers and Skid Rig; Pre-Stress Machine; Pump Cretes Dual Ram; Rock Drill - Crawler or Skid Rig; Rock Drill - Truck Mounted; Rock/Track Tamper; Roto Mill Grinder; Slip-Form Paver; Snow Melters; Soil Test Drill Rig (Truck Mounted); Straddle Buggies; Hydraulic Telescoping Form (Tunnel); Operation of Tieback Machine; Tractor Drawn Belt Loader; Tractor Drawn Belt Loader (with attached pusher - two engineers); Tractor with Boom; Tractaire with Attachments; Traffic Barrier Transfer Machine; Trenching; Truck Mounted Concrete Pump with Boom; Raised or Blind Hole Drills (Tunnel Shaft); Underground Boring and/or Mining Machines 5 ft. in diameter and over tunnel, etc; Underground Boring and/or Mining Machines under 5 ft. in diameter; Wheel Excavator; Widener (APSCO).

Class 2. Batch Plant; Bituminous Mixer; Boiler and Throttle Valve; Bulldozers; Car Loader Trailing Conveyors; Combination Backhoe Front Endloader Machine (Less than 1 cu. yd. Backhoe Bucket or over or with attachments); Compressor and Throttle Valve; Compressor, Common Receiver (3); Concrete Breaker or Hydro Hammer; Concrete Grinding Machine; Concrete Mixer or Paver 7S

Series to and including 27 cu. ft.; Concrete Spreader; Concrete Curing Machine, Burlap Machine, Belting Machine and Sealing Machine; Concrete Wheel Saw; Conveyor Muck Cars (Haglund or Similar Type); Drills, All; Finishing Machine - Concrete; Highlift Shovels or Front Endloader; Hoist - Sewer Dragging Machine; Hydraulic Boom Trucks (All Attachments); Hydro-Blaster; Hydro Excavating (excluding hose work); Laser Screed; All Locomotives, Dinky; Off-Road Hauling Units (including articulating) Non Self-Loading Ejection Dump; Pump Cretes: Squeeze Cretes - Screw Type Pumps, Gypsum Bulker and Pump; Roller, Asphalt; Rotary Snow Plows; Rototiller, Seaman, etc., self-propelled; Self-Propelled Compactor; Spreader - Chip - Stone, etc.; Scraper - Single/Twin Engine/Push and Pull; Scraper - Prime Mover in Tandem (Regardless of Size); Tractors pulling attachments, Sheeps Foot, Disc, Compactor, etc.; Tug Boats.

Class 3. Boilers; Brooms, All Power Propelled; Cement Supply Tender; Compressor, Common Receiver (2); Concrete Mixer (Two Bag and Over); Conveyor, Portable; Farm-Type Tractors Used for Mowing, Seeding, etc.; Forklift Trucks; Grouting Machine; Hoists, Automatic; Hoists, All Elevators; Hoists, Tugger Single Drum; Jeep Diggers; Low Boys; Pipe Jacking Machines; Post-Hole Digger; Power Saw, Concrete Power Driven; Pug Mills; Rollers, other than Asphalt; Seed and Straw Blower; Steam Generators; Stump Machine; Winch Trucks with "A" Frame; Work Boats; Tamper-Form-Motor Driven.

Class 4. Air Compressor; Combination - Small Equipment Operator; Directional Boring Machine; Generators; Heaters, Mechanical; Hydraulic Power Unit (Pile Driving, Extracting, or Drilling); Light Plants, All (1 through 5); Pumps, over 3" (1 to 3 not to exceed a total of 300 ft.); Pumps, Well Points; Vacuum Trucks (excluding hose work); Welding Machines (2 through 5); Winches, 4 Small Electric Drill Winches.

Class 5. SkidSteer Loader (all); Brick Forklifts; Oilers.

Class 6. Field Mechanics and Field Welders

Class 7. Dowell Machine with Air Compressor; Gradall and machines of like nature.

OPERATING ENGINEER - FLOATING

Class 1. Craft Foreman; Master Mechanic; Diver/Wet Tender; Engineer; Engineer (Hydraulic Dredge).

Class 2. Crane/Backhoe Operator; Boat Operator with towing endorsement; Mechanic/Welder; Assistant Engineer (Hydraulic Dredge); Leverman (Hydraulic Dredge); Diver Tender.

Class 3. Deck Equipment Operator, Machineryman, Maintenance of Crane (over 50 ton capacity) or Backhoe (115,000 lbs. or more); Tug/Launch Operator; Loader/Dozer and like equipment on Barge, Breakwater Wall, Slip/Dock, or Scow, Deck Machinery, etc.

Class 4. Deck Equipment Operator, Machineryman/Fireman (4 Equipment Units or More); Off Road Trucks; Deck Hand, Tug Engineer, Crane Maintenance (50 Ton Capacity and Under) or Backhoe Weighing (115,000 pounds or less); Assistant Tug Operator.

Class 5. Friction or Lattice Boom Cranes.

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Class 6. ROV Pilot, ROV Tender

SURVEY WORKER

Operates survey equipment (such as levels, transits, data collectors, GPS and robotic total stations) for the purpose of performing construction layout and/or grade checking.

SURVEY FOREMAN

Operates survey equipment (such as levels, transits, data collectors, GPS and robotic total stations) for the purpose of performing construction layout and/or grade checking; oversees survey crew operations; and/or coordinates work of survey crews.

TERRAZZO FINISHER

The handling of sand, cement, marble chips, and all other materials that may be used by the Mosaic Terrazzo Mechanic, and the mixing, grinding, grouting, cleaning and sealing of all Marble, Mosaic, and Terrazzo work, floors, base, stairs, and wainscoting by hand or machine, and in addition, assisting and aiding Marble, Masonic, and Terrazzo Mechanics.

TRAFFIC SAFETY Worker I

Traffic Safety Worker I - work associated with the delivery, installation, pick-up and servicing of safety devices during periods of roadway construction, including such work as set-up and maintenance of barricades, barrier wall reflectors, drums, cones, delineators, signs, crash attenuators, glare screen and other such items, and the layout and application or removal of conflicting and/or temporary roadway markings utilized to control traffic in construction zones, as well as flagging for these operations.

TRAFFIC SAFETY WORKER II

Work associated with the installation and removal of permanent pavement markings and/or pavement markers including both installations performed by hand and installations performed by truck.

TRUCK DRIVER - BUILDING, HEAVY AND HIGHWAY CONSTRUCTION - EAST & WEST

Class 1. Two or three Axle Trucks. A-frame Truck when used for transportation purposes; Air Compressors and Welding Machines, including those pulled by cars, pick-up trucks and tractors; Ambulances; Batch Gate Lockers; Batch Hopperman; Car and Truck Washers; Carry-alls; Fork Lifts and Hoisters; Helpers; Mechanics Helpers and Greasers; Oil Distributors 2-man operation; Pavement Breakers; Pole Trailer, up to 40 feet; Power Mower Tractors; Self-propelled Chip Spreader; Skipman; Slurry Trucks, 2-man operation; Slurry Truck Conveyor Operation, 2 or 3 man; Teamsters; Unskilled Dumpman; and Truck Drivers hauling warning lights, barricades, and portable toilets on the job site.

Class 2. Four axle trucks; Dump Crets and Adgetors under 7 yards; Dumpsters, Track Trucks, Euclids, Hug Bottom Dump Turnapulls or Turnatrailers when pulling other than self-loading equipment or similar equipment under 16 cubic yards; Mixer Trucks under 7 yards; Ready-mix Plant Hopper Operator, and Winch Trucks, 2 Axles.

Class 3. Five axle trucks; Dump Crets and Adgetors 7 yards and over; Dumpsters, Track Trucks, Euclids, Hug Bottom Dump

Turnatrailers or turnapulls when pulling other than self-loading equipment or similar equipment over 16 cubic yards; Explosives and/or Fission Material Trucks; Mixer Trucks 7 yards or over; Mobile Cranes while in transit; Oil Distributors, 1-man operation; Pole Trailer, over 40 feet; Pole and Expandable Trailers hauling material over 50 feet long; Slurry trucks, 1-man operation; Winch trucks, 3 axles or more; Mechanic--Truck Welder and Truck Painter.

Class 4. Six axle trucks; Dual-purpose vehicles, such as mounted crane trucks with hoist and accessories; Foreman; Master Mechanic; Self-loading equipment like P.B. and trucks with scoops on the front.

Other Classifications of Work:

For definitions of classifications not otherwise set out, the Department generally has on file such definitions which are available. If a task to be performed is not subject to one of the classifications of pay set out, the Department will upon being contacted state which neighboring county has such a classification and provide such rate, such rate being deemed to exist by reference in this document. If no neighboring county rate applies to the task, the Department shall undertake a special determination, such special determination being then deemed to have existed under this determination. If a project requires these, or any classification not listed, please contact IDOL at 217-782-1710 for wage rates or clarifications.

LANDSCAPING

Landscaping work falls under the existing classifications for laborer, operating engineer and truck driver. The work performed by landscape plantsman and landscape laborer is covered by the existing classification of laborer. The work performed by landscape operators (regardless of equipment used or its size) is covered by the classifications of operating engineer. The work performed by landscape truck drivers (regardless of size of truck driven) is covered by the classifications of truck driver.

MATERIAL TESTER & MATERIAL TESTER/INSPECTOR I AND II

Notwithstanding the difference in the classification title, the classification entitled "Material Tester I" involves the same job duties as the classification entitled "Material Tester/Inspector I". Likewise, the classification entitled "Material Tester II" involves the same job duties as the classification entitled "Material Tester/Inspector II".

Cook County Prevailing Wage Rates posted on 5/21/2026

"General Decision Number: IL20260009 05/18/2026

State: Illinois

Construction Types: Building, Heavy, Highway and Residential

Counties: Illinois Counties of
Cook

Excludes Landscape Projects

Modification Number	Publication Date
1	01/09/2026
2	05/18/2026

ASBE0017-001 06/01/2024

	Rates	Fringes
HAZARDOUS MATERIAL HANDLER (INCLUDES PREPARATION, WETTING, STRIPPING REMOVAL SCRAPPING, VACUUMING, BAGGING AND DISPOSAL OF ALL INSULATION MATERIALS, WHETHER THEY CONTAIN ASBESTOS OR NOT, FROM MECHANICAL SYSTEMS)	$ 41.27	32.76
FIRE STOP TECHNICIAN	$ 44.02	32.76
ASBESTOS WORKER/INSULATOR (INCLUDES THE APPLICATION OF ALL INSULATING MATERIALS, PROTECTIVE COVERINGS, COATINGS, AND FINISHES TO ALL TYPES OF MECHANICAL SYSTEMS)	$ 55.02	35.75

BOIL0001-001 05/01/2024

	Rates	Fringes
BOILERMAKER	$ 53.10	38.54

BRIL0021-001 06/01/2016

	Rates	Fringes
BRICKLAYER	$ 44.88	26.62

BRIL0021-004 06/01/2017

	Rates	Fringes
MARBLE MASON	$ 44.63	26.83

BRIL0021-006 06/01/2017

	Rates	Fringes
TILE SETTER	$ 45.49	25.72
TILE FINISHER	$ 38.56	22.10
TERRAZZO WORKER/SETTER	$ 44.38	25.84

BRIL0021-009 06/01/2017

	Rates	Fringes
MARBLE FINISHER	$ 33.95	26.03

BRIL0021-012 06/01/2017

	Rates	Fringes
POINTER, CLEANER AND CAULKER	$ 45.42	24.06

CARP0555-001 06/01/2022

	Rates	Fringes
CARPENTER: CARPENTER, LATHER, MILLWRIGHT, PILEDRIVER, AND SOFT FLOOR LAYER (Heavy & Highway)	$ 52.01	38.85
CARPENTER: CARPENTER, LATHER, MILLWRIGHT, PILEDRIVER, AND SOFT FLOOR LAYER (Building)	$ 52.01	38.85

CARP0555-002 10/01/2023

	Rates	Fringes
CARPENTER (RESIDENTIAL CONSTRUCTION)	$ 45.61	35.31

ELEC0009-003 05/26/2024

	Rates	Fringes
LINE CONSTRUCTION: GROUNDMAN	$ 48.44	29.09
LINE CONSTRUCTION (LINEMAN AND EQUIPMENT OPERATOR)	$ 62.10	37.29

ELEC0134-001 06/02/2025

	Rates	Fringes
ELECTRICIAN	$ 57.75	42.89

ELEC0134-003 06/02/2025

	Rates	Fringes
ELECTRICIAN:ELECTRICAL TECHNICIAN: THE WORK SHALL CONSIST OF THE INSTALLATION, OPERATION, INSPECTION, MAINTENANCE, REPAIR AND SERVICE OF RADIO, TELEVISION, RECORDING, VOICE SOUND VISION PRODUCTION AND REPRODUCTION, TELEPHONE AND TELEPHONE INTERCONNECT, FACSIMILE, DATA APPATATUS, COAXIAL, FIBRE OPTIC AND WIRELESS EQUIPMENT, APPLIANCES AND SYSTEMS USED FOR THE TRANSMISSION AND RECEPTION OF SIGNALS OF ANY NATURE, BUSINESS, DOMESTIC, COMMERCIAL, EDUCATION, ENTERTAINMENT AND RESIDENTIAL PURPOSES, INCLUDING BUT NOT LIMITED TO COMMUNICATION AND TELEPHONE, ELECTRONIC AND SOUND EQUIPMENT, FIBRE OPTIC AND DATA COMMUNICATION SYSTEMS, AND THE PERFORMANCE OF ANY TASK DIRECTLY RELATED TO SUCH INSTALLATION OR SERVICE WHETHER AT NEW OR EXISTING SITES, SUCH TASKS TO INCLUDE THE PLACING OF WIRE AND CABLE AND ELECTRICAL POWER CONDUIT OR OTHER RACEWAY WORK WITHIN THE EQUIPMENT ROOM AND PULLING WIRE AND/OR CABLE THROUGH CONDUIT AND THE INSTALLATION OF ANY INCIDENTIAL CONDUIT.	$ 51.14	30.55

ELEV0002-001 01/01/2025

	Rates	Fringes
ELEVATOR MECHANIC FOOTNOTES: A) PAID HOLIDAYS: NEW YEAR'S DAY; MEMORIAL DAY; INDEPENDENCE DAY; LABOR DAY; THANKSGIVING DAY; DAY AFTER THANKSGIVING DAY; VETERANS' DAY AND CHRISTMAS DAY. B) EMPLOYER CONTRIBUTES 8% OF REGULAR HOURLY RATE AS VACATION PAY CREDIT FOR EMPLOYEE WITH MORE THAN 5 YEARS OF SERVICE, AND 6% FOR EMPLOYEE WITH LESS THAN 5 YEARS SERVICE	$ 70.68	38.44

ENGI0150-006 06/01/2025

	Rates	Fringes
OPERATOR: POWER EQUIPMENT, GROUP 4 (BUILDING AND RESIDENTIAL CONSTRUCTION) BOBCATS AND/OR OTHER SKID STEER LOADERS; BRICK FORKLIFTS; OILERS	$ 59.20	51.00
OPERATOR: POWER EQUIPMENT, GROUP 3 (BUILDING AND RESIDENTIAL CONSTRUCTION) AIR COMPRESSOR-SMALL 250 AND UNDER (1 TO 5 NOT TO EXCEED A TOTAL OF 300 FT); AIR COMPRESSOR-LARGE OVER 250; COMBINATION-SMALL EQUIPMENT OPERATOR; GENERATOR- SMALL 50 KW AND UNDER; GENERATOR-LARGE OVER 50 KW; HEATERS, MECHANICAL; HOISTS, INSIDE ELEVATORS (REMODELING OR RENOVATIN WORK); HYDRUALIC POWER UNITS (PILE DRIVING, EXTRACTING, AND DRILLING); LOW BOYS; PUMPS OVER 3"" (1 TO 3 NOT TO EXCEED A TOTAL OF 300 FT); PUMPS, WELL POINTS; WELDING MACHINES (2 THROUGH 5); WINCHES, 4 SMALL ELECTRIC DRILL WINCHES; BOBCAT (UP TO AND INCLUDING 3/4 CU YD).....	$ 60.95	51.00
OPERATOR: POWER EQUIPMENT, GROUP 2 (BUILDING AND RESIDENTIAL CONSTRUCTION) BOBCAT (OVER 3/4 CU YD); BOILERS; BROOM, POWER PROPELLED; BULLDOZERS; CONCRETE MIXER (TWO BAG AND OVER); CONVEYOR, PORTABLE; FORKLIFT TRUCKS; GREASER ENGINEER; HIGHLIFT SHOVELS OR FRONT END LOADERS UNDER 2 1/4 CU YD; AOTOMATIC HOISTS, HOISTS, INSIDE ELEVATORS; HOISTS, SEWER DRAGGING MACHINE; HOISTS, TUGGER SINGLE DRUM; LASER SCREED; ROCK DRILL (SELF-PROPELLED); ROCK DRILL (TRUCK MOUNTED)*; ROLLERS; STEAM GENERATORS; TRACTORS; TRACTOR DRAWN VIBRATORY ROLLER (RECEIVES AN ADDITIONAL $.50 PER HOUR); WINCH TRUCKS WITH ""A"" FRAME. *-REQUIRES OILER.....	$ 63.50	51.00
OPERATOR: POWER EQUIPMENT, GROUP 1 (BUILDING AND RESIDENTIAL CONSTRUCTION) MECHANIC; ASPHALT PLANT*; ASPHALT SPREADER; AUTOGRADE*; BACKHOES WITH CAISSON ATTACHMENT*:BATCH PLANT*; BENOTO(REQUIRES TWO ENGINEERS); BOILER AND THROTTLE VALVE; CAISSON RIGS*; CENTRAL REDI-MIX PLANT*; COMBINATION BACKHOE FRONT ENDLOADER MACHINE; COMPRESSOR AND THROTTLE VALVE; CONCRETE BREAKER (TRUCK MOUNTED)*; CONCRETE CONVEYOR; CONCRETE CONVEYOR, TRUCK MOUNTED; CONCRETE PAVER OVER 27E CU. FT.*; CONCRETE PAVER 27E CU FT AND UNDER*; CONCRETE PLACER*; CONCRETE PLACING BOOM; CONCRETE PUMP (TRUCK MOUNTED); CONCRETE TOWER; CRANES*; CRANES, HAMMERHEAD*; CRANES, (GCI AND SIMILAR TYPE REQUIRES TWO OPERATORS ONLY); CRETER CRANE; CRUSHER, STONE, ETC; DERRICKS; DERRICKS, TRAVELING*; FORMLESS CURB AND GUTTER MACHINE*; GRADER, ELEVATING; GROUTING MACHINES; HIGHLIFT SHOVELS OR FRONT ENDLOADER 2 1/4 YD. AND OVER; HOISTS, ELEVATORS, OUTSIDE TYPE RACK AND PINION AND SIMILAR MACHINES; HOISTS, ONE, TWO, AND THREE DRUM; HOISTS, TWO TUGGER ONE FLOOR; HYDRAULIC BACKHOES*; HYDRAULIC BOOM TRUCKS; HYDRAULIC VAC (AND SIMILAR EQUIPMENT);LOCOMOTIVES; MOTOR PATROL*; PILE DRIVERS AMD SKID RIG*; POST HOLE DIGGER; PRE- STRESS MACHINE; PUMP CRETES DUAL RAM(REQUIRING FREQUENT LUBRICATION AND WATER); PUMP CRETES; SQUEEZE CRETES-SCREW TYPE PUMPS GYPSUM BULKER AND PUMP; RAISED AND BLIND HOLE DRILL*; ROTO MILL GRINDER (36"" AND OVER)*; ROTO MILL GRINDER (LESS THAN 36"")*; SCOOPS-TRACTOR DRAWN; SLIP-FORM PAVER*; STRADDLE BUGGIES; TOURNAPULL; TRACTOR WITH BOOM, AND SIDE BOOM; AND TRENCHING MACHINES*. *-REQUIRES OILER.....	$ 64.80	51.00

ENGI0150-025 06/01/2025

	Rates	Fringes
OPERATOR: POWER EQUIPMENT, GROUP 5 (HEAVY AND HIGHWAY CONSTRUCTION) BOBCATS (ALL); BRICK FORKLIFTS; OILERS; DIRECTIONAL BORING	$ 57.80	51.00
OPERATOR: POWER EQUIPMENT, GROUP 4 (HEAVY AND HIGHWAY CONSTRUCTION) AIR COMPRESSOR - SMALL 250 AND UNDER (1 TO 5 NOT TO EXCEED A TOTAL OF 300 FT); AIR COMPRESSOR - LARGE OVER 250; COMBINATION - SMALL EQUIPMENT OPERATOR; DIRECTIONAL BORING MACHINE; GENERATORS - SMALL 50 KW AND UNDER; GENERATORS - LARGE , OVER 50 KW; HEATERS, MECHANICAL; HYDRAULIC POWER UNIT (PILE DRIVING, EXTRACTING OR DRILLING); LIGHT PLANTS (1 TO 5); PUMPS, OVER 3"" (1 TO 3, NOT TO EXCEED A TOTAL OF 300 FT); PUMPS, WELL POINTS; TRACTAIRE; WELDING MACHINES (2 THROUGH 5); WINCHES, 4 SMALL ELECTRIC DRILL WINCHES;	$ 59.00	51.00
OPERATOR: POWER EQUIPMENT, GROUP 3 (HEAVY AND HIGHWAY CONSTRUCTION) BOILERS; BROOMS, ALL POWER PROPELLED; CEMENT SUPPLY TENDER; COMPRESSOR, COMMON RECEIVER (2); CONCRETE MIXER, TWO BAG AND OVER; CONVEYOR, PORTABLE; FARM TYPE TRACTORS USED FOR MOWING, SEEDING, ETC; FIREMAN ON BOILERS; FORKLIFT TRUCKS; GROUTING MACHINES; HOISTS, AUTOMATIC; HOISTS, ALL ELEVATORS; HOISTS, TUGGER SINGLE DRUM; JEEP DIGGERS; LOW BOYS; PIPE JACKING MACHINES; POST-HOLE DIGGER; POWER SAW, CONCRETE, POWER DRIVEN; PUG MILLS; ROLLERS, OTHER THAN ASPHALT; SEED AND STRAW BLOWER; STEAM GENERATORS; STUMP MACHINE; WINCH TRUCKS WITH A-FRAME; WORK BOATS; TAMPER-FORM MOTOR DRIVEN	$ 60.40	51.00
OPERATOR: POWER EQUIPMENT, GROUP 2 (HEAVY AND HIGHWAY CONSTRUCTION) BATCH PLANT*; BITUMINOUS MIXER; BOILER AND THROTTLE VALVE; BULLDOZER; CAR LOADER TRAILING CONVEYORS; COMBINATION BACKKHOE FRONT END LOADER MACHINE, (LESS THAN 1 CU YD BACKHOE BUCKET WITH ATTACHMENTS); COMPRESSOR AND THROTTLE VALVE; COMPRESSOR, COMMON RECEIVER (3); CONCRETE BREAKER OR HYDRO HAMMER; CONCRETE GRINDING MACHINE; CONCRETE MIXER OR PAVER 7S SERIES TO AND INCLUDING 27 CU FT; CONCRETE SPREADER; CONCRETE CURING MACHINE; BURLAP MACHINE; BELTING MACHINE AND SEALING MACHINE; CONCRETE WHEEL SAW; CONVEYOR MUCK CARS (HAGLUND OR SIMILAR TYPE); DRILLS (ALL); FINISHING MACHINE-CONCRETE; GREASER ENGINEER; HIGHLIFT SHOVELS OR FRONT END LOADER; HOIST- SEWER DRAGGING MACHINE; HYDRAULIC BOOM TRUCKS, ALL ATTACHMENTS; HYDRO-BLASTER (REQUIRES TWO OPERATORS); LASER SCREED*; LOCOMOTIVES, DINKY; OFF-ROAD HAULING UNITS (INCLUDING ARTICULATING); PUMP CRETES; SQUEEZE CRETES-SCREW TYPE PUMPS, GYPSUM BULKER AND PUMP; ROLLER ASPHALT; ROTARY SNOW PLOWS; ROTOTILLER, SEAMAN, SELF-PROPELLED; SCOOPS-TRACTOR DRAWN; SELF- PROPELLED COMPACTOR; SPREADER-CHIP-STONE; SCRAPER; SCRAPER-PRIME MOVER IN TANDEM REGARDLESS OF SIZE (ADD $1.00 TO GROUP 2 HOURLY RATE FOR EACH HOUR AND FOR EACH MACHINE ATTACHED THERETO ADD $1.00 TO GROUP 2 HOURLY RATE FOR EACH HOUR); TANK CAR HEATER; TRACTORS, PUSH, PULLING SHEEPS FOOT, DISC, OR COMPACTOR, ETC; TUG BOATS *REQUIRES OILER	$ 62.45	51.00
OPERATOR: POWER EQUIPMENT, GROUP 1 (HEAVY AND		

HIGHWAY CONSTRUCTION) ASPHALT PLANT*; ASPHALT HEATER AND PLANER COMBINATION; ASPHALT HEATER SCARFIRE*, ASPHALT SPREADER; AUTOGRADER/ GOMACO OR SIMILAR; ABG PAVER*, BACKHOES WITH CAISSON ATTACHMENT*, BALLAST REGULATOR, BELT LOADER*; CAISSON RIGS*CAR DUMPER, CENTRAL REDI-MIX PLANT*, COMBINATION BACKHOE; FRONT END LOADER MACHINE (1 CU YD OR OVER BACKHOE BUCKET OR WITH ATTACHMENTS); CONCRETE BREAKER (TRUCK MOUNTED); CONCRETE CONVEYOR; CONCRETE PAVER OVER 27E CU FT*; CONCRETE PLACER*; CONCRETE TUBE FLOAT; CRANES, ALL ATTACHMENTS*; CRANES, HAMMERHEAD, LINDEN, PECO AND MACHINES OF A LIKE NATURE*; CRETER CRANE; CRUSHER, STONE; ALL DERRICKS; DERRICK BOATS; DERRICKS, TRAVELING*; DOWELL MACHINE WITH AIR COMPRESSOR ($1.00 ABOVE CLASS 1); DREDGES*; FIELD MECHANIC WELDER; FORMLESS CURB AND GUTTER MACHINE*; GRADALL AND MACHINES OF A LIKE NATURE*; GRADER, ELEVATING; GRADER, MOTOR GRADER, MOTOR PATROL, AUTO PATROL, FORM GRADER, PULL GRADER, SUBGRADER; GUARD RAIL POST DRIVER MOUNTED*; HOISTS, ONE, TWO, AND THREE DRUM; HYDRAULIC BACKHOES*; BACKHOES WITH SHEAR ATTACHMENTS*; MUCKING MACHINE; PILE DRIVERS AND SKID RIG*; PRE-STRESS MACHINE; PUMP CRETES DUAL RAM (REQUIRES FREQUENT LUBRICATION AND WATER)*; ROCK DRILL- CRAWLER OR SKID RIG*; ROCK DRILL TRUCK MOUNTED*; ROCK/ TRACK TAMPER; ROTO MILL GRINDER, (36"" AND OVER)*; SLIP-FORM PAVER*; SOIL TEST DRILL RIG, TRUCK MOUNTED*; STRADDLE BUGGIES; HYDRAULIC TELESCOPING FORM (TUNNEL); TRACTOR DRAWN BELT LOADER*; TRACTOR DRAWN BELT LOADER WITH ATTACHED PUSHER (TWO ENGINEERS); TRACTOR WITH BOOM; TRACTAIRE WITH ATTACHMENT; TRAFFIC BARRIER TRANSFER MACHINE*; TRENCHING MACHINE; TRUCK MOUNTED CONCRETE PUMP WITH BOOM*; UNDERGROUND BORING AND/OR MINING MACHINES 5 FT IN DIAMETER AND OVER TUNNEL, ETC.*; WHEEL EXCAVATOR* & WIDENER (APSCO); RAISED OR BLIND HOE DRILL, TUNNEL & SHAFT* *REQUIRES OILER.....$ 63.00 51.00

IRON0001-026 06/01/2025

	Rates	Fringes
IRONWORKER: STRUCTURAL AND REINFORCING.....	$ 62.46	46.58
IRONWORKER: SHEETER.....	$ 62.71	46.58

IRON0063-001 06/01/2025

	Rates	Fringes
IRONWORKER: ORNAMENTAL.....	$ 59.26	44.81

IRON0063-002 06/01/2025

	Rates	Fringes
IRONWORKER (FENCE ERECTOR).....	$ 52.25	34.31

IRON0136-001 07/01/2025

	Rates	Fringes
IRONWORKER: MASTER RIGGERS.....	$ 56.75	47.38
IRONWORKER (MACHINERY MOVERS; RIGGERS; MACHINERY ERECTORS).....	$ 54.25	47.38

LABO0002-006 06/01/2025

	Rates	Fringes

LABORER, BUILDING & RESIDENTIAL: GROUP 12 DOSIMETER USE (ANY DEVICE) MONITORING NUCLEAR EXPOSURE); ASBESTOS ABATEMENT LABORER; TOXIC AND HAZARDOUS WASTE REMOVAL LABORERS.....$ 52.40 36.94

LABORER, BUILDING & RESIDENTIAL: GROUP 11 JACKHAMMERMEN ON FIRE BRICK WORK ONLY.....$ 51.68 36.94

LABORER, BUILDING & RESIDENTIAL: GROUP 10 BOILER SETTER PLASTIC LABORERS.....$ 51.85 36.94

LABORER, BUILDING & RESIDENTIAL: GROUP 9 CHIMNEY ON FIRE BRICK; CAISSON DIGGERS; & WELL POINT SYSTEM MEN.....$ 51.75 36.94

LABORER, BUILDING & RESIDENTIAL: GROUP 8 FIREBRICK & BOILER LABORERS.....$ 51.73 36.94

LABORER, BUILDING & RESIDENTIAL: GROUP 7 JACKHAMMERMEN; POWER DRIVEN CONCRETE SAWS; AND OTHER POWER TOOLS.....$ 51.63 36.94

LABORER, BUILDING & RESIDENTIAL: GROUP 6 STONE DERRICKMEN & HANDLERS.....$ 51.60 36.94

LABORER, BUILDING & RESIDENTIAL: GROUP 5 CEMENT GUN NOZZLE LABORERS (GUNITE); WINDLASS AND CAPSTAN PERSON.....$ 51.55 36.94

LABORER, BUILDING & RESIDENTIAL: GROUP 4 CHIMNEY OVER 40 FT.; SCAFFOLD LABORERS.....$ 51.50 36.94

LABORER, BUILDING & RESIDENTIAL: GROUP 3 CEMENT GUN.....$ 51.48 36.94

LABORER, BUILDING & RESIDENTIAL: GROUP 2 FIREPROOFING AND FIRE SHOP LABORERS.....$ 51.40 36.94

LABORER, BUILDING & RESIDENTIAL: GROUP 1 BUILDING LABORERS; PLASTERER TENDERS; PUMPS FOR DEWATERING; AND OTHER UNCLASSIFIED LABORERS.....$ 51.40 36.94

LABO0002-007 06/01/2025

	Rates	Fringes
LABORER, HEAVY & HIGHWAY: GROUP 5 ASBESTOS ABATEMENT LABORERS; TOXIC AND HAZARDOUS WASTE REMOVAL LABORERS, DOSIMETER (ANY DEVICE) MONITORING NUCLEAR EXPOSURE	$ 51.40	36.94
LABORER, HEAVY & HIGHWAY: GROUP 4 RAKERS, LUTEMEN; MACHINE-SCREWMEN; KETTLEMEN; MIXERMEN; DRUN-MEN; JACKHAMMERMEN (ASPHALT); PAINTMEN; MITRE BOX SPREADERS; LABORERS ON BIRCH, OVERMAN AND SIMILAR SPREADER EQUIPMENT; LABORERS ON APSCO; LABORERS ON AIR COMPRESSOR; PAVING FORM SETTER; JACKHAMMERMEN (CONCRETE); POWER DRIVE CONCRETE SAWS; OTHER POWER TOOLS	$ 51.68	36.94
LABORER, HEAVY & HIGHWAY: GROUP 3 CEMENT GUN NOZZLE (LABORERS), GUNITE	$ 51.55	36.94
LABORER, HEAVY & HIGHWAY: GROUP 2 ASPHALT TAMPERS & SMOOTHERS; CEMENT GUN LABORERS	$ 51.48	36.94
LABORER, HEAVY & HIGHWAY: GROUP 1 COMMON LABORER; TENDERS; MATERIAL EXPEDITOR (ASPHALT PLANT); STREET PAVING, GRADE SEPARATION, SIDEWALK, CURB & GUTTER, STRIPPERS & ALL LABORERS NOT OTHERWISE MENTIONED	$ 51.40	36.94

LABO0002-008 06/01/2025

	Rates	Fringes
LABORER, TUNNEL AND SEWER: GROUP 5 ASBESTOS ABATEMENT LABORER; TOXIC AND HAZARDOUS WASTE REMOVAL LABORER; DOSIMETER (ANY DEVICE) MONITORING NUCLEAR EXPOSURE LABORER CLASSIFICATIONS (SEWER)	$ 51.40	36.94
LABORER, TUNNEL AND SEWER: GROUP 4 AIR TRAC DRILL OPERATOR; MINER; BRICKLAYER TENDERS; CONCRETE BLOWER OPERATOR; DRILLERS; DYNAMITERS; ERECTOR		

OPERATOR; FORM MEN; JACKHAMMERMEN; POWERPAC; MINING
MACHINE OPERATORS; MUCKING MACHINE OPERATOR; LASER
BEAM OPERATOR; LINER PLATE AND RING SETTERS; SHIELD
DRIVERS; POWER KNIFE OPERATOR; WELDER- BURNERS;
PIPE JACKING MACHINE OPERATOR; SKINNERS;
MAINTENANCE TECHNICIAN.....$ 51.75 36.94
LABORER, TUNNEL AND SEWER: GROUP 3 CONCRETE
REPAIRMEN; LOCK TENDERS (PRESSURE SIDE); MORTAR
MEN; MUCKERS; GROUT MACHINE OPERATORS; TRACK LAYERS.$ 51.63 36.94
LABORER, TUNNEL AND SEWER: GROUP 2 AIR HOIST
OPERATOR; KEY BOARD OPERATOR; CONCRETE LABORER;
GROUT; LOCK TENDERS (FREE AIR SIDE); STEEL SETTERS;
TUGGERS; SWITCHMEN; CAR PUSHER.....$ 51.53 36.94
LABORER, TUNNEL AND SEWER: GROUP 1 CAGE TENDERS;
DUMPMEN; FLAGMEN; SIGNALMEN; TOP LABORERS.....$ 51.40 36.94
LABORER, COMPRESSED AIR: 34 - AND OVER.....$ 55.40 36.94
LABORER, COMPRESSED AIR: 27 - 33 POUNDS.....$ 54.40 36.94
LABORER, COMPRESSED AIR: 21 - 26 POUNDS.....$ 53.40 36.94
LABORER, COMPRESSED AIR: 16 - 20 POUNDS.....$ 52.90 36.94
LABORER, COMPRESSED AIR: 0 - 15 POUNDS.....$ 52.40 36.94

LABO0225-001 06/01/2025

	Rates	Fringes
LABORER, DEMOLITION/WRECKING: GROUP 3 ASBESTOS WORK WITH COMPLETE DEMOLITION/WRECKING OR STRIP OUT WORK.	$ 51.40	36.94
LABORER, DEMOLITION/WRECKING: GROUP 2 INTERIOR WRECKING AND STRIP OUT WORK	$ 51.40	36.94
LABORER, DEMOLITION/WRECKING: GROUP 1 COMPLETE DEMOLITION	$ 46.40	36.94

PAIN0014-001 06/01/2024

	Rates	Fringes
PAINTER (INCLUDING TAPER)	$ 53.05	33.91

PAIN0027-001 06/01/2024

	Rates	Fringes
GLAZIER	$ 51.55	44.09

PLAS0005-002 07/01/2015

	Rates	Fringes
PLASTERER	$ 42.25	26.65

PLAS0502-001 06/01/2025

	Rates	Fringes
CEMENT MASON/CONCRETE FINISHER	$ 53.10	43.80

PLUM0130-001 06/01/2025

	Rates	Fringes
PLUMBER	$ 60.50	39.02

PLUM0597-002 06/01/2023

	Rates	Fringes
PIPEFITTER	$ 55.00	38.62

ROOF0011-001 12/01/2024

	Rates	Fringes
ROOFER	$ 50.25	30.43

SFIL0281-001 07/01/2025

	Rates	Fringes
SPRINKLER FITTER	$ 63.25	36.50

SHEE0073-001 06/01/2022

	Rates	Fringes
SHEET METAL WORKER	$ 49.10	42.91

SHEE0073-002 06/08/2018

	Rates	Fringes
SHEET METAL WORKER (ALUMINUM GUTTER WORK)	$ 31.32	37.02

TEAM0731-001 06/01/2025

	Rates	Fringes
TRUCK DRIVER: 6 AXLES (COOK COUNTY - HEAVY AND HIGHWAY) FOOTNOTES: A. PAID HOLIDAYS: NEW YEAR'S DAY, MEMORIAL DAY, INDEPENDENCE DAY, LABOR DAY, THANKSGIVING DAY, AND CHRISTMAS DAY. B. 900 STRAIGHT TIME HOURS OR MORE IN 1 CALENDAR YEAR FOR THE SAME EMPLOYER SHALL RECEIVE 1 WEEK PAID VACATION; 3 YEARS - 2 WEEKS PAID VACATION; 10 YEARS - 3 WEEKS PAID VACATION; 20 YEARS - 4 WEEKS PAID VACATION. C. AN ADDITIONAL $.20 PER AXLE SHALL BE PAID FOR ALL VEHICLES WITH MORE THAN SIX (6) AXLES. LOW-BOY IS AN ADDITIONAL $1.50 PER HOUR HEALTH AND WELFARE: $448.80 PER WEEK PENSION: $562.80 PER WEEK	$ 46.20	30.27
TRUCK DRIVER: 5 AXLES (COOK COUNTY - HEAVY AND HIGHWAY) FOOTNOTES: A. PAID HOLIDAYS: NEW YEAR'S DAY, MEMORIAL DAY, INDEPENDENCE DAY, LABOR DAY, THANKSGIVING DAY, AND CHRISTMAS DAY. B. 900 STRAIGHT TIME HOURS OR MORE IN 1 CALENDAR YEAR FOR THE SAME EMPLOYER SHALL RECEIVE 1 WEEK PAID VACATION; 3 YEARS - 2 WEEKS PAID VACATION; 10 YEARS - 3 WEEKS PAID VACATION; 20 YEARS - 4 WEEKS PAID VACATION. C. AN ADDITIONAL $.20 PER AXLE SHALL BE PAID FOR ALL VEHICLES WITH MORE THAN SIX (6) AXLES. LOW-BOY IS AN ADDITIONAL $1.50 PER HOUR HEALTH AND WELFARE: $448.80 PER WEEK PENSION: $562.80 PER WEEK	$ 46.00	30.27
TRUCK DRIVER: 4 AXLES (COOK COUNTY - HEAVY AND HIGHWAY) FOOTNOTES: A. PAID HOLIDAYS: NEW YEAR'S DAY, MEMORIAL DAY, INDEPENDENCE DAY, LABOR DAY, THANKSGIVING DAY, AND CHRISTMAS DAY. B. 900 STRAIGHT TIME HOURS OR MORE IN 1 CALENDAR YEAR FOR THE SAME EMPLOYER SHALL RECEIVE 1 WEEK PAID VACATION; 3 YEARS - 2 WEEKS PAID VACATION; 10 YEARS - 3 WEEKS PAID VACATION; 20 YEARS - 4 WEEKS PAID VACATION. C. AN ADDITIONAL $.20 PER AXLE SHALL BE PAID FOR ALL VEHICLES WITH MORE THAN SIX (6) AXLES. LOW-BOY IS AN ADDITIONAL $1.50 PER HOUR HEALTH AND WELFARE: $448.80 PER WEEK PENSION: $562.80 PER WEEK	$ 45.80	30.27
TRUCK DRIVER: 2 OR 3 AXLES (COOK COUNTY - HEAVY AND HIGHWAY) FOOTNOTES: A. PAID HOLIDAYS: NEW YEAR'S DAY, MEMORIAL DAY, INDEPENDENCE DAY, LABOR DAY, THANKSGIVING DAY, AND CHRISTMAS DAY. B. 900 STRAIGHT TIME HOURS OR MORE IN 1 CALENDAR YEAR FOR THE SAME EMPLOYER SHALL RECEIVE 1 WEEK PAID VACATION; 3 YEARS - 2 WEEKS PAID VACATION; 10 YEARS		

- 3 WEEKS PAID VACATION; 20 YEARS - 4 WEEKS PAID VACATION. C. AN ADDITIONAL $.20 PER AXLE SHALL BE PAID FOR ALL VEHICLES WITH MORE THAN SIX (6) AXLES.
LOW-BOY IS AN ADDITIONAL $1.50 PER HOUR
HEALTH AND WELFARE: $448.80 PER WEEK PENSION:
$562.80 PER WEEK.....$ 45.55 30.27

TEAM0731-002 04/01/2025

	Rates	Fringes
TRAFFIC CONTROL DEVICE MONITOR (TRAFFIC SAFETY WORKER: PRIMARY DUTIES INCLUDE BUT ARE NOT LIMITED TO THE DELIVERY, MAINTENANCE AND PICK-UP OF TRAFFIC CONTROL DEVICES, THE SET-UP AND INSTALLATION OF TRAFFIC SIGNS, PAVEMENT MARKINGS, BARRICADES, CRASH BARRELS AND GLARE SCREENS, TRAFFIC CONTROL SURVEILLANCE, THE REPAIR AND MAINTENANCE TRUCKS, CARS, ARROW BOARDS, MESSAGE SIGNS, BARRICADE AND SIGN FABRICATION EQUIPMENT).....	$ 43.40	22.71

TEAM0786-001 06/01/2025

	Rates	Fringes
TRUCK DRIVER: 6 AXLES (COOK COUNTY - BUILDING AND RESIDENTIAL) FOOTNOTES: A. AN ADDITIONAL $.20 PER AXLE SHALL BE PAID FOR ALL VEHICLES WITH MORE THAN SIX (6) AXLES. LOW-BOY WORK CLASSIFICATION IS AN ADDITIONAL $1.50 PER HOUR. HEALTH AND WELFARE: $445.00 PER WEEK PENSION: $408 PER WEEK. B. 900 STRAIGHT TIME HOURS OR MORE IN 1 CALENDAR YEAR FOR THE SAME EMPLOYER SHALL RECEIVE 1 WEEK PAID VACATION; 3 YEARS - 2 WEEKS PAID VACATION; 10 YEARS - 3 WEEKS PAID VACATION; 20 YEARS - 4 WEEKS PAID VACATION. PAID HOLIDAYS: NEW YEAR'S DAY, MEMORIAL DAY, INDEPENDENCE DAY, LABOR DAY, THANKSGIVING DAY, AND CHRISTMAS DAY.....	$ 54.64	0.30
TRUCK DRIVER: 5 AXLES (COOK COUNTY - BUILDING AND RESIDENTIAL) FOOTNOTES: A. AN ADDITIONAL $.20 PER AXLE SHALL BE PAID FOR ALL VEHICLES WITH MORE THAN SIX (6) AXLES. LOW-BOY WORK CLASSIFICATION IS AN ADDITIONAL $1.50 PER HOUR. HEALTH AND WELFARE: $445.00 PER WEEK PENSION: $408 PER WEEK. B. 900 STRAIGHT TIME HOURS OR MORE IN 1 CALENDAR YEAR FOR THE SAME EMPLOYER SHALL RECEIVE 1 WEEK PAID VACATION; 3 YEARS - 2 WEEKS PAID VACATION; 10 YEARS - 3 WEEKS PAID VACATION; 20 YEARS - 4 WEEKS PAID VACATION. PAID HOLIDAYS: NEW YEAR'S DAY, MEMORIAL DAY, INDEPENDENCE DAY, LABOR DAY, THANKSGIVING DAY, AND CHRISTMAS DAY.....	$ 54.43	0.30
TRUCK DRIVER: 4 AXLES (COOK COUNTY - BUILDING AND RESIDENTIAL) FOOTNOTES: A. AN ADDITIONAL $.20 PER AXLE SHALL BE PAID FOR ALL VEHICLES WITH MORE THAN SIX (6) AXLES. LOW-BOY WORK CLASSIFICATION IS AN ADDITIONAL $1.50 PER HOUR. HEALTH AND WELFARE: $445.00 PER WEEK PENSION: $408 PER WEEK. B. 900 STRAIGHT TIME HOURS OR MORE IN 1 CALENDAR YEAR FOR THE SAME EMPLOYER SHALL RECEIVE 1 WEEK PAID VACATION; 3 YEARS - 2 WEEKS PAID VACATION; 10 YEARS - 3 WEEKS PAID VACATION; 20 YEARS - 4 WEEKS PAID VACATION. PAID HOLIDAYS: NEW YEAR'S DAY, MEMORIAL DAY, INDEPENDENCE DAY, LABOR DAY, THANKSGIVING DAY, AND CHRISTMAS DAY.....	$ 54.21	0.30

TRUCK DRIVER: 2 & 3 AXLES (COOK COUNTY - BUILDING AND RESIDENTIAL) FOOTNOTES: A. AN ADDITIONAL $.20 PER AXLE SHALL BE PAID FOR ALL VEHICLES WITH MORE THAN SIX (6) AXLES. LOW-BOY WORK CLASSIFICATION IS AN ADDITIONAL $1.50 PER HOUR. HEALTH AND WELFARE: $445.00 PER WEEK PENSION: $408 PER WEEK. B. 900 STRAIGHT TIME HOURS OR MORE IN 1 CALENDAR YEAR FOR THE SAME EMPLOYER SHALL RECEIVE 1 WEEK PAID VACATION; 3 YEARS - 2 WEEKS PAID VACATION; 10 YEARS - 3 WEEKS PAID VACATION; 20 YEARS - 4 WEEKS PAID VACATION. PAID HOLIDAYS: NEW YEAR'S DAY, MEMORIAL DAY, INDEPENDENCE DAY, LABOR DAY, THANKSGIVING DAY, AND CHRISTMAS DAY.....$ 53.95 0.30

WELDERS - Receive rate prescribed for craft performing operation to which welding is incidental.

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Note: Executive Order (EO) 13706, Establishing Paid Sick Leave for Federal Contractors applies to all contracts subject to the Davis-Bacon Act for which the contract is awarded (and any solicitation was issued) on or after January 1, 2017. If this contract is covered by the EO, the contractor must provide employees with 1 hour of paid sick leave for every 30 hours they work, up to 56 hours of paid sick leave each year. Employees must be permitted to use paid sick leave for their own illness, injury or other health-related needs, including preventive care; to assist a family member (or person who is like family to the employee) who is ill, injured, or has other health-related needs, including preventive care; or for reasons resulting from, or to assist a family member (or person who is like family to the employee) who is a victim of, domestic violence, sexual assault, or stalking. Additional information on contractor requirements and worker protections under the EO is available at https://www.dol.gov/agencies/whd/government-contracts.

Note: Executive Order 13658 generally applies to contracts subject to the Davis-Bacon Act that were awarded on or between January 1, 2015 and January 29, 2022, and that have not been renewed or extended on or after January 30, 2022. Executive Order 13658 does not apply to contracts subject only to the Davis-Bacon Related Acts regardless of when they were awarded. If a contract is subject to Executive Order 13658, the contractor must pay all covered workers at least $13.65 per hour (or the applicable wage rate listed on this wage determination, if it is higher) for all hours spent performing on the contract from May 11, 2026, through December 31, 2026. The applicable Executive Order minimum wage rate will be adjusted annually. Additional information on contractor requirements and worker protections under Executive Order 13658 is available at www.dol.gov/whd/govcontracts.

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

The body of each wage determination lists the classifications and wage rates that have been found to be prevailing for the type(s) of construction and geographic area covered by the wage determination. The classifications are listed in alphabetical order under rate identifiers indicating whether the particular rate is a union rate (current union negotiated rate), a survey rate, a weighted union average rate, a state adopted rate, or a

supplemental classification rate.

Union Rate Identifiers

A four-letter identifier beginning with characters other than
SU, UAVG, SA, or SC denotes that a union rate was
prevailing for that classification in the survey. Example:
PLUM0198-005 07/01/2024. PLUM is an identifier of the union
whose collectively bargained rate prevailed in the survey for
this classification, which in this example would be Plumbers.
0198 indicates the local union number or district council
number where applicable, i.e., Plumbers Local 0198. The next
number, 005 in the example, is an internal number used in
processing the wage determination. The date, 07/01/2024 in the
example, is the effective date of the most current negotiated
rate.

Union prevailing wage rates are updated to reflect all changes
over time that are reported to WHD in the rates
in the collective bargaining agreement (CBA) governing the
classification.

Union Average Rate Identifiers

The UAVG identifier indicates that no single rate prevailed for
those classifications, but that 100% of the data reported for
the classifications reflected union rates. EXAMPLE:
UAVG-OH-0010 01/01/2024. UAVG indicates that the rate is a
weighted union average rate. OH indicates the State of Ohio.
The next number, 0010 in the example, is an internal number
used in producing the wage determination. The date, 01/01/2024
in the example, indicates the date the wage determination was
updated to reflect the most current union average rate.

A UAVG rate will be updated once a year, usually in January, to
reflect a weighted average of the current rates in the
collective bargaining agreements on which the rate is based.

Survey Rate Identifiers

The SU identifier indicates that either a single non-union
rate prevailed (as defined in 29 CFR 1.2) for this
classification in the survey or that the rate was derived by
computing a weighted average rate based on all the rates
reported in the survey for that classification. As a weighted
average rate includes all rates reported in the survey, it may
include both union and non-union rates. Example: SUFL2022-007
6/27/2024. SU indicates the rate is a single non-union
prevailing rate or a weighted average of survey data for that
classification. FL indicates the State of Florida. 2022 is the
year of the survey on which these classifications and rates are
based. The next number, 007 in the example, is an internal
number used in producing the wage determination. The date,
6/27/2024 in the example, indicates the survey completion date
for the classifications and rates under that identifier.

SU wage rates typically remain in effect until a new survey
is conducted. However, the Wage and Hour Division (WHD) has the
discretion to update such rates under 29 CFR 1.6(c)(1).

State Adopted Rate Identifiers

The SA identifier indicates that the classifications and
prevailing wage rates set by a state (or local) government were
adopted under 29 C.F.R 1.3(g)-(h). Example: SAME2023-007

01/03/2024. SA reflects that the rates are state adopted. ME refers to the State of Maine. 2023 is the year during which the state completed the survey on which the listed classifications and rates are based. The next number, 007 in the example, is an internal number used in producing the wage determination. The date, 01/03/2024 in the example, reflects the date on which the classifications and rates under the ◆SA◆ identifier took effect under state law in the state from which the rates were adopted.

WAGE DETERMINATION APPEALS PROCESS

1) Has there been an initial decision in the matter? This can be:

a) a survey underlying a wage determination
b) an existing published wage determination
c) an initial WHD letter setting forth a position on a wage determination matter
d) an initial conformance (additional classification and rate) determination

On survey related matters, initial contact, including requests for summaries of surveys, should be directed to the WHD Branch of Wage Surveys. Requests can be submitted via email to davisbaconinfo@dol.gov or by mail to:

Branch of Wage Surveys
Wage and Hour Division
U.S. Department of Labor
200 Constitution Avenue, N.W.
Washington, DC 20210

Regarding any other wage determination matter such as conformance decisions, requests for initial decisions should be directed to the WHD Branch of Construction Wage Determinations. Requests can be submitted via email to BCWD-Office@dol.gov or by mail to:

Branch of Construction Wage Determinations
Wage and Hour Division
U.S. Department of Labor
200 Constitution Avenue, N.W.
Washington, DC 20210

2) If an initial decision has been issued, then any interested party (those affected by the action) that disagrees with the decision can request review and reconsideration from the Wage and Hour Administrator (See 29 CFR Part 1.8 and 29 CFR Part 7). Requests for review and reconsideration can be submitted via email to dba.reconsideration@dol.gov or by mail to:

Wage and Hour Administrator
U.S. Department of Labor
200 Constitution Avenue, N.W.
Washington, DC 20210

The request should be accompanied by a full statement of the interested party's position and any information (wage payment data, project description, area practice material, etc.) that the requestor considers relevant to the issue.

3) If the decision of the Administrator is not favorable, an interested party may appeal directly to the Administrative Review Board (formerly the Wage Appeals Board). Write to:

Administrative Review Board
U.S. Department of Labor
200 Constitution Avenue, N.W.
Washington, DC 20210.

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END OF GENERAL DECISION

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PART 8

TECHNICAL SPECIFICATIONS

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SECTION 010100 - SUMMARY OF WORK & ADMINISTRATIVE PROCEDURES

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

A. Detailed Individual Residence Work Scopes and General Provisions of Contract, including General and Supplementary Conditions and other Specification Sections, apply to this Section.

1.2 PROJECT DESCRIPTION

A. The Project consists of alterations and modifications to existing, privately owned and occupied residences of various types and sizes as shown on the Contract Documents prepared by the Engineer. The Dwellings to be modified, with their file #'s, addresses, and parcel numbers are located in Volume 2. A Location Map is provided in Volume 2 of the Contract Documents, showing the location of each dwelling included in this Contract.

The overall objective of the Residential Sound Insulation Program is to achieve quantitative noise reductions in selected dwellings most affected by the aircraft operations. Toward this end, the program provides for the improvement of openings in the exterior envelope using known technology and quality workmanship. It is anticipated that proposed improvements to be undertaken by the current program will result in a total benefit to the Homeowner.

B. The work consists of alteration and modification treatments to each dwelling to achieve interior protection against aircraft noise intrusion. This includes, but is not limited to; replacement of existing windows and doors, door weather-stripping, mechanical and electrical modifications, and related items required as part of the Work. Scope of Work on each dwelling will vary based on sound exposure levels, existing building conditions, and Homeowner requests, among other design criteria.

1. The Work includes minor removal/demolition and installation of acoustical windows, acoustical doors, door frames, storm doors, hardware, glazing, interior wall/ceiling treatments, architectural woodwork (including finishes), heating-ventilating-air conditioning system modifications and electrical system modifications may be required in certain dwellings.
2. Asbestos removal may be required in certain dwellings.
3. Lead paint removal may be required in certain dwellings.
4. Mold remediation may be required in certain dwellings.

A list of properties to receive alteration and modification treatments included as part of this contract can be found in the Table of Contents contained in Volume 2 of this contract.

1.3 WORK UNDER OTHER CONTRACTS (OR PROVIDED SEPARATELY)

A. The Contractor or any of his/her subcontractors will not perform any supplementary work on the dwelling outside the scope of the Airport's Contract while the sound insulation modifications are in progress until the Airport's Contract has been fulfilled and final approval given on the Work performed for this Project. Neither the Contractor, nor his/her Subcontractors, shall enter into any verbal or written agreement to perform any services or work for the Homeowner(s) which are not part of the Contract Documents, until sound

insulation modifications have been completed and accepted by the Engineer. Routine repair and maintenance activities by the Homeowner shall not be restricted, but the Homeowner must inform the Contractor of any routine work, which may affect the noise mitigation construction work.

1.4 MATERIAL WAREHOUSING

A. Contractor shall establish a materials storage warehouse of sufficient size and in reasonable proximity to the project work, as acceptable to Engineer. Contractor shall establish a stanchion in said warehouse for each individual dwelling. Stanchions shall be clearly labeled to identify individual dwelling and all windows, prime doors and storm doors for the subject dwelling shall be stored in the stanchion prior to commencement of any work at the dwelling.

B. Contractor shall make warehouse available for Engineer's review as required for Engineer to verify the presence of necessary materials in advance of commencement of construction at each individual dwelling. Contractor must provide material for **12 dwellings** prior to Engineer issuing Notice to Proceed/Construction. Contractor shall participate in material inspections and provide labor as necessary for Engineer to verify stored materials.

C. Individual dwelling starts (commencement of construction) will only be scheduled by Engineer upon verification that all prime doors, storm doors, and windows for said dwelling are available and stored at the warehouse. Dwelling starts will be scheduled **fourteen (14) calendar** days from Engineer's verification of available stored materials. Engineer will utilize Contractor's schedule for purpose of scheduling warehouse inspections and material storage verifications. Should the delivery of window and door product not accommodate the accepted construction schedule, the Contractor will be responsible for submitting a revised construction schedule.

1.5 WORK SEQUENCE

A. The entity whose bid has been accepted will be required to furnish all bonds, insurance, and other information and documents as required by Contract Documents to allow Authority to execute the Contract, within **ten (10) calendar** days from the date of Contractor receipt of notice to that effect. Failure of the successful Bidder to furnish the required bonds, insurance, and other required documents within the ten **(10) calendar** day period shall be just cause for cancellation of the award and forfeiture of the proposal guaranty (bid bond), not as a penalty, but as liquidated damages to the Authority.

B. Refer to the General Conditions and Supplemental General Conditions for criteria governing the "Notice to Proceed".

C. Contractor shall submit to Engineer electronic copies of product data for doors, windows, major furnaces, air conditioning, electrical components and components from supporting specification sections used support the Work of the project within **fourteen (14) calendar** days from receipt of The Preliminary Notice-to-Proceed (PNTP).

D. Once all major products are approved, the Engineer will schedule a Measurement Walk-Through with Contractor and Homeowners for each dwelling identified to receive alterations

or modifications to allow Contractor to take and record necessary dimensions, identify and record physical features, and to develop detailed electrical and mechanical system installation approach. The Engineer shall provide notice to each Homeowner at least **fourteen (14) calenda**r days prior to appointment. Eight Measurement Walk-Throughs will be scheduled per Work Day, between the hours of 8:00 am and 5:00 p.m. Approximately, **one (1) hour** will be allocated for each individual dwelling Measurement Walk-Through. Prime window manufacturer representative shall be required to accompany Contractor during Measurement Walk-Throughs, and to participate in window measurement.

E. Based upon Measurement Walk-Throughs, Contractor shall prepare, submit, and gain approval of Shop Drawings and other submittals, as necessary to release material orders, and acquire necessary materials to commence physical construction.

F. Based upon Contractor's approved schedule the Engineer shall provide notice to each Homeowner a minimum of **fourteen (14) calendar days** prior to the actual on-site construction start of each respective dwelling. Engineer shall confirm by telephone with Homeowners, no less than 48 hours in advance of the commencement of work.

G. Based upon Contractor's approved construction schedule, Engineer in close coordination with Contractor, will schedule and jointly conduct with a Contractor representative a Pre-Construction Walk-Through. Pre-Construction Walk-Throughs shall be conducted within 48 to 96 hours in advance of any physical construction for each dwelling unit in the Contract to verify all Homeowner pre-construction work and responsibilities have been met. Should Homeowner issues be identified by Engineer, which would preclude commencement of work at given dwelling unit, Engineer will provide written notice to Contractor requiring work at said dwelling be put on hold until resolution of the noted issues. Under such circumstances, Engineer will notify Contractor in writing when issues have been resolved and Contractor may reschedule dwelling work.

H. There shall be a minimum of one (1) non-working Superintendent per contract concurrently under construction, including other Sound Insulation Contracts, which Contractor may have with the Authority. Superintendents shall be designated in writing to Engineer.

I. Upon commencement of on-site physical construction at each individual dwelling, Contractor shall work continuously on said dwelling without interruption of the Work, until Final Acceptance is granted by the Engineer, including completion of all punchlist work.

1. Contract work shall be completed and final acceptance granted for each individual dwelling within **six (6) Working Days** of the scheduled and accepted commencement of construction date for the said dwelling.
2. A work day is defined as any weekday, Monday through Friday, except Holidays, from 8:00am to 5:00pm.

J. At the Contractors written request. Engineer will schedule final inspections for the construction work:

1. If all work is completed and acceptable, Contractor will receive written final acceptance from the Engineer. If work remains incomplete, Contractor will receive a handwritten list

of punchlist items at completion of said inspection. Contractor shall immediately resume work on the residence until all punchlist items have been completed. Upon receipt of notification, Engineer will schedule an inspection for the purpose of verifying completion of the work within twenty-four **(24) hours**, or on the next available working day.

2. Contractor shall provide an itemized list of contingency item quantities (if applicable) incorporated into each individual dwelling at Final Inspections.
3. In the event that re-order of a long lead time item (i.e. window, door, etc.) is required, through no fault of the Contractor, to complete the punchlist, the Engineer, at their discretion, may extend the allotted Working Day completion time in writing, as appropriate, to allow for delivery and installation of the material. Suspension of time charged against the Contractor will not take effect until completion of work on all other punchlist items. Upon completion of all other punchlist items, time charged against the Contractor will be suspended until the date stated in the written extension. Time will continue to be charged against the Contractor on the date stated in the written extension.

K. Final acceptance, as utilized for assessment of Contract Time for completion of individual dwellings, shall mean that all work at the subject dwelling has been completed, including punchlist work.

L. Contractor will not be permitted to and shall not have more than **eight (8) individual dwellings** simultaneously under physical construction at any given period of this Contract. Limit number of starts per week to a maximum of **four (4) dwellings**. Variances to this requirement may be granted after a written request for such a variance is made by Contractor and approved by Owner.

M. In accordance with General Requirements and Covenants, Contractor shall complete all Work of this Contract, and obtain Final Acceptance from Engineer within: - **Two Hundred and Fifty (250) Calendar Days** from effective date of written Preliminary Notice-to-Proceed (P/NTP).

N. Contractor shall keep the Engineer informed of work schedule, and progress of the work at each individual dwelling. The Engineer shall be notified of any interruptions, however brief, in the construction schedule, in order to coordinate with and minimize inconvenience to the Homeowner.

O. Contractor shall assume and consider in development of their bid prices that a moderate level of schedule modification and adjustment will be required throughout the term of this contract to accommodate Homeowner coordination, availability, Homeowner completion of necessary pre-work and special circumstances. Such necessary adjustments as requested by Engineer shall not constitute altered work scope, nor constitute grounds for additional Contractor compensation.

P. Contractor shall consider Contract Completion Requirements as specified in Section 80-03 Prosecution and Progress, in developing their bid and selecting material suppliers and vendors. Contractor shall select suppliers and vendors who will allow Contractor to complete Contract Work within specified completion requirements. Supplier and vendor delays or inability to meet Contract required delivery dates will not serve as cause or justify extension of Contract completion requirements.

Q. Holidays: Unless otherwise approved by the Engineer and Homeowner no work will be allowed to progress on Memorial Day, Fourth of July and Labor Day. In addition no work will be allowed on Thanksgiving Day or the Friday after Thanksgiving Day and no work will be allowed from December 18 to the following January 2 in observance of the Christmas/New Year Holidays. The contractor is advised to make allowances for these Holiday periods in his construction schedule. Work must be scheduled so that no work remains incomplete at a dwelling during the Christmas/New Year holiday period referenced above. No adjustments to the over all contract completion time limit will be made for Holiday work shut downs. In regards to the time limit for completion of all work at a particular residence, no working days will be assessed during a Holiday work shut down.

1.6 SUPERINTENDENT / SUPERVISION

A. Provide and bear associated expenses for a full-time superintendent. Superintendent shall be competent and responsible employee, satisfactory to the Engineer, who is regularly employed by the Contractor and designated representative at project site throughout progress of work having the authority to make project decisions. Superintendent is responsible for coordinating work of Contractor.

B. Contractor shall coordinate with prime window manufacturer to have a manufacturer's representative on site for a minimum of **three (3) working days** to assist and/or instruct Contractor's workers on proper installation procedures for acoustical window products. The costs for providing the manufacturer's representative shall be included in the Contractor's bid.

1.7 CONFLICT OF INTEREST

A. To maintain integrity of schedule and keep lines of responsibility defined, Contractor agrees not to enter into any Contract, verbal or written, with Homeowners involving dwellings covered by this Contract. This Contract provision shall remain until final approval is given on the Work performed for the overall Project.

1.8 LIQUIDATED DAMAGES

A. Liquidated damages will be assessed in accordance with the General Conditions in the amount of **five hundred dollars ($500.00) per Calendar Day** for each Calendar Day beyond the stipulated Contract Time Limit as stated in the Preliminary Notice to Proceed for completion of all work for which any Work of the Contract remains uncompleted, including punchlist work.

B. Contractor is allotted **six (6) Working Days** for contract work from commencement of scheduled physical construction of each individual dwelling, to complete all Work at said dwelling including punchlist work, and to obtain Engineer acceptance. Liquidated damages will be assessed in accordance with General Conditions in the amount of **five hundred dollars ($500.00) per Working Day** for each Work Day beyond the specified Work Day completion period that work at an individual dwelling remains uncompleted, including punchlist work. The subject liquidated damages apply to each individual dwelling. (i.e. should five (5) dwellings be simultaneously uncompleted beyond nine (9) Work Days for General Contract, liquidated damages would be assessed at two hundred fifty dollars ($250.00) per Work Day per dwelling,

resulting in a total daily assessment of one thousand two hundred fifty dollars ($1,250.00) per Work Day.

1.9 REPAIRING OR REPLACING EXISTING WORK

A. Existing work that is damaged or removed by work done under this Contract, including interior and exterior finishes, trim, fixtures, and furnishings, shall be repaired or replaced with identical or approved equivalent to match existing adjacent work in all respects. Damage to driveways, public roads, other paved or improved areas, fences, lawn areas, trees, shrubbery, poles, underground utilities, etc., shall be restored to original condition by Contractor at his own expense, to satisfaction of the Engineer.

1.10 APPLICATION OF MISCELLANEOUS ALLOWABLE FUNDS

A. The application of the Miscellaneous Allowable Funds will vary from dwelling-to-dwelling including both type and quantity of modifications and installations. All dwellings included in the Contract will receive window and door modifications. Application of electrical, mechanical, insulation, baffles, and other installations are dependent on specific dwelling sound insulation treatment needs. Contractor shall consider the variability of the application of the Miscellaneous Allowable Funds when preparing their bid. Unforeseen conditions may vary from dwelling-to-dwelling and shall not automatically constitute alterations of intended Contract work justification and approval for additional compensation. Any Miscellaneous Allowable Funds not allocated for use during the contract period shall be deducted in a form of a credit to the Authority at Project Closeout.

1.11 SUBSTITUTIONS

A. Should the Contractor, after award of Contract, wish to use any products, materials and/or Subcontractors other than those previously submitted and approved, he shall request written permission of the Engineer. Requests for approval must name and adequately describe proposed substitutions, include shop drawings, and test certifications. Engineer will consider all aspects of proposed substitution and advise Contractor in writing of approval or rejection. Engineer records approved substitutions.

1.12 DEBRIS AND SURPLUS MATERIAL

A. Debris, waste material, scrap, or salvageable material generated by construction unsuitable for re-use must be legally removed on a daily basis, except materials retained by Homeowner. Coordinate with Homeowner to identify materials retained by Homeowner. Materials that are capable of being recycled shall be. Debris may not accumulate and work areas must be kept clean at all times. Clean areas of work to vacuum clean condition at end of each day. Keep areas of work and circulation clean, facilitating minimal disruption to occupants. Failure to provide satisfactory cleaning may result in Engineer directing others to clean up at Contractor’s expense. The Contractor is required to provide temporary floor coverings to protect premises during construction by means of fabric drop cloths.

1.13 PROTECTION

A. Protection of work shall be continuously maintained to protect adjacent property and improvements from accidents, injury, or damages. Properly protect work with lights, guard rails, temporary covers, and barricades. Brace and secure work against storm or accident and provide additional forms of protection as necessary. Permission must be obtained from Engineer in writing prior to leaving any opening with temporary cover overnight or during inclement weather. Without Engineer's permission, openings must be filled with new materials of construction prior to leaving project each day.

B. Protective measures to protect public from hazards resulting from contract work and exclude unauthorized persons from work, shall be provided and maintained in good repair. When regulated by local building code or other authority, such requirements for protection shall be considered as minimum requirements and Contractor is responsible for their protection as may be required by public safety laws.

