PROJECT MANUAL

for the renovations of

Morganton Community House
Phase II

Morganton, North Carolina

GLAZER ARCHITECTURE, PA
78 1/2 Patton Avenue, Asheville, NC 28801
828.254.5853

NORTH CAROLINA PROFESSIONAL SEAL 18486 ENGINEER JEROME C. HAY
10/17/16

NORTH CAROLINA PROFESSIONAL SEAL 022178 ENGINEER DANIEL J. MAY
10-17-16

NORTH CAROLINA PROFESSIONAL SEAL 30835 ENGINEER DAVID LAWRENCE BRIGGS

GLAZER ARCHITECTURE, P.A. REGISTERED ARCHITECTURAL CORPORATION CERT.NO. 51109 NORTH CAROLINA ASHEVILLE, N.C.

PATTI LEE GLAZER REGISTERED ARCHITECT 3851 NORTH CAROLINA ASHEVILLE, N.C.
10/17/16

Project Number: 1236
Bid Date: 11-17-16

Copy Number:

DOCUMENT 000105 - PROJECT DIRECTORY

Owner
City of Morganton, a Municipal Corporation
305 East Union Street, Suite A100
Morganton, NC 28655
City Representative: Michael Berley, Project Manager in the Development and Design Services Department
Tel: 828-438-5362
Email: mberley@ci.morganton.nc.us

Architect
Glazer Architecture, P.A.
78 ½ Patton Avenue
Asheville, North Carolina 28801
Tel: 828-254-5853
Fax: 828-254-5856
Project Architect: Patti Glazer, AIA
Email: pg@glazerarchitecture.com

Structural Engineer
Mady Engineering
1357 Garren Creek Rd.
Fairview, NC 28730
Tel: 828-628-2577
Fax: 828-628-2578
Contact: Dan Mady, PE
Email: danmady1@gmail.com

Mechanical Engineer
Sud Associates, P.A.
20 Battery Park Ave.
Flat Iron Building, Ste. 706
Asheville, NC 28801
Tel. 828-255-4691
Fax: 828-255-4949
Contact: Jerome Hay, PE
Email: jhay@sudassociates.com

Plumbing Engineer
Sud Associates, P.A.
20 Battery Park Ave.
Flat Iron Building, Ste. 706
Asheville, NC 28801
Tel. 828-255-4691
Fax: 828-255-4949
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Electrical Engineer
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20 Battery Park Ave.
Flat Iron Building, Ste. 706
Asheville, NC 28801
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Fax: 828-255-4949
Contact: Dave Briggs, PE
Email: dbriggs@sudassociates.com

END OF DOCUMENT

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1997 EDITION

AIA DOCUMENT A701-1997

Instructions to Bidders

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

TABLE OF ARTICLES

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of Architects
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Washington, D.C. 20006-5292

ARTICLE 1 DEFINITIONS

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

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

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

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

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

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

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

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

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

ARTICLE 2 BIDDER'S REPRESENTATIONS

2.1 The Bidder by making a Bid represents that:

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

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

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

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

ARTICLE 3 BIDDING DOCUMENTS

3.1 COPIES

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

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

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

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

3.2 INTERPRETATION OR CORRECTION OF BIDDING DOCUMENTS

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

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

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

3.3 SUBSTITUTIONS

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

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

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

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

3.4 ADDENDA

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

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

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

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

ARTICLE 4 BIDDING PROCEDURES

4.1 PREPARATION OF BIDS

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

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

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

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

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

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

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

4.2 BID SECURITY

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

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

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

4.3 SUBMISSION OF BIDS

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

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

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

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

4.4 MODIFICATION OR WITHDRAWAL OF BID

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

4.4.2 Prior to the time and date designated for receipt of Bids, a Bid submitted may be modified or withdrawn by notice to the party receiving Bids at the place designated for receipt of Bids. Such notice shall be in writing over the signature of the Bidder. Written confirmation over the signature of the Bidder shall be received, and date- and time-stamped by the receiving party on or before the date and time set for receipt of Bids. A change shall be so worded as not to reveal the amount of the original Bid.

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

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

ARTICLE 5 CONSIDERATION OF BIDS

5.1 OPENING OF BIDS

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

5.2 REJECTION OF BIDS

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

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5.3 ACCEPTANCE OF BID (AWARD)

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

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

ARTICLE 6 POST-BID INFORMATION

6.1 CONTRACTOR'S QUALIFICATION STATEMENT

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

6.2 OWNER'S FINANCIAL CAPABILITY

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

6.3 SUBMITTALS

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

.1 a designation of the Work to be performed with the Bidder's own forces;

.2 names of the manufacturers, products, and the suppliers of principal items or systems of materials and equipment proposed for the Work; and

.3 names of persons or entities (including those who are to furnish materials or equipment fabricated to a special design) proposed for the principal portions of the Work.

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

6.3.3 Prior to the execution of the Contract, the Architect will notify the Bidder in writing if either the Owner or Architect, after due investigation, has reasonable objection to a person or entity proposed by the Bidder. If the Owner or Architect has reasonable objection to a proposed person or entity, the Bidder may, at the Bidder's option, (1) withdraw the Bid or (2) submit an acceptable substitute person or entity with an adjustment in the Base Bid or Alternate Bid to cover the difference in cost occasioned by such substitution. The Owner may accept the adjusted bid price or disqualify the Bidder. In the event of either withdrawal or disqualification, bid security will not be forfeited.

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

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ARTICLE 7 PERFORMANCE BOND AND PAYMENT BOND

7.1 BOND REQUIREMENTS

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

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

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

7.2 TIME OF DELIVERY AND FORM OF BONDS

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

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

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

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

ARTICLE 8 FORM OF AGREEMENT BETWEEN OWNER AND CONTRACTOR

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

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DOCUMENT 002115 – SUPPLEMENTARY INSTRUCTIONS TO BIDDERS

The provisions of this Supplementary Instructions to Bidders shall modify and supplement the provisions contained in the "*Instructions to Bidders*," AIA Document A701-1997 Edition. The provisions contained in this Supplementary Instructions to Bidders will supersede any conflicting provisions of the AIA Document.

ARTICLE 1 - DEFINITIONS

1.1 Owner: City of Morganton, a Municipal Corporation, 305 East Union Street, Suite A100, Morganton, NC 28655

1.2 Project: Morganton Community House Phase 2, 120 North King Street, Morganton NC 28655

1.3 Architect: Glazer Architecture, P.A. 78 ½ Patton Avenue, Asheville, North Carolina 28801. For bidding questions, contact Patti Glazer or Russ Nicholson, Project Architects (email: pg@glazerarchitecture.com, rn@glazerarchitecture.com), at the offices of the Architect.

1.4 Bidders: The Project is open to bid to all qualified bidders who have a proper license under North Carolina State laws governing their respective trades at the time of Bid. Addenda will be transmitted to Bidders and Sub-bidders who identify themselves as such by email to the project architect above and who are known by the Architect to have received a complete set of Bidding Documents.

ARTICLE 2 - BIDDER'S REPRESENTATION

2.1 Instructions to Bidders: The Bidder, by making a Bid, represents that Bid is made in accordance with Document 00200 "Instructions to Bidders", AIA Document A701 – 1997 and this Document 002115 "Supplementary Instructions to Bidders" included in the Bidding Documents.

2.2 Bidder's Stipulation: The Bidder's proposal shall not stipulate conditions extraneous to the Bidding Documents. Bid shall be based on the Bidding Documents without exception. The Bidder acknowledges the following provisions (which are not intended to be a comprehensive list of all contractual provisions):

- **A.** Contact Time for Substantial Completion is indicated in 00 5200 Proposed Agreement AIA A101-2007.
- **B.** Notice to Proceed provisions are indicated in 00 5200 Proposed Agreement AIA A101-2007
- **C.** Liquidated Damages for late completion is indicated in 00 5200 Proposed Agreement AIA A101-2007.
- **D.** Retainage on Applications for Payment is indicated in 00 5200 Proposed Agreement AIA A101-2007.
- **E.** Dispute Resolution method is indicated in 00 5200 Proposed Agreement AIA A101-2007.
- **F.** Maximum Markup for Change Orders is indicated in 00 7300 Supplementary Conditions.
- **G.** Sales Tax Exemption is indicated in 00 7300 Supplementary Conditions.
- **H.** Allowances to be included in the Base Bid are indicated in 01 2100 Allowances.

2.3 Pre-bid Conference: October 26, 2016 at 2:00pm at the Project Site.

- **A.** Bidder are required to attend the pre-bid conference. Bidders failing to be represented at pre-bid conference will be disqualified from bidding at the discretion of the Owner. Other Sub-bidders are encouraged to attend the pre-bid conference.

2.4 Site Visits: The Pre-Bid Conference will include a site visit. Bidders and Sub-bidders may schedule additional site visits coordinated through Sharon Jablonski (Email: sharonj@downtownmorganton.com, Tel. 828-438-5252) and the Community House schedule.

ARTICLE 3 - BIDDING DOCUMENTS

3.1 Copies of Bidding Documents: Delete Sub-paragraphs 3.1.1 and 3.1.2 from Instructions to Bidders AIA Document A701-1997 Edition and insert the following: Bidders may obtain online access to Bidding Documents after October 17, 2016. Bidding Documents will be posted on the Owner's website: www.ci.morganton.nc.us/openbids. Printing of documents is the Bidder or Sub-bidders responsibility. The Owner can print Bidding Documents Drawings, if requested, for a fee of $1.00 per square foot. The Owner can print Bidding Documents Project Manual, if requested, for $0.50 per 8½" x 11" page. Partial copies of the Bidding Documents will not be issued. Online access will be provided to all Bidder and Sub-bidders.

A. Deposit Sum: There is no refundable deposit amount.

B. Return Location: Bidding Document are not required to be returned.

3.2 Examination: The Bidding Documents may be examined at the following locations:

A. Office of the Architect: Glazer Architecture, 78 ½ Patton Avenue, Asheville, NC 28801

B. Office of the Owner: Development & Design Services Department, City of Morganton, 305 East Union Street, Suite A100, Morganton, NC 28655.

C. Owner's website: www.morgantonnc.gov/bids

D. Plan Rooms: Bidding Documents have been distributed to, and are available through:

1. Hispanic Contractors Association of the Carolinas (info@hcacarolinas.org)
2. Carolinas AGC (www.isqft.com)
3. FW Dodge (Deborah Baran, Deborah.baran@construction.com)

3.3 Missing Documents: If Bidding Documents enumerated in the "Project Manual Table of Contents" or "List of Drawings" are missing in part or entirety from the Project Manual or Drawings, inform entity from which the original Bidding Documents were obtained for replacement.

3.4 Availability to Sub-bidders: For the convenience of the Bidders, Bidding Documents will be available to Sub-bidders who have a proper license under North Carolina State laws governing their respective trades at the time of Bid with the stipulation that Sub-bidders prepare bids as instructed for Bidders including the obligation that Sub-bidders shall use complete sets of Bidding Documents in preparing bids. Neither the Owner nor the Architect assumes responsibility for errors and misinterpretations which result from the use of incomplete sets of Bidding Documents.

3.5 Substitutions: Delete Paragraph 3.3 Substitutions from Instructions to Bidders AIA Document A701-1997 Edition and insert the following: No substitutions will be considered prior to receipt of Bids. No substitutions will be considered after the Contract award. If the Architect makes changes to the Bidding Documents, such change shall be set forth in an Addendum. Bidders shall not rely upon changes made in any other manner.

ARTICLE 4 - BIDDING PROCEDURE

4.1 Bid Location, Date and Time: Bids will be received by delivery or postal mail to Michael Berley, Project Manager in the Development Department for the City of Morganton 305 East Union Street, Suite A100, Morganton, NC 28655 until 10:00 am on November 17, 2016 and then be publicly

opened and read aloud at Morganton City Hall Council Chambers at above address. Refer to Article 6 for Post-Bid Information due 72 hours after bid.

4.2 Submit Bids in sealed envelopes labeled per Paragraph 4.3.1 of the Instructions to Bidders.

4.3 Bid Security: Each bid shall be accompanied by a deposit to The City of Morganton in cash, cashier's check, or a certified check on some bank or trust company insured by the Federal Deposit Insurance Corporation in an amount equal to not less than five percent (5%) of the bid amount. This deposit shall be retained if the successful bidder fails to execute the contract within ten (10) days after written notification of the Award of Contract or fails to give satisfactory surety as required in N.C. Gen. Stat. Sec 143-129. In lieu of making the cash deposit as above provided, the bidder may file a bid bond executed by a corporate surety licensed under the laws of North Carolina to execute such bonds, conditioned that the surety will upon demand forthwith make payment to the obligee upon said bond if the bidder fails to execute the contract in accordance with the bid bond. A Bid Bond in the form of AIA Document A310 is included in the Project Manual for submission of Bid Security.

4.4 Minority and Historically Underutilized Business Forms: Each bid shall be accompanied by Identification of HUB Certified/ Minority Business Participation certification form and one of the following notarized affidavits on forms provided in the Bidding Documents:

A. State of North Carolina AFFIDAVIT A – Listing of Good Faith Efforts, or

B. State of North Carolina AFFIDAVIT B-- Intent to Perform Contract with Own Workforce

Refer to Article 6 for required post-bid affidavits.

4.5 E-verify Affidavit: Each bid shall be accompanied by notarized affidavit on form provided in Bidding Documents indicating Bidder is aware of and in compliance with the requirements of E-Verify, Article 2 of Chapter 64 of the North Carolina General Statutes.

4.6 Iran Divestment Act Certification: Each bid shall be accompanied by certification on form provided in Bidding Documents indicating Bidder is not listed on the Final Divestment List created by the State Treasurer pursuant to North Carolina General Statutes 143-6A-4.

ARTICLE 5 - CONSIDERATION OF BIDS

5.1 Bid Duration: Except as provided in North Carolina General Statutes, a Bid may not be modified, withdrawn or canceled for the number of days indicated on the Bid Form following the date designated for the receipt of Bids.

5.2 Evaluation and Consideration of Bids: Owner has the right to establish any criteria the Owner considers to be in the Owner's best interest with respect to Base Bid, Alternates, or other provisions of proposals by the Bidders for the evaluation and consideration of Bids.

ARTICLE 6 - POST-BID INFORMATION

6.1 Post-Bid Information on Bid Form: Within 72 hours of the Bid Date and Time, Bidders shall submit fully completed Post-Bid Information on the Bid Form. Prepare Post-bid Information as instructed for bids except that amounts may be written without words and corporate seal is not required.

6.2 Within 72 hours of being notified that the Bidder is the apparent lowest responsible and responsive Bidder, such Bidder shall submit by the following completed affidavits included in the Bidding Documents:

A. State of North Carolina AFFIDAVIT C – Portion of the Work to be Performed by HUB Certified/Minority Businesses

B. State of North Carolina AFFIDAVIT D – Good Faith Efforts

6.3 Additional Post Bid Information: Submit additional post bid information as required by Article 6 of the Instructions to Bidders as soon as practicable or as required elsewhere.

6.4 Alternates Information: Within 4 calendar days after notification of selection for the award of a Contract and before execution of a contract, the Bidder shall state in writing the last possible date to include Bid Alternates by Change Order such that the Contract Sum will be adjusted by the amount stated on the Bid Form and that the Contract Time will not be extended. Bid Alternates which are not accepted for inclusion in the Contract Sum at execution of the Agreement for the Work will be deferred for decision by this date.

6.5 Subcontractor List: Within 4 calendar days after notification of selection for the award of a Contract and before execution of a contract, the Bidder shall submit complete supplier and subcontractor list as required by Article 5 of the General Conditions.

6.6 Owner's Financial Information: Delete Paragraph 6.2 Owner's Financial Capability from Instructions to Bidders AIA Document A701-1997 Edition and insert the following: The provisions of the Bidding Documents shall not create and obligation of the Owner to furnish financial evidence of Owner's capacity to fulfill obligations under the Contract.

ARTICLE 7 - PERFORMANCE BOND AND PAYMENT BOND

7.1 Performance and Payment Bond: A Performance and Payment Bond as required in General and Supplementary Conditions will be required at or before execution of the Contract. Those bonds shall meet the requirements of North Carolina General Statutes 143-129 and of Article 3 of Chapter 44A of the North Carolina General Statutes. Bids shall include the costs of such bonds.

ARTICLE 8 - FORM OF AGREEMENT BETWEEN OWNER AND CONTRACTOR

8.1 Contract Form: The Agreement for the Work will be written on "AIA Document A101-2007, Standard Form of Agreement Between Owner and Contractor Where the Basis of Payment Is a Stimulated Sum". A Proposed Agreement for the Work is included in the Project Manual as part of the Bidding Documents.

END OF DOCUMENT 002115

DOCUMENT 00410 – BID FORM

ARTICLE 1 - DEFINITIONS

1.1 Owner: City of Morganton, a Municipal Corporation, 305 East Union Street, Suite A100, Morganton, NC 28655

1.2 Project: Morganton Community House Phase 2, 120 North King Street, Morganton NC 28655

1.3 Architect: Glazer Architecture, P.A. 78 ½ Patton Avenue, Asheville, North Carolina 28801.

1.4 Bidder:

Legal name of Bidder		
Legal form of Bidder (mark one) ☐ Corporation ☐ Partnership ☐ Individual	*State of incorporation or place of business*	*Corporate seal (if corporation)*

ARTICLE 2 - PROPOSAL

2.1 Proposal: The Bidder agrees, if this Bid is accepted, to enter into an agreement with the Owner, based on the Proposed Agreement for the Work included in the Project Manual and to perform all Work for the construction of the Project in accordance with the proposed Contract Documents prepared within the Contract Time and Contract Sum set forth therein based on the following Bid:

ARTICLE 3 - BID

3.1 Base Bid: Bidder agrees to perform the Work of the proposed Contract Documents for the following Base Bid:

written	*figures*
dollars	$

3.2 Alternate Bids: Bidder agrees to perform the Work of Alternates as described in the proposed Contract Documents for the following Alternate Bids:

A. Alternate 1: Add Fireplace

mark and circle one	*written*	*figures*
☐ ADD ☐ DEDUCT	dollars	$

B. Alternate 2: Add Finish Work in Stair

mark and circle one	*written*	*figures*
☐ ADD ☐ DEDUCT	dollars	$

C. Alternate 3: Add Wallpaper

mark and circle one	*written*	*figures*
☐ ADD ☐ DEDUCT	dollars	$

D. Alternate 4: Sequence Work

mark and circle one	*written*	*figures*
☐ ADD ☐ DEDUCT	dollars	$
Written number of days by which to modify the Contract Time if Alternate 4 is accepted by the Owner. Positive numbers extend the Contract Time. Negative numbers reduce the Contract Time.	days	*figures* days

E. Alternate 5: Decentralized DDC System - HVAC

mark and circle one	*written*	*figures*
☐ ADD ☐ DEDUCT	dollars	$

ARTICLE 4 - ADDITIONAL INFORMATION

4.1 Bidder's Personnel: Bidder proposes to assign the following personnel to the Project:

A. Project Manager: Responsible for overall coordination:

insert name of Project Manager

B. Superintendent: Responsible for supervision at the Project Site:

insert name of Superintendent

ARTICLE 5 - BIDDER'S REPRESENTATION

5.1 Instructions to Bidders: The Bidder, represents that this Bid is made in accordance with Document 002113 "Instructions to Bidders", AIA Document A701 – 1997 and Document 002115 "Supplementary to Bidders" included in the Bidding Documents. The Bidder accepts the provisions in these documents for the disposition of Bid Security.

A. Bidding Documents: The Bidder has read and understands the Bidding Documents for which the Bid is submitted including but not limited to provisions for Contact Time for Substantial Completion, Notice to Proceed, Liquidated Damages for late completion, Retainage on Applications for Payment, Dispute Resolution method, Maximum Markup for Change Orders, Sales Tax Exemption, and Allowances to be included in the Base Bid

B. Site Visit: The Bidder has visited the site, become familiar with the local conditions and regulations under which the Work is to be performed and has correlated the Bidder's personal observation with the requirements of the proposed Contract Documents.

5.2 **Addenda:** Bidder acknowledges receipt of the following Addenda:

insert addendum number	*insert addendum date*
insert addendum number	*insert addendum date*
insert addendum number	*insert addendum date*
insert addendum number	*insert addendum date*
insert addendum number	*insert addendum date*

5.3 **Independence of Bid:** Bidder certifies, that this Bid has been arrived at independently, without consultation, communication, or agreement as to any matter relating to this Bid with any other Bidder, with any competitor, or in conformity with an agreement or rules of a group, association, or organization.

5.4 **Evaluation and Consideration of Bids:** Bidder acknowledges that Owner has the right to establish any criteria the Owner considers to be in the Owner's best interest with respect to Base Bid, Alternates, or other provisions of proposals by the Bidders for the evaluation and consideration of Bids. Bidder acknowledges that Owner has the right to reject any Bids and to accept Bids with irregularities.

5.5 **Bid Security:** Bidder has included a bid security as required by the Bidding Documents with this Bid.

5.6 **Project Conditions:** Bidder acknowledges that no change in Contract Sum or Contract Time shall be permitted due to existing conditions that would have been apparent from a reasonable and thorough examination of the Project Site.

5.7 **Bid Duration:** This Bid will remain subject to acceptance by the Owner in the form of a written notification of the Award of Contract for 60 days after the Bid Date. Bidder acknowledges that a Bid may not be modified, withdrawn or canceled for this number of days except as provided in North Carolina General Statutes. Bidder proposes to enter into and execute an Agreement for the Work on the basis of this Bid, within ten days of notification of Award of Contract by the Owner.

5.8 **Certification:** Bidder certifies that the signatory to this Bid is legally authorized to bind the Bidder to a contract.

Signature	*Position*	*Date*

ARTICLE 6 - POST-BID INFORMATION

6.1 **Post-Bid Information:** Within 72 hours of the Bid Date and Time and to Architect by fax (828-254-5856) or by email (pg@glazerarchitecture.com), Bidders shall submit the following fully completed Post-Bid Information. Prepare Post-bid Information as instructed for bids except that amounts may be written without words and corporate seal is not required.

6.2 **Bidder:**

Legal name of Bidder

6.3 **Sub-bidders:** For each portion of the Work indicated below, Bidder proposes to use the following Sub-bidders as the prime sub-bidder allocated the greatest value for that portion of Work.

Portion of the Work	**Proposed Sub-bidder** *indicate proposed entity*
Cast in Place Concrete	
Masonry	
Structural Steel	
Rough Carpentry	
Finish Carpentry	
Gypsum Board Assemblies	
Finish Flooring	
Doors	
Door Hardware	
Folding Panel Partitions	
Painting	
Elevator	

Portion of the Work	**Proposed Sub-bidder** *indicate proposed entity*
Plumbing	
HVAC	
Electrical	
Fire Alarm	

6.4 Signature: Bidder certifies that the signatory to this Post-Bid Information Bid is legally authorized to bind the Bidder to a contract.

Signature	*Position*	*Date*

END OF DOCUMENT 00410

AIA® Document A310™ – 2010

Bid Bond

CONTRACTOR:
(Name, legal status and address)

SURETY:
(Name, legal status and principal place of business)

OWNER:
(Name, legal status and address)

BOND AMOUNT: $

PROJECT:
(Name, location or address, and Project number, if any)

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

Any singular reference to Contractor, Surety, Owner or other party shall be considered plural where applicable.

The Contractor and Surety are bound to the Owner in the amount set forth above, for the payment of which the Contractor and Surety bind themselves, their heirs, executors, administrators, successors and assigns, jointly and severally, as provided herein. The conditions of this Bond are such that if the Owner accepts the bid of the Contractor within the time specified in the bid documents, or within such time period as may be agreed to by the Owner and Contractor, and the Contractor either (1) enters into a contract with the Owner in accordance with the terms of such bid, and gives such bond or bonds as may be specified in the bidding or Contract Documents, with a surety admitted in the jurisdiction of the Project and otherwise acceptable to the Owner, for the faithful performance of such Contract and for the prompt payment of labor and material furnished in the prosecution thereof; or (2) pays to the Owner the difference, not to exceed the amount of this Bond, between the amount specified in said bid and such larger amount for which the Owner may in good faith contract with another party to perform the work covered by said bid, then this obligation shall be null and void, otherwise to remain in full force and effect. The Surety hereby waives any notice of an agreement between the Owner and Contractor to extend the time in which the Owner may accept the bid. Waiver of notice by the Surety shall not apply to any extension exceeding sixty (60) days in the aggregate beyond the time for acceptance of bids specified in the bid documents, and the Owner and Contractor shall obtain the Surety's consent for an extension beyond sixty (60) days.

If this Bond is issued in connection with a subcontractor's bid to a Contractor, the term Contractor in this Bond shall be deemed to be Subcontractor and the term Owner shall be deemed to be Contractor.

When this Bond has been furnished to comply with a statutory or other legal requirement in the location of the Project, any provision in this Bond conflicting with said statutory or legal requirement shall be deemed deleted herefrom and provisions conforming to such statutory or other legal requirement shall be deemed incorporated herein. When so furnished, the intent is that this Bond shall be construed as a statutory bond and not as a common law bond.

Signed and sealed this day of ,

(Contractor as Principal)	*(Seal)*
(Witness)	*(Title)*
(Surety)	*(Seal)*
(Witness)	*(Title)*

Identification of HUB Certified/ Minority Business Participation

I,_____,
(Name of Bidder)
do hereby certify that on this project, we will use the following HUB Certified/ minority business as construction subcontractors, vendors, suppliers or providers of professional services.

Firm Name, Address and Phone #	Work Type	*Minority Category	**HUB Certified (Y/N)

*Minority categories: Black, African American (**B**), Hispanic (**H**), Asian American (**A**) American Indian (**I**), Female (**F**) Socially and Economically Disadvantaged (**D**)

**** HUB Certification with the state HUB Office required to be counted toward state participation goals.**

The total value of minority business contracting will be ($)_____.

State of North Carolina AFFIDAVIT A – Listing of Good Faith Efforts

County of _____

(Name of Bidder)

Affidavit of_____

I have made a good faith effort to comply under the following areas checked:

Bidders must earn at least 50 points from the good faith efforts listed for their bid to be considered responsive. (1 NC Administrative Code 30 I.0101)

- ❑ **1 – (10 pts)** Contacted minority businesses that reasonably could have been expected to submit a quote and that were known to the contractor, or available on State or local government maintained lists, at least 10 days before the bid date and notified them of the nature and scope of the work to be performed.
- ❑ **2 --(10 pts)** Made the construction plans, specifications and requirements available for review by prospective minority businesses, or providing these documents to them at least 10 days before the bids are due.
- ❑ **3 – (15 pts)** Broken down or combined elements of work into economically feasible units to facilitate minority participation.
- ❑ **4 – (10 pts)** Worked with minority trade, community, or contractor organizations identified by the Office of Historically Underutilized Businesses and included in the bid documents that provide assistance in recruitment of minority businesses.
- ❑ **5 – (10 pts)** Attended prebid meetings scheduled by the public owner.
- ❑ **6 – (20 pts)** Provided assistance in getting required bonding or insurance or provided alternatives to bonding or insurance for subcontractors.
- ❑ **7 – (15 pts)** Negotiated in good faith with interested minority businesses and did not reject them as unqualified without sound reasons based on their capabilities. Any rejection of a minority business based on lack of qualification should have the reasons documented in writing.
- ❑ **8 – (25 pts)** Provided assistance to an otherwise qualified minority business in need of equipment, loan capital, lines of credit, or joint pay agreements to secure loans, supplies, or letters of credit, including waiving credit that is ordinarily required. Assisted minority businesses in obtaining the same unit pricing with the bidder's suppliers in order to help minority businesses in establishing credit.
- ❑ **9 – (20 pts)** Negotiated joint venture and partnership arrangements with minority businesses in order to increase opportunities for minority business participation on a public construction or repair project when possible.
- ❑ **10 - (20 pts)** Provided quick pay agreements and policies to enable minority contractors and suppliers to meet cash-flow demands.

The undersigned, if apparent low bidder, will enter into a formal agreement with the firms listed in the Identification of Minority Business Participation schedule conditional upon scope of contract to be executed with the Owner. Substitution of contractors must be in accordance with GS143-128.2(d) Failure to abide by this statutory provision will constitute a breach of the contract.

The undersigned hereby certifies that he or she has read the terms of the minority business commitment and is authorized to bind the bidder to the commitment herein set forth.

Date:_____ Name of Authorized Officer:_____

Signature:_____

Title:_____

SEAL

State of_____, County of_____

Subscribed and sworn to before me this _____day of _____20____

Notary Public_____

My commission expires _____

State of North Carolina --AFFIDAVIT B-- Intent to Perform Contract with Own Workforce.

County of _____

Affidavit of _____
(Name of Bidder)

I hereby certify that it is our intent to perform 100% of the work required for the _____

_____ contract.
(Name of Project)

In making this certification, the Bidder states that the Bidder does not customarily subcontract elements of this type project, and normally performs and has the capability to perform and will perform all elements of the work on this project with his/her own current work forces; and

The Bidder agrees to provide any additional information or documentation requested by the owner in support of the above statement. The Bidder agrees to make a Good Faith Effort to utilize minority suppliers where possible.

The undersigned hereby certifies that he or she has read this certification and is authorized to bind the Bidder to the commitments herein contained.

Date: _____ Name of Authorized Officer: _____

Signature: _____

Title: _____

SEAL

State of _____, County of _____

Subscribed and sworn to before me this _____ day of _____ 20___

Notary Public _____

My commission expires _____

Do not submit with bid Do not submit with bid Do not submit with bid Do not submit with bid

State of North Carolina - AFFIDAVIT C - Portion of the Work to be Performed by HUB Certified/Minority Businesses

County of _____

(Note this form is to be submitted only by the apparent lowest responsible, responsive bidder.)

If the portion of the work to be executed by HUB certified/minority businesses as defined in GS143-128.2(g) and 128.4(a),(b),(e) is equal to or greater than 10% of the bidders total contract price, then the bidder must complete this affidavit.
This affidavit shall be provided by the apparent lowest responsible, responsive bidder within **72 hours** after notification of being low bidder.

Affidavit of _____ I do hereby certify that on the
(Name of Bidder)

_____
(Project Name)

Project ID#_____ Amount of Bid $_____

I will expend a minimum of _____% of the total dollar amount of the contract with minority business enterprises. Minority businesses will be employed as construction subcontractors, vendors, suppliers or providers of professional services. Such work will be subcontracted to the following firms listed below. Attach additional sheets if required

Name and Phone Number	*Minority Category	**HUB Certified Y/N	Work Description	Dollar Value

*Minority categories: Black, African American (**B**), Hispanic (**H**), Asian American (**A**) American Indian (**I**), Female (**F**) Socially and Economically Disadvantaged (**D**)

**** HUB Certification with the state HUB Office required to be counted toward state participation goals.**

Pursuant to GS143-128.2(d), the undersigned will enter into a formal agreement with Minority Firms for work listed in this schedule conditional upon execution of a contract with the Owner. Failure to fulfill this commitment may constitute a breach of the contract.

The undersigned hereby certifies that he or she has read the terms of this commitment and is authorized to bind the bidder to the commitment herein set forth.

Date:_____ Name of Authorized Officer:_____

SEAL

Signature:_____

Title:_____

State of _____, County of _____
Subscribed and sworn to before me this _____day of _____20____
Notary Public_____
My commission expires_____

State of North Carolina AFFIDAVIT D – Good Faith Efforts

County of _____

(Note this form is to be submitted only by the apparent lowest responsible, responsive bidder.)