C. Buildings and premises are now occupied. Work shall be done with as little inconvenience as reasonably possible and without danger to people occupying premises and permanent structures within project area. Special care must be exercised in use of machinery to avoid danger or nuisance. Provide, install, and maintain temporary protection, with tarps, pads, drop cloths, covers, or other appropriate items to minimize damage to premises or its contents.

D. Special measures to protect occupants from noise, dust, and other disturbances:

1. Keep common circulation areas clean and unobstructed.
2. Isolate work areas from occupied portions of residence as much as possible.
3. Seal dust and fumes from contaminating adjacent or occupied spaces.
4. Perform daily cleaning and protection in accordance with this and other sections.

1.14 WATER, ELECTRICITY AND SANITARY FACILITIES

A. Provide potable water, sanitary facilities, and electricity as may be required by Contractor or subcontractors during progress of work, in a manner acceptable to Engineer and respective property Owners.

1.15 CONTRACTOR USE OF PREMISES

A. Limit use of the premises to construction activities areas; allow for Homeowner occupancy.

1. All work at the site, or storage of materials thereon, shall be performed Monday through Friday of each week, between the hours of 8:00 a.m. and 5:00 p.m. only, excluding holidays.
2. Confine operations to areas within limits as established with the Homeowner and the Engineer at the start-up of each on-site work phase. The Contractor shall confine the Work to the actual work areas and access routes on the Homeowner's property. Interior and exterior circulation areas shall be kept free of debris, construction materials, etc. at all times to allow for clear and safe access and egress.
3. Keep driveways and entrances serving the premises clear and available to the Homeowner. Do not use these areas for parking or storage of materials. Schedule

deliveries to minimize space and time requirements for storage of materials and equipment.

B. Use of the Existing Residence: Maintain the existing dwelling in a weather tight condition throughout the construction period. Repair damage caused by construction operations. Take all precautions necessary to protect the building and its occupants during the construction period.

1. Each Homeowner has agreed to provide access into their Dwelling to the Contractor in accordance with Section 1.15.1. Such access to the Dwelling will be at reasonable times and by appointment with the Homeowner. The Contractor will only enter the Dwelling with the Homeowner's express consent. Each Homeowner has also agreed that they, themselves, or another responsible adult will be present at all times when the Contractors are in the residence.
2. Each Homeowner has also agreed to perform any and all preparatory work necessary to prepare the Dwelling for construction, such as removing all draperies, blinds, or shades and associated hardware and dressings, moving furniture, and protecting valuables. This includes covering all furniture, appliances, and electronic equipment such as televisions, entertainment systems, or computers to protect them from dust or debris. The Contractor must understand that some Homeowners will be unable to, or will not know how to, adequately move or protect all items, including furniture, and allowances must be made by the Contractor and its Subcontractors for these eventualities. The Contractor will also alert the Homeowner of special construction activities involving dust and/or vibrations, etc. and make suggestions to the Homeowner as to methods for protection.
3. The Contractor is responsible for moving furniture, or other items which Homeowners can not or did not move, that may impede the progress of construction. For the purpose of preparing this bid, Contractor shall estimate **ten (10) man-hours of labor**. No direct payment will be made for this work. Contractor shall include the cost of this work in the various pay items involved. No compensation will be made for man-hours used over the above estimate, and no contract deduction will be requested for unused man-hours.
4. Contractor to provide and maintain toilet facilities for work crews and subcontractors. Method of providing sanitary facilities shall be acceptable to the Engineer and respective property Owners. Contractor’s use of Homeowner’s toilet room is strictly prohibited.
5. The Contractor and his/her Subcontractors shall provide his/her own necessary connections and shall remove same at the end of completion of the Work each day.
6. The Contractor shall designate and maintain a "room of refuge" for the Homeowner. This room shall be weather tight and free of any construction materials, debris, or equipment for the duration of the project. The "room of refuge" location may change during the course of construction to accommodate the Contractor's schedule and progress.
7. All existing exposed floors in the work area and the passageway to the work area shall be covered with fabric drop cloths during construction. Adjacent rooms and/or areas shall be kept dust free utilizing polyethylene barriers. All existing finishes, facilities, and furnishings shall be protected and/or covered during construction.
8. At the end of each work day, the Contractor and his/her Subcontractors shall clean up the general area in which work was completed, including all unused materials, tools, debris, barriers, etc. Areas shall be left "vacuum clean". The dwelling must be left in a safe, clean, habitable condition each night with all Homeowner utilities reconnected and serviceable.

9. In some cases, removal, relocation, and reinstallation of heating and cooling system components will occur during cold/hot months. The Contractor shall be aware that altered systems must be reinstalled and operable at the end of each workday, providing non-interrupted heating/cooling and hot water to the Homeowner for the project duration. Subsequently, it may be necessary for the Contractor to drain and recharge a system or provide temporary cool more than once to complete the modifications, while providing the Homeowner use of their heating system during the construction period. The Contractor shall consider and include this aspect as a basic Contract requirement.
10. Storage on the Homeowner's property is not permitted. Off-site storage of materials or equipment for the Work shall be at the Contractor's risk and expense.
11. Contractor is prohibited from playing radios, personal listening devices, etc., smoking or creating nuisances to the Homeowner or neighboring properties. Any employee violating this provision may be discharged and not employed on-site for the duration of this contract.
12. The Contractor shall take special measurements to protect product, integrity of installations, and tenants from winter building conditions. All exposed openings not in progress of work are to be protected with 6 mil polyethylene vapor barriers to prevent excessive heat loss and secured against inclement weather.

1.16 HOMEOWNER OCCUPANCY

A. Full Homeowner Occupancy: The Homeowners will each continue to occupy their residences during the entire construction period. The Contractor and his/her Subcontractors shall cooperate with the Homeowners during construction operations to perform the Work with minimal conflicts and inconvenience and to facilitate Homeowner usage of the residence.

1.17 WINTER/SUMMER PROTOCOLS

A. Contract shall make every attempt to accommodate the Homeowner when scheduling work under these winter/summer conditions.

B. Contractors must identify, investigate, and resolve all issues prior to the first day of work. Those circumstances noted during the pre-walk must be addressed and factored into the work schedule.

C. HVAC installations, where specified, shall not be replaced on the same day that window installations begin.

D. During window and door installation, all attempts will be made to ensure completion of the work started. If a window or door can not be replaced by the end of the workday, the opening must be boarded, sealed with caulk to the satisfaction of the Engineer and the unit replaced the next day. No window or door will be left exposed overnight.

E. HVAC work will not be started after 12:00 noon, if at all possible. All attempts must be made to ensure that the work will be completed by the end of the workday (8:00 a.m. to 5:00 p.m.).

F. HVAC will not be left non-operational overnight (in accordance with Section 1.15.B.9). The old furnace must be reassembled and in working condition if the new system can not be installed by the end of the workday.

G. When work is completed for the day, the site must be clean and comfortable for the Homeowner, regardless of the status of the installation.

H. A 24-hour emergency response team must be available to address all issues that may arise throughout the warranty phase of this Contract. For Contractor(s) that are not local, a written plan with local representative(s) and contact information must be submitted for the following program components General, HVAC and Electrical.

I. If HVAC system is inoperable at the end of the workday, the Contractor must provide shelter (hotel) or temporary heating/cooling acceptable to the Homeowner, until the system is fully operational and accepted by the Engineer.

J. If window installation is disrupted, the Contractor is responsible for the security of the residence.

K. Each Contractor must provide in writing, an active safety program to be implemented by crews under their supervision.

The above items represent work that shall be anticipated by the contractor. Work described in this section shall be considered incidental work and shall not be justification for additional payment to the Contractor.

1.18 MISCELLANEOUS PROVISIONS

A. The Homeowners shall be given first right to claim salvage incurred through removal of windows, doors, mechanical system HVAC equipment, wall and window air-conditioning units, whole-house attic fans or similar items from the dwellings. Care shall be taken, as is practical, to maintain the condition of these salvage items until the Homeowner either claims them or rejects them. All salvageable materials not claimed by the Homeowners upon completion of Work shall be removed from the premises, recycled or disposed of by the Contractor and/or his/her Subcontractors.

B. In dwellings with an existing security system affected by the Work under this Contract, the Homeowner shall be responsible for any required relocation, adjustment, etc., or any other Work required on the security system to accommodate the new construction. The Contractor shall be responsible for coordination with the Homeowner and his/her subcontractors for all security system work to be completed.

C. Contractor must register employees present at job sites and submit names of personnel to Engineer, who, in turn, shall submit names to the Authority. The Engineer shall ensure proper identification is provided and visible for each of the Contractor’s employees at all times while working on this project. Violation of requirement will result in removal of employee from project.

D. All workers shall have sufficient skill and experience to perform properly the work assigned to them. Workers engaged in special work or skilled work shall have sufficient experience in such work and in the operation of the equipment required to perform the work satisfactorily.

E. Any person employed by the Contractor or by any Subcontractor who, in the opinion of the Engineer, does not perform his work in a proper and skillful manner or is intemperate or disorderly shall, at the written request of the Engineer, be removed forthwith by the Contractor or Subcontractor employing such person, and shall not be employed again in any portion of the work without the approval of the Engineer.

F. Should the Contractor fail to remove such person or persons or fail to furnish suitable and sufficient personnel for the proper prosecution of the work, the Engineer may suspend the work by written notice until compliance with such orders.

PART 2 - PRODUCTS (Not Applicable)

PART 3 - EXECUTION (Not Applicable)

END OF SECTION 010100

SECTION 010270 - APPLICATION FOR PAYMENT

PART 1 – GENERAL

1.1 RELATED DOCUMENTS

A. Drawings and general provisions of Contract, and other Specification Sections, apply to this Section.

1.2 SUMMARY

A. This Section specifies administrative and procedural requirements governing the Contractor's Applications for Payment.

1.3 SCHEDULE OF VALUES (FOR LUMP SUM BID ITEMS)

A. For Contracts where a Lump Sum Price is bid for each home submit a detailed Schedule of Values for each home as follows:

1. Required Bid Lump Sum Cost Breakdown Categories Per home:

a. Pre-Construction Costs

(1) Bonding, insurance and administrative costs.

b. Pre-Construction Work

(1) Measurements, shop drawings, submittals and other related items.

c. Windows

(1) Materials, including window units, storm windows, any framing (if required), and trim materials, weatherstripping and finishes.
(2) Labor, including window and storm window demolition, removal, installation, repair and adjustment of the opening, all trim and finishing.

d. Doors

(1) Materials, including doors and frames (if required), storm doors, weatherstripping, trim and finishes.
(2) Labor, including door and storm door demolition, removal, installation, repair and adjustment of the opening, all trim and finishing.

e. Wall/Ceiling/Floor modifications

(1) Materials, including all gypsum board and other drywall materials, all insulation materials, all associated mounting, building fastening or attachment hardware and framing, all trim and finish materials not already included under window and door costs.

(2) Labor, including all mounting, building, attaching, and finishing of new wall and ceiling modifications, all demolition, removal, repair and patching of existing wall and ceiling areas not already included under window and door costs, all duct enclosure work, installation of all attic, wall, crawlspace and basement insulation, all attic louver, vent and baffle installation, all vent baffle carpentry and installation, and all other drywall and carpentry not already included under windows and doors.

f. Mechanical

(1) Materials and equipment including mechanical ventilation system components, ductwork, installation of new insulation and vent and attic louvers, where required.
(2) Labor, including the demolition, removal and modification of existing equipment and installations, testing, and adjustment of new equipment or modified existing equipment.

g. Electrical

(1) Materials, including all wiring, electrical outlets, switches, load centers and related materials.
(2) Labor, including the demolition, removal and modification of existing equipment, installation, testing and adjustment of new equipment or modified existing equipment.

h. Asbestos Removal (if applicable)

(1) Materials and equipment required for the containment, removal, sealing, and disposal of asbestos containing materials.
(2) Labor, including all work required in Section 028000.

i. Lead Paint Removal (if applicable)

(1) Materials and equipment required for the demolition, removal and disposal of lead containing materials.
(2) Labor, including all work required in Section 028000.

Schedule of Values shall be submitted to the Engineer no later than ten (10) calendar days prior to the start of any work. Failure to submit schedule of values will prevent Contractor from starting work and will not justify a compensable delay.

1.4 APPLICATIONS FOR PAYMENT

A. Application For Payment Times: The date for submittal of Contractor's monthly application for payment will be as identified in the General Conditions or as identified at the Pre-Construction Conference.

B. Application For Payment Format for Total Work Stored Completed to Date: The following format must be followed by the Contractor for each Application for Payment:

1. Submit all documentation to the Engineer electronically.
2. Submit one (1) notarized original of AIA Document G 702 and one (1) original of Periodic Cost Estimate (Attachment #12).
3. Submit one (1) copy of AIA G 703 continuation sheet or approved equal containing at minimum the following information:
   a. A listing of percent complete for each home.
   b. The listing of all approved change order work to date including any Bonus monies approved.
4. For payment of stored materials, the Contractor shall submit the required information in accordance with section 90-06 of the Contract Documents.
5. Beginning with the second application for payment submit a "Subcontractor / or Vendor Release of Lien for Progress Payment" – (Attachment #6)
   a. Identify the Contract and Prime Contractor.
   b. Identify all subcontractors and major suppliers and their respective contract amounts.
   c. Indicate the amount of total payments received from the Authority as of the date of the application for payment.
   d. Indicate the amount of payments made to date to each subcontractor and major supplier by the Prime Contractor.
   e. The Prime Contractor is to place his/her notarized signature on the sheet attesting to the correctness of the information listed above.
   f. The Authority reserves the right to require lien affidavits from each subcontractor and supplier for each application for payment in lieu of this Subcontractor / Supplier Payment Status Report.

6. The submittal of certified payrolls for Prime and all Subcontractors must be current within one (1) week of the date of the application for payment. No payment including labor costs will be processed until this condition is satisfied.

C. Application for payment at Final Acceptance

1. All the requirements listed above will be in effect with the addition of the requirements identified in Section 017000 of the Contract Documents titled PROJECT CLOSE-OUT. Administrative actions and submittals which must precede or coincide with submittal of the final payment Application for Payment include the following:

D. Application for Payment at the end of the One-Year Guaranty Period (Release of all Retainage):

1. Submittal of AIA G702 Form with the additional submittal requirements identified in Section 017000 of the Contract Documents.

END OF SECTION 010270

SECTION 013119 - PROJECT MEETINGS

PART 1 – GENERAL

1.1 RELATED DOCUMENTS

A. Drawings and general provisions of the Contract and other Specification Sections, apply to this Section.

1.2 SUMMARY

A. This Section specifies administrative and procedural requirements for project meetings including but not limited to:

1. Pre-Construction Conference.
2. Progress Meetings.
3. Homeowner's Meetings.

1.3 PRE-CONSTRUCTION CONFERENCE

A. Contractor shall attend a Pre-Construction conference scheduled and conducted by the CEA, or its representatives, after execution of the Contract, but prior to commencement of construction activities. The conference will be conducted in accordance with the Agenda indicated below in paragraph 1.03 C of these specifications. Minutes of the meeting will be prepared by the CEA's representatives and distributed to all attendees.

B. Attendees: The CEA, Engineer, and the Contractor's Project Manager and superintendent/s, major subcontractors, manufacturers, suppliers and other concerned parties shall each be represented at the conference by persons familiar with and authorized to conclude matters relating to the Work.

C. Agenda: Discuss items of significance relating to the progression of the work including such topics as:

1. Tentative construction schedule.
2. Critical Work sequencing.
3. Designation of responsible personnel.
4. Procedures for processing field decisions and Change Orders.
5. Procedures for processing Applications for Payment.
6. Distribution of Contract Documents.
7. Submittal of Shop Drawings, Product Data and Samples.
8. Preparation of record documents.
9. Use of the premises.
10. Office, Work and storage areas.
11. Equipment deliveries and priorities.
12. Safety procedures.
13. First aid.
14. Security.
15. Housekeeping.

16. Working hours.
17. Arrangements with building code officials (if applicable).
18. Status of required building permits.
19. Review of On-Line Permit Process – All permits must begin work Description: **CEA RESIDENTIAL SOUND INSULATION PROGRAM**
20. Additional information about Homeowners.
21. Communications and relations with Homeowners.

1.4 PROGRESS MEETINGS

A. Attend progress meetings at an agreed upon location on a weekly basis. Engineer will schedule meetings and notify the Contractor of meeting dates.

B. Attendees: In addition to representatives of the CEA and Engineer, each Contractor, subcontractor, codes enforcement officials, suppliers or other entities concerned with current progress or involved in planning, coordination or performance of future activities shall be represented at these meetings by persons familiar with the Project and authorized to conclude matters relating to progress.

C. Agenda: Review and correct or approve minutes of the previous progress meeting. Review other items of significance that could affect progress. Include topics for discussion as appropriate to the current status of the Project.

1. Contractor's Construction Schedule: Review progress since the last meeting. Determine where each activity is in relation to the Contractor's Construction Schedule, whether on time or ahead or behind schedule. Determine how construction behind schedule will be expedited; secure commitments from parties involved to do so. Discuss whether schedule revisions are required to ensure that current and subsequent activities will be completed within the Contract Time.
2. Review the present and future needs of each entity present, including such items as:
   a. Interface requirements.
   b. Time.
   c. Sequences.
   d. Deliveries.
   e. Off-site fabrication problems.
   f. Access.
   g. Hours of Work.
   h. Hazards and risks.
   i. Housekeeping.
   j. Quality and Work standards.
   k. Change Orders.
   l. Documentation of information for payment requests.
   m. Homeowner concerns.

D. Reporting: The CEA, or its representative, will prepare and distribute electronic copies of minutes of the meeting to each party present and to other parties who should have been

present. Include a brief summary, in narrative form, of progress since the previous meeting and report.

1. Schedule Updating: Revise the construction schedule after each progress meeting where revisions to the schedule have been made or recognized. Issue the revised schedule concurrently with the report of each meeting.

1.5 HOMEOWNER'S MEETINGS

A. Engineer shall schedule meetings with Homeowners within **two (2)** calendar days prior to the Contractor commencing work. This meeting is to review the list of items that must be completed by the Homeowner prior to the start of construction.
B. At minimum meetings shall be attended by the Engineer or his inspector, and the Contractor's Superintendent. Attendance by representatives of major subcontractors affected by the work is also recommended, but not required.
C. Meeting agendas shall include the scope of installations, conditions of installation and areas which are directly affected by the installations, preparation and installation procedures, coordination with homeowner activities, and homeowner's checklist and acceptance at substantial completion.

PART 2 - PRODUCTS (Not Applicable)

PART 3 - EXECUTION (Not Applicable)

END OF SECTION

SECTION 013300 - SUBMITTALS

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

A. Shop Drawings, Product Data submittals, general provisions of the Contract and other specification sections apply to this Section.

1.2 SUMMARY

A. Administrative and procedural requirements for performance of the Work, includes but is not limited to:

1. Product Data
2. Shop Drawings
3. Contractor's construction schedule
4. Samples

1.3 PREPARATION AND PROCEDURES

A. Preparation and processing of submittals should be coordinated with the performance of construction activities. Each submittal shall be transmitted sufficiently in advance of performance of all related construction activities to avoid delay.

1. Coordinate each submittal with manufacturing, purchasing, delivery, testing, other submittals and all related activities that require sequential activity.
2. Submittal transmissions of varying related submittals will be coordinated in a manner which prevents the need to review submittals concurrently.
   a. The Engineer reserves the right to withhold action on a submittal requiring coordination with other submittals until related submittals are received.
3. Processing Procedure:
   Sufficient review time must be allowed for each submission, in order that construction is not delayed as a result of the time required to process aforementioned submittals.
   a. The Engineer will be allowed fourteen **(14) calendar days** beginning on the first working day after receipt of a submittal for initial review. Allow additional time if processing must be delayed to permit coordination with subsequent submittals. The Engineer will promptly advise the Contractor when a submittal being processed must be delayed.
   b. Re-submittals shall be processed in the same manner as the original submittal. Allow fourteen **(14) calendar days** for reprocessing each re-submittal.
   c. No extension of Contract Time will be authorized because of failure to transmit submittals to the Engineer sufficiently in advance of the Work to permit processing. Contractor shall allow for possible re-submission of Shop Drawings.
   d. Submittals not submitted in accordance with described procedure shall be returned, with no action taken, to the Contractor for required format.

B. Preparation:

A Title Block shall be placed on all Shop Drawings, Product Data, and all submittals specified in the general provisions of the Contract for identification purposes. Permanent labels are to be place on submitted product samples for identification.

1. All submittals, including shop drawings, product lists, and product data shall be submitted to the Engineer by the Contractor and shall bear the Contractor's stamp of review and approval.
2. Provide a space approximately 4 inch x 5 inch on the label or beside the title block on Shop Drawings to record the Engineer's review and approval markings and the action taken.
3. Include the following information on the label for processing and recording action taken.
   a. Project name
   b. Date
   c. Name and address of Engineer
   d. Name and address of Contractor
   e. Name and address of subcontractor
   f. Name and address of supplier
   g. Name of manufacturer
   h. Number and title of appropriate Specification Section & Subsection. (example – 07216 – 1.03C Blown Insulation – MSDS Sheet)
   i. Drawing number and detail references, as appropriate
   j. Parcel Address and PPN Number (if applicable) of Home(s) in which submittal items will be installed
4. Reproductions of shop drawings or product data will not be accepted. The use of non-reproducible highlighters will not be allowed when marking up submittals.

C. Transmittal: Package each submittal appropriately for delivery and handling. Submittals received from sources other than the Contractor will be returned without action.

1. Transmittal shall contain recorded relevant information and requests for data, deviations from Contract Document requirements, including minor variations and limitations. Include Contractor's certification that information complies with Contract Document requirements.

1.4 PRODUCT DATA

A. Product Data shall be submitted electronically (General/HVAC) for each element of construction or system regardless of the quantity of elements or systems per specification section. Product Data includes manufacturer's printed information such as material content, installation instructions, specifications, catalog cuts, standard color charts, roughing-in diagrams and templates, standard wiring diagrams and performance curves. Product data shall be completed by the Contractor and submitted to the Engineer for approval.

1. Submit to the Engineer for review and approval. Each product must have product submittal cover sheet and contain Contractor's Approval Stamp. *Product Data not submitted in accordance with this procedure shall be returned to the Contractor for required format.* Mark each electronic copy to show applicable choices and options.

Where printed Product Data includes information on several products, some of which are not required, mark electronic copy to indicate the applicable information. Include the following information:

a. Manufacturer's printed recommendations
b. Compliance with recognized trade association standards
c. Compliance with recognized testing agency standards
d. Application of testing agency labels and seals
e. Notation of dimensions verified by field measurement
f. Compliance with Contract Documents specification

2. Manufacturer's Product Data shall not be submitted until compliance with requirements of the Contract Documents has been confirmed.
3. Quantity: Submit an electronic copy of each required submittal to the Engineer for review and approval. The Engineer will return a copy stamped with action taken and corrections or required modifications. Unless noncompliance with Contract Document provisions is observed, the submittal may serve as the final submittal.
4. Distribution: Furnish electronic copies of final submittal to installers, subcontractors, suppliers, manufacturers, fabricators, and others required for performance of construction activities. Show distribution on transmittal forms.
   a. Installation shall not begin until an applicable copy of Product Data applicable is in the installer's possession.
   b. Do not permit use of unmarked copies of Product Data in connection with construction.

1.5 SHOP DRAWINGS

A. Standard information prepared without specific reference to the project are not considered Shop Drawings. Do not reproduce Contract Documents or copy standard information as the basis of Shop Drawings. Highlight, circle, or indicate deviations from the Contract Documents.

B. Shop Drawings include manufacturer and installation drawings, setting diagrams, schedules, patterns, templates and similar drawings. *The drawings shall be arranged in the order described below and contain the information listed. Drawings not submitted in accordance with this procedure shall be returned for the required format:*

1. Cover Sheet

a. Contractor Title block (company name, address, phone and fax #'s)
b. Date Submitted
c. Homeowner Data (Parcel address & PPN#)
d. Approved by (individual preparing drawing)
e. Items Requiring Engineer's Direction
f. Special Notes (information pertinent to project)
g. Door Color Information
h. Contractor's Approval Stamp
i. 4"x5" space for Engineer's approval stamp

2. Second Page – Schedules
   a. Prime Door
   b. Storm Door
   Note: Second and third pages may be combined.
3. Third Page- Schedules
   a. Window (include sill heights for egress windows)
   b. Access Panel Door
   c. Skylight
   Note: Second and third pages may be combined.
4. Fourth Page – Related Schedules
   a. Wood Trim
   b. Drywall
   c. Related Work Elements
5. Quantity Sheets for each residence to be included.
   a. Formatted in table form in kind with Bid Forms.
   b. For all items of work at each residence include bid item number, bid item description, estimated quantity, bid unit price, extended price for each unit price bid item and a total cost of all unit price bid items.
6. Copies of Measurement Walk-Through Sheets to be attached.
7. Copies of Engineer's original Scope of Work sheets to be attached.
8. Sheet Size: Shop Drawings to be submitted on 8-1/2" x 11" sized paper. Indicate proper scale on all Shop Drawings.
9. Quantity: Submit an electronic copy of each drawing for approval. Each drawing must contain the contractor's approval stamp. Required corrections will be noted and returned to the Contractor for revision and re-submittal. After the required corrections have been approved, or if the originally submitted shops require no revisions, the original will be stamped and returned to the Contractor.
10. Shop Drawings shall not be used without an appropriate final stamp indicating action can be taken in connection with construction.

C. Shop Drawing Schedules: Schedules shall include the following information:
   a. Dimensions established by field measurement
   b. Styles
   c. Color
   d. Number key
   e. Detail Notes
   f. Elevation
   g. Identification of products and materials included.
   h. Compliance with specified standards.
   i. Notation of coordination requirements.

   Note: Use style numbers listed in the window, door and storm door selection sheets when identifying these products on all drawings.

1.6 CONTRACTOR'S CONSTRUCTION SCHEDULE

A. Construction Schedules:

1. Before the preparation of the Contractor's Progress Schedule, Contractor shall inspect the project Work Site in order to familiarize itself with the condition of the existing area where it will perform the Work.
2. Contractor shall submit a revised (as necessary) Critical Path Method (CPM) Progress Schedule, electronically, to the Engineer at the pre-construction conference and be prepared to discuss the Progress schedule, events and construction procedures at the time. No Work shall be allowed to proceed unless and until a CPM Progress Schedule is submitted. In the event a Notice to Proceed has issued, no time extension or compensation will be allowed to Contractor for failure to comply with this provision.
3. The Contractor shall furnish a CPM Progress Schedule clearly showing the order in which the Contractor proposes to carry out the Work, the dates on which it will start the salient features of the Work (including procurement of materials, plant and equipment), production rates and the proposed dates for completing said salient features. The CPM Progress Schedule submitted shall be consistent in all respects with the time constraints and sequencing requirements of the Contract.
4. An updated CPM Progress Schedule shall be submitted monthly, or as requested by the Engineer, to show the progress of the Work. In any event, if the Contractor fails to submit said updated CPM Progress Schedule within ten **(10) calendar days** after a written request by the Engineer, the Engineer shall have the right to withhold progress payments for any work until a satisfactory CPM Progress Schedule is submitted to the Engineer.
5. The capacity of the construction plant, sequence of operations and methods of operations shall be such as to ensure the completion of the Work within the time specified in the CPM Progress Schedule.
6. When the Contractor is to furnish major items of equipment or materials, the CPM Progress Schedule shall include the proposed dates of manufacture and shipment of these items and the names and locations of factories or other sources from which said items are to be obtained.
7. Total Float is the number of days by which a part of the Work in the schedule may be delayed from its early dates without necessarily extending the Contract Time. Contract Float is the number of days between the Contractor's anticipated date for early completion of the Work, or specified part, and the corresponding Contract Time. Total Float and Contract Float belong to the project and are not for the exclusive benefit of any party. They shall be available to the District, its agents, or the Contractor to accommodate changes in the Work or to mitigate the effect of events which may delay performance or completion. Each party will monitor and optimize the use of float for the benefit of the project.
8. An early completion schedule is one which anticipates completion of all or specified part of the Work ahead of the corresponding Contract Completion Date. Because Contract Float belongs to the Project, the Contractor shall not be entitled to any extension in Contract Time, or recovery for any delay incurred because of extensions in an early completion date, until all Contract Float is used or consumed and performance or completion of the Work extends beyond the Contract Completion Date. The Contractor shall adjust or remove any float suppression techniques, e.g., preferential sequencing (crew movements, equipment use, form reuse, etc.) extended durations, imposed dates, scheduling of Work not required for a Contract

Time as required Work, and others, as prerequisite to a request for an increase in Contract price or Contract Time.

1.7 SAMPLES

A. Submit full-size, fully manufactured Samples cured and finished as specified and physically identical with the material or product proposed. Samples include partial sections of manufactured or fabricated components, cuts or containers of materials, color range sets, and swatches showing color, texture and pattern. Permanent labels are to be place on submitted product samples for identification.

1. Mount, display, or package samples in the manner specified to facilitate review of qualities indicated. Prepare samples to match the Engineer's Sample. Include the following:
   a. Generic description of the sample
   b. Sample source
   c. Product name or name of manufacturer
   d. Compliance with recognized standards
   e. Compliance with Contract Documents specifications
   f. Availability and delivery time
2. Submit samples for review of kind, color, pattern, and texture, for a final check of these characteristics with other elements, and for a comparison of these characteristics between the final submittal and the actual component as delivered and installed.
   a. Where variation in color, pattern, texture or other characteristics are inherent in the material or product represented, submit multiple units [(not less than three (3)], that show approximate limits of the variations.
   b. Refer to other Specification Sections for requirements for samples that illustrate workmanship, fabrication techniques, details of assembly, connections, operation and similar construction characteristics.
   c. Refer to other Sections for samples to be returned to the Contractor for incorporation in the Work. Such samples must be undamaged at time of use. On the transmittal, indicate special requests regarding disposition of Sample submittals.
3. Preliminary submittals: Where samples are for selection of color, pattern, texture or similar characteristics from a range of standard choices, submit one (1) full set of choices for the material or product.
   a. Preliminary submittals will be reviewed and returned with the Engineer's mark indicating selection and other action.
4. Except for samples illustrating assembly details, workmanship, manufacturer’s techniques, connections, operation and similar characteristics, submit one (1) set of samples.
   a. Unless noncompliance with Contract Document provisions is observed, the submittal may serve as the final submittal.

B. Distribution of Samples: Prepare and distribute additional sets to subcontractors, installers, and others as required for performance of the Work. Show distribution on transmittal forms.

1. Comply with submittal requirements to the fullest extent possible. Process transmittal forms to provide a record of activity.

1.8 MANUFACTURER'S CERTIFICATION

A. Manufacturer's Certification shall consist of a written statement from the manufacturer that confirms that the product submitted meets or exceeds the performance requirements of the Contract Specifications.

B. Manufacturer's Certification shall be on manufacturer's company letterhead, and shall be signed by a qualified representative of the manufacturer.

C. Certifications offered by distributors of submitted product shall be rejected.

1.9 ENGINEER'S ACTION

A. Except for submittals for record, information or similar purposes, where action and return is required or requested, the Engineer will review each submittal, mark to indicate action taken, and return promptly.

1. Compliance with specified characteristics is the Contractor's responsibility. Review/approval neither extends nor alters any contractual obligations of the Engineer or Contractor.

B. Action Stamp: The Engineer will stamp each submittal with a uniform, self-explanatory action stamp. The stamp will be appropriately marked, as follows, to indicate the action taken:

1. Unrestricted Release: **"Approved"** or **"Reviewed"**, that part of the Work covered by the submittal may proceed provided it complies with requirements of the Contract Documents. Final acceptance of the Work will depend upon that compliance.
2. Final-But-Restricted Release: **"Approved as Noted"** or **"Furnish as Corrected"**, that part of the Work covered by the submittal may proceed provided it complies with notations or corrections on the submittal and requirements of the Contract Documents. Final acceptance will depend on that compliance.
3. Returned for Resubmittal: **"Not Approved - Revise and Resubmit"** or **"Revise and Resubmit"**, do not proceed with that part of the Work covered by the submittal, including purchasing, manufacturing, delivery, or other activity. Revise or prepare a new submittal in accordance with the notations and resubmit without delay.
   a. Submittals marked **"Not Approved - Revise and Resubmit"** or **"Revise and Resubmit"**, are not permitted to be used at the Project site or elsewhere where Work is in progress.
4. Rejected: **"Rejected"**, do not proceed with that part of the Work covered by the submittal, including purchasing, fabrication, delivery, or other activity. Material is not in compliance with specifications. Material will not be allowed on the project site, or elsewhere where Work is in progress. Prepare new submittals in accordance with the notations and specifications, and resubmit without delay.

5. Other Action: Submittals primarily for information or record purposes, special processing or other activity will be returned, marked **"Action Not Required"**.

1.10 RECORD DRAWINGS

A. Electrical contractor shall provide an electronic copy of the circuit directory for each branch circuit panel board and mount on panel door.

PART 2 – PRODUCTS (NOT USED)

PART 3 – EXECUTION (NOT USED)

END OF SECTION

SECTION 014000 - QUALITY CONTROL

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

A. Drawings and general provisions of Contract, and other Specification Sections, apply to this Section.

1.2 SUMMARY

A. This Section specifies administrative and procedural requirements for quality control services.

B. Quality control services include inspections and tests and related actions including reports, performed by independent agencies, governing authorities, and the Contractor. They do not include Contract enforcement activities performed by the Engineer.

C. Inspection and testing services are required to verify compliance with requirements specified or indicated. These services do not relieve the Contractor of responsibility for compliance with Contract Document requirements. Testing may be required when:

1. Product quality is in question.
2. Product installation is in question

All costs for such testing shall be paid by Contractor. Contractor shall be reimbursed only for testing that conclusively demonstrates that product and/or installation is in compliance with the Contract Documents.

D. Requirements of this Section relate to customized fabrication and installation procedures, not production of standard products.

1. Specific quality control requirements for individual construction activities are specified in the Sections that specify those activities. Those requirements, including inspections and tests, cover production of standard products as well as customized fabrication and installation procedures.
2. Inspections, tests and related actions specified are not intended to limit the Contractor's quality control procedures that facilitate compliance with Contract Document requirements.
3. Requirements for the Contractor to provide quality control services required by the Engineer, Sponsor, or authorities having jurisdiction are not limited by provisions of this Section.

E. All work shall be subject to sound level testing by the Engineer for the purpose of determining the actual noise reduction and acceptability of the work. The Contractor and its subcontractors shall take into account when scheduling and bidding the project that prior to commencement of the work, a mutually agreeable schedule of construction and testing will be established by the Contractor, Engineer and Homeowners.

F. The Contractor shall notify the Engineer when the work is ready for final inspection prior to testing. Test-ready work shall be defined as a completed house with all improvements made per the Contract Documents, following final inspection and completion of Punch List items noted by the Engineer. Should the improvements fail to meet the acoustical objectives known for a specific product and/or assembly, the Engineer may order further corrective measures to be undertaken by the Contractor. Testing shall be performed by others under separate contract.

1.3 RESPONSIBILITIES

A. Contractor Responsibilities: The Contractor shall provide inspections, tests and similar quality control services, specified in individual Specification Sections and required by governing authorities, except where they are specifically indicated to be the Sponsor's responsibility, or are provided by another identified entity; these services include those specified to be performed by an independent agency and not by the Contractor. Costs for these services shall be included in the Contract Sum.

1. The Contractor shall employ and pay an independent agency, to perform specified quality control services.
2. The Sponsor will engage and pay for the services of an independent agency to perform inspections and tests specified as the Sponsor's responsibility.
3. Retesting: The Contractor is responsible for retesting where results of required inspections, tests or similar services prove unsatisfactory and do not indicate compliance with Contract Document requirements, regardless of whether the original test was the Contractor's responsibility.
   a. Cost of retesting construction revised or replaced by the Contractor is the Contractor's responsibility, where required tests were performed on original construction.
4. Laboratory testing for specific products:
   a. During instances in which product quality is in question, products shall be tested in accordance with the following schedule:

Product	Tests to be Performed	Applicable Test Method(s) to be used
Vinyl Acoustical Windows, Prime Doors, Storm Doors	Air Leakage Water Penetration Structural Performance Acoustical Performance	ASTM E283 ASTM E331 ASTM E330 ASTM E90, E413

B. Testing shall be performed by a NVLAP certified laboratory approved by Engineer.

C. All costs for shipping product shall be borne by the Contractor. Product samples to be tested shall be selected by Engineer.

D. Product that cannot be incorporated into Work as a result of testing shall be reordered by Contractor. Reordered product and associated shipping costs for reordered product

shall be directly reimbursed to the Contractor via written and approved RFC, only if tested product is found to be in compliance with Contract Documents. In such cases, only product and shipping costs shall be paid, with no additional compensation for overhead and profit for reordered product. Tested product failing to meet requirements of Contract Documents is subject to removal/rejection per Contract Documents.

1.4 SUBMITTALS

A. The independent testing agency shall submit a certified written report of each inspection, test or similar service, to the Engineer, in triplicate, unless the Contractor is responsible for the service. If the Contractor is responsible for the service, submit a certified written report of each inspection, test or similar service through the Contractor, in triplicate.

1. Report Data: Written reports of each inspection, test or similar service shall include, but not be limited to the following:

a. Date of issue.
b. Project title and number.
c. Name, address and telephone number of testing agency.
d. Names of individuals making the inspection or test.
e. Designation of the Work and test method.
f. Identification of product and Specification Section.
g. Complete inspection or test data.
h. Test results and interpretations of test results.
i. Comments or professional opinion as to whether inspected or tested Work complies with Contract Document requirements.
j. Name and signature of laboratory inspector.
k. Recommendations on retesting.

1.5 QUALITY ASSURANCE

A. Qualification for Service Agencies: Engage inspection and testing service agencies, including independent testing laboratories, which are pre qualified as complying with "Recommended Requirements for Independent Laboratory Qualification" by the American Council of Independent Laboratories, and which specialize in the types of inspections and tests to be performed.

PART 2 - PRODUCTS (Not Applicable)

PART 3 - EXECUTION

3.01 REPAIR AND PROTECTION

A. General: All items of existing work which are to remain and are damaged or removed on account of work done under this Contract, including interior and exterior finished trim, fixtures, and furnishings, shall be repaired and replaced to match existing adjacent work

in all respects. Any damage to buildings, roads, public roads, bituminous concrete areas, fences, lawn areas, trees, shrubbery, poles, underground utilities, etc., shall be repaired or replaced to a condition equal to or better than original. Comply with Contract Document requirements for Section 017329 CUTTING AND PATCHING.

B. Protect construction exposed by or for quality control service activities, and protect repaired construction.

C. Repair and protection is the Contractor's responsibility, regardless of the assignment of responsibility for inspection, testing or similar services.

3.2 MEASUREMENTS

A. All dimensions shown on the drawings shall be field verified by the Contractor. Dimensions for replacement windows shall be field verified by the window manufacturer’s authorized representative. The Contractor shall not order materials or begin fabrication of any assembly until proper field measurements have been completed.

B. When measuring for replacement units at existing casement or awning windows, the Contractor shall remove interior casings and apron and verify rough opening dimensions. New unit shall be sized to fit rough opening. Re-install interior trim once measurements have been taken.

C. All dimensions shall be field verified by the Contractor. Dimensions shown on the drawings are approximate. Drawings are not to be scaled.

D. Egress Landings: Where Drawings call for the installation of wall modifications, including installation of exterior sliding glass storm doors, within the “means of egress” and/or “landing area” of an egress path (as defined by the local Building Code), no dimensional reduction that is less than the local Building Code requirement or less than existing if currently below the code requirements, will be allowed. Any alternative to the designed wall modification necessary to accomplish this requirement shall be reviewed and approved by the Engineer.

END OF SECTION

SECTION 015600 - DUST CONTROL

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

A. Drawings and General Provisions of Contract, and other Specification Sections, apply to this Section.

1.2 SUMMARY

A. This Section specifies procedures to control dust and protect Homeowners' existing facilities, finishes, and personal on-site possessions.

B. Procedures described in this section shall be applicable during all phases of the Work.

1.3 DEFINITIONS

A. Dust Control Measures: Any protective cloth or polyethylene barrier installed with duct tape, furring strips, etc. to provide a semi-air tight separation between a work area and the Homeowners wall or floor-coverings, hallways, adjacent rooms, existing furnishings, or exterior surfaces such as driveways, sidewalks, and lawns. Dust Control Measures shall sufficiently prevent passage of dust, dirt, liquids, or other construction materials or tools between the work area and the area being protected. Work areas shall include passageways to and from the work area.

PART 2 - PRODUCTS (Not Applicable).

PART 3 – EXECUTION

3.1 GENERAL

A. The Contractor shall establish, construct, and maintain all interior and exterior Dust Control Measures.

B. The Contractor shall schedule with occupant to erect temporary Dust Control Measures during his operations. The Contractor shall remove temporary Dust Control Measures at the completion of each type of separate work operation unless written approval is granted from the Engineer.

C. The Contractor will remove all Dust Control Measures at the completion of each residence and repair, clean, or replace, at no cost to the Homeowner, the Engineer, or the CEA, all damaged or soiled finishes, materials, or personal items owned by the occupants.

END OF SECTION

SECTION 016000 - MATERIAL & EQUIPMENT

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

A. Drawings and General Provisions of Contract, and other Specification Sections, apply to this Section.

1.2 SUMMARY

A. This Section specifies administrative and procedural requirements governing the Contractor's selection of products for use in the Project.

B. The Contractor's Construction Schedule and the Schedule of Submittals are included under Section 013300 SUBMITTALS.

C. Administrative procedures for handling requests for substitutions for products to be considered as an equal made before award of the Contract.

1.3 DEFINITIONS

A. Definitions used in this Article are not intended to change the meaning of other terms used in the Contract Documents, such as "specialties", "systems", "structure", "finishes", "accessories" and similar terms. Such terms such are self-explanatory and have well recognized meanings in the construction industry.

1. "Products" are items purchased for incorporation in the Work, whether purchased for the Project or taken from previously purchased stock. The term "product" includes the terms "material," "equipment," "system," and terms of similar intent.
    a. "Named Products" are items identified by manufacturer's product name, including make or model designation, indicated in the manufacturers published product literature that is current as of the date of the Contract Documents.
    b. "Foreign Products", as distinguished from "domestic products," are items substantially manufactured (40 percent or more of value) outside of the United States and its possessions; or produced or supplied by entities substantially owned (more than 50 percent) by persons who are not citizens of nor living within the United States and its possessions.
2. "Materials" are products that are substantially shaped, cut, worked, mixed, finished, refined or otherwise fabricated, processed, or installed to form a part of the Work.
3. "Equipment" is a product with operational parts, whether motorized or manually operated, that requires service connections such as wiring or piping.

1.4 SUBMITTALS

A. Product List Schedule: Prepare a schedule showing products specified in a tabular form acceptable to the Engineer. Include generic names of products required. Include the manufacturer's name and proprietary product names for each item listed.

1. Coordinate the product list schedule with the Contractor's Construction Schedule and the Schedule of Submittals.
2. Form: Prepare the product listing schedule with information on each item tabulated under the following column headings:
   a. Related Specification Section number.
   b. Generic name used in Contract Documents.
   c. Proprietary name, model number and similar designations.
   d. Manufacturer's and name and address.
   e. Supplier's name and address.
   f. Installer's name and address.
   g. Projected delivery date, or time span of delivery period.
3. Initial Submittal: Up to **twenty (20) calendar days** after date of the Notice to Proceed, submit an **electronic** copy of an initial product list schedule. Provide a written explanation for omissions of data, and for known variations from Contract requirements.
4. Completed Schedule: Up to **twenty (20)** calendar days after date of the Notice to Proceed, submit an **electronic** copy of the completed product list schedule. Provide a written explanation for omissions of data, and for known variations from Contract requirements.
5. Engineer's Action: The Engineer will respond in writing to the Contractor within **fourteen (14)** calendar days of receipt of the completed product list schedule. No response within this time period constitutes no objection to listed manufacturers or products, but does not constitute a waiver of the requirement that products comply with Contract Documents. The Engineer's response will include the following:
   a. A list of unacceptable product selections, containing a brief explanation of reasons for this action.

1.5 SUBSTITUTIONS

A. Conditions: The Contractor's request to substitute a product as an equal will be received and considered by the Engineer when one or more of the following conditions are satisfied, as determined by the Engineer:

1. Extensive revisions to Contract Documents are not required.
2. Proposed changes are in keeping with the general intent of Contract Documents.
3. The request is timely, fully documented and properly submitted.
4. The request is directly related to an "or equal" clause or similar language in the Contract Documents.
5. The specified product or method of construction cannot be provided within the Contract Time. The request will not be considered if the product or method cannot be provided as a result of failure to pursue the Work promptly or coordinate activities properly.
6. The specified product or method of construction cannot receive necessary approval by a governing authority, and the requested substitution can be approved.
7. A substantial advantage is offered the CEA, in terms of cost, time, energy conservation or other considerations of merit, after deducting offsetting responsibilities the CEA may be required to bear. Additional responsibilities for the CEA may include additional compensation to the Engineer for redesign and evaluation services, increased cost of other construction by the CEA or separate Contractors, and similar considerations.

8. The specified product or method of construction cannot be provided in a manner that is compatible with other materials, and where the Contractor certifies that the substitution will overcome the incompatibility.
9. The specified product or method of construction cannot provide a warranty required by the Contract Documents and where the Contractor certifies that the proposed substitution provide the required warranty.

B. The Contractor's submittal and Engineer's acceptance of Shop Drawings, Product Data or Samples that relate to construction activities not complying with the Contract Documents does not constitute an acceptable or valid request for substitution, nor does it constitute approval.

1.6 QUALITY ASSURANCE

A. Source Limitations: To the fullest extent possible, provide products of the same kind, from a single source.

B. Foreign Product Limitations: Except under one or more of the following conditions, provide domestic products, not foreign products, for inclusion in the Work:

1. Refer to "Buy American" provisions of the Contract Documents.

C. Any material to be used in the work may be: 1) tested in accordance with Section 014000 or inspected at any time by the Engineer, and may be rejected if it fails to comply with specified tests or is identified as defective based on Engineer's inspection; and 2) shall be designated as to proposed source by the Contractor in time to permit all required testing and inspection before the material is needed to be incorporated in the work. The Contractor shall have no claim because of his/her failure to allow adequate time for testing and inspection. Necessary arrangements shall be made to permit the Consultant to make inspection of materials or equipment ordered for the work.

1.7 PRODUCT DELIVERY, STORAGE, AND HANDLING

A. Deliver, store and handle products in accordance with the manufacturer's recommendations, using means and methods that will prevent damage, deterioration and loss, including theft. Storage of materials and equipment for this work shall be permitted solely at the Contractor's risk and shall be limited to areas approved by the Consultant. No liability or responsibility for said storage shall be placed on the Consultant or the CEA.

1. The Contractor shall not store materials or equipment on Homeowner's property. The Contractor and his/her subcontractors shall provide and maintain necessary offsite storage facilities for materials and equipment that are part of the Work.
2. Coordinate delivery with installation time to ensure minimum holding time for items that are flammable, hazardous, easily damaged, or sensitive to deterioration, theft and other losses.
3. Store products offsite in a manner that will facilitate inspection and measurement of quantity or counting of units.

4. Store products subject to damage by the elements above ground, under cover in a weather-tight enclosure, with ventilation adequate to prevent condensation. Maintain temperature and humidity within range required by manufacturer's instructions.
5. Contractor shall allow Engineer to inspect products upon delivery to Contractor's storage facility to ensure compliance with the Contract Documents, and to ensure that products are undamaged and properly protected. Such inspection, and the results of such inspection, does not in any way relieve Contractor of responsibility for product condition and conformance with Project Specifications.
6. Deliver products to the site on the day of installation in the manufacturer's original sealed container or other packaging system, complete with labels and instructions for handling, storing, unpacking, protecting and installing.
7. Inspect products upon delivery to site to ensure compliance with the Contract Documents, and to ensure that products are undamaged and properly protected. Existing materials shall not be removed if products delivered are damaged or are found to be at variance with Contract Documents.

PART 2 - PRODUCTS

2.1 PRODUCT SELECTION

A. General Product Requirements: Provide products that comply with the Contract Documents, that are new, undamaged, in bright and first class condition and, unless otherwise indicated, unused at the time of installation.

1. Provide products complete with all accessories, trim, finish, safety guards and other devices and details needed for a complete installation and for the intended use and effect.
2. Standard Products: Where available, provide standard products of types that have been produced and used successfully in similar situations on other projects.

B. Product Selection Procedures: Product selection is governed by the Contract Documents and governing regulations, not by previous Project experience. Procedures governing product selection include the following:

1. Descriptive Specification Requirements: Where Specifications describe a product or assembly, listing exact characteristics required, with or without use of a brand or trade name, provide a product or assembly that provides the characteristics and otherwise complies with Contract requirements.
2. Performance Specification Requirements: Where Specifications require compliance with performance requirements, provide products that comply with these requirements, and are recommended by the manufacturer for the application indicated. General overall performance of a product is implied where the product is specified for a specific application.
    a. Manufacturer's recommendations may be contained in published product literature, or by the manufacturer's certification of performance.

3. Compliance with Standards, Codes and Regulations: Where the Specifications only require compliance with an imposed code, standard or regulation, select a product that complies with the standards, codes or regulations specified.
4. Visual Matching: Where Specifications require matching an established Sample, the Engineer's decision will be final on whether a proposed product matches satisfactorily.
   a. Where no product available within the specified category matches satisfactorily and also complies with other specified requirements, comply with provisions of the Contract Documents concerning "substitutions" for selection of a matching product in another product category, or for noncompliance with specified requirements.
5. Visual Selection: Where specified product requirements include the phrase "...as selected from manufacturer's standard colors, patterns, textures..." or a similar phrase, select a product and manufacturer that complies with other specified requirements. The Engineer will select the color, pattern and texture from the product line selected.

PART 3 - EXECUTION

3.1 INSTALLATION OF PRODUCTS

A. Comply with manufacturer's instructions and recommendations for installation of products in the applications indicated. Anchor each product securely in place, accurately located and aligned with other Work.

1. All workmanship in construction not specifically covered in the Specifications shall be of the first class order and equal to that customary used in first class work of a similar nature and character by skilled tradesman.
2. Clean exposed surfaces and protect as necessary to ensure freedom from damage and deterioration at time of Substantial Completion.

END OF SECTION

SECTION 016310 - PRODUCT SUBSTITUTIONS

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

A. Drawings and general provisions of Contract, and other Specification Sections, apply to this Section.

1.2 SUMMARY

A. This Section specifies administrative and procedural requirements for handling requests for product substitutions to be considered as an equal made after award of the Contract.

B. The Contractor's Construction Schedule and the Schedule of Submittals are included under Section 013300 SUBMITTALS.

C. Procedural requirements governing the Contractor's selection of products and product options are included under Section "Materials and Equipment".

1.3 DEFINITIONS

A. Definitions used in this Section are not intended to change or modify the meaning of other terms used in the Contract Documents.

B. Substitutions: Requests for changes in products, materials, equipment, and methods of construction required by Contract Documents proposed by the Contractor after award of the Contract are considered requests for "substitutions". The following are not considered substitutions:

1. Substitutions requested by Bidders during the bidding period, and accepted prior to award of Contract, are considered as included in the Contract Documents and are not subject to requirements specified in this Section for substitutions.
2. Revisions to Contract Documents requested by the CEA or Engineer.
3. Specified options of products and construction methods included in Contract Documents.
4. The Contractor's determination of and compliance with governing regulations and orders issued by governing authorities.

1.4 SUBMITTALS

A. Substitution Request Submittal: Requests for substitution will be considered if received within thirty (30) calendar days after the Contract Award and 14 days prior to the Measurement Walk. Requests received more than thirty (30) calendar days after the above date may be considered or rejected at the discretion of the Engineer.

1. Submit an electronic copy of each request for substitution for consideration. Submit requests in the form and in accordance with procedures required for Change Order proposals.

2. Identify the product, or the fabrication or installation method to be replaced in each request. Include related Specification Section and Drawing numbers. Provide complete documentation showing compliance with the requirements for substitutions, and the following, as appropriate:

    a. Product Data, including Drawings and descriptions of products, fabrication and installation procedures.
    b. Samples, where applicable or requested.
    c. A detailed comparison of significant qualities of the proposed substitution with those of the Work specified. Significant qualities may include elements such as size, weight, durability, performance and visual effect.
    d. Coordination information, including a list of changes or modifications needed to other parts of the Work, which will become necessary to accommodate the proposed substitution.
    e. A statement indicating the substitution's effect on the Contractor's Construction Schedule compared to the schedule without approval of the substitution. Indicate the effect of the proposed substitution on overall Contract Time.
    f. Cost information, including a proposal of the net change, if any in the Contract Sum.
    g. Certification by the Contractor that the substitution proposed is equal-to or better in every significant respect to that required by the Contract Documents, and that it will perform adequately in the application indicated. Include the Contractor's waiver of rights to additional payment or time, which may subsequently become necessary because of the failure of the substitution to perform adequately.

3. Engineer’s Action: Within seven (7) calendar days of receipt of the request for substitution, the Engineer will request additional information or documentation necessary for evaluation of the request. Within fourteen (14) calendar days of receipt of the request, or one (1) week of receipt of the additional information or documentation, which ever is later, the Engineer will notify the Contractor of acceptance or rejection of the proposed substitution. If a decision on use of a proposed substitute cannot be made or obtained within the time allocated, use the product specified by name. Acceptance will be in the form of a Change Order.

PART 2 - PRODUCTS

2.1 SUBSTITUTIONS

A. Conditions: The Contractor's request to substitute a product as an equal will be received and considered by the Engineer when one or more of the following conditions are satisfied, as determined by the Engineer:

1. Extensive revisions to Contract Documents are not required.
2. Proposed changes are in keeping with the general intent of Contract Documents.
3. The request is timely, fully documented and properly submitted.
4. The request is directly related to an "or equal" clause or similar language in the Contract Documents.

5. The specified product or method of construction cannot be provided within the Contract Time. The request will not be considered if the product or method cannot be provided as a result of failure to pursue the Work promptly or coordinate activities properly.
6. The specified product or method of construction cannot receive necessary approval by a governing authority, and the requested substitution can be approved.
7. A substantial advantage is offered the CEA, in terms of cost, time, energy conservation or other considerations of merit, after deducting offsetting responsibilities the CEA may be required to bear. Additional responsibilities for the CEA may include additional compensation to the Engineer for redesign and evaluation services, increased cost of other construction by the CEA or separate Contractors, and similar considerations.
8. The specified product or method of construction cannot be provided in a manner that is compatible with other materials, and where the Contractor certifies that the substitution will overcome the incompatibility.
9. The specified product or method of construction cannot provide a warranty required by the Contract Documents and where the Contractor certifies that the proposed substitution provide the required warranty.

B. The Contractor's submittal and Engineer’s acceptance of Shop Drawings, Product Data or Samples that relate to construction activities not complying with the Contract Documents does not constitute an acceptable or valid request for substitution, nor does it constitute approval.

PART 3 - EXECUTION (Not Applicable)

END OF SECTION

SECTION 017000 - PROJECT CLOSEOUT

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

A. Drawings and general provisions of Contract, and other Specification Sections apply to this Section.

1.2 SUMMARY

A. This Section specifies administrative and procedural requirements for project close-out, and the subsequent reduction or release of retained monies:

1.3 CONTRACT FINAL ACCEPTANCE

A. Each home included in the Contract must first receive final acceptance before the Project Close-out and reduction in retained monies process can begin. Refer to the General Conditions and Section 010100 SUMMARY OF WORK for requirements of Final Acceptance.

1.4 PROJECT CLOSE-OUT DOCUMENTATION REQUIREMENTS

A. In addition to Final Acceptance of the Contract, the submittal of the CEA Attachments identified in the General Conditions and the following Documentation by the Contractor will be a requirement for the reduction in retained monies:

1. Submit final application for payment including costs of all change order work.
2. Submit AIA G707A Consent of Surety to Reduction in Retainage at Final Acceptance. Five percent (5%) may be deducted and retained by the CEA until the project reaches 50% complete.
3. Submit AIA G707 Consent of Surety to Final Payment at the end of the One Year Guaranty Period. After the project reaches 50% complete, the CEA shall not withhold additional retainage but shall continue to withhold retainage equal to five percent (5%) of the total Contract Amount until the project is Substantially Complete.
4. Submit AIA G706 Contractor's Affidavit of Payment of Debts and Claims.
5. Submit AIA G706A Contractor's Affidavit of Release of Liens for Prime Contractor, all subcontractors, window, door, furnace and air-conditioning equipment suppliers.
6. Submit Contractor's written One-Year Guarantee for all materials, equipment and workmanship on Company letterhead in accordance with Section 017836 of the Contract Documents.
7. Submittal of Certified Payrolls for Prime Contractor and all Subcontractors current with date of Final Acceptance.
8. Submittal of State of Illinois "Affidavit of Compliance Prevailing Wages" (Example Affidavit located in Prevailing Wage Rate Section of this book) for Prime Contractor and all Subcontractors.
9. Submittal of all individual **Homeowner Warranty Packages** including but not limited to operations and maintenance manuals for all windows, doors, HVAC and Electrical Equipment (1 original hardcopy to the Homeowner and an electronic copy to the Engineer).

10. Submittal of Asbestos Containing Material Disposal Certifications in accordance with Section 028000 of the Contract Documents (if applicable).

11. Submittal of Lead Containing Material Disposal Certifications in accordance with Section 028000 of the Contract Documents (if applicable).
12. Submittal of as-built drawings for each Residence (1 original and 1 electronic copy).
13. Submittal of electronic copies of all required Building Permits or Permit Applications with proof that all such Permit Fees have been paid and each has been noted with certified approval from the respective municipality.
14. Submittal of electronic copies of the final approved municipal certificate and/or certificate of occupancy.
15. Miscellaneous Record Submittals: Refer to other Specification Sections for requirements of miscellaneous record-keeping submittals in connection with actual performance of the Work.

PART 2 - PRODUCTS (Not Applicable)

PART 3 - EXECUTION

3.1 CLOSEOUT PROCEDURES

A. Warranties shall commence on the date of Final Acceptance for each residence.

B. The One-Year Guarantee Period for the Contract as referenced in Section 017836 of the Contract Documents shall begin on the date certified for substantial completion.

3.2 FINAL CLEANING

A. General: General cleaning during construction is required by the Contract Documents.

B. Cleaning: Employ experienced workers or professional cleaners for final cleaning. Clean each surface or unit to the condition expected in a normal cleaning and maintenance program. Comply with manufacturer's instructions.

END OF SECTION

SECTION 017329 - CUTTING AND PATCHING

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

A. Drawings and general provisions of Contract, and Specification Sections, apply to this Section.

1.2 SUMMARY

A. This Section specifies administrative and procedural requirements for cutting and patching.

B. Refer to other Sections for specific requirements and limitations applicable to cutting and patching individual parts of the Work.

C. Some requirements of this Section apply to mechanical and electrical installations. Refer to Specification Sections for other requirements and limitations applicable to cutting and patching for mechanical and electrical installations.

D. Demolition of selected portions of the Home for alterations is included in Section “Selective Demolition”.

1.3 SUBMITTALS

A. Cutting and Patching Proposal: Where approval of procedures for cutting and patching is required before proceeding, submit a proposal describing procedures well in advance of the time cutting and patching will be performed and request approval to proceed. Include the following information, as applicable, in the proposal:

1. Describe the extent of cutting and patching required and how it is to be performed. Indicate why it cannot be avoided.
2. Describe anticipated results in terms of changes to existing construction; including changes to structural elements and operating components, as well as changes in the building’s appearance and other significant visual elements.
3. List products to be used and firms or entities that will perform Work.
4. Indicate dates when cutting and patching is to be performed.
5. List utilities that will be disturbed or affected, including those that will be relocated and those that will be temporarily out-of-service. Indicate how long service will be disrupted.
6. Approval by the Engineer to proceed with cutting and patching does not waive the Engineer’s right to later require complete removal and replacement of a part of the Work found to be unsatisfactory.

1.4 QUALITY ASSURANCE

A. Requirements for Structural Work: Do not cut and patch structural elements in a manner that would reduce their load-carrying capacity or load-deflection ratio.

B. Operational and Safety Limitations: Do not cut and patch operating elements or safety related components in a manner that would result in reducing their capacity to perform as intended, or result in increased maintenance, or decreased operational life or safety.

1. Obtain approval of the cutting and patching proposal before cutting and patching the following operating elements or safety related systems:

a. Water, moisture, or vapor barriers.
b. Membranes and flashings.
c. Control systems.
d. Communication systems.
e. Electrical wiring systems.
f. Mechanical systems.

C. Visual Requirements: Do not cut and patch construction exposed on the exterior or in occupied spaces, in a manner that would, in the Engineer's opinion, reduce the building's aesthetic qualities, or result in visual evidence of cutting and patching. Remove and replace Work cut and patched in a visually unsatisfactory manner.

PART 2 - PRODUCTS

2.1 MATERIALS

A. Use materials that are identical to existing materials. If identical materials are not available or cannot be used where exposed surfaces are involved, use materials that match existing adjacent surfaces to the fullest extent possible with regard to visual effect. Use materials whose installed performance will equal or surpass that of existing materials.

B. For replacement of Work removed, comply with the Specifications for the type of work to be done. If these Contract Documents do not include instructions regarding specific materials to be repaired, the Engineer shall be consulted regarding appropriate standards.

PART 3 - EXECUTION

3.1 INSPECTION

A. Before cutting existing surfaces examine surfaces to be cut and patched and conditions under which cutting and patching is to be performed. Take corrective action before proceeding, if unsafe or unsatisfactory conditions are encountered.

3.2 PREPARATION

A. Temporary Support: Provide temporary support of Work to be cut.

B. Protection: Protect existing construction during cutting and patching to prevent damage. Provide protection from adverse weather conditions for portions of the Work that might be exposed during cutting and patching operations. Provide security to the Homeowner's

property where access to the Home has been exposed during the ongoing work. Provide protection for appliances, wall fixtures, floor coverings, and window coverings near the work. Provide dust control using polyethylene barriers.

C. Avoid interference with use of adjoining areas or interruption of free passage to adjoining areas.

D. Take all precautions necessary to avoid cutting existing pipe, conduit or ductwork serving the building, but scheduled to be removed or relocated until provisions have been made to bypass them.

3.3 PERFORMANCE

A. General: Employ skilled workers to perform cutting and patching. Proceed with cutting and patching at the earliest feasible time and complete without delay.

1. Cut existing construction to provide for installation of other components or performance of other construction activities, the subsequent fitting and patching required to restore surfaces to their original condition and to ensure that the required sound insulation performance for newly installed items is achieved.
2. Repair existing finishes damaged, removed, or stained by the Work.

B. Cutting: Cut existing construction using methods least likely to damage elements to be retained or adjoining construction. Where possible review proposed procedures with the original installer; comply with the original installer's recommendations.

1. In general, where cutting is required, use hand or small power tools designed for sawing or grinding, not hammering and chopping. Cut holes and slots neatly to size required with minimum disturbance of adjacent surfaces. Temporarily cover openings when not in use.
2. To avoid marring existing finished surfaces, cut or drill from the exposed or finished side into concealed surfaces.
3. Cut through concrete and masonry using a cutting machine such as a carbide saw or diamond core drill.
4. By-pass utility services such as pipe or conduit, before cutting, where services are shown or required to be removed, relocated or abandoned. Cut-off pipe or conduit in walls or partitions to be removed. Cap, valve, or plug and seal the remaining portion of pipe or conduit to prevent entrance of moisture or other foreign matter after by-passing and cutting.

C. Patching: Patch with durable seams that are as invisible as possible. Comply with specified tolerances: Patch and repair voids to maintain the sound insulation performance of installed windows, doors, acoustic louvers, and baffles.

1. Where feasible, inspect and test patched areas to demonstrate integrity of the installation.

2. Restore exposed finishes of patched areas and extend finish restoration into retained adjoining construction in a manner that will eliminate evidence of patching and refinishing.
3. Patched work shall match existing adjacent work in texture and appearance so as to make patch or transition invisible to the eye at a distance of three feet.
4. Where masonry, plaster, metal or other finished surface is cut in such a way that a smooth transition with new work is not possible, terminate existing surface neatly along a straight line at a natural line of division, and provide trim appropriate to finished surface.

D. Specific Patching Instructions

1. EXISTING REGISTERS, GRILLES, DIFFUSERS AT NEW WALL/CEILING MODIFICATIONS
   Where a new wall or ceiling modification is being constructed, remove any existing floor, wall, or ceiling registers, grilles, diffusers, etc., or any item required for the installation of the new Work. Block holes in existing floor to match existing floor thickness. Block holes in existing ceiling and/or wall(s) with gypsum board to match existing plaster or gypsum board thickness. Provide new openings where required. After installation of new acoustic wall or ceiling modification, reinstall existing register, diffuser, etc. forward of wall or ceiling. Cut back and/or add new ductwork or pipe, etc. to match existing where required for a complete and operable installation. Provide new registers, diffusers, or grilles to match existing where existing are unusable. Where both baseboard radiation and floor/ceiling registers exist, both shall be extended forward of the new wall modification.
2. EXISTING ELECTRICAL ITEMS AT NEW WALL/CEILING MODIFICATIONS
   Where a new wall or ceiling modification (or vertical/horizontal duct enclosure) is being installed, any existing lights, fans, outlets, switches, plugs, telephone jacks, cable jacks, thermostats, etc., or any other item(s), exclusive of security systems, affected by the installation of the new Work, are to be extended forward and reinstalled to accommodate the new wall or ceiling modification. Provide new wiring, plug extensions, etc. as required for a complete and operable installation. All work shall be performed in accordance with all applicable codes. Patch all wall/ceiling finishes to match existing thickness before installation of new wall or ceiling modification.
3. EXISTING PANELING/WAINSCOTING/BASEBOARD - REMOVAL AND REINSTALLATION AT NEW WALL MODIFICATIONS
   Remove existing wall paneling, knotty pine, wainscoting, baseboard, etc., or other wall finish (and trim where exists) prior to modifying walls that will receive an acoustical modification. After the acoustical wall modification is completed, reinstall wall paneling (and trim where exists) over new wall surfaces. Provide new wall finish and/or trim to match existing where required. Also remove and reinstall existing wall paneling, wainscoting, baseboard, or other wall finish (and trim where exists) on adjacent intersecting walls where required to access the modified wall. Where paneling or other finish is not being reinstalled, patch nail holes.
4. EXISTING PANELING/WAINSCOTING/BASEBOARD - CUT BACK ADJACENT AT NEW WALL MODIFICATIONS
   Where existing wall paneling, knotty pine, wainscoting, baseboard, etc. (or other wall treatment) is to be removed for installation of new acoustical wall modification, also

remove, cut back, and reinstall existing wall paneling, knotty pine, wainscoting, baseboard, etc. (or other wall treatment) on adjacent intersecting wall(s) before construction of new wall modification and reinstallation of existing wall finish. Provide new wall finish and/or trim to match existing where required. Where reinstalled paneling is unable to butt squarely, provide 1/2 inch quarter round molding trim at all corners in the room from floor to ceiling (or to top of wainscoting). In no case shall a new wall treatment be built against existing paneling, baseboard, or other existing wall or ceiling modification. Where paneling or other finish is not being reinstalled, patch nail holes.

5. EXISTING PANELING - REMOVE/REINSTALL AT NEW CEILING MODIFICATION
   Where existing wall paneling, knotty pine, etc. (or other wall treatment(s) exist in spaces to receive new acoustical ceiling modifications, remove, cut down, and reinstall wall paneling or other wall modification on all affected walls in the room (and molding where exists) as required to accommodate the new ceiling modification. Reinstall existing ceiling molding(s) or provide new, if unusable, to match existing. If no ceiling molding exists, provide new molding at all wall/ceiling intersections in the room. In no case shall a new ceiling modification be built against existing paneling, molding, or other existing wall treatment(s). Where paneling or other finish is not being reinstalled, patch nail or other holes.
6. EXISTING SHELVING/CASEWORK - REMOVE/REINSTALL AT NEW WORK
   At wall, ceiling, or other modifications in contact with existing shelving, casework, or other finished item, remove and reinstall the item to its original location unless otherwise noted. Provide new parts to match existing where required for a complete, safe, and secure reinstallation. Provide new trim where required.
7. EXISTING FLOOR FINISHES - CUT BACK/PROTECT AT NEW WALL/DOOR MODIFICATIONS
   Where a new wall or door modification is to be installed, the existing carpeting and/or pad, or other floor finish shall be cut back and reinstalled to accommodate the new wall or door modification. Protect existing floor finish during construction. Reinstalled floor finish shall match existing conditions. Provide new tack strips, trim, padding, etc., where required, for a complete and finished installation.
8. EXISTING CEILING MOLDINGS - REMOVE/REINSTALL AT NEW WALL/CEILING MODIFICATIONS
   In rooms scheduled to receive a new acoustical ceiling or wall treatment, remove and reinstall existing ceiling molding where exists. Where no molding exists, provide new molding at entire room perimeter. Where existing ceiling moldings are not reusable, or in poor condition, provide new. Attach new or existing reinstalled moldings to wall.
9. EXISTING SYNTHETIC BRICK/STUCCO - REMOVE AT NEW WALL/CEILING MODIFICATIONS
   Where synthetic brick, stucco, mirror, or other applied finish exists on a wall or ceiling designated to receive new acoustical wall or ceiling modification, remove the material, adhesive, or mortar completely down to the existing plaster, gypsum board, or masonry finish, ready for the new wall or ceiling modification. Provide new resilient channels at 16 inches o.c., where required for installation of the new wall and/or ceiling modifications.
10. EXISTING RADIATORS - REMOVE/REINSTALL AT NEW WALL MODIFICATION
    Remove existing steam (or gas, etc.) radiator(s) and associated piping, valve(s), fitting(s), etc. where new acoustical wall modification, chase, or other new item is being installed. Block pipe holes in existing floor (or wall, ceiling, etc.) to match existing floor (or wall, ceiling, etc.) thickness. After installation of new acoustical wall modification, chase or

other new item, reinstall existing radiator(s) and associated piping, valve(s), etc., forward and in front of the new wall modification maintaining the minimum clear dimension between the finish face of the wall and the radiator back as required by State or local building code (or local building official). Cut back and/or extend and reroute existing piping as necessary for a complete and operable radiator installation. Relocated piping shall be installed so as to penetrate up from the floor, not from the wall. All floor penetrations shall be fire-caulked and any exposed to view shall be covered with a chrome-plated escutcheon. Where required, provide new fitting(s), valve(s), piping or radiator, etc. to match existing for a complete and operable installation.

11. EXISTING BASEBOARD RADIATION - REMOVE/REINSTALL AT NEW WALL MODIFICATIONS
    Remove existing baseboard radiator(s) and associated piping, fitting(s), etc. where new acoustical wall modification, chase, or other new item is being installed. Also remove, cut back and reinstall existing baseboard radiators on adjacent intersecting walls, as required. Block pipe holes in existing floor (or wall, ceiling, etc.) to match existing floor (or wall, ceiling, etc.) thickness. After installation of new acoustical wall modification, chase, or other new item, reinstall existing baseboard radiator, and associated piping, fins, fittings, baseboard cover, etc., forward and in front of new wall modification. Cut back and/or extend and reroute existing piping, radiator, and accessories as necessary for a complete and operable radiator installation. Relocated piping shall be installed so as to penetrate up from the floor, not from the wall. Where required, provide new piping, fitting(s), trim, etc., or baseboard radiator to match existing for a complete and operable installation. Where existing removed baseboard is not reusable and cannot be matched, provide new baseboard radiation for the entire room.
12. EXISTING FORCED AIR COMPONENTS - REMOVE/REINSTALL AT NEW WALL/CEILING MODIFICATIONS
    Remove existing forced air grill(s) and/or register(s), associated ductwork, fitting(s), etc. where new acoustical wall or ceiling modification, chase, or other new item is being installed. Block duct holes in existing floor (or wall, ceiling, etc.) to match existing floor (or wall, ceiling, etc. thickness). After installation of new acoustical wall modification, chase or other new item, reinstall existing grill(s), and/or register(s) and associated ductwork, fittings, cover, etc., forward and in front of new wall modification. Cut back and/or extend and reroute existing ductwork and accessories, as necessary, for a complete and operable forced air installation. Relocated ductwork shall be installed so as to penetrate up from the floor, not from the wall. Floor or ceiling registers, grills and associated ductwork shall be moved forward of the new wall modification to maintain a minimum three (3) inch clear dimension between face of new wall modification and wall side of register and/or grill.
13. NEW DUCTWORK PENETRATIONS
    At new floor, wall, or ceiling ductwork openings, the floor, wall and/or ceiling finish(es) affected by new openings shall be repaired to match existing. Openings created for new ductwork shall be no greater than 5/8 inch around the perimeter of the ductwork and shall be filled with fiberglass insulation, backer rod, and sealant (with wood blocking, as required by these Specifications). Provide new metal collar(s) at floor and ceiling penetrations. Where new ductwork passes through a closet space, cut back and adjust existing shelves, bracket(s), rods, etc. to accommodate new ductwork. Provide new shelves, brackets, rods, etc., to match existing where required for a complete and secure installation.

14. NEW DUCTWORK AT FINISH CEILINGS
    Where a finished GWB or other ceiling exists in any space designated to receive new ductwork, remove the portion of ceiling necessary to accommodate the new ductwork installation. Where designated, provide new duct enclosure as detailed. Provide new ceiling material, finish and components, as required, to match existing for a complete, finished installation.
15. NEW DUCTWORK - REWORK EXISTING CEILINGS
    Remove, adjust, and reinstall existing SAT/ACT or other ceiling, as required for installation and measuring of new ductwork and/or duct enclosure, insulation, wall/ceiling modifications, or any work to be completed under this contract. Where exists, adjust and refit ceiling grid and tiles (or other ceiling material) with new duct enclosure or wall/ceiling modifications. Provide new ceiling tiles, grid, components, etc. to match existing, where required for a complete finished installation.
16. EXISTING LAY-IN CEILING TILE AT NEW WALL MODIFICATIONS
    At wall modifications in spaces with existing SAT (or similar) ceiling, remove and reinstall portions of existing ceiling and grid suspension system as required for installation of the new wall modification. Adjust, cut back and/or provide new tiles and/or grid components to match existing for a complete finished installation. New wall modification shall extend up to the existing original finish ceiling or floor/ceiling structure.
17. EXISTING ATTACHED CEILING TILE AT NEW WALL MODIFICATIONS
    At wall modifications in spaces where existing ACT (or similar) ceiling finish, remove and reinstall portions of existing ceiling tiles as required for installation of the new wall modification. Adjust, cut back, reinstall, and/or provide new ACT ceiling tile, components, and supports, as required, to match existing for a complete finished installation. New wall modification shall extend up to the existing original finish ceiling or floor/ceiling structure.
18. EXISTING FIRESTOPS TO BE MAINTAINED
    Maintain all existing firestops at walls and/or floors and/or ceilings and/or other areas. All firestopping that is removed for installation of the new Work shall be maintained by means approved by the State and local building and fire officials. All firestopping that is removed for access to piping or other work shall be reinstalled to its original location after the work is completed. Provide new firestopping material to match existing if existing is not reusable. Interior voids created around new ductwork (or other items) passing through a firestop shall be maximum 5/8 inch at the ductwork (or other item) perimeter. Openings created beyond this dimension shall be filled with material to match the existing fire-stopping material before filling the 5/8 inch void. Fill any voids created in the firestopping with fiberglass batt insulation. Fill voids less than 3/8 inch with fire retardant sealant at the perimeter of the duct, pipe, or other protruding element. At firestops above beams which are removed for passage of new ductwork, provide a sheetmetal shield above the ductwork secured to the subfloor.
19. EXISTING CEILING BEAMS AT NEW WALL/CEILING MODIFICATIONS
    Where false beam(s) or other similar decoration exists (i.e. paneling, trim, etc.) in a ceiling scheduled to receive a new ceiling modification (or where abutting a wall modification), remove existing beams and associated trim, blocking, etc. before installation of new ceiling (or wall) modification. Reinstall existing beams and associated blocking, trim, etc. (or other similar decoration) over original locations. Provide new to

match existing where not salvageable. Where real beams exist, install new gypsum board between and against them. Provide new closure molding where required.

20. NEW WORK IN CLOSET SPACE
    At installation(s) of a new attic access panel, wall or ceiling modification, duct enclosure, etc. or other construction within a closet (or other space(s)), remove existing rod and shelving, etc. (or any other obstruction) required for installation of the new Work. Adjust, as required, and reinstall the existing item(s) to their original location. Replace any item(s) damaged during the course of removal with new to match existing. If items are not reusable, provide new to match existing.
21. EXISTING PANELING/WAINSCOTING AT NEW DUCTWORK ENCLOSURES
    Where a new vertical or horizontal duct or other type enclosure is scheduled to be installed adjacent to a wall (or ceiling) faced with paneling, wainscoting, knotty pine, tile, etc. (or other wall/ceiling treatment); remove, adjust, and reinstall the existing wall/ceiling treatment (and trim where exists) prior to construction of the new enclosure. Provide new finish to match existing where required. Provide new closure trim (vertical and horizontal) where required. In all cases, also remove, adjust, and reinstall existing baseboard and/or ceiling molding on all affected walls. Provide new to match existing where required.
22. EXISTING ABUTTING WALL DIMENSION MATCH
    At wall treatments abutting existing walls lesser in dimension than wall treatments width, extend existing wall as required for full abutment of the new wall treatment and clearance of trim (if exists). New wall construction to match existing. Where a door, frame, and/or shelving, etc. exists; remove, adjust, and reinstall as required. If new wall treatment abuts existing trim remove, adjust and reinstall trim (or provide new to match existing).
23. NEW WORK AT EXISTING LAY-IN CEILING
    Where new insulation and/or ductwork, pipes, etc. are scheduled to be installed over an existing ACT (or similar) ceiling, remove and reinstall the existing ceiling tiles and/or grid suspension system as required to measure and accomplish the Work. Replace any material or components damaged during the course of the Work with new to match existing. Adjust, cut back and/or provide new tiles and/or grid components to match existing, as required, for a complete, finished, installation.
24. EXISTING EXTERIOR SIDING AT REMOVALS - REPAIR TO MATCH EXISTING
    Where an existing electric meter, storm window, door, window or door trim, etc. is being removed or relocated, the Contractor shall repair or replace exterior siding, shingles, trim, etc. affected by the new Work to match existing conditions. Where new siding abuts existing piece that is less than 2 feet long, replace with a new full length piece. Stagger vertical joints a minimum of 2 feet. Where vinyl or aluminum siding exists, match existing exposure, color and texture. Where wood siding, clapboards, or shingles exist, matching existing exposure, color, and finish.
25. EXISTING EXTERIOR PANNING/WRAP - REPLACE TO MATCH EXISTING
    Where new windows or doors are being installed into openings at which the head, jamb, and/or sill trim and/or sill are wrapped with .040-inch colored aluminum, 26 gauge colored coil stock panning or solid plastic trim pieces or extrusions. Design panning to direct drainage to the exterior sung concealed fasteners to the maximum extent practical. Exposed fasteners shall be color coated to match panning with the smallest heads possible. Exposed edges of metal trim shall be hemmed and the edge the full

length with a continuous hook strip or butyl tape. The Contractor shall remove the existing panning or wrap and replace it with new to match existing profile, unless otherwise indicated by the Engineer. Final installation shall be weathertight and maintenance free.

26. EXISTING EXTERIOR SIDING AT NEW INSTALLATIONS - REPAIR TO MATCH EXISTING
    Where any new exterior work such as window, door, louver, or new trim or panning installation affects the existing siding, shingles, clapboards, vinyl or aluminum siding and/or trim, the Contractor shall repair or replace the material affected by the work with new to match existing. Where vinyl or aluminum siding exists, match existing exposure, color, and texture. Where wood siding, clapboards, or shingles exist, match existing exposure, wood species, color, and finish.
27. NEW EXTERIOR SOFFIT VENTS AT EXISTING SOFFIT
    Where new continuous aluminum undereave soffit vents are being installed, remove existing wood soffit for entire length of new vents and provide a new exterior grade plywood soffit with thickness to match existing. Provide continuous sealant at perimeter of new vent and where new soffit abuts existing. At existing aluminum or vinyl soffits, remove and replace with new soffit designed to receive vent or install new vent into existing soffit per vinyl or aluminum siding manufacturer directions/details.
28. STUCCO MATCHING
    Exterior stucco shall be mixed and applied to match existing texture, and shall be ready to receive finish paint. If the existing stucco is an integral color material, the new stucco shall match that color.
29. MASONRY MATCHING
    Masonry shall be installed using materials which match existing. If existing masonry is an integral color material, the new masonry shall match that color. Fit masonry units into bonding and coursing pattern. Mortar joint width and color to match existing.
30. NEW WINDOWS/DOORS - REMOVE AND REINSTALL ITEMS
    Where required for the installation of a new window or door (or other work); remove existing shutters, planters, fire escapes, etc., or any other item (decorative or otherwise) thereof that impedes the Work. Prepare openings to receive new work. Openings shall be squared, plumbed and leveled so new windows and door operate easily and smoothly without binding. Reinstall the existing shutter(s), planter(s), etc. to the original location(s) (or new approved location where required) with new galvanized fastening devices as required for a complete, secure, and safe reinstallation. If damaged upon removal, provide new items finished to match existing.
31. NEW EXTERIOR LOUVERS/VENTS - REMOVE AND REINSTALL ITEMS
    Where new acoustic louvers, vents, or secondary door or window, etc., or other item(s) are to be installed, remove existing antenna, flagpole, lighting, fire escape, rails, bars, etc., or any other item (decorative or otherwise) required to complete the Work. Reinstall item to its original location (or new approved location, where required). Provide new galvanized fastening devices where required for a complete, secure, and safe installation. If damaged upon removal, provide new items finished to match existing.
32. NEW WALLS/CEILINGS - EXTEND ELECTRICAL ITEMS
    At new wall and ceiling modifications, all existing wall or ceiling lighting fixtures, smoke alarms, switches, receptacles, fans, or other electrical items (exclusive of security or fire alarm systems) shall be extended forward to accommodate the new wall or ceiling

modification. The above electrical item reference also includes telephone, coaxial, and audio cables. All work shall be in accordance with the National Electrical Code.

33. CLEANING

Thoroughly clean areas and spaces where cutting and patching is performed or used as access. Remove completely paint, mortar, oils, putty and items of similar nature. Where existing exterior surface adjacent to the patch is stained or discolored from mildew, grime, pollution or dirt so that the new patch area is obvious, thoroughly clean the entire wall with manufacturers spray-on liquid cleaner. Apply cleaner using a hand-held wand applicator in accordance with the product manufacturer's instructions. Thoroughly rinse and remove all residue with clean water. Thoroughly clean piping, conduit and similar features before painting or other finishing is applied. Restore damaged pipe covering to its original condition.

END OF SECTION

SECTION 017836 – WARRANTIES AND BONDS

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

A. Drawings and general provisions of Contract, and other Specification Sections, apply to this Section.

1.2 SUMMARY

A. This Section specifies general administrative and procedural requirements for warranties and bonds required by the Contract Documents, including manufacturer's standard warranties on products and special warranties.

1. Refer to the Contract Documents for terms of the Contractor's special warranty of workmanship and materials.
2. General close-out requirements are included in Section 017000 "PROJECT CLOSE-OUT."
3. Specific requirements for warranties for the Work and products and installations that are specified to be warranted are included in the individual Specification Sections.

B. Disclaimers and Limitations: Manufacturer's disclaimers and limitations on product warranties do not relieve the Contractor of the warranty on the Work that incorporates the products, nor does it relieve suppliers, manufacturers, and subcontractors required to countersign special warranties with the Contractor.

1.3 WARRANTY REQUIREMENTS

A. The General Contractor shall furnish an electronic copy of warranty against defects in workmanship and materials related to the installation of the Work for a period of one (1) year after the date of substantial completion for the Contract. Proposed guarantee and warranty documents must be submitted to the Engineer for review and approval with other required submittals prior to commencement of construction.

B. All guarantees and warranties required in the various sections of the specifications which originate with a Subcontractor or Manufacturer must be delivered to the Engineer before final payment to the Contractor may be made for the amount of that sub-trade or for the phase of work to which the guarantee or warranty relates. Upon final inspection and completion of punch listed items for each residence, the Contractor should submit in duplicate, a guarantees and warranties package specific to each individual residence, to the Engineer. Each package will stipulate that, after the Contractor's guarantee period the aforementioned guarantees and warranties will include as beneficiaries each of the Homeowners for the properties which are part of this contract. The warranty packages should also include product descriptions, operation and maintenance information suitable for the Homeowners. Warranties shall be submitted in a format approved by the Engineer.

C. Related Damages and Losses: When correcting warranted Work that has failed, remove and replace other Work that has been damaged as a result of such failure or that must be removed and replaced to provide access for correction of warranted Work.

D. Reinstatement of Warranty: When Work covered by a warranty has failed and been corrected by replacement or rebuilding, reinstate the warranty by written endorsement and provide an electronic copy. The reinstated warranty shall be equal to the original warranty with an equitable adjustment for depreciation.

E. Replacement Cost: Upon determination that Work covered by a warranty has failed, replace or rebuild the Work to an acceptable condition complying with requirements of the Contract Documents. The Contractor is responsible for the cost of replacing/rebuilding defective Work regardless of whether the Homeowner has benefited from use of the Work through a portion of its anticipated useful service life.

F. CEA's Recourse: Written warranties made to the Homeowners are in addition to implied warranties, and shall not limit the duties, obligations, rights and remedies otherwise available under the law, nor shall warranty periods be interpreted as limitations on time in which the CEA can enforce such other duties, obligations, rights, or remedies. The CEA reserves the right to reject warranties and to limit selections to products with warranties not in conflict with requirements of the Contract Documents.

1.4 SUBMITTALS

A. Submit electronic copies of written warranties to the Engineer prior to the date certified for Substantial Completion of each Home. If the Engineer's Certificate of Substantial Completion designates a commencement date for warranties other than the date of Substantial Completion for the Work at each Home, submit written warranties upon request of the Engineer.

B. When a special warranty is required to be executed by the Contractor, or the Contractor and a Subcontractor, supplier or manufacturer, prepare a written document that contains appropriate terms and identification, ready for execution by the required parties. Submit an electronic draft to the CEA through the Engineer for approval prior to final execution.

1. Refer to individual Specification Sections for specific content requirements, and particular requirements for submittal of special warranties.

PART 2 - PRODUCTS (Not Applicable)

PART 3 - EXECUTION (Not Applicable)

END OF SECTION

SECTION 028000 - ABATEMENT OF ASBESTOS AND LEAD WASTE

PART I GENERAL

1.1 SECTION INCLUDES

A. Sampling, removal, transportation, and disposal of Asbestos Containing Material (ACM) and surfaces coated with Lead-Based Paint (LBP) as specified herein.

B. Protection, documentation, and other procedures as required herein.

1.2 REFERENCES

A. ASTM E1368 - Standard Practice for Visual Inspection of Asbestos Abatement Projects

1.3 GENERAL PROCEDURAL REQUIREMENTS

A. CONTRACTOR is responsible for all asbestos and lead-based paint material encountered on the project. CONTRACTOR shall bear all costs for testing, labor, materials, equipment, plans, specifications, and services required for abatement, sealing, containment, transportation, and disposal of ACM and LBP.

B. CONTRACTOR shall ensure proper licensure by (1) Illinois Department of Public Health (IDPH) Asbestos and Lead Division, (2) Department of Environmental Protection, Division of Air Quality and (3) Federal Environmental Protection Agency, Lead: Renovation, Repair and Painting Program and certification of all workers involved in sampling, testing, removal, transportation, disturbing and disposal of ACM and LBP from homes and properties.

C. CONTRACTOR shall follow Federal EPA RRP, Federal and State OSHA, Illinois Department of Public Health Childhood Lead Poisoning Prevention Program and Illinois EPA procedures for review and approval of site safety and for contingency plans for work on asbestos and LBP sites, and Cook County Department of Environment and Sustainability.

D. The ENGINEER shall conduct pre-testing of suspected ACM and LBP associated with Work prior to disturbance of surfaces, utilizing an independent third party firm to determine presence of ACM and/or LBP as required by regulation(s). Sampling for pre-testing shall be completed prior to CONTRACTOR's field measurements.

E. CONTRACTOR shall conduct testing during removal of ACM and LBP, utilizing independent third party firm, where required by Federal EPA, Illinois Department of Public Health and Cook County Department of Environment and Sustainability.

F. CONTRACTOR shall conduct clearance-testing at conclusion of removal of ACM and LBP to demonstrate that clearance requirements have been met, utilizing independent third party firm, as required by regulations. Failure requires that abatement process continue and unlicensed personnel are restricted from work areas until satisfactory clearance testing results are achieved. ACM clearance test results must be provided to the ENGINEER within eight (8) hours of sampling. If LBP clearance test results are required by regulation, they must also be provided to the ENGINEER within twenty four (24) hours of sampling.

G. CONTRACTOR shall ensure compliance with current federal, state, and local regulations concerning testing, waste handling, transportation, and disposal of ACM and LBP.

H. This project is not intended to provide general removal of ACM or LBP. ACM and LBP removal shall be limited to those areas necessary to complete improvements specified under this program.

I. Homes in this project have been tested for presence of lead-based paint. CONTRACTOR shall follow Federal EPA, Lead: Renovation, Repair and Painting Program regulations for lead-safe work practices.

J. Individual designs contained in the Project Manual identify potential hazardous materials. Testing has been conducted prior to construction to identify ACM or LBP in those areas necessary to complete improvements specified under this program.

K. CONTRACTOR shall submit a Notification to the Cook County Department of Environment and Sustainability and Illinois EPA for each individual home containing asbestos.

L. Estimated Quantities: CONTRACTOR shall use the following quantities for bidding asbestos removal work. If necessary, abatement work in excess of the following quantities shall be by change order approved by the ENGINEER.

1. HVAC-related asbestos removal – Asbestos is in the form of asbestos tape and duct wrapping. Total ACM area for entire project to be removed to accommodate HVAC scope is **one hundred (100) SF**. This quantity includes amount of ACM to be removed to make necessary mechanical penetrations.
2. General construction asbestos removal – Asbestos is in the form of asbestos siding. Total ACM area for entire project to be removed to accommodate General Scope is **fifty (50) SF** (removal and replacement of asbestos siding).
3. Electrical asbestos removal – Asbestos is in the form of asbestos siding. Total ACM area for entire project to be removed to accommodate electrical Scope of Work is **twenty (20) SF** (removal and replacement of asbestos siding).

1.4 REGULATIONS

A. CONTRACTOR shall comply with all applicable federal, state, municipal, and local regulations for the handling of ACM and LBP. This includes, but is not limited to:

1. U.S. Environmental Protection Agency (EPA), including Title 40, Code of Federal Regulations, Part 61, Sub-parts A and M, National Emission Standards for Hazardous Air Pollutants, (EPA).
   U.S. Environmental Protection Agency (EPA), including Title 40, Code of Federal Regulations, Part 745, Lead-Based Paint Poisoning Prevention In Certain Residential Structures, Subpart E, (EPA)
2. Occupational Safety and Health Administration (OSHA), including Title 29, Code of Federal Regulations, Part 1910.1025, Lead in General Industry Standard, Title 29, Code of Federal Regulations, Part 1926.62, Lead in Construction Standard, Title 29, Code of Federal Regulations, Part 1910.1001, Asbestos in General Industry Standard,

and Title 29, Code of Federal Regulations, Part 1926.1101, Asbestos in Construction Industry Standard, OSHA, U.S. Department of Labor.
Occupational Safety and Health Administration (OSHA), including Title 29, Code of Federal Regulations, Part 1926.59, Hazard Communication in Construction Standard and Title 29, Code of Federal Regulations, Part 1910.1200, Hazard Communication in General Industry Standard

3. Illinois Department of Public Health, EPA, and Illinois EPA most recent rules, regulations, and amendments pertaining to ACM and lead handling.
4. Recommendations of the National Institute of Occupational Safety and Health (NIOSH).
5. ASTM Standard E 1368, Practice for Visual Inspection of Asbestos Abatement Projects.
6. Cook County Department of Environment and Sustainability pertaining to Asbestos and lead regulations and permitting. 30-548
7. General CONTRACTOR shall inform HOMEOWNERS of hazards from LBP, lead contaminated dust, and lead contaminated soil prior to renovations, in accordance with Section 406 (a) of Toxic Substances Control Act (TSCA). This may be accomplished by giving HOMEOWNERS a copy of Environmental Protection Agency (EPA) Pamphlet titled "Protect Your Family From Lead in Your Home" (most recent version). Copies may be obtained from EPA website (www.epa.gov). CONTRACTOR shall contact regional EPA office to confirm that pamphlet meets state level requirements for homeowner notification as well. Obtain a signed acknowledgement from HOMEOWNER documenting receipt of pamphlet.
8. Prior to starting any work, CONTRACTOR shall submit documentation that all of the **ABATEMENT CONTRACTOR's** employees involved with the Work of this Contract have attended an awareness training course in accordance with EPA 40 CFR 763 (asbestos) and OSHA 29 CFR 1926.1101 (asbestos), OSHA 29 CFR 1910.1025 (respiratory protection), and OSHA 29 CFR 1926.62 (lead) training requirements. As a minimum, the course(s) shall include training for employees in the proper procedures to be followed when and if hazardous materials are encountered within a residence.

B. Disposal sites which accept ACM and lead waste shall be permitted by the Illinois Environmental Protection Agency/U.S. Environmental Protection Agency to accept such material.

C. When there is a conflict or overlap of the above references, the most stringent provision is applicable.

D. In the event that any requirement of this Specification contradicts any other requirement, immediately notify the ENGINEER of such a contradiction. In such cases, the regulation or law shall apply.

E. Post all applicable regulations in a conspicuous place at jobsite. Assure that the regulations are not altered, defaced, or covered by other materials.

F. All work conducted on target housing or child-occupied facilities shall be performed in accordance with 40 CFR 745, subpart E. CONTRACTOR shall be responsible for information distribution requirements, renovator and dust sampling technician certification, and work

practice standards as applicable.

a. See link for brochure: http://www.epa.gov/lead/pubs/renovaterightbrochure.pdf

1.5 LICENSING AND CERTIFICATION REQUIREMENTS

A. CONTRACTOR shall employ and utilize workers holding a current valid asbestos handling license as required by Illinois Department of Public Health. Contractor performing removal of asbestos must have minimum three (3) years' experience in asbestos handling. Conspicuously display a copy of a valid asbestos handling license proximate to but outside the work area during the duration of the project. Permit only those persons who hold valid asbestos handling certificates and are at least 18 years old to engage in Work on this project.

B. CONTRACTOR shall employ and utilize supervisors and workers trained and certified in lead-safe work practices as required by Federal EPA, Lead: Renovation, Repair and Painting Program and Illinois Cabinet for Health and Family Services. Certification shall be provided by an accredited firm. Permit only those persons under the supervision of an EPA Certified Renovator, who hold valid LBP handling certification from the State of Illinois and are at least 18 years old to engage in Work on this project.

1.6 NOTICE AND RECORDKEEPING

A. Maintain, for at least thirty (30) years, a record of each asbestos project in which the CONTRACTOR engages as required by all federal and state rules, laws, regulations, and requirements.

B. Provide an entire copy of all records required by regulatory agencies to the ENGINEER at the conclusion of the project.

1.7 DEFINITIONS

A. Definitions included in Federal EPA, Lead: Renovation, Repair and Painting Program, Illinois Department of Public Health Lead Program, Federal and State OSHA and Illinois Environmental Protection Agency and other references apply throughout the Contract Documents.

1.8 SUBMITTALS AND NOTICES

A. Prior to Commencement of Work, submit the following documents to the ENGINEER in a single bound, indexed submittal. Do not start work until these submittals are returned with the ENGINEER'S action stamp indicating that the submittal is returned for unrestricted use.

1. Copy of CONTRACTOR's asbestos license.
2. Copy of Residential Property Renovation permit(s).
3. Documentation as described in section 1.04(A)(7) demonstrating proper awareness training for all workers.

4. Documentation as described in section 1.05 demonstrating proper licensure and certification of workers performing ACM and LBP work.
5. Documentation that laboratory chosen to perform air monitoring is properly certified by DPH to conduct such analysis and that sampling technicians are properly certified.

6. Documentation that required permits, disposal site locations, and arrangements for transportation /disposal of ACM and lead waste have been obtained.
   a. On a weekly basis submit electronic copies of all manifests and disposal site receipts to the Engineer.
7. Construction abatement work plan including, but not limited to, the following information:
   a. Abatement sequencing and timetable.
   b. Size, length, and number of work shifts per day/per week.
   c. Mobilization schedule.
   d. Variances to be used at specific locations.
8. Plan of Action:
   a. Submit a detailed plan of the procedures proposed for use in complying with the requirements of this specification. Include in the plan the location and layout of controlled areas, the sequencing of work, the interface of trades involved in the performance of work, methods to be used to assure the safety of building occupants and visitors to the site, and a detailed description of the methods to be employed to control pollution. Expand upon the methods of removal to prohibit visible emissions in work area, closing out of the building's HVAC system, and packaging of removed building components. CONTRACTOR shall supply documentation that the workers have been trained in Lead-Safe Work Practices. The plan must be approved by the ENGINEER prior to commencement of work.
9. Provide a notarized statement, signed by an officer of the asbestos abatement firm, indicating that required written notifications have been provided, including notifications to IEPA regional office with jurisdiction over project area in accordance with Title 40 CFR Part 61 Subparts A & M, National Emission Standards for Hazardous Air Pollutants, and U.S. EPA and Cook County Department of Environment and Sustainability.
10. Provide electronic copies of written correspondence to HOMEOWNERS, including required 10-day advance notifications.
11. Provide signed receipts, waste manifests from facilities that accepted ACM and LBP wastes for disposal.
12. Provide all testing results, including pre-construction testing, post-construction testing, and all testing conducted during construction.

1.9 RESPONSIBILITY FOR AIR MONITORING DURING ASBESTOS WORK

A. CONTRACTOR is responsible for air monitoring, utilizing an independent firm.

B. Air monitoring subcontractor shall not be affiliated with CONTRACTOR.

1.10 PROJECT MONITOR

A. Provide access, assistance, and documentation to the ENGINEER as may be required to verify conformance with Contract Documents. Authorized representative shall advise the ENGINEER of substantial nonconformance with contract documents and/or situations presenting a health hazard or other danger to workers, occupants, or real property is observed during the course of their review of project. Work shall not resume until corrective measures have been made to satisfaction of the ENGINEER.

B. Authorized representative will advise the ENGINEER on environmental matters. Such advisement does not relieve CONTRACTOR's obligation to comply with applicable health and safety regulations promulgated by federal, state, or local governments. No activity on part of the ENGINEER represents CONTRACTOR's compliance with applicable health and safety regulations.

1.11 PROTECTION OF CONTRACTOR'S PERSONNEL

A. CONTRACTOR is responsible for protection of work force. Worker protection shall include compliance with OSHA 29 CFR 1926.1101, OSHA 29 CFR 1926.62, OSHA 29 CFR 1910.1025 and OSHA 1910.1001 as applicable.

B. Reduce worker's exposure to asbestos and lead to as low a level as practicable. In addition to appropriate engineering and administrative controls, proper respiratory protection shall be utilized to minimize exposure.

C. Provide workers, as a minimum, with respirators equipped with high efficiency particulate filters approved by NIOSH for asbestos/lead work to be worn whenever a potential exposure to asbestos or lead exists. Sufficient filters shall be provided for replacement as required by applicable regulations. Provide other types of respirators where required. Disposable respirators shall not be used. CONTRACTOR shall ensure that workers are trained in the proper use of respirators and other equipment.

D. Provide workers with sufficient sets of protective clothing as applicable to the hazards of the area, including disposable clothing, proper footwear, eye protection, and other required or advised protective clothing. Protective clothing and footwear shall be disposed of as asbestos or lead waste as applicable.

E. Protective clothing shall not be worn in lieu of street clothing outside the work area.

PART 2 MATERIALS AND EQUIPMENT

2.1 MATERIALS

A. Deliver all materials in original packages, containers, or bundles bearing the name of the manufacturer and the brand name.

B. **Fire resistant polyethylene sheets** of six (6) mil minimum thickness shall be used as coverings unless otherwise specified. Fire resistant polyethylene sheets shall be sized to minimize the frequency of joints.

C. Materials for fastening and adhering shall be capable of adhering under dry and wet conditions.

D. Sealable polyethylene bags of six (6) mil minimum thickness shall be used. Bags shall be sized to fit within drums specified below.

E. Sealable drums of 30 or 55-gallon capacity shall be of fiber or metal with tightly fitting lids. The drums and bags shall be labeled in accordance with OSHA and Federal EPA requirements and shall be air and water tight.

F. Wetting agents shall be non-toxic and non-carcinogenic.

G. "Spray poly" or similar materials may not be used in this Project.

H. Encapsulant materials shall be an EPA approved bridging and penetration type and conform with the following characteristics:

1. Encapsulants shall not be solvent-based or utilize a hydrocarbon in the liquid in which the solid parts of the encapsulant are suspended.
2. Encapsulants shall not be flammable.
3. Encapsulants shall not form any hazard to residents of the residence in which the work is being completed.

I. CONTRACTOR shall provide all water required to complete ACM and/or LBP removal.

2.2 TOOLS AND EQUIPMENT

A. Provide suitable tools for removal of asbestos-containing materials and lead waste. Metal shovels shall not be used to pick up or remove waste products.

B. Provide sufficient number of high efficiency particulate air (HEPA) filtered vacuum cleaners equipped with wet pick-up adapters, steel floor wands, crevice tools, and carpet tools. All vacuuming of ACM and LBP shall be done with HEPA filtered vacuum cleaners.

C. Airless sprayers capable of spraying amended water shall be provided in sufficient number to allow continuous uninterrupted work.

D. Power tools used to drill, cut, saw or otherwise disturb asbestos material and/or LBP materials shall be equipped with HEPA filtered local exhaust ventilation.

E. Ladders, Platforms, and/or Scaffolds: Scaffolds, platforms, and ladders shall comply with all applicable codes. Seal scaffold or platform joints and ends with tape to prevent incursion of asbestos. Make available to authorized visitors, ladders, platforms, and/or scaffolds of sufficient dimension and quantity so that all work surfaces can be easily and safely reached.

PART 3 EXECUTION

3.1 TEMPORARY POWER AND LIGHTING

A. Provide temporary power for equipment and lighting within the work area as defined by all governing regulations and codes. Ensure safe installation and use of power and lighting within the work site per applicable electrical code requirements and provide safety lighting and ground fault interrupter circuits as power source of electrical equipment and lighting.

B. The HOMEOWNER will not provide power.

C. Ensure continued power for HOMEOWNER'S needs.

3.2 PRECLEANING OF REMOVABLE OBJECTS

A. Pre-clean removable objects within the proposed work areas using HEPA filtered vacuum equipment and/or wet cleaning methods as appropriate. Properly remove objects from work area before abatement operations commence.

3.3 WORK BARRIERS

A. Provide, maintain, and protect all work barriers required by state and federal regulations.

B. Ensure work areas are clearly marked with approved warning or caution signs.

C. In the event that HOMEOWNERS and/or tenant(s) enter work areas during ACM/LBP disturbance/removal, discontinue work until such individuals are clear of work areas. CONTRACTOR shall document the event.

3.4 ASBESTOS-CONTAINING MATERIAL REQUIREMENTS

A. Dry Removal or Disturbance: No dry removal or disturbance of ACM shall be permitted.

B. Wetting Requirements: Wet the ACM frequently with amended water. Allow sufficient time for penetration to occur prior to abatement activities. Saturate all friable materials. Thoroughly wet all non-hydroscopic ACM on a continuous basis.

C. Handling: Directly bag ACM on detachment from the substrate.

D. Handling Large Components: Wrap large components to be removed intact, in two layers of at least six (6)-mil plastic sheeting. Secure and make airtight with tape.

E. Sharp-edged Components: Place ACM with sharp-edged components that may tear the plastic bags or sheeting into hardwall containers and seal airtight.

3.5 LEAD-BASED PAINT MATERIAL REQUIREMENTS

A. A child may not be present during work related to disturbance of, or removal of, paint from the indoor or outdoor surfaces of the facility.

B. Removal, clean-up, and disposal of LBP dust and debris shall be accomplished in a manner that prevents dispersal of dust and debris into the environment.

C. Abrasive removal methods, which include dry sanding, electrical sanding, and sandblasting or open flame burning, or a removal process that permits release of the leaded particulate material into the environment are prohibited.

D. Dust and debris generated by removal shall be disposed of in accordance with applicable federal, state, and local regulations.

E. During work, protect workers from LBP hazards using lead safe work practices, as recommended by the National Association of the Remodeling Industry (NARI). In addition, work shall be completed consistent with the U.S. Department of Labor Occupational Safety and Health Administration, Lead in Construction Standard and Lead in General Industry Standard.

3.6 ENCAPSULATION AND WORK AREA PROCEDURES

A. Encapsulation shall commence upon completion of both of the following:

1. Removal and proper containment of ACM.
2. CONTRACTOR has cleaned up the work site of all loose debris and water and disposed of as ACM.

B. The following surfaces within the work areas shall be sprayed with tinted encapsulant to seal exposed surface. All encapsulants shall be applied in accordance with the manufacturer's recommendations.

1. Any surface where ACM was removed (coordinate with the ENGINEER to avoid any damage to finishes or furnishings of the residential property owner).
2. Exposed edges of transite flue pipes in all residences with such pipes.

C. Employ Federal EPA RRP methods at door and window installations. In addition, the following guidelines must be followed:

1. Turn off forced air heating and air conditioning systems to spaces where work is being performed.

2. Install fire resistant six (6) mil polyethylene sheeting over doorways, vents, grilles, registers, and other openings into spaces where work is being performed.
3. Make available at least one room that HOMEOWNER/tenant(s) may utilize that is not currently disrupted/occupied by construction activities or workers.
4. Mist spray with water, door and window frames, as well as adjacent areas surfaces being worked on to reduce dust and chips.
5. Prior to start of work, remove dust, paint chips, dirt, and similar loose debris within five (5) feet in all directions of surfaces that will be disturbed by renovations, using HEPA vacuum systems. Clean again at end of work day with HEPA vacuum systems.
6. Remove and replace trim disturbed by Work with new trim and dispose of existing trim. Finish new trim per Specifications to match existing trim.
7. Temporary storage prior to disposal shall be at permitted location under control of CONTRACTOR as approved by the ENGINEER. Temporary storage is not permitted within private residences or properties.

3.7 CONTINUOUS CLEANING

A. Clean asbestos-containing and lead-containing debris and contaminated water from the work area as soon as it is identified using wet methods and HEPA vacuuming equipment. Place debris and water in bags. Seal bags and remove from the residence.

B. Clean all enclosure systems at least once each two hours. Keep work area floors and other surfaces as dry and free of any waste as possible.

3.8 EQUIPMENT AND MATERIAL REMOVAL PROCEDURES

C. Clean external surfaces of ACM bags or containers, materials and equipment thoroughly by wet sponging or HEPA vacuuming before moving such items into the equipment decontamination enclosure system washroom for final cleaning and removal to uncontaminated areas. Equipment, materials and containers shall be free of all visible debris and dust. Do not remove items from the work area without first notifying the ENGINEER. All items shall be subject to inspection by the ENGINEER who will designate items requiring further decontamination of visible debris and dust. Ensure that personnel do not leave the work areas through the equipment decontamination enclosure system unless otherwise directed or noted.

3.9 HANDLING AND DISPOSAL OF ASBESTOS-CONTAMINATED OR LEAD- CONTAMINATED WASTE

A. Bagging and Drumming Waste

1. Seal bags of waste with tape in the work area. Gooseneck tape method shall be utilized. Do not allow asbestos waste to dry out prior to sealing bags. While in the work area, bags shall be properly decontaminated. Deposit bags into clean sealable drums immediately adjacent to the work area and transport waste directly to the landfill in such drums. Seal and mark filled drums with the label prescribed by OSHA and the EPA.

B. Handling of Contaminated Water and Wastewater

1. Do not dispose of contaminated water from the work area through any plumbing fixture or system within a residence. Contaminated water must be contained, collected, and disposed of by CONTRACTOR using his own facilities off-site.

C. Transportation of Waste

1. Ensure that the sealed drums are transported to the waste disposal site. Sealed bags may be removed from the drums and deposited at the disposal site. If bags are broken or damaged, leave them in the drums and dispose the sealed drums per the disposal site policy. Uncontaminated drums may be recycled.

D. Waste Manifest System

1. Establish a manifest system that accounts for all asbestos and lead waste. Describe the manifest system in writing for review and acceptance by the ENGINEER. Demonstrate custody over all waste from the time it is removed from the work area until it is deposited at the landfill.
2. Provide electronic copies of the written description, the manifest, and receipts generated during the handling and disposal process to the ENGINEER.
3. Provide final manifest and documents to the ENGINEER within **ten (10) working** days of the removal of materials from the site by the waste hauler.

3.10 FINAL CLEAN UP

A. Removal of Waste: Remove all containerized waste from the work area and the residence immediately after finishing the ACM and lead waste removal and encapsulation work.

B. Removal of Tools and Equipment: Remove all tools and equipment from the work area immediately after work is complete. Place into sealed airtight hardwall container and decontaminate within CONTRACTOR's own facilities outside of the residence.

C. Perform a complete visual inspection of the work area under adequate lighting to ensure the work area is free of visible asbestos and or lead material, debris and dust.

D. After CONTRACTOR has completely removed equipment and materials from the work area of each residence, the residential owner (if available), the ENGINEER, CONTRACTOR, and ILAPCD shall conduct an inspection of the area to ensure it is in an acceptable condition.

3.11 SCHEDULE OF WORK

A. See individual Scopes of Work, for each home, for description of asbestos containing materials and lead-based paints.

B. Each HOMEOWNER and the ENGINEER must be notified in writing in accordance with regulations prior to removal of ACM. Notifications must contain specific time frames and dates in which HOMEOWNER will experience loss of use of portions of their home. In the

interest of maintaining the construction schedule, time required for removal of ACM is not counted against the working days allotted for the home(s) requiring ACM removal. CONTRACTOR is allowed five (5) calendar days to complete ACM removal for each home requiring such work. ACM removal work shall be completed prior to commencement of construction.

C. Notify local, state, and federal agencies as required for type of asbestos abatement conducted at individual homes.

3.12 QUALITY ASSURANCE

A. Asbestos and/or lead abatement, sealing, removal, containment, or disposal shall be done by abatement CONTRACTOR licensed and/or certified in/by state or commonwealth where work is performed.

3.13 LIABILITIES

A. CONTRACTOR is responsible for liabilities, damages, and / or settlements that may occur, relative to abatement, sealing, removal, containment, transportation, or disposal of ACM and/or LBP materials.

3.14 QUALITY CONTROL

A. CONTRACTOR is responsible for protection and repair of adjacent surfaces or areas damaged as a result of this work. Personal safety, maintenance of materials, and equipment are CONTRACTOR responsibilities. Repair, replacement, or restoration of damaged areas or defective materials, equipment, or work shall be at no cost to CEA, the ENGINEER, or HOMEOWNER.

B. If existing materials of construction are removed for access to ACM, CONTRACTOR shall provide new materials finished to match existing.

SECTION 028000 - ABATEMENT OF ASBESTOS AND LEAD WASTE

ACKNOWLEDGEMENT

Project: CHICAGO EXECUTIVE AIRPORT
RESIDENTIAL SOUND INSULATION PROGRAM

I, _____, hereby acknowledge receipt of the
(Printed name)
pamphlet entitled "Protect Your Family from Lead in Your Home," prepared by the United

States Environmental Protection Agency. This pamphlet was hand delivered on _____.
(Date)

(Please check one or both of the following boxes)

☐ I certify that I am the owner of the property located at _____.

☐ I certify that I reside at the property located at _____.

_____
(Signature)

_____
(Date)

END OF SECTION

SECTION 040120 - MAINTENANCE OF UNIT MASONRY

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

A. Drawings and general provisions of the Contract, including General and Special Conditions and Division 01 Specification Sections, apply to this Section.

1.2 SUMMARY

A. Section includes maintenance of unit masonry consisting of masonry restoration and cleaning.

1.3 SUBMITTALS

A. Product Data: For each type of product indicated. Include recommendations for application and use. Include test data substantiating that products comply with requirements.

1.4 QUALITY ASSURANCE

A. Source Limitations: Obtain each type of material for masonry restoration (face brick, cement, sand, etc.) from one source with resources to provide materials of consistent quality in appearance and physical properties.

1.5 DELIVERY, STORAGE, AND HANDLING

A. Deliver materials to Project site in manufacturer's original and unopened containers, labeled with manufacturer's name and type of products.

B. Store cementitious materials on elevated platforms, under cover, and in a dry location. Do not use cementitious materials that have become damp.

1.6 PROJECT CONDITIONS

A. Weather Limitations: Proceed with installation only when existing and forecasted weather conditions permit masonry restoration and cleaning work to be performed according to manufacturers' written instructions and specified requirements.

B. For manufactured repair materials, perform work within the environmental limits set by each manufacturer.

PART 2 - PRODUCTS

2.1 MASONRY MATERIALS

A. Face Brick: Provide face brick meeting physical properties per ASTM C 67, including specially molded, ground, cut, or sawed shapes where required to complete masonry restoration work.

1. Provide units with colors, color variation within units, surface texture, size, and shape to match existing brickwork.

2.2 MORTAR MATERIALS

A. Portland Cement: ASTM C 150, Type I or Type II, color matching of exposed mortar.

1. Provide cement containing not more than 0.60 percent total alkali when tested according to ASTM C 114.
2. Products: Subject to compliance with requirements, provide one of the following:

a. Quikrete Companies.
b. Sakrete, Bonsal American, Inc.
c. Or Approved Equal.

B. Hydrated Lime: ASTM C 207, Type S.

C. Factory-Prepared Lime Putty: ASTM C 1489.

D. Quicklime: ASTM C 5, pulverized lime.

E. Mortar Sand: ASTM C 144 unless otherwise indicated.

1. For pointing mortar, provide sand with rounded edges.
2. Match size, texture, and gradation of existing mortar sand as closely as possible. Blend several sands if necessary to achieve suitable match.

F. Mortar Pigments: Natural and synthetic iron oxides, compounded for mortar mixes. Use only pigments with a record of satisfactory performance in masonry mortars.

G. Water: Potable.

2.3 PAINT REMOVERS

A. Solvent-Type Paint Remover: Manufacturer's standard water-rinsable, solvent-type gel formulation for removing paint coatings from masonry.

1. Products: Subject to compliance with requirements, provide one of the following:

a. ABR Products, Inc.; Super Bio Strip Gel.

b. Diedrich Technologies Inc.; 505 Special Coatings Stripper.
c. Dumond Chemicals, Inc.; Peel Away 2.
d. Hydroclean, Hydrochemical Techniques, Inc.; Hydroclean HT-300 Solvent Paint Remover.
e. Price Research, Ltd.; Price Strip-All.
f. PROSOCO; Sure Klean Fast Acting Stripper.
g. Or Approved Equal.

2.4 CLEANING MATERIALS

A. Cleaning Agent: Detergent type.

1. Products: Subject to compliance with requirements, provide one of the following:

a. Diedrich Technologies Inc.
b. PROSOCO Inc.
c. STO Corporation.
d. Or Approved Equal.

PART 3 - EXECUTION

3.1 BRICK REMOVAL AND REPLACEMENT

A. Remove bricks that are damaged, spalled, or deteriorated. Carefully demolish or remove entire units from joint to joint, without damaging surrounding masonry, in a manner that permits replacement with full-size units.

B. Support and protect remaining masonry that surrounds removal area. Maintain flashing, reinforcement, lintels, and adjoining construction in an undamaged condition.

C. Notify Engineer of unforeseen detrimental conditions including voids, cracks, bulges, and loose units in existing masonry backup, rotted wood, rusted metal, and other deteriorated items.

D. Remove in an undamaged condition as many whole bricks as possible.

1. Remove mortar, loose particles, and soil from brick by cleaning with hand chisels, brushes, and water.
2. Remove sealants by cutting close to brick with utility knife and cleaning with solvents.
3. Store brick for reuse. Store off ground, on skids, and protected from weather.
4. Deliver cleaned brick not required for reuse to homeowner unless otherwise indicated.

E. Clean bricks surrounding removal areas by removing mortar, dust, and loose particles in preparation for replacement.

F. Replace removed damaged brick with other removed brick in good quality, where possible, or with new brick matching existing brick, including size. Do not use broken units unless they can be cut to usable size.

G. Install replacement brick into bonding and coursing pattern of existing brick. If cutting is required, use a motor-driven saw designed to cut masonry with clean, sharp, unchipped edges.

1. Maintain joint width for replacement units to match existing joints.
2. Use setting buttons or shims to set units accurately spaced with uniform joints.

H. Lay replacement brick with completely filled bed, head, and collar joints. Butter ends with sufficient mortar to fill head joints and shove into place. Wet both replacement and surrounding bricks.

1. Tool exposed mortar joints in repaired areas to match joints of surrounding existing brickwork.
2. Rake out mortar used for laying brick before mortar sets and point new mortar joints in repaired area to comply with requirements for repointing existing masonry, and at same time as repointing of surrounding area.
3. When mortar is sufficiently hard to support units, remove shims and other devices interfering with pointing of joints.

3.2 PAINTING STEEL UNCOVERED DURING THE WORK

A. Inspect steel exposed during masonry removal. Where Engineer determines that it is structural, or for other reasons cannot be totally removed, prepare and paint it as follows:

1. Remove paint, rust, and other contaminants as applicable to meet paint manufacturer's recommended preparation.
2. Immediately paint exposed steel with two coats of antirust coating, following coating manufacturer's written instructions and without exceeding manufacturer's recommended rate of application (dry film thickness per coat).

B. If on inspection and rust removal, the cross section of a steel member is found to be reduced from rust by more than 1/16 inch, notify Engineer before proceeding.

3.3 MASONRY UNIT PATCHING

A. Patching Bricks:

1. Remove loose material from masonry surface. Carefully remove additional material so patch will not have feathered edges but will have square or slightly undercut edges on area to be patched and will be at least 1/4 inch thick, but not less than recommended by patching compound manufacturer.
2. Mask adjacent mortar joint or rake out for repointing if patch will extend to edge of masonry unit.

3. Mix patching compound in individual batches to match each unit being patched. Combine one or more colors of patching compound, as needed, to produce exact match.
4. Rinse surface to be patched and leave damp, but without standing water.
5. Brush-coat surfaces with slurry coat of patching compound according to manufacturer's written instructions.
6. Place patching compound in layers as recommended by patching compound manufacturer, but not less than 1/4 inch or more than 2 inches thick. Roughen surface of each layer to provide a key for next layer.
7. Trowel, scrape, or carve surface of patch to match texture and surrounding surface plane or contour of the masonry unit. Shape and finish surface before or after curing, as determined by testing, to best match existing masonry unit.

3.4 PAINT REMOVAL

A. Paint Removal with Solvent-Type Paint Remover:

1. Remove loose and peeling paint using high-pressure spray, scrapers, stiff brushes, or a combination of these. Let surface dry thoroughly.
2. Apply thick coating of paint remover to painted masonry with natural-fiber cleaning brush, deep-nap roller, or large paint brush.
3. Allow paint remover to remain on surface for period recommended by manufacturer.
4. Rinse with water to remove chemicals and paint residue.

3.5 CLEANING BRICKWORK

A. Detergent Cleaning:

1. Wet masonry with water applied by low-pressure spray.
2. Scrub masonry with detergent solution using medium-soft brushes until soil is thoroughly dislodged and can be removed by rinsing. Use small brushes to remove soil from mortar joints and crevices. Dip brush in solution often to ensure that adequate fresh detergent is used and that masonry surface remains wet.
3. Rinse with water to remove detergent solution and soil.

3.6 REPOINTING MASONRY

A. Rake out and repoint joints to the following extent:

1. Joints where mortar is missing or where they contain holes.
2. Cracked joints where cracks can be penetrated at least 1/4 inch.
3. Joints where they sound hollow when tapped by metal object.
4. Joints where they are worn back 1/4 inch or more from surface.
5. Joints where they are deteriorated to point that mortar can be easily removed by hand, without tools.

B. Rake out joints as follows:

1. Remove mortar from masonry surfaces within raked-out joints to provide reveals with square backs and to expose masonry for contact with pointing mortar. Brush, vacuum, or flush joints to remove dirt and loose debris.
2. Do not spall edges of masonry units or widen joints. Replace or patch damaged masonry units as directed by Engineer.

    a. Cut out mortar by hand with chisel and resilient mallet.
    b. Cut out center of mortar bed joints using angle grinders with diamond-impregnated metal blades. Remove remaining mortar by hand with chisel and resilient mallet. Strictly adhere to approved quality-control program.

C. Notify Engineer of unforeseen detrimental conditions including voids in mortar joints, cracks, loose masonry units, rotted wood, rusted metal, and other deteriorated items.

D. Pointing with Mortar:

1. Rinse joint surfaces with water to remove dust and mortar particles. Time rinsing application so, at time of pointing, joint surfaces are damp but free of standing water. If rinse water dries, dampen joint surfaces before pointing.
2. Apply pointing mortar first to areas where existing mortar was removed to depths greater than surrounding areas. Apply in layers not greater than 3/8 inch until a uniform depth is formed. Fully compact each layer thoroughly and allow it to become thumbprint hard before applying next layer.
3. After low areas have been filled to same depth as remaining joints, point all joints by placing mortar in layers not greater than 3/8 inch. Fully compact each layer and allow to become thumbprint hard before applying next layer. Where existing masonry units have worn or rounded edges, slightly recess finished mortar surface below face of masonry to avoid widened joint faces. Take care not to spread mortar beyond joint edges onto exposed masonry surfaces or to featheredge the mortar.
4. When mortar is thumbprint hard, tool joints to match original appearance of joints as demonstrated in approved mockup. Remove excess mortar from edge of joint by brushing.
5. Cure mortar by maintaining in thoroughly damp condition for at least 72 consecutive hours including weekends and holidays.

    a. Acceptable curing methods include covering with wet burlap and plastic sheeting, periodic hand misting, and periodic mist spraying using system of pipes, mist heads, and timers.
    b. Adjust curing methods to ensure that pointing mortar is damp throughout its depth without eroding surface mortar.

6. Hairline cracking within the mortar or mortar separation at edge of a joint is unacceptable. Completely remove such mortar and repoint.

3.7 FINAL CLEANING

A. After mortar has fully hardened, thoroughly clean exposed masonry surfaces of excess mortar and foreign matter; use wood scrapers, stiff-nylon or -fiber brushes, and clean water, spray applied at low pressure.

B. Wash adjacent woodwork and other non-masonry surfaces. Use detergent and soft brushes or cloths.

C. Sweep and rake adjacent pavement and grounds to remove mortar and debris. Where necessary, pressure wash pavement surfaces to remove mortar, dust, dirt, and stains.

END OF SECTION 040120

SECTION 057500 - DECORATIVE FORMED METAL

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

A. Drawings and general provisions of the Contract, including General and Special Conditions and Division 01 Specification Sections, apply to this Section.

1.2 SUMMARY

A. Section Includes: Metal cladding and line-set enclosures.

1.3 SUBMITTALS

A. Product Data: For each type of product indicated.

B. Samples: Submit 4-inch square sample with metal finish indicated of any color.

1.4 QUALITY ASSURANCE

A. Control of Corrosion: Prevent galvanic action and other forms of corrosion by insulating metals and other materials from direct contact with incompatible materials.

1.5 DELIVERY, STORAGE, AND HANDLING

A. Deliver decorative formed metal products wrapped in protective coverings and strapped together in suitable packs or in heavy-duty cartons. Remove protective coverings before they stain or bond to finished surfaces.

B. Store products on elevated platforms in a dry location.

1.6 COORDINATION

A. Coordinate installation of decorative formed metal with adjacent construction to ensure that wall assemblies, flashings, trim, and joint sealants, are protected against damage from the effects of weather, age, corrosion, and other causes.

PART 2 - PRODUCTS

2.1 SHEET METAL

A. General: Provide sheet metal without pitting, seam marks, roller marks, stains, discolorations, or other imperfections where exposed to view on finished units.

B. Aluminum Sheet: Flat sheet complying with ASTM B 209, alloy and temper recommended by aluminum producer and finisher for type of use and finish indicated, and with not less than strength and durability properties of Alloy 5005-H32.

2.2 MISCELLANEOUS MATERIALS

A. Sealants, Exterior: ASTM C 920; elastomeric polyurethane sealant; of type, grade, class, and use classifications required to seal joints in decorative formed metal and remain weathertight; and as recommended in writing by decorative formed metal manufacturer. See Section 079200 “Sealants.”

B. Fasteners: Fabricated from same basic metal and alloy as fastened metal unless otherwise indicated. Do not use metals that are incompatible with materials joined.

1. Provide concealed fasteners for interconnecting decorative formed metal items and for attaching them to other work unless exposed fasteners are unavoidable.

2.3 FABRICATION, GENERAL

A. Coordinate dimensions and attachment methods of decorative formed metal items with those of adjoining construction to produce integrated assemblies with closely fitting joints and with edges and surfaces aligned unless otherwise indicated.

B. Form metal to profiles indicated, in maximum lengths to minimize joints. Produce flat, flush surfaces without cracking or grain separation at bends. Fold back exposed edges of unsupported sheet metal to form a 1/2-inch-wide hem on the concealed side, or ease edges to a radius of approximately 1/32 inch and support with concealed stiffeners.

C. Increase metal thickness or reinforce with concealed stiffeners, backing materials, or both, as needed to provide surface flatness equivalent to stretcher-leveled standard of flatness and sufficient strength for indicated use. Support joints with concealed stiffeners as needed to hold exposed faces of adjoining sheets in flush alignment.

D. Build in straps, plates, and brackets as needed to support and anchor fabricated items to adjoining construction. Reinforce decorative formed metal items as needed to attach and support other construction.

E. Provide support framing, mounting and attachment clips, splice sleeves, fasteners, and accessories needed to install decorative formed metal items.

2.4 METAL CLADDING AND LINE-SET ENCLOSURES

A. Manufacturers: Subject to compliance with requirements, provide products by one of the following:

1. Alcoa Building Products.

2. Peterson Aluminum Corporation.
3. Southern Aluminum Finishing Corporation.
4. Mastic Home Exteriors.
5. Or Approved Equal.

B. Form decorative metal and mullion cladding from metal of type and thickness indicated below. Fabricate to fit tightly to adjoining construction.

1. Aluminum Sheet: 0.024 inch minimum thickness.

2.5 ALUMINUM FINISHES

A. Baked-Enamel or Powder-Coat Finish: AAMA 2603 except with a minimum dry film thickness of 1.5 mils. Comply with coating manufacturer's written instructions for cleaning, conversion coating, and applying and baking finish.

1. Color and Gloss: To match adjacent window, door, siding, or as indicated on Measurement Walk-Through Forms.

PART 3 - EXECUTION

3.1 EXAMINATION

A. Examine substrates, areas, and conditions, with Installer present, for compliance with requirements for installation tolerances and other conditions affecting performance of decorative formed metal.

B. Proceed with installation only after unsatisfactory conditions have been corrected.

3.2 INSTALLATION

A. Locate and place sheet metal fabrications plumb, level and in alignment with adjacent construction.

B. Form tight joints, with exposed connections accurately fitted together. Provide reveals and openings for sealant and joint fillers, as required.

C. Conceal fasteners where possible.

D. Corners are to be formed with minimum 2-inch lapped joints. Corner seams are to be oriented downward to prevent water infiltration. Seal around all seams and joints with approved sealant. Running seams and butt-joints are not acceptable.

E. All items shall be installed in a neat and workmanlike manner as accepted by the Engineer.

3.3 ADJUSTING AND CLEANING

A. Unless otherwise indicated, clean metals by washing thoroughly with clean water and soap, rinsing with clean water, and drying with soft cloths.

B. Restore finishes damaged during installation and construction period so no evidence remains of correction work.

3.4 PROTECTION

A. Protect finishes of decorative formed metal items from damage during construction period. Remove temporary protective coverings at time of Substantial Completion.

END OF SECTION 057500

SECTION 061000 - ROUGH CARPENTRY

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

A. Drawings and general provisions of the Contract, including General and Special Conditions and Division 01 Specification Sections, apply to this Section.

1.2 SUMMARY

A. Section Includes:

1. Framing with dimension lumber.
2. Wood-preservative-treated lumber.
3. Wood blocking, cants, nailers, furring, and grounds.
4. Plywood panels.

1.3 SUBMITTALS

A. Product Data: For each type of product.

1.4 DELIVERY, STORAGE, AND HANDLING

A. Stack lumber flat with spacers beneath and between each bundle to provide air circulation. Protect lumber from weather by covering with waterproof sheeting, securely anchored. Provide for air circulation around stacks and under coverings.

PART 2 - PRODUCTS

2.1 WOOD PRODUCTS, GENERAL

A. Certified Wood: Materials shall be produced from wood obtained from forests certified by an FSC-accredited certification body to comply with FSC STD-01-001, "FSC Principles and Criteria for Forest Stewardship" for the following:

1. Dimension lumber framing.

B. Lumber: DOC PS 20 and applicable rules of grading agencies indicated. If no grading agency is indicated, provide lumber that complies with the applicable rules of any rules-writing agency certified by the ALSC Board of Review. Provide lumber graded by an agency certified by the ALSC Board of Review to inspect and grade lumber under the rules indicated.

1. Factory mark each piece of lumber with grade stamp of grading agency.

2. Where nominal sizes are indicated, provide actual sizes required by DOC PS 20 for moisture content specified. Where actual sizes are indicated, they are minimum dressed sizes for dry lumber.
3. Provide dressed lumber, S4S, unless otherwise indicated.

C. Maximum Moisture Content of Lumber: 19 percent unless otherwise indicated.

2.2 DIMENSION LUMBER FRAMING

A. Provide any of the following species:

1. Hem-fir (north); NLGA.
2. Southern pine; SPIB.
3. Douglas fir-larch; WCLIB or WWPA.
4. Mixed southern pine; SPIB.
5. Spruce-pine-fir; NLGA.
6. Douglas fir-south; WWPA.
7. Hem-fir; WCLIB or WWPA.
8. Douglas fir-larch (north); NLGA.
9. Spruce-pine-fir (south); NeLMA, WCLIB, or WWPA.

2.3 WOOD-PRESERVATIVE-TREATED LUMBER

A. Preservative Treatment by Pressure Process: AWPA U1; Use Category UC2.

B. Kiln-dry lumber after treatment to a maximum moisture content of 19 percent. Do not use material that is warped or that does not comply with requirements for untreated material.

C. Mark lumber with treatment quality mark of an inspection agency approved by the ALSC Board of Review.

D. Application: Treat all rough carpentry unless otherwise indicated.

1. Wood cants, nailers, curbs, equipment support bases, blocking, stripping, and similar members in connection with roofing, flashing, vapor barriers, and waterproofing.
2. Wood sills, sleepers, blocking, furring, stripping, and similar concealed members in contact with masonry or concrete.
3. Wood framing and furring attached directly to the interior of below-grade exterior masonry or concrete walls.
4. Wood framing members that are less than 18 inches above the ground in crawlspaces or unexcavated areas.
5. Wood floor plates that are installed over concrete slabs-on-grade.

2.4 MISCELLANEOUS LUMBER

A. General: Provide miscellaneous lumber indicated and lumber for support or attachment of other construction, including the following:

1. Blocking.
2. Nailers.
3. Rooftop equipment bases and support curbs.
4. Cants.
5. Furring.
6. Grounds.
7. Utility shelving.

B. For blocking not used for attachment of other construction, Utility, Stud, or No. 3 grade lumber of any species may be used provided that it is cut and selected to eliminate defects that will interfere with its attachment and purpose.

C. For blocking and nailers used for attachment of other construction, select and cut lumber to eliminate knots and other defects that will interfere with attachment of other work.

D. For furring strips for installing plywood or hardboard paneling, select boards with no knots capable of producing bent-over nails and damage to paneling.

2.5 PLYWOOD PANELS

A. Plywood Panels: DOC PS 1, not less than 3/4-inch nominal thickness.

2.6 FASTENERS

A. General: Provide fasteners of size and type indicated that comply with requirements specified in this article for material and manufacture.

1. Where rough carpentry is exposed to weather, in ground contact, pressure-preservative treated, or in area of high relative humidity, provide fasteners with hot-dip zinc coating complying with ASTM A 153/A 153M of Type 304 stainless steel.

B. Nails, Brads, and Staples: ASTM F 1667.

C. Power-Driven Fasteners: NES NER-272.

D. Wood Screws: ASME B18.6.1.

PART 3 - EXECUTION

3.1 INSTALLATION, GENERAL

A. Set rough carpentry to required levels and lines, with members plumb, true to line, cut, and fitted. Fit rough carpentry to other construction; scribe and cope as needed for accurate fit. Locate furring, nailers, blocking, grounds, and similar supports to comply with requirements for attaching other construction.

B. Framing Standard: Comply with AF&PA's WCD 1, "Details for Conventional Wood Frame Construction," unless otherwise indicated.

C. Install plywood panels by fastening to studs.

D. Provide blocking and framing as indicated and as required to support facing materials, fixtures, specialty items, and trim.

E. Sort and select lumber so that natural characteristics will not interfere with installation or with fastening other materials to lumber. Do not use materials with defects that interfere with function of member or pieces that are too small to use with minimum number of joints or optimum joint arrangement.

F. Comply with AWPA M4 for applying field treatment to cut surfaces of preservative-treated lumber.

1. Use inorganic boron for items that are continuously protected from liquid water.
2. Use copper naphthenate for items not continuously protected from liquid water.

G. Securely attach rough carpentry work to substrate by anchoring and fastening as indicated, complying with the following:

1. NES NER-272 for power-driven fasteners.
2. Table 2304.9.1, "Fastening Schedule," in ICC's International Building Code.
3. Table R602.3(1), "Fastener Schedule for Structural Members," and Table R602.3(2), "Alternate Attachments," in ICC's International Residential Code for One- and Two-Family Dwellings.

H. Use steel common nails unless otherwise indicated. Select fasteners of size that will not fully penetrate members where opposite side will be exposed to view or will receive finish materials. Make tight connections between members. Install fasteners without splitting wood. Drive nails snug but do not countersink nail heads unless otherwise indicated.

I. For exposed work, arrange fasteners in straight rows parallel with edges of members, with fasteners evenly spaced, and with adjacent rows staggered.

END OF SECTION 061000

SECTION 062023 - INTERIOR FINISH CARPENTRY

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

A. Drawings and general provisions of the Contract, including General and Special Conditions and Division 01 Specification Sections, apply to this Section.

1.2 SUMMARY

A. Section Includes: Interior trim.

1.3 SUBMITTALS

A. Product Data: For each type of process and factory-fabricated product. Indicate component materials, dimensions, profiles, textures, and colors and include construction and application details.

1.4 DELIVERY, STORAGE, AND HANDLING

A. Stack lumber, plywood, and other panels flat with spacers between each bundle to provide air circulation. Protect materials from weather by covering with waterproof sheeting, securely anchored. Provide for air circulation around stacks and under coverings.

B. Deliver interior finish carpentry materials only when environmental conditions meet requirements specified for installation areas. If interior finish carpentry materials must be stored in other than installation areas, store only where environmental conditions meet requirements specified for installation areas.