If the goal of 10% participation by HUB Certified/ minority business **is not** achieved, the Bidder shall provide the following documentation to the Owner of his good faith efforts:

Affidavit of _____ I do hereby certify that on the
(Name of Bidder)

_____
(Project Name)

Project ID#_____ Amount of Bid $_____

I will expend a minimum of _____% of the total dollar amount of the contract with HUB certified/ minority business enterprises. Minority businesses will be employed as construction subcontractors, vendors, suppliers or providers of professional services. Such work will be subcontracted to the following firms listed below. (Attach additional sheets if required)

Name and Phone Number	*Minority Category	**HUB Certified Y/N	Work Description	Dollar Value

*Minority categories: Black, African American (**B**), Hispanic (**H**), Asian American (**A**) American Indian (**I**), Female (**F**) Socially and Economically Disadvantaged (**D**)

**** HUB Certification with the state HUB Office required to be counted toward state participation goals.**

Examples of documentation that may be required to demonstrate the Bidder's good faith efforts to meet the goals set forth in these provisions include, but are not necessarily limited to, the following:

A. Copies of solicitations for quotes to at least three (3) minority business firms from the source list provided by the State for each subcontract to be let under this contract (if 3 or more firms are shown on the source list). Each solicitation shall contain a specific description of the work to be subcontracted, location where bid documents can be reviewed, representative of the Prime Bidder to contact, and location, date and time when quotes must be received.

B. Copies of quotes or responses received from each firm responding to the solicitation.

C. A telephone log of follow-up calls to each firm sent a solicitation.

D. For subcontracts where a minority business firm is not considered the lowest responsible sub-bidder, copies of quotes received from all firms submitting quotes for that particular subcontract.

E. Documentation of any contacts or correspondence to minority business, community, or contractor organizations in an attempt to meet the goal.

F. Copy of pre-bid roster

G. Letter documenting efforts to provide assistance in obtaining required bonding or insurance for minority business.

H. Letter detailing reasons for rejection of minority business due to lack of qualification.

I. Letter documenting proposed assistance offered to minority business in need of equipment, loan capital, lines of credit, or joint pay agreements to secure loans, supplies, or letter of credit, including waiving credit that is ordinarily required.

Failure to provide the documentation as listed in these provisions may result in rejection of the bid and award to the next lowest responsible and responsive bidder.

Pursuant to GS143-128.2(d), the undersigned will enter into a formal agreement with Minority Firms for work listed in this schedule conditional upon execution of a contract with the Owner. Failure to fulfill this commitment may constitute a breach of the contract.

The undersigned hereby certifies that he or she has read the terms of this commitment and is authorized to bind the bidder to the commitment herein set forth.

Date:_____ Name of Authorized Officer:_____

Signature:_____

Title:_____

SEAL

State of _____, County of _____

Subscribed and sworn to before me this _____day of _____20____

Notary Public_____

My commission expires _____

STATE OF _____

COUNTY OF _____

AFFIDAVIT

NOW COMES Affiant, first being sworn, deposes and says as follows

1. _____ ("the Contractor/Supplier") has submitted a bid for contract or desired to enter into a contract with the City of Morganton, and I am the _____ of the Contractor/Supplier.

2. As part of my duties and responsibilities pursuant to said bid and/or contract, I attest that the Contractor/Supplier is aware of and in compliance with the requirements of E-Verify, Article 2 of Chapter 64 of the North Carolina General Statutes, to include (mark which applies):

___ After hiring an employee to work in the United States the Contractor/Supplier verifies the work authorization of said employee through E-Verify and retains the record of the verification of work authorization while the employee is employed and for one year thereafter; or

___ The Contractor/Supplier employs less than twenty-five (25) employees in the State of North Carolina.

3. As part of my duties and responsibilities pursuant to said bid and/or contract, I attest that to the best of the Contractor's/Supplier's knowledge any subcontractors employed as a part of this bid and/or contract are in compliance with the requirements of E-Verify, Article 2 of Chapter 64 of the North Carolina General Statutes, to include (mark which applies):

___ After hiring an employee to work in the United States the subcontractor verifies the work authorization of said employee through E-Verify and retains the record of the verification of work authorization while the employee is employed and for one year thereafter; or

___ Employs less than twenty-five (25) employees in the State of North Carolina.

Pursuant to North Carolina General Statute § 143-133.3(c)(2), contracts solely for the purchase of apparatus, supplies, materials, and equipment are exempt from the E-Verify provision.

This the _____ day of _____, 20____.

AFFIANT:

Business Name_____

Address_____

_____

Signature_____

Printed Name_____

Title_____

Sworn to and subscribed before me, this the _____ day of _____, 20____.

_____

[OFFICIAL SEAL]

_____, Notary Public

My Commission Expires: _____

RFP Number (if applicable): _____

Name of Vendor or Bidder: _____

_____

IRAN DIVESTMENT ACT CERTIFICATION
REQUIRED BY N.C.G.S. 143C-6A-5(a)

As of the date listed below, the vendor or bidder listed above is not listed on the Final Divestment List created by the State Treasurer pursuant to N.C.G.S. 143-6A-4.

The undersigned hereby certifies that he or she is authorized by the vendor or bidder listed above to make the foregoing statement.

Signature Date

Printed Name Title

Notes to persons signing this form:

N.C.G.S. 143C-6A-5(a) requires this certification for bids or contracts with the State of North Carolina, a North Carolina local government, or any other political subdivision of the State of North Carolina. The certification is required at the following times:

- When the bid is submitted
- When a contract is entered into (if the certification was not already made when the vendor made its bid)
- When a contract is renewed or assigned

N.C.G.S. 143C-6A-5(b) requires that contractors with the State, a North Carolina local government, or any other political subdivision of the State of North Carolina must not utilize any subcontractor found on the State Treasurer's Final Divestment List.

The State Treasurer's Final Divestment List can be found on the State Treasurer's website at the address www.nctreasurer.com/Iran and will be updated every 180 days.

DOCUMENT 005200 – PROPOSED AGREEMENT

Unless otherwise indicated, the final Agreement for the Work to be executed by the Owner and Contractor shall be based on the information included in this Proposed Agreement:

Standard Form of Agreement Between Owner and Contractor

Where the basis of payment is a STIPULATED SUM

AIA DOCUMENT A101-2007

AGREEMENT made as of the _____ day of _____ in the year _____ (Date of Agreement to be determined)
(In words, indicate day, month and year)

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

City of Morganton, a Municipal Corporation
305 East Union Street, Suite A100
Morganton, NC 28655

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

Name and address of Contractor to be determined

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

Morganton Community House Phase 2
120 North King Street, Morganton NC 28655

The Architect:
(Name, address and other information)

Glazer Architecture, P.A.
78 ½ Patton Avenue
Asheville, North Carolina 28801

The Owner and Contractor agree as follows.

TABLE OF ARTICLES

ARTICLE 1 THE CONTRACT DOCUMENTS

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

ARTICLE 2 THE WORK OF THIS CONTRACT

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

ARTICLE 3 DATE OF COMMENCEMENT AND SUBSTANTIAL COMPLETION

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

The date of commencement of the Work shall be indicated in a Notice to Proceed which shall be issued to the Contractor within 30 days after the execution of this Agreement. The date of commencement of the Work in such Notice to Proceed shall be no more than 10 days following the date of issuance of the Notice to Proceed.

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

No additional time is anticipated.

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

§ 3.3 The Contractor shall achieve Substantial Completion of the entire Work not later than one hundred eighty (180) days from the date of commencement, or as follows:

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

, subject to adjustments of this Contract Time as provided in the Contract Documents.
(Insert provisions, if any, for failure to achieve Substantial Completion on time.)

The Contractor shall be liable for a Five Hundred Dollars ($500.00) per day liquidated damages charge after the date set forth for Substantial Completion until the Work reaches Substantial Completion. Owner and Contractor acknowledge that the actual damages accruing by reason of Contractor's failure complete the Work by the date set forth for Substantial Completion would be unreasonably difficult to determine, and therefore Contractor agrees to pay as liquidated damages, and not as a penalty, the charge indicated above.

ARTICLE 4 CONTRACT SUM

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

§ 4.2 The Contract Sum is based upon the following alternates, if any, which are described in the Contract Documents and are hereby accepted by the Owner:
(State the numbers or other identification of accepted alternates. If the bidding or proposal documents permit the Owner to accept other alternates subsequent to the execution of this Agreement, attach a schedule of such other alternates showing the amount for each and the date when that amount expires.)

Accepted Alternates to be determined

Up to the deferral date and for a change in the Contract Sum indicated below for each Alternate not accepted, Alternates which were not accepted may be included by Change Order without a change in the Contract Time:

Deferral date and cost for Alternates not accepted to be determined

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

No Unit Prices are anticipated.

§ 4.4 Allowances included in the Contract Sum, if any:
(Identify allowance and state exclusions, if any, from the allowance price.)

Allowances to be determined. Refer to Section 01200 Allowances for a schedule of Allowances to be included in the Bid.

ARTICLE 5 PAYMENTS

§ 5.1 PROGRESS PAYMENTS

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

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

No different period is anticipated.

§ 5.1.3 The Owner shall make payment of the certified amount to the Contractor not later than ten (10) days after the Owner receives the certified Application for Payment.
(Federal, state or local laws may require payment within a certain period of time.)

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

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

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

.1 Take that portion of the Contract Sum properly allocable to completed Work as determined by multiplying the percentage completion of each portion of the Work by the share of the Contract Sum allocated to that portion of the Work in the schedule of values, less retainage of five percent (5%). Pending final determination of cost to the Owner of changes in the Work, amounts not in dispute shall be included as provided in Section 7.3.9 of AIA Document A201™–2007, General Conditions of the Contract for Construction;

.2 Add that portion of the Contract Sum properly allocable to materials and equipment delivered and suitably stored at the site for subsequent incorporation in the completed construction (or, if approved in advance by the Owner, suitably stored off the site at a location agreed upon in writing), less retainage of five percent (5%);

.3 Subtract the aggregate of previous payments made by the Owner; and

.4 Subtract amounts, if any, for which the Architect has withheld or nullified a Certificate for Payment as provided in Section 9.5 of AIA Document A201–2007.

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

.1 Add, upon Substantial Completion of the Work, a sum sufficient to increase the total payments to the full amount of the Contract Sum, less such amounts as the Architect shall determine for incomplete Work, retainage applicable to such work and unsettled claims; and
(Section 9.8.5 of AIA Document A201–2007 requires release of applicable retainage upon Substantial Completion of Work with consent of surety, if any.)

.2 Add, if final completion of the Work is thereafter materially delayed through no fault of the Contractor, any additional amounts payable in accordance with Section 9.10.3 of AIA Document A201–2007.

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

The Owner will pay to the Contractor the total amount of the approved application for payment less a five percent (5%) retainage; provided, however, that after fifty percent (50%) of the Work has been satisfactorily completed on schedule as determined by the Architect and, with the approval of the Owner and with written consent of the surety (if required by same), retainage will be fixed at 5% of 50% of the Contract Sum until Substantial Completion and additional further requirements for retainage will be waived so long as the Work continues to be completed in a satisfactory manner and on schedule, but subject to the provisions of Paragraph 9.5 of the General Conditions. Notwithstanding, any payment under this Contract is subject to the provisions of North Carolina G.S. 143-134.1 including restrictions on the retainage on any periodic or final payment and/or the payment of interest on a final payment.

Likewise, the Contractor is subject to the provisions of North Carolina G.S. 143- 134.1(b) and (b1) governing payments by the contractor to subcontractors (of any tier).

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

§ 5.2 FINAL PAYMENT

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

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

.2 a final Certificate for Payment has been issued by the Architect.

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

No different period is anticipated.

ARTICLE 6 DISPUTE RESOLUTION

§ 6.1 INITIAL DECISION MAKER

The Architect will serve as Initial Decision Maker pursuant to Section 15.2 of AIA Document A201–2007, unless the parties appoint below another individual, not a party to this Agreement, to serve as Initial Decision Maker.
(If the parties mutually agree, insert the name, address and other contact information of the Initial Decision Maker, if other than the Architect.)

No other entity other than the Architect is anticipated to serve as Initial Decision Maker.

§ 6.2 BINDING DISPUTE RESOLUTION

For any Claim subject to, but not resolved by, mediation pursuant to Section 15.3 of AIA Document A201–2007, the method of binding dispute resolution shall be as follows:
(Check the appropriate box. If the Owner and Contractor do not select a method of binding dispute resolution below, or do not subsequently agree in writing to a binding dispute resolution method other than litigation, Claims will be resolved by litigation in a court of competent jurisdiction.)

[**X**] Arbitration pursuant to Section 15.4 of AIA Document A201-2007

[ ] ~~Litigation in a court of competent jurisdiction~~

[ ] Other *(Specify)*

ARTICLE 7 TERMINATION OR SUSPENSION

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

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

ARTICLE 8 MISCELLANEOUS PROVISIONS

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

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

One percent (1%) per month or fraction thereof

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

Michael Berley, Project Manager in the Development Department for the City of Morganton
305 East Union Street, Suite A100, Morganton, NC 28655

§ 8.4 The Contractor's representative and Project Manager per Paragraph 3.9 of the General and Supplementary Conditions:
(Name, address and other information)

Name and address of Project Manager to be determined

The Contractor's Superintendent per per Paragraph 3.9 of the General and Supplementary Conditions:
(Name, address and other information)

Name and address of Superintendent to be determined

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

§ 8.6 Other provisions:

Contractor shall abide by the City of Morganton's adopted Standard Policy on Minority Compliance.
Contractor shall comply with minority and historically underutilized business requirements as outlined in North Carolina G.S. 143-128.

ARTICLE 9 ENUMERATION OF CONTRACT DOCUMENTS

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

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

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

§ 9.1.3 The Supplementary and other Conditions of the Contract:

Document 007300 - SUPPLEMENTARY CONDITIONS contained in the Project Manual.

§ 9.1.4 The Specifications:

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

Division 01 -- General Requirements
01 2100 Allowances
01 2300 Alternates
01 2600 Contract Modification Procedures
01 2900 - Payment Procedures
01 3100 - Project Management and Coordination
01 3300 Submittal Procedures
01 3517 Renovation Work
01 4000 Quality Requirements
01 4200 References
01 5000 Temporary Facilities and Controls
01 6000 Product Requirements
01 7000 Execution Requirements
01 7700 Closeout Procedures
Division 02 -- Existing Conditions – NOT USED
Division 03 -- Concrete
03 3000 Cast-in-Place Concrete
03 3511 Concrete Floor Finishing
Division 04 – Masonry
04 0120 Brick Cutting and Patching
04 2200 Concrete Unit Masonry
04 2300 Glass Unit Masonry
Division 05 -- Metals
05 0514 Factory Applied Metal Finishes
05 1200 Structural Steel Framing
05 5000 Metal Fabrications
05 5213 Metal Railings
Division 6 -- Wood, Plastics, and Composites
06 1000 Rough Carpentry
06 2000 Finish Carpentry
Division 07 -- Thermal and Moisture Protection
07 1713 Bentonite Panel Waterproofing
07 2100 Thermal Insulation
07 8400 Firestopping
07 9005 Joint Sealants
Division 08 -- Openings
08 1113 Steel Doors And Frames
08 1416 Flush Wood Doors
08 1433 Stile And Rail Wood Doors
Division 09 -- Finishes
09 2116 Gypsum Board Assemblies
09 2613 Acoustical Gypsum Plastering
09 3000 Tiling
09 5100 Acoustical Ceilings
09 6011 Flooring Preparation
09 6500 Resilient Flooring And Accessories
09 6800 Carpeting
09 6813 Tile Carpeting
09 7200 Wall Coverings
09 9000 Onsite Coating (Painting, Staining, Clearcoating)
Division 10 -- Specialties
10 1400 Signage
10 2113.19 Toilet Compartments

10 2226.33 Folding Panel Partitions
10 2800 Toilet, Bath, And Laundry Accessories
10 3100 Manufactured Fireplaces
10 4400 Fire Protection Specialties
Division 11 -- Equipment
11 5213 Projection Screens
Division 12 -- Furnishings
12 3530 Manufactured Casework
12 3600 Countertops
Division 13 -- Special Construction – NOT USED
Division 14 -- Conveying Equipment
14 2010 Passenger Elevators
Division 21 -- Fire Suppression – NOT USED
Division 22 -- Plumbing
22 0110 Plumbing General Requirements
22 0150 Basic Materials And Methods
22 0700 Plumbing Insulation
22 1116 Domestic Water Piping
22 1119 Domestic Water Piping Specialties
22 4000 Plumbing Fixtures
22 6400 Natural Gas Piping
Division 23 -- Heating, Ventilating, and Air-Conditioning (HVAC)
23 0510 Basic Mechanical Requirements
23 0530 Electrical Provisions for Mechanical Work
23 0590 Mechanical Painting and Identification
23 0593 Testing and Balancing of HVAC Systems
23 0700 Mechanical Insulation
23 0923 Direct Digital Controls
23 2300 Refrigerant Piping and Specialties
23 3100 Ductwork and Dampers
23 3423 HVAC Power Ventilators
23 3715 Air Outlets and Inlets
23 8147 Split System Air Cooled Heat Pumps
23 8239 Electric Wall Heaters
Division 25 -- Integrated Automation – NOT USED
Division 26 -- Electrical
26 0050 Electrical General Requirements
26 0075 Electrical Identification
26 0080 Electrical Testing
26 0120 Conductors and Cables
26 0130 Raceways and Boxes
26 0410 Enclosed Switches and Circuit Breakers
26 0500 Common Work Results for Electrical
26 0510 Grounding and Bonding
26 2416 Panelboards
26 2726 Wiring Devices
26 2813 Fuses
26 5000 Lighting Controls
26 5100 Interior Lighting
26 5600 Exterior Lighting
Division 27 – Communications – NOT USED
Division 28 -- Electronic Safety and Security
283100 Fire Detection and Alarm

Division 31 thru 48 – NOT USEDPending complete list of Specifications to be provided by the Architect

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

Are dated October 17, 2016 and are as follows:
LIST OF DRAWINGS
CVR-I Cover Sheet
CVR-II Building Code Data Summary
CVR-III Life Safety Plans
ARCHITECTURAL:
A1, Existing/Demolition Floor Plans
A2, Main Floor Renovated Plan
A3, Lower Floor Renovated Plan
A4, Reflected Ceiling Plans
A5, Building Sections and Details
A6, Enlarged Plans and Elevations
A7, Finish & Door Schedule, Charts, Details
A8, Staging & Sequencing
STRUCTURAL:
S1, Lower Level & Foundation Plan
S2, Main Level Framing Plan
S3, Sections & Details
S4, Sections & Details
PLUMBING:
P0.1, Plumbing Plan – Demolition
P1.1, Plumbing Plans – Lower level
P1.2, Plumbing Plan – Main Level – supply
P1.3, Plumbing Plan – Main Level – DWV
P2.1, Plumbing – Details, Schedules & Legend
MECHANICAL:
M0.1, Mechanical Plan – Demolition
M1.1, Mechanical Plan – Lower Level
M1.2, Mechanical Plan – Main Level
M2.1, Mechanical Schedules, Details
ELECTRICAL:
E0.1, Electrical Plan – Demolition
E1.1, Electrical Plan – Main Level – Power
E1.2, Electrical Plan – Lower Level – Power
E1.3, Electrical Plan – Main Level – Lighting
E1.4, Electrical Plan – Lower Level – Lighting
E1.5, Electrical Plan – Attic Power
E1.6, Electrical Plan – Fire Alarm
E2.1, Electrical – Power Riser, Legend & Notes
E2.2, Electrical – Power Panels & Lighting Schedules

§ 9.1.6 The Addenda, if any:

The Addenda are to be determined.

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

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

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

.2 Other documents, if any, listed below:
(List here any additional documents that are intended to form part of the Contract Documents. AIA Document A201–2007 provides that bidding requirements such as advertisement or invitation to bid, Instructions to Bidders, sample forms and the Contractor's bid are not part of the Contract Documents unless enumerated in this Agreement. They should be listed here only if intended to be part of the Contract Documents.)

ARTICLE 10 INSURANCE AND BONDS
The Contractor shall purchase and maintain insurance and provide bonds as set forth in Article 11 of AIA Document A201–2007.
(State bonding requirements, if any, and limits of liability for insurance required in Article 11 of AIA Document A201–2007.)

Limits of liability for insurance are indicated in Article 11 of the Supplementary Condition.

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

OWNER *(Signature)*	**CONTRACTOR** *(Signature)*
(Printed name and title)	*(Printed name and title)*

END OF DOCUMENT 005200

AIA® Document A201™ – 2007

General Conditions of the Contract for Construction

for the following PROJECT:
(Name and location or address)

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

THE OWNER:
(Name and address)

THE ARCHITECT:
(Name and address)

TABLE OF ARTICLES

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ARTICLE 1 GENERAL PROVISIONS

§ 1.1 BASIC DEFINITIONS

§ 1.1.1 THE CONTRACT DOCUMENTS

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

§ 1.1.2 THE CONTRACT

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

§ 1.1.3 THE WORK

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

§ 1.1.4 THE PROJECT

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

§ 1.1.5 THE DRAWINGS

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

§ 1.1.6 THE SPECIFICATIONS

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

§ 1.1.7 INSTRUMENTS OF SERVICE

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

§ 1.1.8 INITIAL DECISION MAKER

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

§ 1.2 CORRELATION AND INTENT OF THE CONTRACT DOCUMENTS

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

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

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

§ 1.3 CAPITALIZATION

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

§ 1.4 INTERPRETATION

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

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

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

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

§ 1.6 TRANSMISSION OF DATA IN DIGITAL FORM

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

ARTICLE 2 OWNER

§ 2.1 GENERAL

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

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

§ 2.2 INFORMATION AND SERVICES REQUIRED OF THE OWNER

§ 2.2.1 Prior to commencement of the Work, the Contractor may request in writing that the Owner provide reasonable evidence that the Owner has made financial arrangements to fulfill the Owner's obligations under the Contract. Thereafter, the Contractor may only request such evidence if (1) the Owner fails to make payments to the Contractor as the Contract Documents require; (2) a change in the Work materially changes the Contract Sum; or (3) the Contractor identifies in writing a reasonable concern regarding the Owner's ability to make payment when due. The Owner shall furnish such evidence as a condition precedent to commencement or continuation of the Work or the portion of the Work affected by a material change. After the Owner furnishes the evidence, the Owner shall not materially vary such financial arrangements without prior notice to the Contractor.

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

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

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

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

§ 2.3 OWNER'S RIGHT TO STOP THE WORK

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

§ 2.4 OWNER'S RIGHT TO CARRY OUT THE WORK

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

ARTICLE 3 CONTRACTOR

§ 3.1 GENERAL

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

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

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

§ 3.2 REVIEW OF CONTRACT DOCUMENTS AND FIELD CONDITIONS BY CONTRACTOR

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

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

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

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

§ 3.3 SUPERVISION AND CONSTRUCTION PROCEDURES

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

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

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

§ 3.4 LABOR AND MATERIALS

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

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

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

§ 3.5 WARRANTY

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

§ 3.6 TAXES

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

§ 3.7 PERMITS, FEES, NOTICES, AND COMPLIANCE WITH LAWS

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

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

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

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

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

§ 3.8 ALLOWANCES

§ 3.8.1 The Contractor shall include in the Contract Sum all allowances stated in the Contract Documents. Items covered by allowances shall be supplied for such amounts and by such persons or entities as the Owner may direct,

but the Contractor shall not be required to employ persons or entities to whom the Contractor has reasonable objection.

§ 3.8.2 Unless otherwise provided in the Contract Documents,

.1 allowances shall cover the cost to the Contractor of materials and equipment delivered at the site and all required taxes, less applicable trade discounts;

.2 Contractor's costs for unloading and handling at the site, labor, installation costs, overhead, profit and other expenses contemplated for stated allowance amounts shall be included in the Contract Sum but not in the allowances; and

.3 whenever costs are more than or less than allowances, the Contract Sum shall be adjusted accordingly by Change Order. The amount of the Change Order shall reflect (1) the difference between actual costs and the allowances under Section 3.8.2.1 and (2) changes in Contractor's costs under Section 3.8.2.2.

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

§ 3.9 SUPERINTENDENT

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

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

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

§ 3.10 CONTRACTOR'S CONSTRUCTION SCHEDULES

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

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

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

§ 3.11 DOCUMENTS AND SAMPLES AT THE SITE

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

§ 3.12 SHOP DRAWINGS, PRODUCT DATA AND SAMPLES

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

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

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

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

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

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

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

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

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

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

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

§ 3.13 USE OF SITE

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

§ 3.14 CUTTING AND PATCHING

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

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

§ 3.15 CLEANING UP

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

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

§ 3.16 ACCESS TO WORK

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

§ 3.17 ROYALTIES, PATENTS AND COPYRIGHTS

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

§ 3.18 INDEMNIFICATION

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

other rights or obligations of indemnity that would otherwise exist as to a party or person described in this Section 3.18.

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

ARTICLE 4 ARCHITECT

§ 4.1 GENERAL

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

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

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

§ 4.2 ADMINISTRATION OF THE CONTRACT

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

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

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

§ 4.2.4 COMMUNICATIONS FACILITATING CONTRACT ADMINISTRATION

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

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

§ 4.2.6 The Architect has authority to reject Work that does not conform to the Contract Documents. Whenever the Architect considers it necessary or advisable, the Architect will have authority to require inspection or testing of the

Work in accordance with Sections 13.5.2 and 13.5.3, whether or not such Work is fabricated, installed or completed. However, neither this authority of the Architect nor a decision made in good faith either to exercise or not to exercise such authority shall give rise to a duty or responsibility of the Architect to the Contractor, Subcontractors, material and equipment suppliers, their agents or employees, or other persons or entities performing portions of the Work.

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

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

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

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

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

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

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

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

ARTICLE 5 SUBCONTRACTORS

§ 5.1 DEFINITIONS

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

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

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

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

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

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

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

§ 5.3 SUBCONTRACTUAL RELATIONS

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

§ 5.4 CONTINGENT ASSIGNMENT OF SUBCONTRACTS

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

.1 assignment is effective only after termination of the Contract by the Owner for cause pursuant to Section 14.2 and only for those subcontract agreements that the Owner accepts by notifying the Subcontractor and Contractor in writing; and

.2 assignment is subject to the prior rights of the surety, if any, obligated under bond relating to the Contract.

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

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

§ 5.4.3 Upon such assignment to the Owner under this Section 5.4, the Owner may further assign the subcontract to a successor contractor or other entity. If the Owner assigns the subcontract to a successor contractor or other entity, the Owner shall nevertheless remain legally responsible for all of the successor contractor's obligations under the subcontract.

ARTICLE 6 CONSTRUCTION BY OWNER OR BY SEPARATE CONTRACTORS

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

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

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

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

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

§ 6.2 MUTUAL RESPONSIBILITY

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

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

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

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

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

§ 6.3 OWNER'S RIGHT TO CLEAN UP

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

ARTICLE 7 CHANGES IN THE WORK

§ 7.1 GENERAL

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

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

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

§ 7.2 CHANGE ORDERS

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

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

§ 7.3 CONSTRUCTION CHANGE DIRECTIVES

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

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

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

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

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

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

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

§ 7.3.7 If the Contractor does not respond promptly or disagrees with the method for adjustment in the Contract Sum, the Architect shall determine the method and the adjustment on the basis of reasonable expenditures and savings of those performing the Work attributable to the change, including, in case of an increase in the Contract Sum, an amount for overhead and profit as set forth in the Agreement, or if no such amount is set forth in the Agreement, a reasonable amount. In such case, and also under Section 7.3.3.3, the Contractor shall keep and present, in such form as the Architect may prescribe, an itemized accounting together with appropriate supporting data. Unless otherwise provided in the Contract Documents, costs for the purposes of this Section 7.3.7 shall be limited to the following:

.1 Costs of labor, including social security, old age and unemployment insurance, fringe benefits required by agreement or custom, and workers' compensation insurance;

.2 Costs of materials, supplies and equipment, including cost of transportation, whether incorporated or consumed;

.3 Rental costs of machinery and equipment, exclusive of hand tools, whether rented from the Contractor or others;

.4 Costs of premiums for all bonds and insurance, permit fees, and sales, use or similar taxes related to the Work; and

.5 Additional costs of supervision and field office personnel directly attributable to the change.

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

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

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

§ 7.4 MINOR CHANGES IN THE WORK

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

ARTICLE 8 TIME

§ 8.1 DEFINITIONS

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

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

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

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

§ 8.2 PROGRESS AND COMPLETION

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

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

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furnished by the Contractor and Owner. The date of commencement of the Work shall not be changed by the effective date of such insurance.

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

§ 8.3 DELAYS AND EXTENSIONS OF TIME

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

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

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

ARTICLE 9 PAYMENTS AND COMPLETION

§ 9.1 CONTRACT SUM

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

§ 9.2 SCHEDULE OF VALUES

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

§ 9.3 APPLICATIONS FOR PAYMENT

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

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

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

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

§ 9.3.3 The Contractor warrants that title to all Work covered by an Application for Payment will pass to the Owner no later than the time of payment. The Contractor further warrants that upon submittal of an Application for Payment all Work for which Certificates for Payment have been previously issued and payments received from the

Owner shall, to the best of the Contractor's knowledge, information and belief, be free and clear of liens, claims, security interests or encumbrances in favor of the Contractor, Subcontractors, material suppliers, or other persons or entities making a claim by reason of having provided labor, materials and equipment relating to the Work.

§ 9.4 CERTIFICATES FOR PAYMENT

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

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

§ 9.5 DECISIONS TO WITHHOLD CERTIFICATION

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

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

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

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

§ 9.6 PROGRESS PAYMENTS

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

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

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

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

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

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

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

§ 9.7 FAILURE OF PAYMENT

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

§ 9.8 SUBSTANTIAL COMPLETION

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

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

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

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

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

§ 9.9 PARTIAL OCCUPANCY OR USE

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

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

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

§ 9.10 FINAL COMPLETION AND FINAL PAYMENT

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

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

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

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

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

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

ARTICLE 10 PROTECTION OF PERSONS AND PROPERTY

§ 10.1 SAFETY PRECAUTIONS AND PROGRAMS

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

§ 10.2 SAFETY OF PERSONS AND PROPERTY

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

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

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

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

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

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

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

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

§ 10.2.8 INJURY OR DAMAGE TO PERSON OR PROPERTY

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

§ 10.3 HAZARDOUS MATERIALS

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

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

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

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

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

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

§ 10.4 EMERGENCIES

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

ARTICLE 11 INSURANCE AND BONDS

§ 11.1 CONTRACTOR'S LIABILITY INSURANCE

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

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

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

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

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

§ 11.2 OWNER'S LIABILITY INSURANCE

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

§ 11.3 PROPERTY INSURANCE

§ 11.3.1 Unless otherwise provided, the Owner shall purchase and maintain, in a company or companies lawfully authorized to do business in the jurisdiction in which the Project is located, property insurance written on a builder's

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

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

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

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

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

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

§ 11.3.2 BOILER AND MACHINERY INSURANCE

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

§ 11.3.3 LOSS OF USE INSURANCE

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

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

§ 11.3.5 If during the Project construction period the Owner insures properties, real or personal or both, at or adjacent to the site by property insurance under policies separate from those insuring the Project, or if after final payment property insurance is to be provided on the completed Project through a policy or policies other than those insuring the Project during the construction period, the Owner shall waive all rights in accordance with the terms of Section 11.3.7 for damages caused by fire or other causes of loss covered by this separate property insurance. All separate policies shall provide this waiver of subrogation by endorsement or otherwise.