1.5 FIELD CONDITIONS

A. Environmental Limitations: Do not deliver or install interior finish carpentry materials until building is enclosed and weatherproof, wet work in space is completed and nominally dry, and HVAC system is operating and maintaining temperature and relative humidity at occupancy levels during the remainder of the construction period.

B. Do not install finish carpentry materials that are wet, moisture damaged, or mold damaged.

1. Indications that materials are wet or moisture damaged include, but are not limited to, discoloration, sagging, or irregular shape.
2. Indications that materials are mold damaged include, but are not limited to, fuzzy or splotchy surface contamination and discoloration.

PART 2 - PRODUCTS

2.1 MATERIALS, GENERAL

A. Certified Wood: The following wood products shall be produced from wood obtained from forests certified by an FSC-accredited certification body to comply with FSC STD-01-001, "FSC Principles and Criteria for Forest Stewardship":

B. Lumber: DOC PS 20 and the following grading rules:

1. NeLMA: Northeastern Lumber Manufacturers' Association, "Standard Grading Rules for Northeastern Lumber."
2. NHLA: National Hardwood Lumber Association, "Rules for the Measurement and Inspection of Hardwood & Cypress."
3. NLGA: National Lumber Grades Authority, "Standard Grading Rules for Canadian Lumber."
4. SPIB: The Southern Pine Inspection Bureau, "Standard Grading Rules for Southern Pine Lumber."
5. WCLIB: West Coast Lumber Inspection Bureau, Standard No. 17, "Grading Rules for West Coast Lumber."
6. WWPA: Western Wood Products Association, "Western Lumber Grading Rules."

C. Factory mark each piece of lumber with grade stamp of inspection agency indicating grade, species, moisture content at time of surfacing, and mill.

1. For exposed lumber, mark grade stamp on end or back of each piece.

D. Softwood Plywood: DOC PS 1.

E. Hardboard: AHA A135.4.

F. MDF: ANSI A208.2, Grade 130.

G. Particleboard: ANSI A208.1, Grade M-2.

H. Melamine-Faced Particleboard: Particleboard complying with ANSI A208.1, Grade M-2, finished on both faces with thermally fused, melamine-impregnated decorative paper and complying with requirements of NEMA LD3, Grade VGL, for test methods 3.3, 3.4, 3.6, 3.8, and 3.10.

2.2 WOOD-PRESERVATIVE-TREATED MATERIALS

A. Preservative Treatment by Pressure Process: AWPA U1; Use Category UC2.

1. Kiln dry lumber and plywood after treatment to a maximum moisture content of 19 and 18 percent respectively.

2. Preservative Chemicals: Acceptable to authorities having jurisdiction and containing no arsenic or chromium.
3. For exposed items indicated to receive transparent finish, do not use chemical formulations that contain colorants or that bleed through or otherwise adversely affect finishes.
4. Do not use material that is warped or does not comply with requirements for untreated material.
5. Mark lumber with treatment-quality mark of an inspection agency approved by the American Lumber Standard Committee's Board of Review.

    a. For exposed lumber indicated to receive a stained or natural finish, mark end or back of each piece.

6. Mark plywood with appropriate classification marking of an inspection agency acceptable to authorities having jurisdiction.

    a. For exposed plywood indicated to receive a stained or natural finish, mark back of each piece.

2.3 INTERIOR TRIM

A. Hardwood Lumber Trim for Transparent Finish (Stain):

1. Species and Grade: Red oak; Clear; NHLA.
2. Maximum Moisture Content: 9 percent.
3. Face Surface: Surfaced (smooth).
4. Matching: Selected for compatible grain and color.

B. Hardwood Lumber Trim for Opaque Finish (Paint Finish):

1. Species and Grade: Poplar; Clear; NHLA.
2. Maximum Moisture Content: 9 percent.
3. Face Surface: Surfaced (smooth).

C. Hardwood Moldings for Transparent Finish (Stain): WMMPA HWM 2, N-grade wood moldings made to patterns included in WMMPA HWM 1.

1. Species: Red oak.
2. Kiln-dried softwood or MDF, with exposed surfaces veneered with species indicated, may be used in lieu of solid wood.
3. Maximum Moisture Content: 9 percent.
4. Matching: Selected for compatible grain and color.
5. Base, Shoe-Mold, Casing, Mull-Casing, and Stop Pattern: Match existing.

D. Softwood Moldings for Opaque Finish (Paint Finish):

1. Species: White pine.
2. Grade: Custom.

3. Maximum Moisture Content: 9 percent.
4. Matching: Selected for compatible grain and color.
5. Base, Shoe-Mold, Casing, Mull-Casing, and Stop Pattern: Match existing.

E. PVC-Wrapped Moldings: WMMPA WM 2 and made to patterns included in WMMPA WM 12.

1. Manufacturers: Subject to compliance with requirements, provide products by one of the following:

a. Louisiana-Pacific Corporation.
b. Nickell Moulding Company, Inc.
c. Spectrim Building Products.
d. Zamma Corporation.
e. Or Approved Equal.

2. Base, Shoe-Mold, Casing, Mull-Casing, and Stop Pattern: Match existing.
3. Colors, Textures, and Grain Patterns: Match existing.

2.4 MISCELLANEOUS MATERIALS

A. Fasteners for Interior Finish Carpentry: Nails, screws, and other anchoring devices of type, size, material, and finish required for application indicated to provide secure attachment, concealed where possible.

B. Glue: Aliphatic-resin, polyurethane, or resorcinol wood glue recommended by manufacturer for general carpentry use.

1. Wood glue shall have a VOC content of 30 g/L or less when calculated according to 40 CFR 59, Subpart D (EPA Method 24).

2.5 FABRICATION

A. Back out or kerf backs of the following members except those with ends exposed in finished work.

B. Ease edges of lumber less than 1 inch in nominal thickness to 1/16-inch radius and edges of lumber 1 inch or more in nominal thickness to 1/8-inch radius.

C. No finger joints permitted.

PART 3 - EXECUTION

3.1 EXAMINATION

A. Examine substrates, with Installer present, for compliance with requirements for installation tolerances and other conditions affecting performance.

B. Examine finish carpentry materials before installation. Reject materials that are wet, moisture damaged, and mold damaged.

C. Proceed with installation only after unsatisfactory conditions have been corrected.

3.2 PREPARATION

A. Clean substrates of projections and substances detrimental to application.

3.3 INSTALLATION, GENERAL

A. Do not use materials that are unsound, warped, improperly treated or finished, inadequately seasoned, too small to fabricate with proper jointing arrangements, or with defective surfaces, sizes, or patterns.

B. Interior trim in bathrooms only shall be PVC.

C. Install interior finish carpentry level, plumb, true, and aligned with adjacent materials. Use concealed shims where necessary for alignment.

1. Scribe and cut interior finish carpentry to fit adjoining work. Refinish and seal cuts as recommended by manufacturer.
2. Where face fastening is unavoidable, countersink fasteners, fill surface flush, and sand unless otherwise indicated.
3. Install to tolerance of 1/8 inch in 96 inches for level and plumb. Install adjoining interior finish carpentry with 1/32-inch maximum offset for flush installation and 1/16-inch maximum offset for reveal installation.
4. Coordinate interior finish carpentry with materials and systems in or adjacent to it. Provide cutouts for mechanical and electrical items that penetrate interior finish carpentry.

3.4 STANDING AND RUNNING TRIM INSTALLATION

A. Install with minimum number of joints practical, using full-length pieces from maximum lengths of lumber available. Do not use pieces less than 24 inches long, except where necessary. Stagger joints in adjacent and related standing and running trim. Cope and Miter at returns, miter at outside corners, and cope at inside corners to produce tight-fitting joints with full-surface contact throughout length of joint. Use scarf joints for end-to-end joints. Plane backs of casings to provide uniform thickness across joints where necessary for alignment.

1. Match color and grain pattern of trim for transparent finish (stain finish) across joints.
2. Install trim after gypsum-board joint finishing operations are completed.
3. Install without splitting; drill pilot holes before fastening where necessary to prevent splitting. Fasten to prevent movement or warping. Countersink fastener heads on exposed carpentry work and fill holes.

3.5 ADJUSTING

A. Replace interior finish carpentry that is damaged or does not comply with requirements. Interior finish carpentry may be repaired or refinished if work complies with requirements and shows no evidence of repair or refinishing. Adjust joinery for uniform appearance.

3.6 CLEANING

A. Clean interior finish carpentry on exposed and semiexposed surfaces. Restore damaged or soiled areas and touch up factory-applied finishes, if any.

3.7 PROTECTION

A. Protect installed products from damage from weather and other causes during construction.

B. Remove and replace finish carpentry materials that are wet, moisture damaged, and mold damaged.

1. Indications that materials are wet or moisture damaged include, but are not limited to, discoloration, sagging, or irregular shape.
2. Indications that materials are mold damaged include, but are not limited to, fuzzy or splotchy surface contamination and discoloration.

END OF SECTION 062023

SECTION 072100 - THERMAL INSULATION

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

A. Drawings and general provisions of the Contract, including General and Special Conditions and Division 01 Specification Sections, apply to this Section.

1.2 SUMMARY

A. Section Includes:

1. Foam-plastic board insulation.
2. Glass-fiber blanket insulation.
3. Loose-fill insulation.
4. Vapor retarders.

1.3 SUBMITTALS

A. Product Data: For each type of product indicated.

1.4 QUALITY ASSURANCE

A. Surface-Burning Characteristics: As determined by testing identical products according to ASTM E 84 by a qualified testing agency. Identify products with appropriate markings of applicable testing agency.

1.5 DELIVERY, STORAGE, AND HANDLING

A. Protect insulation materials from physical damage and from deterioration due to moisture, soiling, and other sources. Store inside and in a dry location. Comply with manufacturer's written instructions for handling, storing, and protecting during installation.

B. Protect foam-plastic board insulation as follows:

1. Do not expose to sunlight except to necessary extent for period of installation and concealment.
2. Protect against ignition at all times. Do not deliver foam-plastic board materials to Project site before installation time.
3. Quickly complete installation and concealment of foam-plastic board insulation in each area of construction.

PART 2 - PRODUCTS

2.1 FOAM-PLASTIC BOARD INSULATION

A. Extruded-Polystyrene Board Insulation: ASTM C 578, of type and minimum compressive strength indicated below, with maximum flame-spread and smoke-developed indexes of 75 and 450, respectively, per ASTM E 84.

1. Manufacturers: Subject to compliance with requirements, provide products by one of the following:

a. DiversiFoam Products.
b. Dow Chemical Company.
c. Owens Corning.
d. Pactiv Building Products.
e. Or Approved Equal.

2. Type X, 15 psi.
3. Thickness: 2 inches.

B. Adhesive for Bonding Insulation: Product with demonstrated capability to bond insulation securely to substrates without damaging insulation and substrates.

2.2 GLASS-FIBER BLANKET INSULATION

A. Manufacturers: Subject to compliance with requirements, provide products by one of the following:

1. CertainTeed Corporation.
2. Guardian Building Products, Inc.
3. Johns Manville.
4. Knauf Insulation.
5. Owens Corning.
6. Or Approved Equal.

B. Unfaced, Glass-Fiber Blanket Insulation: ASTM C 665, Type I; with maximum flame-spread and smoke-developed indexes of 25 and 50, respectively, per ASTM E 84; passing ASTM E 136 for combustion characteristics.

C. Kraft-Faced, Glass-Fiber Blanket Insulation: ASTM C 665, Type II (non-reflective faced), Class C (faced surface not rated for flame propagation); Category 1 (membrane is a vapor barrier).

D. Eave Ventilation Troughs: Preformed, rigid fiberboard or plastic sheets designed and sized to fit between roof framing members and to provide cross ventilation between insulated attic spaces and vented eaves.

2.3 LOOSE-FILL INSULATION

A. Manufacturers: Subject to compliance with requirements, provide products by one of the following:

1. CertainTeed Corporation.
2. Guardian Building Products, Inc.
3. Johns Manville.
4. Owens Corning.
5. GreenFiber.
6. International Cellulose Corporation.
7. Or Approved Equal.

B. Cellulosic-Fiber Loose-Fill Insulation: ASTM C 739, chemically treated for flame-resistance, processing, and handling characteristics.

C. Glass-Fiber Loose-Fill Insulation: ASTM C 764, Type I for pneumatic application; with maximum flame-spread and smoke-developed indexes of 5, per ASTM E 84.

D. Eave Ventilation Troughs: Preformed, rigid fiberboard or plastic sheets designed and sized to fit between roof framing members and to provide cross ventilation between insulated attic spaces and vented eaves.

2.4 VAPOR RETARDERS

A. Manufacturers: Subject to compliance with requirements, provide products by one of the following:

1. Reef Industries, Inc.
2. Raven Industries.
3. Or Approved Equal.

B. Polyethylene Vapor Retarders: ASTM D 4397, 10 mils thick, with maximum permeance rating of 0.13 perm.

C. Vapor-Retarder Tape: Pressure-sensitive tape of type recommended by vapor-retarder manufacturer for sealing joints and penetrations in vapor retarder.

D. Vapor-Retarder Fasteners: Pancake-head, self-tapping steel drill screws; with fender washers.

E. Adhesive for Vapor Retarders: Product recommended by vapor-retarder manufacturer and has demonstrated capability to bond vapor retarders securely to substrates indicated.

PART 3 - EXECUTION

3.1 PREPARATION

A. Contractor shall coordinate installation with HVAC and Electrical construction activities when placing insulation in areas that would affect their work.

B. Clean substrates of substances that are harmful to insulation or vapor retarders, including removing projections capable of puncturing vapor retarders, or that interfere with insulation attachment.

C. Ensure that existing soffit vents are in working order and are free of dirt, debris, and insulation. If structure impedes airflow through soffit vents, drill holes as directed by Engineer to provide venting. Existing insulation shall not be allowed within two inches of underside of roof sheathing.

D. Install eave ventilation troughs between roof framing members in insulated attic spaces at vented eaves.

E. Install insulation away from new and existing exhaust stacks/ducts, light fixtures, or other heated surfaces. Use 3/8-inch minimum thickness plywood to box out insulation from heated surfaces and attic accesses. Plywood box out shall extended at least 4-inches above top of new insulation.

3.2 INSTALLATION, GENERAL

A. All attic areas must be treated to obtain a value of R-38.

B. Comply with insulation manufacturer's written instructions applicable to products and applications indicated.

C. Install insulation that is undamaged, dry, and unsoiled and that has not been left exposed to ice, rain, or snow at any time.

D. Extend insulation to envelop entire area to be insulated. Cut and fit tightly around obstructions and fill voids with insulation. Remove projections that interfere with placement.

E. Provide sizes to fit applications indicated and selected from manufacturer's standard thicknesses, widths, and lengths. Apply single layer of insulation units to produce thickness indicated unless multiple layers are otherwise shown or required to make up total thickness.

3.3 INSTALLATION OF INSULATION FOR FRAMED CONSTRUCTION

A. Apply insulation units to substrates by method indicated, complying with manufacturer's written instructions. If no specific method is indicated, bond units to substrate with adhesive or use mechanical anchorage to provide permanent placement and support of units.

B. Glass-Fiber Blanket Insulation: Install in cavities formed by framing members according to the following requirements:

1. Use insulation widths and lengths that fill the cavities formed by framing members. If more than one length is required to fill the cavities, provide lengths that will produce a snug fit between ends.
2. Place insulation in cavities formed by framing members to produce a friction fit between edges of insulation and adjoining framing members.
3. Maintain 3-inch clearance of insulation around recessed lighting fixtures not rated for or protected from contact with insulation.
4. For wood-framed construction, install blankets according to ASTM C 1320 and as follows:

    a. With faced blankets having stapling flanges, secure insulation by inset, stapling flanges to sides of framing members.
    b. With faced blankets having stapling flanges, lap blanket flange over flange of adjacent blanket to maintain continuity of vapor retarder once finish material is installed over it.

5. Vapor-Retarder-Faced Blankets: Tape joints and ruptures in vapor-retarder facings, and seal each continuous area of insulation to ensure airtight installation.

C. Loose-Fill Insulation: Apply according to ASTM C 1015 and manufacturer's written instructions. Level horizontal applications to uniform thickness as indicated, lightly settle to uniform density, but do not compact excessively.

1. For cellulosic-fiber loose-fill insulation, comply with CIMA's Bulletin #2, "Standard Practice for Installing Cellulose Insulation."

D. Wall Cavity Installations:
1. Remove siding, and install insulation pneumatically in accordance with manufacturer’s installation instructions. At completion of installation, fill access ports with plugs as recommended by manufacturer and approved by Engineer and reinstall siding and wood trim. Repair and/or replace damaged materials and restore to match existing conditions and finishes to the satisfaction of Engineer. Replace damaged siding.
2. Homes with asbestos siding: Asbestos containing materials shall be removed prior to installation of blown insulation.

3.4 INSTALLATION OF VAPOR RETARDERS

A. Extend vapor retarders to extremities of areas to protect from vapor transmission. Secure vapor retarders in place with adhesives or other anchorage system as indicated. Extend vapor retarders to cover miscellaneous voids in insulated substrates, including those filled with loose-fiber insulation.

B. Seal vertical joints in vapor retarders over framing by lapping no fewer than two studs.

1. Fasten vapor retarders to wood framing at top, end, and bottom edges; at perimeter of wall openings; and at lap joints. Space fasteners 16 inches o.c.
2. Before installing vapor retarders, apply urethane sealant to flanges of metal framing including runner tracks, metal studs, and framing around door and window openings. Seal overlapping joints in vapor retarders with vapor-retarder tape according to vapor-retarder manufacturer's written instructions. Seal butt joints with vapor-retarder tape. Locate all joints over framing members or other solid substrates.
3. Firmly attach vapor retarders to metal framing and solid substrates with vapor-retarder fasteners as recommended by vapor-retarder manufacturer.

C. Seal joints caused by pipes, conduits, electrical boxes, and similar items penetrating vapor retarders with vapor-retarder tape to create an airtight seal between penetrating objects and vapor retarders.

D. Repair tears or punctures in vapor retarders immediately before concealment by other work. Cover with vapor-retarder tape or another layer of vapor retarders.

3.5 PROTECTION

A. Protect installed insulation and vapor retarders from damage due to harmful weather exposures, physical abuse, and other causes. Provide temporary coverings or enclosures where insulation is subject to abuse and cannot be concealed and protected by permanent construction immediately after installation.

END OF SECTION 072100

SECTION 074600 - SIDING

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

A. Drawings and general provisions of the Contract, including General and Special Conditions and Division 01 Specification Sections, apply to this Section.

1.2 SUMMARY

A. Section Includes: Aluminum, fiber-cement, and vinyl siding.

1.3 SUBMITTALS

A. Product Data: For each type of product indicated.

1.4 DELIVERY, STORAGE, AND HANDLING

A. Store materials in a dry, well-ventilated, weathertight place.

1.5 COORDINATION

A. Coordinate installation with flashings and other adjoining construction to ensure proper sequencing.

PART 2 - PRODUCTS

2.1 ALUMINUM SIDING

A. General: Formed and coated aluminum siding complying with AAMA 1402.

1. Manufacturers: Subject to compliance with requirements, provide products by one of the following:

    a. Alcoa Home Exteriors, Inc.
    b. Gentek Building Products, Inc.
    c. Kaycan Ltd.
    d. Norandex/Reynolds Distribution; an Owens Corning company.
    e. Rollex Corporation.
    f. Or Approved Equal.

2. Horizontal and Vertical Pattern: Match existing.
3. Texture: Match existing.
4. Nominal Thickness: Match existing.

5. Insulation: Manufacturer's standard integral insulation panels.
6. Finish: Match existing.

2.2 FIBER-CEMENT SIDING

A. General: ASTM C 1186, Type A, Grade II, fiber-cement board, noncombustible when tested according to ASTM E 136; with a flame-spread index of 25 or less when tested according to ASTM E 84.

1. Manufacturers: Subject to compliance with requirements, provide products by one of the following:

a. Cemplank.
b. CertainTeed Corp.
c. GAF Materials Corporation.
d. James Hardie.
e. MaxiTile, Inc; a California corporation.
f. Nichiha Fiber Cement.
g. Or Approved Equal.

2. Horizontal, Vertical, and Shingle Pattern: Match existing.
3. Panel Texture: Match existing.
4. Factory Priming: Manufacturer's standard acrylic primer.

2.3 VINYL SIDING

A. General: Integrally colored vinyl siding complying with ASTM D 3679.

1. Manufacturers: Subject to compliance with requirements, provide products by one of the following:

a. Alcoa Home Exteriors, Inc.
b. Alside.
c. CertainTeed Corp.
d. Crane Performance Siding.
e. Gentek Building Products, Inc.
f. Heartland Building Products.
g. Kaycan Ltd.
h. Louisiana-Pacific Corporation.
i. Mitten Inc.
j. Owens Corning.
k. Resource Materials Corporation.
l. Rollex Corporation.
m. Royal Building Products.
n. Variform, Inc.
o. Or Approved Equal.

2. Horizontal, Vertical, and Shingle Pattern: Match existing.
3. Texture: Match existing.
4. Nominal Thickness: Match existing.
5. Minimum Profile Depth (Butt Thickness): Match existing.
6. Nailing Hem: Double thickness.
7. Finish: Match existing.

2.4 ACCESSORIES

A. Siding Accessories, General: Provide starter strips, edge trim, outside and inside corner caps, and other items as recommended by siding manufacturer for building configuration.

B. Aluminum Accessories: Where aluminum accessories are indicated, provide accessories complying with AAMA 1402.

C. Vinyl Accessories: Integrally colored vinyl accessories complying with ASTM D 3679 except for wind-load resistance.

D. Fasteners:

1. For fastening to wood, use siding nails of sufficient length to penetrate a minimum of 1 inch into substrate.
2. For fastening to metal, use ribbed bugle-head screws of sufficient length to penetrate a minimum of 1/4 inch, or three screw-threads, into substrate.
3. For fastening aluminum, use aluminum fasteners. Where fasteners will be exposed to view, use prefinished aluminum fasteners in color to match item being fastened.
4. For fastening fiber cement, use hot-dip galvanized fasteners.
5. For fastening vinyl, use hot-dip galvanized fasteners. Where fasteners will be exposed to view, use prefinished aluminum fasteners in color to match item being fastened.

PART 3 - EXECUTION

3.1 EXAMINATION

A. Examine substrates for compliance with requirements for installation tolerances and other conditions affecting performance of siding and related accessories.

B. Proceed with installation only after unsatisfactory conditions have been corrected.

3.2 PREPARATION

A. Clean substrates of projections and substances detrimental to application.

3.3 INSTALLATION

A. General: Comply with siding manufacturer's written installation instructions applicable to products and applications indicated unless more stringent requirements apply.

1. Do not install damaged components.
2. Center nails in elongated nailing slots without binding siding to allow for thermal movement.

B. Install aluminum siding and related accessories according to AAMA 1402.

1. Install fasteners no more than 24 inches o.c.

C. Install fiber-cement siding and related accessories.

1. Install fasteners no more than 24 inches o.c.

D. Install vinyl siding and related accessories according to ASTM D 4756.

1. Install fasteners for horizontal vinyl siding no more than 16 inches o.c.
2. Install fasteners for vertical vinyl siding no more than 12 inches o.c.

E. Install joint sealants as specified in Section 079200 "Joint Sealants" and to produce a weathertight installation.

F. Where aluminum siding will contact dissimilar metals, protect against galvanic action by painting contact surfaces with primer or by applying sealant or tape or installing nonconductive spacers as recommended by manufacturer for this purpose.

3.4 ADJUSTING AND CLEANING

A. Remove damaged, improperly installed, or otherwise defective materials and replace with new materials complying with specified requirements.

B. Clean finished surfaces according to manufacturer's written instructions and maintain in a clean condition during construction.

END OF SECTION 074600

SECTION 077200 - ATTIC VENTS

PART 1 GENERAL

1.1 SECTION INCLUDES

A. Installation of new venting products, including all associated building paper, flashing, siding, sheathing, and sealants.

B. Modification of existing attic ventilation as specified in individual Scope of Work for each residence.

C. Types of vent applications specified in this section include:

1. Gable end venting - provide adequate size to allow two (2) square feet vented for each enclosed area.
2. Soffit venting.
3. Roof venting.

D. Verification that both new and existing attic ventilation is not impeded by insulation, debris, or other obstacles, as specified in individual Scope of Work for each residence.

1.2 REFERENCES

A. ASTM D226 – Standard Specification for Asphalt-Saturated Organic Felt Used in Roofing and Waterproofing

1.3 SUBMITTALS

A. Product Data: Submit manufacturer’s technical product data and installation instructions/recommendations.

B. Shop Drawings: Submit ventilation schedule indicating dimensions, materials, styles, and colors per residence. Submit installation details showing related work such as sealants, flashing, and trim.

1.4 DELIVERY, STORAGE AND HANDLING

A. Deliver materials in manufacturer's unopened packages with labels intact. Store materials to in accordance with manufacturer's recommendations.

1.5 PROJECT CONDITIONS

A. Substrate: Proceed with installation only after confirming that substrate conditions are in accordance with manufacturer’s recommendations.

B. Weather Conditions: Proceed with installation only when weather conditions are in compliance with manufacturer's recommendations.

SECTION 077200 - ATTIC VENTS

PART 2 PRODUCTS

2.1 CONTINUOUS SOFFIT VENTS

A. General: Pre-formed aluminum or vinyl vents. Provide continuous venting in maximum lengths available to minimize joints. Vents shall be equipped with insect screens.

1. Manufacturers: Subject to compliance with requirements, provide products by one of the following:

a. Air Vent Inc.
b. Alcoa Building Products.
c. GAF MasterFlow.
d. Lomanco Inc.
e. Owens Corning.
f. Or Approved equal.

2. Minimum Width: 2 ¾ inches.
3. Color: Match existing conditions and finishes.

2.2 RECTANGULAR SOFFIT VENTS

A. General: Pre-formed aluminum or vinyl vents. Vents shall be equipped with insect screens.

1. Manufacturers: Subject to compliance with requirements, provide products by one of the following:

a. Air Vent Inc.
b. Alcoa Building Products.
c. GAF MasterFlow.
d. Lomanco Inc.
e. Owens Corning.
f. Or Approved equal.

2. Minimum Size: 4 by 16 inches.
3. Color: Match existing conditions and finishes.

2.3 GABLE VENTS

A. General: Pre-formed aluminum or vinyl vents. Gable vents shall be used at gable-end walls and grade-level perimeter skirts. Coordinate installation locations with Engineer. Vents shall be equipped with insect screens.

1. Manufacturers: Subject to compliance with requirements, provide products by one of the following:

a. Alcoa Building Products.

b. Fypon.
c. GAF MasterFlow.
d. Lomanco, Inc.
e. Mid-America Siding Components.
f. Owens Corning.
g. Or Approved equal.

2. Minimum Size: 12 by 16 inches.
3. Color: Match existing conditions and finishes.

2.4 ROOF (MUSHROOM) VENTS

A. General: Shall be of aluminum construction, equipped with a nailing flange, vent flange, and insect screen.

1. Manufacturers: Subject to compliance with requirements, provide products by one of the following:

a. Air Vent Inc.
b. Alcoa Building Products.
c. GAF MasterFlow.
d. Lomanco Inc.
e. Owens Corning.
f. Or Approved equal.

2. Minimum Net Free Area: 60 in^2.
3. Color: Match existing conditions and finishes.

2.5 ACCESSORY MATERIALS

A. Asphalt-Saturated Felt: No. 30 minimum, asphalt saturated organic felt, un-perforated, complying with ASTM D226.

B. Metal Flashing: Minimum 26-gage stainless steel sheet job-formed to sizes and configurations shown or required. Set in mastic.

C. Fasteners: Aluminum or hot-dip galvanized siding or roofing nails in length as recommended by manufacturer. Provide pre-finished nails in color to match vent where exposed nailing is required. Use caulking and sealants in accordance with Specification Section 079000 and in accordance with manufacturer's recommendations.

PART 3 EXECUTION

3.1 INSPECTION

A. Dimensions in Project Manual are approximate. Details are for typical vents and do not cover all field conditions. Prior to preparation of shop drawings, carefully measure existing conditions. Indicate actual dimensions and conditions on shop drawings.

B. Proceed with installation only after confirming that substrate conditions are in accordance with manufacturer's recommendations.

C. Contractor is responsible for costs of cutting, patching, trim, repair to existing materials, and matters required for complete and installation.

D. Ensure that air flow through existing attic ventilation is not impeded or blocked by existing insulation. Existing insulation blocking airflow and/or covering existing ventilation shall be pulled or cut back from ventilation locations.

E. Coordinate vent locations with Engineer.

3.2 PREPARATION

A. Do not commence cutting soffits or gable-end walls until new venting units have been delivered to the site.

B. Clean substrate of any projections and substances detrimental to installation of vents in accordance with manufacturer's recommendations. Cover knotholes or other minor voids in substrate with sheet-metal flashing secured with roofing nails.

C. Coordinate installation of vents with flashing, caulking and other adjoining Work to ensure proper sequencing.

3.3 INSTALLATION, GENERAL

A. Comply with manufacturer's installation instructions and recommendations. Coordinate with repair and/or installation of sheathing, flashing, caulking, vapor barriers and insulation; as required to ensure each element of Work performs properly and that combined elements are waterproof and weather-tight.

B. Provide and install blocking, furring, nailers and other supplementary framing required to provide firm mounting support for venting products.

3.4 INSTALLATION OF FLASHING AND CAULKING

A. Provide back-flashing where recommended by manufacturer at all seams/joints. Lap flashing in weatherboard fashion.

B. Install caulking in accordance with provisions of Specification Section 079000 Sealants and in accordance with manufacturer's recommendations.

3.5 ADJUSTING, CLEANING, AND PROTECTION

A. Ensure that newly installed insulation does not cover new or existing ventilation. Existing or newly installed insulation blocking airflow and/or covering ventilation shall be pulled away or cut away from affected ventilation locations.

SECTION 077200 - ATTIC VENTS

END OF SECTION

SECTION 079200 - JOINT SEALANTS

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

A. Drawings and general provisions of the Contract, including General and Special Conditions and Division 01 Specification Sections, apply to this Section.

1.2 SUMMARY

A. Section Includes:

1. Urethane joint sealants
2. Paintable silicone hybrid joint sealants
3. Mildew-resistant, silicone joint sealants

1.3 SUBMITTALS

A. Product Data: For each joint-sealant product indicated.

1.4 PROJECT CONDITIONS

A. Do not proceed with installation of joint sealants under the following conditions:

1. When ambient and substrate temperature conditions are outside limits permitted by joint-sealant manufacturer.
2. When joint substrates are wet.
3. Where joint widths are less than those allowed by joint-sealant manufacturer for applications indicated.
4. Where contaminants capable of interfering with adhesion have not yet been removed from joint substrates.

PART 2 - PRODUCTS

2.1 MATERIALS, GENERAL

A. Compatibility: Provide joint sealants, backings, and other related materials that are compatible with one another and with joint substrates under conditions of service and application, as demonstrated by joint-sealant manufacturer, based on testing and field experience.

B. Colors of Exposed Joint Sealants:

1. Exterior Applications: Match adjacent window, door, or other building component.

2. Interior Applications:

    a. Adjacent material is stained or painted color other than white: Clear.
    b. Adjacent material is painted white: White.

2.2 URETHANE JOINT SEALANTS

A. Single-Component, Nonsag, Urethane Joint Sealant: ASTM C 920, Type S, Grade NS, Class 25, for Use NT.

1. Products: Subject to compliance with requirements, provide one of the following:

    a. Bostik, Inc.; Chem-Calk 900.
    b. Novagard Solutions; Novaflex Advanced.
    c. Pacific Polymers International, Inc.; Elasto-Thane 230 Type II.
    d. Pecora Corporation; Dynatrol I-XL.
    e. Polymeric Systems, Inc.; Flexiprene 1000.
    f. Schnee-Morehead, Inc.; Permathane SM7100.
    g. Sika Corporation, Construction Products Division; Sikaflex - 1a.
    h. Tremco Incorporated; Dymonic.
    i. Or Approved Equal.

2.3 SILICONE JOINT SEALANTS

A. Silicone-Acrylic Blend: Single-component, non-sag, plus 25 percent and minus 25 percent movement capability, exterior non-traffic-use; ASTM C 920, Type S, Grade NS, Class 35/25, Use NT.

1. Dow Corning Corp.
2. GE Construction Sealants
3. Pecora Corp
4. Tremco Inc.
5. Or Approved Equal

B. Silicone, Neutral-curing, S, NS, 25, NT: Mildew-resistant, acetoxy, single-component, nonsag, plus 25 percent and minus 25 percent movement capability, non-traffic-use, silicone joint sealant; ASTM C 920, Type S, Grade NS, Class 25, Use NT.

1. Dow Corning Corp.
2. GE Construction Sealants
3. Pecora Corp
4. Tremco Inc.
5. Or Approved Equal

2.4 JOINT SEALANT BACKING

A. General: Provide sealant backings of material that are nonstaining; are compatible with joint substrates, sealants, primers, and other joint fillers; and are approved for applications indicated by sealant manufacturer based on field experience and laboratory testing.

B. Cylindrical Sealant Backings: ASTM C 1330, Type O (open-cell material), and of size and density to control sealant depth and otherwise contribute to producing optimum sealant performance.

C. Bond-Breaker Tape: Polyethylene tape or other plastic tape recommended by sealant manufacturer for preventing sealant from adhering to rigid, inflexible joint-filler materials or joint surfaces at back of joint. Provide self-adhesive tape where applicable.

PART 3 - EXECUTION

3.1 EXAMINATION

A. Examine joints indicated to receive joint sealants, with Installer present, for compliance with requirements for joint configuration, installation tolerances, and other conditions affecting joint-sealant performance.

B. Proceed with installation only after unsatisfactory conditions have been corrected.

3.2 PREPARATION

A. Surface Cleaning of Joints: Clean out joints immediately before installing joint sealants to comply with joint-sealant manufacturer's written instructions and the following requirements:

1. Remove all foreign material from joint substrates that could interfere with adhesion of joint sealant, including dust, paints (except for permanent, protective coatings tested and approved for sealant adhesion and compatibility by sealant manufacturer), old joint sealants, oil, grease, waterproofing, water repellents, water, surface dirt, and frost.
2. Clean porous joint substrate surfaces by brushing, grinding, mechanical abrading, or a combination of these methods to produce a clean, sound substrate capable of developing optimum bond with joint sealants. Remove loose particles remaining after cleaning operations above by vacuuming. Porous joint substrates include the following:

    a. Concrete.
    b. Masonry.
    c. Unglazed surfaces of ceramic tile.
    d. Exterior insulation and finish systems.

3. Remove laitance and form-release agents from concrete.

4. Clean nonporous joint substrate surfaces with chemical cleaners or other means that do not stain, harm substrates, or leave residues capable of interfering with adhesion of joint sealants. Nonporous joint substrates include the following:

    a. Metal.
    b. Glass.
    c. Porcelain enamel.
    d. Glazed surfaces of ceramic tile.

3.3 INSTALLATION OF JOINT SEALANTS

A. General: Comply with joint-sealant manufacturer's written installation instructions for products and applications indicated, unless more stringent requirements apply.

B. Sealant Installation Standard: Comply with recommendations in ASTM C 1193 for use of joint sealants as applicable to materials, applications, and conditions indicated.

C. Install sealant backings of kind indicated to support sealants during application and at position required to produce cross-sectional shapes and depths of installed sealants relative to joint widths that allow optimum sealant movement capability.

    1. Do not leave gaps between ends of sealant backings.
    2. Do not stretch, twist, puncture, or tear sealant backings.
    3. Remove absorbent sealant backings that have become wet before sealant application and replace them with dry materials.

D. Install bond-breaker tape behind sealants where sealant backings are not used between sealants and backs of joints.

E. Install sealants using proven techniques that comply with the following and at the same time backings are installed:

    1. Place sealants so they directly contact and fully wet joint substrates.
    2. Completely fill recesses in each joint configuration.
    3. Produce uniform, cross-sectional shapes and depths relative to joint widths that allow optimum sealant movement capability.

F. Tooling of Nonsag Sealants: Immediately after sealant application and before skinning or curing begins, tool sealants according to requirements specified in subparagraphs below to form smooth, uniform beads of configuration indicated; to eliminate air pockets; and to ensure contact and adhesion of sealant with sides of joint.

    1. Remove excess sealant from surfaces adjacent to joints.
    2. Use tooling agents that are approved in writing by sealant manufacturer and that do not discolor sealants or adjacent surfaces.
    3. Provide concave joint profile per Figure 8A in ASTM C 1193, unless otherwise indicated.
    4. Provide flush joint profile where indicated per Figure 8B in ASTM C 1193.

5. Provide recessed joint configuration of recess depth and at locations indicated per Figure 8C in ASTM C 1193.

3.4 CLEANING

A. Clean off excess sealant or sealant smears adjacent to joints as the Work progresses by methods and with cleaning materials approved in writing by manufacturers of joint sealants and of products in which joints occur.

3.5 PROTECTION

A. Protect joint sealants during and after curing period from contact with contaminating substances and from damage resulting from construction operations or other causes so sealants are without deterioration or damage at time of Substantial Completion. If, despite such protection, damage or deterioration occurs, cut out and remove damaged or deteriorated joint sealants immediately so installations with repaired areas are indistinguishable from original work.

3.6 JOINT-SEALANT SCHEDULE

A. Joint-Sealant Application: Exterior joints in vertical and horizontal concrete, concrete masonry, EIFS and brick surfaces.

1. Urethane Joint Sealant: Single component, non-sag, non-traffic grade, neutral curing.

B. Joint-Sealant Application: Exterior and interior horizontal and vertical surfaces of new work. New work includes painting of previously coated wood surfaces.

1. Siliconized –Acrylic Joint Sealant

C. Joint-Sealant Application: Interior horizontal and vertical joints in bathroom and kitchen surfaces.

1. 100% Silicone Joint Sealant

END OF SECTION 079200

SECTION 081160 – STORM AND SECURITY DOORS

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

A. Drawings and general provisions of the Contract, including General and Special Conditions and Division 01 Specification Sections, apply to this Section.

1.2 SUMMARY

A. Section includes swinging, swinging security, and sliding storm doors.

1.3 SUBMITTALS

A. Submit Prior to Measurement Walk-Through:

1. Product Data: For each type of product indicated. Include construction details, material descriptions, core descriptions, and finishes.
2. Installation Details: Include elevations of each door design, details of seals, door bottoms, details of anchorages, joints, field splices, connections, flashing, and sealant installation.
3. Product Test Reports: Based on evaluation of comprehensive tests performed by a qualified testing agency, for each type of door assembly.
4. Warranties: For manufacturer's warranties.

B. Submit After Measurement Walk-Through:

1. Shop Drawings: For product schedule for doors. Use same designations indicated on Door Schedule.

C. Submit During Final Inspection:

1. Maintenance Data: For finishes, weatherstripping, operable panels, and operating hardware to include maintenance manuals.
2. Warranty Data: For finishes, glazing, assembly, and door materials to include warranty certificates.

D. Substitutions: Proposals for new manufacturers and products that do not meet all specifications must be submitted at least four (4) weeks prior to bid date. Included with the submittal requirements, as mentioned in 1.3 A, provide a corner-cut or full-size sample unit, and color samples. The acceptance of new manufacturers and products is at the Engineer’s sole discretion.

E. Approved Equals: Proposals for new manufacturers and products that meet all specifications can be made during the submittal process. Included with the submittal requirements, as mentioned in 1.3 A, provide a corner-cut or full-size sample unit, and color samples. The acceptance of new manufacturers and products is at the Engineer’s sole discretion.

1.4 PRODUCT TEST REPORTS

A. Performance Class and Grade: AAMA/WDMA/CSA 101/I.S.2/A440 as follows: Minimum is R15.

1. Uniform Structural Load: Rated for no damage when tested according to ASTM E330.
2. Water Resistance: Rated for no water penetration when tested according to ASTM E331 & ASTM E547.
3. Air Leakage: Rated to not exceed 1.0 Cfm/sq. ft. when tested according to ASTM E283.

B. Outdoor/ Indoor Transmission Class (OITC): Rated for not less than the following when tested for laboratory sound transmission loss according to ASTM E90 and determined by ASTM E1332:

1. Swinging and Security Storm Doors: 28.
2. Sliding Storm Doors: 28.

C. If product test reports are older than five (5) years from the date received by Engineer, submit letter from Manufacturer certifying that the product is still exactly the same as it was when tested, and no suppliers, materials, or manufacturing processes have changed and also submit letter from the Testing Company stating that the tests have not changed since the report was last generated.

1.5 WARRANTY

A. Special Warranty: Manufacturer's standard form in which manufacturer agrees to repair or replace components of door assemblies that fail in materials or workmanship within specified warranty period.

1. Failures include, but are not limited to, the following:

a. Failure to meet sound rating requirements.
b. Faulty operation of seals.
c. Deterioration of metals or wood, metal or wood finishes, and other materials beyond normal use or weathering.

2. Warranty Period for Swinging Storm Doors: 5 years from date of Substantial Completion.
3. Warranty Period for Sliding Storm Doors: 10 years from date of Substantial Completion.

1.6 QUALITY ASSURANCE

A. Source Limitations: Obtain door assemblies from single source from single manufacturer per door operation.

B. Testing Agency Qualifications: An independent agency accredited as a performance testing laboratory according to the National Voluntary Laboratory Accreditation Program of NIST.

1.7 DELIVERY, STORAGE, AND HANDLING

A. Comply with provisions of Section 016000 “Materials & Equipment.”

B. Deliver in original packaging and protect from weather.

C. Store door assemblies in an upright position in a clean and dry storage area above ground.

1.8 PROJECT CONDITIONS

A. Field Measurements: Door sizes indicated on Door Schedule are approximate. Verify door openings by field measurements before fabrication and indicate measurements on Shop Drawings. Door swings depicted on floor plans are schematic only and do not represent finished condition. Contractor shall confirm final door swing with Homeowner and Engineer. Contractor is responsible for all measurements taken and all costs for corrections necessitated by incorrect data. Contractor is responsible for field inspection of all existing conditions that may interfere with installation and/or operation of new door.

B. Environmental Limitations: Do not deliver or install doors until spaces are enclosed and weatherproof, wet work in spaces is complete and dry, and ambient temperature and humidity conditions are maintained at the levels indicated by manufacturer.

PART 2 - PRODUCTS

2.1 MANUFACTURERS

A. Manufacturers: Subject to compliance with requirements and specifications, provide products by one of the following:

1. Storm Doors:

a. Mon-Ray, Inc.
b. Or Approved Equal.

2. Security Storm Doors:

a. Mon-Ray, Inc.
b. Or Approved Equal.

2.2 MATERIALS

A. Storm Doors:

1. Aluminum Framing Extrusions: ASTM B 221, Alloy 6063-T6 or alloy and temper required to suit structural and finish requirements, not less than 0.050 inch thick. Comply with AAMA/WDMA/CSA 101/I.S.2/A440.

a. Swinging Storm Door: Solid-core rigid flakeboard, 3-ply laminated wood fiberboard, or constructed of aluminum extrusions. Seamless aluminum or vinyl door skin bonded to core with pressure setting adhesive. Edges to be sealed with structural aluminum extrusions. Z-bar shall be extruded aluminum with uniform pre-drilled installation holes positioned for maximum support.

2. Fasteners: Provide fasteners of aluminum, nonmagnetic stainless steel, or other materials warranted by manufacturer to be noncorrosive for SC 3 severe service conditions and compatible with members, trim, hardware, anchors, and other components of storm doors. Comply with AAMA/WDMA/CSA 101/I.S.2/A440.

a. Exposed Fasteners: Unless unavoidable for applying hardware, do not use exposed fasteners. For application of hardware, use fasteners that match finish of member or hardware being fastened, as appropriate.

3. Anchors, Clips, and Accessories: Provide anchors, clips, and accessories of aluminum, nonmagnetic stainless steel, or zinc-coated steel or iron for storm doors, complying with ASTM B 456 or ASTM B 633 for SC 3 severe service conditions; provide sufficient strength to withstand design pressure indicated.
4. Reinforcing Members: Provide aluminum, nonmagnetic stainless steel, or nickel/chrome-plated steel reinforcing members that are noncorrosive for SC 3 severe service conditions and that comply with AAMA/WDMA/CSA 101/I.S.2/A440; provide sufficient strength to withstand design pressure indicated.
5. Sealant: For sealants required within fabricated sliding doors, provide storm door manufacturer's standard, permanently elastic, non-shrinking, and non-migrating type recommended by sealant manufacturer for joint size and movement.

B. Security Storm Doors:

1. Welded Steel Frame: Heavy-duty 16 gauge minimum steel frame with lock guard and tamper lip covering access to deadbolt.
2. Fasteners: Provide stainless steel fasteners and one-way hinge screws or similar.

2.3 GLAZING

A. Glass: Clear annealed glass, ASTM C 1036, Type 1, Class 1, q3.

1. Kind: Fully tempered and/or laminated as required by code.

B. Glazing System: Manufacturer's standard factory-glazing system that produces weathertight seal.

2.4 HARDWARE

A. See section 087111 “Door Hardware” for more information.

2.5 SWINGING STORM DOOR INSECT SCREENS

A. General: Fabricate insect screens to integrate with door frame. Provide screen for each door panel. Screen wickets are not permitted.

B. Aluminum Frames: Manufacturer's standard aluminum alloy complying with SMA 1004 or SMA 1201. Fabricate frames with mitered or coped joints or corner extrusions, concealed fasteners, and removable PVC spline/anchor concealing edge of frame.

1. Tubular Framing Sections and Cross Braces: Roll formed from aluminum sheet.
2. Finish for Screen Frames: Match color and finish of storm window.

C. Glass-Fiber Mesh Fabric: 18-by-14 or 18-by-16 mesh of PVC-coated, glass-fiber threads; woven and fused to form a fabric mesh resistant to corrosion, shrinkage, stretch, impact damage, and weather deterioration. Comply with ASTM D 3656.

1. Mesh Color: Charcoal gray.

2.6 FABRICATION

A. Provide concealed corner reinforcements and alignment clips for accurately fitted hairline joints at butted or mitered connections.

B. Factory prepare interior aluminum frames to receive templated mortised hardware; include cutouts, reinforcements, mortising, drilling, and tapping.

C. Fabricate frames for glazing with removable stops to allow glazing replacement without dismantling frame. Locate removable stops on the inside of spaces accessed by keyed doors.

D. Fabricate components to allow secure installation without exposed fasteners.

E. Weep Holes: Provide weep holes and internal drainage passages to conduct infiltrating water to exterior.

2.7 FINISHES

A. Baked-Enamel or Powder-Coat Finish: AAMA 2603 except with a minimum dry film thickness of 1.5 mils. Comply with coating manufacturer's written instructions for cleaning, conversion coating, and applying and baking finish.

1. Color: White, beige, bronze, or as indicated on Selection Sheet.

PART 3 - EXECUTION

3.1 PREPARATION

A. Furnish, install, and maintain dustproof temporary coverings and other protection for existing interior and exterior Work.

B. Coordinate installation of storm door assemblies with flashing, siding, casing, caulking, and other adjoining work to ensure proper sequencing.

C. Install new storm doors and related items into scheduled openings as soon as existing door is removed. Under no circumstances shall existing opening be left open to weather overnight.

3.2 EXAMINATION

A. Examine substrates, areas, and conditions, with Installer present, for compliance with requirements for installation tolerances and other conditions affecting performance of storm door assemblies.

B. Replace damaged or rotted wood with material as directed by Engineer. Rotted material is defined as any material that has been damaged by weather, insects, or anything that may otherwise compromise the structural integrity of the material in question. Contractor is entitled to compensation for removing and replacing rotted material not noted on door schedule or Scope of Work with prior approval by Engineer at approved price submitted to Engineer in written RFC. Replacement of rotted material shall be completed in accordance with Section 061000 “Rough Carpentry.”

C. Electrical relocations and/or modifications necessitated by installation shall be responsibility of Contractor.

D. Examine anchors to verify actual locations of storm door frame connections before frame installation.

E. Proceed with installation only after unsatisfactory conditions have been corrected.

3.3 INSTALLATION

A. General: Install storm door assemblies plumb, rigid, properly aligned, and securely fastened in place; comply with manufacturer's written instructions.

B. Frames: Set frames accurately in position in a concealed continuous sealant bed; plumbed, aligned, and braced securely until permanent anchors are set.

C. Provide 2-inch minimum air space between storm and prime door. Use wood build out for proper fastening and air space requirements. Furnish and install head flashing for built-out installations.

D. Installation Tolerances: Adjust door frames for squareness, alignment, twist, and plumbness to the following tolerances:

1. Squareness: Plus or minus 1/16 inch, measured at door rabbet on a line 90 degrees from jamb perpendicular to frame head.
2. Alignment: Plus or minus 1/16 inch, measured at jambs on a horizontal line parallel to plane of wall.
3. Twist: Plus or minus 1/16 inch, measured at opposite face corners of jambs on parallel lines, and perpendicular to plane of wall.
4. Plumbness: Plus or minus 1/16 inch, measured at jambs on a perpendicular line from head to floor.

E. Separate aluminum and other corrodible surfaces from sources of corrosion or electrolytic action at points of contact with other materials according to ASTM E 2112, Section 5.12 "Dissimilar Materials."

F. Doors: Fit doors accurately in frames, within manufacturer's standard clearances. Shim as necessary.

G. Seals: Where seals have been prefit and preinstalled in the factory and subsequently removed for shipping, reinstall seals and adjust according to manufacturer's written instructions.

H. Provide new break-metal surrounds at door sill, jambs, and head. Provide aluminum brick mould only as scheduled.

I. Furnish and apply concealed caulking to provide an acoustically tight condition and good visual appearance in accordance with installation details.

J. Repair or replace casing, siding, and/or other adjacent damaged construction in affected area to match existing construction and finishes.

3.4 ADJUSTING AND CLEANING

A. Final Adjustments: Check and adjust seals, door bottoms, and other hardware items right before final inspection. Leave work in complete and proper operating condition. Adjust gaskets, gasket retainers, and retainer covers to provide contact required to achieve OITC rating. Adjust operating panels and screens to provide tight fit at contact points for smooth operation and weather-tight closure.

B. Remove and replace defective work, including defective or damaged seals and doors and frames that are warped, bowed, or otherwise unacceptable.

C. Touch-up shop applied finishes to satisfaction of Engineer.

D. Clean all surfaces including, but not limited to grout and/or sealant off door frames immediately after installation.

E. Clean glass immediately after installing doors. Comply with manufacturer's written recommendations for final cleaning and maintenance. Remove nonpermanent labels and clean surfaces.

END OF SECTION 081160

SECTION 083113 – ATTIC ACCESS

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

A. Drawings and general provisions of the Contract, including General and Special Conditions and Division 01 Specification Sections, apply to this Section.

1.2 SUMMARY

A. Section Includes:

1. Acoustically treating existing attic/kneewall accesses, whole-house fans, and pull-down stairs.
2. New attic/kneewall accesses, removal of whole-house fans, and new pull-down stairs.

1.3 SUBMITTALS

A. Submit Prior to Measurement Walk-Through:

1. Product Data: For each type of product, include construction details, materials, individual components and profiles, and finishes.
2. Installation Details: Include fabrication and installation of attic/kneewall accesses and pull-down stairs for each type of substrate.

B. Submit After Measurement Walk-Through:

1. Shop Drawings: For schedule of attic/kneewall accesses and pull-down stairs.

1.4 QUALITY ASSURANCE

A. Source Limitations: Obtain each type of access door and frame from single source from single manufacturer.

PART 2 - PRODUCTS

2.1 ACCESS HATCHES FOR WALLS AND CEILINGS

A. Manufacturers: Subject to compliance with requirements, provide products by one of the following:

1. Access Panel Solutions.
2. Acudor Products, Inc.
3. Babcock-Davis.
4. Battic Door.

5. Cendrex Inc.
6. Elmdor/Stoneman Manufacturing Co.; Div. of Acorn Engineering Co.
7. Karp Associates, Inc.
8. Larsen's Manufacturing Company.
9. Maxam Metal Products Limited.
10. Metropolitan Door Industries Corp.
11. MIFAB, Inc.
12. Nystrom, Inc.
13. Sealin' Hatch.
14. Or Approved Equal.

B. Flush Access Doors with Concealed Flanges:

1. Assembly Description: Fabricate door to fit flush to frame. Provide frame with gypsum board or plaster beads for concealed flange installation.
2. Locations: Wall or ceiling.
3. Access Size: 22 inch by 30 inch.
4. Metallic-Coated Steel Sheet for Door: Nominal 0.064 inch, 16 gage.

    a. Finish: Factory finish to match existing ceiling or wall finish.

5. Frame Material: Same material and thickness as door.
6. Hinges: Manufacturer's standard.
7. Hardware: Latch.

C. Pre-Insulated Access Hatch:

1. Assembly Description: Wood frame and door.
2. Locations: Ceiling.
3. Access Size: 22 inch by 30 inch.

    a. Finish: Factory finish to match existing ceiling finish.

2.2 ACCESS STAIRS AND LADDERS

A. Manufacturers: Subject to compliance with requirements, provide products by one of the following:

1. Bessler Stairway Co.
2. Century Industries.
3. Louisville Ladder, Inc.
4. Marwin Company (The), Inc.
5. Werner Co.
6. Or Approved Equal.

B. Pull-Down Attic Stairs:

1. Assembly Description: Stair shall be constructed of clear southern yellow pine in 3 folding sections joined by heavy duty steel section hinges. Treads shall be a minimum of 1 inch thick by 6 inch wide nominal, and mortised into side stiles and supported by 3/16 inch steel ladder rods which span from stile to stile. Rise between treads shall not exceed 9-1/4 inch.
2. Locations: Ceiling.
3. Access Size: Minimum of 22 inch by 54 inch.
4. Capacity: Minimum of 300 lbs.
5. Panel: Interior finish stair panel shall be paint grade plywood. If factory panel is inadequate or warped, affix a ¼ inch minimum thickness finish grade plywood panel to interior surface. Panel shall not bow or bend, and shall fit flush with opening when closed.

    a. Finish: Prime and paint to match ceiling finish as specified in Section 099000 "Painting."

6. Frame Material: Frame shall be constructed of clear southern yellow or white pine with a minimum thickness of ¾ inch. Corners shall be butt joined with screw fasteners.
7. Hardware: Operating mechanism shall consist of continuous piano hinge and two positive acting spring-balance hinges per stair. When a security access condition applies, install brass slide latches on each side of interior surface to prevent opening from attic.

C. Crawlspace Access Ladder:

1. Provide permanent crawlspace access ladder for each in-floor crawlspace access per Scope of Work.

2.3 WEATHERSTRIPPING

A. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
1. Zero International, Model #326 & #328.
2. Pemko, Model #319_N.
3. Or Approved Equal.

B. Attic Accesses, Prime Doors, and Pull-Down Stairs:

1. Weatherstripping shall be clear anodized aluminum, with closed cell sponge neoprene flexible bulb, 3/16-inches thick, and flexible to -30 degrees F.

2.4 ACOUSTICALLY TREAT ACCESS PANEL

A. See Details and Section 072100 "Thermal Insulation" for insulation type.

2.5 ACOUSTICALLY TREAT WHOLE-HOUSE FAN AND PULL-DOWN STAIR

A. Manufacturers: Subject to compliance with requirements, provide products by one of the following:

1. Battic Door.
2. Or Approved Equal.

B. Pull-Down Stair Acoustical Treatment:

1. Insulate to an R-value that matches or exceeds the amount of thermal insulation installed in the attic.

C. Whole-House Fan:

1. Insulate to a minimum value of R-8.

2.6 FABRICATION

A. General: Provide access door and frame assemblies manufactured as integral units ready for installation.

B. Metal Surfaces: For metal surfaces exposed to view in the completed Work, provide materials with smooth, flat surfaces without blemishes. Do not use materials with exposed pitting, seam marks, roller marks, rolled trade names, or roughness.

C. Doors and Frames: Grind exposed welds smooth and flush with adjacent surfaces. Furnish attachment devices and fasteners of type required to secure access doors to types of supports indicated.

1. For concealed flanges with drywall bead, provide edge trim for gypsum board securely attached to perimeter of frames.
2. For concealed flanges with plaster bead for full-bed plaster applications, provide zinc-coated expanded metal lath and exposed casing bead welded to perimeter of frames.
3. Provide mounting holes in frames for attachment of units to wood framing.

D. Latching Mechanisms: Furnish number required to hold doors in flush, smooth plane when closed.

2.7 FINISHES

A. Comply with NAAMM's "Metal Finishes Manual for Architectural and Metal Products" for recommendations for applying and designating finishes.

B. Protect mechanical finishes on exposed surfaces from damage by applying a strippable, temporary protective covering before shipping.

C. Appearance of Finished Work: Noticeable variations in same piece are not acceptable.

D. Steel and Metallic-Coated-Steel Finishes:

1. Factory Prime: Apply manufacturer's standard, fast-curing, lead- and chromate-free, universal primer immediately after surface preparation and pretreatment.
2. Factory Finish: Immediately after cleaning and pretreating, apply manufacturer's standard two-coat, baked-on finish consisting of prime coat and thermosetting topcoat, with a minimum dry-film thickness of 1 mil for topcoat.

PART 3 - EXECUTION

3.1 EXAMINATION

A. Examine substrates for compliance with requirements for installation tolerances and other conditions affecting performance of the Work.

B. Proceed with installation only after unsatisfactory conditions have been corrected.

3.2 INSTALLATION

A. Comply with manufacturer's written instructions for installing access doors and frames.

B. Install doors and accesses flush with adjacent finish surfaces or recessed to receive finish material.

3.3 ADJUSTING

A. Adjust doors, accesses, and hardware, after installation, for proper operation.

B. Remove and replace doors, accesses, and frames that are warped, bowed, or otherwise damaged.

END OF SECTION 083113

SECTION 083216 – VINYL SLIDING PATIO DOORS

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

A. Drawings and general provisions of the Contract, including General and Special Conditions and Division 01 Specification Sections, apply to this Section.

1.2 SUMMARY

A. Section includes Sliding Vinyl Glass Door.

1.3 DESIGN REQUIREMENTS

A. Provide custom-sized sliding vinyl doors for each existing rough opening. Provide unit no less than 1/4 inch smaller in width and in height than the opening size. For openings out of square or plumb, the opening size is the largest level and plumb rectangle that can fit within the existing rough opening.

1.4 SUBMITTALS

A. Submit Prior to Measurement Walk-Through:

1. Product Data: For each type of product indicated. Include construction details, material descriptions, core descriptions, and finishes or finishing instructions.
2. Installation Details: Include elevations of each door design, details of seals, door bottoms, and thresholds, details of anchorages, joints, field splices, connections, flashing, and sealant installation.
3. Product Test Reports: Based on evaluation of comprehensive tests performed by a qualified testing agency, for each type of door assembly.
4. Warranties: For manufacturer's warranties.

B. Submit After Measurement Walk-Through:

1. Shop Drawings: For product schedule for doors. Use same designations indicated on Door Schedule.

C. Submit During Final Inspection:

1. Maintenance Data: For finishes, weatherstripping, operable panels, and operating hardware to include maintenance manuals.
2. Warranty Data: For finishes, glazing, assembly, and door materials to include warranty certificates.

D. Substitutions: Proposals for new manufacturers and products that do not meet all specifications must be submitted at least four (4) weeks prior to bid date. Included with the submittal requirements, as mentioned in 1.3 A, provide a corner-cut or full-size sample unit,

and color samples. The acceptance of new manufacturers and products is at the Engineer's sole discretion.

E. Approved Equals: Proposals for new manufacturers and products that meet all specifications can be made during the submittal process. Included with the submittal requirements, as mentioned in 1.3 A, provide a corner-cut or full-size sample unit, and color samples. The acceptance of new manufacturers and products is at the Engineer's sole discretion.

1.5 PRODUCT TEST REPORTS

A. Performance Class and Grade: AAMA/WDMA/CSA 101/I.S.2/A440 as follows: Minimum is R15.

1. Uniform Structural Load: Rated for no damage when tested according to ASTM E330.
2. Water Resistance: Rated for no water penetration when tested according to ASTM E331 & ASTM E547.
3. Air Leakage: Rated to not exceed 0.3 Cfm/sq. ft. when tested according to ASTM E283.

B. Thermal Transmittance: NFRC 100 maximum whole-door U-factor of 0.56 Btu/sq. ft. x h x deg F.

C. Condensation Resistance: AAMA 1503 minimum CRF of 55.

D. Outdoor/ Indoor Transmission Class (OITC): Rated for not less than 32 OITC when tested for laboratory sound transmission loss according to ASTM E 90 and determined by ASTM E 1332:

E. If product test reports are older than five (5) years from the date received by Engineer, submit letter from Manufacturer certifying that the product is still exactly the same as it was when tested, and no suppliers, materials, or manufacturing processes have changed and also submit letter from the Testing Company stating that the tests have not changed since the report was last generated.

1.6 WARRANTY

A. Special Warranty: Manufacturer's standard form in which manufacturer agrees to repair or replace sliding and swinging vinyl-framed glass patio doors that fail in materials or workmanship within specified warranty period.

1. Failures include, but are not limited to, the following:

a. Failure to meet performance requirements.
b. Structural failures including excessive deflection.
c. Water leakage or air infiltration.
d. Faulty operation of movable panels and hardware.
e. Deterioration of vinyl, metals, vinyl, other materials, and finishes beyond normal weathering.
f. Deterioration of insulating glass as defined in Section 088000 "Glazing."

2. Warranty Period:

   a. Sliding and Swinging Door: 10 years from date of Substantial Completion.
   b. Glazing: 10 years from date of Substantial Completion.
   c. Metal Finish: 10 years from date of Substantial Completion.

1.7 QUALITY ASSURANCE

A. Source Limitations: Obtain door assemblies, including doors, frames, seals, tracks, hinges, and thresholds from single source from single manufacturer.

B. Testing Agency Qualifications: An independent agency accredited as a performance testing laboratory according to the National Voluntary Laboratory Accreditation Program of NIST.

1.8 DELIVERY, STORAGE, AND HANDLING

A. Comply with provisions of Section 016000 “Materials & Equipment.”

B. Deliver in original packaging and protect from weather.

C. Store door assemblies in an upright position in a clean and dry storage area above ground.

1.9 PROJECT CONDITIONS

A. Field Measurements: Door sizes indicated on Door Schedule are approximate. Verify door openings by field measurements before fabrication and indicate measurements on Shop Drawings. Door swings depicted on floor plans are schematic only and do not represent finished condition. Contractor shall confirm final door swing with Homeowner and Engineer. Contractor is responsible for all measurements taken and all costs for corrections necessitated by incorrect data.

B. Environmental Limitations: Do not deliver or install doors until spaces are enclosed and weatherproof, wet work in spaces is complete and dry, and ambient temperature and humidity conditions are maintained at the levels indicated by manufacturer.

PART 2 - PRODUCTS

2.1 MANUFACTURERS

A. Manufacturers: Subject to compliance with requirements and specifications.

2.2 MATERIALS

A. Provide materials and components meeting the applicable requirements of the applicable AAMA standard.

B. Vinyl: Comply with ASTM 303 and ASTM D4216 extrusions for doors and windows.

C. Fasteners, Anchors, Clips. And Accessories: Aluminum, or Austentitic (non-magnetic) stainless steel; provide sufficient strength to withstand design pressure.

1. Exposed Fasteners: Unless unavoidable for applying hardware, do not use exposed fasteners. For application of hardware, use fasteners that match finish of member or hardware being fastened, as appropriate.

D. Anchors, Clips, and Accessories: Aluminum, nonmagnetic stainless steel, or zinc-coated steel or iron complying with ASTM B 456 or ASTM B 633 for SC 3 severe service conditions; provide sufficient strength to withstand design pressure indicated.

E. Mullions: Provide mullions and mullion casing and cover plates as shown, matching door units, complete with anchors for support to structure and installation of sliding vinyl glass door units. Allow for erection tolerances and provide for movement of door units due to thermal expansion and building deflections, as indicated. Provide mullions and cover plates capable of withstanding design loads of door units.

F. Reinforcing Members: Aluminum, nonmagnetic stainless steel, nickel/chrome-plated steel complying with ASTM B 456 or zinc-coated steel or iron complying with ASTM B 633 for SC 3 severe service conditions; provide sufficient strength to withstand design pressure indicated.

G. Drip Caps: Extruded aluminum, factory fabricated and finished to match aluminum cladding; designed to direct water away from building when installed horizontally at head of aluminum-clad vinyl-framed glass door units.

2.3 GLAZING

A. Insulating-Glass Units: ASTM E 2190.

1. Glass: Clear annealed glass, ASTM C 1036, Type 1, Class 1, q3.

a. Kind: Fully tempered and/or laminated as required by code; sandblasted opaque where indicated on Selection Sheet.

2. Lites: Two.
3. Filling: Fill space between glass lites with air.
4. Low-E Coating: Pyrolytic on manufacturer recommended surface.

B. Glazing System: Manufacturer's standard factory-glazing system that produces weathertight seal.

2.4 HARDWARE

A. Provide manufacturer's standard hardware fabricated from corrosion- resistant material of sufficient strength to perform its intended function; designed to smoothly operate, tightly close, and securely lock sliding door units. Do not use aluminum in frictional contact with other metals. Where exposed, provide solid bronze; extruded, cast, or wrought aluminum; solid white metal with special coating finish; or nonmagnetic stainless steel.

B. Roller Assemblies: Provide movable panels with roller assemblies. Provide adjustable tandem roller assemblies with non-magnetic stainless-steel rollers.

C. Threshold and Sill Cap/Track: Provide manufactures standard extruded-aluminum threshold and track designed to comply with performance requirements indicated and to drain to the exterior.

D. Door Pulls: Provide manufacturer's standard pull handle with lever operated, keyed cylinder lock. Color to match door frame.

E. Locks: Install manufacturer’s standard pull and locking device on each movable panel with thumb-turn on interior, lockable from the inside only. Adjust locking device to allow unobstructed movement of the panel across adjacent panel in the direction indicated.

F. Grilles (False Muntins): Provide grilles in designs indicated, on the inside of the IGU.

1. Material: Manufacturer’s standard.
2. Bar Width: Not less than 3/4 inch wide.
3. Color: Match extruded aluminum finish.

2.5 SLIDING PATIO DOOR INSECT SCREENS

A. General: Design doors and hardware to accommodate screens in a tight-fitting, removable arrangement, with a minimum of exposed fasteners and latches. Fabricate insect screens to fully integrate with door frame. Locate screens on the outside of door and provide for each operable door panel. Comply with SMA 1201.

B. Insect Screen Frames: Manufacturer's standard members, with mitered or coped joints, concealed fasteners, adjustable rollers, and removable PVC or PE spline/anchor concealing edge of mesh.

1. Finish: Manufacturer's standard to match extruded aluminum finish.

C. Glass-Fiber Mesh Fabric: ASTM D 3656, 18-by-14 or 18-by-16 count per sq. in. mesh of PVC-coated, glass-fiber threads; woven and fused to form a fabric mesh resistant to corrosion, shrinkage, stretch, impact damage, and weather deterioration in the following color:

1. Mesh Color: Charcoal gray.

D. Hardware: Extruded, cast, or wrought aluminum.

1. Lock: Manufacturer's standard pull and keyless locking device on each movable panel, lockable from inside only. Adjust locking device to allow unobstructed movement of panel across adjacent panel in direction indicated.

E. For swinging storm door insect screens see Section 081160 “Storm Doors.”

2.6 FABRICATION

A. Complete fabrication, assembly, finishing, hardware application and other work in the factory to the greatest extent possible. Disassemble components only as necessary for shipment and installation.

B. Weep Holes: Provide weep holes and internal passages to conduct infiltrating water to exterior.

C. Mechanically fasten frames to provide rigid, tight joinery. Seal corner joints and screw heads with elastomeric sealant. Provide end dams in sill assemblies to direct water to exterior.

D. Weather-stripping: Provide operable panels with double row of Weather-stripping in horizontal rails and single- or double-row Weather-stripping in meeting or jamb stiles, as required to meet specified performance requirements. Provide Weather- stripping locked into extruded grooves in panels.

2.7 FINISH

A. Exterior Finish:

1. Baked-Enamel Aluminum Finishes: For extruded aluminum, provide manufacturer’s standard baked enamel complying with AAMA 2603 and paint manufacturer’s specifications for cleaning, conversion coating, painting, and coating thickness. For roll-formed aluminum, provide roll-coating with performance characteristics, equivalent to AAMA 2603.
2. Color: White, beige, bronze, or as indicated on Selection Sheet.

B. Interior Finish:

1. Exposed Unfinished Vinyl Surfaces: Manufacturer's standard stain-grade species or prime coat where indicated on Drawings.
2. Factory Finishes: Manufacturer’s standard finishing process. Paint and/or stain colors to be selected by homeowner during field measurements.
3. Shop Finishes: Paint and/or stain as scheduled per manufacturer’s instructions. Paint and/or stain colors to be selected by homeowner during field measurements.
4. Color: As selected by Homeowner at Measurement Walk-Through.

PART 3 - EXECUTION

3.1 PREPARATION

A. Do not remove existing door units until correct new door units are on site.

B. Furnish, install, and maintain dustproof temporary coverings and other protection for existing interior and exterior Work.

C. Coordinate installation of door assemblies with flashing, siding, casing, caulking, and other adjoining work to ensure proper sequencing.

D. Install new doors and related items into scheduled openings as soon as existing door is removed. Under no circumstances shall existing opening be left open to weather overnight.

3.2 EXAMINATION

A. Examine openings, substrates, structural support, anchorage, and conditions, with Installer present, for compliance with requirements for installation tolerances and other conditions affecting performance of work.

B. Replace damaged vinyl with material as directed by Engineer. Rotted material is defined as any material that has been damaged by weather, insects, or anything that may otherwise compromise the structural integrity of the material in question. Contractor is entitled to compensation for removing and replacing rotted material not noted on door schedule or Scope of Work with prior approval by Engineer at approved price submitted to Engineer in written RFC. Replacement of rotted material shall be completed in accordance with Section 061000 “Rough Carpentry.”

C. Electrical relocations and/or modifications necessitated by installation shall be responsibility of Contractor.

D. Verify rough opening dimensions, levelness of threshold substrate, and operational clearances.

E. Examine wall flashings, vapor retarders, water and weather barriers, and other built-in components to ensure a coordinated, weathertight sliding door installation.

1. Masonry Surfaces: Visibly dry and free of excess mortar, sand, and other construction debris.
2. Vinyl-Frame Walls: Dry, clean, sound, well nailed, free of voids, and without offsets at joints. Ensure that nail heads are driven flush with surfaces in opening and within 3 inches of opening.
3. Metal Surfaces: Dry and clean; free of grease, oil, dirt, rust, corrosion, and welding slag; without sharp edges or offsets at joints.

F. Proceed with installation only after unsatisfactory conditions have been corrected.

3.3 INSTALLATION

A. Comply with Drawings, Shop Drawings, and manufacturer's written instructions for installing doors, hardware, accessories, and other components.

B. Install doors level, plumb, square, true to line, without distortion, warp or rack of frames and panels, or impeding thermal movement, anchored securely in place to structural support, and in proper relation to wall flashing, vapor retarders, air barriers, water/weather barriers, and other adjacent construction.

1. Install frames with removable glazing stops located on secure side of opening.
2. Remove temporary braces only after frames or bucks have been properly set and secured.
3. Check squareness, twist, and plumbness of frames. Shim as necessary to comply with installation tolerances.
4. Solidly pack approved mineral-fiber insulation behind frames.

C. Installation Tolerances: Adjust door frames for squareness, alignment, twist, and plumbness to the following tolerances:

1. Squareness: Plus or minus 1/16 inch, measured at door rabbet on a line 90 degrees from jamb perpendicular to frame head.
2. Alignment: Plus or minus 1/16 inch, measured at jambs on a horizontal line parallel to plane of wall.
3. Twist: Plus or minus 1/16 inch, measured at opposite face corners of jambs on parallel lines, and perpendicular to plane of wall.
4. Plumbness: Plus or minus 1/16 inch, measured at jambs on a perpendicular line from head to floor.

D. Enlarge opening at floor to maintain sill height. Structural modifications, cutting, and patching required for enlargement of openings as scheduled shall be responsibility of Contractor. Make necessary repairs or additions with material as directed by Engineer to create an acceptable sill to receive threshold. Adjust and reinforce substrate for proper installation and operation. Trim interior leading edge of threshold with Homeowner’s choice of anodized aluminum or oak sealed with polyurethane.

E. Thresholds: Set thresholds in full bed of sealant complying with requirements in Section 079000 "Sealants."

F. Separate aluminum and other corrodible surfaces from sources of corrosion or electrolytic action at points of contact with other materials according to ASTM E 2112, Section 5.12 "Dissimilar Materials."

G. Doors: Fit doors accurately in frames, within clearances indicated below. Shim as necessary.

1. Non-Fire-Rated Doors: Fit non-fire-rated doors accurately in frames with the following clearances:

a. Jambs: 1/8 inch.

b. Head with Butt Hinges: 1/8 inch.
c. Sill: Manufacturer's standard.

H. Seals: Where seals have been prefit and preinstalled in the factory and subsequently removed for shipping, reinstall seals and adjust according to manufacturer's written instructions.

I. Provide new interior trim to match existing type, pattern, material, and finish per discretion of the Engineer.

J. Provide new break-metal surrounds at door sill, jambs, and head. Provide aluminum brick mould only as scheduled.

K. Furnish and apply concealed caulking to provide an acoustically tight condition and good visual appearance in accordance with installation details.

L. Repair or replace casing, siding, and/or other adjacent damaged construction in affected area to match existing construction and finishes.

3.4 ADJUSTING, CLEANING, AND PROTECTION

A. Lubricate hardware and moving parts.

B. Adjust operating panels and screens to provide a tight fit at contact points and weather stripping for smooth operation, without binding, and weathertight closure.

C. Adjust hardware for proper alignment, smooth operation, and proper latching without unnecessary force or excessive clearance.

D. Clean frame surfaces immediately after installing doors. Comply with manufacturer's written recommendations for final cleaning and maintenance. Avoid damaging protective coatings and finishes.

E. Clean glass immediately after installing doors. Comply with manufacturer's written recommendations for final cleaning and maintenance. Remove nonpermanent labels and clean surfaces.

F. Remove and replace glass that has been broken, chipped, cracked, abraded, or damaged during construction period.

G. Protect door surfaces from contact with contaminating substances resulting from construction operations. In addition, monitor sliding door surfaces adjacent to and below exterior concrete and masonry surfaces during construction for presence of dirt, scum, alkaline deposits, stains, or other contaminants. If contaminating substances do contact sliding door surfaces, remove contaminants immediately according to manufacturer's written instructions.

H. Refinish or replace doors with damaged finishes.

I. Replace damaged components.

END OF SECTION 083216

SECTION 083219 – WOOD-FRAMED PATIO DOORS

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

A. Drawings and general provisions of the Contract, including General and Special Conditions and Division 01 Specification Sections, apply to this Section.

1.2 SUMMARY

A. Section includes sliding and swinging wood-framed glass patio doors for exterior locations with extruded aluminum-clad exterior exposed surfaces.

1.3 SUBMITTALS

A. Submit Prior to Measurement Walk-Through:

1. Product Data: For each type of product indicated. Include construction details, material descriptions, core descriptions, and finishes or finishing instructions.
2. Installation Details: Include elevations of each door design, details of seals, door bottoms, and thresholds, details of anchorages, joints, field splices, connections, flashing, and sealant installation.
3. Product Test Reports: Based on evaluation of comprehensive tests performed by a qualified testing agency, for each type of door assembly.
4. Warranties: For manufacturer's warranties.

B. Submit After Measurement Walk-Through:

1. Shop Drawings: For product schedule for doors. Use same designations indicated on Door Schedule.

C. Submit During Final Inspection:

1. Maintenance Data: For finishes, weatherstripping, operable panels, and operating hardware to include maintenance manuals.
2. Warranty Data: For finishes, glazing, assembly, and door materials to include warranty certificates.

D. Substitutions: Proposals for new manufacturers and products that do not meet all specifications must be submitted at least four (4) weeks prior to bid date. Included with the submittal requirements, as mentioned in 1.3 A, provide a corner-cut or full-size sample unit, and color samples. The acceptance of new manufacturers and products is at the Engineer’s sole discretion.

E. Approved Equals: Proposals for new manufacturers and products that meet all specifications can be made during the submittal process. Included with the submittal requirements, as

mentioned in 1.3 A, provide a corner-cut or full-size sample unit, and color samples. The acceptance of new manufacturers and products is at the Engineer's sole discretion.

1.4 PRODUCT TEST REPORTS

A. Performance Class and Grade: AAMA/WDMA/CSA 101/I.S.2/A440 as follows: Minimum is R15.

1. Uniform Structural Load: Rated for no damage when tested according to ASTM E330.
2. Water Resistance: Rated for no water penetration when tested according to ASTM E331 & ASTM E547.
3. Air Leakage: Rated to not exceed 0.3 Cfm/sq. ft. when tested according to ASTM E283.

B. Thermal Transmittance: NFRC 100 maximum whole-door U-factor of 0.56 Btu/sq. ft. x h x deg F.

C. Condensation Resistance: AAMA 1503 minimum CRF of 55.

D. Outdoor/ Indoor Transmission Class (OITC): Rated for not less than 28 OITC when tested for laboratory sound transmission loss according to ASTM E90 and determined by ASTM E1332:

E. If product test reports are older than five (5) years from the date received by Engineer, submit letter from Manufacturer certifying that the product is still exactly the same as it was when tested, and no suppliers, materials, or manufacturing processes have changed and also submit letter from the Testing Company stating that the tests have not changed since the report was last generated.

1.5 WARRANTY

A. Special Warranty: Manufacturer's standard form in which manufacturer agrees to repair or replace sliding and swinging wood-framed glass patio doors that fail in materials or workmanship within specified warranty period.

1. Failures include, but are not limited to, the following:

a. Failure to meet performance requirements.
b. Structural failures including excessive deflection.
c. Water leakage or air infiltration.
d. Faulty operation of movable panels and hardware.
e. Deterioration of wood, metals, vinyl, other materials, and finishes beyond normal weathering.
f. Deterioration of insulating glass as defined in Section 088000 "Glazing."

2. Warranty Period:

a. Sliding and Swinging Door: 10 years from date of Substantial Completion.
b. Glazing: 10 years from date of Substantial Completion.

c. Metal Finish: 10 years from date of Substantial Completion.

1.6 QUALITY ASSURANCE

A. Source Limitations: Obtain door assemblies, including doors, frames, seals, tracks, hinges, and thresholds from single source from single manufacturer.

B. Testing Agency Qualifications: An independent agency accredited as a performance testing laboratory according to the National Voluntary Laboratory Accreditation Program of NIST.

1.7 DELIVERY, STORAGE, AND HANDLING

A. Comply with provisions of Section 016000 “Materials & Equipment.”

B. Deliver in original packaging and protect from weather.

C. Store door assemblies in an upright position in a clean and dry storage area above ground.

1.8 PROJECT CONDITIONS

A. Field Measurements: Door sizes indicated on Door Schedule are approximate. Verify door openings by field measurements before fabrication and indicate measurements on Shop Drawings. Door swings depicted on floor plans are schematic only and do not represent finished condition. Contractor shall confirm final door swing with Homeowner and Engineer. Contractor is responsible for all measurements taken and all costs for corrections necessitated by incorrect data.

B. Environmental Limitations: Do not deliver or install doors until spaces are enclosed and weatherproof, wet work in spaces is complete and dry, and ambient temperature and humidity conditions are maintained at the levels indicated by manufacturer.

PART 2 - PRODUCTS

2.1 MANUFACTURERS

A. Manufacturers: Subject to compliance with requirements, provide products by one of the following:

1. Marvin Windows and Doors.
2. Kolbe & Kolbe Millwork Co., Inc.
3. Sierra Pacific Windows.
4. Or Approved Equal.

2.2 PATIO DOORS

A. Wood: Clear fir or pine or another suitable fine-grained lumber; kiln-dried to a moisture content of 6 to 12 percent at time of fabrication; free of visible finger joints, blue stain, knots, pitch pockets, and surface checks larger than 1/32 inch deep by 2 inches wide; water-repellent preservative treated.

B. Aluminum Extrusions for Cladding: Manufacturer's standard extruded-aluminum cladding mechanically bonded to exterior exposed wood members. Provide aluminum alloy and temper recommended by wood-framed glass door manufacturer for strength, corrosion resistance, and application of required finish.

1. Exterior extruded aluminum-cladding: Minimum of 0.050 inch thick.

C. Wood Trim, Clad Trim, and Glazing Stops: Material and finish to match frame members.

D. Fasteners: Aluminum, nonmagnetic stainless steel, or other materials warranted by manufacturer to be noncorrosive for SC 3 severe service conditions and compatible with sliding wood-framed glass door members, cladding, trim, hardware, anchors, and other components.

1. Exposed Fasteners: Unless unavoidable for applying hardware, do not use exposed fasteners. For application of hardware, use fasteners that match finish of member or hardware being fastened, as appropriate.

E. Anchors, Clips, and Accessories: Aluminum, nonmagnetic stainless steel, or zinc-coated steel or iron complying with ASTM B 456 or ASTM B 633 for SC 3 severe service conditions; provide sufficient strength to withstand design pressure indicated.

F. Mullions: Provide mullions and mullion casing and cover plates as shown, matching door units, complete with anchors for support to structure and installation of sliding wood-framed glass door units. Allow for erection tolerances and provide for movement of door units due to thermal expansion and building deflections, as indicated. Provide mullions and cover plates capable of withstanding design loads of door units.

G. Reinforcing Members: Aluminum, nonmagnetic stainless steel, nickel/chrome-plated steel complying with ASTM B 456 or zinc-coated steel or iron complying with ASTM B 633 for SC 3 severe service conditions; provide sufficient strength to withstand design pressure indicated.

H. Drip Caps: Extruded aluminum, factory fabricated and finished to match aluminum cladding; designed to direct water away from building when installed horizontally at head of aluminum-clad wood-framed glass door units.

2.3 GLAZING

A. Insulating-Glass Units: ASTM E 2190.

1. Glass: Clear annealed glass, ASTM C 1036, Type 1, Class 1, q3.

a. Kind: Fully tempered and/or laminated as required by code; sandblasted opaque where indicated on Selection Sheet.

2. Lites: Two.
3. Filling: Fill space between glass lites with air.
4. Low-E Coating: Pyrolytic on manufacturer recommended surface.

B. Glazing System: Manufacturer's standard factory-glazing system that produces weathertight seal.

2.4 HARDWARE

A. See Section 087111 “Door Hardware” for more information.

2.5 ACCESSORIES

A. Grilles (False Muntins): Provide grilles in designs indicated, on the inside of the IGU.

1. Material: Manufacturer’s standard.
2. Bar Width: Not less than 3/4 inch wide.
3. Color: Match extruded aluminum finish.

2.6 SLIDING PATIO DOOR INSECT SCREENS

A. General: Design doors and hardware to accommodate screens in a tight-fitting, removable arrangement, with a minimum of exposed fasteners and latches. Fabricate insect screens to fully integrate with door frame. Locate screens on the outside of door and provide for each operable door panel. Comply with SMA 1201.

B. Insect Screen Frames: Manufacturer's standard members, with mitered or coped joints, concealed fasteners, adjustable rollers, and removable PVC or PE spline/anchor concealing edge of mesh.

1. Finish: Manufacturer's standard to match extruded aluminum finish.

C. Glass-Fiber Mesh Fabric: ASTM D 3656, 18-by-14 or 18-by-16 count per sq. in. mesh of PVC-coated, glass-fiber threads; woven and fused to form a fabric mesh resistant to corrosion, shrinkage, stretch, impact damage, and weather deterioration in the following color:

1. Mesh Color: Charcoal gray.

D. Hardware: Extruded, cast, or wrought aluminum.

1. Lock: Manufacturer's standard pull and keyless locking device on each movable panel, lockable from inside only. Adjust locking device to allow unobstructed movement of panel across adjacent panel in direction indicated.

E. For swinging storm door insect screens see Section 081160 “Storm Doors.”

2.7 FABRICATION

A. Fabricate wood-framed glass doors in sizes indicated. Include a complete system for assembling components and anchoring door.

B. Fabricate wood-framed glass doors that are reglazable without dismantling panel framing.

C. Weather Stripping: Provide full-perimeter weather stripping for each operable panel unless otherwise indicated.

D. Factory machine wood-framed glass doors for openings and hardware that is not surface applied.

E. Complete fabrication, assembly, finishing, hardware application, and other work in the factory to greatest extent possible. Disassemble components only as necessary for shipment and installation. Allow for scribing, trimming, and fitting at Project site.

F. Factory-Glazed Fabrication: Glaze wood-framed glass doors in the factory. Comply with requirements in AAMA/WDMA/CSA 101/I.S.2/A440.

G. Glazing Stops: Provide snap-on glazing stops coordinated with glazing system indicated. Provide glazing stops to match panel frames.

2.8 FINISH

A. Exterior Finish:

1. Baked-Enamel or Powder-Coat Finish: AAMA 2603 except with a minimum dry film thickness of 1.5 mils. Comply with coating manufacturer's written instructions for cleaning, conversion coating, and applying and baking finish.
2. Color: White, beige, bronze, or as indicated on Selection Sheet.

B. Interior Finish:

1. Exposed Unfinished Wood Surfaces: Manufacturer's standard stain-grade species or prime coat where indicated on Drawings.
2. Factory Finishes: Manufacturer’s standard finishing process. Paint and/or stain colors to be selected by homeowner during field measurements.
3. Shop Finishes: Paint and/or stain as scheduled per manufacturer’s instructions. Paint and/or stain colors to be selected by homeowner during field measurements.
4. Color: As selected by Homeowner at Measurement Walk-Through.

PART 3 - EXECUTION

3.1 PREPARATION

A. Do not remove existing door units until correct new door units are on site.

B. Furnish, install, and maintain dustproof temporary coverings and other protection for existing interior and exterior Work.

C. Coordinate installation of door assemblies with flashing, siding, casing, caulking, and other adjoining work to ensure proper sequencing.

D. Install new doors and related items into scheduled openings as soon as existing door is removed. Under no circumstances shall existing opening be left open to weather overnight.

3.2 EXAMINATION

A. Examine openings, substrates, structural support, anchorage, and conditions, with Installer present, for compliance with requirements for installation tolerances and other conditions affecting performance of work.

B. Replace damaged or rotted wood with material as directed by Engineer. Rotted material is defined as any material that has been damaged by weather, insects, or anything that may otherwise compromise the structural integrity of the material in question. Contractor is entitled to compensation for removing and replacing rotted material not noted on door schedule or Scope of Work with prior approval by Engineer at approved price submitted to Engineer in written RFC. Replacement of rotted material shall be completed in accordance with Section 061000 “Rough Carpentry.”

C. Electrical relocations and/or modifications necessitated by installation shall be responsibility of Contractor.

D. Verify rough opening dimensions, levelness of threshold substrate, and operational clearances.

E. Examine wall flashings, vapor retarders, water and weather barriers, and other built-in components to ensure a coordinated, weathertight sliding door installation.

1. Masonry Surfaces: Visibly dry and free of excess mortar, sand, and other construction debris.
2. Wood-Frame Walls: Dry, clean, sound, well nailed, free of voids, and without offsets at joints. Ensure that nail heads are driven flush with surfaces in opening and within 3 inches of opening.
3. Metal Surfaces: Dry and clean; free of grease, oil, dirt, rust, corrosion, and welding slag; without sharp edges or offsets at joints.

F. Proceed with installation only after unsatisfactory conditions have been corrected.

3.3 INSTALLATION

A. Comply with Drawings, Shop Drawings, and manufacturer's written instructions for installing doors, hardware, accessories, and other components.

B. Install doors level, plumb, square, true to line, without distortion, warp or rack of frames and panels, or impeding thermal movement, anchored securely in place to structural support, and in proper relation to wall flashing, vapor retarders, air barriers, water/weather barriers, and other adjacent construction.

1. Install frames with removable glazing stops located on secure side of opening.
2. Remove temporary braces only after frames or bucks have been properly set and secured.
3. Check squareness, twist, and plumbness of frames. Shim as necessary to comply with installation tolerances.
4. Solidly pack approved mineral-fiber insulation behind frames.

C. Installation Tolerances: Adjust door frames for squareness, alignment, twist, and plumbness to the following tolerances:

1. Squareness: Plus or minus 1/16 inch, measured at door rabbet on a line 90 degrees from jamb perpendicular to frame head.
2. Alignment: Plus or minus 1/16 inch, measured at jambs on a horizontal line parallel to plane of wall.
3. Twist: Plus or minus 1/16 inch, measured at opposite face corners of jambs on parallel lines, and perpendicular to plane of wall.
4. Plumbness: Plus or minus 1/16 inch, measured at jambs on a perpendicular line from head to floor.

D. Enlarge opening at floor to maintain sill height. Structural modifications, cutting, and patching required for enlargement of openings as scheduled shall be responsibility of Contractor. Make necessary repairs or additions with material as directed by Engineer to create an acceptable sill to receive threshold. Adjust and reinforce substrate for proper installation and operation. Trim interior leading edge of threshold with Homeowner’s choice of anodized aluminum or oak sealed with polyurethane.

E. Thresholds: Set thresholds in full bed of sealant complying with requirements in Section 079000 "Sealants."

F. Separate aluminum and other corrodible surfaces from sources of corrosion or electrolytic action at points of contact with other materials according to ASTM E 2112, Section 5.12 "Dissimilar Materials."

G. Doors: Fit doors accurately in frames, within clearances indicated below. Shim as necessary.

1. Non-Fire-Rated Doors: Fit non-fire-rated doors accurately in frames with the following clearances:

a. Jambs: 1/8 inch.

b. Head with Butt Hinges: 1/8 inch.
c. Sill: Manufacturer's standard.

H. Seals: Where seals have been prefit and preinstalled in the factory and subsequently removed for shipping, reinstall seals and adjust according to manufacturer's written instructions.

I. Provide new interior trim to match existing type, pattern, material, and finish per discretion of the Engineer.

J. Provide new break-metal surrounds at door sill, jambs, and head. Provide aluminum brick mould only as scheduled.

K. Furnish and apply concealed caulking to provide an acoustically tight condition and good visual appearance in accordance with installation details.

L. Repair or replace casing, siding, and/or other adjacent damaged construction in affected area to match existing construction and finishes.

3.4 ADJUSTING, CLEANING, AND PROTECTION

A. Lubricate hardware and moving parts.

B. Adjust operating panels and screens to provide a tight fit at contact points and weather stripping for smooth operation, without binding, and weathertight closure.

C. Adjust hardware for proper alignment, smooth operation, and proper latching without unnecessary force or excessive clearance.

D. Clean frame surfaces immediately after installing doors. Comply with manufacturer's written recommendations for final cleaning and maintenance. Avoid damaging protective coatings and finishes.

E. Clean glass immediately after installing doors. Comply with manufacturer's written recommendations for final cleaning and maintenance. Remove nonpermanent labels and clean surfaces.

F. Remove and replace glass that has been broken, chipped, cracked, abraded, or damaged during construction period.

G. Protect door surfaces from contact with contaminating substances resulting from construction operations. In addition, monitor sliding door surfaces adjacent to and below exterior concrete and masonry surfaces during construction for presence of dirt, scum, alkaline deposits, stains, or other contaminants. If contaminating substances do contact sliding door surfaces, remove contaminants immediately according to manufacturer's written instructions.

H. Refinish or replace doors with damaged finishes.

I. Replace damaged components.

END OF SECTION 083219

SECTION 083473 – SWINGING PRIME DOORS

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

A. Drawings and general provisions of the Contract, including General and Special Conditions and Division 01 Specification Sections, apply to this Section.

1.2 SUMMARY

A. Section includes steel, wood, and fiberglass pre-hung swinging door assemblies.

1.3 SUBMITTALS

A. Submit Prior to Measurement Walk-Through:

1. Product Data: For each type of product indicated. Include construction details, material descriptions, core descriptions, fire-resistance rating, and finishes or finishing instructions.
2. Installation Details: Include elevations of each door design, details of seals, door bottoms, and thresholds, details of anchorages, joints, field splices, connections, flashing, and sealant installation.
3. Product Test Reports: Based on evaluation of comprehensive tests performed by a qualified testing agency, for each type of door assembly.
4. Warranties: For manufacturer's warranties.

B. Submit After Measurement Walk-Through:

1. Shop Drawings: For product schedule for doors. Use same designations indicated on Door Schedule.

C. Submit During Final Inspection:

1. Maintenance Data: For finishes, weatherstripping, operable panels, and operating hardware to include maintenance manuals.
2. Warranty Data: For finishes, glazing, assembly, and door materials to include warranty certificates.

D. Substitutions: Proposals for new manufacturers and products that do not meet all specifications must be submitted at least four (4) weeks prior to bid date. Included with the submittal requirements, as mentioned in 1.3 A, provide a corner-cut or full-size sample unit, and color samples. The acceptance of new manufacturers and products is at the Engineer’s sole discretion.

E. Approved Equals: Proposals for new manufacturers and products that meet all specifications can be made during the submittal process. Included with the submittal requirements, as

mentioned in 1.3 A, provide a corner-cut or full-size sample unit, and color samples. The acceptance of new manufacturers and products is at the Engineer's sole discretion.

1.4 PRODUCT TEST REPORTS

A. Performance Class and Grade: AAMA/WDMA/CSA 101/I.S.2/A440 as follows: Minimum is R15.

1. Uniform Structural Load: Rated for no damage when tested according to ASTM E330.
2. Water Resistance: Rated for no water penetration when tested according to ASTM E331 & ASTM E547.
3. Air Leakage: Rated to not exceed 1.0 Cfm/sq. ft. when tested according to ASTM E283.

B. Outdoor/ Indoor Transmission Class (OITC): Rated for not less than the following when tested for laboratory sound transmission loss according to ASTM E90 and determined by ASTM E1332:

1. Steel, Wood, and Fiberglass: 26, 28, and 26, respectively.

C. If product test reports are older than five (5) years from the date received by Engineer, submit letter from Manufacturer certifying that the product is still exactly the same as it was when tested, and no suppliers, materials, or manufacturing processes have changed and also submit letter from the Testing Company stating that the tests have not changed since the report was last generated.

1.5 WARRANTY

A. Special Warranty: Manufacturer's standard form in which manufacturer agrees to repair or replace components of door assemblies that fail in materials or workmanship within specified warranty period.

1. Failures include, but are not limited to, the following:

a. Failure to meet sound rating requirements.
b. Faulty operation of seals.
c. Deterioration of metals, fiberglass, or wood, metal, fiberglass, or wood finishes, and other materials beyond normal use or weathering.
d. Wood doors that are warped (bow, cup, or twist) more than 1/4 inch in a 42-by-84-inch section, or show telegraphing of core construction in face veneers exceeding 0.01 inch in a 3-inch span.

2. Warranty Period for Steel and Fiberglass Doors: 10 years from date of Substantial Completion.
3. Warranty Period for Wood Doors: 5 years from date of Substantial Completion.

1.6 QUALITY ASSURANCE

A. Source Limitations: Obtain door assemblies, including doors, frames, seals, hinges, and thresholds from single source from single manufacturer per door material type.

B. Testing Agency Qualifications: An independent agency accredited as a performance testing laboratory according to the National Voluntary Laboratory Accreditation Program of NIST.

C. Fire-Rated Door Assemblies: Assemblies listed and labeled by a qualified testing agency, for fire-protection ratings indicated, based on testing at positive pressure according to NFPA 252 or UL 10C.

1. Steel and Wood Door Fire-Rating if Indicated on Selection Sheet: 20 minutes.

1.7 DELIVERY, STORAGE, AND HANDLING

A. Comply with provisions of Section 016000 “Materials & Equipment.”

B. Deliver in original packaging and protect from weather.

C. Store door assemblies in an upright position in a clean and dry storage area above ground.

1.8 PROJECT CONDITIONS

A. Field Measurements: Door sizes indicated on Door Schedule are approximate. Verify door openings by field measurements before fabrication and indicate measurements on Shop Drawings. Door swings depicted on floor plans are schematic only and do not represent finished condition. Contractor shall confirm final door swing with Homeowner and Engineer. Contractor is responsible for all measurements taken and all costs for corrections necessitated by incorrect data. Contractor is responsible for field inspection of all existing conditions that may interfere with installation and/or operation of new door.

B. Environmental Limitations: Do not deliver or install doors until spaces are enclosed and weatherproof, wet work in spaces is complete and dry, and ambient temperature and humidity conditions are maintained at the levels indicated by manufacturer.

PART 2 - PRODUCTS

2.1 MANUFACTURERS

A. Manufacturers: Subject to compliance with requirements, provide products by one of the following:

1. Steel Doors:

a. Jeld-Wen Windows & Doors.

b. Krieger Specialty Products.
c. Or Approved Equal.

2. Wood Doors:

a. Jeld-Wen Windows & Doors.
b. JB Sash.
c. Vancouver.
d. Or Approved Equal.

3. Fiberglass Doors:

a. Jeld-Wen Windows & Doors.
b. Therma-Tru.
c. Or Approved Equal.

2.2 STEEL DOORS

A. Description: Provide steel doors, 1-3/4 inches thick, of seamless construction; with manufacturer's standard solid core as required to provide OITC and fire rating indicated. Construct doors with smooth, flush surfaces without visible joints or seams on exposed faces or stile edges. Fabricate according to ANSI/NAAMM-HMMA 865.

1. Doors: Fabricate from galvanized steel sheet 24-gauge nominal thickness, or thicker as required to provide OITC rating indicated.
2. Loose Stops for Glazed Lites in Doors: Same material as face sheets.
3. Top and Bottom Channels: Closed with continuous channels of same material as face sheets, spot welded to face sheets not more than 6 inches o.c.
4. Hardware Reinforcement: Same material as face sheets.

B. Materials:

1. Metallic-Coated Steel Sheet: ASTM A 653/A 653M, Commercial Steel (CS), Type B, with G60 zinc (galvanized) or A40 zinc-iron-alloy (galvannealed) coating designation.
2. Glazing: As required by door assembly manufacturer to comply with OITC requirements.
3. Frame: Three piece wood frame. Hinge side of frame shall be preassembled to door.
4. Jambs: Shall be sized as required for existing wall thickness. Verify correct jamb sizes during field measurements, prior to ordering. Jamb extensions are not acceptable unless approved by Engineer.

2.3 WOOD DOORS

A. Description: Provide oak and/or birch doors as described below, 1-3/4 inches thick; with manufacturer's standard solid core as required to provide OITC and fire rating indicated. Fabricate according to WDMA 1.S.1-A.

2.4

A. Materials:

1. Certified Wood: Fabricate doors with cores not less than 70 percent of wood products.
2. WDMA I.S.1-A Performance Grade: Heavy Duty.
3. Particleboard: ANSI A208.1, Grade LD-1 or Grade LD-2.
4. Blocking: Provide wood blocking in particleboard-core doors.
5. Glazing: As required by door assembly manufacturer to comply with OITC requirements.
6. Frame: Three piece wood frame. Hinge side of frame shall be preassembled to door.
7. Jambs: Shall be sized as required for existing wall thickness. Verify correct jamb sizes during field measurements, prior to ordering. Jamb extensions are not acceptable unless approved by Engineer.
8. Veneer: For stained doors an oak veneer shall be used and for painted doors a birch veneer shall be used.

2.5 FIBERGLASS DOORS

A. Description: Provide fiberglass doors, 1-3/4 inches thick, of seamless construction; with manufacturer's standard solid core as required to provide OITC rating indicated. Construct doors with smooth, flush surfaces without visible joints or seams on exposed faces or stile edges. Fabricate according to AAMA/WDMA/CSA 101/I.S.2/A440.

B. Materials:

1. Fiberglass veneer door shall be reinforced and stiffened with steel, wood, or fiberglass and insulated with expanded polyurethane foam core.
2. Glazing: As required by door assembly manufacturer to comply with OITC requirements.
3. Frame: Three piece wood frame. Hinge side of frame shall be preassembled to door.
4. Jambs: Shall be sized as required for existing wall thickness. Verify correct jamb sizes during field measurements, prior to ordering. Jamb extensions are not acceptable unless approved by Engineer.

2.6 GLAZING

A. Insulating-Glass Units: ASTM E 2190.

1. Glass: Clear annealed glass, ASTM C 1036, Type 1, Class 1, q3.

   a. Kind: Fully tempered and/or laminated as required by code; sandblasted opaque where indicated on Selection Sheet.

2. Lites: Two.
3. Filling: Fill space between glass lites with air.
4. Low-E Coating: Pyrolytic on manufacturer recommended surface.

B. Glazing System: Manufacturer's standard factory-glazing system that produces weathertight seal.

2.7 HARDWARE

A. Description: Provide manufacturer's standard pre-hung system, including head and jamb seals, door sweeps, hinges, and thresholds, as required by testing to achieve OITC and/or fire rating indicated. See section 087111 “Door Hardware” for more information.

2.8 FABRICATION

A. Doors to be rigid and free of defects, warp, or buckle. Accurately form to required sizes and profiles. Factory fit doors to suit frame-opening sizes indicated, with uniform clearances and bevels according to referenced quality standard, unless otherwise indicated. Comply with final door hardware schedules and hardware templates.

1. Glazed Lites: Factory install glazed lites according to requirements of tested assembly to achieve OITC rating indicated. Provide fixed stops and moldings.
2. Hardware Preparation: Factory prepare doors to receive templated mortised hardware; include cutouts, reinforcement, mortising, drilling, and tapping. Reinforce doors to receive nontemplated mortised and surface-mounted door hardware.
3. Locate door hardware as recommended by manufacturer.
4. Coordinate measurements of hardware mortises in frames to verify dimensions and alignment before factory machining.
5. Tolerances: Fabricate doors to tolerances indicated in ANSI/NAAMM-HMMA 865.
6. Comply with clearance requirements in NFPA 80 for fire-rated doors.

2.9 FINISHES

A. Factory Finishes: Manufacturer’s standard finishing process. Paint and/or stain colors to be selected by Homeowner during Measurement Walk-Through.

B. Shop Finishes: Paint and/or stain as scheduled per manufacturer’s instructions. Paint and/or stain colors to be selected by Homeowner during Measurement Walk-Through.

PART 3 - EXECUTION

3.1 PREPARATION

A. Finish door completely including, but not limited to, door, frame, and oak threshold strip, prior to site delivery.

B. Do not remove existing door units until correct new door units are on site.

C. Furnish, install, and maintain dustproof temporary coverings and other protection for existing interior and exterior Work.

D. Coordinate installation of pre-hung door assemblies with flashing, siding, casing, caulking, and other adjoining work to ensure proper sequencing.

E. Install new doors and related items into scheduled openings as soon as existing door is removed. Under no circumstances shall existing opening be left open to weather overnight.

3.2 EXAMINATION

A. Examine substrates, areas, and conditions, with Installer present, for compliance with requirements for installation tolerances and other conditions affecting performance of door assemblies.

B. Replace damaged or rotted wood with material as directed by Engineer. Rotted material is defined as any material that has been damaged by weather, insects, or anything that may otherwise compromise the structural integrity of the material in question. Contractor is entitled to compensation for removing and replacing rotted material not noted on door schedule or Scope of Work with prior approval by Engineer at approved price submitted to Engineer in written RFC. Replacement of rotted material shall be completed in accordance with Section 061000 “Rough Carpentry.”

C. Electrical relocations and/or modifications necessitated by installation shall be responsibility of Contractor.

D. Examine roughing-in for embedded and built-in anchors to verify actual locations of door frame connections before frame installation.

E. Proceed with installation only after unsatisfactory conditions have been corrected.

3.3 INSTALLATION

A. General: Install door assemblies plumb, rigid, properly aligned, and securely fastened in place; comply with manufacturer's written instructions.

B. Frames: Set frames accurately in position; plumbed, aligned, and braced securely until permanent anchors are set.

1. At fire-rated openings, install frames according to NFPA 80.
2. Install frames with removable glazing stops located on secure side of opening.
3. Remove temporary braces only after frames or bucks have been properly set and secured.
4. Check squareness, twist, and plumbness of frames. Shim as necessary to comply with installation tolerances.
5. Solidly pack approved mineral-fiber insulation behind frames.

C. Installation Tolerances: Adjust door frames for squareness, alignment, twist, and plumbness to the following tolerances:

1. Squareness: Plus or minus 1/16 inch, measured at door rabbet on a line 90 degrees from jamb perpendicular to frame head.
2. Alignment: Plus or minus 1/16 inch, measured at jambs on a horizontal line parallel to plane of wall.
3. Twist: Plus or minus 1/16 inch, measured at opposite face corners of jambs on parallel lines, and perpendicular to plane of wall.
4. Plumbness: Plus or minus 1/16 inch, measured at jambs on a perpendicular line from head to floor.

D. Enlarge opening at floor to maintain sill height. Structural modifications, cutting, and patching required for enlargement of openings as scheduled shall be responsibility of Contractor. Make necessary repairs or additions with material as directed by Engineer to create an acceptable sill to receive threshold. Adjust and reinforce substrate for proper installation and operation. Trim interior leading edge of threshold with Homeowner's choice of anodized aluminum or oak sealed with polyurethane.

E. Thresholds: Set thresholds in full bed of sealant complying with requirements in Section 079000 "Sealants."

F. Separate aluminum and other corrodible surfaces from sources of corrosion or electrolytic action at points of contact with other materials according to ASTM E 2112, Section 5.12 "Dissimilar Materials."

G. Doors: Fit doors accurately in frames, within clearances indicated below. Shim as necessary.

1. Non-Fire-Rated Doors: Fit non-fire-rated doors accurately in frames with the following clearances:

   a. Jambs: 1/8 inch.
   b. Head with Butt Hinges: 1/8 inch.
   c. Sill: Manufacturer's standard.

2. Fire-Rated Doors: Install fire-rated doors with clearances according to NFPA 80.

H. Seals: Where seals have been prefit and preinstalled in the factory and subsequently removed for shipping, reinstall seals and adjust according to manufacturer's written instructions.

I. Provide new interior trim to match existing type, pattern, material, and finish per discretion of the Engineer.

J. Provide new break-metal surrounds at door sill, jambs, and head. Provide aluminum brick mould only as scheduled.

K. Furnish and apply concealed caulking to provide an acoustically tight condition and good visual appearance in accordance with installation details.

L. Repair or replace casing, siding, and/or other adjacent damaged construction in affected area to match existing construction and finishes.

3.4 ADJUSTING AND CLEANING

A. Final Adjustments: Check and adjust seals, door bottoms, and other hardware items right before final inspection. Leave work in complete and proper operating condition. Adjust gaskets, gasket retainers, and retainer covers to provide contact required to achieve OITC rating.

B. Remove and replace defective work, including defective or damaged seals and doors and frames that are warped, bowed, or otherwise unacceptable.

C. Touch-up shop applied finishes to satisfaction of Engineer.

D. Clean all surfaces including, but not limited to grout and/or sealant off door frames immediately after installation.

E. Clean glass immediately after installing doors. Comply with manufacturer's written recommendations for final cleaning and maintenance. Remove nonpermanent labels and clean surfaces.

END OF SECTION 083473

SECTION 085160 – STORM WINDOWS

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

A. Drawings and general provisions of the Contract, including General and Special Conditions and Division 01 Specification Sections, apply to this Section.

1.2 SUMMARY

A. Section includes aluminum storm windows. Existing windows shall receive an interior or exterior storm as indicated on Window Schedule. New windows shall receive secondary glazing unless otherwise indicated on Window Schedule. Storm windows on all operable prime windows will include an integrated or interchangeable insect screen.

1.3 SUBMITTALS

A. Submit Prior to Measurement Walk-Through:

1. Product Data: For each type of product. Include construction details, material descriptions, glazing and fabrication methods, dimensions of individual components and profiles, hardware, and finishes for storm windows. Provide recommendations for maintaining and cleaning surfaces.
2. Installation Details: Include plans, elevations, sections, hardware, accessories, insect screens, operational clearances, and details of installation, including anchor, flashing, and sealant installation.
3. Product Test Reports: For each type of storm window, for tests performed by a qualified testing agency.
4. Warranties: For manufacturer's warranties.

B. Submit After Measurement Walk-Through:

1. Shop Drawings: For product schedule for storm windows. Use same designations indicated on Drawings. See Section 013300 “Submittals” for details.

C. Submit During Final Inspection:

1. Maintenance Data: For finishes, weatherstripping, operable panels, and operating hardware to include maintenance manuals. See Section 013300 “Submittals” for details.
2. Warranty Data: For finishes, glazing, assembly, and window materials to include warranty certificates. See Section 013300 “Submittals” for details.

D. Substitutions: Proposals for new manufacturers and products that do not meet all specifications must be submitted at least four weeks prior to bid date. Included with the submittal requirements, as mentioned in 1.03 A, provide a corner-cut or full-size sample unit, and color samples. The acceptance of new manufacturers and products is at the Engineer’s sole discretion.

E. Approved Equals: Proposals for new manufacturers and products that meet all specifications can be made during the submittal process. Included with the submittal requirements, as mentioned in 1.03 A, provide a corner-cut or full-size sample unit, and color samples. The acceptance of new manufacturers and products is at the Engineer's sole discretion.

1.4 PRODUCT TEST REPORTS

A. Performance Class and Grade: AAMA/WDMA/CSA 101/I.S.2/A440 as follows: Minimum is R15.

1. Uniform Structural Load: Rated for no damage when tested according to ASTM E330.
2. Water Resistance: Rated for no water penetration when tested according to ASTM E331 & ASTM E547.
3. Air Leakage: Rated to not exceed 1.0 Cfm/sq. ft. when tested according to ASTM E283.

B. Outdoor/ Indoor Transmission Class (OITC): Rated for not less than 28 OITC when tested for laboratory sound transmission loss according to ASTM E90 and determined by ASTM E1332.

C. If product test reports are older than five (5) years from the date received by Engineer, submit letter from Manufacturer certifying that the product is still exactly the same as it was when tested, and no suppliers, materials, or manufacturing processes have changed and also submit letter from the Testing Company stating that the tests have not changed since the report was last generated.

1.5 WARRANTY

A. Manufacturer's Warranty: Manufacturer agrees to repair or replace storm windows that fail in materials or workmanship within specified warranty period.

1. Failures include, but are not limited to, the following:

a. Failure to meet performance requirements.
b. Structural failures including excessive deflection, water leakage, and air infiltration.
c. Faulty operation of movable sash and hardware.
d. Deterioration of materials and finishes beyond normal weathering.
e. Failure of insulating glass.

2. Warranty Period:

a. Window: 10 years from date of Substantial Completion.
b. Glazing Units: 10 years from date of Substantial Completion.
c. Aluminum Finish: 10 years from date of Substantial Completion.

1.6 QUALITY ASSURANCE

A. Source Limitations: Obtain storm windows from single source from single manufacturer.

B. Testing Agency Qualifications: An independent agency accredited as a performance testing laboratory according to the National Voluntary Laboratory Accreditation Program of NIST.

C. Product Standard: Comply with AAMA/WDMA/CSA 101/I.S.2/A440 for definitions and minimum standards of performance, materials, components, accessories, and fabrication unless more stringent requirements are indicated.

1. Window Certification: WDMA certified with label attached to each storm window.

1.7 DELIVERY, STORAGE AND HANDLING

A. Comply with provisions of Section 016000.

B. Store window units in an upright position in a clean and dry storage area above ground.

C. Deliver in original packaging and protect from weather.

1.8 PROJECT CONDITIONS

A. Field Measurements: Window sizes indicated on Window Schedule are approximate. Verify storm window openings by field measurements before fabrication and indicate measurements on Shop Drawings. Contractor is responsible for all measurements taken and all costs for corrections necessitated by incorrect data.

A. Proceed with installation of window units only when weather conditions comply with manufacturer's recommendations and openings are dry.

PART 2-PRODUCTS

2.1 MANUFACTURERS

A. Manufacturers: Subject to compliance with requirements and specifications, provide products by one of the following:

1. Mon-Ray, Inc.
2. Or Approved Equal.

2.2 STORM WINDOWS

A. Operating Types: Storm window shall match prime window operation as closely as possible. Provide the following operating types in locations indicated on Drawings:

1. Interior or exterior double hung.
2. Interior or exterior horizontal sliding.
3. Interior or exterior removable fixed.

B. Frames and Sashes: Aluminum extrusions complying with AAMA/WDMA/CSA 101/I.S.2/A440.

1. Frames and sashes shall not decrease overall glass area provided by prime window.
2. Meeting rails of prime and storm windows shall align horizontally in center.

2.3 GLAZING

A. Glass: Clear annealed glass, ASTM C 1036, Type 1, Class 1, q3.

1. Kind: Fully tempered and/or laminated where indicated on Drawings or as required by code.

B. Glazing System: Manufacturer's standard factory-glazing system that produces weathertight seal.

2.4 HARDWARE

A. Hardware, General: Provide manufacturer's standard hardware fabricated from aluminum, stainless steel, carbon steel complying with AAMA 907, or other corrosion-resistant material compatible with adjacent materials; designed to smoothly operate, tightly close, and securely lock windows, and sized to accommodate sash weight and dimensions.

1. Exposed Hardware Color and Finish: As indicated by manufacturer's designations.

B. Weather Stripping: Provide full-perimeter weather stripping for each operable sash unless otherwise indicated.

C. Fasteners: Noncorrosive and compatible with window members, trim, hardware, anchors, and other components.

1. Exposed Fasteners: Do not use exposed fasteners to the greatest extent possible. For application of hardware, use fasteners that match finish hardware being fastened.

2.5 INSECT SCREENS

A. General: Fabricate insect screens to integrate with window frame. Provide screen for each operable exterior sash. Screen wickets are not permitted.

1. Type and Location: Full, inside for project-out, outside for project-in, outside for double-hung, outside for sliding, or half, outside for double-hung and sliding sashes.

B. Aluminum Frames: Manufacturer's standard aluminum alloy complying with SMA 1004 or SMA 1201. Fabricate frames with mitered or coped joints or corner extrusions, concealed fasteners, and removable PVC spline/anchor concealing edge of frame.

1. Tubular Framing Sections and Cross Braces: Roll formed from aluminum sheet.
2. Finish for Screen Frames: Match color and finish of storm window.

C. Glass-Fiber Mesh Fabric: 18-by-14 or 18-by-16 mesh of PVC-coated, glass-fiber threads; woven and fused to form a fabric mesh resistant to corrosion, shrinkage, stretch, impact damage, and weather deterioration. Comply with ASTM D 3656.

1. Mesh Color: Charcoal gray.

2.6 FABRICATION

A. Fabricate storm windows in sizes indicated. Include a complete system for installing and anchoring windows.

B. Glaze storm windows in the factory.

C. Weather strip each operable sash to provide weathertight installation.

D. Weep Holes: Provide weep holes and internal passages to conduct infiltrating water to exterior.

E. Provide water-shed members above side-hinged sashes and similar lines of natural water penetration.

F. Complete fabrication, assembly, finishing, hardware application, and other work in the factory to greatest extent possible. Disassemble components only as necessary for shipment and installation.

2.7 FINISH

A. Storm windows to be same color as prime window, unless otherwise indicated on Drawings. Sidelite and transom storm units shall match storm door.

B. Comply with NAAMM's "Metal Finishes Manual" for recommendations for applying and designating finishes.

C. Protect mechanical finishes on exposed surfaces from damage by applying a strippable, temporary protective covering before shipping.

D. Appearance of Finished Work: Variations in appearance of abutting or adjacent pieces are acceptable if they are within one-half of the range of approved Samples. Noticeable variations in the same piece are not acceptable. Variations in appearance of other

components are acceptable if they are within the range of approved Samples and are assembled or installed to minimize contrast.

E. Storm windows installed on aluminum windows shall match aluminum prime window color and finish.

F. Storm windows installed on wood, vinyl, and existing window finish:

1. Baked-Enamel or Powder-Coat Finish: AAMA 2603 except with a minimum dry film thickness of 1.5 mils. Comply with coating manufacturer's written instructions for cleaning, conversion coating, and applying and baking finish.
2. Color: To match exterior finish of prime window.

PART 3-EXECUTION

3.1 PREPARATION

A. Do not remove existing storm windows until new units are on site and installation of new unit is imminent. Contractor may not leave openings unprotected from the elements. Should temporary opening covers be required, install only with approval of Engineer.

B. Furnish, install, and maintain dustproof temporary coverings and other protection for existing interior and exterior work.

C. Coordinate installation of storm window units with flashing, siding, casing, caulking and other adjoining work to ensure proper sequencing.

D. Remove items that may interfere with the work, such as awnings, and reinstall the items after installation is complete. If items cannot be reinstalled, alert the Engineer.

E. Remove existing storm windows entirely, unless otherwise directed by Engineer.

F. Make existing openings smooth and satisfactory to receive new window units. Remove and replace soft or rotted wood. Contractor shall be responsible for removing and replacing rotted material not noted on the window schedule. Contractor may be entitled to additional compensation for removing and replacing rotted material not noted on window schedule or scope of work. Contractor shall identify all areas subject to additional compensation to the Engineer prior to removal of any materials.

G. Clean existing surfaces before installing new storm window unit.

H. Legally dispose of site debris on a daily basis.

3.2 EXAMINATION

A. Examine openings, substrates, structural support, anchorage, and conditions, with Installer present, for compliance with requirements for installation tolerances and other conditions affecting performance of the Work.

B. Verify rough opening dimensions, levelness of sill plate, and operational clearances.

C. Examine wall flashings, vapor retarders, water and weather barriers, and other built-in components to ensure weathertight window installation.

D. Proceed with installation only after unsatisfactory conditions have been corrected.

3.3 INSTALLATION

A. Comply with Engineer’s details and manufacturer's written instructions for installing storm windows, hardware, accessories, and other components. For installation procedures and requirements not addressed in manufacturer's written instructions, comply with installation requirements in ASTM E 2112.

B. Install storm windows level, plumb, square, true to line, without distortion, anchored securely in place to structural support, and in proper relation to wall flashing and other adjacent construction to produce weathertight construction.

C. Install storm windows and components to drain condensation to the exterior.

D. Separate aluminum and other corrodible surfaces from sources of corrosion or electrolytic action at points of contact with other materials.

E. Provide minimum 2 inch airspace between prime window and storm window glass.

F. Provide new wood trim and brake-metal surrounds at all new window units to match existing construction conditions and finishes unless otherwise directed by Engineer. Mechanical fasteners for new brake-metal shall be concealed from view. Extruded trim product(s) provided by manufacturer may be used in lieu of new wood and brake-metal surrounds. Color and finish shall match windows.

G. Tolerances: 1/4 inch maximum gap is acceptable at head and jambs between storm window units and frames or as recommended by manufacturer.

H. Install sealants to provide weathertight installation in accordance with Engineer’s details and manufacturer’s specifications.

I. Contractor is responsible for cutting, patching, trim, and repairs to existing construction necessary for proper installation of storm windows. Contractor shall restore areas adjacent to the work that are damaged by the construction to their original condition.

J. Interior Storm Windows: Where interior trim is replaced, use wider pieces to cover existing area where trim was removed as required. Finish new trim per Section 099000 “Painting.”

K. Storm Windows for Existing Skylights: To have continuous piano type hinge and sash, held with wing type fasteners at 12 inch on-center maximum at meeting rail. For cathedral or vaulted ceilings, locate hinge on high side of opening, perpendicular to the slope and provide removable pins.

3.4 ADJUSTING, CLEANING, AND PROTECTION

A. Adjust operating sashes and hardware for a tight fit at contact points and weather stripping for smooth operation and weathertight closure.

B. Remove nonpermanent and non-warning labels.

C. Clean exposed surfaces after installing storm windows. Remove excess sealants, glazing materials, dirt, and other substances. Keep protective films and coverings in place until final cleaning.

D. Remove and replace sashes if glass has been broken, chipped, cracked, abraded, or damaged during construction period.

E. Protect window surfaces from contact with contaminating substances resulting from construction operations. If contaminating substances do contact window surfaces, remove contaminants immediately according to manufacturer's written instructions.

END OF SECTION 085160

SECTION 085200 – WOOD WINDOWS

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

A. Drawings and general provisions of the Contract, including General and Special Conditions and Division 01 Specification Sections, apply to this Section.

1.2 SUMMARY

A. Section includes extruded aluminum-clad wood prime windows with aluminum storm windows. All operating windows shall have insect screens.

1.3 SUBMITTALS

A. Submit Prior to Measurement Walk-Through:

1. Product Data: For each type of product. Include construction details, material descriptions, glazing and fabrication methods, dimensions of individual components and profiles, hardware, and finishes for wood windows. Provide recommendations for maintaining and cleaning surfaces.
2. Installation Details: Include plans, elevations, sections, hardware, accessories, insect screens, operational clearances, and details of installation, including anchor, flashing, and sealant installation.
3. Product Test Reports: For each type of wood window, for tests performed by a qualified testing agency.
4. Warranties: For manufacturer's warranties.

B. Submit After Measurement Walk-Through:

1. Shop Drawings: For product schedule for wood windows. Use same designations indicated on Drawings.

C. Submit During Final Inspection:

1. Maintenance Data: For finishes, weatherstripping, operable panels, and operating hardware to include maintenance manuals.
2. Warranty Data: For finishes, glazing, assembly, and window materials to include warranty certificates.

D. Substitutions: Proposals for new manufacturers and products that do not meet all specifications must be submitted at least four (4) weeks prior to bid date. Included with the submittal requirements, as mentioned in 1.3 A, provide a corner-cut or full-size sample unit, and color samples. The acceptance of new manufacturers and products is at the Engineer’s sole discretion.

E. Approved Equals: Proposals for new manufacturers and products that meet all specifications can be made during the submittal process. Included with the submittal requirements, as mentioned in 1.3 A, provide a corner-cut or full-size sample unit, and color samples. The acceptance of new manufacturers and products is at the Engineer's sole discretion.

1.4 PRODUCT TEST REPORTS

A. Performance Class and Grade: AAMA/WDMA/CSA 101/I.S.2/A440 as follows: Minimum is R15.

1. Uniform Structural Load: Rated for no damage when tested according to ASTM E330.
2. Water Resistance: Rated for no water penetration when tested according to ASTM E331 & ASTM E547.
3. Air Leakage: Rated to not exceed 0.3 Cfm/sq. ft. when tested according to ASTM E283.

B. Thermal Transmittance: NFRC 100 maximum whole-window U-factor of 0.3 Btu/sq. ft. x h x deg F.

C. Condensation Resistance: AAMA 1503 minimum CRF of 55.

D. Outdoor/ Indoor Transmission Class (OITC): Rated for not less than 30 OITC when tested with a storm window for laboratory sound transmission loss according to ASTM E90 and determined by ASTM E1332.

E. If product test reports are older than five (5) years from the date received by Engineer, submit letter from Manufacturer certifying that the product is still exactly the same as it was when tested, and no suppliers, materials, or manufacturing processes have changed and also submit letter from the Testing Company stating that the tests have not changed since the report was last generated.

1.5 WARRANTY

A. Manufacturer's Warranty: Manufacturer agrees to repair or replace wood windows that fail in materials or workmanship within specified warranty period.

1. Failures include, but are not limited to, the following:

a. Failure to meet performance requirements.
b. Structural failures including excessive deflection, water leakage, and air infiltration.
c. Faulty operation of movable sash and hardware.
d. Deterioration of materials and finishes beyond normal weathering.
e. Failure of insulating glass.

2. Warranty Period:

a. Window: 10 years from date of Substantial Completion.

b. Glazing Units: 10 years from date of Substantial Completion.
c. Aluminum Finish: 10 years from date of Substantial Completion.

1.6 QUALITY ASSURANCE

A. Source Limitations: Obtain wood windows from single source from single manufacturer.

B. Testing Agency Qualifications: An independent agency accredited as a performance testing laboratory according to the National Voluntary Laboratory Accreditation Program of NIST.

C. Product Standard: Comply with AAMA/WDMA/CSA 101/I.S.2/A440 for definitions and minimum standards of performance, materials, components, accessories, and fabrication unless more stringent requirements are indicated.

1. Window Certification: WDMA certified with label attached to each window.

1.7 DELIVERY, STORAGE AND HANDLING

A. Comply with provisions of Section 016000 “Materials & Equipment.”

B. Deliver in original packaging and protect from weather.

C. Prime or seal wood surfaces, including surface to be concealed by wall construction, if more than (30) days will expire between delivery and installation.

D. Store window units in an upright position in a clean and dry storage area above ground.

1.8 PROJECT CONDITIONS

A. Field Measurements: Window sizes indicated on Window Schedule are approximate. Verify wood window openings by field measurements before fabrication and indicate measurements on Shop Drawings. Contractor shall make provisions to have a qualified window manufacturer representative accompany measuring team for a minimum eight hour day to provide instructions to Contractor on proper measuring for window product(s). Contractor is responsible for all measurements taken and all costs for corrections necessitated by incorrect data.

B. The storm or prime window manufacturer shall be responsible for mounting the storm windows to their respective prime windows prior to delivery to the contractor.

C. Proceed with installation of window units only when weather conditions comply with manufacturer’s recommendations and openings are dry.

PART 2 - PRODUCTS

2.1 MANUFACTURERS

A. Manufacturers: Subject to compliance with requirements, provide products by one of the following:

1. Marvin Windows and Doors.
2. Kolbe & Kolbe Millwork Co., Inc.
3. Sierra Pacific Windows.
4. Or Approved Equal.

2.2 WOOD WINDOWS

A. Operating Types: Provide the following operating types in locations indicated on Window Schedule:

1. Casement (inswing or outswing).
2. Awning (inswing or outswing).
3. Hopper (inswing or outswing).
4. Double-hung.
5. Horizontal-sliding.
6. Fixed.

B. Frames and Sashes: Fine-grained wood lumber, stain-grade, complying with AAMA/WDMA/CSA 101/I.S.2/A440; kiln dried to a moisture content of not more than 12 percent at time of fabrication; free of visible finger joints, blue stain, knots, pitch pockets, and surface checks larger than 1/32 inch deep by 2 inches wide; water-repellent preservative treated.

1. Exterior extruded aluminum-cladding: Minimum of 0.050 inch thick.
2. Sashes of operable window units must be removable or tilt-in to interior for maintenance.

2.3 GLAZING

A. Insulating-Glass Units: ASTM E 2190.

1. Glass: Annealed glass, ASTM C 1036, Type 1, Class 1, q3.

a. Tint: Clear.
b. Kind: Fully tempered and/or textured opaque where indicated on Window Schedule or as required by code.

2. Lites: Two.
3. Filling: Fill space between glass lites with air.

4. Low-E Coating: Pyrolytic on manufacturer recommended surface.

B. Glazing System: Manufacturer's standard factory-glazing system that produces weathertight seal.

2.4 HARDWARE

A. Hardware, General: Provide manufacturer's standard hardware fabricated from aluminum, stainless steel, carbon steel complying with AAMA 907 or other corrosion-resistant material compatible with adjacent materials; designed to smoothly operate, tightly close, and securely lock windows, and sized to accommodate sash weight and dimensions.

1. Exposed Hardware Color and Finish: As indicated by manufacturer's designations.

B. Projected Window Hardware:

1. Gear-Type Rotary Operators: Complying with AAMA 901 when tested according to ASTM E 405, Method A. Provide operators that function without requiring the removal of interior screens or using screen wickets.
2. Hinges: Manufacturer's standard type for sash weight and size indicated.
3. Single-Handle Locking System: Operates positive-acting arms that pull sash into locked position. Provide one arm on sashes up to 29 inches tall and two arms on taller sashes.
4. Limit Devices: Concealed friction adjustor, adjustable stay bar limit devices designed to restrict sash opening.
5. Operator Stud Cover: Matching operator handle finish. Provide in locations where operator handle is removed for controlled access.
6. Pole Operators: Tubular-shaped anodized aluminum; with rubber-capped lower end and standard push-pull hook at top to match hardware design; of sufficient length to operate window without reaching more than 60 inches above floor; one pole operator and pole hanger per room that has operable windows more than 72 inches above floor.

C. Hung Window Hardware:

1. Counterbalancing Mechanism: Complying with AAMA 902, concealed, of size and capacity to hold sash stationary at any open position.
2. Locks and Latches: Allow unobstructed movement of the sash across adjacent sash in direction indicated and operated from the inside only.
3. Hardware: Releasing tilt latch allows sash to pivot about horizontal axis or side-loaded sash can be removed to facilitate cleaning exterior surfaces from the interior.

D. Horizontal-Sliding Window Hardware:

1. Sill Cap/Track: Manufacturer's standard of dimensions and profile indicated; designed to comply with performance requirements indicated and to drain to the exterior.
2. Locks and Latches: Allow unobstructed movement of the sash across adjacent sash in direction indicated and operated from the inside only.
3. Roller Assemblies: Low-friction design.

E. Weather Stripping: Provide full-perimeter weather stripping for each operable sash unless otherwise indicated.

F. Fasteners: Noncorrosive and compatible with window members, trim, hardware, anchors, and other components.

1. Exposed Fasteners: Do not use exposed fasteners to the greatest extent possible. For application of hardware, use fasteners that match finish hardware being fastened.

2.5 ACCESSORIES

A. Dividers (Muntins): Provide divider grilles in designs indicated for each sash lite.

1. Type: Simulated Divided Lite with Spacer Bars.
2. Material: Manufacturer's standard.
3. Pattern and Profile: Pattern as indicated on Drawings and profile to match existing.
4. Color: To match interior and exterior finish as indicated on Measurement Walk-Through forms.

B. Aluminum Extrusions: Provide aluminum extrusions for each opening.

1. Profile: Brick mould casing, flat casing, frame expander, jamb extender, simulated thick sill adapter, mullion cover, and mullion expander.

2.6 STORM WINDOWS

A. See Section 085160 “Storm Windows” for more information.

2.7 FABRICATION

A. Fabricate extruded aluminum-clad wood windows in sizes indicated. Include a complete system for installing and anchoring windows.

B. Glaze extruded aluminum-clad wood windows in the factory.

C. Weather strip each operable sash to provide weathertight installation.

D. Weep Holes: Provide weep holes and internal passages to conduct infiltrating water to exterior.

E. Provide water-shed members above side-hinged sashes and similar lines of natural water penetration.

F. Mullions: Provide mullions and cover plates, matching window units, complete with anchors for support to structure and installation of window units. Allow for erection tolerances and provide for movement of window units due to thermal expansion and building deflections. Provide mullions and cover plates capable of withstanding design wind loads of window units.

G. Bow and Bay Window Assemblies: Provide operating and fixed units in configuration indicated. Provide window frames, sashes, hardware, and other trim and components necessary for a complete, secure, and weathertight installation, including the following:

1. Angled mullion posts with interior and exterior trim.
2. Angled interior and exterior extension and trim.
3. Clear pine head and seat boards.
4. Top and bottom plywood platforms.
5. Exterior head and sill casings and trim.
6. Support brackets.

H. Complete fabrication, assembly, finishing, hardware application, and other work in the factory to greatest extent possible. Disassemble components only as necessary for shipment and installation. Allow for scribing, trimming, and fitting at Project site.

2.8 FINISH

A. Exterior Finish:

1. Baked-Enamel or Powder-Coat Finish: AAMA 2603 except with a minimum dry film thickness of 1.5 mils. Comply with coating manufacturer's written instructions for cleaning, conversion coating, and applying and baking finish.
2. Color: White, beige, bronze, or as indicated on Measurement Walk-Through forms.

B. Interior Finish:

1. Factory Finishes: Manufacturer’s standard finishing process. Paint and/or stain colors to be selected by homeowner during field measurements.
2. Shop Finishes: Paint and/or stain as scheduled per manufacturer’s instructions. Paint and/or stain colors to be selected by homeowner during field measurements.

PART 3 - EXECUTION

3.1 PREPARATION

A. Do not remove existing windows until new units are on site and installation of new unit is imminent. Contractor may not leave openings unprotected from the elements. Should temporary opening covers be required, install only with approval of Engineer.

B. Furnish, install, and maintain dustproof temporary coverings and other protection for existing interior and exterior work.

C. Coordinate installation of window units with flashing, siding, casing, caulking and other adjoining work to ensure proper sequencing.

D. Remove items that may interfere with the work, such as awnings, and reinstall the items after installation is complete. If items cannot be reinstalled, alert the Engineer.

E. Score edges of existing casing prior to window removal to prevent paint and wallpaper from peeling away from existing surfaces.

F. Remove existing windows and frames entirely unless otherwise directed by Engineer.

G. Remove existing sash weights and fill cavities and gaps between the opening and window with wood blocking and/or batt insulation.

H. Make existing openings smooth and satisfactory to receive new window units. Remove and replace soft or rotted wood. Contractor shall be responsible for removing and replacing rotted material not noted on the window schedule. Contractor may be entitled to additional compensation for removing and replacing rotted material not noted on window schedule or scope of work. Contractor shall identify all areas subject to additional compensation to the Engineer prior to removal of any materials.

I. Clean existing surfaces before installing new window unit.

J. Legally dispose of site debris on a daily basis.

3.2 EXAMINATION

A. Examine openings, substrates, structural support, anchorage, and conditions, with Installer present, for compliance with requirements for installation tolerances and other conditions affecting performance of the Work.

B. Verify rough opening dimensions, levelness of sill plate, and operational clearances.

C. Examine wall flashings, vapor retarders, water and weather barriers, and other built-in components to ensure weathertight window installation.

D. Proceed with installation only after unsatisfactory conditions have been corrected.

3.3 INSTALLATION

A. Comply with Engineer’s details and manufacturer's written instructions for installing windows, storm windows, hardware, accessories, and other components. For installation procedures and requirements not addressed in Engineer’s details and manufacturer's written instructions, comply with installation requirements in ASTM E 2112.

B. Install windows level, plumb, square, true to line, without distortion, anchored securely in place to structural support, and in proper relation to wall flashing and other adjacent construction to produce weathertight construction. Provide new vapor retardant material taped in place with weather barrier tape to separate any untreated wood from any masonry components.

C. Install new window frame for enlargements or as scheduled. Patch existing window frame with solid wood where indicated on Project Details or as directed by Engineer. Minimize damage to existing siding and casing during installation. Install exterior flashing in weatherboard fashion in accordance with manufacturer's installation instructions, applicable requirements of referenced quality standards, and Contract Document details. Electrical relocations and/or modifications necessitated by enlargements shall be responsibility of Contractor. Structural modifications, cutting, and patching for enlargement of scheduled openings are responsibility of Contractor.

D. Install storm windows according to Engineer's details and manufacturer's written instructions.

E. Set sill members in bed of sealant or with gaskets for weathertight construction.

F. Install windows and components to drain condensation to the exterior.

G. Replace head and side stops with new wood stops and fasteners that match existing.

H. Separate aluminum and other corrodible surfaces from sources of corrosion or electrolytic action at points of contact with other materials according to ASTM E 2112, Section 5.12 "Dissimilar Materials."

I. Provide new wood trim at the interior and brake-metal surrounds at the exterior for all new window units to match existing construction conditions and finishes unless otherwise directed by Engineer. Mechanical fasteners for new brake-metal shall be concealed from view. Extruded trim product(s) provided by manufacturer may be used in lieu of new wood and brake-metal surrounds. Color and finish shall match windows.

J. Tolerances: ¼-inch minimum, ½-inch maximum gap is acceptable at head and jambs between window units and frames. Fill gaps with backer-rod as required and instructed by window and sealant manufacturer installation instructions.

K. Install sealants to provide weathertight installation in accordance with Engineer's details and manufacturer's specifications.

L. Contractor is responsible for cutting, patching, trim, and repairs to existing construction necessary for proper installation of windows. Contractor shall restore areas adjacent to the work that are damaged by the construction to their original condition.

M. Where interior trim is replaced, use wider pieces to cover existing area where trim was removed as required. Finish new trim per Section 099000 "Painting."