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

§ 11.3.7 WAIVERS OF SUBROGATION

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

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

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

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

§ 11.4 PERFORMANCE BOND AND PAYMENT BOND

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

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

ARTICLE 12 UNCOVERING AND CORRECTION OF WORK

§ 12.1 UNCOVERING OF WORK

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

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

§ 12.2 CORRECTION OF WORK

§ 12.2.1 BEFORE OR AFTER SUBSTANTIAL COMPLETION

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

§ 12.2.2 AFTER SUBSTANTIAL COMPLETION

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

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

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

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

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

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

§ 12.3 ACCEPTANCE OF NONCONFORMING WORK

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

ARTICLE 13 MISCELLANEOUS PROVISIONS

§ 13.1 GOVERNING LAW

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

§ 13.2 SUCCESSORS AND ASSIGNS

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

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

§ 13.3 WRITTEN NOTICE

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

§ 13.4 RIGHTS AND REMEDIES

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

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

§ 13.5 TESTS AND INSPECTIONS

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

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

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

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

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

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

§ 13.6 INTEREST

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

§ 13.7 TIME LIMITS ON CLAIMS

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

ARTICLE 14 TERMINATION OR SUSPENSION OF THE CONTRACT

§ 14.1 TERMINATION BY THE CONTRACTOR

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

.1 Issuance of an order of a court or other public authority having jurisdiction that requires all Work to be stopped;

.2 An act of government, such as a declaration of national emergency that requires all Work to be stopped;

.3 Because the Architect has not issued a Certificate for Payment and has not notified the Contractor of the reason for withholding certification as provided in Section 9.4.1, or because the Owner has not made payment on a Certificate for Payment within the time stated in the Contract Documents; or

.4 The Owner has failed to furnish to the Contractor promptly, upon the Contractor's request, reasonable evidence as required by Section 2.2.1.

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

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

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

§ 14.2 TERMINATION BY THE OWNER FOR CAUSE

§ 14.2.1 The Owner may terminate the Contract if the Contractor

.1 repeatedly refuses or fails to supply enough properly skilled workers or proper materials;

.2 fails to make payment to Subcontractors for materials or labor in accordance with the respective agreements between the Contractor and the Subcontractors;

.3 repeatedly disregards applicable laws, statutes, ordinances, codes, rules and regulations, or lawful orders of a public authority; or

.4 otherwise is guilty of substantial breach of a provision of the Contract Documents.

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

.1 Exclude the Contractor from the site and take possession of all materials, equipment, tools, and construction equipment and machinery thereon owned by the Contractor;

.2 Accept assignment of subcontracts pursuant to Section 5.4; and

.3 Finish the Work by whatever reasonable method the Owner may deem expedient. Upon written request of the Contractor, the Owner shall furnish to the Contractor a detailed accounting of the costs incurred by the Owner in finishing the Work.

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

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

§ 14.3 SUSPENSION BY THE OWNER FOR CONVENIENCE

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

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

.1 that performance is, was or would have been so suspended, delayed or interrupted by another cause for which the Contractor is responsible; or

.2 that an equitable adjustment is made or denied under another provision of the Contract.

§ 14.4 TERMINATION BY THE OWNER FOR CONVENIENCE

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

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

.1 cease operations as directed by the Owner in the notice;

.2 take actions necessary, or that the Owner may direct, for the protection and preservation of the Work; and

.3 except for Work directed to be performed prior to the effective date of termination stated in the notice, terminate all existing subcontracts and purchase orders and enter into no further subcontracts and purchase orders.

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

ARTICLE 15 CLAIMS AND DISPUTES

§ 15.1 CLAIMS

§ 15.1.1 DEFINITION

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

§ 15.1.2 NOTICE OF CLAIMS

Claims by either the Owner or Contractor must be initiated by written notice to the other party and to the Initial Decision Maker with a copy sent to the Architect, if the Architect is not serving as the Initial Decision Maker.

Claims by either party must be initiated within 21 days after occurrence of the event giving rise to such Claim or within 21 days after the claimant first recognizes the condition giving rise to the Claim, whichever is later.

§ 15.1.3 CONTINUING CONTRACT PERFORMANCE

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

§ 15.1.4 CLAIMS FOR ADDITIONAL COST

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

§ 15.1.5 CLAIMS FOR ADDITIONAL TIME

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

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

§ 15.1.6 CLAIMS FOR CONSEQUENTIAL DAMAGES

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

.1 damages incurred by the Owner for rental expenses, for losses of use, income, profit, financing, business and reputation, and for loss of management or employee productivity or of the services of such persons; and

.2 damages incurred by the Contractor for principal office expenses including the compensation of personnel stationed there, for losses of financing, business and reputation, and for loss of profit except anticipated profit arising directly from the Work.

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

§ 15.2 INITIAL DECISION

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

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

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

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

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

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

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

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

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

§ 15.3 MEDIATION

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

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

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

§ 15.4 ARBITRATION

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

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

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

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

§ 15.4.4 CONSOLIDATION OR JOINDER

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

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

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

DOCUMENT 007300 - SUPPLEMENTARY CONDITIONS

Add, substitute and delete from the "General Conditions of the Contract for Construction, AIA Document A201-2007" the Paragraphs, Subparagraphs or Clauses as indicated in this Document. Added text is underlined. Deleted text is struck through. Instructional text is italicized.

ARTICLE 1 GENERAL PROVISIONS

1.1 BASIC DEFINITIONS

Add:

1.1.8 Refer to the Definition Articles of Division 1 General Requirements Sections for additional basic definitions.

1.2 CORRELATION AND INTENT OF THE CONTRACT DOCUMENTS

Add:

1.2.4 Where a conflict or overlap exists between two or more requirements of the Contract Documents, comply with the requirement(s) that require(s) a greater quality or quantity of Work as determined by the Architect's interpretation. Where clarification is required, omit requirements(s) from the Contract Documents as directed by the Architect. Omitting requirements under these circumstances will not be considered a change in the Work or a modification of the intent of the Contract Documents.

1.3 CAPITALIZATION

Add:

1.3.2 Terms capitalized in the Contract Documents are one or more of the following:

- .1 Specific in nature as defined in the Contract Documents or required (such as parties to the Contract or portions of the Contract Documents).
- .2 Specific in nature by intrinsic meaning (such as proper nouns).
- .3 Specific portions of the Project Site (such as room names).
- .4 Headings (such as Paragraph names).
- .5 Capitalized for graphic convention (such as text on Drawings)

Add:

1.3.3 The meaning of terms in the Contract Documents are not changed by the absence capitalization.

ARTICLE 2 OWNER

2.2 INFORMATION AND SERVICES REQUIRED OF THE OWNER

Substitute:

2.2.1 The provisions of the Contract shall not create and obligation of the Owner to furnish financial evidence of Owner's capacity to fulfill obligations under the Contract. ~~Prior to commencement of the Work, the Contractor may request in writing that the Owner provide reasonable evidence that the Owner has made financial arrangements to fulfill the Owner's obligations under the Contract. Thereafter, the Contractor may only request such evidence if (1) the Owner fails to make payments to the Contractor as the Contract Documents require; (2) a change in the Work materially changes the Contract Sum; or (3) the Contractor identifies in writing a reasonable concern regarding the Owner's ability to make payment when due. The Owner shall furnish such evidence as a condition precedent to commencement or continuation of the Work or the portion of the Work affected by a material change. After the Owner furnishes the evidence, the Owner shall not materially vary such financial arrangements without prior notice to the Contractor.~~

Substitute:

2.2.3 The provisions of the Contract shall not create and obligation of the Owner to furnish information on the physical or legal characteristics of the Project site in addition to that furnished in the Contract

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

ARTICLE 3 CONTRACTOR

3.2 REVIEW OF CONTRACT DOCUMENTS AND FIELD CONDITIONS BY CONTRACTOR

Add:
3.2.1.1 Contractor and (Sub-)Subcontractors shall use complete sets of Contract Documents in performance of the Work. Neither the Owner nor the Architect assumes responsibility for errors and misinterpretations which result from the use of incomplete sets of Contract Documents.

Add:
3.2.1.2 No change in Contract Sum or Contract Time shall be permitted due to existing conditions that would have been apparent from a reasonable and thorough examination of the Project Site.

3.4 LABOR AND MATERIALS

Substitute:
3.4.2 Except in the case of minor changes in the Work authorized by the Architect in accordance with Sections 3.12.8 or 7.4, the Contractor may make ~~substitutions~~ changes in the Work only with the consent of the Owner, after evaluation by the Architect and in accordance with a Change Order or Construction Change Directive. The Contractor shall not request substitutions.

Add:
3.4.2.1 The Contractor shall reimburse the Owner for cost associated with evaluation of substitutions as indicated in Division 1 General Requirements.

Add:
3.4.4 Contractor' employees and other persons carrying out the Contract, are expected to exhibit good behavior at all times as is generally defined in our society and to treat other workers and visitors to the site with respect. Unacceptable behavior includes, but is not limited to, foul and offensive language, verbal and physical abuse or harassment and discrimination based on gender, race, national origin or religion. Contractor shall not permit persons behaving unacceptably to be engaged in the Work or be present at the Project Site. The Contractor and its subcontractors, as well as their employees may not use or possess any alcoholic or other intoxicating beverages, illegal drugs or controlled substances while at the Project Site or on the Owner's property. Nor may such workers be intoxicated, or under the influence of alcohol or illegal drugs while at the Project Site or on the Owner's property. Subject to the applicable provisions of North Carolina law, the Contractor, subcontractors, sub-subcontractors, and their employees may not use or possess any firearms or other weapons, other than customary construction tools, while at the Project Site or on the Owner's property.

3.6 TAXES

Add:
3.6.1 Owner is a federally and state recognized tax exempt organization as defined by the General Statutes of North Carolina and is thereby exempt from the payment of sales and use taxes. No sales tax is required to be paid on the Contract Sum. The Contractor shall pay only those sales, consumer, use and other similar taxes required to be paid by the Contractor in accordance with the laws and regulations of the State of North Carolina in the performance of its public works contract. The Owner will provide the Contractor with its sales tax exemption number and the Contractor will apply for the exemption in accordance with the state law for all required purchases made by the Contractor. In the event the sales and use taxes are nevertheless payable at the time of purchase, the Contractor shall keep adequate records of all sales and/or use taxes paid and shall cooperate fully with the Owner in seeking any sales tax reimbursement due to the Owner including making any written claim required by the State of North Carolina. The Contractor shall provide the Owner with a sworn affidavit itemizing the quantity and value of the materials and rentals it has used on the Project and the amount of any sales and/or use taxes that

has been paid on such materials or rentals in a timely manner so that the Owner may seek reimbursement for the calendar year or other taxable year as required by law.

3.7 PERMITS, FEES AND NOTICES

Add:

3.7.1.1 In addition to other permits required, Contractor shall secure and pay for the following permits:

.1 Certificates of Occupancy

.2 Local City Building Permit. The Owner, as the City of Morganton, will waive payment of fees associated with securing a building permit normally due the city.

Add:

3.7.5 Where hook-up, connection or other portion of the Work must be furnished or installed by an utility, including water, sewer, electric, fuel, telephone, television or other communications utility, Contractor shall pay fees and expenses charged by utility, unless otherwise indicated. Contractor shall coordinate with utility to not detrimentally impact Project schedule, cost, or intent of the Contract Documents. Contractor shall comply with utility's regulations.

3.9 SUPERINTENDENT

Add:

3.9.1.1 The Contractor shall employ a competent project manager to coordinate the Work overall. The project manger shall represent the Contractor and communications given to the project manager shall be as binding as if given to the Contractor. The Contractor, as soon as practicable after award of the Contract, shall furnish in writing to the Owner through the Architect the name and qualifications of a proposed project manager. The Architect may reply within 14 days to the Contractor in writing stating (1) whether the Owner or the Architect has reasonable objection to the proposed superintendent or (2) that the Architect requires additional time to review. Failure of the Architect to reply within the 14 day period shall constitute notice of no reasonable objection.

Add:

3.9.4 The superintendent and project manager indicated in the Agreement shall be and remain in these roles until Final Payment. If either of these personnel change, the Owner reserves the right to review and approve or disapprove said personnel's replacement, at Owner's sole discretion.

3.10 CONTRACTOR'S CONSTRUCTION SCHEDULES

Substitute:

3.10.1 The Contractor, within ten (10) days of issuance of a Notice to Proceed ~~promptly after being awarded the Contract~~, shall prepare and submit for the Owner's and Architect's information and approval a Contractor's construction schedule for the Work. The Owner's and Architect's approval shall not unreasonably be delayed or withheld. The schedule shall not exceed time limits current under the Contract Documents, shall be revised at appropriate intervals as required by the conditions of the Work and Project, shall be related to the entire Project to the extent required by the Contract Documents, and shall provide for expeditious and practicable execution of the Work.

3.13 USE OF SITE

Add:

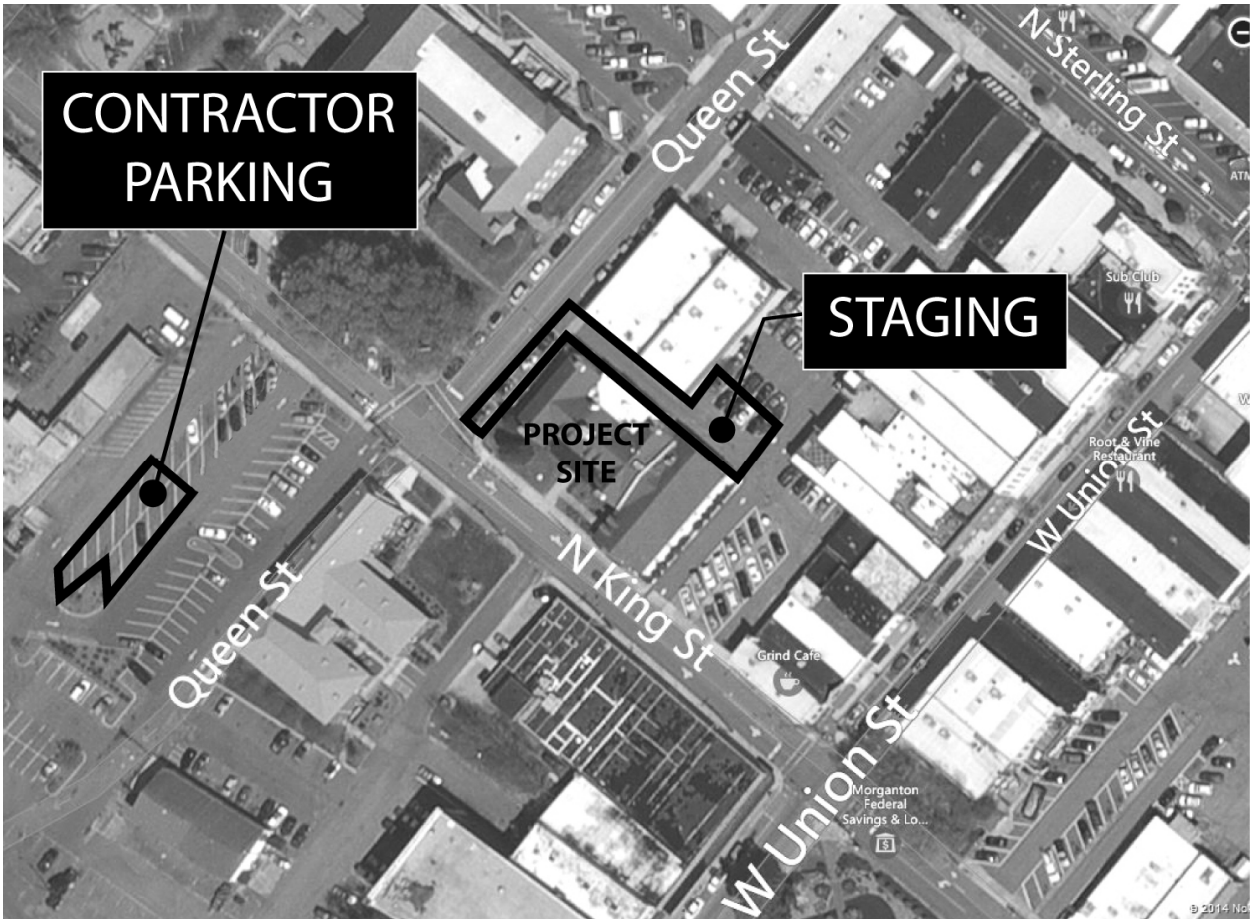
3.13.1 The Contractor shall confine construction equipment, the storage of materials and equipment and the operations of workers to the site and land and areas identified in and permitted by the Contract Documents and other land and areas permitted by laws and regulations, right-of-way, permits and easements, and shall not unreasonably encumber the premises with construction equipment or other materials or equipment. The 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. Should any claim be made by any such owner or occupant because of or in connection with the performance of the Work, the Contractor shall promptly settle with such other party by negotiation or otherwise resolve the claim. The Contractor shall indemnify, defend and hold harmless the

Owner and the Architect and anyone directly or indirectly employed by any of them from and against all claims, costs, losses and damages (including court costs and reasonable attorney's fees) arising out of or resulting from any claim or action, legal or equitable, brought by any such landowner or occupant against the Owner or Architect or both or any other party indemnified hereunder to the extent caused by or based upon performance of the Work or failure to perform the Work.

3.13.1.1 Contract Limits: Limit use of premises, including parking, to areas within the Contract Limits indicated. Do not disturb portions of Project premises beyond Contract Limits indicated.

3.13.1.1.1 Interior: The interior Contract Limits include interior areas in which Work is to be conducted. The Contract Limits do not include areas to be occupied by the Owner per Owner's occupancy requirements as indicated in Section 01 3517 Renovation Work.

3.13.1.1.2 Exterior: Except as to not hinder Owner's use of existing building per Owner's occupancy requirements as indicated in Section 01 3517 Renovation Work, the exterior Contract Limits include limits of property line and additional staging area indicated on the following diagram:



3.13.1.2 Separate Contractors: Contractor's use of premises is limited by Owner's or separate contractor's forces performing construction operations on portions of Project.

3.13.1.3 Permanent Facilities: Contractor's use of permanent facilities for temporary facilities is indicated elsewhere.

3.13.1.4 Noise, Vibration, and Odors: Coordinate and restrict construction to minimize noise, vibration, or odors complaints from on-premises and nearby property occupants at all hours.

3.13.1.4.1 Regulations: Comply with noise, vibration or odor regulations and authorities having jurisdiction.

3.13.1.4.2 Odor Control: Control odors from construction activities to ensure odors do not cause a health hazard.

3.13.1.5 Public Ways: Keep public ways clean and free of foreign substances. Comply with limitations on use of public ways and with other requirements of authorities having jurisdiction.

3.13.1.6 Driveways and Entrances: Keep walkways, driveways, loading areas, and building entrances clear and available to Owner's forces and agents, separate contractors, and emergency vehicles at all times. Do not use these areas for parking or storage of materials.

3.13.1.6.1 Schedule deliveries to minimize use of driveways and entrances.

3.13.1.6.2 Remove snow and ice from such areas.

3.13.1.7 Parking Restrictions: Comply with authorities having jurisdiction's parking restrictions. For parking restriction indicated below, Contractor's personnel includes the personnel of entities which have been retained by the Contractor to perform Work at the Project Site.

3.13.1.7.1 Contractor's Parking Area: Contractor's personnel may park vehicles at locations indicated on diagram included at Subpargraph 3.13.1.1.2 as Contractor's Parking Area outside of the Contract Limits. Use of Contractor's Parking Area for storage, delivery, handling or other construction related activities or operations other than parking of vehicles is prohibited.

3.13.1.8 Firearms: Refer to Paragraph 3.4.4 above.

3.13.1.9 Smoking: Smoking of tobacco products shall not be permitted on Project site or on Owner's premises.

3.13.1.10 Lodging: No overnight lodging is permitted at Project site.

3.13.1.11 Mowing: Contractor shall provide access for, and the Owner will provide watering, mowing, cutting, trimming, and similar maintenance services of vegetation located within Contract Limits.

ARTICLE 4 ADMINISTRATION OF THE CONTRACT

4.2 ARCHITECT'S ADMINISTRATION OF THE CONTRACT

Substitute:

4.2.11 The Architect will interpret and decide matters concerning performance under, and requirements of, the Contract Documents on written requests of either the Owner or Contractor or when judged necessary by Architect. The Architect's response to such requests will be in writing, unless otherwise indicated, within any time limits agreed upon or otherwise with reasonable promptness. If no agreement is made concerning the time within which interpretations required of the Architect shall be furnished in compliance with this Paragraph 4.2, then delay shall not be recognized on account of failure by the Architect to furnish such interpretations until 15 days after written request is received by Architect.

Substitute:

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

ARTICLE 5 SUBCONTRACTORS

Substitute:

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

ARTICLE 7 CHANGES IN THE WORK

7.3 CONSTRUCTION CHANGE DIRECTIVES

Substitute:

7.3.7 If the Contractor does not respond promptly or disagrees with the method for adjustment in the Contract Sum, the method of adjustment shall be determined by the Architect on the basis of reasonable

expenditures and saving of those performing the Work attributable to the change, including, in a case of the increase or decrease of the Contract Sum a reasonable allowance for overhead and profit established by a percentage fee not to exceed ten (10%) percent of such Work's actual cost. In such case, and also under clause 7.3.3.3, the Contractor shall keep and present in such form as the Architect may prescribe, an itemized account together with appropriate supporting data. In the case of a Change Order, this allowance for overhead and profit shall include expenses associated with the estimating, field measurements, proposal preparation and other administrative costs which occur before the Change Order is approved by the Owner and Architect. Unless otherwise provided in the Contract Documents, costs for the purposes of this Subparagraph 7.3.6 shall be limited to the following:

Substitute:
7.3.7.5 ~~additional~~ costs of administrative, supervision and field office personnel directly attributable to the change, and in the case of a Change Order only these costs which occur after the Change Order is approved by the Owner and Architect.

Add:
7.3.7.6 If the Work is performed by a Subcontractor or Sub-subcontractor, an allowance charged by that Subcontractor or Sub-subcontractor for overhead and profit established by a percentage fee not to exceed ten (10%) percent of such Work's actual cost as defined in this Subparagraph 7.3.7.

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

ARTICLE 9 PAYMENTS AND COMPLETION

9.8 SUBSTANTIAL COMPLETION

Add:
9.8.1.1 The following are required to be completed before Substantial Completion:

.1 Contractor's Substantial Completion Certification: Provide Contractor's certification that all remaining Work will be completed within thirty (30) consecutive days after the Date of Substantial Completion or as agreed with the Owner.

.2 Occupancy Work: All remaining Work shall be minor in nature and not materially interfere or hamper the Owner or occupants, and shall not infringe on the Owner or occupants legally protected rights to occupy, access, privacy and security.

.3 Permits: Obtain and submit releases permitting Owner unrestricted use of the Work and access to services and utilities. Include occupancy permits, operating certificates, Elevator certifications, Inspection certifications for heating equipment, Fire suppression certifications, Fire alarm certifications, Certificate of occupancy and similar releases.

.4 Temporary Facilities: Terminate and remove temporary facilities, controls, and services from Project site, along with mockups, construction tools, and similar elements.

.5 Final Cleaning: Complete final cleaning requirements indicated elsewhere, including touchup painting. Touch up and otherwise repair and restore marred exposed finishes to eliminate visual defects.

.6 Notification: Inform Owner of the pending changeover responsibilities for 1) Utilities including fuel and electricity, 2) Owner's occupancy, use, operation, and maintenance, and 3) Insurance.

.7 Punch List: Prepare Punch List as required by Subparagraph 9.8.2 and Section 012900 Payment Procedures.

.8 Systems: Complete the balance and testing and other requirements indicated to be completed before Substantial Completion as required elsewhere for MEP and other equipment and systems.

9.9 PARTIAL OCCUPANCY OR USE

Add:
9.9.4 The Owner shall occupy portions of the existing building and site per Owner's occupancy requirements as indicated in Section 01 3517 Renovation Work.

Add:
9.9.5 Refer to Bid Alternate 4 in Section 01 2300 Alternates for Owner's occupancy and use of completed or partially completed portions of the Work.

9.10 FINAL COMPLETION AND FINAL PAYMENT

Add:
9.10.1.1 In addition to other requirements the following are required to be completed before final inspection and acceptance:

.1 Security: Complete changeover of permanent security facilities to Owner. Make final changeover of permanent locks and deliver keys to Owner. Advise Owner's personnel of changeover in security provisions.
.2 Extra Materials: Deliver attic stock, tools, spare parts, extra materials, and similar items to location designated by Owner. Label with manufacturer's name and model number where applicable.
.3 Record Information: Prepare and submit Project Record Documents, damage or settlement surveys, property surveys (if required), and similar final record information.
.4 O&M Manuals: Prepare and submit complete operation and maintenance manuals.
.5 Demonstration and Training: Complete instruction of Owner's personnel in operation, adjustment, and maintenance of products, equipment, and systems. Submit demonstration and training recordings.
.6 Warranties: Submit executed warranties, workmanship bonds, maintenance service agreements, final certifications, warranty inspections and similar documents.
.7 Systems: Complete the balance and testing and other requirements indicated to be completed before Final Completion as required elsewhere for MEP and other equipment and systems.
.8 Final Waste Management Plan: Submit Final Waste Management Plan as required by waste management execution requirements indicated elsewhere.

ARTICLE 11 INSURANCE AND BONDS

11.1 CONTRACTOR'S LIABILITY INSURANCE

Add:
11.1.2.2 The insurance required by Subparagraph 11.1.1 shall be written as follows and for not less than the following limits, or greater if required by law:

11.1.2.2.1 General liability: (including operations, products and completed operations) A combined single limit coverage of not less than one million dollars ($1,000,000) per occurrence for bodily injury, personal property and property damage shall be maintained. If commercial general liability insurance or other form with a general aggregate limit is used, either the general aggregate limit shall apply separately to this Project or the general aggregate limit shall be not less than two million dollars ($2,000,000).
11.1.2.2.2 Automobile liability: One million dollars ($1,000,000) per accident for bodily injury and property damage shall be maintained.
11.1.2.2.3 Worker's Compensation and employer's liability: Worker's Compensation Insurance shall be maintained in the amount and as required by the law of North Carolina with employer's liability of not less than one hundred thousand dollars ($100,000) per accident, five hundred thousand dollars ($500,000) aggregate policy limit and disease coverage for each employee in the amount of one hundred thousand dollars ($100,000) unless the law of the State of North Carolina requires more coverage.
11.1.2.2.4 The general liability and automobile liability policies shall contain, or be endorsed to contain the following provisions:

11.1.2.2.4.1 The Owner and its officers and employees shall be covered as insureds with respect to liability arising out of the Work or operations performed by or on behalf of a contractor including materials, parts or equipment furnished in connection with such work or operations. General liability coverage can be provided in the form of an endorsement to the Contractor's insurance or as a separate Owner's and Contractor's protective liability policy.
11.1.2.2.4.2 For all claims related to this project, the Contractor's insurance coverage shall be primary insurance. Any insurance or self-insurance maintained by the Owner, its officers, officials and employees shall be in excess of the Contractor's insurance and shall not contribute with it.
11.1.2.2.4.3 Each insurance policy required by this section shall be endorsed to provide that coverage shall not be cancelled by either party, except after thirty (30) days prior written notice by certified mail, return receipt requested, has been given to the Owner.
11.1.2.2.4.4 The Contractor shall require and verify that all subcontractors (of any tier) maintain insurance of the type, limits and conditions set out above.
11.1.2.2.4.5 In the event any of the policies provided by the Contractor provide claims-made coverage, the coverage shall remain in effect for a period of not less than five (5) years after the completion of the Contract or the applicable statute of limitations, whichever occurs first.

Substitute for the first sentence of Subparagraph 11.1.3 only with remainder of Subparagraph 11.1.3 remaining:
11.1.3 Two notarized original Certificates of Insurance and amendatory endorsements acceptable to the Owner shall be filed with the Owner ~~prior to commencement of the Work~~ prior to execution of Contact and thereafter upon renewal or replacement of each required policy of insurance; however, the failure to obtain any required evidence of insurance shall not waive the Contractor's obligation to provide them. Provide one additional copy to the Architect. Include on Certificates of Insurance written information indicating current status of insurance or coverage, name of entity covered by insurance, limits of coverage, amounts of deductibles, if any, and term of the coverage.

11.3 PROPERTY INSURANCE

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

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

Substitute:
11.3.1.2 ~~If the Owner does not intend to purchase such property insurance required by the Contract and with all of the coverages in the amount described above, the Owner shall so inform the Contractor in~~

~~writing prior to commencement of the Work. The Contractor may then effect insurance that will protect the interests of the Contractor, Subcontractors and Sub-subcontractors in the Work, and by appropriate Change Order the cost thereof shall be charged to the Owner.~~ If the Owner, Subcontractors or Sub-subcontractors ~~Contractor~~ is damaged by the failure or neglect of the Contractor ~~Owner~~ to purchase or maintain insurance as described above, ~~without so notifying the Contractor in writing,~~ then the Contractor ~~Owner~~ shall bear all reasonable costs properly attributable thereto.

Substitute:
11.3.1.3 If the property insurance requires deductibles, the ~~Owner~~ Contractor shall pay costs not covered because of such deductibles. If the Contractor or insurer increases the required minimum deductibles or if the Contractor elects to purchase this insurance with voluntary deductible amounts, the Contractor shall be responsible for payment of the additional costs not covered because of such increased or voluntary deductibles.

Add:
11.3.1.6 The policies required by Section 11.3 shall be endorsed to include Owner, its agents and employees as Loss Payee and shall stipulate that the insurance afforded shall be primary insurance and that any other insurance or self-insured retention providing coverage to the Owner, or to its agents or employees, shall be excess and not contributory insurance to the insurance provided by Contractor.

Add:
11.3.1.7 The insurance required by Subparagraph 11.3.1 is not intended to cover machinery, tools or equipment owned or rented by the Contractor that are utilized in the performance of the Work but not incorporated into the permanent improvements. The Contractor shall, at the Contractor's own expense, provide insurance coverage for owned or rented machinery, tools or equipment which shall be subject to the provisions of Subparagraph 11.4.7.

11.4 PERFORMANCE AND PAYMENT BOND

Add:
11.4.3 Unless the Contractor chooses to make a deposit of money, certified checks or government securities for the full amount of the Contract in order to secure the faithful performance of the terms of the Contract Documents in the manner permitted by the State of North Carolina G.S. 143-129(c), a Performance and Payment Bond shall be written for 100% of the Contract Sum as of the date of the Agreement on form AIA Document A312-2010. No increase in bond amount will be required for Change Orders. The bonds shall conform to the requirements of Article 3 of Chapter 44A of the General Statutes of North Carolina and shall be provided by a solvent surety or insurance company licensed by the State of North Carolina and authorized to issue bonds in the amount required by the Contract Documents. Regardless the Instructions to Bidders, two complete executed certified originals of bonds shall be delivered to the Owner at or before the execution of the Contract and provide one copy of bond to Architect. If the surety on any bond furnished by the Contractor is declared bankrupt or becomes insolvent or otherwise has its right to do business in the State of North Carolina terminated, the Contractor shall, within ten (10) days thereafter, substitute another bond or surety which must be acceptable to the Owner. All bonds shall remain in effect for at least one (1) year after the date of last payment under the Contract Documents or until such bond is released by the City.

ARTICLE 13 MISCELLANEOUS PROVISIONS

Add:
13.8 EQUAL OPPORTUNITY

Add:
13.8.1 The Contractor and the Contractor's Subcontractors shall not discriminate against any employee or applicant for employment because of race, religion, color, sex, sexual orientation or national origin. The Contractor shall take affirmative action to insure that applicants are employed, and that employees are treated during employment without regard to their race, religion, color, sex, sexual orientation or national origin. Such action shall include, but not be limited to, the following: employment, upgrading, demotion or transfer; recruitment or recruitment advertising; layoff or termination; rates of pay

or other forms of compensation; and selection for training, including apprenticeship. The Contractor agrees to post in conspicuous places, available to employees and applicants for employment, notices setting forth the policies of non-discrimination.

Add:

13.8.2 The Contractor and the Contractor's Subcontractors shall, in all solicitations or advertisements for employees placed by them or on their behalf, state that all qualified applicants will receive consideration for employment without regard to race, religion, color, sex or national origin.

ARTICLE 15 CLAIMS AND DISPUTES

15.1 CLAIMS

Add:

15.1.7 No claims for additional cost, time or other relief shall be permitted due to existing conditions that would have been apparent from a reasonable and thorough examination of the Project Site before the date of the Agreement.

END OF DOCUMENT 007300

SECTION 012100 - ALLOWANCES

PART 1 - GENERAL

1.1 SECTION INCLUDES

A. Material (Only) Unit-cost Allowances
B. Material (Only) Lump sum Allowances
C. Material and Installation Lump Sum Allowances
D. Contingency Allowance

1.2 RELATED REQUIREMENTS

A. Contract Modification Procedures in 007200 General Conditions:
   1. Definitions:
      a. Labor Costs
      b. Materials Costs
      c. Equipment Costs
      d. Taxes and Insurance Costs
      e. Supervision Costs
      f. Markup

B. Individual Specification Sections
   1. Allowance Requirements

1.3 PRICE AND PAYMENT PROCEDURES

A. Schedule of Allowances: Specifications and Drawings referenced in following Schedule of Allowances contain requirements for materials and methods necessary to achieve the Work described under each Allowance,
   1. Allowance 123600 – Stone Countertops: Reference 123600
      a. Allowance Amount: $7400.00
   2. Allowance 012100 – Chandeliers: Reference 012100
      a. Allowance Amount: $15,000.00

1.4 ALLOWANCES

A. Allowance 012100 – Chandeliers Title: Provide a material only lump sum allowance for the amount indicated in this Section for all new large, medium, and small chandeliers light fixtures combined. Allowance amount is for all chandeliers, not for individual or groups of chandeliers.

1.5 DEFINITIONS

A. Allowance: a method of indicating certain materials and services in the Contract Documents in lieu of specific requirements to defer selection of actual materials and

services to a later date when additional information is available for evaluation. If necessary, specific requirements will be issued as indicated for Change Orders. Refer to Part 2 for definitions of types of Allowances including costs to be included with Allowance Amount and costs to be included as part of the Contract Sum not part of the Allowance Amount.

1.6 SUBMITTALS

A. Scheduling: At the earliest practical date after award of the Contract but at least seven days prior to a date which would delay the Work, advise Architect of the date when final selection of each product or system described by an Allowance must be completed to avoid delaying the Work.

B. Allowance Proposals: Based upon necessary selections made by the Architect (if any), submit proposals for purchase of products or systems included in Allowances, in the form indicated for Change Orders. Other than administrative activities to prepare said Change Order, do not begin Work attributable to Allowances until Change Order for same has been executed. Failure complete Change Order in advance of such Allowance Work shall relieve the Owner from claims for increase in the Contract Sum or Contract Time.
   1. Include with proposal recommendations that are relevant to performing the Work.
   2. Differential Cost: If the actual cost of the allowance is higher than the Allowance Amount, the Owner will pay the difference to the Contractor. If the actual cost of the Allowance is lower than the Allowance Amount, the Contractor will issue a credit to the Owner. Cost differentials will be corrected by Change Order.
   3. The Owner reserves the right to put the Work of Allowances under the Owner's control, to furnish or install Work of Allowances, and to receive the entire Allowance Amount as a credit.

C. Records:
   1. Submit invoices or delivery slips to show actual quantities of materials delivered to the site for use in fulfillment of each allowance.
   2. Submit time sheets and other documentation to show labor time and cost for installation of allowance items that include installation as part of the allowance.

D. Corrective Change Orders: At Project closeout, prepare proposals as indicated for Change Orders to credit unused amounts remaining in Allowance Amounts (if any) to Owner.

PART 2 - PRODUCTS

2.1 MATERIAL (ONLY) LUMP SUM ALLOWANCES.

A. General: A Material Lump Sum Allowance is included to provide for items in which
   1. the scope of the Allowance Work is definite,
   2. the actual quantity and location of the items can be determined from field measurements or Contract Documents,
   3. the qualities of the items are to be determined by selection, and

4. the Allowance Amount indicates a cost for all of the items necessary to complete the Work of the Allowance.

B. Allowance Cost: Include the following costs as part of the Allowance Amount:
   1. Materials Costs
   2. Taxes and Insurance Costs

C. Contract Cost: Include the following costs as part of the Contract Sum not part of the Allowance Amount:
   1. Labor Costs
   2. Equipment Costs
   3. Supervision Costs
   4. Markup

PART 3 - EXECUTION

3.1 EXAMINATION

A. Examination: Examine products covered by an allowance promptly on delivery for damage or defects. Return damaged or defective products to manufacturer for replacement.

3.2 PREPARATION

A. Preparation: Coordinate materials and their installation for each allowance with related materials and installations to ensure that each allowance item is completely integrated and interfaced with related Work.

3.3 UNUSED MATERIALS

A. Return: Return unused materials to the manufacturer or supplier for credit to the Owner, after installation has been completed and accepted.

B. Attic Stock: Where it is not possible to return unused material for credit and when requested by the Architect, prepare unused material for the Owner's storage, and deliver to the Owner's storage space as directed. Otherwise, disposal of excess material is the Contractor's responsibility.

END OF SECTION 012100

SECTION 012300 - ALTERNATES

PART 1 - GENERAL

1.01 SECTION CONTENTS

A. Alternates

1.02 PRICE AND PAYMENT PROCEDURES

A. Schedule of Alternates: Specifications and Drawings referenced in following Schedule of Alternates contain requirements for materials and methods necessary to achieve the Work described under each Alternate.
   1. Alternate 1 - Add Fireplace: Reference Section 10 3100
   2. Alternate 2 - Add Finish Work in Stair: Reference Section 01 2300
   3. Alternate 3 - Add Wallpaper: Reference Section 09 7200
   4. Alternate 4 – Work Sequence: Reference Section 01 2300
   5. Alternate 5 – Centralized DDC system for HVAC: Reference Section 230923 and Sheet M1.2

1.03 ALTERNATES

A. Alternate 2 - Add Finish Work in Stair: Provide a Bid Alternate to omit painting (if any) indicated for wall surfaces in stair and add one layer of 5/8 inch gypsum board on 7/8 inch rigid furring channel spaced at 16 inches to all wall (but not ceiling) surfaces of the stair. Include finish and painting of gypsum board. Include extension on existing electrical devices. Include finishing transition to existing adjacent gypsum board or plaster surfaces including ceiling.

B. Alternate 4 - Work Sequence: The Base Bid Contractor's use of premises and Contract Limits are set forth in the General and Supplementary Conditions with the Owner occupying the Dishroom and Upper and Lower Kitchens as required by Section 013517 Renovation Work. The Base Bid Contractor's use of premises and Contract Limits includes the Lower Level Area of Work as indicated on Sheet A8- Staging and Sequencing. Alternate #4 is to provide a Bid Alternate to:
   1. Provide a temporary demising wall between the area indicated as being Owner occupied in Drawing "A" on Sheet A8-Staging and Sequencing (hereafter Owner Occupied Area "A") and the area indicated as being Owner occupied in Drawing "B" on Sheet A8-Staging and Sequencing (hereafter Owner Occupied Area "B"). Such temporary demising wall shall be considered a temporary facility and be constructed as required for a dust and noise partition per Section 01500 Temporary Facilities and Controls.
   2. In addition to the Dishroom and Upper and Lower Kitchens, provide Owner occupancy and use of and exclude from the Contract Limits, Owner Occupied Area "A" until such a time as Owner Occupied Area "B" is sufficiently complete to allow the Owner to legally use it for its intended purpose and all remaining Work in Owner

Occupied Area "B" is minor in nature and will not materially interfere or hamper the Owner or occupant's use, access, privacy or security. When Owner Occupied Area "B" is such completed and pursuant to Section 9.9 of the General and Supplementary Condition, then the:

a. Contractor shall terminate and remove temporary facilities, controls, and services from the area.
b. Contractor shall complete final cleaning and touchup finishes in the area as required in Section 01700 Execution Requirements.
c. Contractor and Owner shall endeavor to obtain the consent of insurance company or companies providing property insurance pursuant to Subparagraph 11.3.1.5 of the General and Supplementary Conditions.
d. Contractor shall complete the balance and testing and other requirements indicated to be completed before Substantial Completion as required elsewhere for MEP and other equipment and systems.
e. Contractor shall prepare Punch List for the area as is required for Substantial Completion by Subparagraph 9.8.2 of the General and Supplementary Conditions and Section 012900 Payment Procedures.
f. Contractor shall submit a request for and complete an inspection of such area as is required for an inspection for Substantial Completion per Section 012900 Payment Procedures. No Certificate of Substantial Completion shall be issued separately for the area.
g. Contractor shall obtain a Temporary Certificate of Occupancy and other releases from authorities having jurisdiction permitting Owner unrestricted legal use of the area.
h. Owner shall assume responsibility for security, maintenance, utilities, heating, lighting, and damage to the Work caused by the Owner's normal occupancy and use of the area.
i. Contractor shall exclude Owner Occupied Area "B" from the Contract Limits and allow Owner's occupancy and use of same.
j. Owner shall vacate Owner Occupied Area "A" and the Contract Limits shall be extended to include such area for the Contractor to complete construction operations therein.

3. When the entire Project is Substantially Complete, the:
   a. Contractor shall remove the demising wall between Owner Occupied Area "A" and Owner Occupied Area "B".
   b. Base Bid Contract provisions for Substantial Completion, Closeout, and Final Completion shall apply to the entire Project.

C. Alternate 5 - In lieu of stand-alone programmable thermostats, provide a centralized DDC system to control the building's HVAC systems. Refer to Sheet M1.2 and Specification Section 230923 for details.

1.04 DEFINITIONS

A. Alternate or Bid Alternate. Certain construction activities defined in the Bidding Requirements that modify the Contract Documents if accepted by the Owner.
   1. Acceptance of an Alternate by the Owner is indicated either in the Agreement or by Change Order after commencement of the Work.

B. Alternate Amount: An amount proposed by Bidders and stated on the Bid Form to be added to or deleted from the Base Bid to arrive at the Contract Sum if the Alternate is accepted by the Owner.

1.05 ADMINISTRATIVE REQUIREMENTS

A. Coordination: Coordinate related Work and modify or adjust adjacent Work as necessary to ensure that Work affected by each accepted Alternate is complete and fully integrated into the Project. Include as part of each Alternate miscellaneous devices, accessory objects, and similar items incidental to or required for a complete installation whether or not indicated as part of the Alternate.

B. Notification: Within seven days following the commencement of the Work, prepare and distribute to each entity involved, notification of the status of each Alternate. Indicate whether Alternates have been accepted, rejected or deferred for consideration at a later date. Include a complete description of negotiated modifications to Alternates.

C. Alternates Not Accepted: Refer to the Agreement for deferment of Alternates not accepted (if any).

PART 2 - PRODUCTS - Not Used.

PART 3 - EXECUTION - Not Used.

END OF SECTION 012300

SECTION 012600 - CONTRACT MODIFICATION PROCEDURES

PART 1 - GENERAL

1.1 SECTION CONTENTS

A. Change Orders

1.2 RELATED REQUIREMENTS

A. Conditions of the Contract
   1. Minor Changes in the Work
   2. Construction Change Directive

B. Substitution Procedures
   1. Substitutions

1.3 DEFINITIONS

A. Markup: amount for overhead and profit as established in Article 7 of the Conditions of the Contract attributable to the subject portion of the Work as charged by the Contractor, Subcontractor or Sub-subcontractor. Markup is limited to costs attributable to the subject portion of the Work which are not Labor Costs, Materials Costs, Equipment Costs, Taxes and Insurance Costs, or Supervision Costs related to the subject portion of the Work
   1. In the case of a Change Order, this amount for overhead and profit shall include expenses associated with the estimating, site measurements, proposal preparation and other administrative costs which occur before the Change Order is approved by the Owner and Architect.
   2. The following expenses shall be allocated to this amount for overhead and profit:
      a. Compensation of Contractor's, Subcontractor's, and Sub-subcontractor's personnel not stationed at the site.
      b. Cost of Contractor's, Subcontractor's, and Sub-subcontractor's offices not at the site and the expenses for operating, maintaining, and supplying such offices.
      c. Expenses and interest paid on Contractor's, Subcontractor's, and Sub-subcontractor's capital.

B. Labor Costs: costs not higher than the standard paid at the place of the Project related to the subject portion of the Work for:
   1. Costs associated with clause 7.3.7.1 of the Conditions of the Contract.
      a. Labor includes handling and installation operations by personnel at the Project site.

C. Materials Costs: costs not higher than the standard paid at the place of the Project related to the subject portion of the Work for:
   1. Costs associated with clause 7.3.7.2 of the Conditions of the Contract.

2. Costs of incorporated or consumed materials or supplies including discounts as billed to the Contractor, Subcontractor, or Sub-subcontractor
3. Costs of transportation, storage, and delivery of such materials
4. Costs for reasonable material quantities attributable to cutting losses, tolerances, mixing wastes, normal product imperfections, and similar margins
5. Net costs for removal, recycling, reuse, resale and disposal of construction waste from the site

D. Equipment Costs: costs not higher than the standard paid at the place of the Project related to the subject portion of the Work for:
1. Costs associated with clause 7.3.7.3 of the Conditions of the Contract.
2. Rental, mobilization, and demobilization costs of non-incorporated machinery and equipment, which are necessary for the performance of the Work, exclusive of hand tools, whether rented from the Contractor or others
3. Supplies required to operate such

E. Taxes and Insurance Costs: costs not higher than the standard paid at the place of the Project related to the subject portion of the Work for:
1. Costs associated with clause 7.3.7.4 of the Conditions of the Contract.
2. Costs of premiums for all bonds and insurance, permit fees, and sales, use or similar taxes.

F. Supervision Costs: costs not higher than the standard paid at the place of the Project related to the subject portion of the Work for:
1. Costs associated with clause 7.3.7.5 of the Conditions of the Contract.
2. Costs of supervision personnel regularly stationed at the site.

1.4 SUBMITTALS

A. Owner-Initiated Change Order Proposal Request: 1 copy will be delivered to Contractor. Contractor to distribute to entities proposed to perform change to the Work.

B. Contractor-Initiated Change Order Proposal: 2 copies to Architect, 1 additional copy when proposal requires review by Architect's Consultant.

C. Change Orders: 3 copies to Architect, 1 to be retained by Contractor, 1 to be retained by Architect and 1 to be retained by Owner.

1.5 CHANGE ORDER PROPOSAL REQUESTS

A. Owner-Initiated Proposal Requests: Proposed changes in the Work that will require adjustment to the Contract Sum or Contract Time will be issued by the Architect, with a detailed description of the proposed change and supplemental or revised Drawings and Specifications, if necessary.
1. Status: Proposal requests issued by the Architect are for information only. Do not consider them instruction either to stop work in progress, or to execute the proposed change.

2. Response: Unless otherwise indicated in the proposal request, within ten (10) days of receipt of the proposal request, submit to the Architect for the Owner's review an estimate of cost necessary to execute the proposed change.
3. Cost Breakdown: For Contractor and each (Sub-)Subcontractor, itemize costs as follows:
    a. Labor Costs
    b. Materials Costs
        1) Include a list of quantities of products required or eliminated and unit costs, with total amount of purchases and credits to be made. If requested, furnish survey data to substantiate quantities.
    c. Equipment Costs
    d. Taxes and Insurance Costs
    e. Supervision Costs
    f. Markup
4. Time: Include a statement indicating the effect the proposed change in the Work will have on the Contract Time and the reasoning for the effect.

B. Contractor-Initiated Proposal: When latent or other unforeseen conditions require modifications to the Contract, the Contractor may propose changes by submitting a request for a change to the Architect.
1. Summary: Include a statement outlining the reasons for the change and the effect of the change on the Work. Provide a complete description of the proposed change. Indicate the effect of the proposed change on the Contract Sum and Contract Time.
2. Cost Breakdown: Itemize costs as required for Owner-Initiated Proposal Requests
3. Substitutions: Comply with substitution procedures indicated elsewhere if the proposed change in the Work requires the substitution of products or methods for products or methods indicated.
4. Time: Include a statement indicating the effect the proposed change in the Work will have on the Contract Time and the reasoning for the effect..

C. Proposal Request Form: Use AIA Document G 709 for Work Changes Proposal Requests or its complete equivalent.

D. Cost of Proposal Preparation: The cost associated with the preparation of a Change Order Proposal as detailed in this Section shall not be considered for compensation and are included in the allowance for Contractor’s overhead and profit as indicated in the General and Supplementary Conditions.

1.6 CHANGE ORDER PROCEDURES

A. Change Order Preparation: Upon the Architect’s, Contractor’s and Owner's approval of a Change Order Proposal Request, the Architect, or if mutually agreed upon by Architect, Owner and Contractor, the Contractor, will issue a Change Order for signatures by the Owner, Architect, and Contractor on AIA Form G701 or its complete equivalent.

PART 2 - PRODUCTS (Not Used)

PART 3 - EXECUTION (Not Used)

END OF SECTION 012600

SECTION 012900 - PAYMENT PROCEDURES

PART 1 - GENERAL

1.1 SECTION INCLUDES

- A. Application for Payment
  1. Payment Application Period
  2. Certified Application
  3. Certificate for Payment
  4. Initial Payment Application
  5. Substantial Completion Payment Application
  6. Final Completion Payment Application
  7. Contractor's Affidavit
  8. Final Statement
  9. Consent of Surety
- B. Closeout Procedures
  1. Substantial Completion
  2. Final Completion
- C. Lien Waivers
- D. Schedule of Values
- E. Punch List

1.2 RELATED REQUIREMENTS

- A. Contracting Requirements
  1. Agreement
     a. Payment for Stored Materials
     b. Liquidated Damages
     c. Retainage
  2. Conditions of the Contract
     a. Contractor’s Construction Schedule
     b. Insurance Certificates
     c. Performance and Payment Bonds
     d. Permits
- B. General Requirements
  1. Price and Payment Procedures
     a. Allowances
     b. Unit Prices
     c. Alternates
     d. Contract Modification Procedures
        1) Change Orders
  2. Administrative Requirements
     a. Project Management and Coordination
        1) Permit submittals
        2) Subcontracts List
        3) Contractor's Staff List
        4) Project Meetings
     b. Construction Progress Documentation

1) Contractor's Construction Schedule
c. Submittal Procedures
1) Submittals Schedule
2) Product Submittals
3. Execution and Closeout Requirements
a. Execution Requirements
1) Cleaning and Waste Management
a) Final Cleaning
b) Construction Waste Management
b. Closeout Procedures
1) Closeout Submittals
a) Demonstration and Training Schedule
b) Record Documents
c) Executed Warranties
d) Operation and Maintenance Manuals
e) Maintenance Materials
2) Demonstration and Training

1.3 DEFINITIONS

A. Schedule of Values: as defined in the Conditions of the Contract and as required in Part 2 of this Section.

B. Punch List: a comprehensive list of items to be completed or corrected prior to Final Payment as required by the Conditions of the Contract and in Part 2 of this Section.

1.4 SUBMITTALS

A. Insurance Certificates: as indicated in the Conditions of the Contract.

B. Performance and Payment Bonds: as indicated in the Agreement and Conditions of the Contract.

C. Schedule of Values: one electronic copy.
1. Submit the initial Schedule of Values to Architect at earliest possible date but no later than ten (10) days after issuance of a Notice to Proceed. Submit updated Schedule of Values to Architect at earliest possible date but no later than seven (7) days before the date scheduled for submittal of corresponding Applications for Payment. No payments will be approved until corresponding Schedule of Values is completed by Contractor and approved by Architect.

D. Certified Applications for Payment: two (2) originals and two (2) copies.

E. Punch List: one electronic (1) copy.

F. Certified Punch List: two (2) originals and two (2) copies.

G. Contractor's Substantial Completion Certification: two (2) originals and two (2) copies.

H. Other Documents Accompanying Certified Applications for Payment: For each of the following, when required, attached originals to each original Certified Applications for Payment and copies to each copy of Certified Applications for Payment:
   1. Lien Waivers
   2. Contractor's Affidavit
   3. Final Statement
   4. Consent of Surety
   5. Other Documents Accompanying Certified Applications for Payment unless indicated otherwise.

1.5 APPLICATIONS FOR PAYMENT

A. Periods: The period covered by each Application for Payment is the period indicated in the Agreement.

B. Stored Materials: The contractor shall avoid requisitioning materials to be delivered in advance of the time scheduled for their installation in the work. Provide a separate itemization for each part of the Work where Applications for Payment include materials or equipment purchased or fabricated and stored, but not yet installed.
   1. Differentiate between items stored on-site and items stored off-site. For materials stored off-site, the application must be accompanied by proof that the materials are stored in a bonded warehouse and are to be released only to the Contractor for delivery to this project. Include proof of insurance. Include signed and executed form UCC-1 entitled Uniform Commercial Code- Financing Statement.

C. Preparation: Each Application for Payment shall be consistent with previous applications and payments as certified by Architect and paid for by Owner. Use AIA Document G702 and AIA Document G703 Continuation Sheets or complete equivalent approved by the Architect as form for Applications for Payment. Complete every entry on form.
   1. Entries shall match data on the Schedule of Values and Contractor's Construction Schedule. Use updated schedules if revisions were made.
   2. Include amounts of Change Orders and Construction Change Directives approved before last day of construction period covered by application.
   3. Certified Application: Prepare, notarize and execute Certified Applications for Payment by a person authorized to sign legal documents on behalf of Contractor. Architect will return incomplete applications without action.
      a. Transmittal: Submit signed and notarized original copies of each Certified Application for Payment to Architect by a method ensuring receipt. One copy shall include lien waivers and similar attachments if required.
      b. Transmit each copy with a transmittal form listing attachments and recording appropriate information about application.

D. Additional Documents: With each Application for Payment submit the following documents:
   1. Lien Waivers as required in this Section.
   2. Waste Management Plan if updated since previous application.
   3. Contractor’s Construction Schedule, if updated since previous application.

E. Additional Requirements: Application for Payment at the following events involve additional requirements indicated in this Section.
   1. Initial Application
   2. Substantial Completion
   3. Final Payment

1.6 DECISIONS TO WITHHOLD CERTIFICATION

A. Conditions of Payment for Administrative Requirements: In addition to the provisions of the Conditions of the Contract, failure to provide the following information at times required by the Contract Documents shall be the basis for withholding payment in amounts as established at the sole discretion of the Architect.
   1. Administrative Submittals Required Including: insurance certificates, performance and payment bonds, permits, schedule of values, lien waivers, punch list, documents required to accompany payment application, construction schedule, submittals schedule, staff names list, subcontract list, construction reports, project conference or meeting minutes, mockup reports, source or site quality control reports which are indicated to be the Contractor responsibility, site reports, record documents, operation and maintenance manuals, demonstration and training submittals**.**
   2. Product Submittals.

1.7 INITIAL PAYMENT APPLICATION

A. Initial Payment Application: Administrative actions and submittals that must precede or coincide with submittal of first Application for Payment include the following.
   1. Administrative Submittals:
      a. Subcontracts List, if required
      b. Contractor's Staff List, if required.
      c. Schedule of Values.
      d. Contractor's Construction Schedule (preliminary if not final).
      e. Submittals Schedule.
      f. Report of Preconstruction Conference.
   2. Permits, Insurance, Bonds:
      a. Copies of building permits, authorizations and licenses from authorities having jurisdiction for performance of the Work, if Contractor's responsibility.
      b. Data needed to acquire Owner's insurance, if requested.
   3. Submit other documents required in this Section to be submitted with each Application for Payment.

1.8 SUBSTANTIAL COMPLETION

A. Preliminary Procedures: Before requesting inspection for determining date of Substantial Completion, complete the items indicated in the General and Supplementary Conditions as a condition of Substantial Completion:

B. (Re)Inspection Request: Submit request for inspection or (re)inspection for Substantial Completion. Upon receipt of request, Architect, applicable Consultant(s), and optionally, Owner will either proceed with inspection within seven (7) days or Architect will notify Contractor of unfulfilled requirements within three (3) days. If notified of unfulfilled requirements, complete requirements and submit a request for reinspection for Substantial Completion.

C. (Re)Inspection or Reinspection : The Contractor shall be represented at the (re)inspection and record additional incomplete items identified by the Architect, applicable Consultant(s), and Owner (through the Architect) by adding them to the Contractor's Punch List. If during the (re)inspection, more than fifteen (15) individual incomplete items are identified which were not indicated on the Contractor's Punch List, the Architect may, at the Architect's discretion, terminate the (re)inspection and the Project will not be considered Substantially Complete. Request reinspection when the Work identified in previous (re)inspection as incomplete and required for Substantial Completion is completed or corrected.

D. Certificate of Substantial Completion: After the successful and acceptable completion of the (re)inspections, the Architect will prepare the Certificate of Substantial Completion or will notify Contractor of items, either on Contractor's Punch List or additional items identified by Architect, that must be completed or corrected before certificate will be issued.
   1. Results of successfully and acceptably completed (re)inspection will form the basis of requirements for Final Completion.

E. Application for Payment at Substantial Completion: After issuance of a Certificate of Substantial Completion, submit an Application for Payment showing 100 percent completion for portion of the Work claimed as substantially complete. Prepare Application to withhold value of retainage after Substantial Completion as established in the Agreement.
   1. Final Statement: Include documentation supporting claim that the Work is substantially complete and a draft final statement showing an accounting of changes to the Contract Sum.
      a. Liquidated Damages: Submit draft liquidated damages settlement statement.
   2. Consent of Surety: If a Performance and Payment Bond is required, complete and certify consent of surety for reduction of retainage on AIA Document G707A "Consent of Surety to Final Reduction in or Partial Release of Retainage".
   3. Utility Readings: Provide final meter readings for utilities, a measured record of stored fuel, and similar data as of date of Substantial Completion or when Owner took possession of and assumed responsibility for corresponding elements of the Work.
   4. Where applicable, this application shall reflect Certificates of Partial Substantial Completion issued previously for Owner occupancy of designated portions of the Work.
   5. Submit other documents required in this Section to be submitted with each Application for Payment.

1.9 FINAL COMPLETION

A. Preliminary Procedures: Before requesting final inspection for determining date of Final Completion, complete the following and additional items indicated in the General and Supplementary Conditions which are required as a condition of Final Completion:
   1. Certified Punch List: Submit certified copy of punch list to be completed or corrected. The certified copy of the list shall state that each item has been completed or otherwise resolved for acceptance.
   2. O&M Manuals: Prepare and submit complete Operation and Maintenance Manuals as required by closeout procedures indicated elsewhere. Obtain Architect's approval of Operation and Maintenance Manuals. Allow fifteen (15) days for Architect's review of Operation and Maintenance Manuals for comment. Allow additional seven (7) days after receipt of conforming revisions for review of revisions for approval. Continue performing regular operation and maintenance of the Work until Maintenance and Operational Manuals are approved.
   3. Owner's Instructions: Complete demonstration and training of Owner's personnel as required by closeout procedures indicated elsewhere. Submit and obtain Architect's approval of demonstration and training recordings. Allow fifteen (15) days for Architect's review of recordings for comment. Allow additional seven (7) days after receipt of conforming revisions for review of revisions for comment. Allow additional seven (7) days after receipt of conforming revisions for review of revisions for approval. Continue performing regular operation and maintenance of the Work until completion of required Owner's Demonstration and Training.
   4. Warranties: Submit executed warranties, workmanship bonds, maintenance service agreements, final certifications, warranty inspections and similar documents. Obtain Architect's approval of executed warranties. Allow fifteen (15) days for Architect's review of executed warranties for comment. Allow additional seven (7) days after receipt of conforming revisions for review of revisions for approval.
   5. Record Information: Prepare and submit Project Record Documents as required by closeout procedures indicated elsewhere, damage or settlement surveys, property surveys (if required), and similar final record information. Obtain Architect's approval of Record Documents. Allow fifteen (15) days for Architect's review of Record Documents for comment. Allow additional seven (7) days after receipt of conforming revisions for review of revisions for approval.
   6. Maintenance Materials: Deliver extra stock materials, spare parts, tools & software, and similar items to location designated by Owner. Obtain Architect's approval of maintenance materials submission. Allow fifteen (15) days for Architect's review of maintenance materials submission for comment. Allow additional seven (7) days after receipt of conforming revisions for review of revisions for approval.
   7. Systems: Complete balance and testing and related activities for MEP systems indicated elsewhere to be completed before Final Completion.
   8. Liquidated Damages: Submit final liquidated damages settlement statement.
   9. Final Waste Management Plan: Submit Final Waste Management Plan as required for execution requirements indicated elsewhere.

B. (Re)Inspection Request: Submit request for inspection or re-inspection for Final Completion. Upon receipt of request, Architect, applicable Consultant(s), and optionally, Owner will either proceed with inspection within seven (7) days or Architect will notify Contractor of unfulfilled requirements within three (3) days. If notified of

unfulfilled requirements, complete requirements and submit a request for reinspection for Final Completion.

C. (Re)Inspection: The Contractor shall be represented at the (re)inspection and record additional incomplete items identified by the Architect, applicable Consultant(s), and Owner, through the Architect, by adding them to the Contractor's Punch List. If during the (re)inspection, more than fifteen (15) individual incomplete items are identified which were not indicated on the Contractor's Punch List, the Architect may, at the Architect's discretion, terminate the (re)inspection and the Project will not be considered to have reached Final Completion. Request reinspection when the Work identified in previous (re)inspection as incomplete and required for Final Completion is completed or corrected.

D. Approval of Final Completion: After the successful and acceptable completion of the (re)inspections, the Architect will prepare the final Certificate for Payment or will notify Contractor of items, either on Contractor's Punch List or additional items identified by Architect, that must be completed or corrected before certificate will be issued.

E. Final Payment Application: Submit final Application for Payment with releases and supporting documentation not previously submitted and accepted, including the following:
   1. Final Statement: Updated final statement, accounting for final changes to the Contract Sum.
   2. Contractor's Affidavit: Submit notarized AIA Document G706, "Contractor's Affidavit of Payment of Debts and Claims" including:
      a. Evidence that claims have been settled, and that taxes, fees, and similar obligations were paid.
      b. AIA Document G706A "Contractor's Affidavit of Release of Liens"
      c. Lien Waivers covering 100% of Work.
   3. Continuing Insurance Certificate: Certificate that insurance required by the Contract Documents to remain in force after final payment is currently in effect and will not be canceled or allowed to expire until at least 30 days' prior written notice has been given to the Owner. Include a written statement that the Contractor knows of no substantial reason that the insurance will not be renewable to cover the period required by the Contract Documents.
   4. Consent of Surety: If a Performance and Payment Bond is required, complete and certify consent of surety for Final Payment on AIA Document G707, "Consent of Surety to Final Payment."
   5. Submit other documents required in this Section to be submitted with each Application for Payment.

1.10 LIEN WAIVERS

A. When Required: Waivers of Mechanic's Lien (Lien Waivers) will be required under the following conditions:
   1. Final Payment: Submit final Application for Payment with or preceded by final Lien Waivers from every entity who is lawfully entitled to file a mechanic's lien arising out of the Work of the Contract.
   2. Progress Payments: At any time during the construction process, the Owner may require Lien Waivers prior to further payment from any entity who is lawfully

entitled to file a mechanic's lien arising out of the Work of the Contract. The Owner will notify the Contractor in writing at least fifteen (15) days prior to an Application for Payment submission date from which entities Lien Waivers will be required for the respective payment application.