N. Install all window screens and ensure proper fit in accordance with manufacturer's recommendations.

3.4 ADJUSTING, CLEANING, AND PROTECTION

A. Adjust operating sashes and hardware for a tight fit at contact points and weather stripping for smooth operation and weathertight closure.

B. Remove nonpermanent and non-warning labels.

C. Clean exposed surfaces immediately after installing windows. Remove excess sealants, glazing materials, dirt, and other substances. Keep protective films and coverings in place until final cleaning.

D. Remove and replace sashes if glass has been broken, chipped, cracked, abraded, or damaged during construction period.

E. Protect window surfaces from contact with contaminating substances resulting from construction operations. If contaminating substances do contact window surfaces, remove contaminants immediately according to manufacturer's written instructions.

F. Demonstrate operation and removal of prime and storm sashes to the homeowner. Instruct homeowner in the proper materials and techniques for cleaning and maintaining window units.

END OF SECTION 085200

SECTION 085313 - VINYL WINDOWS

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

A. Drawings and general provisions of the Contract, including General and Special Conditions and Division 01 Specification Sections, apply to this Section.

1.2 SUMMARY

A. Section includes vinyl-framed windows with integral storm or aluminum storm windows. All operating windows shall have insect screens.

1.3 SUBMITTALS

A. Submit Prior to Measurement Walk-Through:

1. Product Data: For each type of product. Include construction details, material descriptions, glazing and fabrication methods, dimensions of individual components and profiles, hardware, and finishes for vinyl windows. Provide recommendations for maintaining and cleaning surfaces.
2. Installation Details: Include plans, elevations, sections, hardware, accessories, insect screens, operational clearances, and details of installation, including anchor, flashing, and sealant installation.
3. Product Test Reports: For each type of vinyl window, for tests performed by a qualified testing agency.
4. Warranties: For manufacturer's warranties.

B. Submit After Measurement Walk-Through:

1. Shop Drawings: For product schedule for vinyl windows. Use same designations indicated on Window Schedule.

C. Submit During Final Inspection:

1. Maintenance Data: For finishes, weatherstripping, operable panels, and operating hardware to include maintenance manuals.
2. Warranty Data: For finishes, glazing, assembly, and window materials to include warranty certificates.

D. Substitutions: Proposals for new manufacturers and products that do not meet all specifications must be submitted at least four (4) weeks prior to bid date. Included with the submittal requirements, as mentioned in 1.3 A, provide a corner-cut or full-size sample unit, and color samples. The acceptance of new manufacturers and products is at the Engineer’s sole discretion.

E. Approved Equals: Proposals for new manufacturers and products that meet all specifications can be made during the submittal process. Included with the submittal requirements, as mentioned in 1.3 A, provide a corner-cut or full-size sample unit, and color samples. The acceptance of new manufacturers and products is at the Engineer's sole discretion.

1.4 PRODUCT TEST REPORTS

A. Performance Class and Grade: AAMA/WDMA/CSA 101/I.S.2/A440 as follows: Minimum is R15.

1. Uniform Structural Load: Rated for no damage when tested according to ASTM E330.
2. Water Resistance: Rated for no water penetration when tested according to ASTM E331 & ASTM E547.
3. Air Leakage: Rated to not exceed 1.0 Cfm/sq. ft. when tested according to ASTM E283.

B. Thermal Transmittance: NFRC 100 maximum whole-window U-factor of 0.3 Btu/sq. ft. x h x deg F.

C. Condensation Resistance: AAMA 1503 minimum CRF of 55.

D. Outdoor/ Indoor Transmission Class (OITC): Rated for not less than the following when tested with storm window (secondary glazing) for laboratory sound transmission loss according to ASTM E90 and determined by ASTM E1332:

1. Double-Hung and Horizontal-Sliding: 32.
2. Fixed: 32.
3. Casement and Awning: 32.

E. If product test reports are older than five (5) years from the date received by Engineer, submit letter from Manufacturer certifying that the product is still exactly the same as it was when tested, and no suppliers, materials, or manufacturing processes have changed and also submit letter from the Testing Company stating that the tests have not changed since the report was last generated.

1.5 WARRANTY

A. Manufacturer's Warranty: Manufacturer agrees to repair or replace vinyl windows that fail in materials or workmanship within specified warranty period.

1. Failures include, but are not limited to, the following:

a. Failure to meet performance requirements.
b. Structural failures including excessive deflection, water leakage, and air infiltration.
c. Faulty operation of movable sash and hardware.
d. Deterioration of materials and finishes beyond normal weathering.
e. Failure of insulating glass.

2. Warranty Period:

a. Window: 10 years from date of Substantial Completion.
b. Glazing Units: 10 years from date of Substantial Completion.

1.6 QUALITY ASSURANCE

A. Source Limitations: Obtain vinyl windows from single source from single manufacturer.

B. Testing Agency Qualifications: An independent agency accredited as a performance testing laboratory according to the National Voluntary Laboratory Accreditation Program of NIST.

C. Product Standard: Comply with AAMA/WDMA/CSA 101/I.S.2/A440 for definitions and minimum standards of performance, materials, components, accessories, and fabrication unless more stringent requirements are indicated.

1. Window Certification: WDMA certified with label attached to each window.

1.7 DELIVERY, STORAGE AND HANDLING

A. Comply with provisions of Section 016000.

B. Deliver in original packaging and protect from weather.

C. Store window units in an upright position in a clean and dry storage area above ground.

1.8 PROJECT CONDITIONS

A. Field Measurements: Window sizes indicated on Window Schedule are approximate. Verify vinyl window openings by field measurements before fabrication and indicate measurements on Shop Drawings. Contractor shall make provisions to have a qualified window manufacturer representative accompany measuring team for a minimum eight hour day to provide instructions to Contractor on proper measuring for window product(s). Contractor is responsible for all measurements taken and all costs for corrections necessitated by incorrect data.

B. Proceed with installation of window units only when weather conditions comply with manufacturer’s recommendations and openings are dry.

PART 2 - PRODUCTS

2.1 MANUFACTURERS

A. Manufacturers: Subject to compliance with requirements and specifications.

2.2 VINYL WINDOWS

A. Operating Types: Provide the following operating types in locations indicated on Window Schedule:

1. Casement: Project out.
2. Awning: Project out.
3. Double hung.
4. Horizontal sliding.
5. Fixed.

B. Frames and Sashes: Impact-resistant, UV-stabilized PVC complying with AAMA/WDMA/CSA 101/I.S.2/A440.

2.3 GLAZING

A. Insulating-Glass Units: ASTM E 2190.

1. Glass: Clear annealed glass, ASTM C 1036, Type 1, Class 1, q3.

a. Kind: Fully tempered and/or textured opaque where indicated on Window Schedule or as required by code.

2. Lites: Two.
3. Filling: Fill space between glass lites with air.
4. Low-E Coating: Pyrolytic on manufacturer recommended surface.

B. Glazing System: Manufacturer's standard factory-glazing system that produces weathertight seal.

2.4 HARDWARE

A. General: Provide manufacturer's standard hardware fabricated from aluminum, stainless steel, carbon steel complying with AAMA 907, or other corrosion-resistant material compatible with adjacent materials; designed to smoothly operate, tightly close, and securely lock windows, and sized to accommodate sash weight and dimensions.

1. Exposed Hardware Color and Finish: As indicated by manufacturer's designations.

B. Projected Window Hardware:

1. Gear-Type Rotary Operators: Complying with AAMA 901 when tested according to ASTM E 405, Method A. Provide operators that function without requiring the removal of interior screens or using screen wickets.
2. Hinges: Manufacturer's standard type for sash weight and size indicated.
3. Single-Handle Locking System: Operates positive-acting arms that pull sash into locked position. Provide one arm on sashes up to 29 inches tall and two arms on taller sashes.

4. Limit Devices: Concealed friction adjustor, adjustable stay bar limit devices designed to restrict sash opening.
5. Pole Operators: Tubular-shaped anodized aluminum; with rubber-capped lower end and standard push-pull hook at top to match hardware design; of sufficient length to operate window without reaching more than 60 inches above floor; one pole operator and pole hanger per room that has operable windows more than 72 inches above floor.

C. Hung Window Hardware:

1. Counterbalancing Mechanism: Complying with AAMA 902, concealed, of size and capacity to hold sash stationary at any open position.
2. Locks and Latches: Allow unobstructed movement of the sash across adjacent sash in direction indicated and operated from the inside only.
3. Tilt Hardware: Releasing tilt latch allows sash to pivot about horizontal axis to facilitate cleaning exterior surfaces from the interior.
4. Side-Load Hardware: Allow sashes to be easily removable to facilitate cleaning exterior surfaces from the interior.

D. Horizontal-Sliding Window Hardware:

1. Sill Cap/Track: Manufacturer's standard of dimensions and profile indicated; designed to comply with performance requirements indicated and to drain to the exterior.
2. Locks and Latches: Allow unobstructed movement of the sash across adjacent sash in direction indicated and operated from the inside only.
3. Roller Assemblies: Low-friction design.

E. Weather Stripping: Provide full-perimeter weather stripping for each operable sash unless otherwise indicated.

F. Fasteners: Noncorrosive and compatible with window members, trim, hardware, anchors, and other components.

1. Exposed Fasteners: Do not use exposed fasteners to the greatest extent possible. For application of hardware, use fasteners that match finish hardware being fastened.

2.5 ACCESSORIES

A. Dividers (Muntins): Provide divider grilles in designs indicated for each sash lite.

1. Quantity and Type: One permanently located between insulating-glass lites.
2. Material: Manufacturer's standard.
3. Pattern: As indicated on Drawings.
4. Profile: Manufacturer’s standard.
5. Color: To match interior and exterior color as indicated on Drawings.

2.6 STORM WINDOWS

A. See Section 085160 “Storm Windows” for more information.

2.7 FABRICATION

A. Fabricate vinyl windows in sizes indicated. Include a complete system for assembling components and anchoring windows.

B. Glaze vinyl windows in the factory.

C. Weather strip each operable sash to provide weathertight installation.

D. Weep Holes: Provide weep holes and internal passages to conduct infiltrating water to exterior.

E. Provide water-shed members above side-hinged sashes and similar lines of natural water penetration.

F. Mullions: Provide mullions and cover plates, compatible with window units, complete with anchors for support to structure and installation of window units. Allow for erection tolerances and provide for movement of window units due to thermal expansion and building deflections. Provide mullions and cover plates capable of withstanding design wind loads of window units. Provide manufacturer's standard finish to match window units.

G. Hardware: Mount hardware through double walls of vinyl extrusions or provide corrosion-resistant reinforcement.

H. Bow and Bay Window Assemblies: Provide operating and fixed units in configuration indicated. Provide window frames, sashes, hardware, and other trim and components necessary for a complete, secure, and weathertight installation, including the following:

1. Angled mullion posts with interior and exterior trim.
2. Angled interior and exterior extension and trim.
3. Clear pine head and seat boards.
4. Top and bottom plywood platforms.
5. Exterior head and sill casings and trim.
6. Support brackets.

I. Complete fabrication, assembly, finishing, hardware application, and other work in the factory to greatest extent possible. Disassemble components only as necessary for shipment and installation. Allow for scribing, trimming, and fitting at Project site.

2.8 FINISH

A. Finish: Integral color, white, beige, or brown.

PART 3 - EXECUTION

3.1 PREPARATION

A. Do not remove existing windows until new units are on site and installation of new unit is imminent. Contractor may not leave openings unprotected from the elements. Should temporary opening covers be required, install only with approval of Engineer.

B. Furnish, install, and maintain dustproof temporary coverings and other protection for existing interior and exterior work.

C. Coordinate installation of window units with flashing, siding, casing, caulking and other adjoining work to ensure proper sequencing.

D. Remove items that may interfere with the work, such as awnings, and reinstall the items after installation is complete. If items cannot be reinstalled, alert the Engineer.

E. Score edges of existing casing prior to window removal to prevent paint and wallpaper from peeling away from existing surfaces.

F. Remove existing windows and frames entirely unless otherwise directed by Engineer.

G. Remove existing sash weights and fill cavities and gaps between the opening and window with wood blocking and/or batt insulation.

H. Make existing openings smooth and satisfactory to receive new window units. Remove and replace soft or rotted wood. Contractor shall be responsible for removing and replacing rotted material not noted on the window schedule. Contractor may be entitled to additional compensation for removing and replacing rotted material not noted on window schedule or scope of work. Contractor shall identify all areas subject to additional compensation to the Engineer prior to removal of any materials.

I. Clean existing surfaces before installing new window unit.

J. Legally dispose of site debris on a daily basis.

3.2 EXAMINATION

A. Examine openings, substrates, structural support, anchorage, and conditions, with Installer present, for compliance with requirements for installation tolerances and other conditions affecting performance of the Work.

B. Verify rough opening dimensions, levelness of sill plate, and operational clearances.

C. Examine wall flashings, vapor retarders, water and weather barriers, and other built-in components to ensure weathertight window installation.

D. Proceed with installation only after unsatisfactory conditions have been corrected.

3.3 INSTALLATION

A. Comply with Engineer's details and manufacturer's written instructions for installing windows, storm windows, hardware, accessories, and other components. For installation procedures and requirements not addressed in Engineer's details and manufacturer's written instructions, comply with installation requirements in ASTM E 2112.

B. Install windows level, plumb, square, true to line, without distortion, anchored securely in place to structural support, and in proper relation to wall flashing and other adjacent construction to produce weathertight construction. Provide new vapor retardant material taped in place with weather barrier tape to separate any untreated wood from any masonry components.

C. Install new window frame for enlargements or as scheduled. Patch existing window frame with solid wood where indicated on Project Details or as directed by Engineer. Minimize damage to existing siding and casing during installation. Install exterior flashing in weatherboard fashion in accordance with manufacturer's installation instructions, applicable requirements of referenced quality standards, and Contract Document details. Electrical relocations and/or modifications necessitated by enlargements shall be responsibility of Contractor. Structural modifications, cutting, and patching for enlargement of scheduled openings are responsibility of Contractor.

D. Install storm windows according to Engineer's details and manufacturer's written instructions.

E. Set sill members in bed of sealant or with gaskets for weathertight construction.

F. Install windows and components to drain condensation to the exterior.

G. Replace head and side stops with new wood stops and fasteners that match existing.

H. Separate aluminum and other corrodible surfaces from sources of corrosion or electrolytic action at points of contact with other materials.

I. Provide new wood trim at the interior and brake-metal surrounds at the exterior for all new window units to match existing construction conditions and finishes unless otherwise directed by Engineer. Mechanical fasteners for new brake-metal shall be concealed from view. Extruded trim product(s) provided by manufacturer may be used in lieu of new wood and brake-metal surrounds. Color and finish shall match windows.

J. Tolerances: ¼-inch minimum, ½-inch maximum gap is acceptable at head and jambs between window units and frames. Fill gaps with backer-rod as required and instructed by window and sealant manufacturer installation instructions.

K. Install sealants to provide weathertight installation in accordance with Engineer's details and manufacturer's specifications.

L. Contractor is responsible for cutting, patching, trim, and repairs to existing construction necessary for proper installation of windows. Contractor shall restore areas adjacent to the work that are damaged by the construction to their original condition.

M. Where interior trim is replaced, use wider pieces to cover existing area where trim was removed as required. Finish new trim per Section 099000 “Painting.”

N. Install all window screens and ensure proper fit in accordance with manufacturer’s recommendations.

PRODUCT DATA SHEET 1 - ADJUSTING, CLEANING, AND PROTECTION

A. Adjust operating sashes and hardware for a tight fit at contact points and weather stripping for smooth operation and weathertight closure.

B. Remove nonpermanent and non-warning labels.

C. Clean exposed surfaces immediately after installing windows. Remove excess sealants, glazing materials, dirt, and other substances. Keep protective films and coverings in place until final cleaning.

D. Remove and replace sashes if glass has been broken, chipped, cracked, abraded, or damaged during construction period.

E. Protect window surfaces from contact with contaminating substances resulting from construction operations. If contaminating substances do contact window surfaces, remove contaminants immediately according to manufacturer's written instructions.

F. Demonstrate operation and removal of prime and storm sashes to the homeowner. Instruct homeowner in the proper materials and techniques for cleaning and maintaining window units.

END OF SECTION 085313

SECTION 087111 – DOOR HARDWARE

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

A. Drawings and general provisions of the Contract, including General and Special Conditions and Division 01 Specification Sections, apply to this Section.

1.2 SUMMARY

A. Section includes: Mechanical door hardware for swinging, swinging security, and sliding prime and storm doors.

1.3 SUBMITTALS

A. Submit Prior to Measurement Walk-Through:

1. Product Data: For each type of product indicated. Include construction and installation details, material descriptions, dimensions of individual components and profiles, and finishes.
2. Installation Details: Include fabrication and assembly of door hardware, as well as installation procedures and diagrams.
3. Warranties: For manufacturer's warranties.

B. Submit After Measurement Walk-Through:

1. Shop Drawings: For product schedule for hardware. Use same designations indicated on Door Schedule.

C. Submit During Final Inspection:

1. Maintenance Data: For each type of door hardware to include in maintenance manuals.
2. Warranty Data: For each type of door hardware to include warranty certificates.

D. Substitutions: Proposals for new manufacturers and products that do not meet all specifications must be submitted at least four (4) weeks prior to bid date. Included with the submittal requirements, as mentioned in 1.3 A, provide samples for verification. The acceptance of new manufacturers and products is at the Engineer's sole discretion.

E. Approved Equals: Proposals for new manufacturers and products that meet all specifications can be made during the submittal process. Included with the submittal requirements, as mentioned in 1.3 A, provide samples for verification. The acceptance of new manufacturers and products is at the Engineer's sole discretion.

F. Samples for Verification: For exposed door hardware of each type required, in each finish specified, prepared on Samples of size indicated below. Tag Samples with full description.

1. Sample Size: Minimum 2-by-4-inch Samples for sheet and 4-inch long Samples for other products.

1.4 WARRANTY

A. Special Warranty: Manufacturer's standard form in which manufacturer agrees to repair or replace components of door hardware that fail in materials or workmanship within specified warranty period.

1. Failures include, but are not limited to, the following:

a. Structural failures including excessive deflection, cracking, or breakage.
b. Faulty operation of doors and door hardware.
c. Deterioration of metals, metal finishes, and other materials beyond normal weathering and use.

2. Warranty Period: Three years from date of Substantial Completion, unless otherwise indicated.

1.5 QUALITY ASSURANCE

A. Source Limitations: Obtain each type of door hardware from a single manufacturer.

B. Fire-Rated Door Assemblies: Where fire-rated door assemblies are indicated, provide door hardware rated for use in assemblies complying with NFPA 80 that are listed and labeled by a qualified testing agency, for fire-protection ratings indicated, based on testing at positive pressure according to NFPA 252 or UL 10C, unless otherwise indicated.

C. Means of Egress Doors: Latches shall not require more than 15 lbf to release the latch. Locks shall not require use of a key, tool, or special knowledge for operation.

D. Accessibility Requirements: For door hardware on doors in an accessible route, comply with the U.S. Architectural & Transportation Barriers Compliance Board's ADA-ABA Accessibility Guidelines and ICC/ANSI A117.1.

1. Provide operating devices that do not require tight grasping, pinching, or twisting of the wrist and that operate with a force of not more than 5 lbf.
2. Comply with the following maximum opening-force requirements:

a. Interior, Non-Fire-Rated Hinged Doors: 5 lbf applied perpendicular to door.
b. Sliding Doors: 5 lbf applied parallel to door at latch.
c. Fire Doors: Minimum opening force allowable by authorities having jurisdiction.

3. Bevel raised thresholds with a slope of not more than 1:2. Provide thresholds not more than 1/2 inch high and 3/4 inch high for exterior sliding doors.

4. Adjust door closer sweep periods so that, from an open position of 70 degrees, the door will take at least 3 seconds to move to a point 3 inches from the latch, measured to the leading edge of the door.

PART 2 - PRODUCTS

2.1 HINGES

A. Manufacturers: Subject to compliance with requirements, provide products by one of the following:

1. Hager Companies.
2. PBB, Inc.
3. Stanley Hardware; Div. of The Stanley Works.
4. Or Approved Equal.

B. Plain-Bearing Hinges: BHMA A156.17.

1. Mounting: Full mortise.
2. Number of Hinges per Door: Three.
3. Material: Steel base with steel non-rising loose pin with flat buttons.
4. Size: 4-inch by 4-inch.
5. Corners: 5/8-inch radius.
6. Finish: To match mechanical locks finish.

C. Spring Hinges: BHMA A156.17 and NFPA 80 for fire-rated assemblies.

1. Mounting: Full mortise.
2. Number of Hinges per Door: Three.
3. Material: Wrought steel with torsion spring.
4. Size: 4-inch by 4-inch.
5. Corners: 5/8-inch radius.
6. Finish: To match mechanical locks finish.

2.2 MECHANICAL LOCKS

A. Manufacturers: Subject to compliance with requirements, provide products by one of the following:

1. Schlage Lock Division; an Ingersoll-Rand company.
2. Weiser Lock Corp.; a Black & Decker Corp. company.
3. Or Approved Equal.

B. Bored Locks (Handsets): BHMA A156.2; Grade 3.

1. Lock Throw: Minimum 1/2-inch latchbolt throw.

2. Exterior Door Lock Backset: 2-3/4 inches.
3. Interior Door Lock Backset: 2-3/8 inches.
4. Material: Stainless steel base with wrought steel trim.
5. Operating Device (Standard): Knob outside and inside with escutcheons (roses) operated by key outside and turn inside.
6. Operating Device (Ornamental): Handle outside and knob inside with escutcheons (roses) operated by thumb latch outside and turn inside.
7. Strikes: Extra-long-lip for locks used on frames with applied wood casing trim.
8. Finish: Bright brass, antique brass, or nickel as selected by Homeowner during Measurement Walk-Through.

C. Bored Auxiliary Locks (Deadbolts): BHMA A156.5: Grade 2; with strike that suits frame.

1. Lock Throw: Minimum 1-inch bolt throw.
2. Exterior Door Backset: 2-3/4 inches.
3. Interior Door Backset: 2-3/8 inches.
4. Material: Stainless steel base with wrought steel trim.
5. Operating Device (Standard): Deadbolt operated by key outside and turn inside.
6. Operating Device (Ornamental): Deadbolt with escutcheons (roses) operated by key outside and turn inside.
7. Strikes: Manufacturer's standard.
8. Finish: To match bored lock finish.

2.3 DOOR GASKETING

A. Manufacturers: Subject to compliance with requirements, provide products by one of the following:

1. Hager Companies.
2. M-D Building Products, Inc.
3. National Guard Products.
4. Pemko Manufacturing Co.
5. Zero International.
6. Schlegel Systems, Inc.
7. Or Approved Equal.

B. Door Gasketing and Sweeps: BHMA A156.22; Provide manufacturer's standard pre-hung system with resilient or flexible seal strips that are easily replaceable and readily available from stocks maintained by manufacturer, as required by testing to achieve STC and/or fire rating indicated.

2.4 THRESHOLDS

A. Manufacturers: Subject to compliance with requirements, provide products by one of the following:

1. Hager Companies.

2. M-D Building Products, Inc.
3. National Guard Products.
4. Pemko Manufacturing Co.; an ASSA ABLOY Group company.
5. Zero International.
6. Or Approved Equal.

B. Thresholds: BHMA A156.21; fabricated to full width of opening indicated. Standard as recommended by manufacturer or handicap if indicated on Drawings; fabricated from aluminum with sealed oak strip.

2.5 AUXILIARY DOOR HARDWARE

A. Manufacturers: Subject to compliance with requirements, provide products by one of the following:

1. Don-Jo Mfg., Inc.
2. Hager Companies.
3. IVES Hardware.
4. Stanley Hardware; Div. of The Stanley Works.
5. Trimco.
6. Or Approved Equal.

B. Wide-Angle Door Viewers: Grade 1 or 2; BHMA A156.16, solid brass with optical glass lenses; adjustable to door thickness and permitting 1-way observation with minimum 170-degree viewing angle.

1. Finish: Match prime door hardware finish as closely as possible.

2.6 SWINGING STORM DOOR HARDWARE

A. Hinges: Stainless steel with stainless steel pin.

B. Handsets: Manufacturer’s standard pull, latch, dead bolt, and keyed lock.

1. Strikes: Manufacturer’s standard.
2. Finish: Match storm door finish as closely as possible.

C. Door Gasketing: Manufacturer’s standard to meet performance requirements.

D. Auxiliary: Pneumatic self-closure with hold-open feature, chain and spring assemblies as provided by manufacturer.

2.7 SECURITY STORM DOOR HARDWARE

A. Hinges: Stainless steel with non-removable stainless steel pin.

B. Bored Locks (Handsets): BHMA A156.2; Grade 3.

1. Lock Throw: Minimum 1/2-inch latchbolt throw.
2. Material: Stainless steel base with wrought steel trim.
3. Operating Device: Lever outside and inside with escutcheons (roses) operated by key outside and turn inside.
4. Strikes: Manufacturer's standard.
5. Finish: Match storm door finish or prime door hardware finish as selected by Homeowner during Measurement Walk-Through.

C. Bored Auxiliary Locks (Deadbolts): BHMA A156.5: Grade 2; with strike that suits frame.

1. Lock Throw: Minimum 1-inch bolt throw.
2. Material: Stainless steel base with wrought steel trim.
3. Operating Device: Deadbolt operated by key outside and turn inside.
4. Strikes: Manufacturer's standard.
5. Finish: Match storm handset finish as closely as possible.

D. Door Gasketing: Manufacturer's standard to meet performance requirements.

E. Auxiliary: Pneumatic self-closure with hold-open feature, chain and spring assemblies as provided by manufacturer.

2.8 SLIDING DOOR HARDWARE

A. General: Provide manufacturer's standard hardware, fabricated from a corrosion-resistant material compatible with wood and aluminum cladding complying with AAMA 907; designed to smoothly operate, tightly close, and securely lock wood-framed glass doors and sized to accommodate panel weight and dimensions. Do not use aluminum in frictional contact with other metals. Match hardware with cladding appearance.

B. Roller Assemblies: Provide movable panels with adjustable-height roller assemblies, complying with AAMA 906, consisting of self-lubricating, dual tandem manufacturer's standard nylon or steel ball-bearing rollers; two roller assemblies per panel.

C. Threshold and Sill Cap/Track: Provide manufacturer's standard threshold and track of thickness, dimensions, and profile indicated; designed to comply with performance requirements indicated and to drain to exterior; with manufacturer's standard finish.

D. Door Pulls: Provide manufacturer's standard pull grips.

E. Lock: Install manufacturer's keyed cylinder lock, and locking device on each movable panel, lockable from the inside by turn and outside by key. Adjust locking device to allow unobstructed movement of the panel across adjacent panel in the direction indicated.

F. Security Foot Bolt: Provide security foot-operated dead bolt attached to bottom rail of movable sliding door panels to lock the panel when fully closed and when partially open to permit ventilation.

G. Limit Stops: Resilient rubber.

H. Compression-Type Weather Stripping: Provide compressible weather stripping designed for permanently resilient sealing under bumper or wiper action, and completely concealed when wood-framed glass door is closed. Manufacturer's standard system and materials complying with AAMA/WDMA/CSA 101/I.S.2/A440.

I. Sliding-Type Weather Stripping: Provide woven-pile weather stripping of wool, polypropylene, or nylon pile and resin-impregnated backing fabric. Comply with AAMA 701. Provide weather stripping with integral barrier fin or fins of semirigid, polypropylene sheet or polypropylene-coated material. Comply with AAMA 702.

2.9 SLIDING STORM DOOR HARDWARE

A. General: Provide manufacturer's standard hardware, fabricated from a corrosion-resistant material compatible with aluminum complying with AAMA 907 and designed to smoothly operate, tightly close, and securely lock sliding aluminum-framed glass doors. Do not use aluminum in frictional contact with other metals. Match hardware with cladding appearance.

B. Roller Assemblies: Provide movable panels with adjustable-height roller assemblies, complying with AAMA 906, consisting of self-lubricating, dual tandem manufacturer's standard nylon or steel ball-bearing rollers; with two roller assemblies per panel.

C. Threshold and Sill Cap/Track: Provide extruded-aluminum threshold and track of thickness, dimensions, and profile indicated; designed to comply with performance requirements indicated and to drain to the exterior; with manufacturer's standard finish. Provide handicap sill as indicated on Drawings.

D. Door Pulls: Provide manufacturer's standard extruded-aluminum pull grips.

E. Lock: If an existing lockable storm door exists, install manufacturer's keyed locking device or a keyed locking device as recommended by the manufacturer on each movable panel, lockable from the inside only. Adjust locking device to allow unobstructed movement of the panel across adjacent panel in the direction indicated.

F. Compression-Type Weather Stripping: Provide compressible weather stripping designed for permanently resilient sealing under bumper or wiper action, and completely concealed when sliding aluminum-framed glass door is closed.

G. Sliding-Type Weather Stripping: Provide woven-pile weather stripping of wool, polypropylene, or nylon pile and resin-impregnated backing fabric. Comply with AAMA 701.

2.10 KEYING SYSTEM

A. Standard Lock Cylinders: BHMA A156.5; Grade 3; face finished to match lockset.

1. Number of Pins for Prime Doors: Minimum of six.
2. Number of Pins for Storm Doors: Manufacturer’s standard.

3. Keying System: Key all prime door cylinders to same key and all storm door cylinders to same key.
4. Key Material: Nickel silver.
5. Quantity: Two keys per lockset.

PART 3 - EXECUTION

3.1 EXAMINATION

A. Examine doors and frames, with Installer present, for compliance with requirements for installation tolerances, labeled fire-rated door assembly construction, wall and floor construction, and other conditions affecting performance.

B. Proceed with installation only after unsatisfactory conditions have been corrected.

3.2 INSTALLATION

A. Mounting Heights: Mount door hardware units at heights to comply with governing regulations. If required, stagger hardware to not interfere with storm door hardware.

B. Install each door hardware item to comply with manufacturer's written instructions. Where cutting and fitting are required to install door hardware onto or into surfaces that are later to be painted or finished in another way, coordinate removal, storage, and reinstallation of surface protective trim units with finishing work. Do not install surface-mounted items until finishes have been completed on substrates involved.

1. Set units level, plumb, and true to line and location. Adjust and reinforce attachment substrates as necessary for proper installation and operation.
2. Drill and countersink units that are not factory prepared for anchorage fasteners. Space fasteners and anchors according to industry standards.

C. Hinges: Install types and in quantities indicated in door hardware schedule but not fewer than the number recommended by manufacturer for application indicated or one hinge for every 30 inches of door height, whichever is more stringent.

D. Thresholds: Set thresholds for exterior doors and other doors indicated in full bed of sealant complying with requirements specified in Section 079200 "Sealants."

3.3 ADJUSTING

A. Initial Adjustment: Adjust and check each operating item of door hardware and each door to ensure proper operation or function of every unit. Replace units that cannot be adjusted to operate as intended.

1. Spring Hinges: Adjust to achieve positive latching when door is allowed to close freely from an open position of 30 degrees.

3.4 CLEANING AND PROTECTION

A. Clean adjacent surfaces soiled by door hardware installation.

B. Clean operating items as necessary to restore proper function and finish.

C. Provide final protection and maintain conditions that ensure that door hardware is without damage or deterioration.

END OF SECTION 087111

SECTION 092900 - GYPSUM BOARD

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

A. Drawings and general provisions of the Contract, including General and Special Conditions and Division 01 Specification Sections, apply to this Section.

1.2 SUMMARY

A. Section Includes: Interior gypsum board.

1.3 SUBMITTALS

A. Product Data: For each type of product.

1.4 DELIVERY, STORAGE AND HANDLING

A. Store materials inside under cover and keep them dry and protected against weather, condensation, direct sunlight, construction traffic, and other potential causes of damage. Stack panels flat and supported on risers on a flat platform to prevent sagging.

1.5 FIELD CONDITIONS

A. Environmental Limitations: Comply with ASTM C 840 requirements or gypsum board manufacturer's written recommendations, whichever are more stringent.

B. Do not install paper-faced gypsum panels until installation areas are enclosed and conditioned.

C. Do not install panels that are wet, those that are moisture damaged, and those that are mold damaged.

1. Indications that panels are wet or moisture damaged include, but are not limited to, discoloration, sagging, or irregular shape.
2. Indications that panels are mold damaged include, but are not limited to, fuzzy or splotchy surface contamination and discoloration.

PART 2 - PRODUCTS

2.1 GYPSUM BOARD, GENERAL

A. Size: Provide maximum lengths and widths available that will minimize joints in each area and that correspond with support system indicated.

2.2 INTERIOR GYPSUM BOARD

A. Manufacturers: Subject to compliance with requirements, provide products by one of the following:

1. American Gypsum.
2. CertainTeed Corp.
3. Georgia-Pacific Gypsum LLC.
4. Lafarge North America Inc.
5. National Gypsum Company.
6. PABCO Gypsum.
7. Temple-Inland.
8. USG Corporation.
9. Or Approved Equal.

B. Gypsum Wallboard and Ceiling Board: ASTM C 1396/C 1396M.

1. Thickness: 1/2 inch.
2. Long Edges: Tapered.

C. Gypsum Board, Type X (Garages): ASTM C 1396/C 1396M.

1. Thickness: 5/8 inch.
2. Long Edges: Tapered.

D. Moisture- and Mold-Resistant Gypsum Board (Bathrooms): ASTM C 1396/C 1396M. With moisture- and mold-resistant core and paper surfaces.

1. Core: 1/2 inch, regular type.
2. Long Edges: Tapered.
3. Mold Resistance: ASTM D 3273, score of 10 as rated according to ASTM D 3274.

2.3 TRIM ACCESSORIES

A. Interior Trim: ASTM C 1047.

1. Material: Galvanized or aluminum-coated steel sheet or rolled zinc.
2. Shape: Cornerbead.

2.4 JOINT TREATMENT MATERIALS

A. General: Comply with ASTM C 475/C 475M.

B. Joint Tape: Paper.

C. Joint Compound for Interior Gypsum Board: For each coat use formulation that is compatible with other compounds applied on previous or for successive coats.

1. Prefilling: At open joints and damaged surface areas, use setting-type taping compound.
2. Embedding and First Coat: For embedding tape and first coat on joints, fasteners, and trim flanges, use drying-type, all-purpose compound.
3. Fill Coat: For second coat, use drying-type, all-purpose compound.
4. Finish Coat: For third coat, use drying-type, all-purpose compound.
5. Skim Coat: For final coat, use setting-type, sandable topping compound.

PART 3 - EXECUTION

3.1 EXAMINATION

A. Examine areas and substrates including welded hollow-metal frames and framing, with Installer present, for compliance with requirements and other conditions affecting performance.

B. Examine panels before installation. Reject panels that are wet, moisture damaged, and mold damaged.

C. Proceed with installation only after unsatisfactory conditions have been corrected.

3.2 APPLYING AND FINISHING PANELS, GENERAL

A. Comply with ASTM C 840.

B. Install ceiling panels across framing to minimize the number of abutting end joints and to avoid abutting end joints in central area of each ceiling. Stagger abutting end joints of adjacent panels not less than one framing member.

C. Install panels with face side out. Butt panels together for a light contact at edges and ends with not more than 1/16 inch of open space between panels. Do not force into place.

D. Locate edge and end joints over supports, except in ceiling applications where intermediate supports or gypsum board back-blocking is provided behind end joints. Do not place tapered edges against cut edges or ends. Stagger vertical joints on opposite sides of partitions. Do not make joints other than control joints at corners of framed openings.

E. Form control and expansion joints with space between edges of adjoining gypsum panels.

F. Wood Framing: Install gypsum panels over wood framing, with floating internal corner construction. Do not attach gypsum panels across the flat grain of wide-dimension lumber, including floor joists and headers. Float gypsum panels over these members or provide control joints to counteract wood shrinkage.

3.3 APPLYING INTERIOR GYPSUM BOARD

A. Install interior gypsum board in the following locations:

1. Wallboard Type: Vertical surfaces unless otherwise indicated.
2. Type X: Where required for fire-resistance-rated assembly.
3. Ceiling Type: Ceiling surfaces.
4. Moisture- and Mold-Resistant Type: Bathroom surfaces.

B. Single-Layer Application:

1. On ceilings, apply gypsum panels before wall/partition board application to greatest extent possible and at right angles to framing unless otherwise indicated.
2. On partitions/walls, apply gypsum panels vertically (parallel to framing) unless otherwise indicated or required by fire-resistance-rated assembly, and minimize end joints.

    a. Stagger abutting end joints not less than one framing member in alternate courses of panels.
    b. At stairwells and other high walls, install panels horizontally unless otherwise indicated or required by fire-resistance-rated assembly.
    c. Fasten with screws.

3. On Z-furring members, apply gypsum panels vertically (parallel to framing) with no end joints. Locate edge joints over furring members.

3.4 INSTALLING TRIM ACCESSORIES

A. General: For trim with back flanges intended for fasteners, attach to framing with same fasteners used for panels. Otherwise, attach trim according to manufacturer's written instructions.

B. Control Joints: Install control joints according to ASTM C 840.

C. Interior Trim: Install in the following locations:

1. Cornerbead: Use at outside corners.

3.5 FINISHING GYPSUM BOARD

A. General: Treat gypsum board joints, interior angles, edge trim, control joints, penetrations, fastener heads, surface defects, and elsewhere as required to prepare gypsum board surfaces for decoration. Promptly remove residual joint compound from adjacent surfaces.

B. Prefill open joints and damaged surface areas.

C. Apply joint tape over gypsum board joints, except for trim products specifically indicated as not intended to receive tape.

D. Gypsum Board Finish Levels: Finish panels according to ASTM C 840.

3.6 PROTECTION

A. Protect adjacent surfaces from drywall compound and promptly remove from floors and other non-drywall surfaces. Repair surfaces stained, marred, or otherwise damaged during drywall application.

B. Protect installed products from damage from weather, condensation, direct sunlight, construction, and other causes during remainder of the construction period.

C. Remove and replace panels that are wet, moisture damaged, and mold damaged.

END OF SECTION 092900

SECTION 098100 – ACOUSTIC INSULATION

PART 1 - GENERAL

1.1 SUMMARY

A. Section Includes:

1. Mineral wool, semi-rigid board.
2. Open-cell spray polyurethane foam.

1.2 ACTION SUBMITTALS

A. Product Data: For each type of product.

PART 2 - PRODUCTS

2.1 MINERAL – WOOL BRAND

A. Mineral-Wool Board, Type II, Unfaced: ASTM C612, Type II; with maximum flame-spread and smoke-developed indexes of 15 and zero, respectively, per ASTM E84; passing ASTM E136 for combustion characteristics. Nominal density of 4.4 lb. / cu. ft.

1. Basis-of Design: Subject to compliance with requirements, provide “Roxul Safe” as manufactured by Rockwool Group or comparable product.

2.2 OPEN-CELL SPRAY POLYURETHANE FOAM

A. Open-Cell Spray Polyurethane Foam: Spray-applied polyurethane foam using water as a blowing agent. Minimum density of 0.4 lb. /cu. ft.

1. Surface-Burning Characteristics: Comply with ASTM E84; testing by a qualified testing agency. Identify products with appropriate markings of applicable testing agency.

a. Flame-Spread Index: 25 or less.
b. Smoke-Developed Index: 450 or less.

2. Fire Propagation Characteristics: Passes NFPA 285 testing as part of an approved assembly.

PART 3 - EXECUTION

3.1 INSTALLATION, GENERAL

A. Unless specifically shown on the Drawings, the Contractor has the option to utilize either product that achieves the best results for the installation. All insulation shall be concealed by a finished product and not interfere with internal drainage or weeps.

B. Comply with insulation manufacturer's written instructions applicable to products and applications.

C. Install insulation that is undamaged, dry, and unsoiled and that has not been left exposed to ice, rain, or snow at any time.

D. Compress and fit mineral wool strips tightly around obstructions and completely pack and fill voids with insulation around the perimeter of exterior openings and open-backed or field-assembled tubular frames, to the maximum extent possible. Remove projections that interfere with placement. Install insulation in miscellaneous voids and cavity spaces where required. Vestibules shall be considered exterior spaces.

END OF SECTION 098100

SECTION 099113 - EXTERIOR PAINTING

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

A. Drawings and general provisions of the Contract, including General and Special Conditions and Division 01 Specification Sections, apply to this Section.

1.2 SUMMARY

A. Section includes surface preparation and the application of paint systems on exterior substrates and prime doors.

1.3 SUBMITTALS

A. Product Data: For each type of product. Include preparation requirements, application instructions, and MSDS.

B. Samples for Initial Selection: For each type of topcoat product.

1.4 QUALITY ASSURANCE

A. Single-source responsibility: Provide primers and finishes produced by same manufacturer.

1.5 DELIVERY, STORAGE, AND HANDLING

A. Store materials not in use in tightly covered containers in well-ventilated areas with ambient temperatures continuously maintained at not less than 45 deg F. Maintain containers in clean condition, free of foreign materials and residue. Remove rags and waste from storage areas daily.

1.6 FIELD CONDITIONS

A. Apply paints only when temperature of surfaces to be painted and ambient air temperatures are between 50 and 95 deg F.

B. Do not apply paints in snow, rain, fog, or mist; when relative humidity exceeds 85 percent; at temperatures less than 5 deg F above the dew point; or to damp or wet surfaces.

C. Do not apply exterior finishes in snow, rain, fog, or mist.

PART 2 - PRODUCTS

2.1 MANUFACTURERS

A. Manufacturers: Subject to compliance with requirements, provide products by one of the following:

1. Behr Process Corporation.
2. Benjamin Moore & Co.
3. ICI Paints.
4. PPG Architectural Finishes, Inc.
5. Sherwin-Williams Company (The).
6. Or Approved Equal.

2.2 FIBERGLASS PRIMERS

A. Primer, Bonding, Water Based: MPI #17.

1. Water based, emulsion type, pigmented primer used on various types of problematic surfaces such as cured glossy alkyd finishes, plastics, fiberglass and laminates to promote adhesion of subsequent coatings.

2.3 METAL PRIMERS

A. Primer, Alkyd, Quick Dry, for Metal: MPI #76.

1. Solvent based, modified alkyd, fast drying, lead and chromate free, anti-corrosive primer for cleaned interior and exterior steel.

2.4 WOOD PRIMERS

A. Primer, Alkyd for Uncoated Exterior Wood: MPI #5.

1. Pigmented, white, wood primer for uncoated exterior wood surfaces.

2.5 CONCRETE AND MASONRY PRIMER

A. Primer, Latex, flat: MPI #10.

2.6 LATEX-BASED PAINTS

A. Latex, Exterior, Gloss: MPI #119.

B. Latex, Exterior, Semi-gloss: MPI #11.

C. Latex, Exterior, Low-sheen: MPI #15

D. Latex, Textured Coating, Flat: MPI #42.

PART 3 - EXECUTION

3.1 EXAMINATION

A. Examine substrates and conditions, with Applicator present, for compliance with requirements for maximum moisture content and other conditions affecting performance of the Work.

B. Portland Cement Plaster Substrates: Verify that plaster is fully cured.

C. Exterior Gypsum Board Substrates: Verify that finishing compound is sanded smooth.

D. Verify suitability of substrates, including surface conditions and compatibility with existing finishes and primers.

E. Proceed with coating application only after unsatisfactory conditions have been corrected.

3.2 PREPARATION

A. Comply with manufacturer's written instructions and recommendations in "MPI Manual" applicable to substrates and paint systems indicated.

B. Remove hardware, covers, plates, and similar items already in place that are removable and are not to be painted. If removal is impractical or impossible because of size or weight of item, provide surface-applied protection before surface preparation and painting.

1. After completing painting operations, use workers skilled in the trades involved to reinstall items that were removed. Remove surface-applied protection.

C. Clean substrates of substances that could impair bond of paints, including dust, dirt, oil, grease, and incompatible paints and encapsulants.

1. Remove incompatible primers and reprime substrate with compatible primers or apply tie coat as required to produce paint systems indicated.

D. Existing Painted Surfaces, General: Thoroughly clean to remove dirt, soot, grease, mildew, chalkiness and stains using finish paint manufacturers recommended spray-on liquid cleaner.

1. Apply cleaner using hand-held wand applicator in accordance with product manufacturer’s instructions.
2. Remove loose, peeling, cracked and blistered paint by shipping, scrapping, and sanding smooth with medium and fine sandpaper.

3. Touch-up bare spots on previously painted surfaces with finish paint manufacturer's recommended primer.
4. Sand existing semi-gloss and gloss paint surfaces to a uniform smooth dull finish before painting.

E. Concrete Substrates: Remove release agents, curing compounds, efflorescence, and chalk. Do not paint surfaces if moisture content or alkalinity of surfaces to be painted exceeds that permitted in manufacturer's written instructions.

F. Masonry Substrates: Remove efflorescence and chalk. Do not paint surfaces if moisture content or alkalinity of surfaces or mortar joints exceeds that permitted in manufacturer's written instructions.

G. Galvanized-Metal Substrates: Remove grease and oil residue from galvanized sheet metal by mechanical methods to produce clean, lightly etched surfaces that promote adhesion of subsequently applied paints.

H. Wood Substrates:

1. Scrape and clean knots. Before applying primer, apply coat of knot sealer recommended in writing by topcoat manufacturer for exterior use in paint system indicated.
2. Sand surfaces that will be exposed to view, and dust off.
3. Prime edges, ends, faces, undersides, and backsides of wood.
4. After priming, fill holes and imperfections in the finish surfaces with putty or plastic wood filler. Sand smooth when dried.

3.3 APPLICATION

A. Apply paints in according to manufacturer's written instructions and recommendations in "MPI Manual."

1. Use applicators and techniques suited for paint and substrate indicated.
2. Do not apply coats at less than the minimum recommended film thickness for substrate.
3. Paint surfaces behind movable items same as similar exposed surfaces.
4. Paint both sides and edges of exterior doors and entire exposed surface of exterior door frames.
5. Do not paint over labels of independent testing agencies or equipment name, identification, performance rating, or nomenclature plates.

B. Topcoats used on patched areas shall matching existing gloss levels and textures of adjacent surfaces. Paint entire surface of patch from corner to corner and top to bottom. Final appearance of patched area shall be imperceptible.

C. Where new surfaces are only to be painted, the finish level shall be gloss.

D. If undercoats or other conditions show through topcoat, apply additional coats until cured film has a uniform paint finish, color, and appearance.

E. Apply paints to produce surface films without cloudiness, spotting, holidays, laps, brush marks, roller tracking, runs, sags, ropiness, or other surface imperfections. Cut in sharp lines and color breaks.

3.4 CLEANING AND PROTECTION

A. At end of each workday, remove rubbish, empty cans, rags, and other discarded materials from Project site.

B. After completing paint application, clean spattered surfaces. Remove spattered paints by washing, scraping, or other methods. Do not scratch or damage adjacent finished surfaces.

C. Protect work of other trades against damage from paint application. Correct damage to work of other trades by cleaning, repairing, replacing, and refinishing, as approved by Engineer, and leave in an undamaged condition.

D. At completion of construction activities of other trades, touch up and restore damaged or defaced painted surfaces.

E. Provide “wet paint” signs to protect newly painted finishes.

3.5 EXTERIOR PAINTING SCHEDULE

A. Fiberglass Substrates:

1. Prime Coat: Primer, bonding, water based.
2. Intermediate Coat: Exterior alkyd enamel matching topcoat.
3. Topcoat: Latex, exterior, gloss.

B. Galvanized-Metal Substrates:

1. Prime Coat: Primer, galvanized metal.
2. Intermediate Coat: Exterior alkyd enamel matching topcoat.
3. Topcoat: Latex, exterior, gloss.

C. Wood Substrates:

1. Prime Coat: Primer, alkyd for exterior wood.
2. Intermediate Coat: Exterior alkyd enamel matching topcoat.
3. Topcoat: Latex, exterior, gloss.

D. Masonry and Stucco Substrates:

1. Prime Coat: Block filler.
2. Intermediate Coat: Latex, Exterior
3. Top Coat: Latex, Extieor

E. Previously Costed Wood and Metal Substrates:

1. Intermediate Coat: Latex, exterior (touch-up).
2. Top Coat: Latex, Exterior, Gloss

END OF SECTION 099113

SECTION 099123 - INTERIOR PAINTING

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

A. Drawings and general provisions of the Contract, including General and Special Conditions and Division 01 Specification Sections, apply to this Section.

1.2 SUMMARY

A. Section includes surface preparation and the application of paint systems on interior substrates.

1.3 SUBMITTALS

A. Product Data: For each type of product. Include preparation requirements, application instructions, and MSDS.

B. Samples for Initial Selection: For each type of topcoat product.

1.4 QUALITY ASSURANCE

A. Single-source responsibility: Provide primers and finishes produced by same manufacturer.

1.5 DELIVERY, STORAGE, AND HANDLING

A. Store materials not in use in tightly covered containers in well-ventilated areas with ambient temperatures continuously maintained at not less than 45 deg F. Maintain containers in clean condition, free of foreign materials and residue. Remove rags and waste from storage areas daily.

1.6 FIELD CONDITIONS

A. Apply paints only when temperature of surfaces to be painted and ambient air temperatures are between 50 and 95 deg F.

B. Do not apply paints when relative humidity exceeds 85 percent; at temperatures less than 5 deg F above the dew point; or to damp or wet surfaces.

PART 2 - PRODUCTS

2.1 MANUFACTURERS

A. Manufacturers: Subject to compliance with requirements, provide products by one of the following:

1. Behr Process Corporation.
2. Benjamin Moore & Co.
3. ICI Paints.
4. PPG Architectural Finishes, Inc.
5. Sherwin-Williams Company (The).
6. Or Approved Equal.

2.2 PRIMERS/SEALERS

A. Primer Sealer, Latex, Interior: MPI #50.

1. Latex based sealer used on new interior plaster, concrete and gypsum wallboard surfaces that are subsequently painted. Purpose is to reduce the porosity of the substrate for finish coats. Not intended for use on wood or previously painted surfaces.

B. Primer, Latex, for Interior Wood: MPI #39.

1. Latex based primer for use on interior wood surfaces such as doors, casings, and trim.

2.3 WATER-BASED PAINTS

A. Latex, Interior:

1. Flat: MPI #53.
2. Eggshell or Satin: MPI #52.
3. Semi-Gloss: MPI #54.
4. Gloss: MPI #114.

PART 3 - EXECUTION

3.1 EXAMINATION

A. Examine substrates and conditions, with Applicator present, for compliance with requirements for maximum moisture content and other conditions affecting performance of the Work.

B. Gypsum Board Substrates: Verify that finishing compound is sanded smooth.

C. Plaster Substrates: Verify that plaster is fully cured.

D. Spray-Textured Ceiling Substrates: Verify that surfaces are dry.

E. Verify suitability of substrates, including surface conditions and compatibility with existing finishes and primers.

F. Proceed with coating application only after unsatisfactory conditions have been corrected.

3.2 PREPARATION

A. Comply with manufacturer's written instructions and recommendations in "MPI Manual" applicable to substrates indicated.

B. Remove hardware, covers, plates, and similar items already in place that are removable and are not to be painted. If removal is impractical or impossible because of size or weight of item, provide surface-applied protection before surface preparation and painting.

1. After completing painting operations, use workers skilled in the trades involved to reinstall items that were removed. Remove surface-applied protection if any.

C. Clean substrates of substances that could impair bond of paints, including dust, dirt, oil, grease, and incompatible paints and encapsulants.

1. Remove incompatible primers and reprime substrate with compatible primers or apply tie coat as required to produce paint systems indicated.

D. Concrete Substrates: Remove release agents, curing compounds, efflorescence, and chalk. Do not paint surfaces if moisture content or alkalinity of surfaces to be painted exceeds that permitted in manufacturer's written instructions.

E. Masonry Substrates: Remove efflorescence and chalk. Do not paint surfaces if moisture content or alkalinity of surfaces or mortar joints exceed that permitted in manufacturer's written instructions.

F. Wood Substrates:

1. Scrape and clean knots, and apply coat of knot sealer before applying primer.
2. Sand surfaces that will be exposed to view, and dust off.
3. Prime edges, ends, faces, undersides, and backsides of wood.
4. After priming, fill holes and imperfections in the finish surfaces with putty or plastic wood filler. Sand smooth when dried.

3.3 APPLICATION

A. Apply paints according to manufacturer's written instructions and to recommendations in "MPI Manual."

1. Use applicators and techniques suited for paint and substrate indicated.
2. Do not apply coats at less than the minimum recommended film thickness for substrate.

3. Paint surfaces behind furniture same as similar exposed surfaces.
4. Paint front and backsides of access panels, removable or hinged covers, and similar hinged items to match exposed surfaces.
5. Do not paint over labels of independent testing agencies or equipment name, identification, performance rating, or nomenclature plates.

B. Topcoats used on patched areas shall matching existing gloss levels and textures of adjacent surfaces. Paint entire surface of patch from corner to corner and top to bottom. Final appearance of patched area shall be imperceptible.

C. If undercoats or other conditions show through topcoat, apply additional coats until cured film has a uniform paint finish, color, and appearance.

D. Apply paints to produce surface films without cloudiness, spotting, holidays, laps, brush marks, roller tracking, runs, sags, ropiness, or other surface imperfections. Cut in sharp lines and color breaks.

3.4 CLEANING AND PROTECTION

A. At end of each workday, remove rubbish, empty cans, rags, and other discarded materials from Project site.

B. After completing paint application, clean spattered surfaces. Remove spattered paints by washing, scraping, or other methods. Do not scratch or damage adjacent finished surfaces.

C. Protect work of other trades against damage from paint application. Correct damage to work of other trades by cleaning, repairing, replacing, and refinishing, as approved by Engineer, and leave in an undamaged condition.

D. At completion of construction activities of other trades, touch up and restore damaged or defaced painted surfaces.

E. Provide “wet paint” signs to protect newly painted finishes.

3.5 INTERIOR PAINTING SCHEDULE

A. CMU, Gypsum Wallboard, and Plaster Substrates:

1. Prime Coat: Primer sealer, latex, interior.
2. Intermediate Coat: Latex, interior, matching topcoat.
3. Topcoat: Latex, interior.

    a. Flat, eggshell/satin, semi-gloss, or gloss to match existing.

B. Wood Substrates:

1. Prime Coat: Primer, latex, interior wood.
2. Intermediate Coat: Latex, interior, matching topcoat.

3. Topcoat: Latex, interior.

    a. Flat, eggshell/satin, semi-gloss, or gloss to match existing.

END OF SECTION 099123

SECTION 099300 - STAINING AND TRANSPARENT FINISHING

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

A. Drawings and general provisions of the Contract, including General and Special Conditions and Division 01 Specification Sections, apply to this Section.

1.2 SUMMARY

A. Section includes surface preparation and application of wood finishes.

1.3 SUBMITTALS

A. Product Data: For each type of product. Include preparation requirements, application instructions, and MSDS.

B. Samples for Initial Selection: For each type of product indicated.

1.4 QUALITY ASSURANCE

A. Single-source responsibility: Provide primers and finishes produced by same manufacturer.

1.5 DELIVERY, STORAGE, AND HANDLING

A. Store materials not in use in tightly covered containers in well-ventilated areas with ambient temperatures continuously maintained at not less than 45 deg F. Maintain containers in clean condition, free of foreign materials and residue. Remove rags and waste from storage areas daily.

1.6 FIELD CONDITIONS

A. Apply finishes only when temperature of surfaces to be finished and ambient air temperatures are between 50 and 95 deg F.

B. Do not apply finishes when relative humidity exceeds 85 percent; at temperatures less than 5 deg F above the dew point; or to damp or wet surfaces.

C. Do not apply exterior finishes in snow, rain, fog, or mist.

PART 2 - PRODUCTS

2.1 MANUFACTURERS

A. Manufacturers: Subject to compliance with requirements, provide products by one of the following:

1. Behr Process Corporation.
2. Benjamin Moore & Co.
3. ICI Paints.
4. PPG Architectural Finishes, Inc.
5. Sherwin-Williams Company (The).
6. Or Approved Equal.

2.2 WOOD FILLERS

A. Wood Filler Paste: MPI #91.

1. Solvent based, high solids, clear paste filler for new open grained or damaged woods. This filler must fill the pores in hardwoods with minimal surface residues and not show cracking or shrinkage. When dry, the filler must be sand smoothly with no clogging or gumming of the sandpaper.

2.3 SEALERS

A. Alkyd, Sanding Sealer, Clear: MPI #102.

1. Solvent based, quick drying, clear, sandable alkyd sealer used on new interior wood surfaces that are to be top-coated with an alkyd varnish. Also used for spot priming bare spots in previously varnished work that is to receive an alkyd varnish.

2.4 STAINS

A. Stain, Semi-Transparent, for Wood: MPI #90.

1. Solvent based, oil or oil/alkyd, semi transparent, pigmented stain for new hard and softwood trims, doors, paneling, glue laminated beams and dimension lumber, that are to be finished with a clear varnish.

B. Gel Stain, Semi-Transparent, for Fiberglass.

2.5 SOLVENT-BASED VARNISHES

A. Varnish, with UV Inhibitor, Exterior, Gloss: MPI #29.

1. Solvent based, alkyd type, clear varnishes for exterior wood doors, frames and trim. Stabilized against UV deterioration for exterior finishing with a UV inhibitor.

PART 3 - EXECUTION

3.1 EXAMINATION

A. Examine substrates and conditions, with Applicator present, for compliance with requirements for maximum moisture content and other conditions affecting performance of the Work.

B. Verify suitability of substrates, including surface conditions and compatibility with existing finishes.

C. Proceed with finish application only after unsatisfactory conditions have been corrected.

3.2 PREPARATION

A. Comply with manufacturer's written instructions and recommendations in "MPI Architectural Painting Specification Manual" applicable to substrates indicated.

B. Remove hardware, covers, plates, and similar items already in place that are removable. If removal is impractical or impossible because of size or weight of item, provide surface-applied protection before surface preparation and finishing.

1. After completing finishing operations, use workers skilled in the trades involved to reinstall items that were removed. Remove surface-applied protection if any.

C. Clean and prepare surfaces to be finished according to manufacturer's written instructions for each particular substrate condition and as specified.

1. Remove dust, dirt, oil, and grease by washing with a detergent solution; rinse thoroughly with clean water and allow to dry. Remove grade stamps and pencil marks by sanding lightly. Remove loose wood fibers by brushing.
2. Remove mildew by scrubbing with a commercial wash formulated for mildew removal and as recommended by stain manufacturer.

D. Exterior Wood Substrates:

1. Scrape and clean knots, and apply coat of knot sealer before applying primer.
2. Prime edges, ends, faces, undersides, and backsides of wood.
3. Countersink steel nails, if used, and fill with putty or plastic wood filler tinted to final color. Sand smooth when dried.

E. Interior Wood Substrates:

1. Scrape and clean knots, and apply coat of knot sealer before applying primer.

2. Apply wood filler paste to open-grain woods, as defined in "MPI Architectural Painting Specification Manual," to produce smooth, glasslike finish.
3. Sand surfaces that will be exposed to view and dust off.
4. After priming, fill holes and imperfections in the finish surfaces with putty or plastic wood filler. Sand smooth when dried.

3.3 APPLICATION

A. Apply finishes according to manufacturer's written instructions and recommendations in "MPI Architectural Painting Specification Manual."

1. Use applicators and techniques suited for finish and substrate indicated.
2. Finish surfaces behind movable furniture same as similar exposed surfaces.
3. Do not apply finishes over labels of independent testing agencies or equipment name, identification, performance rating, or nomenclature plates.

B. Apply finishes to produce surface films without cloudiness, holidays, lap marks, brush marks, runs, ropiness, or other surface imperfections.

3.4 CLEANING AND PROTECTION

A. At end of each workday, remove rubbish, empty cans, rags, and other discarded materials from Project site.

B. After completing finish application, clean spattered surfaces. Remove spattered materials by washing, scraping, or other methods. Do not scratch or damage adjacent finished surfaces.

C. Protect work of other trades against damage from finish application. Correct damage by cleaning, repairing, replacing, and refinishing, as approved by Engineer, and leave in an undamaged condition.

D. At completion of construction activities of other trades, touch up and restore damaged or defaced finished wood surfaces.

E. Provide “wet stain” signs to protect newly stained finishes.

3.5 FINISH-SYSTEM SCHEDULE

A. Wood Substrates, including Trim, Prime Doors and Windows:

1. Varnish over Semitransparent Stain System:

a. Stain Coat: Stain, solvent based, semi-transparent.
b. First Intermediate Coat: Varnish matching topcoat.
c. Second Intermediate Coat: Varnish matching topcoat.
d. Topcoat: Varnish, with UV Inhibitor, Gloss.

B. Wood Substrates, including Prime Door Thresholds:

1. Alkyd Varnish System:

a. Prime Coat: Alkyd, sanding sealer, clear.
b. Intermediate Coat: Varnish matching topcoat.
a. Topcoat: Varnish, with UV Inhibitor, Gloss.

C. Fiberglass Substrates, including Prime Doors:

1. Varnish over Semitransparent Stain System:

a. Stain Coat: Gel Stain, semi-transparent.
b. First Intermediate Coat: Varnish matching topcoat.
c. Second Intermediate Coat: Varnish matching topcoat.
d. Topcoat: Varnish, with UV Inhibitor, Gloss.

END OF SECTION 099300

SECTION 103200 – FIREPLACE ENCLOSURES

PART 1 GENERAL

1.1 SECTION INCLUDES

A. Installation of fireplace enclosure(s) to provide sound attenuation for existing fireplace opening.

1.2 SUBMITTALS

A. Product Data: Submit manufacturer's technical product data, installation instructions/recommendations. Product data shall demonstrate product compliance with the performance requirements of this specification section.

B. Contractor shall provide Homeowner with color brochure depicting units available during field measurement visit.

C. Contractor shall submit a copy of Homeowner order form and product selection to Engineer.

1.3 QUALITY ASSURANCE

A. Contractor shall coordinate site visits of product representative to measure fireplace openings to provide exact field dimensions from which units are ordered. Contractor and product representative shall provide Engineer with signed Homeowner order form; reflecting Homeowner preference for style, color, and acceptance of unit to be ordered.

B. Coordinate installation of items specified in this section with adjoining units of work, based on fireplace enclosure manufacturer's recommendations.

1.4 DELIVERY, STORAGE AND HANDLING

A. Deliver materials in manufacturer's unopened packages with labels intact. Store materials in accordance with manufacturer's recommendations.

PART 2 PRODUCTS

2.1 FIREPLACE ENCLOSURES

A. Provide enclosure made from a combination of ferrous and/or non-ferrous metals and tempered glass from manufacturer's standard product line.

B. Enclosure to be capable of installation over hearth openings of various fireplace types that may include brick, stone, marble, tile, or other construction.

C. Glass thickness and type: ¼-inch tempered.

2.2 ACCESSORY MATERIALS

A. Furnish and install manufacturer's standard perimeter seals for opening, fasteners and attachment devices.

2.3 MANUFACTURERS

A. Design Specialties, Inc.
B. Diamond W Products.
C. Hearth Craft.
D. Stoll Fireplace, Inc.
E. Thermo-Rite.
C. Or Approved Equal.

PART 3 EXECUTION

3.1 INSPECTION

A. Completed installation shall be appropriate to existing conditions and not exceed existing opening dimensions more than four (4) inches any direction.

B. Examine substrate and conditions where work is to be performed and notify Engineer in writing of unsatisfactory conditions. Do not proceed with work until unsatisfactory conditions have been corrected.

C. Contractor is responsible for costs of cutting, patching, trim, repair to existing materials, and matters required for complete installation.

3.2 PREPARATION

A. Clean substrate of any projections, debris, dirt, or materials detrimental to installation of enclosures.

3.3 INSTALLATION

A. Comply with manufacturer's instructions and recommendations.

B. Anchor units securely to supporting opening, adequate to withstand lateral and thermal stresses.

3.4 ADJUSTING, CLEANING, AND PROTECTION

A. Ensure proper door operation.

B. Clean glass upon completion of installation.

END OF SECTION

SECTION 105500 – RESIDENTIAL MAILBOXES

PART 1 GENERAL

1.1 SECTION INCLUDES

A. Installation of mailboxes as indicated in individual Scopes of Work per residence.

1.2 SUBMITTALS

A. Product Data: Submit manufacturer's specifications and other technical data showing product compliance with the performance requirements of the specification section.

B. Submit manufacturer's installation instructions.

PART 2 PRODUCTS

2.1 MATERIALS & FINISHES

A. Mailboxes: Surface mounted, 20 gauge galvanized steel, electrostatic or baked enamel finish. Color shall be as provided by the manufacturer and selected by Homeowner during Contractor field measurements. Unit shall be horizontal or vertical configuration. Confirm color and configuration selection with Homeowner prior to installation. Unit shall be acceptable for USPS residential door delivery.

2.2 MANUFACTURERS

A. Salsbury Industries.

B. Or Approved Equal.

PART 3 EXECUTION

3.1 SURFACE CONDITIONS

A. Examine the areas and conditions in which mailboxes will be installed to ensure compliance with manufacturer’s installation instructions. Inform Engineer in writing of unsatisfactory conditions. Do not proceed until unsatisfactory conditions are corrected to the satisfaction of Engineer.

3.2 INSTALLATION

A. Coordinate as required to avoid conflicts with other Work.

B. Install mailboxes in accordance with design, pertinent requirements of governmental agencies having jurisdiction, and the manufacturers recommended installation procedures.

C. Install where indicated unless otherwise directed.

END OF SECTION.

230593 - TESTING, ADJUSTING, AND BALANCING FOR HVAC

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

A. Drawings and general provisions of the Contract, including General and Special Conditions and Division 01 Specification Sections, apply to this Section.

1.2 SUMMARY

A. Section Includes:

1. Balancing Air Systems: Constant-volume air systems.

1.3 DEFINITIONS

A. TAB: Testing, adjusting, and balancing.

1.4 SUBMITTALS

A. Sample report forms.

B. Instrument calibration reports, to include the following:

1. Instrument type and make.
2. Serial number.
3. Application.
4. Dates of use.
5. Dates of calibration.

PART 2 - PRODUCTS (Not Applicable)

PART 3 - EXECUTION

3.1 EXAMINATION

A. Examine the Contract Documents to become familiar with Project requirements and to discover conditions in systems' designs that may preclude proper TAB of systems and equipment.

B. Examine systems for installed balancing devices, such as manual volume dampers. Verify that locations of these balancing devices are accessible.

C. Examine the approved submittals for HVAC systems and equipment.

D. Examine design data including HVAC system descriptions, statements of design assumptions for environmental conditions and systems' output, and statements of philosophies and assumptions about HVAC system and equipment controls.

E. Examine ceiling plenums and underfloor air plenums used for supply, return, or relief air to verify that they meet the leakage class of connected ducts are properly separated from adjacent areas. Verify that penetrations in plenum walls are sealed.

F. Examine system and equipment installations and verify that field quality-control testing, cleaning, and adjusting specified in individual Sections have been performed.

G. Examine HVAC equipment and filters and verify that equipment with functioning controls is ready for operation.

H. Report deficiencies discovered before and during performance of TAB procedures. Observe and record system reactions to changes in conditions. Record default set points if different from indicated values.

3.2 GENERAL PROCEDURES FOR BALANCING AIR SYSTEMS

A. Prepare schematic diagrams of systems' "as-built" duct layouts.

B. Determine the best locations in main and branch ducts for accurate duct-airflow measurements.

C. Check dampers for proper position to achieve desired airflow path.

D. Check for airflow blockages.

E. Check condensate drains for proper connections and functioning.

F. Check for proper sealing of air-handling-unit components.

3.3 PROCEDURES FOR CONSTANT-VOLUME AIR SYSTEMS

A. Adjust fans to deliver total indicated airflows within the maximum allowable fan speed listed by fan manufacturer.

1. Measure total airflow.

a. Where sufficient space in ducts is unavailable for Pitot-tube traverse measurements, measure airflow at terminal outlets and inlets and calculate the total airflow.

B. Adjust volume dampers for main duct, submain ducts, and major branch ducts to indicated airflows within specified tolerances.