B. Content of Waiver: Waivers of Mechanic's Lien (Lien Waivers) shall include:
   1. Full Waivers: Each Lien Waivers shall fully waive the right of entity to file a mechanic's lien arising out of the Contract and related to the Work covered by dollar amounts, less retainage, approved in previous Applications for Payment for which the Owner has made payment.
   2. Conditional Waivers: Each Lien Waivers shall waive the right of entity to file a mechanic's lien arising out of the Contract and related to the Work covered by dollar amounts, less retainage, approved in current Application for Payment conditional upon receipt of such approved amount.
   3. Notarized: Lien Waivers shall be duly notarized and executed by an authorized officer of the entity.
   4. Waiver Forms: Submit Lien Waivers on forms acceptable to Owner.

C. Contractor to Discharge Mechanic's Liens. If any mechanics' or material suppliers' liens shall at any time be asserted or filed against the Project as a result of the Contractor's construction activities or those or any Subcontractors, Sub-subcontractors or material suppliers, the Contractor, at the Contractor's expense, shall promptly take and diligently prosecute appropriate action to have the same discharged of record or bonded off within thirty (30) days after notice of filing thereof or such lesser period as shall be necessary to prevent judgment execution or foreclosure of such mechanic's lien or any adverse consequences for the Owner. Upon the Contractor's failure to do so, the Owner, in addition to any other right or remedy that the Owner may have, may take such action as may be reasonably necessary to protect the Owner's interest, including payment or settlement of the lien claim and the Contractor shall reimburse the Owner any amounts paid or incurred by the Owner in connection with such action. The Contractor shall indemnify and hold harmless the Owner with respect to any claims or liens asserted by the Contractor's Subcontractors or Sub-subcontractors at any level if the Contractor has been paid with respect to the work or materials for which the claim or lien is asserted.

PART 2 - PRODUCTS

2.1 SCHEDULE OF VALUES

A. Identification: Include the following Project identification on the Schedule of Values:
   1. Project name and location
   2. Owner's name
   3. Architect's name
   4. Contractor's name
   5. Date of last revision

B. Format: Organize the Schedule of Values in tabular form with line items and columns consistent with AIA Document G703.

C. Columns: Indicate the following in separate columns for each line item:
   1. Related Specification Section
   2. Description of the Work
   3. Name of (Sub-)Subcontractor(s)
   4. Name of supplier(s)
   5. Total dollar value
   6. Total percentage of the Contract Sum to nearest one-hundredth percent, adjusted to total 100 percent.
   7. Stored Materials: where Applications for Payment may include materials or equipment purchased or fabricated and stored, but not yet installed.
      a. Differentiate between items stored on-site and items stored off-site.

D. Line Items: Correlate line items in the Schedule of Values with other administrative requirements, including the following:
   1. Itemization: Provide an itemized breakdown of the Contract Sum in enough detail to facilitate continued evaluation of Applications for Payment and progress reports. Provide several line items for principal subcontract amounts, where appropriate.
      a. Use the Project Manual Table of Contents as an initial guide to establish line items for the Schedule of Values. Provide at least one line item for each Specification Section which relates to work-in-place.
      b. Each item in the Schedule of Values shall be complete and include total cost and proportionate share of the following general overhead and profit items proportional to the percentage of that item in relation to the Contract Sum
         1) Profit, cost of administrative personnel (including project manager, superintendent, estimators, and office staff) and overhead (including transportation, lodging, and home office expense).
         2) Bonds, insurance, permits, taxes and fees.
         3) Costs associated with payment, administrative, quality assurance, product and execution procedures for work-in-place including: application for payment, schedule of values, punch list, project meetings, requests for interpretation, construction schedule, product submittals, testing agencies, field reports, mockups, substitutions, contract modifications, construction layout, field engineering, cutting and patching, and progress cleaning, demonstration and training, extra materials, warranties, construction waste management, record documents, operation and maintenance manual assembly, and commissioning.
         4) Other overhead and profit items not indicated as line items. If information is provided which demonstrates that the progress of an overhead item is able to be independently and readily measured and is not directly attributable to work-in-place, an overhead item may be listed as a separate line item if approved by the Architect.
   2. Allowances: If the Project includes Allowances, provide a separate line item in the Schedule of Values for each Allowance.
   3. Contract Modifications: For each Change Order, either provide a separate line item or allocate to other items on the Schedule of values as directed by the Architect.

4. Alternates: If the Project includes Alternates, either provide a separate line item or allocate to other items on the Schedule of values as directed by the Architect. Include deferred Alternates, if any, as directed by the Architect.
5. Temporary Facilities: Provide a separate line item for each temporary facilities and control and other major cost items that are not direct cost of actual work-in-place.
6. Final Cleaning: If the Project includes final cleaning, provide a separate line item for final cleaning.

E. Content:
1. Accounting: If requested by Architect, provide original informational material to for approval of Schedule of Values.
2. Rounding: Round amounts to nearest whole dollar; total shall equal the Contract Sum.
3. Updating: Update and resubmit the Schedule of Values before the next Applications for Payment when Change Orders or Construction Change Directives result in a change in the Contract Sum.

2.2 PUNCH LIST

A. Responsibility: Contractor shall prepare Punch List as required in the Conditions of the Contract.

B. Primary Organization: Organize punch list by each space or area affected by construction operations including, if necessary, areas disturbed by Contractor that are outside the limits of construction in the following order.
1. General Conditions and Requirements
2. Sitework
3. Building exterior
4. Individual systems involving more than one room
5. Interior by room number and include name

C. Secondary Organization: Organize items applying to each space or area by Specification number.

D. Preparation: Include at the top of each page:
a. Title “List of Incomplete Items (Punch List)”
b. Project name
c. Date of last revision
d. Owner’s name
e. Architect’s name
f. Contractor’s name
g. Page number

PART 3 - EXECUTION – Not Used

END OF SECTION 012900

SECTION 013100 - PROJECT MANAGEMENT AND COORDINATION

PART 1 - GENERAL

1.01 SECTION INCLUDES

A. Coordination
B. Sequencing
C. Coordination Drawings
D. Requests For Interpretation (RFI)
E. Project Meetings
    1. Preconstruction Conference
    2. Preinstallation Conferences
    3. Progress Meetings

1.02 RELATED REQUIREMENTS

A. Contracting Requirements
    1. Conditions of the Contract
        a. Permits
        b. Contractor's Construction Schedule
B. Payment Procedures
    1. Schedule of Values
C. Submittal Procedures
    1. Submittals Schedule
D. Product Requirements
    1. Owner-furnished products
E. Execution Requirements
F. Closeout Procedures
    1. Project Closeout Conference
G. Individual Specification Sections
    1. Coordination
    2. Sequencing
    3. Scheduling
    4. Preinstallation Conferences

1.03 DEFINITIONS

A. Permits: permits, operating permits, licenses, certifications, certificates of use or occupancy, acceptance certificates, inspection certificates, inspection reports, releases, jurisdictional settlements, notices, judgments, approvals, or similar documents established for compliance with regulations bearing on the Work issued by an authority having jurisdiction.

1.04 ADMINISTRATIVE REQUIREMENTS

A. Coordination: Coordinate construction operations included in different Sections of the Specifications which may depend on each other for proper installation, connection, and operation to ensure efficient and orderly installation of each part of the Work.
   1. Where availability of space is limited, coordinate installation of different components to ensure maximum performance and accessibility for required maintenance, service, and repair.
   2. Coordinate construction operations with those by Owner or under separate contracts to ensure efficient and orderly installation of each part of the Work.

B. Sequencing: Schedule construction operations in sequence required to obtain the best results where installation of one part of the Work depends on installation of other components, before or after its own installation.
   1. Make adequate provisions to accommodate items scheduled for later installation.

C. Notification: Prepare memoranda for distribution to each party involved, outlining special procedures required for coordination. Include such items as required notices, reports, and list of attendees at meetings. Secure time commitments for performing critical elements of the Work from entities involved.

D. Administrative Procedures: Coordinate scheduling and timing of required administrative procedures with other construction activities with those by Owner or under separate contracts to avoid conflicts and to ensure orderly progress of the Work. Such administrative activities include the following:
   1. Preparation of Contractor's Construction Schedule
   2. Preparation of the Schedule of Values
   3. Installation and removal of temporary facilities and controls
   4. Delivery and processing of submittals
   5. Progress meetings
   6. Preinstallation conferences
   7. Project closeout activities
   8. Startup and adjustment of systems
   9. Submittals Schedule
   10. Progress reports
   11. Other required schedules and reports

E. Conservation: Coordinate construction activities to ensure that operations are carried out with consideration given to conservation of energy, water, and materials. Coordinate use of temporary utilities to minimize waste.
   1. Salvage materials and equipment involved in performance of, but not actually incorporated into, the Work.

F. Conferences: Requirements for Project meetings are indicated in Part 3.

PART 2 - PRODUCTS – NOT USED

PART 3 - EXECUTION

3.01 PROJECT MEETINGS

A. General: Schedule and conduct meetings and conferences at Project Site, unless otherwise indicated.

1. Attendees: Inform participants and others involved, and individuals whose presence is required, of date and time of each meeting. Notify Owner and Architect of scheduled meeting dates and times.
2. Agenda: When requested by Architect or at Contractor's option, prepare the meeting agenda. Distribute the agenda to all invited attendees.
3. Minutes: Record significant discussions and agreements achieved. Distribute the meeting minutes to everyone attending, who should have attended, and concerned, including Owner and Architect, within three (3) days of the meeting.

B. Preconstruction Conference: Schedule and conduct a preconstruction conference before starting construction, at a time convenient to Owner and Architect, but no later than fifteen (15) days after commencement of the Work. Hold the conference at Project site or another convenient mutually agreed upon location.

1. Attendees: Participants at the conference shall be familiar with Project and authorized to conclude matters relating to the Work. Attendees shall include authorized representatives of the following.
    a. Owner
    b. Architect
    c. Architect's Consultants
    d. Contractor's personnel
        1) Project Manager
        2) Superintendent
        3) Waste management coordinator
    e. Major Subcontractors and suppliers
    f. Other concerned parties
2. Agenda: Discuss items of significance that could affect progress, including:
    a. Administrative Requirements
        1) Designation of key personnel and their duties, responsibilities and personnel assignments
        2) Distribution of the Contract Documents
        3) Coordination of work by Owner or under separate contracts
        4) Work restrictions
        5) Access to site and use of the premises
        6) Rights-of-way and easements
        7) Requirements of railroads, highway departments, other agencies and utility companies
        8) Working hours
        9) Owner's occupancy requirements
        10) Procedures for disruptions and shutdowns

11) Parking availability
12) Lines of communications
13) Tentative construction schedule
14) Phasing
15) Critical work sequencing and long-lead items
16) Procedures for RFIs
17) Submittal procedures

b. Price and Payment Procedures
1) Allowances
2) Unit prices
3) Alternates
4) Substitution procedures
5) Procedures for processing field decisions and Change Orders
6) Payment procedures

c. Quality Requirements
1) Procedures for testing and inspecting

d. Temporary Facilities And Controls
1) Responsibility for temporary facilities and controls
2) Office, work, and storage areas
3) First aid
4) Security
5) Project identification

e. Product Requirements
1) Owner-furnished products
2) Equipment deliveries and priorities
3) Product storage and handling requirements
4) Procedures for moisture and mold control

f. Execution and closeout requirements
1) Construction waste management and recycling
2) Progress cleaning
3) Housekeeping procedures
4) Preparation of record documents
5) Construction indoor air quality procedures

C. Preinstallation Conferences: Schedule and conduct preinstallation conferences at Project site before each construction activity that requires coordination with other construction and where indicated in individual Specification Sections. Advise Architect no less than fifteen (15) days in advance of scheduled meeting dates.

1. Attendees: Participants at the conference shall be familiar with Project and authorized to conclude matters relating to the Work. Attendees shall include authorized representatives of entities explicitly indicated in individual Specification Sections and the following.
a. Contractor
b. Contractor's Superintendent
c. Installer
d. Testing Agency, if any
e. Entities involved in or affected by the installation and its coordination or integration with other materials and installations that have preceded or will follow.

2. Agenda: Review progress of other construction activities and preparations for the particular activity under consideration, including requirements for the following:
    a. Contract Documents
    b. Options
    c. Related RFIs
    d. Related Change Orders
    e. Purchases
    f. Deliveries
    g. Submittals
    h. Execution
        1) Construction indoor air quality procedures
            a) Coatings and adhesives
            b) VOC and formaldehyde
        2) Construction waste management procedures
    i. Review of mockups
    j. Possible conflicts
    k. Compatibility requirements
    l. Time schedules
    m. Weather limitations
    n. Manufacturer's instructions and recommendations
    o. Warranty requirements
    p. Compatibility of materials
    q. Acceptability of substrates
    r. Temporary facilities and controls
    s. Space and access limitations
    t. Regulations of authorities having jurisdiction
    u. Testing and inspecting requirements
    v. Installation procedures
    w. Coordination with other work
    x. Required performance results
    y. Protection of adjacent work
    z. Protection of construction and personnel
    aa. Review and finalize construction schedule and verify availability of materials, installer's personnel, equipment, and facilities needed to make progress and avoid delays
    bb. Insurance requirements, if applicable
    cc. Examine project conditions, if at appropriate stage of completion
    dd. Cleaning requirements
    ee. Correction of Work procedures
3. Record significant conference discussions, agreements, and disagreements, including required corrective measures and actions.
4. Do not proceed with installation if the conference cannot be successfully concluded. Initiate whatever actions are necessary to resolve impediments to performance of the Work and reconvene the conference at earliest feasible date.

D. Progress Meetings: Schedule and conduct progress meetings at regular intervals. Coordinate dates of meetings with preparation of payment requests.
    1. Frequency: monthly.

2. Attendees: Participants at the conference shall be familiar with Project and authorized to conclude matters relating to the Work. Attendees shall include authorized representatives of the following.
    a. Owner
    b. Architect
    c. Contractor's personnel
        1) Project Manager
        2) Superintendent
    d. Each contractor, (Sub-)Subcontractor, supplier, and other entity concerned with current progress or involved in planning, coordination, or performance of near term activities
    e. Other concerned parties
3. Agenda:
    a. Review and correct or approve minutes of previous progress meeting.
    b. Review items of significance that could affect progress. Include topics for discussion as appropriate to status of Project.
    c. Contractor's Construction Schedule:
        1) Review progress since the last meeting.
        2) Determine whether each activity is on time, ahead of schedule, or behind schedule, in relation to Contractor's construction schedule.
        3) Determine how construction behind schedule will be expedited; secure commitments from parties involved to do so.
        4) Discuss whether schedule revisions are required to ensure that current and subsequent activities will be completed within the Contract Time.
        5) Review schedule for next period.
    d. Review present and future needs of each entity present, including the following:
        1) Interface requirements
        2) Sequence of operations
        3) Status of submittals
        4) Construction indoor air quality procedures
        5) Construction waste management procedures
        6) Deliveries
        7) Off-site fabrication
        8) Access
        9) Site utilization
        10) Temporary facilities and controls
        11) Hazards and risks
        12) Progress cleaning
        13) Quality and work standards
        14) Status of correction of deficient items
        15) Field observations
        16) Status of RFIs
        17) Status of proposal requests
        18) Status of Change Orders
        19) Pending claims and disputes
        20) Documentation of information for payment requests
4. Reporting: Include in minutes a brief summary, in narrative form, of progress since the previous meeting and report

a. Schedule Updating: Revise Contractor's construction schedule after each progress meeting where revisions to the schedule have been made or recognized. Issue revised schedule concurrently with the report of each meeting.

END OF SECTION 013100

SECTION 013300 - SUBMITTAL PROCEDURES

PART 1 - GENERAL

1.01 SECTION INCLUDES

A. Submittals Schedule

B. Product Submittals
   1. Product Data
      a. Minimum Submittal
      b. Additional Submittals
   2. Certificates
      a. Product or Material Certificates
      b. Welding Certificates
      c. Installer Certificates
      d. Manufacturer Certificates
      e. FSC Certification
   3. Sample Warranties
   4. Sample Maintenance Contacts
   5. Qualification Statements
      a. Installer Qualification Statements
      b. Manufacturer or Fabricator Qualification Statements
      c. Supplier Qualification Statements
      d. Professional Engineer Qualification Statements
      e. Consultant Qualification Statements
      f. Testing Agency Qualification Statements
   6. Selection Samples
   7. Verification Samples
   8. Shop Drawings
      a. Minimum Submittal
      b. Additional Submittals
         1) Delegated Design
         2) Design Data
         3) Product Schedule or List

1.02 RELATED REQUIREMENTS

A. Contracting Requirements
   1. Conditions of the Contract
      a. Contractor's Construction Schedule Submittals
      b. Insurance Certificates Submittals
      c. Performance and Payment Bonds Submittals
      d. Payroll Report and Certification Submittals
   2. Permit Submittals
   3. Permit Records Submittals

B. Payment Procedures
   1. Drawdown Schedule Submittals
   2. Payment Application Submittals
   3. Schedule of Values Submittals
   4. Punch List Submittals
   5. Substantial Completion Submittals
   6. Final Completion Submittals
   7. Contractor's Affidavit Submittals
   8. Final Statement Submittals
   9. Consent of Surety Submittals

C. Substitution Procedures
   1. Substitution Requests

D. Project Management and Coordination
   1. Project Meetings
      a. Preconstruction Conference Minute Submittals
      b. Preinstallation Conferences Minute Submittals
      c. Progress Meetings minute Submittals
      d. Project Closeout Conference Minute Submittals

E. Quality Requirements
   1. Testing Agencies Qualifications
   2. Preconstruction Testing procedures
   3. Mockup Reports Submittals
   4. Test and Inspection Reports Submittals
      a. Source Quality Control Reports Submittals
      b. Field Quality Control Reports Submittals
   5. Testing Agency Final Report Submittals

F. Temporary Facilities and Controls
   1. Temporary Utility Reports Submittals

G. Product Requirements
   1. Owner-furnished Products Submittals
   2. Comparable Product Request Submittals

H. Execution Requirements
   1. Installer’s Site Reports Submittals
   2. Manufacturer’s Site Reports Submittals
   3. Manufacturer’s Instructions and Recommendations Definition

I. Renovation Work
   1. Schedule of Selective Demolition Activities Submittals

J. Closeout Procedures
   1. Facilities Operation Binders Submittals
      a. Record Submittals Binders Submittals
      b. Operation and Maintenance Manual Binders Submittals
         1) Warranty Binders Submittals
   2. Record Documents Submittals

a. Record Drawings
b. Record Specifications
c. Record Submittals
d. Miscellaneous Record Documents
e. Record Document Location

3. Operation and Maintenance Manuals Submittals
4. Demonstration and Training Submittals

K. General Requirements for MEP Specifications
1. Additional submittal requirements for MEP systems.

L. Individual Specification Sections
1. Product Submittal Requirements

1.03 DEFINITIONS

A. Submittal(s): When used in the Article title of a Specification Section, “submittal(s)” means “submit the following”.

B. Submit: Unless another object is used or otherwise indicated, “submit” means “submit to Architect in written form”.

C. Consultant: entity which provides professional services to the Owner or Architect 1) to design and prepare a portion of the Contract Documents or 2) to assist or advise the Architect in administering the Contract or 3) to assist or advise the Owner in performing the services required of the Owner.
1. Consultants and the portion of the Contract Documents for which the Consultant has provided service on or is responsible to provide services on are identified in, or reasonably inferable from, the Contract Documents.

D. Recycled Content: as defined in ISO 14021 and as required for product requirements indicated elsewhere.

E. Portable Document Format (PDF): An open standard file format licensed by Adobe Systems used for representing documents in a device-independent and display resolution-independent fixed-layout document format.

F. Product Submittals: types of submittals indicated in Part 2. The definition of each type shall be indicated by the requirements listed for each in Part 2.

G. Qualifications Statements: include “Qualification Data” which is a term being phased out.

1.04 ADMINISTRATIVE REQUIREMENTS

A. Sequencing: Coordinate submittal processing schedule with ordering, manufacturing, fabrication, purchasing, testing, delivery, execution and related activities that require sequential activity so as not to delay construction activities.

1. Related Work: Where review of a submittal must be coordinated with related Work, schedule submittal processing for concurrent review with submittals of related Work so as not to delay construction activities.

B. Scheduling:
   1. Selection Coordination: Selection of color, pattern, textures and other finishes must be coordinated and will be made concurrently for all products requiring selection. **All Selection Samples must be submitted for entire Work before selections can be made and submittal approved by Architect.**
   2. Consultants: Product Submittals pertaining to portions of the Work designed by Consultants will be required to be reviewed by that Consultant. Unless otherwise indicated or agreed, Architect will coordinate Consultant's review including distribution and collection of submittals.
   3. Processing Time: Allow enough time for submittal review, including time for resubmittals. No extension of the Contract Time will be authorized because of failure to prepare and submit submittals enough in advance of the Work to permit processing and as follows. Time for review shall commence on Architect's receipt of complete submittal complying with procedural requirements.
      a. Allow fifteen (15) days for first review of each submittal.
      b. Allow an additional seven (7) days for submittals requiring review by Consultants.
      c. Allow seven (7) days for processing each resubmittal.
      d. Allow an additional seven (7) days for resubmittals requiring review by Consultants.
      e. If processing requires coordination with subsequent submittals and related Work, allow additional time required for submission of such subsequent submittals or completion of such related Work.

C. Product Submittal Procedures: Product Submittal procedures are indicated in Part 3. Comply with the procedural requirements of Part 3 only for Product Submittals and where Product Submittal procedures are explicitly indicated elsewhere.
   1. Types of Product Submittals: Types of Product Submittals are indicated by the Article Titles in Part 2. For each type of Product Submittal required, submit a separate submittal following the procedures indicated in Part 3.
   2. Submittal Completeness: Submit each submittal in complete form with all necessary and required information for review. For each Specification Section, submit as a single submittal each type of Product Submittal listed below. Therefore, for any one Specification Section there can be no more than eight (8) submittals.
      1) Product Data
      2) Certificates
      3) Sample Warranties
      4) Sample Maintenance Contracts
      5) Qualification Statements
      6) Selection Samples
      7) Verification Samples
      8) Shop Drawings
   3. Circumstances Requiring Product Submittals: Product Submittals are required only when indicated by individual Specification Sections or elsewhere.

4. Multiple Product Types: Where multiple types or sources of a product are used and Product Submittals are required, provide required product submittals for each type and source.
5. Submittal Grouping: Unless otherwise indicated, to the extent practical, provide all submittals pertaining to one Specification Section at the same time as part of an initial submittal.
    a. Initial Submittal: For each Specification Section where a type of submittal listed below is required, include it as part of the initial submittal. Initial submittals which do not contain all required submittal types shall be considered incomplete and may not be reviewed.
        1) Product Data
        2) Certificates
        3) Sample Warranties
        4) Sample Maintenance Contracts
        5) Qualification Data
        6) Selection Samples
    b. Follow Up Submittals: Unless otherwise indicated, the following submittals are desired, but are not required, to be included with initial submittal:
        1) Verification Samples
        2) Shop Drawings

1.05 SUBMITTALS SCHEDULE

A. Submittals Schedule: Provide a schedule of submittals as required by the Conditions of the Contract (hereafter, Submittals Schedule) and as follows in this Article. Coordinate and include time required for review, resubmittal, ordering, manufacturing, fabrication, and delivery when establishing dates. Coordinate Submittals Schedule with Contractor's Construction Schedule and Schedule of Values. Secure time commitments for preparing submittals from entities involved.

B. Content: Prepare the Submittals Schedule in tabular form based on each Specification Section including the following information for each type of Product Submittal required:
1. Specification Section number and name.
2. Submittal type.
3. Scheduled date for first submittal.
4. Name of subcontractor, supplier, or other entity responsible for submittal preparation to Contractor.
5. Scheduled date for resubmittal, if applicable.
6. Scheduled date for final release or approval.
7. Activity or event number.
8. Urgency: Indicate submittals required to maintain orderly progress of the Work and those required early because of long lead time for manufacture or fabrication.
9. Finish Selection: Indicate on Submittal Schedule latest date when all Selection Samples for entire Project will be submitted.

C. Distribution: Following Architect's approval, distribute copies of Submittal Schedule to parties required to comply with submittal dates indicated.

D. Updating: Revise Submittals Schedule after significant adjustments to the Contractor's Construction Schedule and redistribute.

1.06 SUBMITTALS

A. Submittal Schedule: two (2) copies within fifteen (15) days of execution of Agreement and within (3) days of updating.

1.07 QUALITY ASSURANCE

A. Testing Agency Qualifications: as required by quality requirements indicated elsewhere.

PART 2 - PRODUCTS

2.01 PRODUCT DATA

A. Product Data: Submit Product Data information as a single submittal for each Specification Section.
   1. If information must be specially prepared for submittal because standard printed data are not suitable for use, submit as Shop Drawings, not as Product Data.
   2. Mark each copy of each submittal to show which products and options are applicable.
   3. Minimum Submittal: If not indicated on Shop Drawings (if any), at a minimum, include the following product data information when available and applicable or when explicitly required:
      a. Construction details
      b. Material descriptions
      c. Dimensions of individual components and profiles
      d. Finishes
      e. Manufacturer's product specifications
      f. Manufacturer's catalog cuts
      g. Mill reports
      h. Rated capacities
      i. Printed performance curves
      j. Operational characteristics and range diagrams
      k. Stock Wiring Diagrams: Where wiring is standard for product, submit wiring diagram with Product Data including power, signal, and control wiring.
      l. Electrical characteristics
      m. Utility connections
      n. Furnished accessories
      o. Information indicating compliance with requirements including:
         1) referenced or quality standards,
         2) performance or design requirement, and
         3) regulatory requirements.
      p. Clearances required to other construction

q. Notation of coordination requirements
r. Fastening or attachment methods
s. Location of site connections
t. Size of site connections
u. Manufacturer's Instructions: Manufacturer's instructions as defined elsewhere. Unless otherwise required, manufacturer's instructions required for Product Data submittals need not include operating information. Include the following, as applicable.
    1) Preparation of substrates
    2) Required substrate tolerances
    3) Sequence of installation or erection
    4) Required installation tolerances
    5) Required mechanical, electrical or other service connections
    6) Required adjustments
    7) Recommendations for cleaning and protection
v. Manufacturer's Recommendations: Where manufacturer's recommendations differ fro, or modify manufacturer's instructions, include manufacturer's recommendations as indicated later in this Article.
w. Urea Formaldehyde Content: Other than raw wood or raw agrifiber materials, provide urea formaldehyde content information for wood or agrifiber containing materials used in a product's manufacture, fabrication, or installation and including glues, adhesives, bonding agents or resins. If information is not available as Product Data, submit as manufacturer certificates.

4. Additional Submittals: Include the following Product Data information when explicitly required in individual Specification Sections or elsewhere:
    a. Material Safety Data Sheets: published or written information complying with occupational, environmental and other regulations.
    b. Test Labels: Submit information on application of testing or grading agency labels, marks and seals in the form of a duplicate copy of labels or seals to be applied and location of application on products.
    c. Pre Engineered Data: Submit manufacturer's rated allowable capacities including spans and spacing, bearing, anchor, and installation requirements.
    d. VOC Content: Provide information on product's volatile organic content in g/L calculated according to 40 CFR 59, Subpart D (EPA Method 24). If information is not available as Product Data, submit as manufacturer certificates.
    e. Product Reports: the following types of reports based on evaluation of tests conducted prior to or as part of product submittal approval.
        1) Product or Material Test Reports: written reports indicating, evaluating and interpreting test results of product or material for compliance with required standards. Base reports on tests performed by manufacturer and witnessed by a qualified testing agency, or on comprehensive tests performed by a qualified testing agency. Unless otherwise indicated, base reports on tests performed on products identical to or within ten percent (10%) of the physical dimension of those required for this Project. Unless otherwise indicated, base reports on tests performed within the last five (5) years.

2) Preconstruction Test Reports: reports prepared by a qualified testing agency, indicating and interpreting results of tests performed specifically for Project to verify performance or compliance with specified criteria.
   a) Compatibility Test Reports: reports prepared by a qualified testing agency, indicating and interpreting results of tests performed for assuring compatibility of products or materials with other Work or in place construction. Include written recommendations for primers and substrate preparation needed for adhesion or to prevent degradation of components.
3) Evaluation or Research Reports: written evidence, from a model code organization acceptable to authorities having jurisdiction, that product complies with building code in effect for Project. Include the following information:
   a) Name of evaluation organization.
   b) Date of evaluation.
   c) Time period when report is in effect.
   d) Product and manufacturers' names.
   e) Description of product.
   f) Test procedures and results.
   g) Limitations of use.

f. Manufacturer's Recommendations: Manufacturer's recommendations as defined elsewhere but in written form. Unless otherwise required, manufacturer's recommendations required for Product Data submittals need not include operating information. Include name of product and name, address, and telephone number of manufacturer or manufacturer's authorized representative making recommendations. Include the following, as applicable.
   1) Preparation of substrates.
   2) Required substrate tolerances.
   3) Sequence of installation or erection.
   4) Required installation tolerances.
   5) Required adjustments.
   6) Recommendations for cleaning and protection.

2.02 CERTIFICATES

A. General: Where certificates are required, provide a statement that includes signature of entity responsible for preparing certification. Certificates and certifications shall be signed by an officer or other individual authorized to sign documents on behalf of that entity.
   1. Notarized: Where certificates are indicated to be notarized, provide certificates to which a legally recognized notary public has attested to the validity of the signature on the certificate.

B. Product or Material Certificates: Prepare written statements on manufacturer's letterhead and signed by manufacturer certifying that product or material complies with requirements. Include certification as required by individual Specification Sections.

C. Welding Certificates: Prepare written certification that welding procedures and personnel comply with requirements. Submit record of Welding Procedure Specification (WPS) and Procedure Qualification Record (PQR) on AWS forms. Include names of firms and personnel certified.

D. Installer Certificates: Prepare written statements on installer's letterhead and signed by installer certifying that installer and products comply with requirements. Include certification as required by individual Specification Sections.

E. Manufacturer Certificates: Prepare written statements on manufacturer's letterhead and signed by manufacturer certifying that manufacturer and products comply with requirements. Include certification as required by individual Specification Sections.

2.03 SAMPLE WARRANTIES

A. Sample Warranties: Where warranties, guarantees, or similar requirements are required, submit, for approval, an unexecuted copy of actual document to be executed.

2.04 SAMPLE MAINTENANCE CONTRACTS

A. Sample Maintenance Contracts: Where maintenance contracts or similar requirements are required, submit, for approval, an unexecuted copy of actual document to be executed.

2.05 QUALIFICATION STATEMENTS

A. Qualification Statements: Prepare written information that demonstrates capabilities and experience of entity indicated. Include lists of completed projects with project names and addresses, names and addresses of architects and owners, and other information specified. Include information which evidences compliance with specific qualifications required including work related licensing, accreditation and registration obligations where applicable. If no entities are indicated for qualification data, submit qualification data for each entity explicitly required to be qualified in individual Specification Sections. Types of Qualification Data and additional requirements include the following:
   1. Installer Qualification Statements: Include statement of work force capacity. Where installer is required to be authorized, approved or licensed by manufacturer, prepare written statements on manufacturer's letterhead and signed by manufacturer certifying that installer is authorized, approved or licensed for this specific Project.
   2. Manufacturer or Fabricator Qualification Statements: Include statement of production capacity.
   3. Supplier Qualification Statements: Include statement of production capacity.
   4. Professional Engineer Qualification Statements: Include copy of professional license in jurisdiction where Project is located.
   5. Consultant Qualification Statements: Include membership in professional associations.

6. Testing Agency Qualification Statements: Include proof of qualifications in the form of a recent report on the inspection of the testing agency by a recognized authority.

2.06 SELECTION SAMPLES

A. Samples for Initial Selection: Where samples are required for initial selection purposes, submit manufacturer's charts or chips showing the required range of colors, textures, and patterns available.

B. Possible Variations: If variation in color, pattern, texture, or other characteristic is inherent, possible or anticipated in the product requiring a selection sample, submit additional samples to show the full range of color and texture variations possible and to define the approximate limits of the variations.

2.07 VERIFICATION SAMPLES

A. Samples for Verification: Submit Samples of size indicated, or full-size units if size is not indicated, prepared from the same material to be used for the Work, cured and finished in manner specified, and physically identical with the product proposed for use. Submit Samples for review of kind, color, pattern, and texture for a check of these characteristics with other elements and for a comparison of these characteristics between submittal and actual component as delivered and installed. Samples may include partial sections of manufactured or fabricated components, small cuts or containers of materials, complete units of repetitively used materials, swatches showing color, texture, and pattern, color range sets, and components used for independent testing and inspection.

B. Possible Variations: If variation in color, pattern, texture, or other characteristic is inherent, possible or anticipated in the product requiring a verification sample, submit additional samples to show the full range of color and texture variations possible and to define the approximate limits of the variations. In-place Work not within range of variations submitted is not acceptable.

C. Component Assemblies: Where verification samples are an assembly of different components, submit verification samples which define the assembly workmanship, fabrication techniques, and details of assembly, connections, operation, and similar construction characteristics.

D. Preparation: Mount, display, or package Samples specified in this Article in manner specified to facilitate review of qualities indicated. Prepare Samples to match Architect's sample where so indicated. Attach label on unexposed side that includes the following:
   1. Generic description of Sample.
   2. Product name and name of manufacturer.
   3. Sample source.

2.08 SHOP DRAWINGS

A. Shop Drawings: Prepare Project-specific information, drawn accurately to scale. Do not submit standard printed data as Shop Drawings.
   1. Minimum Submittal: Unless otherwise indicated, at a minimum, include the following Shop Drawings information when available and applicable or when explicitly required.
      a. Identification of products
      b. Compliance with indicated standards
      c. Custom Wiring Diagrams: Where wiring is custom for product or field-installed, submit wiring diagram with Shop Drawings including power, signal, and control wiring.
      d. Fabrication drawings
      e. Plans, elevations, sections, and details
      f. Dimensions
      g. Hardware locations
      h. Reinforcement type and locations
      i. Shopwork manufacturing instructions
      j. Design mixes to include description of type and proportions of ingredients
      k. Factory finishes demarcation
      l. Installation drawings
      m. Imposed loads
      n. Attachments to other work
      o. Location and size of each site (field) connection
      p. Roughing-in and setting diagrams with tolerances
      q. Templates and patterns
      r. Anchoring and fastening methods
      s. Substrate reinforcement requirements
      t. Supplementary support requirements
      u. Notation of coordination and sequencing requirements
      v. Required clearances with tolerances
      w. Notation of dimensions established by site (field) measurement
      x. Demarcation of factory and field assembled work
      y. Method of field assembly
      z. Mounting heights
   2. Additional Submittals: Include the following Shop Drawing information when explicitly required:
      a. Delegated Design: Where delegated design submittal is required of a product or system, the Contractor is responsible to provide professional design services or certifications by a design professional to design products and systems complying with requirements including performance and design criteria indicated.
         1) Performance and Design Criteria: If criteria indicated are not sufficient to perform design services or certification required, submit a written request for interpretation or additional information to Architect.
         2) Delegated-Design Submittal: Submit a statement or Shop Drawings, signed and sealed by the responsible design professional, for each product and system indicating that the products and systems are in compliance with requirements including performance and design criteria indicated. Include design data indicated in this Article and other factors used in performing these services.

b. Design Data: Prepare written and graphic information, including, but not limited to, performance and design criteria, list of applicable codes and regulations, and calculations. Include list of assumptions and other performance and design criteria and a summary of loads. Include load diagrams if applicable. Provide name and version of software, if any, used for calculations. Include page numbers.
c. Product Schedule or List: Prepare a written summary indicating types of products required for the Work and their intended location. Include the following information in tabular form:
   1) Type of product. Include unique identifier for each product indicated in the Contract Documents or assigned by Contractor if none is indicated..
   2) Manufacturer and product name, and model number if applicable.
   3) Number and name of room, area or space.
   4) Location within room, area or space.

3. Sheet Size: Except for templates, patterns, and similar full-size drawings, submit Shop Drawings on sheets at least 8-1/2 by 11 inches but no larger than 24 by 36 inches.
4. Scale: All Shop Drawings shall be at a standard architectural or engineering scale recognized by the U.S. National CAD Standard.

PART 3 - EXECUTION

3.01 SUBMITTAL PREPARATION

A. Identification: With each submittal or resubmittal indicate the following:
1. Project name.
2. Date prepared or revised.
3. Date submitted or resubmitted.
4. Type of submittal.
5. Number and title of applicable Specification Section.
6. Submittal number: Unique identifier, including revision.
   a. Submittal number shall use Specification Section number followed by a dash and then a sequential number (e.g., 061000-01). Resubmittals shall include an alphabetic suffix after another dash (e.g., 061000-01-A). If submittal is not directly applicable to a Specification Section, request interpretation from Architect to obtain number.
7. Drawing number and detail references, if applicable.
8. Location(s) where product is to be installed, as necessary to differentiate it from other submittals of same product type.
9. Name of and contact information for Architect.
10. Name of and contact information for Consultant, if applicable.
11. Name of and contact information for Contractor.
12. Name of and contact information for (Sub-)Subcontractor(s), if applicable.
13. Name of and contact information for Supplier(s).
14. Name of Manufacturer(s).
15. Name of entity that prepared submittal.
16. Signature of transmitter.
17. Other necessary identification.

B. Revisions: Clearly identify revisions and date of revisions.

C. Remarks: Clearly identify remarks.

D. Record: Clearly identify previous and current record of entities to which submittal or resubmittal was distributed and dates of distribution.

E. Form of Sample Submittals: physical; not electronic.

F. Form of Non-sample Submittals: paper; not electronic.

3.02 CONTRACTOR'S REVIEW

A. Review: Review each submittal and check for coordination with other Work of the Contract and for compliance with the Contract Documents. Note corrections and field dimensions. Review each submittal and resubmittal and check for coordination with other Work of the Contract and for compliance with the Contract Documents. Note corrections and field dimensions.

B. Certification: Before submitting to Architect, mark each submittal and resubmittal with a uniform approval stamp and date including statement certifying that submittal has been reviewed, checked, and approved for compliance with the Contract Documents and for coordination with other Work of the Contract.

3.03 SUBMISSION TO ARCHITECT

A. Number: Submit number of copies as follows to Architect:
   1. Samples: Submit one (1) copy to Architect.
   2. Non-Sample Submittals: Submit one (1) **(paper)** copy to Architect for each of the following entities:
      a. Architect.
      b. Consultant for submittals requiring Consultant’s review.
      a. Owner’s Representative. Owner’s Representative comments will be included in Architect’s review.
      b. Record Submittal to be returned to Contractor.

B. Transmittal: Verify identification information required in “Submittal Preparation” Article is included with each submittal and deliver appropriately packaged submittal to Architect.

3.04 ARCHITECT'S ACTION

A. Non-conforming Submittals: The following submittals and resubmittals may not be reviewed and may be discarded or returned at the Architect’s discretion:
   1. which have not been reviewed by the Contractor
   2. which do not bear Contractor's approval stamp
   3. which are not required by the Contract Documents
   4. which are received from sources other than the Contractor

5. which do not include complete identification information required in Submittal Preparation Article in this Part
6. which are incomplete
7. which are not submitted with other submittals required to be submitted simultaneously

B. Architect's Action: Architect will review each complete submittal complying with procedural requirements, make marks to indicate corrections or modifications required (if any), and return it with a stamp marked as listed below. Architect's review of submittals is not an authorization of a contract modification or approval of a change in the Work.
   1. Approved: Where submittals are marked "Approved," that part of the Work covered by the submittal may proceed provided it complies with requirements of the Contract Documents. Final acceptance will depend upon that compliance.
   2. Approved as Corrected: When submittals are marked "Approved 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. Revise & Submit: When submittal is marked "Revise & Submit," do not proceed with that part of the Work covered by the submittal, including purchasing, fabrication, delivery, or other activity. Revise or prepare a new submittal in accordance with the notations. Resubmit without delay. Repeat if necessary to obtain a different action mark.
   4. Not Approved: When submittal is marked "Not Approved," do not proceed with that part of the Work covered by the submittal, including purchasing, fabrication, delivery, or other activity. "Rejected" indicates that the submittal was substantially incorrect and could not be approved if only revised. If comments were not included with returned submittal, contact Architect for corrective measures required. Revise or prepare a new submittal and resubmit without delay. Repeat if necessary to obtain a different action mark.
   5. No Action: Where a submittal is primarily for information or record purposes and does not require Architect's approval, the submittal may be returned unstamped without action.

3.05 DISPOSITION

A. Non-Approved Submittals: Do not permit submittals marked "Revise & Submit " or " Not Approved " to be used in connection with the Work.

B. Non-Sample Record Submittals: One copy of non-sample submittals marked "Approved ", marked "Approved as Corrected " or returned no action taken will be returned to Contractor and shall become a Record Submittal. Maintain Record Submittals at the Record Document location. Make and distribute additional copies of Record Submittal for the following:
   1. Owner's Operation and Maintenance Manuals as required
   2. Contractor's use
   3. Subcontractors, Sub-subcontractors, suppliers, manufacturers, fabricators, installers, authorities having jurisdiction, and others entities as required for performance of their duties and construction activities

C. Record Samples: One copy of Samples marked "Reviewed", marked "Furnish as Corrected" or returned no action taken will be returned to Contractor and shall become a Record Sample. Maintain Record Samples at the Record Document location. Verification Samples will be used for quality-control comparisons throughout the course of construction activity to determine acceptance of the Work.
   1. Verification Samples that may be incorporated into the Work are indicated in individual Specification Sections. Such Samples must be in an undamaged condition at time of use.

END OF SECTION 013300

SECTION 013517 – RENOVATION WORK

PART 1 - GENERAL

1.01 SECTION INCLUDES

A. Owner's Occupancy Requirements
B. Selective Demolition
   1. Removed Construction
C. Renovation Work
   1. Salvage Construction
   2. Reinstalled or Relocated Construction
   3. Remaining Construction
D. Existing Warranties
E. Patching Existing Construction
F. Hazardous Materials
   1. Asbestos
   2. Lead Based Paint

1.02 RELATED REQUIREMENT

A. Payment Procedures
   1. Substantial Completion
B. Project Management and Coordination
   1. Preinstallation Conferences
C. Temporary Facilities and Controls
   1. Temporary Utilities for maintaining service when required
   2. Additional selective demolition access and protection requirements.
   3. Temporary Barriers
      a. Barricades
      b. Protective Walkways
      c. Building Enclosure
      d. Dust and Noise Partition
      e. Dust Curtain
D. Execution Requirements
   1. Progress Cleaning
   2. Construction Waste
   3. Construction IAQ Management
   4. Cutting, Patching, and Correction of Renovation Work.
E. Site Clearing
F. Utilities

1.03 DEFINITIONS

A. Salvage: Detach items from existing construction and deliver them to Owner. “Remove and salvage” has the same meaning as “salvage”.

B. Reinstall or Relocate: Detach items from construction, prepare them for reuse, and install where indicated. “Remove and reinstall” has the same meaning as “reinstall”.

C. Existing to Remain: Existing items of construction that are not to be removed and that are not otherwise indicated to be removed, salvaged, relocated, or reinstalled.

D. Match Existing: match the characteristic indicated, such as profile, texture, composition or appearance, depending on context, with similar materials which exist or existed at the Project site and which are closest in location and function to the material being installed. If no specific characteristics are indicated, match all characteristics.

E. Contractor’s Property: Except for items or materials indicated to remain Owner's property, demolished materials shall become Contractor's property and shall be removed from Project site.
   1. Storage or sale of removed items or materials on-site will not be permitted.

F. Owner’s Property: Items or materials indicated to be relocated, reused, salvaged, reinstalled, otherwise indicated to remain Owner's property, and the following shall remain Owners Property.
   1. Claimed Items: Owner may exercise the right to retain ownership of items or materials to be removed to complete the Work and are not indicated to remain Owner’s property.
      a. Owner will notify Contractor, coordinate with Contractor, and salvage claimed items prior to demolition work so as not to affect construction schedule.
   2. Historic Artifacts: Historic items, relics, and similar objects including, but not limited to, cornerstones and their contents, commemorative plaques and tablets, antiques, and other articles of historic significance, interest or value to Owner that may be unanticipatedly encountered during construction activities remain Owner's property.
      a. Contractor shall salvage historic artifacts.

1.04 ADMINISTRATIVE REQUIREMENTS

A. Renovation Preinstallation Conference: additional attendees include demolition entity. Review the following:
   1. Inspect and discuss condition of construction to be selectively demolished.
   2. Review structural load limitations of existing structure.
   3. Review and finalize Schedule of Renovation Activities and verify availability of materials, demolition personnel, equipment, and facilities needed to make progress and avoid delays.
   4. Review requirements of work performed by other trades that rely on substrates exposed by selective demolition operations.
   5. Review areas where existing construction is to remain and requires protection.

1.05 QUALITY ASSURANCE

A. Accessible Temporary Egress: Comply with applicable provisions in the U.S. Architectural & Transportation Barriers Compliance Board's ADA-ABA Accessibility Guidelines and ICC/ANSI A117.1.

B. Regulatory Requirements: Comply with:
   1. Governing EPA notification regulations before beginning selective demolition.
   2. NFPA 241 "Standard for Safeguarding Construction, Alteration, and Demolition Operations"
   3. ANSI A10.6 “Safety and Health Program Requirements for Demolition Operations”

C. Refrigerant Recovery Technician Qualifications: Certified by an EPA-approved certification program.

D. Demolition Entity Qualifications: qualified; experienced 2 years 3 projects.

1.06 SITE CONDITIONS

A. Owner's Occupancy Requirements: With the exception of areas under construction, the premises and areas of existing building immediately adjacent to construction area (including Dishroom and Upper and Lower Kitchens) will be occupied during the entire construction period as indicated on Drawing Sheet A8.
   1. Cooperate with occupants during construction operations to minimize conflicts and facilitate usage.
   2. Do not close or obstruct active means of egress, including stairs, walkways, and corridors, without written permission from Owner and authorities having jurisdiction.
   3. Site Access: Keep driveways, parking circulation areas, loading areas, walkways and entrances serving premises clear and available to occupants and emergency vehicles.
      a. Do not use these areas for parking or storage of materials.
      b. Schedule deliveries to minimize use of driveways and entrances by construction operations.
   4. Schedule deliveries to minimize space and time requirements for storage of materials and equipment on-site.
   5. Maintain interior access to adjacent occupied or used facilities.
   6. Notify Owner on Schedule of Renovation Activities but otherwise not less than seven (7) days in advance of activities that will affect occupants operations including:
      a. Obstructing access to occupied or used facilities.
      b. Obstructing site access.
      c. Work which will interfere with occupant’s day-to-day operations.
      d. Utility or service interruptions.
   7. Utility Services: If utility services serving occupied facilities are required to be removed, relocated, or abandoned, provide temporary bypass utilities as specified elsewhere to maintain continuity of service. Do not interrupt services for changeover during occupied hours.

8. Occupant Safety: Provide temporary barricades, warning signs, lights, covered walkways, walks, fences, railings, canopies and other forms of protection to ensure safety and protection of occupants from injury due to construction operations.

B. Existing Conditions: Owner assumes no responsibility for condition of areas to be selectively demolished.
   1. Unanticipated Conditions: If unanticipated mechanical, electrical, structural, or other elements that conflict with intended function or design of the completed Work are encountered, investigate and measure both nature and extent of the conflict. Submit Request for Interpretation (RFI) to Architect including drawings necessary for evaluation. Pending receipt of response from Architect, rearrange renovation schedule as necessary to continue overall job progress without undue delay.
   2. Request interpretation from Architect of observed discrepancies between existing conditions and Drawings before proceeding with selective demolition.
   3. Conditions existing at time of inspection for bidding purpose will be maintained by Owner as far as practical.

C. Hazardous Materials: It is not anticipated that hazardous materials will be encountered in the Work. If materials suspected of containing hazardous materials are encountered, comply with the provisions of the General Conditions.
   1. Asbestos: Asbestos containing materials known to the Owner have been previously abated or rendered harmless. Owner will provide information on previous asbestos abatement if requested.
   2. Lead Based Paint: Owner has performed a lead based paint survey of the entire premises. The entire Project has been certified lead-free. Contractor will be provided with a copy of lead based paint report. Examine report.

1.07 WARRANTY

A. Existing Warranties: Remove, replace, cut, patch, restore and repair materials and surfaces cut or damaged during construction operations, by methods and with materials so as not to void existing warranties. Notify warrantor before proceeding. Existing warranties include the following:
   1. Membrane Roofing
   2. Asphalt Shingle Roofing

B. Notify warrantor on completion of selective demolition, and obtain documentation verifying that existing system has been inspected and warranty remains in effect. Submit documentation at Project closeout.

PART 2 - PRODUCTS

2.01 PATCHING MATERIALS

A. Materials for Existing Construction: Where patching of existing construction is required, use materials matching existing materials. For exposed surfaces, use materials that visually match existing adjacent surfaces to the fullest extent possible.
   1. If matching materials are unavailable or cannot be used, use materials that, when installed, visually match existing adjacent surfaces to the fullest extent possible and perform equal or superior to existing materials.

2.02 EXIT SIGNS

A. Temporary Exit Signs:
   1. UL 924
   2. Material: ABS Plastic
   3. Non-toxic; non-radioactive
   4. Size: 16 inch wide x 8 inch high x 3/8 inch thickness nominal
   5. Lettering: Photoluminescent single our double sided for applicable project conditions with site applied directional arrows.
      a. Color: Green
   6. Electrical Connection: none; not
   7. Mounting: Surface, flag, ceiling or conduit mounting for applicable project conditions with plastic bracket and fasteners.
      a. Locate to ensure at least 5 foot candles of fluorescent light illumination during normal occupied hours.
   8. Comparable Product: Glo Brite Eco Exit 7000 Series PM 100 Exit Sign / Jessup Manufacturing Company (www.globritesystem.com)

PART 3 - EXECUTION

3.01 EXAMINATION

A. Extent Verification: Survey existing conditions and correlate with requirements indicated to determine extent of selective demolition required.

B. Reinstalled and Salvage Survey: Inventory and record the condition of items to be removed and reinstalled and items to be removed and salvaged.

C. Ongoing Inspection: Perform engineering surveys as the Work progresses to detect hazards resulting from selective demolition activities.

3.02 PREPARATION

A. Utilities to Remain: Maintain services indicated to remain and protect them against damage during construction operations.

1. Maintain fire protection facilities in service during selective demolition operations.

B. Utilities to be Removed: Locate, identify, disconnect, and seal or cap off utilities to be removed or serving areas to be selectively demolished.
   1. Arrange to shut off removed utilities with utility companies.
   2. Do not start renovation work until necessary utility disconnecting and sealing have been completed and verified.

C. Dangerous Materials: Drain, purge, or otherwise remove, collect, and dispose of chemicals, gases, explosives, acids, flammables, or other dangerous materials before proceeding with selective demolition operations.

D. Existing Finish Protection: Protect finishes to remain (including those of walls, ceilings, floors and surfaces exposed during selective demolition operations) from damage.

E. Owner's Furniture: So as not to delay, hinder, or obstruct construction operations, the Owner shall relocate movable furniture, furnishings, and incidental occupant articles not part of the Work or permanent construction before commencement of Work.

F. Furniture Protection: Cover, protect, and avoid furniture, furnishings, incidental occupant articles, equipment, fixtures and similar items that have not been removed from dust, soiling and damage.

G. Temporary Exit Signs: Provide temporary exit signs to clearly identify means of egress to occupants where permanent exit signs do not serve this function.

H. Exterior Envelope Integrity: Provide temporary building enclosure indicated elsewhere where existing exterior surface construction is removed to ensure that no water leakage or damage from weather occurs to interior areas.

I. Dust and Noise Protection: Comply with construction IAQ requirements indicated elsewhere. Prevent dust, fumes, and odors from entering occupied areas. Limit noise transmission to occupied areas. Use vacuum collection attachments on dust-producing equipment. Isolate work limited to no more than eight (8) hours duration in a 120 hour period within occupied areas using portable dust-containment devices.
   1. Provide the following temporary barriers to separate construction areas from interior building areas not under renovation:
      a. Dust and Noise Partitions: where renovation work is anticipated to, or in fact does, occurs for ten (10) days or more in an area, construct and maintain dust and noise partitions indicated elsewhere.
      b. Dust Curtain: Where renovation work is anticipated to occur in an area for less than ten (10) days, construct and maintain dust curtain or dust and noise partition indicated elsewhere at Contractor's option.
   2. Prior to commencing work, isolate the HVAC system in area where work is to be performed.
      a. Disconnect supply and return ductwork in work area from HVAC systems servicing occupied areas.
      b. Maintain negative air pressure within work area using air-filtration units, starting with commencement of temporary barrier construction, and continuing until removal of temporary barrier is complete.
   3. Perform daily progress cleaning as required elsewhere.

J. Protection of Structure: Provide and maintain shoring, bracing, and structural supports as required to preserve stability and prevent movement, settlement, or collapse of construction and finishes to remain, and to prevent unexpected or uncontrolled movement or collapse of construction being demolished.
   1. Strengthen or add new supports when required during progress of selective demolition.
   2. Cease demolition operations if safety of structure appears to be endangered. Take precautions to support structure until determination is made for continuing demolition.

3.03 SELECTIVE DEMOLITION

A. Condition of Existing Building: Maintain portions of existing building affected by construction operations in a weather tight condition throughout construction period. Repair damage caused by construction operations.
   1. Provide temporary weather protection, during interval between selective demolition of existing construction on exterior surfaces and new construction, to prevent water leakage and damage to structure and interior areas.
      a. Temporarily cover openings with building enclosure indicated elsewhere.

B. Extent of Selective Demolition: Demolish and remove existing construction only to the extent required by new construction and as indicated.
   1. Foundation Extent: Demolish foundation walls to be removed to a depth of not less than 12 inches below existing ground surface or 5 feet below finish grade, whichever is deeper. Demolish and remove below-grade wood or metal construction.

C. Selective Demolition Methods: Use methods required to complete the Work within limitations of governing regulations and as follows:
   1. Access: Conduct selective demolition and debris-removal operations to ensure minimum interference with roads, streets, walks, walkways, and occupied and used facilities. Provide protection to ensure safe passage of people around selective demolition area.
      a. Temporary Controls: Comply with requirements for access and protection indicated elsewhere.
   2. Cutting: Comply with cutting requirements indicated elsewhere.
   3. Sequence: Proceed with selective demolition systematically, from higher to lower level. Complete selective demolition operations above each floor or tier before disturbing supporting members on the next lower level.
   4. Loading: Locate selective demolition equipment and remove debris and materials so as not to impose excessive loads on supporting walls, floors, or framing.
   5. Deteriorated Construction: Remove decayed, vermin-infested, or otherwise dangerous or unsuitable materials and promptly dispose of off-site.
   6. Heavy Construction: Remove structural framing and other members and lower to ground by method suitable to avoid free fall and to prevent ground impact or dust generation.

D. Existing Services or Systems to Be Removed, Relocated, or Abandoned: Comply with Renovation Article in this Part and as follows:

1. Removed: Disconnect, demolish, and remove fire-suppression systems, plumbing, and HVAC systems, equipment, and components indicated to be removed.
    a. Piping to Be Removed: Remove portion of piping indicated to be removed and cap or plug remaining piping with same or compatible piping material.
    b. Equipment to Be Removed: Disconnect and cap services and remove equipment.
    c. Ducts to Be Removed: Remove portion of ducts indicated to be removed and plug remaining ducts with same or compatible ductwork material.
    d. Refrigerant: Remove refrigerant from mechanical equipment to be selectively demolished according to 40 CFR 82 and regulations of authorities having jurisdiction.
2. Relocated or Salvaged:
    a. Equipment to Be Removed and Reinstalled: Disconnect and cap services and remove, clean, and store equipment; when appropriate, reinstall, reconnect, and make equipment operational.
    b. Equipment to Be Removed and Salvaged: Disconnect and cap services and remove equipment and deliver to Owner.
3. Abandoned: Where explicitly indicated to be abandoned, comply with the following; otherwise remove.
    a. Piping to Be Abandoned in Place: Drain piping and cap or plug piping with same or compatible piping material.
    b. Ducts to Be Abandoned in Place: Cap or plug ducts with same or compatible ductwork material.

E. Resilient Floor Coverings: Remove floor coverings and adhesive according to recommendations in RFCI's "Recommended Work Practices for the Removal of Resilient Floor Coverings."
1. Do not use methods requiring solvent-based adhesive strippers without Architect’s approval
2. Remove residual adhesive and prepare substrate for new floor coverings by one of the methods recommended by RFCI.

F. Fill Below-Grade: Completely fill below-grade areas and voids resulting from demolition work. Unless otherwise indicated, provide fill consisting of approved earth, gravel, or sand, free of trash and debris, stones over 6 inches in diameter, roots, or other organic matter.

3.04 RENOVATION

A. Removed Construction: Comply with requirements for selective demolition.
1. Construction to Be Removed:
    a. Existing construction requiring selective demolition to complete the Work.
    b. Items indicated on Drawings
    c. Items indicated in individual Specification Sections

B. Salvaged Construction: Comply with the following:
1. Carefully detach item from existing construction.
2. Clean salvaged items.
3. Protect and pack items after cleaning. Identify contents of containers.

4. Store items in a secure area until delivery to Owner.
5. Transport items to Owner's storage area on-site.
6. Protect items from damage during transport and storage.
7. Construction to Be Salvaged:
   a. Items indicated on Drawings
   b. Items indicated in individual Specification Sections

C. Reinstalled or Relocated Construction: Comply with the following:
1. Carefully detach item from existing construction.
2. Clean, paint and repair items to functional condition adequate for intended reuse.
3. Protect and pack items after cleaning and repairing. Identify contents of containers.
4. Protect items from damage during transport and storage.
5. Securely store items off-site if Project Site areas designated for Contractor's use are not adequate.
6. Install items in locations indicated. Comply with installation requirements for new materials and equipment if applicable. Provide connections, supports, and miscellaneous materials necessary to make item functional for intended reuse.
7. Construction to Be Reinstalled:
   a. Items indicated on Drawings
   b. Items indicated in individual Specification Sections

D. Remaining Construction: Protect construction indicated to remain against damage and soiling during selective demolition. When permitted by Architect, items may be removed to a suitable, protected storage location during selective demolition and cleaned and reinstalled in their original locations after selective demolition operations are complete.

3.05 PATCHING EXISTING CONSTRUCTION

A. Patching: Where patching to existing surfaces is required, patch to produce surfaces suitable for new materials. If requirements of new Work do not apply to existing construction, return construction and surfaces to condition existing prior to cutting.

1. Installer: If possible, retain original installer or fabricator to cut and patch existing construction to remain. If it is impossible to engage original installer or fabricator, engage another experienced entity.

3.06 CLEANING AND CORRECTION

A. Disposal: Comply with progress cleaning and construction waste requirements indicated elsewhere for disposal of selective demolition, removed materials, and renovation work waste and debris.

B. Cleaning: Upon completion of selective demolition work, remove tools and equipment. Remove protections no longer required. Leave interior areas as required for progress cleaning indicated elsewhere.

C. Correction: Promptly repair damage to construction caused by renovation work. Replace selective demolition performed in excess of that required.

END OF SECTION 013517

SECTION 014000 - QUALITY REQUIREMENTS

PART 1 - GENERAL

1.01 SECTION INCLUDES

A. Quality Assurance
   1. Fire Test Response Characteristics
   2. General Qualification Requirements
      a. Manufacturer's Sales Representative Qualifications
      b. Manufacturer's Service Representative Qualifications
      c. Installer Qualifications
      d. Manufacturer Qualifications
      e. Supplier Qualifications
      f. Professional Engineer Qualifications
      g. Testing Agency Qualifications
   3. Mockups Requirements
      a. Field Samples
      b. Benchmark Samples
      c. Laboratory Mockups

B. Quality Control
   1. Responsibilities
      a. Owner's Quality Control Responsibilities
      b. Contractor's Quality Control Responsibilities
      c. Testing Agency's Responsibilities
         1) Test and Inspection Reports
         2) Testing Agency Final Report

C. Warranty Requirements
   1. Manufacturer's Warranty
   2. Special Warranty
      a. Installer's Warranty

1.02 RELATED REQUIREMENTS

A. Construction Progress Documentation in General Conditions
   1. Contractor's Construction Schedule Coordination with Testing and Inspection.

B. Submittal Procedures
   1. Sample Warranties Submittals
   2. Qualification Statements Submittals
   3. Preconstruction Testing Submittals

C. Execution Requirements
   1. Cutting and Patching
   2. Manufacturer's Site Reports

3. Installer's Site Reports
4. Correction of Work disturbed by testing and inspecting activities.

D. Closeout Procedures
1. Executed Warranties submittal

E. Individual Specification Sections
1. Warranty Requirements
2. Qualification Statement Submittals
3. Qualification Requirements
4. Mockup Requirements
5. Mockup Report Submittals
6. Source Quality Control
7. Site Quality Control
8. Manufacturer's Site Reports
9. Installer's Site Reports

1.03 DEFINITIONS

A. Quality-Assurance Services: Activities, actions, and procedures performed before and during execution of the Work to guard against defects and deficiencies and substantiate that proposed construction will comply with requirements.

B. Quality-Control Services: Tests, inspections, procedures, and related actions during and after execution of the Work to evaluate that actual products incorporated into the Work and completed construction comply with requirements. Services do not include contract enforcement activities performed by Architect.

C. Source Quality Control Testing: Tests and inspections that are performed at the source, e.g., plant, mill, factory, or shop.

D. Site (or Field) Quality Control Testing: Tests and inspections that are performed on-site for installation of the Work and for completed Work; synonymous with "field quality control testing"

E. Mockups: Full size, physical examples of proposed completed Work. Mockups are not Samples as defined by the General Conditions.
1. Field Samples and Benchmark Samples: types of mockups which are examples of coatings.
2. Laboratory Mockups: Full size physical assemblies constructed at testing facility to verify performance characteristics.

F. Installer: Contractor or another entity engaged by Contractor as an employee, Subcontractor, or Sub-subcontractor, to perform a particular construction operation at the Project site, including installation, erection, application, and similar operations. "Applicator" or "erector" shall have same meaning as "installer".

G. Experience: When used in conjunction with qualifications of an entity, "experience" or "experienced" means the following in regards to time period and number of projects:

1. Time Period: a record of successful performance as the same business entity for no less than the time period indicated. In the preceding sentence, “successful performance” means continually performing work similar or greater in quantity and quality to that required for this Project, complying with applicable laws and regulations for that work, fulfilling related licensing and registration obligations imposed by authorities having jurisdiction, and maintaining solvency.
    a. Minimum: In conjunction with qualifications of an entity, if the entity is required to be experienced and no time period is indicated, one (1) year experience shall be required.
2. Number of Projects: having successfully completed, as the same business entity, no less than the number of projects indicated similar or larger in size and scope to this Project. In the preceding sentence, “successfully completed” means completion of related work on other projects in compliance with the design intent and requirements of authorities having jurisdiction and which has continued to perform as intended.
    a. Minimum: In conjunction with qualifications of an entity, if the entity is required to be experienced and no number of projects is indicated, two (2) projects shall be required.