1. Measure airflow of submain and branch ducts.

a. Where sufficient space in submain and branch ducts is unavailable for Pitot-tube traverse measurements, measure airflow at terminal outlets and inlets and calculate the total airflow for that zone.

2. Remeasure each submain and branch duct after all have been adjusted. Continue to adjust submain and branch ducts to indicated airflows within specified tolerances.

C. Measure air outlets and inlets without making adjustments.

1. Measure terminal outlets using a direct-reading hood or outlet manufacturer's written instructions and calculating factors.

D. Adjust air outlets and inlets for each space to indicated airflows within specified tolerances of indicated values. Make adjustments using branch volume dampers rather than extractors and the dampers at air terminals.

3.4 PROCEDURES FOR CONDENSING UNITS

A. Verify proper rotation of fans.

3.5 FINAL REPORT

A. Final Report Contents: In addition to certified field-report data, include the following:

1. Field test reports prepared by system and equipment installers.

B. General Report Data: In addition to form titles and entries, include the following data:

1. Title page.
2. Name and address of the TAB contractor.
3. Project name.
4. Project location.
5. Contractor's name and address.
6. Report date.

C. System Diagrams: Include schematic layouts of air distribution systems. Present each system with single-line diagram and include the following:

D. Air-Handling-Unit Test Reports: For air-handling units with coils, include the following:

1. Test Data (Indicated and Actual Values):

a. Total air flow rate in cfm.
b. Fan rpm.
c. Supply airflow in cfm.
d. Return airflow in cfm.

E. Electric-Coil Test Reports: For electric furnaces, duct coils, and electric coils installed in central-station air-handling units, include the following:

1. Test Data (Indicated and Actual Values):

a. Heat output in Btu/h.
b. Air flow rate in cfm.
c. Entering-air temperature in deg F.
d. Leaving-air temperature in deg F.

F. Round, Flat-Oval, and Rectangular Duct Traverse Reports: Include a diagram with a grid representing the duct cross-section and record the following:

1. Report Data:

a. Location.
b. Duct size in inches.
c. Duct area in sq. ft.
d. Indicated air flow rate in cfm.
e. Actual air flow rate in cfm.

END OF SECTION 230593

230713 - DUCT INSULATION

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

A. Drawings and general provisions of the Contract, including General and Special Conditions and Division 01 Specification Sections, apply to this Section.

1.2 SUMMARY

A. Section includes insulating the following duct services:

1. Indoor, exposed supply and outdoor air.
2. Indoor, exposed return located in unconditioned space.
3. Outdoor, exposed supply and return.

1.3 SUBMITTALS

A. Product Data: For each type of product indicated. Include thermal conductivity, water-vapor permeance thickness, and jackets (both factory- and field-applied if any).

1.4 QUALITY ASSURANCE

A. Surface-Burning Characteristics: For insulation and related materials, as determined by testing identical products according to ASTM E 84, by a testing agency acceptable to authorities having jurisdiction. Factory label insulation and jacket materials and adhesive, mastic, tapes, and cement material containers, with appropriate markings of applicable testing agency.

1. Insulation Installed Indoors: Flame-spread index of 25 or less, and smoke-developed index of 50 or less.
2. Insulation Installed Outdoors: Flame-spread index of 75 or less, and smoke-developed index of 150 or less.

1.5 DELIVERY, STORAGE, AND HANDLING

A. Packaging: Insulation material containers shall be marked by manufacturer with appropriate ASTM standard designation, type and grade, and maximum use temperature.

1.6 COORDINATION

A. Coordinate clearance requirements with duct Installer for duct insulation application.

PART 2 - PRODUCTS

2.1 INSULATION MATERIALS

A. Products shall not contain asbestos, lead, mercury, or mercury compounds.

B. Products that come in contact with stainless steel shall have a leachable chloride content of less than 50 ppm when tested according to ASTM C 871.

C. Insulation materials for use on austenitic stainless steel shall be qualified as acceptable according to ASTM C 795.

D. Mineral-Fiber Blanket Insulation: Mineral or glass fibers bonded with a thermosetting resin. Comply with ASTM C 553, Type II and ASTM C 1290, Type I.

1. Products: Subject to compliance with requirements, provide one of the following:

a. CertainTeed Corp.; SoftTouch Duct Wrap.
b. Johns Manville; Microlite.
c. Knauf Insulation; Friendly Feel Duct Wrap.
d. Manson Insulation Inc.; Alley Wrap.
e. Owens Corning; SOFTR All-Service Duct Wrap.
f. Or Approved Equal.

2.2 ADHESIVES

A. Materials shall be compatible with insulation materials, jackets, and substrates and for bonding insulation to itself and to surfaces to be insulated unless otherwise indicated.

B. Mineral-Fiber Adhesive: Comply with MIL-A-3316C, Class 2, Grade A.

1. Products: Subject to compliance with requirements, provide one of the following:

a. Childers Brand, Specialty Construction Brands, Inc., a business of H. B. Fuller Company; CP-127.Eagle Bridges - Marathon Industries; 225.
b. Foster Brand, Specialty Construction Brands, Inc., a business of H. B. Fuller Company; 85-60/85-70.Mon-Eco Industries, Inc.; 22-25.
c. Or Approved Equal.

2.3 FACTORY-APPLIED JACKETS

A. FSK Jacket: Aluminum-foil, fiberglass-reinforced scrim with kraft-paper backing; complying with ASTM C 1136, Type II.

2.4 TAPES

A. FSK Tape: Foil-face, vapor-retarder tape matching factory-applied jacket with acrylic adhesive; complying with ASTM C 1136.

1. Products: Subject to compliance with requirements, provide one of the following:

a. ABI, Ideal Tape Division; 491 AWF FSK.
b. Avery Dennison Corporation, Specialty Tapes Division; Fasson 0827.
c. Compac Corporation; 110 and 111.
d. Venture Tape; 1525 CW NT, 1528 CW, and 1528 CW/SQ.
e. Or Approved Equal.

2. Width: 3 inches.
3. Thickness: 6.5 mils.
4. Adhesion: 90 ounces force/inch in width.
5. Elongation: 2 percent.
6. Tensile Strength: 40 lbf/inch in width.
7. FSK Tape Disks and Squares: Precut disks or squares of FSK tape.

PART 3 - EXECUTION

3.1 EXAMINATION

A. Examine substrates and conditions for compliance with requirements for installation tolerances and other conditions affecting performance of insulation application.

1. Verify that systems to be insulated have been tested and are free of defects.
2. Verify that surfaces to be insulated are clean and dry.

B. Proceed with installation only after unsatisfactory conditions have been corrected.

3.2 PREPARATION

A. Surface Preparation: Clean and dry surfaces to receive insulation. Remove materials that will adversely affect insulation application.

3.3 GENERAL INSTALLATION REQUIREMENTS

A. Install insulation materials, accessories, and finishes with smooth, straight, and even surfaces; free of voids throughout the length of ducts and fittings.

B. Install insulation materials, vapor barriers or retarders, jackets, and thicknesses required for each item of duct system as specified in insulation system schedules.

C. Install accessories compatible with insulation materials and suitable for the service. Install accessories that do not corrode, soften, or otherwise attack insulation or jacket in either wet or dry state.

D. Install insulation with longitudinal seams at top and bottom of horizontal runs.

E. Install multiple layers of insulation with longitudinal and end seams staggered.

F. Keep insulation materials dry during application and finishing.

G. Install insulation with tight longitudinal seams and end joints. Bond seams and joints with adhesive recommended by insulation material manufacturer.

H. Install insulation with least number of joints practical.

I. Apply adhesives, mastics, and sealants at manufacturer's recommended coverage rate and wet and dry film thicknesses.

J. Cut insulation in a manner to avoid compressing insulation more than 75 percent of its nominal thickness.

K. Finish installation with systems at operating conditions. Repair joint separations and cracking due to thermal movement.

L. Repair damaged insulation facings by applying same facing material over damaged areas. Extend patches at least 4 inches beyond damaged areas. Adhere, staple, and seal patches similar to butt joints.

3.4 PENETRATIONS

A. Insulation Installation at Interior Wall and Partition Penetrations (That Are Not Fire Rated): Install insulation continuously through walls and partitions.

B. Insulation Installation at Floor Penetrations:

1. Duct: For penetrations through fire-rated assemblies, terminate insulation at fire damper sleeves and externally insulate damper sleeve beyond floor to match adjacent duct insulation. Overlap damper sleeve and duct insulation at least 2 inches.

3.5 INSTALLATION OF MINERAL-FIBER INSULATION

A. Blanket Insulation Installation on Ducts and Plenums: Secure with adhesive and insulation pins.

1. Apply adhesives according to manufacturer's recommended coverage rates per unit area, for 100 percent coverage of duct and plenum surfaces.
2. Apply adhesive to entire circumference of ducts and to all surfaces of fittings and transitions.

3. Install either capacitor-discharge-weld pins and speed washers or cupped-head, capacitor-discharge-weld pins on sides and bottom of horizontal ducts and sides of vertical ducts as follows:

    a. On duct sides with dimensions 18 inches and smaller, place pins along longitudinal centerline of duct. Space 3 inches maximum from insulation end joints, and 16 inches o.c.
    b. On duct sides with dimensions larger than 18 inches, place pins 16 inches o.c. each way, and 3 inches maximum from insulation joints. Install additional pins to hold insulation tightly against surface at cross bracing.
    c. Pins may be omitted from top surface of horizontal, rectangular ducts and plenums.
    d. Do not overcompress insulation during installation.
    e. Impale insulation over pins and attach speed washers.
    f. Cut excess portion of pins extending beyond speed washers or bend parallel with insulation surface. Cover exposed pins and washers with tape matching insulation facing.

4. For ducts and plenums with surface temperatures below ambient, install a continuous unbroken vapor barrier. Create a facing lap for longitudinal seams and end joints with insulation by removing 2 inches from one edge and one end of insulation segment. Secure laps to adjacent insulation section with 1/2-inch outward-clinching staples, 1 inch o.c. Install vapor barrier consisting of factory- or field-applied jacket, adhesive, vapor-barrier mastic, and sealant at joints, seams, and protrusions.

    a. Repair punctures, tears, and penetrations with tape or mastic to maintain vapor-barrier seal.
    b. Install vapor stops for ductwork and plenums operating below 50 deg F at 18-foot intervals. Vapor stops shall consist of vapor-barrier mastic applied in a Z-shaped pattern over insulation face, along butt end of insulation, and over the surface. Cover insulation face and surface to be insulated a width equal to two times the insulation thickness, but not less than 3 inches.

5. Overlap unfaced blankets a minimum of 2 inches on longitudinal seams and end joints. At end joints, secure with steel bands spaced a maximum of 18 inches o.c.
6. Install insulation on rectangular duct elbows and transitions with a full insulation section for each surface. Install insulation on round and flat-oval duct elbows with individually mitered gores cut to fit the elbow.
7. Insulate duct stiffeners, hangers, and flanges that protrude beyond insulation surface with 6-inch-wide strips of same material used to insulate duct. Secure on alternating sides of stiffener, hanger, and flange with pins spaced 6 inches o.c.

3.6 INDOOR DUCT AND PLENUM INSULATION SCHEDULE

A. Concealed and exposed, round and rectangular, supply-air, return-air, and outdoor-air duct and plenum insulation:

    1. Mineral-Fiber Blanket: 1-1/2 inches thick and 1.5-lb/cu. ft. nominal density.

3.7 ABOVEGROUND, OUTDOOR DUCT AND PLENUM INSULATION SCHEDULE

A. Concealed and exposed, round and rectangular, supply-air, return-air, and outdoor-air duct and plenum insulation:

1. Mineral-Fiber Blanket: 2 inches and 1.5-lb/cu. ft. nominal density.

END OF SECTION 230713

230719 - HVAC PIPING INSULATION

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

A. Drawings and general provisions of the Contract, including General and Special Conditions and Division 01 Specification Sections, apply to this Section.

1.2 SUMMARY

A. Section includes insulating the following HVAC piping systems:

1. Condensate drain piping.
2. Refrigerant suction piping.

1.3 SUBMITTALS

A. Product Data: For each type of product indicated. Include thermal conductivity, water-vapor permeance thickness, and jackets (both factory and field applied if any).

1.4 QUALITY ASSURANCE

A. Surface-Burning Characteristics: For insulation and related materials, as determined by testing identical products according to ASTM E 84, by a testing and inspecting agency acceptable to authorities having jurisdiction. Factory label insulation and jacket materials and adhesive, mastic, tapes, and cement material containers, with appropriate markings of applicable testing agency.

1. Insulation Installed Indoors: Flame-spread index of 25 or less, and smoke-developed index of 50 or less.
2. Insulation Installed Outdoors: Flame-spread index of 75 or less, and smoke-developed index of 150 or less.

1.5 DELIVERY, STORAGE, AND HANDLING

A. Packaging: Insulation material containers shall be marked by manufacturer with appropriate ASTM standard designation, type and grade, and maximum use temperature.

1.6 COORDINATION

A. Coordinate clearance requirements with piping Installer for piping insulation application.

PART 2 - PRODUCTS

2.1 INSULATION MATERIALS

A. Products shall not contain asbestos, lead, mercury, or mercury compounds.

B. Products that come in contact with stainless steel shall have a leachable chloride content of less than 50 ppm when tested according to ASTM C 871.

C. Insulation materials for use on austenitic stainless steel shall be qualified as acceptable according to ASTM C 795.

D. Flexible Elastomeric Insulation: Closed-cell, sponge- or expanded-rubber materials. Comply with ASTM C 534, Type I for tubular materials.

1. Products: Subject to compliance with requirements, provide one of the following:

a. Aeroflex USA, Inc.; Aerocel.
b. Armacell LLC; AP Armaflex.
c. K-Flex USA; Insul-Lock, Insul-Tube, and K-FLEX LS.
d. Or Approved Equal.

2.2 ADHESIVES

A. Materials shall be compatible with insulation materials, jackets, and substrates and for bonding insulation to itself and to surfaces to be insulated unless otherwise indicated.

B. Flexible Elastomeric Adhesive: Comply with MIL-A-24179A, Type II, Class I.

1. Products: Subject to compliance with requirements, provide one of the following:

a. Aeroflex USA, Inc.; Aeroseal.
b. Armacell LLC; Armaflex 520 Adhesive.
c. Foster Brand, Specialty Construction Brands, Inc.; 85-75.
d. K-Flex USA; R-373 Contact Adhesive.
e. Or Approved Equal.

2.3 TAPES

A. PVC Tape: White vapor-retarder tape matching field-applied PVC jacket with acrylic adhesive; suitable for indoor and outdoor applications.

1. Products: Subject to compliance with requirements, provide one of the following:

a. ABI, Ideal Tape Division; 370 White PVC tape.
b. Compac Corporation; 130.
c. Venture Tape; 1506 CW NS.

d. Or Approved Equal.

2. Width: 2 inches.
3. Thickness: 6 mils.
4. Adhesion: 64 ounces force/inch in width.
5. Elongation: 500 percent.
6. Tensile Strength: 18 lbf/inch in width.

PART 3 - EXECUTION

3.1 EXAMINATION

A. Examine substrates and conditions for compliance with requirements for installation tolerances and other conditions affecting performance of insulation application.

1. Verify that systems to be insulated have been tested and are free of defects.
2. Verify that surfaces to be insulated are clean and dry.
3. Proceed with installation only after unsatisfactory conditions have been corrected.

3.2 PREPARATION

A. Surface Preparation: Clean and dry surfaces to receive insulation. Remove materials that will adversely affect insulation application.

3.3 GENERAL INSTALLATION REQUIREMENTS

A. Install insulation materials, accessories, and finishes with smooth, straight, and even surfaces; free of voids throughout the length of piping including fittings, valves, and specialties.

B. Install insulation materials, forms, vapor barriers or retarders, jackets, and thicknesses required for each item of pipe system as specified in insulation system schedules.

C. Install accessories compatible with insulation materials and suitable for the service. Install accessories that do not corrode, soften, or otherwise attack insulation or jacket in either wet or dry state.

D. Install insulation with longitudinal seams at top and bottom of horizontal runs.

E. Install multiple layers of insulation with longitudinal and end seams staggered.

F. Do not weld brackets, clips, or other attachment devices to piping, fittings, and specialties.

G. Keep insulation materials dry during application and finishing.

H. Install insulation with tight longitudinal seams and end joints. Bond seams and joints with adhesive recommended by insulation material manufacturer.

I. Install insulation with least number of joints practical.

J. Where vapor barrier is indicated, seal joints, seams, and penetrations in insulation at hangers, supports, anchors, and other projections with vapor-barrier mastic.

1. Install insulation continuously through hangers and around anchor attachments.
2. For insulation application where vapor barriers are indicated, extend insulation on anchor legs from point of attachment to supported item to point of attachment to structure. Taper and seal ends at attachment to structure with vapor-barrier mastic.
3. Install insert materials and install insulation to tightly join the insert. Seal insulation to insulation inserts with adhesive or sealing compound recommended by insulation material manufacturer.
4. Cover inserts with jacket material matching adjacent pipe insulation. Install shields over jacket, arranged to protect jacket from tear or puncture by hanger, support, and shield.

K. Apply adhesives, mastics, and sealants at manufacturer's recommended coverage rate and wet and dry film thicknesses.

L. Cut insulation in a manner to avoid compressing insulation more than 75 percent of its nominal thickness.

M. Finish installation with systems at operating conditions. Repair joint separations and cracking due to thermal movement.

N. Repair damaged insulation facings by applying same facing material over damaged areas. Extend patches at least 4 inches beyond damaged areas. Adhere, staple, and seal patches similar to butt joints.

3.4 PENETRATIONS

A. Insulation Installation at Aboveground Exterior Wall Penetrations: Install insulation continuously through wall penetrations.

1. Seal penetrations with flashing sealant.
2. For applications requiring only indoor insulation, terminate insulation inside wall surface and seal with joint sealant. For applications requiring indoor and outdoor insulation, install insulation for outdoor applications tightly joined to indoor insulation ends. Seal joint with joint sealant.

B. Insulation Installation at Interior Wall and Partition Penetrations (That Are Not Fire Rated): Install insulation continuously through walls and partitions.

C. Insulation Installation at Floor Penetrations:

1. Pipe: Install insulation continuously through floor penetrations.

3.5 INSTALLATION OF FLEXIBLE ELASTOMERIC INSULATION

A. Seal longitudinal seams and end joints with manufacturer's recommended adhesive to eliminate openings in insulation that allow passage of air to surface being insulated.

B. Insulation Installation on Pipe Flanges:

1. Install pipe insulation to outer diameter of pipe flange.
2. Make width of insulation section same as overall width of flange and bolts, plus twice the thickness of pipe insulation.
3. Fill voids between inner circumference of flange insulation and outer circumference of adjacent straight pipe segments with cut sections of sheet insulation of same thickness as pipe insulation.
4. Secure insulation to flanges and seal seams with manufacturer's recommended adhesive to eliminate openings in insulation that allow passage of air to surface being insulated.

C. Insulation Installation on Pipe Fittings and Elbows:

1. Install mitered sections of pipe insulation.
2. Secure insulation materials and seal seams with manufacturer's recommended adhesive to eliminate openings in insulation that allow passage of air to surface being insulated.

D. Insulation Installation on Valves and Pipe Specialties:

1. Install preformed valve covers manufactured of same material as pipe insulation when available.
2. When preformed valve covers are not available, install cut sections of pipe and sheet insulation to valve body. Arrange insulation to permit access to packing and to allow valve operation without disturbing insulation.
3. Install insulation to flanges as specified for flange insulation application.
4. Secure insulation to valves and specialties and seal seams with manufacturer's recommended adhesive to eliminate openings in insulation that allow passage of air to surface being insulated.

3.6 INDOOR PIPING INSULATION SCHEDULE

A. Condensate and Equipment Drain Water below 60 Deg F:

1. All Pipe Sizes: Insulation shall be the following:

a. Flexible Elastomeric: 1 inch thick.

B. Refrigerant Suction Piping:

1. All Pipe Sizes: Insulation shall be the following:

a. Flexible Elastomeric: 1 inch thick.

3.7 OUTDOOR, ABOVEGROUND PIPING INSULATION SCHEDULE

A. Condensate and Equipment Drain Water below 60 Deg F:

1. All Pipe Sizes: Insulation shall be the following:

a. Flexible Elastomeric: 1 inch thick.

B. Refrigerant Suction Piping:

1. All Pipe Sizes: Insulation shall be the following:

a. Flexible Elastomeric: 2 inches thick.

END OF SECTION 230719

232300 - HVAC PIPING

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

A. Drawings and general provisions of the Contract, including General and Special Conditions and Division 01 Specification Sections, apply to this Section.

1.2 SUMMARY

A. This Section includes:

1. Refrigerant piping used for air-conditioning applications.
2. Water piping used for condensate draining.

1.3 PERFORMANCE REQUIREMENTS

A. Line Test Pressure for Refrigerant R-410A:

1. Suction Lines for Air-Conditioning Applications: 300 psig.
2. Suction Lines for Heat-Pump Applications: 535 psig.

1.4 SUBMITTALS

A. Product Data: For each type of piping specialty indicated.

1.5 PRODUCT STORAGE AND HANDLING

A. Store piping in a clean and protected area with end caps in place to ensure that piping interior and exterior are clean when installed.

PART 2 - PRODUCTS

2.1 COPPER TUBE AND FITTINGS

A. Copper Tube:

1. Humidifier (Cold Water): ASTM B 88, Type L.
2. Air Conditioning (Refrigerant): ASTM B 280, Type ACR.

B. Wrought-Copper Fittings: ASME B16.22.

C. Wrought-Copper Unions: ASME B16.22.

D. Solder Filler Metals: ASTM B 32. Use 95-5 tin antimony or alloy HB solder to join copper socket fittings on copper pipe.

2.2 STEEL PIPE AND FITTINGS

A. Steel Pipe: ASTM A 53/A 53M, black steel with plain ends; Type, Grade, and wall thickness as selected in Part 3 piping applications articles.

B. Wrought-Steel Fittings: ASTM A 234/A 234M, for welded joints.

C. Steel Flanges and Flanged Fittings: ASME B16.5, steel, including bolts, nuts, and gaskets, bevel-welded end connection, and raised face.

D. Welding Filler Metals: Comply with AWS D10.12/D10.12M for welding materials appropriate for wall thickness and chemical analysis of steel pipe being welded.

2.3 PLASTIC PIPE AND FITTINGS

A. PVC Plastic Pipe: ASTM D 1785, with wall thickness as indicated in "Piping Applications" Article.

1. PVC Plastic Pipe Fittings: Socket-type pipe fittings, ASTM D 2466 for Schedule 40 pipe; ASTM D 2467 for Schedule 80 pipe.

B. Solvent Cements for Joining Plastic Piping:

1. PVC Piping: ASTM D 2564. Include primer according to ASTM F 656.

a. PVC solvent cement shall have a VOC content of 510 g/L or less.
b. Adhesive primer shall have a VOC content of 550 g/L or less.

2.4 REFRIGERANTS

A. Available Manufacturers: Subject to compliance with requirements, manufacturers offering products that may be incorporated into the Work include, but are not limited to, the following:

B. Manufacturers: Subject to compliance with requirements, provide products by one of the following:

1. Atofina Chemicals, Inc.
2. DuPont Company; Fluorochemicals Div.
3. Honeywell, Inc.; Genetron Refrigerants.
4. INEOS Fluor Americas LLC.
5. Or Approved Equal.

C. ASHRAE 34, R-410A: Pentafluoroethane/Difluoromethane.

PART 3 - EXECUTION

3.1 PIPING INSTALLATION

A. Install refrigerant piping according to ASHRAE 15.

B. Install piping in concealed locations unless otherwise indicated and except in equipment rooms and service areas.

C. 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.

D. Install piping above accessible ceilings to allow sufficient space for ceiling panel removal.

E. Install piping adjacent to machines to allow service and maintenance.

F. Install piping free of sags and bends.

G. Install fittings for changes in direction and branch connections.

H. Select system components with pressure rating equal to or greater than system operating pressure.

I. Install piping as short and direct as possible, with a minimum number of joints, elbows, and fittings.

J. Slope refrigerant piping as follows:

1. Install horizontal suction lines with a uniform slope downward to compressor.
2. Install traps and double risers to entrain oil in vertical runs.
3. Liquid supply lines may be installed level.

K. Before installation of steel refrigerant piping, clean pipe and fittings using the following procedures:

1. Shot blast the interior of piping.
2. Remove coarse particles of dirt and dust by drawing a clean, lintless cloth through tubing by means of a wire or electrician's tape.
3. Draw a clean, lintless cloth saturated with trichloroethylene through the tube or pipe. Continue this procedure until cloth is not discolored by dirt.
4. Draw a clean, lintless cloth, saturated with compressor oil, squeezed dry, through the tube or pipe to remove remaining lint. Inspect tube or pipe visually for remaining dirt and lint.
5. Finally, draw a clean, dry, lintless cloth through the tube or pipe.
6. Safety-relief-valve discharge piping is not required to be cleaned but is required to be open to allow unrestricted flow.

L. Install piping with adequate clearance between pipe and adjacent walls and hangers or between pipes for insulation installation.

M. Condensate line shall be rigid PVC between condensate pump and drain.

N. When unable to route to existing sump, route condensate line from pump to exterior sloped down toward the pump so excess water flows back into the pump.

O. For systems that condensate during cold weather, route standard PVC pipe until the end of the pipe is roughly 12 inches from the exterior wall and install a transition tube to 1-1/4 inch diameter. Continue at 1-1/4 inch diameter at a downward pitch penetrating to the exterior.

P. Seal all exterior penetrations according to Section 079200 “Joint Sealants.”

3.2 PIPE JOINT CONSTRUCTION

A. Ream ends of pipes and tubes and remove burrs. Bevel plain ends of steel pipe.

B. Remove scale, slag, dirt, and debris from inside and outside of pipe and fittings before assembly.

C. Fill pipe and fittings with an inert gas (nitrogen or carbon dioxide), during brazing or welding, to prevent scale formation.

D. Soldered Joints: Construct joints according to ASTM B 828.

E. Threaded Joints: Thread steel 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.

F. Steel pipe can be threaded, but threaded joints must be seal brazed or seal welded.

G. Welded Joints: Construct joints according to AWS D10.12/D10.12M.

H. Condensate-Drain Piping: Schedule 40 PVC plastic pipe and fittings and solvent-welded joints.

I. Plastic Piping Solvent-Cemented 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. PVC Pressure Piping: Join ASTM D 1785 schedule number, 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.

3. PVC Nonpressure Piping: Join according to ASTM D 2855.

3.3 HANGERS AND SUPPORTS

A. Install the following pipe attachments:

1. Adjustable steel clevis hangers for individual horizontal runs less than 20 feet long.
2. Spring hangers to support vertical runs.
3. Copper-clad hangers and supports for hangers and supports in direct contact with copper pipe.

B. Support multifloor vertical runs at least at each floor.

C. Install hangers for steel piping with the following maximum spacing and minimum rod sizes:

1. Maximum span: 7 feet.

D. Install hangers for drawn-temper copper piping with the following maximum spacing and minimum rod sizes:

1. Maximum span: 5 feet; minimum rod size, 1/4 inch.

E. Plastic Piping Hanger Spacing: Space hangers according to pipe manufacturer's written instructions for service conditions. Avoid point loading. Space and install hangers with the fewest practical rigid anchor points.

3.4 SYSTEM CHARGING

A. Charge system using the following procedures:

1. Install core in filter dryers after leak test but before evacuation.
2. Evacuate entire refrigerant system with a vacuum pump to 500 micrometers. If vacuum holds for 12 hours, system is ready for charging.
3. Break vacuum with refrigerant gas, allowing pressure to build up to 2 psig.
4. Charge system with a new filter-dryer core in charging line.

END OF SECTION 232300

233113 - METAL DUCTS

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

A. Drawings and general provisions of the Contract, including General and Special Conditions and Division 01 Specification Sections, apply to this Section.

1.2 SUMMARY

A. Section Includes:

1. Single-wall rectangular and round ducts and fittings.
2. Sheet metal materials.
3. Sealants and gaskets.
4. Hangers and supports.

1.3 SUBMITTALS

A. Product Data: For each type of the following products:

1. Sealants and gaskets.

PART 2 - PRODUCTS

2.1 SINGLE-WALL RECTANGULAR DUCTS AND FITTINGS

A. General Fabrication Requirements: Comply with SMACNA's "HVAC Duct Construction Standards - Metal and Flexible" based on indicated static-pressure class unless otherwise indicated.

B. Transverse Joints: Select joint types and fabricate according to SMACNA's "HVAC Duct Construction Standards - Metal and Flexible," Figure 2-1, "Rectangular Duct/Transverse Joints," for static-pressure class, applicable sealing requirements, materials involved, duct-support intervals, and other provisions in SMACNA's "HVAC Duct Construction Standards - Metal and Flexible."

C. Longitudinal Seams: Select seam types and fabricate according to SMACNA's "HVAC Duct Construction Standards - Metal and Flexible," Figure 2-2, "Rectangular Duct/Longitudinal Seams," for static-pressure class, applicable sealing requirements, materials involved, duct-support intervals, and other provisions in SMACNA's "HVAC Duct Construction Standards - Metal and Flexible."

D. Elbows, Transitions, Offsets, Branch Connections, and Other Duct Construction: Select types and fabricate according to SMACNA's "HVAC Duct Construction Standards - Metal and Flexible," Chapter 4, "Fittings and Other Construction," for static-pressure class, applicable

sealing requirements, materials involved, duct-support intervals, and other provisions in SMACNA's "HVAC Duct Construction Standards - Metal and Flexible."

2.2 SINGLE-WALL ROUND DUCTS AND FITTINGS

A. General Fabrication Requirements: Comply with SMACNA's "HVAC Duct Construction Standards - Metal and Flexible," Chapter 3, "Round, Oval, and Flexible Duct," based on indicated static-pressure class unless otherwise indicated.

1. Manufacturers: Subject to compliance with requirements, provide products by one of the following:

a. Lindab Inc.
b. McGill AirFlow LLC.
c. SEMCO Incorporated.
d. Sheet Metal Connectors, Inc.
e. Spiral Manufacturing Co., Inc.
f. Or Approved Equal.

B. Transverse Joints: Select joint types and fabricate according to SMACNA's "HVAC Duct Construction Standards - Metal and Flexible," Figure 3-1, "Round Duct Transverse Joints," for static-pressure class, applicable sealing requirements, materials involved, duct-support intervals, and other provisions in SMACNA's "HVAC Duct Construction Standards - Metal and Flexible."

C. Longitudinal Seams: Select seam types and fabricate according to SMACNA's "HVAC Duct Construction Standards - Metal and Flexible," Figure 3-2, "Round Duct Longitudinal Seams," for static-pressure class, applicable sealing requirements, materials involved, duct-support intervals, and other provisions in SMACNA's "HVAC Duct Construction Standards - Metal and Flexible."

D. Tees and Laterals: Select types and fabricate according to SMACNA's "HVAC Duct Construction Standards - Metal and Flexible," Figure 3-5, "90 Degree Tees and Laterals," and Figure 3-6, "Conical Tees," for static-pressure class, applicable sealing requirements, materials involved, duct-support intervals, and other provisions in SMACNA's "HVAC Duct Construction Standards - Metal and Flexible."

2.3 SHEET METAL MATERIALS

A. General Material Requirements: Comply with SMACNA's "HVAC Duct Construction Standards - Metal and Flexible" for acceptable materials, material thicknesses, and duct construction methods unless otherwise indicated. Sheet metal materials shall be free of pitting, seam marks, roller marks, stains, discolorations, and other imperfections.

B. Galvanized Sheet Steel: Comply with ASTM A 653/A 653M.

C. Aluminum Sheets: Comply with ASTM B 209 Alloy 3003, H14 temper; with mill finish for concealed ducts, and standard, one-side bright finish for duct surfaces exposed to view.

2.4 SEALANT AND GASKETS

A. General Sealant and Gasket Requirements: Surface-burning characteristics for sealants and gaskets shall be a maximum flame-spread index of 25 and a maximum smoke-developed index of 50 when tested according to UL 723; certified by an NRTL.

B. Two-Part Tape Sealing System:

1. Tape: Woven cotton fiber impregnated with mineral gypsum and modified acrylic/silicone activator to react exothermically with tape to form hard, durable, airtight seal.
2. Tape Width: 3 inches.
3. Sealant: Modified styrene acrylic.
4. Water resistant.
5. Mold and mildew resistant.
6. Maximum Static-Pressure Class: 10-inch wg, positive and negative.
7. Service: Indoor and outdoor.
8. Service Temperature: Minus 40 to plus 200 deg F.
9. Substrate: Compatible with galvanized sheet steel (both PVC coated and bare), stainless steel, or aluminum.
10. For indoor applications, sealant shall have a VOC content of 250 g/L or less when calculated according to 40 CFR 59, Subpart D (EPA Method 24).
11. Sealant shall comply with the testing and product requirements of the California Department of Health Services' "Standard Practice for the Testing of Volatile Organic Emissions from Various Sources Using Small-Scale Environmental Chambers."

C. Water-Based Joint and Seam Sealant:

1. Application Method: Brush on.
2. Solids Content: Minimum 65 percent.
3. Shore A Hardness: Minimum 20.
4. Water resistant.
5. Mold and mildew resistant.
6. VOC: Maximum 75 g/L (less water).
7. Maximum Static-Pressure Class: 10-inch wg, positive and negative.
8. Service: Indoor or outdoor.
9. Substrate: Compatible with galvanized sheet steel (both PVC coated and bare), stainless steel, or aluminum sheets.

D. Flanged Joint Sealant: Comply with ASTM C 920.

1. General: Single-component, acid-curing, silicone, elastomeric.
2. Type: S.
3. Grade: NS.
4. Class: 25.

5. Use: O.
6. For indoor applications, sealant shall have a VOC content of 250 g/L or less when calculated according to 40 CFR 59, Subpart D (EPA Method 24).
7. Sealant shall comply with the testing and product requirements of the California Department of Health Services' "Standard Practice for the Testing of Volatile Organic Emissions from Various Sources Using Small-Scale Environmental Chambers."

E. Flange Gaskets: Butyl rubber, neoprene, or EPDM polymer with polyisobutylene plasticizer.

F. Round Duct Joint O-Ring Seals:

1. Seal shall provide maximum leakage class of 3 cfm/100 sq. ft. at 1-inch wg and shall be rated for 10-inch wg static-pressure class, positive or negative.
2. EPDM O-ring to seal in concave bead in coupling or fitting spigot.
3. Double-lipped, EPDM O-ring seal, mechanically fastened to factory-fabricated couplings and fitting spigots.

2.5 HANGERS AND SUPPORTS

A. Hanger Rods for Noncorrosive Environments: Cadmium-plated steel rods and nuts.

B. Hanger Rods for Corrosive Environments: Electrogalvanized, all-thread rods or galvanized rods with threads painted with zinc-chromate primer after installation.

C. Strap and Rod Sizes: Comply with SMACNA's "HVAC Duct Construction Standards - Metal and Flexible," Table 5-1, "Rectangular Duct Hangers Minimum Size," and Table 5-2, "Minimum Hanger Sizes for Round Duct."

D. Steel Cables for Galvanized-Steel Ducts: Galvanized steel complying with ASTM A 603.

E. Steel Cables for Stainless-Steel Ducts: Stainless steel complying with ASTM A 492.

F. Steel Cable End Connections: Cadmium-plated steel assemblies with brackets, swivel, and bolts designed for duct hanger service; with an automatic-locking and clamping device.

G. Duct Attachments: Sheet metal screws, blind rivets, or self-tapping metal screws; compatible with duct materials.

H. Trapeze and Riser Supports:

1. Supports for Galvanized-Steel Ducts: Galvanized-steel shapes and plates.
2. Supports for Stainless-Steel Ducts: Stainless-steel shapes and plates.
3. Supports for Aluminum Ducts: Aluminum or galvanized steel coated with zinc chromate.

PART 3 - EXECUTION

3.1 DUCT INSTALLATION

A. Drawing plans, schematics, and diagrams indicate general location and arrangement of duct system. Indicated duct locations, configurations, and arrangements were used to size ducts and calculate friction loss for air-handling equipment sizing and for other design considerations. Install duct systems as indicated unless deviations to layout are approved on Shop Drawings and Coordination Drawings.

B. Install ducts according to SMACNA's "HVAC Duct Construction Standards - Metal and Flexible" unless otherwise indicated.

C. Install round ducts in maximum practical lengths.

D. Install ducts with fewest possible joints.

E. Install factory- or shop-fabricated fittings for changes in direction, size, and shape and for branch connections.

F. Unless otherwise indicated, install ducts vertically and horizontally, and parallel and perpendicular to building lines.

G. Install ducts close to walls, overhead construction, columns, and other structural and permanent enclosure elements of building.

H. Install ducts with a clearance of 2 inch, plus allowance for insulation thickness.

I. Route ducts to avoid passing through electrical wiring.

J. Where ducts pass through non-fire-rated interior partitions and exterior walls and are exposed to view, cover the opening between the partition and duct or duct insulation with sheet metal flanges of same metal thickness as the duct. Overlap openings on four sides by at least 1-1/2 inches.

K. Protect duct interiors from moisture, construction debris and dust, and other foreign materials.

3.2 INSTALLATION OF EXPOSED DUCTWORK

A. Protect ducts exposed in finished spaces from being dented, scratched, or damaged.

B. Trim duct sealants flush with metal. Create a smooth and uniform exposed bead. Do not use two-part tape sealing system.

C. Maintain consistency, symmetry, and uniformity in the arrangement and fabrication of fittings, hangers and supports, duct accessories, and air outlets.

D. Repair or replace damaged sections and finished work that does not comply with these requirements.

3.3 DUCT SEALING

A. Seal ducts for duct static-pressure, seal classes, and leakage classes specified in "Duct Schedule" Article according to SMACNA's "HVAC Duct Construction Standards - Metal and Flexible."

3.4 HANGER AND SUPPORT INSTALLATION

A. Comply with SMACNA's "HVAC Duct Construction Standards - Metal and Flexible," Chapter 5, "Hangers and Supports."

B. Hanger Spacing: Comply with SMACNA's "HVAC Duct Construction Standards - Metal and Flexible," Table 5-1, "Rectangular Duct Hangers Minimum Size," and Table 5-2, "Minimum Hanger Sizes for Round Duct," for maximum hanger spacing; install hangers and supports within 24 inches of each elbow and within 48 inches of each branch intersection.

C. Hangers Exposed to View: Threaded rod and angle or channel supports.

D. Support vertical ducts with steel angles or channel secured to the sides of the duct with welds, bolts, sheet metal screws, or blind rivets; support at each floor and at a maximum intervals of 16 feet.

E. Install upper attachments to structures. Select and size upper attachments with pull-out, tension, and shear capacities appropriate for supported loads and building materials where used.

3.5 CONNECTIONS

A. Make connections to equipment with flexible connectors complying with Section 233300 "Air Duct Accessories."

B. Comply with SMACNA's "HVAC Duct Construction Standards - Metal and Flexible" for branch, outlet and inlet, and terminal unit connections.

3.6 DUCT CLEANING

A. Clean existing duct system(s) as scheduled.

B. Use service openings for entry and inspection.

C. Particulate Collection and Odor Control:

1. When venting vacuuming system inside the building, use HEPA filtration with 99.97 percent collection efficiency for 0.3-micron-size (or larger) particles.
2. When venting vacuuming system to outdoors, use filter to collect debris removed from HVAC system, and locate exhaust downwind and away from air intakes and other points of entry into building.

D. Clean the following components by removing surface contaminants and deposits:

1. Air outlets and inlets (registers, grilles, and diffusers).
2. Supply, return, and exhaust fans including fan housings, plenums (except ceiling supply and return plenums), scrolls, blades or vanes, shafts, baffles, dampers, and drive assemblies.
3. Air-handling unit internal surfaces and components including mixing box, coil section, air wash systems, spray eliminators, condensate drain pans, humidifiers and dehumidifiers, filters and filter sections, and condensate collectors and drains.
4. Coils and related components.
5. Return-air ducts, dampers, actuators, and turning vanes except in ceiling plenums and mechanical equipment rooms.
6. Supply-air ducts, dampers, actuators, and turning vanes.
7. Dedicated exhaust and ventilation components and makeup air systems.

E. Mechanical Cleaning Methodology:

1. Clean metal duct systems using mechanical cleaning methods that extract contaminants from within duct systems and remove contaminants from building.
2. Use vacuum-collection devices that are operated continuously during cleaning. Connect vacuum device to downstream end of duct sections so areas being cleaned are under negative pressure.
3. Use mechanical agitation to dislodge debris adhered to interior duct surfaces without damaging integrity of metal ducts, duct liner, or duct accessories.
4. Clean fibrous-glass duct liner with HEPA vacuuming equipment; do not permit duct liner to get wet. Replace fibrous-glass duct liner that is damaged, deteriorated, or delaminated or that has friable material, mold, or fungus growth.
5. Clean coils and coil drain pans according to NADCA 1992. Keep drain pan operational. Rinse coils with clean water to remove latent residues and cleaning materials; comb and straighten fins.
6. Provide drainage and cleanup for wash-down procedures.
7. Antimicrobial Agents and Coatings: Apply EPA-registered antimicrobial agents if fungus is present. Apply antimicrobial agents according to manufacturer's written instructions after removal of surface deposits and debris.

3.7 DUCT SCHEDULE

A. Fabricate ducts with galvanized sheet steel except where aluminum ductwork is existing.

B. Intermediate Reinforcement:

1. Galvanized-Steel Ducts: Galvanized steel.

2. Aluminum Ducts: Aluminum.

C. Elbow Configuration:

1. Rectangular Duct: Comply with SMACNA's "HVAC Duct Construction Standards - Metal and Flexible," Figure 4-2, "Rectangular Elbows."

2. Round Duct: Comply with SMACNA's "HVAC Duct Construction Standards - Metal and Flexible," Figure 3-4, "Round Duct Elbows."

D. Branch Configuration:

1. Rectangular Duct: Comply with SMACNA's "HVAC Duct Construction Standards - Metal and Flexible," Figure 4-6, "Branch Connection."

2. Round and Flat Oval: Comply with SMACNA's "HVAC Duct Construction Standards - Metal and Flexible," Figure 3-5, "90 Degree Tees and Laterals," and Figure 3-6, "Conical Tees." Saddle taps are permitted in existing duct.

END OF SECTION 233113

233300 - AIR DUCT ACCESSORIES

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

A. Drawings and general provisions of the Contract, including General and Special Conditions and Division 01 Specification Sections, apply to this Section.

1.2 SUMMARY

A. Section Includes:

1. Control dampers.
2. Flange connectors.
3. Duct silencers.
4. Flexible connectors.
5. Flexible ducts.

1.3 SUBMITTALS

A. Product Data: For each type of product.

PART 2 - PRODUCTS

2.1 MATERIALS

A. Galvanized Sheet Steel: Comply with ASTM A 653/A 653M.

B. Aluminum Sheets: Comply with ASTM B 209, Alloy 3003, Temper H14; with mill finish for concealed ducts and standard, 1-side bright finish for exposed ducts.

C. Extruded Aluminum: Comply with ASTM B 221, Alloy 6063, Temper T6.

D. Reinforcement Shapes and Plates: Galvanized-steel reinforcement where installed on galvanized sheet metal ducts; compatible materials for aluminum and stainless-steel ducts.

2.2 CONTROL DAMPERS

A. Manufacturers: Subject to compliance with requirements, provide products by one of the following:

1. American Warming and Ventilating; a division of Mestek, Inc.
2. Arrow United Industries; a division of Mestek, Inc.
3. Cesco Products; a division of Mestek, Inc.
4. Greenheck Fan Corporation.

5. Lloyd Industries, Inc.
6. McGill AirFlow LLC.
7. Metal Form Manufacturing, Inc.
8. Nailor Industries Inc.
9. NCA Manufacturing, Inc.
10. Pottorff.
11. Ruskin Company.
12. Vent Products Company, Inc.
13. Young Regulator Company.
14. Or Approved Equal.

B. Low-leakage rating and bearing AMCA's Certified Ratings Seal for both air performance and air leakage.

2.3 FLANGE CONNECTORS

A. Manufacturers: Subject to compliance with requirements, provide products by one of the following:

1. Ductmate Industries, Inc.
2. Nexus PDQ; Division of Shilco Holdings Inc.
3. Ward Industries, Inc.; a division of Hart & Cooley, Inc.
4. Or Approved Equal.

B. Material: Galvanized steel.

C. Gage and Shape: Match connecting ductwork.

2.4 DUCT SILENCERS

A. Manufacturers: Subject to compliance with requirements, provide products by one of the following:

1. Dynasonics.
2. Industrial Noise Control, Inc.
3. McGill AirFlow LLC.
4. Ruskin Company.
5. Vibro-Acoustics.
6. Or Approved Equal.

B. Connection Sizes: Match connecting ductwork unless otherwise indicated.

C. Fabricate silencers to form rigid units that will not pulsate, vibrate, rattle, or otherwise react to system pressure variations. Do not use mechanical fasteners for unit assemblies.

2.5 FLEXIBLE CONNECTORS

A. Manufacturers: Subject to compliance with requirements, provide products by one of the following:

1. Ductmate Industries, Inc.
2. Duro Dyne Inc.
3. Elgen Manufacturing.
4. Ventfabrics, Inc.
5. Ward Industries, Inc.; a division of Hart & Cooley, Inc.
6. Or Approved Equal.

B. Materials: Flame-retardant or noncombustible fabrics.

C. Coatings and Adhesives: Comply with UL 181, Class 1.

D. Metal-Edged Connectors: Factory fabricated with a fabric strip 3-1/2 inches wide attached to two strips of 2-3/4-inch-wide, 0.028-inch-thick, galvanized sheet steel or 0.032-inch-thick aluminum sheets. Provide metal compatible with connected ducts.

E. Indoor System, Flexible Connector Fabric: Glass fabric double coated with neoprene.

1. Minimum Weight: 26 oz./sq. yd.
2. Tensile Strength: 480 lbf/inch in the warp and 360 lbf/inch in the filling.
3. Service Temperature: Minus 40 to plus 200 deg F.

2.6 FLEXIBLE DUCTS

A. Manufacturers: Subject to compliance with requirements, provide products by one of the following:

1. Flexmaster U.S.A., Inc.
2. McGill AirFlow LLC.
3. Ward Industries, Inc.; a division of Hart & Cooley, Inc.
4. Or Approved Equal.

B. Insulated, Flexible Duct: UL 181, Class 1, multiple layers of aluminum laminate supported by helically wound, spring-steel wire; fibrous-glass insulation; polyethylene vapor-barrier film.

1. Pressure Rating: 10-inch wg positive and 1.0-inch wg negative.
2. Maximum Air Velocity: 4000 fpm.
3. Temperature Range: Minus 20 to plus 210 deg F.
4. Insulation R-value: R-8.0.

PART 3 - EXECUTION

3.1 INSTALLATION

A. Install duct accessories of materials suited to duct materials; use galvanized-steel accessories in galvanized-steel and fibrous-glass ducts, and aluminum accessories in aluminum ducts.

B. Set dampers to fully open position before testing, adjusting, and balancing.

C. Connect ducts to duct silencers rigidly. Silencers shall be installed in all supply branch runs that are less than 6-feet in length.

D. Install flexible connectors to connect ducts to equipment.

E. Connect flexible ducts to metal ducts with adhesive plus sheet metal screws. Maximum flexible duct length per supply branch run shall be 8-feet.

F. Install duct test holes where required for testing and balancing purposes.

END OF SECTION 233300

233423 - HVAC POWER VENTILATORS

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

A. Drawings and general provisions of the Contract, including General and Special Conditions and Division 01 Specification Sections, apply to this Section.

1.2 SUMMARY

A. Section Includes:

1. Centrifugal wall ventilators.
2. Ceiling-mounted ventilators.

1.3 SUBMITTALS

A. Product Data: For each type of product indicated. Include rated capacities, operating characteristics, and furnished specialties and accessories. Also include the following:

1. Certified fan performance curves with system operating conditions indicated.
2. Certified fan sound-power ratings.
3. Motor ratings and electrical characteristics, plus motor and electrical accessories.
4. Fan controllers.

1.4 QUALITY ASSURANCE

A. Electrical Components, Devices, and Accessories: Listed and labeled as defined in NFPA 70, by a qualified testing agency, and marked for intended location and application.

B. AMCA Compliance: Fans shall have AMCA-Certified performance ratings and shall bear the AMCA-Certified Ratings Seal.

C. UL Standards: Power ventilators shall comply with UL 705. Power ventilators for use for restaurant kitchen exhaust shall also comply with UL 762.

1.5 COORDINATION

A. Coordinate sizes and locations of equipment supports and roof penetrations with actual equipment provided.

PART 2 - PRODUCTS

2.1 THROUGH-WALL VENTILATORS

A. Manufacturers: Subject to compliance with requirements, provide products by one of the following:

1. Broan-NuTone LLC.
2. Fantech.
3. Hunter Fans.
4. Panasonic.
5. Or Approved Equal.

B. Grille: Plastic, louvered grille.

C. Accessories:

1. Controller: Fan operates when control is turned on.
2. Bird Screens: Removable, 1/2-inch mesh, aluminum or brass wire.
3. Wall Grille: Flush mounting.
4. Dampers: Counterbalanced, parallel-blade, backdraft dampers mounted in wall sleeve; factory set to close when fan stops.

D. Capacities and Characteristics:

1. Minimum Airflow: 100 cfm.
2. Fan Diameter: 6 inches.
3. Drive Arrangement: Direct.
4. Maximum Sound: 2 sone.
5. Damper: Yes.

2.2 CEILING-MOUNTED VENTILATORS

A. Manufacturers: Subject to compliance with requirements, provide products by one of the following:

1. Broan-NuTone LLC.
2. Fantech.
3. Hunter Fans.
4. Panasonic.
5. Or Approved Equal.

B. Type: Fan, Fan with Light, and Fan with Light and Heat, as scheduled.

C. Grille: Plastic, louvered grille.

D. Accessories:

1. Fan and Light Control: Fan and light operate together when control is turned on. Fan operates for a set period (5 – 60 minutes) after light is turned off.
2. Heat Control: Crank timer, operates continuously for set period up to 60 minutes.
3. Dampers: Counterbalanced, parallel-blade, backdraft dampers mounted in wall sleeve; factory set to close when fan stops.
4. Discharge: 4-inch-diameter duct terminated at exterior with rain cap.
5. Heat Bulb: 250 watt BR40 size infrared bulb.

E. Capacities and Characteristics:

1. Minimum Airflow: 65 cfm.
2. Drive Arrangement: Direct.
3. Maximum Sound: 2 sone.
4. Damper: Yes.

PART 3 - EXECUTION

3.1 INSTALLATION

A. Install power ventilators level and plumb.

B. Ceiling Units: Suspend units from structure; use steel wire or metal straps.

C. Install units with clearances for service and maintenance.

3.2 CONNECTIONS

A. Make final duct connections with flexible connectors.

B. Install ducts adjacent to power ventilators to allow service and maintenance.

3.3 FIELD QUALITY CONTROL

A. Tests and Inspections:

1. Verify that shipping, blocking, and bracing are removed.
2. Verify that unit is secure on mountings and supporting devices and that connections to ducts and electrical components are complete.
3. Verify that cleaning and adjusting are complete.
4. Remove and replace malfunctioning units and retest as specified above.

B. Test and adjust controls. Replace damaged and malfunctioning controls and equipment.

END OF SECTION 233423

233713 - DIFFUSERS, REGISTERS, AND GRILLES

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

A. Drawings and general provisions of the Contract, including General and Special Conditions and Division 01 Specification Sections, apply to this Section.

1.2 SUMMARY

A. Section Includes: Fixed face registers and grilles.

1.3 SUBMITTALS

A. Product Data: For each type of product indicated, include the following:

1. Data Sheet: Indicate materials of construction, finish, and mounting details; and performance data including throw and drop, static-pressure drop, and noise ratings.

PART 2 - PRODUCTS

2.1 REGISTERS AND GRILLES

A. Two-Way Fixed Face Outlet Register:

1. Manufacturers: Subject to compliance with requirements, provide products by one of the following:

    a. A-J Manufacturing Co., Inc.
    b. Anemostat Products; a Mestek company.
    c. Carnes.
    d. Dayus Register & Grille Inc.
    e. Hart & Cooley Inc.
    f. Krueger.
    g. Nailor Industries Inc.
    h. Price Industries.
    i. Titus.
    j. Tuttle & Bailey.
    k. Or Approved Equal.

2. Material: Aluminum.
3. Finish (Wall & Ceiling): Baked enamel, white.
4. Finish (Floor): Baked enamel, match flooring as close as possible.
5. Core Construction: Removable.
6. Frame: 1 inch wide.
7. Mounting (Wall & Ceiling): Countersunk screw.

8. Mounting (Floor): Drop-in.
9. Damper Type: Adjustable opposed blade.

B. Fixed Face Inlet Grille:

1. Manufacturers: Subject to compliance with requirements, provide products by one of the following:

a. A-J Manufacturing Co., Inc.
b. Anemostat Products; a Mestek company.
c. Carnes.
d. Dayus Register & Grille Inc.
e. Hart & Cooley Inc.
f. Krueger.
g. Nailor Industries Inc.
h. Price Industries.
i. Titus.
j. Tuttle & Bailey.
k. Or Approved Equal.

2. Material: Aluminum.
3. Finish: Baked enamel, white.
4. Core Construction: Removable.
5. Frame: 1 inch wide.
6. Mounting Frame: Filter.
7. Mounting: Countersunk screw.
8. Accessory: 2 extra filters.

PART 3 - EXECUTION

3.1 EXAMINATION

A. Examine areas where registers and grilles are to be installed for compliance with requirements for installation tolerances and other conditions affecting performance of equipment.

B. Proceed with installation only after unsatisfactory conditions have been corrected.

3.2 INSTALLATION

A. Install registers and grilles level and plumb.

B. Ceiling, Wall, and Floor-Mounted Outlets and Inlets:

1. Drawings indicate general arrangement of ducts, fittings, and accessories. Air outlet and inlet locations have been indicated to achieve design requirements for air volume, noise criteria, airflow pattern, throw, and pressure drop. Make final locations where

indicated, as much as practical. For units installed in lay-in ceiling panels, locate units in the center of panel. Where architectural features or other items conflict with installation, notify Engineer for a determination of final location.

C. Install registers and grilles with airtight connections to ducts and to allow service and maintenance.

3.3 ADJUSTING

A. After installation, adjust registers and grilles before starting air balancing.

END OF SECTION 233713

235100 - BREECHINGS, CHIMNEYS, AND STACKS

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

A. Drawings and general provisions of the Contract, including General and Special Conditions and Division 01 Specification Sections, apply to this Section.

1.2 SUMMARY

A. This Section includes the following:

1. Listed chimney liners.
2. Listed double-wall vents.
3. Listed sidewall power vents.

1.3 ACTION SUBMITTALS

A. Product Data: For the following:

1. Chimney liners.
2. Type B vents.
3. Sidewall power vents.

PART 2 - PRODUCTS

2.1 LISTED CHIMNEY LINERS

A. Manufacturers: Subject to compliance with requirements, provide products by one of the following:

1. American Metal Products; MASCO Corporation.
2. Deflect-O Corp.
3. Heat-Fab, Inc.
4. Industrial Chimney Company.
5. Metal-Fab, Inc.
6. Selkirk Inc.; Selkirk Metalbestos and Air Mate.
7. Shook Manufactured Products, Inc.
8. Simpson Dura-Vent Co., Inc.; Subsidiary of Simpson Manufacturing Co.
9. Tru-Flex Metal Hose Corp.
10. Or Approved Equal.

B. Description: Corrugated, single-wall chimney liner tested according to UL 1777 and rated for 1000 deg F continuously, or 2100 deg F for 10 minutes; with negative or positive flue pressure complying with NFPA 211.

C. Corrugated Liner Materials: Stainless steel.

D. Accessories:

1. Fittings: Tees, elbows, increasers, draft-hood connectors, metal caps with bird barriers, adjustable roof flashings, storm collars, support assemblies, thimbles, firestop spacers, and fasteners; fabricated from similar or compatible materials and designs.
2. Sealant: Manufacturer's standard high-temperature sealant.
3. Insulating Fill: Manufacturer's standard high-temperature insulation fill material in annular space surrounding chimney liner including high-temperature, ceramic-fiber insulation required to seal chimney at top and bottom.

2.2 LISTED TYPE B VENTS

A. Manufacturers: Subject to compliance with requirements, provide products by one of the following:

1. American Metal Products; MASCO Corporation.
2. Cleaver-Brooks; Div. of Aqua-Chem Inc.
3. FAMCO.
4. Hart & Cooley, Inc.
5. Heat-Fab, Inc.
6. Industrial Chimney Company.
7. LSP Products Group, Inc.
8. Metal-Fab, Inc.
9. Schebler Co. (The).
10. Selkirk Inc.; Selkirk Metalbestos and Air Mate.
11. Simpson Dura-Vent Co., Inc.; Subsidiary of Simpson Manufacturing Co.
12. Tru-Flex Metal Hose Corp.
13. Van-Packer Company, Inc.
14. Or Approved Equal.

B. Description: Double-wall metal vents tested according to UL 441 and rated for 480 deg F continuously for Type B, with neutral or negative flue pressure complying with NFPA 211.

C. Construction: Inner shell and outer jacket separated by at least a 1/4-inch airspace.

D. Inner Shell: Aluminum.

E. Outer Jacket: Galvanized steel.

F. Accessories: Tees, elbows, increasers, draft-hood connectors, terminations, adjustable roof flashings, storm collars, support assemblies, thimbles, firestop spacers, and fasteners; fabricated from similar materials and designs as vent-pipe straight sections; all listed for same assembly.

1. Termination: Round chimney top designed to exclude minimum 98 percent of rainfall.

2.3 SIDEWALL POWER VENTS

A. Manufacturers: Subject to compliance with requirements, provide products by one of the following:

1. Bosch.
2. D&D Chemical, Inc.
3. Field Controls.
4. Tjernlund.
5. Or Approved Equal.

B. Description: Provide complete sidewall venting kit as scheduled, including B vent, vent hood, power vent, control relay, and wiring.

PART 3 - EXECUTION

3.1 EXAMINATION

A. Examine areas and conditions for compliance with requirements for installation tolerances and other conditions affecting performance of work. Proceed with installation only after unsatisfactory conditions have been corrected.

3.2 APPLICATION

A. Listed Chimney Liners: High-efficiency boiler or furnace vents in masonry chimney.

B. Listed Type B Vents and Sidewall Power Vents: Vents for certified gas appliances.

3.3 INSTALLATION OF LISTED VENTS AND CHIMNEYS

A. Locate to comply with minimum clearances from combustibles and minimum termination heights according to product listing or NFPA 211, whichever is most stringent.

B. Seal between sections of positive-pressure vents according to manufacturer's written installation instructions, using sealants recommended by manufacturer.

C. Support vents at intervals recommended by manufacturer to support weight of vents and all accessories, without exceeding appliance loading.

D. Slope breechings down in direction of appliance, with condensate drain connection at lowest point piped to nearest drain.

E. Lap joints in direction of flow.

F. Connect base section to foundation using anchor lugs of size and number recommended by manufacturer.

G. Join sections with acid-resistant joint cement to provide continuous joint and smooth interior finish.

H. Erect stacks plumb to finished tolerance of no more than 1 inch out of plumb from top to bottom.

3.4 CLEANING

A. After completing system installation, including outlet fittings and devices, inspect exposed finish. Remove burrs, dirt, and construction debris and repair damaged finishes.

B. Clean breechings internally, during and after installation, to remove dust and debris. Clean external surfaces.

C. Provide temporary closures at ends of breechings, chimneys, and stacks that are not completed or connected to equipment.

END OF SECTION 235100

235400 – FURNACES

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

A. Drawings and general provisions of the Contract, including General and Special Conditions and Division 01 Specification Sections, apply to this Section.

1.2 SUMMARY

A. This Section includes the following:

1. Gas-fired, Oil-fired, and Electric furnaces and accessories complete with controls.
2. Packaged heating and cooling units.
3. Air filters.
4. Air cleaners.
5. Humidifiers.
6. Refrigeration components.
7. Condensate pumps.

1.3 SUBMITTALS

A. Product Data: Include rated capacities, operating characteristics, furnished specialties, and accessories for each of the following:

1. Furnace.
2. Packaged unit.
3. Thermostat.
4. Humidistat.
5. Air filter.
6. Air cleaner.
7. Humidifier.
8. Refrigeration components.
9. Condensate pumps.

B. Warranty: Special warranty specified in this Section.

1.4 CLOSEOUT SUBMITTALS

A. Operation and Maintenance Data: For each furnace to include in emergency, operation, and maintenance manuals for each of the following:

1. Furnace and accessories complete with controls.
2. Packaged unit.
3. Air filter.
4. Air cleaner.

5. Humidifier.
6. Refrigeration components.

1.5 MAINTENANCE MATERIAL SUBMITTALS

A. Furnish extra materials described below that match products installed and that are packaged with protective covering for storage and identified with labels describing contents.

1. Washable Air Filters: Furnish two complete sets.

1.6 QUALITY ASSURANCE

A. Electrical Components, Devices, and Accessories: Listed and labeled as defined in NFPA 70, Article 100, by a testing agency acceptable to authorities having jurisdiction, and marked for intended use.

B. ASHRAE Compliance: Applicable requirements in ASHRAE 62.1, Section 5 - "Systems and Equipment" and Section 7 - "Construction and Startup."

C. ASHRAE/IESNA 90.1 Compliance: Applicable requirements in ASHRAE/IESNA 90.1, Section 6 - "Heating, Ventilating, and Air-Conditioning."

D. Comply with NFPA 70.

1.7 COORDINATION

A. Coordinate size and location of concrete bases. Cast anchor-bolt inserts into bases. Concrete, reinforcement, and formwork requirements are specified with concrete.

B. Coordinate installation of roof curbs, equipment supports, and roof penetrations. These items are specified in Section 077200 "Roof Accessories."

1.8 WARRANTY

A. Special Warranty: Manufacturer's standard form in which manufacturer agrees to repair or replace the following components of furnaces that fail in materials or workmanship within specified warranty period:

1. Warranty Period, Commencing on Date of Substantial Completion:

a. Furnace Heat Exchanger: 20 years.
b. Integrated Ignition and Blower Control Circuit Board: Five years.
c. Draft-Inducer Motor: Five years.
d. Packaged Unit Compressor and Heat Exchanger: Five years.
e. High-Efficiency Oil Furnace Burner: Three years.
f. Refrigeration Compressors: 10 years.

g. Evaporator and Condenser Coils: Five years.

PART 2 - PRODUCTS

2.1 GAS-FIRED FURNACES, NONCONDENSING

A. Manufacturers: Subject to compliance with requirements, provide products by one of the following:

1. American Standard Companies, Inc.
2. Armstrong Air Conditioning Inc.
3. Bryant Heating & Cooling Systems; Div. of United Technologies Corp.
4. Carrier Corporation; Div. of United Technologies Corp.
5. Comfortmaker Air Conditioning & Heating; a division of International Comfort Products, LLC.
6. Lennox Industries Inc.
7. Rheem Manufacturing Company; Air Conditioning Division.
8. Ruud Air Conditioning Division.
9. Trane.
10. York International Corp.; a division of Unitary Products Group.
11. Or Approved Equal.

B. General Requirements for Gas-Fired, Noncondensing Furnaces: Factory assembled, piped, wired, and tested; complying with ANSI Z21.47/CSA 2.3, "Gas-Fired Central Furnaces," and with NFPA 54.

C. Cabinet: Galvanized steel.

1. Cabinet interior around heat exchanger shall be factory-installed insulation.
2. Lift-out panels shall expose burners and all other items requiring access for maintenance.
3. Factory paint external cabinets in manufacturer's standard color.
4. Airstream Surfaces: Surfaces in contact with the airstream shall comply with requirements in ASHRAE 62.1.

D. Fan: Centrifugal, factory balanced, resilient mounted, direct drive.

E. Heat Exchanger: Aluminized or Stainless steel.

F. Burner:

1. Gas Valve: 100 percent safety two-stage main gas valve, main shutoff valve, pressure regulator, safety pilot with electronic flame sensor, limit control, transformer, and combination ignition/fan timer control board.
2. Ignition: Electric pilot ignition, with hot-surface igniter or electric spark ignition.

G. Gas-Burner Safety Controls:

1. Electronic Flame Sensor: Prevents gas valve from opening until pilot flame is proven; stops gas flow on ignition failure.
2. Flame Rollout Switch: Installed on burner box; prevents burner operation.
3. Limit Control: Fixed stop at maximum permissible setting; de-energizes burner on excessive bonnet temperature; automatic reset.

H. Combustion-Air Inducer: Centrifugal fan with thermally protected motor and sleeve bearings prepurges heat exchanger and vents combustion products; pressure switch prevents furnace operation if combustion-air inlet or flue outlet is blocked.

I. Furnace Controls: Solid-state board integrates ignition, heat, cooling, and fan speeds; and adjustable fan-on and fan-off timing; terminals for connection to accessories.

J. Vent Materials: Comply with requirements in Section 235100 "Breechings, Chimneys, and Stacks" for Type B metal vents.

K. Capacities and Characteristics:

1. Airflow Configuration: Upflow, Downflow, or Horizontal, as scheduled.
2. Gas: Natural.
3. Minimum Efficiency AFUE: 80 percent.
4. Burner: Two-stage.
5. Draft-Inducer Motor: Variable-speed.

2.2 GAS-FIRED FURNACES, CONDENSING

A. Manufacturers: Subject to compliance with requirements, provide products by one of the following:

1. American Standard Companies, Inc.
2. Armstrong Air Conditioning Inc.
3. Bryant Heating & Cooling Systems; Div. of United Technologies Corp.
4. Carrier Corporation; Div. of United Technologies Corp.
5. Comfortmaker Air Conditioning & Heating; a division of International Comfort Products, LLC.
6. Lennox Industries Inc.
7. Rheem Manufacturing Company; Air Conditioning Division.
8. Ruud Air Conditioning Division.
9. Trane.
10. York International Corp.; a division of Unitary Products Group.
11. Or Approved Equal.

B. General Requirements for Gas-Fired, Condensing Furnaces: Factory assembled, piped, wired, and tested; complying with ANSI Z21.47/CSA 2.3, "Gas-Fired Central Furnaces," and with NFPA 54.

C. Cabinet: Galvanized steel.

1. Cabinet interior around heat exchanger shall be factory-installed insulation.
2. Lift-out panels shall expose burners and all other items requiring access for maintenance.
3. Factory paint external cabinets in manufacturer's standard color.
4. Airstream Surfaces: Surfaces in contact with the airstream shall comply with requirements in ASHRAE 62.1.

D. Fan: Centrifugal, factory balanced, resilient mounted, direct drive.

E. Heat Exchanger:

1. Primary: Aluminized or Stainless steel.
2. Secondary: Polyethylene-coated or Stainless steel.

F. Burner:

1. Gas Valve: 100 percent safety two-stage main gas valve, main shutoff valve, pressure regulator, safety pilot with electronic flame sensor, limit control, transformer, and combination ignition/fan timer control board.
2. Ignition: Electric pilot ignition, with hot-surface igniter or electric spark ignition.

G. Gas-Burner Safety Controls:

1. Electronic Flame Sensor: Prevents gas valve from opening until pilot flame is proven; stops gas flow on ignition failure.
2. Flame Rollout Switch: Installed on burner box; prevents burner operation.
3. Limit Control: Fixed stop at maximum permissible setting; de-energizes burner on excessive bonnet temperature; automatic reset.

H. Combustion-Air Inducer: Centrifugal fan with thermally protected motor and sleeve bearings prepurges heat exchanger and vents combustion products; pressure switch prevents furnace operation if combustion-air inlet or flue outlet is blocked.

I. Furnace Controls: Solid-state board integrates ignition, heat, cooling, and fan speeds; adjustable fan-on and fan-off timing; terminals for connection to accessories.