H. Qualified: When used in conjunction with qualifications of an entity, "qualified" means being familiar with requirements of the Work for this Project, having sufficient capacity and skill to perform the Work successfully in a timely manner, and fulfilling related licensing and registration obligations imposed by authorities having jurisdiction.

I. Manufacturer Authorized, Manufacturer Approved, or Factory Authorized: When used in conjunction with qualifications of an entity, “manufacturer authorized” or “factory authorized” means an entity whose personnel who will be performing Work on this Project are trained and approved by product or material manufacturer to perform Work indicated.

J. Manufacturer: An entity which manufactures, creates, produces or fabricates material into finished products for the Work away from the Project Site. Unless otherwise indicated “fabricator” shall have the same meaning as “manufacturer”.

K. Supplier: An entity which furnishes products for the Work. “Source”, “vendor”, “distributor” and “wholesaler” shall have the same meaning as “supplier”.

L. Professional Engineer: An entity which provides engineering services as part of the Work.

M. Testing Agency: An entity engaged to perform specific tests, inspections, or both. Testing laboratory shall mean the same as testing agency.

N. Manufacturer's Warranty: written warranty prepared by individual manufacturer for a particular product and specifically endorsed by manufacturer to Owner. “Standard warranty” and “product warranty” have the same meaning as “manufacturer's warranty”.

O. Special Warranty: Written warranty required by or incorporated into the Contract Documents specifically endorsed by designated entity or entities to Owner. Special warranties may be required in conjunction with manufacturer’s warranty either to

extend provisions of manufacturer's warranty or to provide additional rights for Owner. “Project warranty” has the same meaning as “special warranty”.

1. Installer’s Warranty: a form of special warranty which, unless otherwise indicated, is endorsed by installer of a product or system and the Contractor to Owner.

P. Fail: when used in the context to describe requirements of a warranty or requirements for correction of the Work, “fail” means “do not comply with the requirements of the Contract Documents”. Failures include the condition of not complying with requirements of the Contract Documents and other conditions indicated.

Q. Defect: when used in the context to describe requirements of a warranty or requirements for correction of the Work, “defect” means “the lack of a quality which prevents failure”. Defects include lacking qualities which prevent not complying with requirements of the Contract Documents and other defects indicated.

1.04 QUALITY ASSURANCE

A. Minimum Quantity or Quality Levels: The quantity or quality level indicated by the Contract documents shall be the minimum provided or performed. The actual installation may comply exactly with the minimum quantity or quality indicated, or it may exceed the minimum within reasonable limits. Indicated numeric values are minimum or maximum, as appropriate, for the context of requirements. Refer uncertainties to Architect for interpretation before proceeding.

B. Contractor's Quality Control Procedures: Specified tests, inspections, and related actions do not limit Contractor's quality-control procedures that facilitate compliance with the Contract Document requirements. Testing and inspecting services are required to verify compliance with requirements specified or indicated and do not relieve Contractor of responsibility for compliance with the Contract Document requirements.

C. Fire Test Response Characteristics: Unless otherwise indicated, where fire-test-response characteristics are indicated in individual Specification Sections, provide products indicated with the fire-test-response characteristics indicated, as determined by testing identical products per test method indicated by testing and inspecting agency acceptable to authorities having jurisdiction. Identify materials and products with appropriate markings of applicable testing and inspecting agency.

D. Qualifications: The following entities shall meet the qualification requirements indicated in individual Specifications Sections and below at a minimum.

1. Manufacturer’s Sales Representative Qualifications: approved by manufacturer of products of subject to distribute, market, and act on behalf of the manufacturer as a sales agent; having through knowledge of the manufacturer’s products and Contract Documents requirement to recommend products which will comply with the requirements indicated for this Project.
2. Manufacturer’s Service Representative Qualifications: trained and approved by manufacturer of products of subject with the technical expertise to observe, inspect, troubleshoot, test, adjust, repair, operate and maintain installations of

manufacturer's products that are similar in material, design, and extent to those indicated for this Project.

3. Installer Qualifications:
   a. Entities installing Work valued in excess of $2000 shall be:
      1) An entity familiar with installing, erecting, or assembling work similar to that required for this Project.
      2) Qualified
      3) Experienced: 3 projects unless otherwise indicated; 2 years unless otherwise indicated.
   b. Where required by individual Specification Sections to be approved by manufacturer, installer shall be approved or authorized in writing by the manufacturer of the product for which the installer will be installing to install products as required for this Project. Such approval may require complete training or certification programs as required by the product's manufacturer.
   c. Use of trade-specific terminology in referring to a trade or entity does not require that certain construction activities be performed by accredited or unionized individuals, or that requirements specified apply exclusively to specific trade(s).
      1) A term referring to a construction activity (such as "carpentry") does not imply that performance must be by accredited or unionized individuals of a corresponding trade (such as "carpenter") nor does it imply that requirements specified apply exclusively to a corresponding trade.
      2) A term referring to a particular tradesperson (such as "plumber" or "electrical contractor") shall imply that performance must be by a corresponding installer but shall not control the Contractor in dividing the Work among the Contractor's own forces or Subcontractors. That is, "plumber" means "plumbing installer".
4. Manufacturer Qualifications: Entities manufacturing or fabricating Work valued in excess of $2000 shall be:
      1) An entity familiar with manufacturing products similar to that required for this Project.
      2) Qualified
      3) Experienced: 4 projects unless otherwise indicated; 3 years unless otherwise indicated.
5. Supplier Qualifications: Entities furnishing Work valued in excess of $2000 shall be:
      1) An entity familiar with furnishing products similar to that required for this Project.
      2) Qualified
      3) Experienced: 3 projects unless otherwise indicated; 2 years unless otherwise indicated.
6. Professional Engineer Qualifications: A professional engineer who is legally qualified to practice in jurisdiction where Project is located and who is experienced in providing engineering services of the kind indicated. Engineering services are defined as those performed for the system, assembly, or product that is similar to those indicated for this Project in material, design, and extent.
7. Testing Agency Qualifications:
   a. Qualified; Independent
      1) Independent: A business entity which is not affiliated with the Contractor or a (Sub-)Subcontractor. Testing Agency need not be

independent where explicitly allowed in individual Specification Sections.

b. An NRTL, an NVLAP, or a testing agency acceptable to authorities having jurisdiction.
   1) NRTL: A nationally recognized testing laboratory according to 29 CFR 1910.7.
   2) NVLAP: A testing agency accredited according to NIST's National Voluntary Laboratory Accreditation Program.

c. Testing agency with the experience and capability to conduct testing and inspecting indicated according to ASTM E 329 and with additional qualifications specified in individual Specification Sections and required by authorities having jurisdiction.

E. Mockups: Construct mockups using products and execution required for completed Work before commencing Work requiring mockups.
   1. Mockups will be used to verify selections made under Sample submittals; to demonstrate finishes and aesthetic effects; to establish qualities of products and materials and execution; to review coordination, testing, and operation; to show interface between dissimilar materials; to demonstrate compliance with indicated installation tolerances and other characteristics on the completed Work.
   2. Approved mockups establish a standard by which the Work will be evaluated for compliance with the Contract requirements. Completed Work which deviates from qualities of approved mockups does not conform to the requirements of the Contract Documents.
   3. Build mockups in location and of size indicated or, if not indicated, as directed by Architect.
   4. Notify Architect seven (7) days in advance of dates and times when mockups will be constructed.
   5. Unless otherwise permitted, construct mockup with same installers proposed for installing completed Work.
   6. Demonstrate the proposed range of aesthetic effects and workmanship.
   7. Where mockup is an assembly of component products to be installed by more than one installer, coordinate construction to provide completely integrated mockup of proposed Work constructed in proposed sequence.
   8. Make corrections to mockup as directed by Architect
   9. Mockup Report:
      a. Prepare a written report including the following information:
         1) Project name, date and identification of Work exampled by mockup.
         2) Name of entities who constructed mockup.
         3) Record of Architect's observations, comments, required action, and other information relevant to determining qualities of mockup.
      b. Submit: three (3) copies to Architect for approval. Do not proceed with Work related to mockup until mockup report is approved by Architect.
   10. Obtain Architect's approval of mockups before starting work, fabrication, or construction.
   11. Approval of mockups does not constitute approval of deviations from the Contract Documents contained in mockups unless such deviations are specifically approved by Architect in writing.
   12. Maintain mockups during construction in an undisturbed condition as a standard for evaluating the completed Work. Protect mockups from the elements with weather-resistant membrane.

13. Demolish and remove mockups when directed, unless otherwise indicated.

1.05 WARRANTY

A. General: Warranties specified in other Sections shall be in addition to, and run concurrent with, other warranties required by the Contract Documents. Manufacturer's disclaimers and limitations on product warranties do not relieve Contractor of obligations under requirements of the Contract Documents. Written warranties made to the Owner 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 Owner can enforce such other duties, obligations, rights, or remedies.

B. Duration: Where a time period is indicated for warranties, it shall be the warranty period and shall start on the Date of Substantial Completion for the warranted Work unless another time period is indicated.

C. Form of Warranties: When specified forms are included with the Contract Documents, prepare a written document using indicated form properly executed; otherwise prepare a written document containing appropriate identification, terms and content required.

D. Endorsement: Work is considered not to conform to the requirements of the Contract Documents where a warranty, certification, or similar commitment is required for the Work until evidence is presented that entities required to endorse such commitments are willing to do so.

E. Sample Warranties: Where a warranty is required, submit sample warranty as required for Product Submittals indicated elsewhere.

F. Executed Warranties: Where a warranty is required, submit executed warranty as required closeout procedures indicated elsewhere.

1.06 OWNER'S QUALITY CONTROL RESPONSIBILITIES

A. Quality Control Services: Owner will engage and pay for a qualified testing agency to perform quality assurance or control services under the following circumstances:
   1. Quality control services are specifically indicated to be the Owner's responsibility regardless of other circumstances.
   2. Quality control services are required by the Contract Documents and responsibility is not specifically assigned to the Contractor or another entity except this circumstance will not apply to testing and inspecting required to evidence product or construction compliance with requirements prior to or as part of product submittal approval unless explicitly stated to be Owner's responsibility.
   3. Special tests and inspections are required by authorities having jurisdiction and responsibility is not specifically assigned to the Contractor or another entity.

B. Owner's Responsibilities:

1. Owner will furnish Contractor with names, addresses, and telephone numbers of testing agencies engaged and a description of the types of testing and inspecting they are engaged to perform.

1.07 CONTRACTOR'S QUALITY CONTROL RESPONSIBILITIES

A. Quality Control Services:Contractor shall engage and pay for a qualified testing agency to perform quality control services under the following circumstances:
   1. Quality control services are specifically indicated to be the Contractor's responsibility regardless of other circumstances.
   2. Testing and inspecting are requested by Contractor are not required by the Contract Documents.
   3. Testing and inspecting is required to evidence product or construction compliance with referenced standards or other requirements prior to or as part of product submittal approval and such testing and inspecting has not been performed by other entities.
   4. For construction that revised or replaced Work that failed to comply with requirements of the Contract Documents, Contractor shall provide quality control services, including retesting and reinspecting, regardless of whether original tests or inspections were Contractor's responsibility. In this case, Contractor shall use same testing agency used for original Work and the Contract Sum will be appropriately adjusted by Change Order.
   5. Where additional testing is required because of the failure of a sample of the Work to comply with requirements, Contractor shall provide quality control services, including retesting and reinspecting, regardless of whether original tests or inspections were Contractor's responsibility. In this case, Contractor shall use same testing agency used for original Work and the Contract Sum will be appropriately adjusted by Change Order.

B. Contractor's Responsibilities:
   1. Coordination: Coordinate sequence of activities to accommodate required quality assurance and control services to prevent delaying the Work and to avoid necessity of removing and replacing construction to accommodate testing and inspecting.
      a. Schedule times for tests, inspections, obtaining samples, and similar activities with sufficient time for testing and analyzing results.
      b. Notify testing agencies at least seventy two (72) hours in advance of time when Work that requires testing or inspecting will be performed.
   2. Associated Services: Cooperate with agencies performing required tests, inspections, and similar quality assurance and control services, and provide reasonable auxiliary services as requested. Notify agency sufficiently in advance of operations to permit assignment of personnel. Provide the following:
      a. Access to the Work.
      b. Incidental labor and facilities necessary to facilitate tests and inspections.
      c. Adequate quantities of representative samples of materials that require testing and inspecting. Assist agency in obtaining samples.
      d. Facilities for storage and field-curing of test samples.
      e. Preliminary design mix proposed for use for material mixes that require control by testing agency.

f. Security and protection for samples and for testing and inspecting equipment at Project site.

3. Preconstruction Testing: Where preconstruction testing is required, Contactor shall:
   a. Provide test specimens and assemblies representative of proposed materials and construction. Provide sizes and configurations of assemblies to adequately demonstrate capability of product to comply with performance requirements.
   b. Submit specimens in a timely manner with sufficient time for testing and analyzing results to prevent delaying the Work.
   c. Fabricate and install test assemblies using installers who will perform the same tasks for Project.
   d. When testing is complete, remove assemblies; do not reuse materials on Project.

1.08 TESTING AGENCY'S RESPONSIBILITIES

A. Testing Agency Responsibilities: The following requirements apply to all testing agencies engaged for the Project.
   1. Testing agency will cooperate with Architect and Contractor in performance of duties.
   2. Testing agency will provide qualified personnel to perform required tests and inspections.
   3. Testing agency will notify Architect and Contractor promptly of irregularities or deficiencies observed in the Work during performance of its services.
   4. Testing agency will interpret tests and inspections and state in each report whether tested and inspected work complies with or deviates from the Contract Documents.
   5. Testing agency will not release, revoke, alter, or increase requirements of the Contract Documents or approve or accept any portion of the Work.
   6. Testing agency will not perform any duties of Contractor.

B. Test and Inspection Reports: Testing agency will prepare and submit a report of each test, inspection, and similar quality assurance or control service to Architect with copies to appropriate Consultant (if any), Owner, Contractor, appropriate Subcontractor or Sub-subcontractor (if any) and to authorities having jurisdiction (if required by that authority). Testing agency reports will be written, certified, and include the following:
   1. Date of issue.
   2. Project title and number.
   3. Name, address, and telephone number of testing agency.
   4. Dates and locations of samples and tests or inspections.
   5. Names of individuals making tests and inspections.
   6. Description of the Work and test and inspection method.
   7. Identification of product and Specification Section.
   8. Complete test or inspection data.
   9. Test and inspection results and an interpretation of test results.
   10. Ambient conditions at time of sample taking and testing and inspecting.
   11. Comments or professional opinion on whether tested or inspected Work complies with the Contract Document requirements.
   12. Name and signature of laboratory inspector.

13. Recommendations on retesting and reinspecting.

C. Testing Agency Final Report: When tests have been completed for which testing agency was engaged or at Substantial Completion, testing agency will prepare a final report of unresolved deficiencies of tests and inspections, or a statement that there are no unresolved deficiencies. Testing Agency will submit report as required for test and inspection reports.

PART 2 - PRODUCTS – Not Used

PART 3 - EXECUTION

3.01 REPAIR AND PROTECTION

A. Repair and protection are Contractor's responsibility, regardless of the assignment of responsibility for quality control services.

B. Repair: On completion of testing, inspecting, sample taking, and similar services, repair damaged construction and restore substrates and finishes.
   1. Provide materials and comply with installation requirements specified in other Sections of these Specifications. Restore patched areas and extend restoration into adjoining areas in a manner that eliminates evidence of patching.
   2. Comply with the cutting and patching execution requirements indicated elsewhere.

C. Protection: Protect construction exposed by or for quality control activities.

END OF SECTION 014000

SECTION 014200 - REFERENCES

PART 1 - GENERAL

1.01 SECTION INCLUDES

A. Contract Language
B. Definitions
C. Standards

1.02 RELATED REQUIREMENTS

A. Conditions of the Contract
   1. Definitions

B. Individual Specification Sections
   1. Standards

1.03 CONTRACT LANGUAGE

A. Hierarchical Organization: Contract Documents may be organized by hierarchical outline format. The intent and meaning of Contract Document text shall apply to each of its subordinate portions. Likewise, the intent and meaning of Contract Document text is dependent upon and associated with the text to which it is subordinate.

B. Headings: The meaning of Contract Document text is intrinsic to the intent of the Contract Documents whether or not the text is a complete sentence or an Article heading, Paragraph heading, or other heading. The meaning of headings applies to all subordinate text to the heading.

C. Specifications Organization: The Specifications may be divided into the following hierarchical outline format listed as follows in order of hierarchy and accompanied by definitions.
   1. Division: groupings of Sections according to the Construction Specification Institute's "MasterFormat" which make up the Specifications and Division 00.
   2. Section: a portion of a Division which indicates requirements for a portion of the Work.
   3. Part: a portion of a Section which groups related information.
      a. "Part 1 – General" describes administrative, procedural, overall and other requirements.
      b. "Part 2 – Products" describes material, product, system, assembly, fabrication (usually off site) and other requirements.
      c. "Part 3 – Execution" describes action, manner, technique, installation (usually on site) and other requirements.
      d. "Part 4" is optional an may be used for schedules, sample warranties, exhibits, attachments, a combination of other Parts or other purposes implied by the title of the Part.
   4. Article: a portion of a Part demarcated by a heading alone on a line.

a. Where a Paragraph which is immediately subordinate to an Article in hierarchy does not begin with a complete sentence or a heading (as defined below for "colons" in this Section), the words "shall comply with the following" or "shall be provided with the following", as appropriate to the context, shall be assumed to follow the Article text.

5. Paragraph: a portion of an Article.
6. Subparagraph: a portion of a Paragraph which may be further divided into Subparagraphs.

D. Section Includes: Where "this section contains", "Section Includes", "Section Contents" or "Contents" is used in a Specification Section, items listed represent requirements or potions of the Work which are specified in that Section. Drawings and general provisions of the Contract, including General and Supplementary Conditions (if any) and Division 1 General Requirements, apply to all Specification Sections. Where terms of a general nature are used in a Section, such as "manufacturer" or "installation standard", they apply to all the Work of that Section unless otherwise indicated.

1. Section includes items listed after an equals sign "=" are terms used in the Contract Documents which are synonymous with the term listed before the equals sign.

E. Related Requirements: Where "Related Requirements", "Related Work" or "Related Sections" is used in a Specification Section, items listed represent Work which is specified in other Sections or elsewhere in the Contract Documents. These other Sections may contain general, product, execution and other requirements which relate to the referring Section. Coordinate Related Requirements with Work of the referring Section, and other provisions of the Contract Documents not listed, to not detrimentally impact the Project sequencing, schedule, cost, or intent of the Contract Documents. The items listed do not represent a comprehensive list of all Work requiring coordination.

F. Hierarchical Document Reference: Unless another portion of the Contract Documents is explicitly referenced:

1. Where a non-specific reference is made to a portion of the Contact Documents, reference shall be to the applicable portion of the Contract Documents least removed in hierarchy to the reference. Examples include:
   a. Reference to an Article with no further specificity means an Article in the same Part as the reference
   b. Reference to a Paragraph with no further specificity, means a Paragraph in the same Article as the reference.
2. References of "as follows", "as indicated below", or similar language indicates that reference is being made to:
   a. all following text in the referencing (Sub)Paragraph, and
   b. all text in following (Sub)Paragraphs which are subordinate in hierarchy to the referring(Sub)Paragraph until a (Sub)Paragraph equal to or higher than the referring (Sub)Paragraph is encountered.

G. Abbreviated Language: Where language used in Specifications and other Contract Documents is abbreviated, words and meanings shall be interpreted as appropriate in context. Words that are implied, but not stated, shall be interpolated as the sense requires.

H. Plural Words: Singular words will be interpreted as plural and plural words interpreted as singular where applicable as the context of the Contract Documents indicates.

I. Imperative Mood: Imperative commands used in the Contract Documents are to be performed by the Contractor unless otherwise indicated.

J. Colon:
   1. Heading: A colon immediately followed by a complete sentence in a Paragraph or Subparagraph designates the text before the colon is a heading.
   2. Shall: A colon immediately followed by text (not at the end of a line) which is not a complete sentence means "shall be", “shall be for” or “shall comply with” as appropriate to the context. For this purpose a complete sentence is one which has the grammatical structure to be considered a sentence in the English language. The use of a capital letter at the beginning of the text following the colon or a period or other terminal punctuation at the end of or in the text following the colon shall not be used to evaluate the text as a sentence.
   3. Follows: Unless meaning is clear without a colon, a colon at the end of a line in a Paragraph or Subparagraph (not immediately followed by text) means “as follows”, “the following”, “shall be the following”, “shall comply with the following” or “shall be as follows” as appropriate to the context.
   4. Period: If meaning is clear without a colon, a punctuation period “.” shall be understood for a colon at the end of a line in a Paragraph or Subparagraph (not immediately followed by text).

K. Slash: A slash mark “/” shall have the following meaning as appropriate to the context:
   1. General: Unless otherwise indicated, a slash means “per” or “for”, depending on the context.
   2. Article: When used in an Article heading, a slash means “used in the following applications:”.
   3. Standard: When used to refer to a referenced standard, a slash means “in compliance with”. The items listed before the slash indicate the characteristics required under the criteria of the standard indicated, but are not intended to limit the requirements only to these characteristics. Unless otherwise explicitly indicated, comply with the entire standard in addition to the characteristics listed.
   4. Division: When used in a mathematical expression, a slash means “divided by” or “per”.
   5. Proprietary: When used in regards to a proprietary requirement, a slash means “as manufactured or fabricated by”.

L. Parentheses: Text in Parentheses is not optional and shall be included in the meaning of the text.
   1. Parenthesis may be used to indicate multiple instances all or which shall apply. For example, “(Sub-)Subcontractor” means “Subcontractor and Sub-subcontractors” and “(Sub)Paragraph” means “Paragraph and Subparagraph”.
   2. Parenthesis may denote different forms of a word to be used in the applicable context. For example “The Mechanical Subcontractor(s) shall coordinate work” means if there is a single Mechanical Subcontractor: “The Mechanical Subcontractor shall coordinate work” and if there are multiple Mechanical Subcontactors: “The Mechanical Subcontractors shall coordinate work”.

M. Emphasized Text: Bold or underscored text facilitates scan reading and has no other meaning, unless otherwise indicated.

1.04 DEFINITIONS

A. General Conditions Definitions: Basic Contract definitions are included in the General and Supplementary Conditions of the Contract.

B. General Requirements: requirements of Division 01.

C. General Requirement Definitions: The definitions listed in the Definitions Article of all Division 1 Sections shall apply to the entire Contract Documents unless otherwise indicated.

D. Project Manual: volume(s) assembled for the Work which may include the bidding requirements, sample forms, Contracting Requirements, Conditions of the Contract and Specifications.

E. Division, Section, Part, Article, Paragraph and Subparagraph: When not used in reference to the Conditions of the Contract, the meaning of these terms are defined in the Contract Language Article.

F. Approved, Permitted and Authorized: synonymous terms meaning “approved by Architect” unless another object is used or otherwise indicated. When used to convey Architect's action on Contractor's submittals, applications, and requests, "approved", "permitted" and "authorized" are limited to Architect's duties and responsibilities as stated in the Conditions of the Contract.

G. Directed, and Requested: synonymous terms meaning a command or instruction by the Architect unless another object is used or otherwise indicated.

H. Selected: “selected by Architect” unless another object is used or otherwise indicated

I. Required and Allowed: synonymous terms meaning “required by the Contract Documents” unless another object is used or otherwise indicated.

J. Requirements: “requirements of the Contract Documents” unless another object is used or otherwise indicated.

K. Indicated, Shown, Noted, Scheduled and Specified: synonymous terms meaning “indicated in or required by the Contract Documents” unless another object is used or otherwise indicated.

L. Elsewhere: When used in conjunction with a requirement of the Contract Documents, “elsewhere” means “in different or other place(s) in the Contract Documents”. When used in this context in a Specification Section, it means “in different or other place(s) in the Contract Documents but not in this Section”.
   1. When used in a Specification Section, the Related Requirements Article in that Section may include (some but not necessarily all) place(s) in the Contract

Documents to which reference is made. If location is not clear, request interpretation from Architect.

M. Typical: “unless otherwise indicated”. These terms are used to indicate a requirement applicable to the general, normal, or standard case. If an explicit different requirement is stated without the use of these terms, the explicit different requirement shall replace the general case requirement.

N. Including or Include: “Including” means “including but not limited to”. “Include(s)” means “include(s) but not limited to the following:”.

O. Regulations: laws, ordinances, statutes, and lawful orders issued by authorities having jurisdiction, and rules, conventions, and agreements within the construction industry that control performance of the Work.

P. Furnish: pay for, supply and deliver to Project site, ready for installation and similar operations.

Q. Install: construction operations at Project site including receiving custody and control, unloading, inspecting, storing, unpacking, assembling, setting, connecting, erecting, placing, anchoring, applying, working to dimension, finishing, curing, protecting, cleaning, adjusting and similar operations.

R. Provide: furnish and install, complete and ready for the intended use.

S. Project Site or Site: space available for Contractor’s use at the location of the Project for performing the Work.
   1. When used to refer to a trade or discipline (e.g. “sitework” or “site lighting”), “site” means “earth” or “exterior” as appropriate.
   2. When used to refer to a method or activity (e.g. “site finished” or “site applied”), site mean space available for Contractor’s use at the location of the Project for performing the Work.

T. Field: any location where the Work is allowed be preformed other than a factory, shop, workshop, mill, or plant. Field locations may or may not include site locations.
   1. When used to refer to a report or quality control activity, “field” means “site” (, e.g. “field report” is synonymous with “site report” and “field quality control” is synonymous with “site quality control”).

U. Factory, Shop, Workshop, Mill, Plant: synonymous terms meaning location normally and customarily used for the manufacture or fabrication of materials or products in a controlled environment.

V. Finished Spaces or Finished Areas: portions of the Project which are not unfinished spaces or which are inhabited or used by people during the regular or normal occupancy of the Project. Spaces used for storage or circulation of occupants are finished spaces.

W. Unfinished Spaces or Unfinished Areas: portions of the Project which are normally uninhabited by occupant or which are used exclusively to enclose mechanical, electrical and other building service equipment.

1. Subject to the above definition, unfinished spaces may include: crawl spaces, plenums, shafts, trenches, equipment vaults, manholes, or attics.

X. Wet Areas: portions of the Project and surfaces that are either soaked, saturated, or regularly and frequently subjected to moisture or liquids (usually water), such as gang showers, tub enclosures, individual showers, laundries, saunas, steam rooms, swimming pools, hot tubs, and exterior areas.

Y. Exposed: Unless otherwise indicated, a portion of the Project is exposed when it is visible in the completed construction including portions exposed by operation of regularly used doors or drawers. A portion of the Project is not exposed when it is visible only by operation of maintenance hatches or panels. A portion of the Project is not exposed when it is visible only by removal of in place construction.

Z. Finished or Finish: Depending upon the context, “finished” means “completed” or “having a treatment or coating applied”. When used as a noun, “finish” means “treatment or coating”.

AA. Not In Contract (NIC): construction not part of the Work of the Contract for Construction, but which may require coordination provisions in the Work for installation by Owner or separate contractors. Refer uncertainties to Architect for interpretation.

BB. Building Envelope: At a given location, the building envelope is defined as the layer(s) of the part of the building, in a closed position, designed or intended to provide resistance to thermal transfer, moisture movement, air movement, outside originating non-building solids, or the passage of outside originating electromagnetic radiation.

CC. Exterior: portions of the Project either part of or outside the inner most layer of the building envelope.

DD. Interior: portions of the Project inside the inner most layer of the building envelope. Except, when in reference to requirements regarding volatile organic content or chemical composition of site applied products in liquid or powder form, “interior” is defined as portions of the Project either part of or inside the outer most layer of the building envelope.

EE. Standard: the terms “standard”, “quality standard”, “referenced standard”, “industry standard”, “construction standard”, “performance standard”, and “design standard” when used to refer to a document are synonymous terms which mean published information from an organization, code agency, or government agency which systematically sets forth objective criteria for a material, method, or assembly.

1.05 STANDARDS

A. Applicability of Standards: Where requirements of the Work are established by reference to standards, comply with such standards for the applicable portion of the Work unless more stringent requirements which require a higher quality or quantity of Work are indicted in the Contract Documents. Standards so referenced have the same force and effect as if bound or copied directly into the Contract Documents to the

extent referenced. Such standards are made a part of the Contract Documents by reference.

1. Completeness of Standards: Unless explicit language is used to limit the applicability of a standard, the Work shall comply with the entire standard. Stating a test, grade, class or other similar characteristic of a standard does not in itself limit the other requirements of the standard which apply. Such limiting language may include:
   a. Explicit limiting reference to only a portion of the standard such as a chapter or section such as “comply only with section 420 of this standard”.
   b. References which explicitly state what provisions of the standard are to be used, such as “comply with only the performance, thickness, and composition requirements of this standard”.

B. Publication Dates: Comply with standards in effect as of date of the Contract Documents, unless another date is indicated.

C. Conflicting Requirements: If compliance with two or more standards is indicated and the standards establish different or conflicting requirements for minimum quantities or quality levels, comply with the most stringent requirement. Refer uncertainties and requirements that are different, but apparently equal, for Architect’s interpretation before proceeding.

1. The contractual relationships, duties, and responsibilities of the parties in Contract and those of the Architect shall not be altered from the Contract Documents by mention or inference otherwise in any reference document.

D. Copies of Standards: Each entity engaged in construction on Project must be familiar with standards required for its construction activity. Copies of applicable standards are not bound with the Contract Documents. Where copies of standards are needed to perform a required construction activity, obtain copies directly from publication source.

E. Standards Abbreviations: Where undefined abbreviations and acronymsare used in Specifications or other Contract Documents for standards, regulations, organizations, code agencies and government agencies they shall mean the recognized name in in Gale Research's "Encyclopedia of Associations" or in Columbia Books' "National Trade & Professional Associations of the U.S." or the Federal Government’s Unified Facilities Guide Specifications Section 01 42 00 Sources For Reference Publications (http://www.wbdg.org/ccb/DOD/UFGS/UFGS%2001%2042%2000.pdf).

PART 2 - PRODUCTS – Not Used

PART 3 - EXECUTION – Not Used

END OF SECTION 014200

SECTION 015000 - TEMPORARY FACILITIES AND CONTROLS

PART 1 - GENERAL

1.01 SECTION INCLUDES

A. Temporary Utility Facilities
   1. Sanitary Sewerage
   2. Water
   3. Heating
   4. Cooling and Humidity Control
   5. Ventilation
   6. Electricity
   7. Lighting
   8. Telecommunications

B. Temporary Construction Facilities
   1. Field Offices
   2. Sheds
   3. Sanitary Facilities
      a. Toilets Facilities
      b. Wash Facilities
      c. Drinking Water Facilities.
   4. Waste and Recycling Facilities

C. Temporary Construction Aid Facilities
   1. Stairs
   2. Elevators
   3. Hoists

D. Temporary Vehicular Access and Parking Facilities
   1. Parking Areas
   2. Roads
   3. Traffic Control

E. Temporary Barrier and Enclosure Facilities
   1. Barricades
   2. Security Enclosures
   3. Tree and Plant Protection
   4. Building Enclosures
   5. Dust and Noise Partitions
   6. Dust Curtains

F. Temporary Control Facilities
   1. Environmental Controls
   2. Shoring
   3. Fire Protection

G. Temporary Project Identification Facilities
   1. Directional Signs
   2. Project Identification Sign

1.02 RELATED REQUIREMENTS

A. Conditions of the Contract
   1. Permanent Utility Installation Charges
   2. Parking restrictions

B. Renovation Work: requirements for the use of:
   1. Barricades
   2. Protective Walkways
   3. Building Enclosures
   4. Dust and Noise Partition
   5. Dust Curtain

C. Product Requirements
   1. Adhesives and Sealants Requirements
   2. Coatings Requirements

D. Execution Requirements
   1. Correction
   2. Progress Cleaning
   3. Construction Waste Handling and Management
   4. Progress Maintenance
   5. Final Cleaning
   6. Construction IAQ Management
      a. Occupancy IAQ Requirements
      b. Filtration Media Replacement
   7. Lighting Replacement

E. Permanent Specialties
   1. Fire Protection Specialties

F. Permanent Conveying Equipment
   1. Elevators

G. Permanent Fire Suppression
   1. Fire Suppression Systems

H. Permanent HVAC
   1. Heating Systems
   2. Cooling and Humidity Control Systems
   3. Ventilation Systems

I. Permanent Electrical
   1. Electric distribution
   2. Lighting

J. Permanent Communications
   1. Telecommunications

K. Permanent Utilities
   1. Water Utilities
   2. Sanitary Sewerage Utilities
   3. Storm Drainage Utilities
   4. Electrical Utilities
   5. Communications Utilities

L. Individual Specification Sections
   1. Temporary heat, ventilation, humidity, and lighting requirements

1.03 DEFINITIONS

A. Permanent Enclosure: As determined by Architect, permanent or temporary roofing is complete, insulated, and weather tight; exterior walls are insulated and weather tight; and all openings are closed with permanent construction or substantial temporary closures.