J. Accessories:

1. Combination Combustion-Air Intake and Vent: PVC plastic fitting to combine combustion-air inlet and vent through outside wall or roof.

2. PVC Plastic Vent Materials:

   a. PVC Plastic Pipe: Schedule 40, complying with ASTM D 1785.
   b. PVC Plastic Fittings: Schedule 40, complying with ASTM D 2466, socket type.
   c. PVC Solvent Cement: ASTM D 2564.

K. Capacities and Characteristics:

1. Airflow Configuration: Upflow, Downflow, or Horizontal, as scheduled.
2. Gas: Natural.
3. Minimum Efficiency AFUE: 92% percent.
4. Burner: Two-stage.
5. Draft-Inducer Motor: Variable-speed.

2.3 OIL-FIRED FURNACES

A. Manufacturers: Subject to compliance with requirements, provide products by one of the following:

1. American Standard Companies, Inc.
2. Armstrong Air Conditioning Inc.
3. Carrier Corporation; Div. of United Technologies Corp.
4. Comfortmaker Air Conditioning & Heating; a division of International Comfort Products, LLC.
5. Lennox Industries Inc.
6. Rheem Manufacturing Company; Air Conditioning Division.
7. Ruud Air Conditioning Division.
8. York International Corp.; a division of Unitary Products Group.
9. Or Approved Equal.

B. General Requirements for Oil-Fired Furnaces: Factory assembled, piped, wired, and tested; complying with UL 727 and with NFPA 31.

C. Cabinet: Galvanized steel.

1. Cabinet interior around heat exchanger shall be factory-installed insulation.
2. Lift-out panels shall expose burners and all other items requiring access for maintenance.
3. Factory paint external cabinets in manufacturer's standard color.
4. Airstream Surfaces: Surfaces in contact with the airstream shall comply with requirements in ASHRAE 62.1.

D. Fan: Centrifugal, factory balanced, resilient mounted, direct drive.

E. Heat Exchanger: Welded steel with ceramic-fiber liner or refractory insert at the burner in the combustion chamber. Minimum 2-inch-diameter access ports in heat exchanger to permit access for cleaning.

F. Burner: High-pressure atomizing type, with rubber-mounted, adjustable, combustion-air blower; integrated fuel pump; hinged, flame-inspection port; cadmium-sulfide flame sensor; electrodes; ignition transformer; and oil nozzle.

1. Time-Delay Relay: Limits time for establishing main flame.
2. Flame Sensor: Monitors flame and stops burner on flame failure.
3. Limit Control: Fixed stop at maximum permissible setting; de-energizes burner on excessive bonnet temperature; automatic reset.

G. Barometric Draft Regulator: Match furnace; for mounting in flue.

H. Furnace Controls: Solid-state board integrates ignition, heat, cooling, and fan speeds; and adjustable fan-on and fan-off timing; terminals for connection to accessories.

I. Vent Materials: Comply with requirements in Section 235100 "Breechings, Chimneys, and Stacks" for Type B metal vents.

J. Capacities and Characteristics:

1. Airflow Configuration: Upflow, Downflow, or Horizontal, as scheduled.
2. Minimum Efficiency AFUE: 80 percent.

2.4 ELECTRIC FURNACES

A. Manufacturers: Subject to compliance with requirements, provide products by one of the following:

1. Armstrong Air Conditioning Inc.
2. Bryant Heating & Cooling Systems; Div. of United Technologies Corp.
3. Carrier Corporation; Div. of United Technologies Corp.
4. Comfortmaker Air Conditioning & Heating; a division of International Comfort Products, LLC.
5. Lennox Industries Inc.
6. Rheem Manufacturing Company; Air Conditioning Division.
7. Ruud Air Conditioning Division.
8. York International Corp.; a division of Unitary Products Group.
9. Or Approved Equal.

B. General Requirements for Electric Furnaces: Factory assembled, piped, wired, and tested.

C. Cabinet: Steel, with duct liner.

1. Duct Liner: Fiberglass, minimum 3/4 inch thick, complying with ASTM C 1071 and having a coated surface exposed to airstream complying with NFPA 90A or NFPA 90B and with NAIMA's "Fibrous Glass Duct Liner Standard."

a. Airstream Surfaces: Surfaces in contact with the airstream shall comply with requirements in ASHRAE 62.1.

2. Factory paint external cabinets in manufacturer's standard color.

D. Fan: Centrifugal, factory balanced, resilient mounted, direct drive.

E. Electric-Resistant Heating Elements: Helix-wound, nickel-chromium wire-heating elements in ceramic insulators mounted on steel supports.

F. Heating-Element Control: Sequencer relay with relay for each element; switches elements on and off, with delay between each increment; initiates, stops, or changes fan speed.

G. Summer Fan Switch: Connected to permit independent on-off switch of unit fan.

H. Capacities and Characteristics:

1. Airflow Configuration: Upflow, Downflow, or Horizontal, as scheduled.

2.5 PACKAGED HEATING AND COOLING UNITS

A. Manufacturers: Subject to compliance with requirements, provide products by one of the following:

1. Carrier Corporation; Div. of United Technologies Corp.
2. Trane.
3. York International Corp.; a division of Unitary Products Group.
4. Or Approved Equal.

B. General Requirements: Provide packaged, single zone, constant volume units with natural gas fired heating and electric cooling. Units shall be self-contained, packaged, factory assembled and prewired, consisting of a cabinet and frame, supply fan, heat exchanger and burner, controls, air filters, refrigerant cooling coil and compressor, condenser coil and condenser fan. Units shall be configured for horizontal air discharge and return.

C. Cabinet: Galvanized steel.

1. Cabinet interior around heat exchanger shall be factory-installed insulation.
2. Lift-out panels shall expose burners and all other items requiring access for maintenance.
3. Factory paint external cabinets in manufacturer's standard color.
4. Airstream Surfaces: Surfaces in contact with the airstream shall comply with requirements in ASHRAE 62.1.

D. Fan: Centrifugal, factory balanced, resilient mounted, direct drive.

E. Heat Exchanger: Aluminized or Stainless steel.

F. Burner:

1. Gas Valve: 100 percent safety two-stage main gas valve, main shutoff valve, pressure regulator, safety pilot with electronic flame sensor, limit control, transformer, and combination ignition/fan timer control board.
2. Ignition: Electric pilot ignition, with hot-surface igniter or electric spark ignition.

G. Gas-Burner Safety Controls:

1. Electronic Flame Sensor: Prevents gas valve from opening until pilot flame is proven; stops gas flow on ignition failure.
2. Flame Rollout Switch: Installed on burner box; prevents burner operation.
3. Limit Control: Fixed stop at maximum permissible setting; de-energizes burner on excessive bonnet temperature; automatic reset.

H. Combustion-Air Inducer: Centrifugal fan with thermally protected motor and sleeve bearings prepurges heat exchanger and vents combustion products; pressure switch prevents furnace operation if combustion-air inlet or flue outlet is blocked.

I. Furnace Controls: Solid-state board integrates ignition, heat, cooling, and fan speeds; and adjustable fan-on and fan-off timing; terminals for connection to accessories.

J. Capacities and Characteristics:

1. Gas: Natural.
2. Minimum Efficiency AFUE: 80 percent.
3. Burner: Two-stage.

K. Draft-Inducer Motor: Variable-speed.

2.6 THERMOSTATS AND HUMIDISTATS

A. Controls shall comply with requirements in ASHRAE/IESNA 90.1, "Controls."

B. Solid-State Thermostat: Wall-mounting, programmable, microprocessor-based unit with manual switching from heating to cooling, preferential rate control, seven-day programmability with minimum of four temperature presets per day, vacation mode, and battery backup protection against power failure for program settings.

C. Humidistat: Adjustable, wall-mounting unit.

D. Control Wiring: Unshielded twisted-pair cabling.

1. No. 24 AWG, 100 ohm, four pair.

2.7 AIR FILTERS

A. Washable Filters: 1-inch-thick, urethane pad.

2.8 AIR CLEANERS

A. Electronic Air Cleaners: Packaged system, including sheet metal housing, prefilter, power supply, and automatic control device, arranged for mounting in return-air duct at furnace; equip with on-off and test switches and pilot light.

1. Standard: UL 586, "High-Efficiency, Particulate, Air Filter Units."

2. Rating: ASHRAE 52.2, particle size to 0.01 micrometer.
3. Static Pressure Drop: Maximum 0.14-inch wg at 300-fpm air velocity.

B. Manufacturers: Subject to compliance with requirements, provide products by one of the following:

1. Aprilaire.
2. Honeywell International, Inc.
3. Trion, Inc.
4. White-Rodgers.
5. Or Approved Equal.

C. Prefilter Media: Alternating layers of aluminum, flat and herringbone-crimp screen.

D. Collection Cells: Aluminum, independently supported and nested.

1. Ionizing Section: Alternately spaced grounded struts and charged ionizing wires.
2. Collecting Section: Alternately grounded and charged plates, with insulators located out of airstream.

E. Power Pack: Self-contained, prewired rectifying unit to convert 120-V ac, single-phase, 60-Hz power to approximately 12,000-V dc for ionizer and 6000-V dc for collector; include overload protection, on-off switch, pilot light showing operating status, and access door interlock.

F. Finish of Interior Surfaces: Surfaces in contact with the airstream shall comply with requirements in ASHRAE 62.1.

G. Cabinet: 16-gage galvanized steel with epoxy powder finish for duct mounting.

H. Capacities and Characteristics:

1. System Airflow: 2,000 cfm.
2. Power Pack:

a. Volts: 120 V.
b. Hertz: 60.

3. Efficiency: 90 percent on particles 20 micrometers and larger at 500 fpm.

2.9 HUMIDIFIERS

A. Manufacturers: Subject to compliance with requirements, provide products by one of the following:

1. Aprilaire.
2. Carrier Corporation; Div. of United Technologies Corp.
3. Lennox Industries Inc.
4. Or Approved Equal.

B. Minimum capacity rating indicated according to ARI 610, "Central System Humidifiers for Residential Applications."

C. Wetted-pad, continuous-drain, bypass type with bypass damper and water-flow control orifice; arranged for mounting on return duct or plenum with bypass connection to supply duct.

D. Comply with applicable requirements in ASHRAE 62.1.

2.10 REFRIGERATION COMPONENTS

A. General Refrigeration Component Requirements:

1. Refrigeration compressor, coils, and specialties shall be designed to operate with CFC-free refrigerants.
2. Energy Efficiency: Equal to or greater than prescribed by ASHRAE/IESNA 90.1, "Energy Standard for Buildings except Low-Rise Residential Buildings."

B. Refrigerant Coil: Copper tubes mechanically expanded into aluminum fins. Comply with ARI 210/240, "Unitary Air-Conditioning and Air-Source Heat Pump Equipment." Match size with furnace. Include condensate drain pan with accessible drain outlet.

1. Refrigerant Coil Enclosure: Steel, matching furnace and evaporator coil, with access panel and flanges for integral mounting at or on furnace cabinet and galvanized sheet metal drain pan coated with black asphaltic base paint.

C. Refrigerant Line Kits: Annealed-copper suction and liquid lines factory cleaned, dried, pressurized with nitrogen, sealed, and with suction line insulated. Provide in standard lengths for installation without joints, except at equipment connections.

D. Refrigerant Piping: Comply with requirements in Section 232300 "HVAC Piping."

E. Air-Cooled, Compressor-Condenser Unit:

1. Casing: Steel, finished with baked enamel, with removable panels for access to controls, weep holes for water drainage, and mounting holes in base. Provide brass service valves, fittings, and gage ports on exterior of casing.
2. Compressor: Hermetically sealed reciprocating or scroll type.

a. Crankcase heater.
b. Vibration isolation mounts for compressor.
c. Compressor motor shall have thermal- and current-sensitive overload devices, start capacitor, relay, and contactor.
d. Two-speed compressor motors shall have manual-reset high-pressure switch and automatic-reset low-pressure switch.
e. Refrigerant Charge: R-410A.

3. Refrigerant Coil: Copper tube, with mechanically bonded aluminum fins, complying with ARI 210/240, and with liquid subcooler.
4. Heat-Pump Components: Reversing valve and low-temperature air cut-off thermostat.
5. Fan: Aluminum-propeller type, directly connected to motor.
6. Motor: Permanently lubricated, with integral thermal-overload protection.
7. Low Ambient Kit: Permits operation down to 45 deg F.

F. Capacities and Characteristics:

1. Compressor-Condenser Unit:

a. Minimum Cooling Energy Efficiency (SEER): 13.

2.11 CONDENSATE PUMPS

A. Manufacturers: Subject to compliance with requirements, provide products by one of the following:

1. DiversiTech.
2. Flotec.
3. Hartell.
4. Little Giant.
5. Wayne.
6. Or Approved Equal.

B. General: Provide condensate pump constructed of ABS plastic, which can develop 15 feet of head, has an auxiliary safety switch, is UL rated, operates on 115 volts, has thermal overload protection, and an audible alarm that activates on high water condition.

C. Condensate alarm: See Section 283111 “Detectors and Alarms.”

PART 3 - EXECUTION

3.1 EXAMINATION

A. Examine areas and conditions, with Installer present, for compliance with requirements for installation tolerances and other conditions affecting performance of the Work.

B. Examine factory-installed insulation before furnace installation. Reject units that are wet, moisture damaged, or mold damaged.

C. Examine roughing-in for gas, oil, and refrigerant piping systems to verify actual locations of piping connections before equipment installation.

D. Proceed with installation only after unsatisfactory conditions have been corrected.

3.2 INSTALLATION

A. Install gas-fired furnaces and associated fuel and vent features and systems according to NFPA 54.

B. Install oil-fired furnaces and associated fuel and vent piping according to NFPA 31.

1. Upgrade oil piping from tank to burner. Protect oil piping as required by code. No joints are allowed between tank and burner.

C. Suspended Units: Suspend from structure using threaded rods, spring hangers, and building attachments. Secure rods to unit hanger attachments. Adjust hangers so unit is level and plumb.

1. Provide plywood walkway for maintenance access to furnace installations in attic or crawlspace.

D. Install ground-mounted, furnace on 2-inch-thick, reinforced, leveled concrete base; 2 inches larger on each side than unit. Coordinate anchor installation with concrete base.

E. Base-mounted units in closets: Secure units to substrate. Provide optional bottom closure base if required by installation conditions.

F. Controls: Install thermostats and humidistats at mounting height of 60 inches above floor.

G. Wiring Method: Install control wiring in accessible ceiling spaces and in gypsum board partitions where unenclosed wiring method may be used. Conceal control wiring except in unfinished spaces.

H. Wire condensate pump safety switch so compressor will shut down and audible alarm sounds when float activates switch. Install both a primary and secondary condensate drain overflow detection device. Both devices will activate an audible alarm when tripped.

I. Install ground-mounted, compressor-condenser components on 4-inch-thick, reinforced, leveled concrete base; 4 inches larger on each side than unit. Coordinate anchor installation with concrete base.

1. If any existing sidewalks or other features must be removed to install pad, reconstruct to like new condition to match the existing. Unit must be located to meet existing codes.

J. Any temporary heating or cooling necessary during installation shall be provided by Contractor at no cost to Owner.

3.3 CONNECTIONS

A. Connect gas piping with union or flange and appliance connector valve.

B. Connect oil piping with union or flange and ball or gate valve.

C. Install piping adjacent to equipment to allow service and maintenance.

D. Connect water piping with union and ball valve.

E. Vent Connection, Noncondensing, Gas-Fired Furnaces: Connect Type B vents to furnace vent connection and extend outdoors. Type B vents and their installation requirements are specified in Section 235100 "Breechings, Chimneys, and Stacks"

F. Vent and Outside-Air Connection, Condensing, Gas-Fired Furnaces: Connect plastic piping vent material to furnace connections and extend outdoors. Terminate vent outdoors with a cap and in an arrangement that will protect against entry of birds, insects, and dirt.

1. Ream ends of pipes and tubes and remove burrs. Bevel plain ends of steel pipe.
2. Remove scale, slag, dirt, and debris from inside and outside of pipe and fittings before assembly.
3. Plastic Piping Solvent-Cement Joints: Clean and dry joining surfaces. Join pipe and fittings according to the following:

    a. Comply with ASTM F 402 for safe-handling practice of cleaners, primers, and solvent cements.
    b. 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.

4. Slope pipe vent back to furnace or to outside terminal.

G. Vent Connections, Oil-Fired Furnaces: Connect Type L vents to furnace vent connection and extend outdoors.

H. Connect ducts to furnace with flexible connector. Comply with requirements in Section 233300 "Air Duct Accessories."

I. Connect refrigerant tubing kits to refrigerant coil in furnace and to air-cooled, compressor-condenser unit.

1. Flared Joints: Use ASME B16.26 fitting and flared ends, following procedures in CDA's "Copper Tube Handbook."
2. 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.
3. 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.

J. Comply with requirements in Section 232300 "HVAC Piping" for installation and joint construction of refrigerant piping.

K. Condensate may be discharged to the exterior of the home or to the interior sanitary plumbing or sump pump as allowed by local codes and approved by Homeowner. Condensate piping shall be routed at ceiling to avoid trip hazard.

3.4 FIELD QUALITY CONTROL

A. Perform the following field tests and inspections and prepare test reports:

1. Perform electrical test and visual and mechanical inspection.
2. Leak Test: After installation, charge systems with refrigerant and oil and test for leaks. Repair leaks, replace lost refrigerant and oil, and retest until no leaks exist.
3. Operational Test: After electrical circuitry has been energized, start units to confirm proper operation, product capability, and compliance with requirements.
4. Verify that fan wheel is rotating in the correct direction and is not vibrating or binding.
5. Test and adjust controls and safeties. Replace damaged and malfunctioning controls and equipment.

B. Verify that vibration isolation and flexible connections properly dampen vibration transmission to structure.

3.5 STARTUP SERVICE

A. Complete installation and startup checks according to manufacturer's written instructions and perform the following:

1. Inspect for physical damage to unit casings.
2. Verify that access doors move freely and are weathertight.
3. Clean units and inspect for construction debris.
4. Verify that all bolts and screws are tight.
5. Adjust vibration isolation and flexible connections.
6. Verify that controls are connected and operational.

B. Start unit according to manufacturer's written instructions and complete manufacturer's operational checklist.

C. Measure and record airflows.

D. Verify proper operation of capacity control device.

E. After startup and performance test, lubricate bearings.

3.6 ADJUSTING

A. Adjust initial temperature and humidity set points.

B. Set controls, burner, and other adjustments for optimum heating performance and efficiency. Adjust heat-distribution features, including shutters, dampers, and relays, to provide optimum heating performance and system efficiency.

3.7 CLEANING

A. All materials resulting from demolition necessary to install HVAC shall be removed from site unless directed otherwise.

B. After completing installation, clean furnaces internally according to manufacturer's written instructions.

C. Install new filters after testing, adjusting, and balancing.

3.8 DEMONSTRATION

A. Train homeowners to adjust, operate, and maintain units.

END OF SECTION 235400

237200 - AIR-TO-AIR VENTILATION EQUIPMENT

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

A. Drawings and general provisions of the Contract, including General and Special Conditions and Division 01 Specification Sections, apply to this Section.

1.2 SUMMARY

A. Section Includes:

1. Energy Recovery Ventilators.
2. Blending Ventilators.
3. Outside Air Intakes.

1.3 SUBMITTALS

A. Product Data: For each type of product indicated. Include rated capacities, operating characteristics, furnished specialties, and accessories.

1.4 CLOSEOUT SUBMITTALS

A. Operation and Maintenance Data: Include in maintenance manuals.

1.5 MAINTENANCE MATERIAL SUBMITTALS

A. Furnish extra materials that match products installed and that are packaged with protective covering for storage and identified with labels describing contents.

1. Filters: One set of each type of filter specified.

1.6 QUALITY ASSURANCE

A. Electrical Components, Devices, and Accessories: Listed and labeled as defined in NFPA 70, by a qualified testing agency, and marked for intended location and application.

B. ARI Compliance:

1. Capacity ratings for air-to-air energy recovery equipment shall comply with ARI 1060, "Performance Rating of Air-to-Air Heat Exchangers for Energy Recovery Ventilation Equipment."

C. ASHRAE Compliance:

1. Applicable requirements in ASHRAE 62.1, Section 5 - "Systems and Equipment" and Section 7 - "Construction and Startup."
2. Capacity ratings for air-to-air ventilation equipment shall comply with ASHRAE 84, "Method of Testing Air-to-Air Heat Exchangers."

1.7 COORDINATION

A. Coordinate layout and installation of air-to-air ventilation equipment and suspension system with other construction that penetrates ceilings or is supported by them, including light fixtures, and HVAC equipment.

1.8 WARRANTY

A. Special Warranty: Manufacturer's standard form in which manufacturer agrees to repair or replace components of air-to-air energy recovery equipment that fail in materials or workmanship within specified warranty period.

1. Warranty Period for Energy Recovery Core: Five years.
2. Warranty Period for Parts: Two years.

PART 2 - PRODUCTS

2.1 ENERGY RECOVERY VENTILATOR

A. Manufacturers: Subject to compliance with requirements, provide products by one of the following:

1. American Aldes.
2. Carrier Corporation.
3. Fantech.
4. RenewAire LLC.
5. Trane; American Standard Companies, Inc.
6. Or Approved Equal.

B. General: Energy recovery ventilator shall have enthalpic core that is removable and washable with water and mild soap. Unit shall be equipped with two air flow balancing dampers.

A. Casing: Manufacturer's standard construction with corrosion-protection coating and exterior finish, hinged access doors with neoprene gaskets for inspection and access to internal parts, minimum 1-inch-thick thermal insulation, knockouts for electrical and piping connections, exterior drain connection, and lifting lugs. A door switch shall disconnect power whenever the access door is opened.

B. Blowers: Mounted in draw-through location with centrifugal type wheel, single inlet with forward curved galvanized steel blades, and cold-rolled steel housing. Motor shall be direct

drive, PSC type. Sleeve bearings shall be permanently lubricated and maintenance free. Motor shall be mounted using vibration isolating grommets and shall utilize quick connectors that require no tools to disconnect.

C. Filters: 1-inch-thick washable, both supply and exhaust.

D. Capacities: Energy recovery ventilator shall be properly sized per application. Contractor shall size unit in accordance with manufacturer's recommendations.

E. Accessories: Supply and exhaust hood kit shall include two low air flow resistance hoods and two double wall collars. The exterior parts of the hood shall have corrosion protection and be equipped with an openable leaf screen.

2.2 BLENDING VENTILATOR

A. Manufacturers: Subject to compliance with requirements, provide products by one of the following:

1. American Aldes.
2. Carrier Corporation.
3. Fantech.
4. RenewAire LLC.
5. Trane; American Standard Companies, Inc.
6. Or Approved Equal.

A. Casing: Manufacturer's standard construction with corrosion-protection coating and exterior finish, hinged access doors with neoprene gaskets for inspection and access to internal parts, minimum 1-inch-thick thermal insulation, capable of multiple installation orientations, and accommodate constant airflow regulators. A door switch shall disconnect power whenever the access door is opened.

B. Blowers: Mounted in draw-through location with centrifugal type wheel, single inlet with forward curved galvanized steel blades, and cold-rolled steel housing. Sleeve bearings shall be permanently lubricated and maintenance free.

C. Filters: 1-inch-thick removable and washable, both supply and return.

D. Capacities: Blending ventilator shall be properly sized per application. Contractor shall size unit in accordance with manufacturer's recommendations.

E. Accessories: Supply and exhaust hood kit shall include two low air flow resistance hoods and two double wall collars. The exterior parts of the hood shall have corrosion protection and be equipped with an openable leaf screen.

2.3 OUTSIDE AIR INTAKES

A. Manufacturers: Subject to compliance with requirements, provide products by one of the following:

1. Honeywell.
2. Or Approved Equal.

B. Damper Assembly: 24-volt, power open, spring shut assembly with blade edge seal, designed for low leakage when in the closed position. Damper shall power open upon start-up of furnace fan and spring shut when furnace shuts down.

2.4 CONTROLS

A. Energy Recovery and Blending Ventilators: Wall-mounted next to furnace thermostat, with continuous and programmable operation options and additional manual controls to control low or high exchange.

PART 3 - EXECUTION

3.1 EXAMINATION

A. Examine areas and conditions, with Installer present, for compliance with requirements for installation tolerances and other conditions affecting performance of the Work.

B. Examine casing insulation materials and filter media before air-to-air ventilation equipment installation. Reject insulation materials and filter media that are wet, moisture damaged, or mold damaged.

C. Examine roughing-in for electrical services to verify actual locations of connections before installation.

D. Proceed with installation only after unsatisfactory conditions have been corrected.

3.2 INSTALLATION

A. Suspended Units: Suspend and brace units from structural-support frame using threaded steel rods and spring hangers.

B. Install units with clearances for service and maintenance.

C. Install new filters at completion of equipment installation and before testing, adjusting, and balancing.

D. Pipe drains from drain pans to nearest floor drain; use ASTM D 1785, Schedule 40 PVC pipe and solvent-welded fittings, same size as condensate drain connection.

3.3 CONNECTIONS

A. Install piping adjacent to unit to allow service and maintenance.

B. Connect piping to units mounted on vibration isolators with flexible connectors.

C. Connect cooling condensate drain pans with air seal trap at connection to drain pan and install cleanouts at changes in pipe direction.

D. Refrigerant Piping: Comply with applicable requirements in Section 232300 "HVAC Piping."

E. Comply with requirements for ductwork specified in Section 233113 "Metal Ducts."

F. Install electrical devices furnished with units but not factory mounted.

3.4 FIELD QUALITY CONTROL

A. Tests and Inspections:

1. Operational Test: After electrical circuitry has been energized, start units to confirm proper motor rotation and unit operation.
2. Adjust seals and purge.
3. Test and adjust controls and safeties. Replace damaged and malfunctioning controls and equipment.
4. Set initial temperature and humidity set points.
5. Set field-adjustable switches and circuit-breaker trip ranges as indicated.

B. Air-to-air ventilation equipment will be considered defective if it does not pass tests and inspections.

3.5 DEMONSTRATION

A. Train homeowners to adjust, operate, and maintain air-to-air ventilation units.

END OF SECTION 237200

238126 - SPLIT-SYSTEM AIR-CONDITIONERS

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

A. Drawings and general provisions of the Contract, including General and Special Conditions and Division 01 Specification Sections, apply to this Section.

1.2 SUMMARY

A. Section includes split-system air-conditioning and heat-pump units consisting of separate evaporator-fan and compressor-condenser components.

1.3 SUBMITTALS

A. Product Data: For each type of product indicated. Include rated capacities, operating characteristics, and furnished specialties and accessories. Include performance data in terms of capacities, outlet velocities, static pressures, sound power characteristics, motor requirements, and electrical characteristics.

B. Warranty: Special warranty specified in this Section.

1.4 CLOSEOUT SUBMITTALS

A. Operation and Maintenance Data: For split-system air-conditioning units to include in emergency, operation, and maintenance manuals.

1.5 QUALITY ASSURANCE

A. Electrical Components, Devices, and Accessories: Listed and labeled as defined in NFPA 70, by a qualified testing agency, and marked for intended location and application.

B. ASHRAE Compliance:

1. Fabricate and label refrigeration system to comply with ASHRAE 15, "Safety Standard for Refrigeration Systems."
2. ASHRAE Compliance: Applicable requirements in ASHRAE 62.1, Section 4 - "Outdoor Air Quality," Section 5 - "Systems and Equipment," Section 6 - " Procedures," and Section 7 - "Construction and System Start-up."

C. ASHRAE/IESNA Compliance: Applicable requirements in ASHRAE/IESNA 90.1.

1.6 WARRANTY

A. Special Warranty: Manufacturer's standard form in which manufacturer agrees to repair or replace components of split-system air-conditioning units that fail in materials or workmanship within specified warranty period.

1. Warranty Period:

a. For Compressor: Five years.
b. For Parts and Labor: One year.

PART 2 - PRODUCTS

2.1 MANUFACTURERS

A. Manufacturers: Subject to compliance with requirements, provide products by one of the following:

1. Carrier Corporation; Home Comfort and HVAC Building & Industrial Systems.
2. Daikin AC, Thermal Mechanics, Inc.
3. Friedrich Air Conditioning Company.
4. Lennox International Inc.
5. Mitsubishi Electric & Electronics USA, Inc.; HVAC Advanced Products Division.
6. SANYO North America Corporation; SANYO Fisher Company.
7. Trane; a business of American Standard companies.
8. YORK; a Johnson Controls company.
9. Or Approved Equal.

2.2 INDOOR UNITS

A. Wall-Mounted, Evaporator-Fan Components:

1. Cabinet: Enameled steel with removable panels on front and ends in white color, high-impact polystyrene, and discharge drain pans with drain connection.
2. Refrigerant Coil: Copper tube, with mechanically bonded aluminum fins and thermal-expansion valve. Comply with ARI 206/110.
3. Electric Coil: Helical, nickel-chrome, resistance-wire heating elements; with refractory ceramic support bushings, automatic-reset thermal cutout, built-in magnetic contactors, manual-reset thermal cutout, airflow proving device, and one-time fuses in terminal box for overcurrent protection.
4. Fan: Direct drive, centrifugal.
5. Fan Motors:

a. Multitapped, multispeed with internal thermal protection and permanent lubrication.
b. Enclosure Type: Totally enclosed, fan cooled.

c. NEMA Premium (TM) efficient motors as defined in NEMA MG 1.
d. Controllers, Electrical Devices, and Wiring: Comply with requirements for electrical devices and connections specified in electrical Sections.

6. Airstream Surfaces: Surfaces in contact with the airstream shall comply with requirements in ASHRAE 62.1.
7. Filters: Permanent, cleanable.
8. Condensate Drain Pans:

a. Fabricated with slope in at least two planes to collect condensate from cooling coils (including coil piping connections, coil headers, and return bends) and humidifiers, and to direct water toward drain connection.
b. Drain Connection: Located at lowest point of pan and sized to prevent overflow. Terminate with threaded nipple on end(s) of pan.
c. Pan-Top Surface Coating: Asphaltic waterproofing compound.

2.3 OUTDOOR UNITS

A. Air-Cooled, Compressor-Condenser Components:

1. Casing: Steel, finished with baked enamel in standard color, with removable panels for access to controls, weep holes for water drainage, and mounting holes in base. Provide brass service valves, fittings, and gage ports on exterior of casing.
2. Compressor: Hermetically sealed with crankcase heater and mounted on vibration isolation device. Compressor motor shall have thermal- and current-sensitive overload devices, start capacitor, relay, and contactor.

a. Compressor Type: Scroll.
b. Two-speed compressor motor with manual-reset high-pressure switch and automatic-reset low-pressure switch.
c. Refrigerant Charge: R-410A.
d. Refrigerant Coil: Copper tube, with mechanically bonded aluminum fins and liquid subcooler. Comply with ARI 206/110.

3. Heat-Pump Components: Reversing valve and low-temperature-air cutoff thermostat.
4. Fan: Aluminum-propeller type, directly connected to motor.
5. Motor: Permanently lubricated, with integral thermal-overload protection.
6. Low Ambient Kit: Permits operation down to 45 deg F.
7. Mounting Base: Concrete.

2.4 ACCESSORIES

A. Thermostat: Wireless infrared functioning to remotely control compressor and evaporator fan, with the following features:

1. Compressor time delay.
2. 24-hour time control of system stop and start.

3. Liquid-crystal display indicating temperature, set-point temperature, time setting, operating mode, and fan speed.
4. Fan-speed selection including auto setting.

B. Automatic-reset timer to prevent rapid cycling of compressor.

C. Refrigerant Line Kits: Soft-annealed copper suction and liquid lines factory cleaned, dried, pressurized, and sealed; suction line with flared fittings at both ends.

D. Drain Hose: For condensate.

E. Condensate Pump: Provide manufacturer’s standard condensate pump system designed to work with indoor unit.

2.5 CAPACITIES AND CHARACTERISTICS

A. Minimum Cooling Capacity: 13 SEER.

PART 3 - EXECUTION

3.1 INSTALLATION

A. Install units level and plumb.

B. Install evaporator-fan components using manufacturer's standard mounting devices securely fastened to building structure.

C. Equipment Mounting:

1. Install ground-mounted, compressor-condenser components on cast-in-place concrete equipment base(s).

D. Install and connect precharged refrigerant tubing to component's quick-connect fittings. Install tubing to allow access to unit.

3.2 CONNECTIONS

A. Piping installation requirements are specified in other Sections.

B. Where piping is installed adjacent to unit, allow space for service and maintenance of unit.

3.3 FIELD QUALITY CONTROL

A. Tests and Inspections:

1. Leak Test: After installation, charge system and test for leaks. Repair leaks and retest until no leaks exist.
2. Operational Test: After electrical circuitry has been energized, start units to confirm proper motor rotation and unit operation.
3. Test and adjust controls and safeties. Replace damaged and malfunctioning controls and equipment.

B. Remove and replace malfunctioning units and retest as specified above.

3.4 STARTUP SERVICE

A. Perform startup service.

1. Complete installation and startup checks according to manufacturer's written instructions.

3.5 DEMONSTRATION

A. Train homeowners to adjust, operate, and maintain units.

END OF SECTION 238126

260519 - LOW-VOLTAGE ELECTRICAL POWER CONDUCTORS AND CABLES

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

A. Drawings and general provisions of the Contract, including General and Special Conditions and Division 01 Specification Sections, apply to this Section.

1.2 SUMMARY

A. Section Includes:

1. Building wires and cables rated 600 V and less.
2. Connectors, splices, and terminations rated 600 V and less.

1.3 SUBMITTALS

A. Product Data: For each type of product.

PART 2 - PRODUCTS

2.1 CONDUCTORS AND CABLES

A. Manufacturers: Subject to compliance with requirements, provide products by one of the following:

1. Alcan Products Corporation; Alcan Cable Division.
2. Alpha Wire.
3. Belden Inc.
4. Encore Wire Corporation.
5. General Cable Technologies Corporation.
6. Southwire Incorporated.
7. Or Approved Equal.

B. Copper Conductors: Comply with NEMA WC 70/ICEA S-95-658.

C. Conductor Insulation: Comply with NEMA WC 70/ICEA S-95-658.

2.2 CONNECTORS AND SPLICES

A. Manufacturers: Subject to compliance with requirements, provide products by one of the following:

1. AFC Cable Systems, Inc.
2. Gardner Bender.

3. Hubbell Power Systems, Inc.
4. Ideal Industries, Inc.
5. Ilsco; a branch of Bardes Corporation.
6. NSi Industries LLC.
7. O-Z/Gedney; a brand of the EGS Electrical Group.
8. 3M; Electrical Markets Division.
9. Tyco Electronics.
10. Or Approved Equal.

B. Description: Factory-fabricated connectors and splices of size, ampacity rating, material, type, and class for application and service indicated.

2.3 SYSTEM DESCRIPTION

A. Electrical Components, Devices, and Accessories: Listed and labeled as defined in NFPA 70, by a qualified testing agency, and marked for intended location and application.

B. Comply with NFPA 70.

PART 3 - EXECUTION

3.1 CONDUCTOR MATERIAL APPLICATIONS

A. Feeders: Copper. Solid for No. 10 AWG and smaller; stranded for No. 8 AWG and larger.

B. Branch Circuits: Copper. Solid for No. 10 AWG and smaller; stranded for No. 8 AWG and larger, except VFC cable, which shall be extra flexible stranded.

3.2 INSTALLATION OF CONDUCTORS AND CABLES

A. Conceal cables in finished walls, ceilings, and floors unless otherwise indicated.

B. Complete raceway installation between conductor and cable termination points according to Section 260533 "Raceways and Boxes for Electrical Systems" prior to pulling conductors and cables.

C. Use manufacturer-approved pulling compound or lubricant where necessary; compound used must not deteriorate conductor or insulation. Do not exceed manufacturer's recommended maximum pulling tensions and sidewall pressure values.

D. Use pulling means, including fish tape, cable, rope, and basket-weave wire/cable grips, that will not damage cables or raceway.

E. Install exposed cables parallel and perpendicular to surfaces of exposed structural members, and follow surface contours where possible.

3.3 CONNECTIONS

A. Tighten electrical connectors and terminals according to manufacturer's published torque-tightening values. If manufacturer's torque values are not indicated, use those specified in UL 486A-486B.

B. Make splices, terminations, and taps that are compatible with conductor material.

1. Use oxide inhibitor in each splice, termination, and tap for aluminum conductors.

C. Wiring at Outlets: Install conductor at each outlet, with at least 6 inches of slack.

3.4 FIELD QUALITY CONTROL

A. Perform the following tests and inspections:

1. After installing conductors and cables and before electrical circuitry has been energized, test service entrance and feeder conductors and conductors feeding the following critical equipment and services for compliance with requirements.
2. Perform each visual and mechanical inspection and electrical test stated in NETA Acceptance Testing Specification. Certify compliance with test parameters.

B. Cables will be considered defective if they do not pass tests and inspections.

END OF SECTION 260519

260526 - GROUNDING AND BONDING FOR ELECTRICAL SYSTEMS

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

A. Drawings and general provisions of the Contract, including General and Special Conditions and Division 01 Specification Sections, apply to this Section.

1.2 SUMMARY

A. Section includes grounding and bonding systems and equipment.

1.3 SUBMITTALS

A. Product Data: For each type of product indicated.

PART 2 - PRODUCTS

2.1 MANUFACTURERS

A. Manufacturers: Subject to compliance with requirements, provide products by one of the following:

1. Burndy; Part of Hubbell Electrical Systems.
2. Dossert; AFL Telecommunications LLC.
3. ERICO International Corporation.
4. Fushi Copperweld Inc.
5. Galvan Industries, Inc.; Electrical Products Division, LLC.
6. Harger Lightning and Grounding.
7. ILSCO.
8. O-Z/Gedney; A Brand of the EGS Electrical Group.
9. Robbins Lightning, Inc.
10. Siemens Power Transmission & Distribution, Inc.
11. Or Approved Equal.

2.2 SYSTEM DESCRIPTION

A. Electrical Components, Devices, and Accessories: Listed and labeled as defined in NFPA 70, by a qualified testing agency, and marked for intended location and application.

B. Comply with UL 467 for grounding and bonding materials and equipment.

2.3 CONDUCTORS

A. Insulated Conductors: Copper wire or cable insulated for 600 V unless otherwise required by applicable Code or authorities having jurisdiction.

B. Bare Copper Conductors:

1. Solid Conductors: ASTM B 3.
2. Stranded Conductors: ASTM B 8.
3. Bonding Cable: 28 kcmil, 14 strands of No. 17 AWG conductor, 1/4 inch in diameter.
4. Bonding Conductor: No. 4 or No. 6 AWG, stranded conductor.
5. Bonding Jumper: Copper tape, braided conductors terminated with copper ferrules; 1-5/8 inches wide and 1/16 inch thick.

2.4 CONNECTORS

A. Listed and labeled by an NRTL acceptable to authorities having jurisdiction for applications in which used and for specific types, sizes, and combinations of conductors and other items connected.

B. Bolted Connectors for Conductors and Pipes: Copper or copper alloy.

C. Welded Connectors: Exothermic-welding kits of types recommended by kit manufacturer for materials being joined and installation conditions.

2.5 GROUNDING ELECTRODES

A. Ground Rods: Copper-clad steel; 3/4 inch by 10 feet.

PART 3 - EXECUTION

3.1 APPLICATIONS

A. Conductors: Install solid conductor for No. 8 AWG and smaller, and stranded conductors for No. 6 AWG and larger unless otherwise indicated.

B. Underground Grounding Conductors: Install bare copper conductor, No. 2/0 AWG minimum.

1. Bury at least 24 inches below grade.

C. Isolated Grounding Conductors: Green-colored insulation with continuous yellow stripe. On feeders with isolated ground, identify grounding conductor where visible to normal inspection, with alternating bands of green and yellow tape, with at least three bands of green and two bands of yellow.

D. Conductor Terminations and Connections:

1. Pipe and Equipment Grounding Conductor Terminations: Bolted connectors.
2. Underground Connections: Welded connectors except at test wells and as otherwise indicated.
3. Connections to Ground Rods at Test Wells: Bolted connectors.
4. Connections to Structural Steel: Welded connectors.

3.2 GROUNDING AT THE SERVICE

A. Equipment grounding conductors and grounding electrode conductors shall be connected to the ground bus. Install a main bonding jumper between the neutral and ground buses.

3.3 EQUIPMENT GROUNDING

A. Install insulated equipment grounding conductors with all feeders and branch circuits.

B. Install insulated equipment grounding conductors with the following items, in addition to those required by NFPA 70:

1. Feeders and branch circuits.
2. Lighting circuits.
3. Receptacle circuits.
4. Single-phase motor and appliance branch circuits.
5. Three-phase motor and appliance branch circuits.
6. Flexible raceway runs.
7. Armored and metal-clad cable runs.

C. Air-Duct Equipment Circuits: Install insulated equipment grounding conductor to duct-mounted electrical devices operating at 120 V and more, including air cleaners, humidifiers, and other duct electrical equipment. Bond conductor to each unit and to air duct and connected metallic piping.

3.4 INSTALLATION

A. Grounding Conductors: Route along shortest and straightest paths possible unless otherwise indicated or required by Code. Avoid obstructing access or placing conductors where they may be subjected to strain, impact, or damage.

B. Ground Rods: Drive rods until tops are 2 inches below finished floor or final grade unless otherwise indicated.

1. Interconnect ground rods with grounding electrode conductor below grade and as otherwise indicated. Make connections without exposing steel or damaging coating if any.

C. Bonding Straps and Jumpers: Install in locations accessible for inspection and maintenance except where routed through short lengths of conduit.

1. Bonding to Structure: Bond straps directly to basic structure, taking care not to penetrate any adjacent parts.
2. Bonding to Equipment Mounted on Vibration Isolation Hangers and Supports: Install bonding so vibration is not transmitted to rigidly mounted equipment.
3. Use exothermic-welded connectors for outdoor locations; if a disconnect-type connection is required, use a bolted clamp.

3.5 FIELD QUALITY CONTROL

A. Tests and Inspections:

1. After installing grounding system but before permanent electrical circuits have been energized, test for compliance with requirements.
2. Inspect physical and mechanical condition. Verify tightness of accessible, bolted, electrical connections with a calibrated torque wrench according to manufacturer's written instructions.
3. Test completed grounding system at each location where a maximum ground-resistance level is specified, at service disconnect enclosure grounding terminal and at individual ground rods. Make tests at ground rods before any conductors are connected.

B. Grounding system will be considered defective if it does not pass tests and inspections.

END OF SECTION 260526

260533 - RACEWAYS AND BOXES FOR ELECTRICAL SYSTEMS

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

A. Drawings and general provisions of the Contract, including General and Special Conditions and Division 01 Specification Sections, apply to this Section.

1.2 SUMMARY

A. Section Includes:

1. Metal conduits (raceways), tubing, and fittings.
2. Nonmetal conduits, tubing, and fittings.
3. Boxes, enclosures, and cabinets.

1.3 SUBMITTALS

A. Product Data: For surface raceways, wireways and fittings, floor boxes, hinged-cover enclosures, and cabinets.

PART 2 - PRODUCTS

2.1 METAL CONDUITS (RACEWAYS), TUBING, AND FITTINGS

A. Manufacturers: Subject to compliance with requirements, provide products by one of the following:

1. AFC Cable Systems, Inc.
2. Allied Tube & Conduit.
3. Anamet Electrical, Inc.
4. Electri-Flex Company.
5. O-Z/Gedney.
6. Picoma Industries.
7. Republic Conduit.
8. Robroy Industries.
9. Southwire Company.
10. Thomas & Betts Corporation.
11. Western Tube and Conduit Corporation.
12. Wheatland Tube Company.
13. Or Approved Equal.

B. Listing and Labeling: Metal conduits, tubing, and fittings shall be listed and labeled as defined in NFPA 70, by a qualified testing agency, and marked for intended location and application.

C. Galvanized rigid steel conduit: Comply with ANSI C80.1 and UL 6.

D. PVC-Coated Steel Conduit: PVC-coated rigid steel conduit.

1. Comply with NEMA RN 1.
2. Coating Thickness: 0.040 inch, minimum.

E. EMT: Comply with ANSI C80.3 and UL 797.

F. FMC: Comply with UL 1; zinc-coated steel.

G. LFMC: Flexible steel conduit with PVC jacket and complying with UL 360.

H. Fittings for Metal Conduit: Comply with NEMA FB 1 and UL 514B.

1. Fittings for EMT:

a. Material: Steel.
b. Type: Setscrew or compression.

2. Expansion Fittings: PVC or steel to match conduit type, complying with UL 651, rated for environmental conditions where installed, and including flexible external bonding jumper.
3. Coating for Fittings for PVC-Coated Conduit: Minimum thickness of 0.040 inch, with overlapping sleeves protecting threaded joints.

I. Joint Compound for GRC: Approved, as defined in NFPA 70, by authorities having jurisdiction for use in conduit assemblies, and compounded for use to lubricate and protect threaded conduit joints from corrosion and to enhance their conductivity.

2.2 BOXES, ENCLOSURES, AND CABINETS

A. Manufacturers: Subject to compliance with requirements, provide products by one of the following:

1. Adalet.
2. Cooper Technologies Company; Cooper Crouse-Hinds.
3. EGS/Appleton Electric.
4. Erickson Electrical Equipment Company.
5. FSR Inc.
6. Hoffman.
7. Hubbell Incorporated.
8. Kraloy.
9. Milbank Manufacturing Co.
10. Mono-Systems, Inc.
11. O-Z/Gedney.
12. RACO; Hubbell.
13. Robroy Industries.
14. Spring City Electrical Manufacturing Company.
15. Stahlin Non-Metallic Enclosures.

16. Thomas & Betts Corporation.
17. Wiremold / Legrand.
18. Or Approved Equal.

B. General Requirements for Boxes, Enclosures, and Cabinets: Boxes, enclosures, and cabinets installed in wet locations shall be listed for use in wet locations.

C. Sheet Metal Outlet and Device Boxes: Comply with NEMA OS 1 and UL 514A.

D. Cast-Metal Outlet and Device Boxes: Comply with NEMA FB 1, ferrous alloy, Type FD, with gasketed cover.

E. Nonmetallic Outlet and Device Boxes: Comply with NEMA OS 2 and UL 514C.

F. Small Sheet Metal Pull and Junction Boxes: NEMA OS 1.

G. Cast-Metal Access, Pull, and Junction Boxes: Comply with NEMA FB 1 and UL 1773, galvanized, cast iron with gasketed cover.

H. Box extensions used to accommodate new building finishes shall be of same material as recessed box.

PART 3 - EXECUTION

3.1 RACEWAY APPLICATION

A. Outdoors: Apply raceway products as specified below unless otherwise indicated:

1. Exposed Conduit: Galvanized rigid steel conduit
2. Concealed Conduit, Aboveground: Galvanized rigid steel conduit or EMT.
3. Boxes and Enclosures, Aboveground: NEMA 250, Type 3R.

B. Indoors: Apply raceway products as specified below unless otherwise indicated:

1. Exposed, Not Subject to Physical Damage: EMT.
2. Concealed in Ceilings and Interior Walls and Partitions: EMT.
3. Damp or Wet Locations: GRC.
4. Boxes and Enclosures: NEMA 250, Type 1, except use NEMA 250, Type 4 stainless steel in institutional and commercial kitchens and damp or wet locations.

C. Raceway Fittings: Compatible with raceways and suitable for use and location.

1. Rigid and Intermediate Steel Conduit: Use threaded rigid steel conduit fittings unless otherwise indicated. Comply with NEMA FB 2.10.
2. PVC Externally Coated, Rigid Steel Conduits: Use only fittings listed for use with this type of conduit. Patch and seal all joints, nicks, and scrapes in PVC coating after installing conduits and fittings. Use sealant recommended by fitting manufacturer and apply in thickness and number of coats recommended by manufacturer.

3. EMT: Use setscrew or compression, steel fittings. Comply with NEMA FB 2.10.
4. Flexible Conduit: Use only fittings listed for use with flexible conduit. Comply with NEMA FB 2.20.

D. Install nonferrous conduit or tubing for circuits operating above 60 Hz. Where aluminum raceways are installed for such circuits and pass through concrete, install in nonmetallic sleeve.

E. Do not install aluminum conduits, boxes, or fittings in contact with concrete or earth.

3.2 INSTALLATION

A. Comply with NECA 1 and NECA 101 for installation requirements. Comply with NFPA 70 limitations for types of raceways allowed in specific occupancies and number of floors.

B. Keep raceways at least 6 inches away from parallel runs of flues and steam or hot-water pipes. Install horizontal raceway runs above water and steam piping.

C. Complete raceway installation before starting conductor installation.

D. Install no more than the equivalent of three 90-degree bends in any conduit run except for control wiring conduits, for which fewer bends are allowed. Support within 12 inches of changes in direction.

E. Conceal conduit and EMT within finished walls, ceilings, and floors unless otherwise indicated. Install conduits parallel or perpendicular to building lines.

F. Support conduit within 12 inches of enclosures to which attached.

G. Threaded Conduit Joints, Exposed to Wet, Damp, Corrosive, or Outdoor Conditions: Apply listed compound to threads of raceway and fittings before making up joints. Follow compound manufacturer's written instructions.

H. Coat field-cut threads on PVC-coated raceway with a corrosion-preventing conductive compound prior to assembly.

I. Terminate threaded conduits into threaded hubs or with locknuts on inside and outside of boxes or cabinets. Install bushings on conduits up to 1-1/4-inch trade size and insulated throat metal bushings on 1-1/2-inch trade size and larger conduits terminated with locknuts. Install insulated throat metal grounding bushings on service conduits.

J. Install raceways square to the enclosure and terminate at enclosures with locknuts. Install locknuts hand tight plus 1/4 turn more.

K. Do not rely on locknuts to penetrate nonconductive coatings on enclosures. Remove coatings in the locknut area prior to assembling conduit to enclosure to assure a continuous ground path.

L. Cut conduit perpendicular to the length.

M. Surface Raceways:

1. Install surface raceway with a minimum 2-inch radius control at bend points.
2. Secure surface raceway with screws or other anchor-type devices at intervals not exceeding 48 inches and with no less than two supports per straight raceway section. Support surface raceway according to manufacturer's written instructions. Tape and glue are not acceptable support methods.

N. Install raceway sealing fittings at accessible locations according to NFPA 70 and fill them with listed sealing compound. For concealed raceways, install each fitting in a flush steel box with a blank cover plate having a finish similar to that of adjacent plates or surfaces. Install raceway sealing fittings according to NFPA 70.

O. Install devices to seal raceway interiors at accessible locations. Locate seals so no fittings or boxes are between the seal and the following changes of environments. Seal the interior of all raceways at the following points:

1. Where conduits pass from warm to cold locations, such as boundaries of refrigerated spaces.
2. Where an underground service raceway enters a building or structure.
3. Where otherwise required by NFPA 70.

P. Comply with manufacturer's written instructions for solvent welding RNC and fittings.

Q. Recessed Boxes in Masonry Walls: Saw-cut opening for box in center of cell of masonry block, and install box flush with surface of wall. Prepare block surfaces to provide a flat surface for a raintight connection between box and cover plate or supported equipment and box.

R. Horizontally separate boxes mounted on opposite sides of walls so they are not in the same vertical channel.

S. Locate boxes so that cover or plate will not span different building finishes.

T. Support boxes of three gangs or more from more than one side by spanning two framing members or mounting on brackets specifically designed for the purpose.

U. Fasten junction and pull boxes to or support from building structure. Do not support boxes by conduits.

3.3 PROTECTION

A. Protect coatings, finishes, and cabinets from damage and deterioration.

1. Repair damage to galvanized finishes with zinc-rich paint recommended by manufacturer.

2. Repair damage to PVC coatings or paint finishes with matching touchup coating recommended by manufacturer.

END OF SECTION 260533

262416 - PANELBOARDS

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

A. Drawings and general provisions of the Contract, including General and Special Conditions and Division 01 Specification Sections, apply to this Section.

1.2 SUMMARY

A. Section Includes: Load centers.

1.3 SUBMITTALS

A. Product Data: For each type of panelboard, switching and overcurrent protective device, transient voltage suppression device, accessory, and component indicated. Include dimensions and manufacturers' technical data on features, performance, electrical characteristics, ratings, and finishes.

1.4 QUALITY ASSURANCE

A. Testing Agency Qualifications: Member company of NETA or an NRTL.

B. Source Limitations: Obtain panelboards, overcurrent protective devices, components, and accessories from single source from single manufacturer.

C. Electrical Components, Devices, and Accessories: Listed and labeled as defined in NFPA 70, by a qualified testing agency, and marked for intended location and application.

D. Comply with NEMA PB 1.

E. Comply with NFPA 70.

1.5 DELIVERY, STORAGE, AND HANDLING

A. Remove loose packing and flammable materials from inside panelboards; install temporary electric heating (250 W per panelboard) to prevent condensation.

B. Handle and prepare panelboards for installation according to NECA 407.

1.6 PROJECT CONDITIONS

A. Environmental Limitations:

1. Do not deliver or install panelboards until spaces are enclosed and weathertight, wet work in spaces is complete and dry, work above panelboards is complete, and temporary HVAC system is operating and maintaining ambient temperature and humidity conditions at occupancy levels during the remainder of the construction period.

A. Interruption of Existing Electric Service: Do not interrupt electric service to home occupied by homeowner or others unless permitted under the following conditions and then only after arranging to provide temporary electric service according to requirements indicated:

1. Notify Engineer no fewer than 7 days in advance of proposed interruption of electric service.
2. Indicate method of providing temporary electric service.
3. Do not proceed with interruption of electric service without Engineer's permission.
4. Comply with NFPA 70E.

1.7 COORDINATION

A. Coordinate layout and installation of panelboards and components with other construction that penetrates walls or is supported by them, including electrical and other types of equipment, raceways, piping, encumbrances to workspace clearance requirements, and adjacent surfaces. Maintain required workspace clearances and required clearances for equipment access doors and panels.

B. Coordinate sizes and locations of concrete bases with actual equipment provided. Cast anchor-bolt inserts into bases. Concrete, reinforcement, and formwork requirements are specified with concrete.

PART 2 - PRODUCTS

2.1 GENERAL REQUIREMENTS FOR PANELBOARDS

A. Enclosures: Surface-mounted cabinets.

1. Rated for environmental conditions at installed location.

a. Indoor Dry and Clean Locations: NEMA 250, Type 1.
b. Outdoor Locations: NEMA 250, Type 3R.

2. Front: Secured to box with concealed trim clamps. For surface-mounted fronts, match box dimensions.
3. Hinged Front Cover: Entire front trim hinged to box and with standard door within hinged trim cover.
4. Skirt for Surface-Mounted Panelboards: Same gage and finish as panelboard front with flanges for attachment to panelboard, wall, and ceiling or floor.

5. Gutter Extension and Barrier: Same gage and finish as panelboard enclosure; integral with enclosure body. Arrange to isolate individual panel sections.
6. Finishes:

    a. Panels and Trim: Galvanized steel, factory finished immediately after cleaning and pretreating with manufacturer's standard two-coat, baked-on finish consisting of prime coat and thermosetting topcoat.
    b. Back Boxes: Galvanized steel.
    c. Fungus Proofing: Permanent fungicidal treatment for overcurrent protective devices and other components.

7. Directory Card: Inside panelboard door, mounted in transparent card holder.

B. Incoming Mains Location: Top.

C. Service Equipment Label: NRTL labeled for use as service equipment for panelboards or load centers with one or more main service disconnecting and overcurrent protective devices.

D. Panelboard Short-Circuit Current Rating: Fully rated to interrupt symmetrical short-circuit current available at terminals.

2.2 LOAD CENTERS

A. Manufacturers: Subject to compliance with requirements, provide products by one of the following:

1. Eaton Electrical Inc.; Cutler-Hammer Business Unit.
2. General Electric Company; GE Consumer & Industrial - Electrical Distribution.
3. Siemens Energy & Automation, Inc.
4. Square D; a brand of Schneider Electric.
5. Or Approved Equal.

B. Load Centers: Comply with UL 67.

C. Mains: Circuit breaker.

D. Branch Overcurrent Protective Devices: Plug-in circuit breakers, replaceable without disturbing adjacent units.

E. Conductor Connectors: Mechanical type for main, neutral, and ground lugs and buses.

PART 3 - EXECUTION

3.1 EXAMINATION

A. Receive, inspect, handle, and store panelboards according to NECA 407.

B. Examine panelboards before installation. Reject panelboards that are damaged or rusted or have been subjected to water saturation.

C. Examine elements and surfaces to receive panelboards for compliance with installation tolerances and other conditions affecting performance of the Work.

D. Proceed with installation only after unsatisfactory conditions have been corrected.

3.2 INSTALLATION

A. Equipment Mounting: Attach panelboard to the vertical finished or structural surface behind the panelboard.

B. Mount top of trim 90 inches above finished floor unless otherwise indicated.

C. Mount panelboard cabinet plumb and rigid without distortion of box.

D. Install overcurrent protective devices and controllers not already factory installed.

1. Set field-adjustable, circuit-breaker trip ranges.

E. Install filler plates in unused spaces.

F. Arrange conductors in gutters into groups and bundle and wrap with wire ties.

G. Leave four spaces empty in panel to provide enough spare locations for homeowner.

H. Comply with NECA 1.

3.3 IDENTIFICATION

A. Create a directory to indicate installed circuit loads; incorporate homeowner's final room designations. Obtain approval before installing. Use a computer to create directory; handwritten directories are not acceptable.

3.4 FIELD QUALITY CONTROL

A. Acceptance Testing Preparation:

1. Test insulation resistance for each panelboard bus, component, connecting supply, feeder, and control circuit.
2. Test continuity of each circuit.

B. Tests and Inspections:

1. Perform each visual and mechanical inspection and electrical test stated in NETA Acceptance Testing Specification. Certify compliance with test parameters.

2. Correct malfunctioning units on-site, where possible, and retest to demonstrate compliance; otherwise, replace with new units and retest.

C. Panelboards will be considered defective if they do not pass tests and inspections.

3.5 ADJUSTING

A. Adjust moving parts and operable component to function smoothly, and lubricate as recommended by manufacturer.

B. Set field-adjustable circuit-breaker trip ranges.

END OF SECTION 262416

262816 - ENCLOSED SWITCHES AND CIRCUIT BREAKERS

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

A. Drawings and general provisions of the Contract, including General and Special Conditions and other Division 01 Specification Sections, apply to this Section.

1.2 SUMMARY

A. Section Includes:

1. Nonfusible switches.
2. Molded-case circuit breakers (MCCBs).
3. Molded-case switches.
4. Enclosures.

1.3 SUBMITTALS

A. Product Data: For each type of enclosed switch, circuit breaker, accessory, and component indicated. Include dimensioned elevations, sections, weights, and manufacturers' technical data on features, performance, electrical characteristics, ratings, accessories, and finishes.

1. Enclosure types and details for types other than NEMA 250, Type 1.
2. Current and voltage ratings.
3. Short-circuit current ratings (interrupting and withstand, as appropriate).
4. Include evidence of NRTL listing for series rating of installed devices.
5. Detail features, characteristics, ratings, and factory settings of individual overcurrent protective devices, accessories, and auxiliary components.

1.4 QUALITY ASSURANCE

A. Source Limitations: Obtain enclosed switches and circuit breakers, overcurrent protective devices, components, and accessories, within same product category, from single source from single manufacturer.

B. Electrical Components, Devices, and Accessories: Listed and labeled as defined in NFPA 70, by a qualified testing agency, and marked for intended location and application.

1.5 PROJECT CONDITIONS

A. Interruption of Existing Electric Service: Do not interrupt electric service to home occupied by homeowner or others unless permitted under the following conditions and then only after arranging to provide temporary electric service according to requirements indicated:

1. Notify Engineer no fewer than 7 days in advance of proposed interruption of electric service.
2. Indicate method of providing temporary electric service.
3. Do not proceed with interruption of electric service without Engineer's permission.
4. Comply with NFPA 70E.

1.6 COORDINATION

A. Coordinate layout and installation of switches, circuit breakers, and components with equipment served and adjacent surfaces. Maintain required workspace clearances and required clearances for equipment access doors and panels.

PART 2 - PRODUCTS

2.1 NONFUSIBLE SWITCHES

A. Manufacturers: Subject to compliance with requirements, provide products by one of the following:

1. Eaton Electrical Inc.; Cutler-Hammer Business Unit.
2. General Electric Company; GE Consumer & Industrial - Electrical Distribution.
3. Siemens Energy & Automation, Inc.
4. Square D; a brand of Schneider Electric.
5. Or Approved Equal.

B. Type HD, Heavy Duty, Single Throw, 240-V ac, 1200 A and Smaller: UL 98 and NEMA KS 1, horsepower rated, lockable handle with capability to accept three padlocks, and interlocked with cover in closed position.

2.2 MOLDED-CASE CIRCUIT BREAKERS

A. Manufacturers: Subject to compliance with requirements, provide products by one of the following

1. Eaton Electrical Inc.; Cutler-Hammer Business Unit.
2. General Electric Company; GE Consumer & Industrial - Electrical Distribution.
3. Siemens Energy & Automation, Inc.
4. Square D; a brand of Schneider Electric.
5. Or Approved Equal.

B. General Requirements: Comply with UL 489, NEMA AB 1, and NEMA AB 3, with interrupting capacity to comply with available fault currents.

C. Integrally Fused Circuit Breakers: Thermal-magnetic trip element with integral limiter-style fuse listed for use with circuit breaker and trip activation on fuse opening or on opening of fuse compartment door.

D. Ground-Fault, Circuit-Interrupter (GFCI) Circuit Breakers: Single- and two-pole configurations with Class A ground-fault protection (6-mA trip).

2.3 ENCLOSURES

A. Enclosed Switches and Circuit Breakers: NEMA AB 1, NEMA KS 1, NEMA 250, and UL 50, to comply with environmental conditions at installed location.

1. Indoor, Dry and Clean Locations: NEMA 250, Type 1.
2. Outdoor Locations: NEMA 250, Type 3R.

PART 3 - EXECUTION

3.1 EXAMINATION

A. Examine elements and surfaces to receive enclosed switches and circuit breakers for compliance with installation tolerances and other conditions affecting performance of the Work.

B. Proceed with installation only after unsatisfactory conditions have been corrected.

3.2 INSTALLATION

A. Install individual wall-mounted switches and circuit breakers with tops at uniform height unless otherwise indicated.

B. Comply with NECA 1.

3.3 FIELD QUALITY CONTROL

A. Acceptance Testing Preparation:

1. Test insulation resistance for each enclosed switch and circuit breaker, component, connecting supply, feeder, and control circuit.
2. Test continuity of each circuit.

B. Tests and Inspections:

1. Perform each visual and mechanical inspection and electrical test stated in NETA Acceptance Testing Specification. Certify compliance with test parameters.

2. Correct malfunctioning units on-site, where possible, and retest to demonstrate compliance; otherwise, replace with new units and retest.
3. Test and adjust controls and safeties. Replace damaged and malfunctioning controls and equipment.

C. Enclosed switches and circuit breakers will be considered defective if they do not pass tests and inspections.

D. Prepare test and inspection reports, including a certified report that identifies enclosed switches and circuit breakers and that describes scanning results. Include notation of deficiencies detected, remedial action taken, and observations after remedial action.

3.4 ADJUSTING

A. Adjust moving parts and operable components to function smoothly, and lubricate as recommended by manufacturer.

B. Set field-adjustable circuit-breaker trip ranges.

END OF SECTION 262816

283111 –DETECTORS AND ALARMS

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

A. Drawings and general provisions of the Contract, including General and Special Conditions and Division 01 Specification Sections, apply to this Section.

1.2 SUMMARY

A. Section Includes:

1. Smoke detectors.
2. Carbon monoxide detectors.
3. Condensate alarms.

1.3 SUBMITTALS

A. Product Data: For each type of product, including furnished options and accessories.

1. Include rated capacities, operating characteristics, and electrical characteristics.

1.4 QUALITY ASSURANCE

A. Comply with NFPA 72 National Fire Alarm Code.

PART 2 - PRODUCTS

2.1 GENERAL

A. Manufacturers: Subject to compliance with requirements, provide products by one of the following:

1. First Alert.
2. Kidde.
3. Or Approved Equal.

2.2 SMOKE DETECTORS

A. Photoelectric Smoke Detectors:

1. Comply with UL 217; suitable for NFPA 101, residential occupancies; operating at 9V battery powered smoke alarm. Provide with "low" or "missing" battery chirping-sound device.

2. Auxiliary Relays: One.
3. Audible Notification Appliance: Piezoelectric sounder rated at 85 dBA at 10 feet according to UL 464.
4. Visible Notification Appliance: 177-cd strobe.
5. Heat sensor, 135 deg F fixed temperature.
6. Test Switch: Push to test; simulates smoke at rated obscuration.
7. Tandem Connection: Allow tandem connection of number of indicated detectors; alarm on one detector shall actuate notification on all connected detectors.
8. Plug-in Arrangement: Detector and associated electronic components shall be mounted in a plug-in module that connects to a fixed base. Provide terminals in the fixed base for connection to building wiring.
9. Self-Restoring: Detectors shall not require resetting or readjustment after actuation to restore them to normal operation.
10. Integral Visual-Indicating Light: LED type, indicating detector has operated and power-on status.

2.3 CARBON MONOXIDE DETECTORS

A. General: Carbon monoxide detector listed for connection to fire-alarm system.

1. Comply with UL 217; suitable for NFPA 101, residential occupancies; operating at 120-V ac with 9-V dc battery as the secondary power source. Provide with "low" or "missing" battery chirping-sound device.
2. Mounting: Adapter plate for outlet box mounting.
3. Testable by introducing test carbon monoxide into the sensing cell.
4. Detector shall provide alarm contacts and trouble contacts.
5. Detector shall send trouble alarm when nearing end-of-life, power supply problems, or internal faults.
6. Audible Notification Appliance: Piezoelectric sounder rated at 85 dBA at 10 feet according to UL 464.
7. Comply with UL 2075.
8. Locate, mount, and wire according to manufacturer's written instructions.
9. Test button simulates an alarm condition.

2.4 CONDENSATE ALARM

A. Manufacturers: Subject to compliance with requirements, provide products by one of the following:

1. Little Giant; Condalert, LC-310.
2. Or Approved Equal.

B. General: Provide primary and secondary condensate drain overflow detection with audible alarm.

PART 3 - EXECUTION

3.1 EXAMINATION

A. Examine areas and conditions for compliance with requirements for ventilation, temperature, humidity, and other conditions affecting performance of the Work.

1. Verify that manufacturer's written instructions for environmental conditions have been permanently established in spaces where equipment and wiring are installed, before installation begins.

B. Examine roughing-in for electrical connections to verify actual locations of connections before installation.

C. Proceed with installation only after unsatisfactory conditions have been corrected.

3.2 EQUIPMENT INSTALLATION

A. Comply with NFPA 72, NFPA 101, and requirements of authorities having jurisdiction for installation and testing of fire-alarm equipment. Install all electrical wiring to comply with requirements in NFPA 70 including, but not limited to, Article 760, "Fire Alarm Systems."

1. Devices placed in service before all other trades have completed cleanup shall be replaced.
2. Devices installed but not yet placed in service shall be protected from construction dust, debris, dirt, moisture, and damage according to manufacturer's written storage instructions.

B. Smoke-Detector Spacing:

1. Comply with the "Smoke-Sensing Fire Detectors" section in the "Initiating Devices" chapter in NFPA 72, for smoke-detector spacing.

3.3 FIELD QUALITY CONTROL

A. Field tests shall be witnessed by Engineer.

B. Perform the following tests and inspections:

1. Visual Inspection: Conduct visual inspection prior to testing.
2. Test audible appliances according to manufacturer's written instructions.
3. Test visible appliances according to manufacturer's written instructions.

C. Fire-alarm system will be considered defective if it does not pass tests and inspections.

3.4 DEMONSTRATION

A. Train homeowners to adjust, operate, and maintain systems.

END OF SECTION 283111