1.04 PRICE AND PAYMENT PROCEDURES

A. Installation and Removal Costs: Unless explicitly indicated otherwise, Contractor shall pay for installation, hook-up, removal and disconnection costs for temporary facilities.
   1. Permanent Utilities: responsibility for payment of installation of permanent new utilities used for temporary purposes is indicated elsewhere.

B. Use Costs: Unless explicitly indicated otherwise, Contractor shall pay for use and utility costs for temporary facilities. Costs indicated below do not include installation or removal costs.
   1. Temporary Water:
      a. Owner shall pay for water used for temporary facilities.
   2. Temporary Fuel and Heat Energy:
      a. Contractor shall pay for fuel and heat energy (including oil, gas, hydronic, and steam, if any) used for temporary facilities.
   3. Temporary Electricity:
      a. Owner shall pay for electricity used for temporary facilities.
   4. Temporary Telecommunications:
      a. Contractor shall pay for temporary telecommunications use; except, Contractor shall not be required to pay for mobile telecommunications used by Contractor's personnel or entities other than the Contractor unless the Contractor has agreed to pay such costs.
   5. Temporary Waste and Recycling Fees:
      a. Contractor shall pay for waste disposal and recycling fees.

1.05 ADMINISTRATIVE REQUIREMENTS

A. Sequencing: Provide each temporary facility ready for use when needed to avoid delay. Maintain and modify as required. Do not remove until facilities are no longer needed for Project or are replaced by authorized use of permanent facilities.

B. Utilities: Engage appropriate local utility company to install temporary service or connect to existing service. Where utility company provides only a portion of installation service, provide the remainder with matching, compatible materials and equipment. Comply with utility company recommendations.
   1. Arrange with utility company, Owner, and existing users for time when service can be interrupted, if necessary, to make connections for temporary services.
   2. Provide adequate capacity at each stage of construction. Before temporary utility is available, provide trucked-in services.
   3. Obtain easements to bring temporary utilities to Project site where Owner's easements cannot be used for that purpose.
   4. Regulatory Requirements: If required by authorities having jurisdiction, arrange for authorities having jurisdiction to test and inspect each temporary utility before use. Obtain required certifications and permits.

C. Common Use by Others:
   1. Allow other entities involved with Project to use temporary facilities without cost, including:
      a. Owner and Owner's Administrative Forces
      b. Owner's Construction Forces
      c. Separate Contractors
      d. Occupants
      e. Architect
      f. Consultants
      g. Testing Agencies
      h. Authorities Having Jurisdiction

D. Conditions of Use: The following conditions apply to use of temporary facilities (or permanent facilities used for temporary purposes) by all entities using such facilities and controls:
   1. Coordinate, schedule, and sequence use with other entities. Unless otherwise indicated, when conflicts arise, the entity responsible for installing and removing temporary facility shall determine use coordination. For permanent facilities used by occupants, the Owner shall determine use coordination.
   2. Keep clean and neat.
   3. Operate in a safe and efficient manner.
   4. Do not overload or interfere with Project’s progress.
   5. Do not allow hazardous dangerous or unsanitary conditions, or public nuisances to develop or persist.
   6. Except for permanent facilities, relocate as required for progress of the Work.
   7. Enforce strict discipline in use.
   8. Limit availability to essential and intended uses to avoid waste and abuse.

E. Location: Locate temporary facilities where they will serve Project adequately and result in minimum interference with performance of the Work. Relocate and modify facilities as required by progress of the Work.

F. Operation and Maintenance: Maintain temporary facilities in good operating condition until removal. Keep fencing in a state of good repair and proper alignment. Protect temporary facilities from damage caused by freezing temperatures and similar conditions. Protect permanent facilities used for temporary facilities so permanent facilities will be undamaged at time of acceptance. If, despite such protection, permanent facilities become damaged, restore damage as required by correction requirements indicated elsewhere
   1. Maintain operation of temporary enclosures, heating, humidity control, ventilation, and similar facilities on a 24-hour basis where required to achieve indicated results and to avoid possibility of damage.
   2. Prevent water-filled piping from freezing. Maintain markers for underground lines. Protect facilities from damage during excavation operations.

G. Removal: Disconnect, terminate and remove each temporary facility when need for its service has ended, when it has been replaced by authorized use of a permanent facility, and no later than Substantial Completion. Complete or, if necessary, restore permanent construction that may have been delayed because of interference with temporary facility.
   1. Temporary use materials and facilities are the property of Contractor.
      a. Owner reserves right to take possession of Project identification signs.
   2. At Substantial Completion, clean and restore permanent facilities used during construction period. Comply with correction and final cleaning requirements indicated elsewhere.

H. Changeover: At changeover to permanent service, record meter and other readings necessary to allocate usage cost.
   1. Early Changeover: Unless otherwise indicated, at earliest feasible time and when acceptable to Owner, change over from use of only the following temporary facilities to use of permanent service (if any).
      a. Fire Suppression

I. Temporary Use of Permanent Facilities: Contractor shall assume responsibility for operation, maintenance, and protection of each permanent facility by qualified entities during its use as a temporary facility before Owner's acceptance. When permitted, use of permanent facilities for temporary facilities or construction activities is at Contractor's option. Unless approved, if use of a permanent facility diminishes or advances Owner's warranty period, do not use such facility and maintain temporary facility in use.
   1. Operate, maintain, and clean permanent facilities used as temporary facilities in a manner acceptable to Owner and complying with Owner's facilities operation and maintenance procedures.
      a. Maintain such facilities as required for progress maintenance indicated elsewhere.
      b. Operate such facilities to prevent damage, excessive wear, and excessive consumption.
      c. Clean such facilities to ensure a sanitary condition and as required for progress cleaning indicated elsewhere.
   2. At Substantial Completion, clean and restore permanent facilities used for construction, including:
      a. Existing: Unless otherwise indicated, restore existing facilities used during construction to condition existing before commencement of the Work.
      b. New: Restore new permanent facilities as required for new Work.

c. Air Filters: Replace filtration media as required for filtration media replacement indicated elsewhere.
d. Ductwork: Clean inside of air distribution systems as required for final cleaning indicated elsewhere.
e. Parts: Replace parts worn past operational tolerance and parts that have been subject to unusual or severe operating conditions.
f. Lighting: Replace lamps and starters in lighting as required for lighting replacement indicated elsewhere.

3. Personnel remaining after Substantial Completion will be permitted to use permanent facilities until final Completion, under conditions acceptable to Owner.

1.06 SUBMITTALS

A. Utility Implementation and Termination Schedule: Indicate dates for implementation and termination of each temporary utility on Contractor's Construction Schedule.

B. Shop Drawings: Project identification sign.

1.07 QUALITY ASSURANCE

A. Temporary Water Service and Temporary Sewerage Utility Installer Qualifications: Qualified; An entity whose personnel who will perform on-site Work are licensed as master or journeyman plumbers in the Project’s jurisdiction; Experienced 5 year and 10 projects.

B. Temporary Electrical Service Installer Qualifications: Qualified; An entity whose personnel who will perform on-site Work are licensed as electricians in the Project’s jurisdiction; Experienced 5 year and 10 projects.

PART 2 - PRODUCTS

2.01 MATERIALS AND EQUIPMENT

A. General: Provide new materials and equipment. Undamaged, previously used materials and equipment in serviceable condition may be used if approved by Architect. Provide materials suitable for use intended.
1. Refer to Part 3 for additional material and equipment requirements.

B. Sustainable Design Requirements: Comply with the following requirements indicated elsewhere for materials and equipment used for temporary facilities:
1. Adhesives and Sealants Requirements
2. Coatings Requirements

2.02 SHEETING / Dust Curtain, Building Enclosure

1. Material: reinforced waterproof polyethylene sheet
2. Thickness: 10-mil minimum
3. Flame Spread Rating: 15 maximum / ASTM E 84

4. Passing NFPA 701 Test Method 2.

2.03 DUST MATS

A. Dust Mats: Adhesive surfaced walk-off mats for temporary use during construction to control transport of dust.
   1. VOC Content: unknown to Architect if compliant with VOC requirements.
   2. Size 36 by 60 inches minimum.
   3. Color: White
   4. Material: 1.8 mm thickens polyethelene sheet with Ethyl Acetate, MEK, Ethylhexlacrylate, and Buthylacrylate adhesive
   5. Available Products:
      a. Sticky Mats / American Floor Mats (www.americanfloormats.com)
      b. Sticky Mats / Cole Static Control Inc. (www.stickymats.com)

2.04 AIR FILTRATION UNITS

A. Temporary Air Filtration Units: Primary and secondary HEPA-filter-equipped portable units with four-stage filtration. Provide single switch for emergency shutoff. Configure to run continuously.

PART 3 - EXECUTION

3.01 SANITARY SEWERAGE

A. Permanent Sanitary Sewerage: Permanent building wastewater system may be used for temporary facilities only in the performance of legal and customary custodial services for progress and final cleaning, and never for disposal of construction waste.
   1. Do not clog, contaminate, or pollute sewer.
   2. Maintain sewers facilities in a clean, sanitary condition.

B. Toilets: Refer to temporary sanitary facilities requirements for use of permanent toilets.

3.02 WATER

A. Permanent Water Service: Permanent building water supply system may be used for temporary facilities when permitted by authorities having jurisdiction.
   1. Provide rubber hoses as adequate to facilitate construction operations.

3.03 HEATING

A. Temporary Heating: Provide temporary heating required by construction activities for curing or drying of completed installations or for protecting installed construction from adverse effects of low temperatures or high humidity.
   1. Heating Equipment: vented, sealed combustion, self-contained, liquid-propane-gas or fuel-oil heaters with individual space thermostatic control listed and

labeled, by a testing agency acceptable to authorities having jurisdiction, and marked for intended use for type of fuel being consumed and that will not have a harmful effect on completed installations or elements being installed.
   a. Use of gasoline-burning space heaters, open-flame heaters, electric, or salamander-type heating units is prohibited.
2. Maintain a minimum temperature of 50 deg F in permanently enclosed portions of building for normal construction activities, and 65 deg F for finishing activities and areas where finished Work has been installed.

B. Permanent Heating: Permanent heating system may not be used for temporary heating before Substantial Completion.

3.04 COOLING AND HUMIDITY CONTROL

A. Temporary Cooling and Humidity Control: Provide temporary cooling and humidity control required by construction activities for curing or drying of completed installations, for protecting installed construction from adverse effects of high humidity, or when required to reduce substrate moisture levels to level required to allow installation or application of finishes.

B. Permanent Cooling: Permanent cooling system may not be used for temporary cooling before Substantial Completion.

3.05 VENTILATION

A. Temporary Ventilation:
1. Provide temporary ventilation required by construction activities for:
   a. Health and safety of persons
   b. Curing or drying of completed installations
   c. Protecting installed construction from adverse effects of high humidity
   d. Reducing the interior contamination of dust
   e. As necessary to create negative pressure in areas of the building under construction such that dust or other contaminants will not transfer to the Kitchen and other Owner occupied areas of the building in excess of that permitted by health authorities having jurisdiction.
2. Provide temporary ventilation equipment that will not have a harmful effect on completed installations or elements being installed. Coordinate ventilation requirements to produce ambient condition required and minimize energy consumption.

A. Permanent Ventilation: Permanent ventilation system may not be used for temporary ventilation before Substantial Completion.

3.06 ELECTRICITY

A. Existing Electric Power Service: Use of existing electric power service for temporary electricity will be permitted if of adequate capacity.

1. Standards: Comply with NECA "Temporary Electrical Facilities", NEMA, and UL standards and regulations for temporary electric service. Install service to comply with NFPA 70.

3.07 LIGHTING

A. Permanent Lighting: Permanent building lighting system may be used for temporary facilities when permitted by authorities having jurisdiction.
   1. Interior: Install and operate interior temporary lighting to provide the following foot candle illumination per square foot of floor area at the indicated activities:
      a. General overall: 1 foot candle
      b. Traffic and circulation areas: 5 foot candle
      c. Active work areas: 20 foot candle

3.08 TELECOMMUNICATIONS

A. Temporary Voice Service: Provide temporary telephone voice service throughout construction period. Conspicuously post a list of important, operational, and emergency telephone numbers inside and outside of field office and at entrance to site.
   1. Type of Service: cellular or satellite. Contractor may provide landline service in addition at Contractor’s option.

3.09 FIELD OFFICES

A. Temporary Field Office: Provide field office for use as a common facility by all personnel engaged in construction activities; of sufficient size to accommodate required office personnel and meetings of ten (10) persons at Project site. Keep office clean and orderly.
   1. Furnish and equip office as required for to accommodate activities and including file cabinets, plan tables, plan racks, bookcases, folding conference table, and 12 folding chairs.

B. Field Office Location: Area of renovation under construction, including the lower level below the Cobb Room, may be used as office space.
   1. Heat: Provide heater with thermostat capable of maintaining a uniform indoor temperature of 68 deg F.
   2. Cooling: Provide an air-conditioning unit capable of maintaining an indoor temperature of 72 deg F.
   3. Lighting: Provide light fixtures capable of maintaining average illumination of 30 foot candle at desk height.
   4. Power: Provide electrical power as necessary to conduct office activities.

3.10 SHEDS

A. Temporary Sheds: Provide storage and fabrication sheds (e.g. trailers and shipping containers) sized, furnished, and equipped to accommodate materials and equipment

involved, including temporary utility services. Sheds may be open shelters or fully enclosed spaces within building(s) or elsewhere on site.

1. Store combustible materials apart from building under construction.
2. Provide temporary sheds that are noncombustible according to ASTM E 136. Comply with NFPA 241.
3. A sign not smaller than 12 by 12 inches shall be conspicuously placed on each exterior shed depicting the company name, business phone number, and emergency phone number.

3.11 SANITARY FACILITIES

A. Temporary Toilet Facilities: Provide self-contained, single-occupant toilet units of chemical, aerated recirculation, or combustion type; vented; fully enclosed with a glass-fiber-reinforced polyester shell or similar nonabsorbent material.
   1. Maintain adequate supply of toilet tissue. Provide professional custodial services to regularly clean maintain and service temporary toilets as required to maintain sanitary conditions but no less frequently than bi-weekly.

B. Permanent Toilet Facilities: Permanent toilet facilities may not be used for temporary sanitary facilities before Substantial Completion.

C. Temporary Drinking Water Facilities: Provide Containerized 5 gallon tap-dispenser drinking water units including paper cup supply. Maintain adequate supply. Provide covered waste containers for disposal of used material. Locate drinking water so personnel need not walk more than three stories vertically or 500 feet horizontally to facilities.

D. Temporary Hand Wash Facilities: Install hand wash facilities supplied with potable water at convenient locations. Dispose of drainage properly. Supply cleaning compounds appropriate for each type of material handled. Provide paper towels and similar disposable materials for each facility. Maintain adequate supply. Provide covered waste containers for disposal of used material.

E. Permanent Hand Wash Facilities: Permanent building washrooms may not be used for temporary facilities before Substantial Completion.

3.12 WASTE AND RECYCLING FACILITIES

A. Temporary Waste and Recycling Facilities: Provide temporary waste and recycling collection equipment, containers, and signs, in quality and quantity adequate to handle waste from construction operations as indicated for construction waste and progress cleaning execution requirements.

3.13 STAIRS

A. Temporary Stairs: Provide temporary stairs where ladders are not adequate.

B. Permanent Stairs: Permanent stairs may be used for temporary facilities when permitted by authorities having jurisdiction. Provide barriers, coverings, or other methods to protect stairs for safe use so finishes will be undamaged at time of acceptance. Cover new permanent stairs (if any) with protective covering of plywood or similar material in a safe manner so finishes will be undamaged at time of acceptance. If, despite such protection, stairs become damaged, restore damage as required by correction requirements indicated elsewhere. Where stairs are required by authorities having jurisdiction for egress, provide devices, signs, and other methods including debris, material, and equipment removal to maintain safe means of egress.

3.14 ELEVATORS

A. Temporary Elevators: Comply with elevator requirements indicated elsewhere for use of new permanent elevators for construction activities.

3.15 HOISTS

A. Temporary Hoists: Provide facilities for lifting and hoisting materials and personnel.

3.16 PARKING AREAS

A. Temporary Parking Areas: comply with parking restrictions indicated elsewhere.

3.17 ROADS

A. Temporary Roads: Permanent roads may be used for temporary facilities. Maintain temporary roads and paved areas adequate to support loads and to withstand exposure to traffic during construction period.
   1. Snow Plowing: Remove snow and ice from temporary roads as required for construction operation and emergency egress and access to site.

3.18 TRAFFIC CONTROL

A. Temporary Traffic Control: Protect the traveling public from damage to person and property. Minimize interference and obstruction of public traffic. Investigate the adequacy of existing roads and their allowable load limit. Contractor is responsible for the repair of any damage to private and public roads caused by construction operations.
   1. Provide temporary traffic controls at junction of temporary or new permanent roads with public roads. Include warning signs for public traffic and "STOP" signs for entrance onto public roads.
   2. Maintain access for fire-fighting equipment and access to fire hydrants.
   3. AHJ: Except with written permission of and comply with requirements of authorities having jurisdiction:
      a. Conduct operations in a manner that will not close any thoroughfare or interfere with traffic on railways or highways.

b. Do not interfere with the peak traffic flows.
c. When required by the authorities having jurisdiction:
    1) Provide measures for the protection and diversion of traffic, including the provision of watchmen and flagmen, erection of barricades, placing of lights around and in front of equipment the work, and the erection and maintenance of adequate warning, danger, and direction signs.
    2) Maintain traffic on at least half of public roadway widths.
    3) Maintain affected public roads during the construction period.

3.19 BARRICADES

A. Temporary Barricades: Provide temporary guards, barricades and other protection required to prevent injury to people and property to remain. Comply with standards and code requirements for erecting structurally adequate barricades. Paint with appropriate colors, graphics, and warning signs to inform personnel and public of possible hazard. Where appropriate and needed, provide warning lighting.

3.20 SECURITY ENCLOSURES

A. Temporary Security Enclosure: Maintain existing building enclose to maintain security at all times. Provide lockable entrances to prevent unauthorized entrance, vandalism, theft, and similar violations of security.

3.21 TREE AND PLANT PROTECTION

A. Temporary Tree and Plant Protection: Protect tree root systems from damage, flooding, and erosion. Install temporary 48” high fence with posts at 6 foot spacing to protect vegetation from construction damage where indicated. If not indicated, provide fence around drip line of individual trees to remain and around perimeter drip line of groups of trees to remain. Do not fasten or attach ropes, cables, or guys to trees except for those indicated to be attached for plant stabilization.
    1. Fencing: high-visibility orange, nonfading, plastic construction fencing constructed of high-density extruded and stretched polyethylene fabric with 2-inch maximum opening in pattern and weighing a minimum of 0.4 lb/ft.; remaining flexible from minus 60 to plus 200 deg F; minimum tensile yield strength of 2000 psi and ultimate tensile strength of 2680 psi; secured with plastic bands or galvanized-steel or stainless-steel wire ties
    2. Posts: tubular or T-shape galvanized-steel posts full height of fencing and embedded 36 inches minimum into subgrade .

3.22 BUILDING ENCLOSURES

A. Temporary Building Enclosures: Provide temporary building enclosures for protection of construction, in progress and completed, from weather exposure, water leakage, other similar events.

1. Thermal Enclosures: Where heating or cooling is needed and permanent enclosure is not complete, provide insulated temporary enclosures.
2. Coordinate enclosure with ventilating and material drying or curing requirements to avoid dangerous conditions and effects.
3. Vertical Openings: Close openings of 25 sq. ft. or less with plywood or similar materials.
4. Horizontal Openings: Close openings in floor or roof decks and horizontal surfaces with load-bearing, wood-framed construction.
5. Sheeting: Install enclosures using sheeting securely using non-combustible framing or fire-retardant-treated wood framing.

3.23 DUST AND NOISE PARTITIONS

A. Temporary Dust and Noise Partitions:
   1. For durations lasting ten (10) days or more, erect and maintain temporary dust and noise partitions where required to:
      a. Prevent dust, fumes, and odors from migrating.
      b. Limit noise transmission.
      c. Allow temporary ventilation to maintain required negative pressure in construction areas.
   2. Construction: dustproof with sealed joints (both sides) and perimeter and weather stripped openings. Seal perimeter with non-damaging removable sealant where abutting construction to remain.
   3. Size: floor to deck and wall to wall.
   4. Framing: 2x4 inch fire-retardant-treated wood or metal studs at 24 inch maximum spacing.
   5. Facing: 5/8-inch drywall (joints taped) on non-construction side, 1/2-inch fire-retardant-treated plywood (sealed joints) on construction side(s).
   6. Insulation: fully fill partition cavity with sound-deadening insulation.
   7. Door: Where access is required through partition, provide a wood framed 3/4" fire-retardant plywood door with pull handle, weather-stripping, and screen door type spring closer hinges.
      a. Dust Mats: provided both sides of door.

3.24 DUST CURTAINS

A. Dust Curtains:
   1. For durations lasting less than ten (10) days, erect and maintain temporary dust curtains where required to:
      a. Prevent dust, fumes, and odors from migrating.
      b. Limit noise transmission.
      c. Allow temporary ventilation to maintain required negative pressure in construction areas.
   2. Construction: dust resistant with sealed joints (both sides) and perimeter and weather stripped openings. Seal perimeter with non-damaging removable sealant where abutting construction to remain.
   3. Size: floor to deck and wall to wall.
   4. Framing: 2x4 inch fire-retardant-treated wood or metal studs at 48 inch maximum spacing.

5. Facing: sheeting both sides adhered to framing (not nailed or stapled) with sealant.
6. Door: Where access is required through partition, provide a wood framed 3/4" fire-retardant plywood door with pull handle, weather-stripping, and screen door type spring closer hinges.
   a. Dust Mats: provided both sides of door.
7. disturbed during removal.

3.25 ENVIRONMENTAL CONTROLS

A. Temporary Environmental Controls: Provide protection, operate temporary facilities, and conduct construction in ways and by methods that comply with environmental regulations and that minimize possible air, waterway, and subsoil contamination or pollution or other undesirable effects.
   1. Particulates Control: Maintain excavations, stockpiles, roads, parking areas and other work areas free from particulates which would cause air pollution regulatory standards to be exceeded or which would cause a hazard or a nuisance.
      a. Dust Suppression: Use mulch, water sprinkling, temporary enclosures, and other appropriate methods to limit dust and dirt rising and scattering in air to lowest practical level. Do not use water when it may create hazardous or other adverse conditions such as flooding and pollution. Provide particulates control treatment that is nonpolluting and non-tracking, and preferably bio-based (http://www.catalog.biopreferred.gov/bioPreferredCatalog/faces/jsp/catalogLanding.jsp). Apply treatment as required to minimize dust and to prevent visible airborne dust from migrating off site due to low humidity, wind, or other factors.
   2. Vehicles: Avoid airborne, solid, or liquid spillage vehicles by covering and securing loads when hauling on or adjacent to public streets or highways. Lawfully remove spillage and sweep, wash, or otherwise clean project site, streets, or highways.
      a. Provide and maintain effective methods to prevent mud and soil from being tracked by vehicles leaving the site onto public streets or highways. Methods may include washing vehicles or providing open metal grating to loosen and capture debris.
   3. Oily substances: Prevent oily or other hazardous substances from entering the ground, drainage areas, or local bodies of water.
      a. Store and service construction equipment at areas designated for and capable of collection of oil wastes.
   4. VOC: Store volatile liquids, including fuels and solvents, in closed containers.
   5. Equipment emissions: Properly maintain construction equipment to reduce gaseous pollutant emissions.
   6. Fish and Wildlife Resources: Manage and control construction activities to minimize interference with, disturbance of, and damage to fish and wildlife.
      a. Do not disturb fish and wildlife.
      b. Do not alter water flows or otherwise significantly disturb the native habitat related to the Project, except as explicitly indicated.
      c. Identify and conserve wildlife corridors (if any) that intersect the site.

3.26 SHORING

A. Temporary Shoring: Provide and maintain interior and exterior temporary shoring, bracing, or structural support to preserve stability and prevent movement, settlement, or collapse of construction. Unless otherwise indicated, design of adequate shoring systems is Contractor's responsibility.

3.27 FIRE PROTECTION

A. Temporary Fire Protection: Until fire-protection needs are supplied by permanent facilities, install and maintain temporary fire-protection facilities of types needed to protect against reasonably predictable and controllable fire losses. Comply with NFPA 241.
   1. Fire Extinguishers: Provide hand carried UL rated Class ABC dry chemical fire extinguishers and size as required by location and class of fire exposure per NFPA 10 and NFPA 241.
      a. Location: Install fire extinguishers on walls on mounting brackets, where convenient and effective for their intended purpose. Provide not less than two extinguishers on each floor at or near each usable stairwell, one in each field office, one in each storage or fabrication shed.
   2. Fire Safety:
      a. Store combustible materials in containers in fire-safe locations.
      b. Maintain unobstructed access to fire extinguishers, fire hydrants, temporary fire protection facilities, stairways, and other access routes for firefighting.
      c. Prohibit smoking in hazardous fire exposure areas.
      d. Supervise welding operations, combustion-type temporary heating units, and similar sources of fire ignition.
         1) After completion of heat generating construction operations including soldering, welding, and cutting, maintain a fire watch for a minimum of 60 minutes.
      e. Develop and supervise an overall fire prevention and fire protection program for personnel at Project site. Review needs with local fire department and establish procedures to be followed. Instruct personnel in methods and procedures. Post warnings and information.
   3. Fire Safety in Renovated Areas:
      a. Comply with precautions for renovation of NFPA 900 Standard for the Protection of Cultural Resources Including Museums, Libraries, Places of Worship, and Historic Properties.
      b. Test fire alarm system before commencement of construction and every seven (7) days.

3.28 DIRECTIONAL SIGNS

A. Unauthorized Signs: Do not permit installation of unauthorized signs.

B. Temporary Directional Signs: Provide signs as necessary to provide directional information to construction personnel and persons seeking entrance to and orientation on Project. Maintain and touchup signs so they are legible at all times.

3.29 PROJECT IDENTIFICATION SIGN

A. Project Identification Sign: Provide one project identification sign. Engage an experienced sign painter to apply graphics and lettering to one side of sign as prescribed by Architect. Shop paint sign panel and applied graphics with exterior-grade alkyd semi-gloss enamel over exterior primer. Maintain and touchup sign so it is legible at all times.
   1. Project Identification Sign Size: 8' x 4'.
   2. Project Identification Sign Construction: 3/4" thickness exterior grade plywood, aluminum faced polymer core composite, or waterproof solid plastic composite, at Contractor's option.
   3. Locate on site as directed by Architect.
   4. Comply with details indicated and with contents as follows:
      a. Complete Project name
      b. Owner's name and logo
      c. Architect's name and logo
      d. Contractor's name and logo
   5. Support sign with bottom 6'-0" above grade on posts or framing of wood or steel and with exposed fasteners.
   6. Owner reserves right to take possession of project identification sign, otherwise project identification sign remains the property of Contractor.

END OF SECTION 015000

SECTION 016000 - PRODUCT REQUIREMENTS

PART 1 - GENERAL

1.01 SECTION INCLUDS

- A. Owner Furnished Products
- B. Delivery, Storage, and Handling
- C. Product Requirements
  1. Source Limitations
  2. New Products
  3. Complete Products
  4. Sample Matching
  5. Finish Selection
  6. Availability Requirements
  7. Descriptive Requirements
  8. Performance Requirements
  9. Requirements Indicated Elsewhere
     - a. Warranty Requirements
     - b. Standards Requirements
     - c. Allowance Requirements
  10. Proprietary Requirements
      - a. Closed Proprietary Requirements
      - b. Equal Proprietary Requirements
      - c. Comparable Proprietary Requirements
        1) Request Procedures
        2) Evaluation Criteria
  11. Sample Matching
  12. Finish Selection
      - a. Standard Range
      - b. Full Range
      - c. Custom Range
  13. Adhesives and Sealants Requirements
  14. Coatings Requirements

1.02 RELATED REQUIREMENTS

- A. Allowances
  1. Allowance Requirements
- B. Substitution Procedures
- C. Submittal Procedures
  1. Product Submittals
     - a. Product Data
- D. Quality Requirements
  1. Warranty Requirements
- E. References
  1. Standards
- F. Individual Specification Sections
  1. Owner Furnished Products

2. Delivery, Storage, and Handling
3. Product Requirements

1.03 DEFINITIONS

A. Product: Materials, components, systems and construction assemblies required by the Contract Documents for incorporation into the Work or forming the Work results or both, whether purchased for Project or taken from previously purchased stock.
   1. New Products: Items that have not previously been incorporated into another project or facility. Products salvaged or recycled from other projects are not considered new products.

B. Available: Unless otherwise indicated, when used to refer to products, manufacturers, suppliers, or installers “available” designates that the identified products or entities are not required by the Contract Documents to be used in performance of the Work. Subject to compliance with requirements of the Contract Documents, the Contractor may use the indentified products or entities. As such, identifying such products or entities is available information for the Contractor’s convenience and does not indicate that the entity so identified is approved or complies with the requirements of the Contract Documents.

C. Proprietary Requirements Definitions:
   1. Named Manufacturers: designation in the Contract Documents of a specific manufacturer, source or supplier by legal or customarily accepted designation, unless accompanied by the term “available”. If named manufacturer designation is not current, named manufacturer shall be the legal successor performing the same business activity as determined by the Architect. Identification of a named manufacturer does not indicate that the entity so identified is approved or complies with the requirements of the Contract Documents.
   2. Named Products: designation in the Contract Documents of a specific product by manufacturer's identification, label, model, product line, or number, unless accompanied by the term “available”. Identification of a named product does not indicate that the entity so identified is approved or complies with the requirements of the Contract Documents.
   3. Proprietary Requirements: The designation of a named manufacturer or named product or both requires closed, equal or comparable proprietary requirements indicated. If it is not clear which proprietary requirement is applicable, request interpretation from Architect.
   4. Closed Proprietary Requirements: Other than the heading “PRODUCTS” of Part 2 of individual Specification Sections, closed proprietary requirements are indicated by the text "(closed) product", "(closed) manufacturer", “(closed) source”, “(closed) fabricator”, or “(closed) supplier” where no modifiers for comparable or equal proprietary requirements are included.
      a. Equal Proprietary Requirements: Equal proprietary requirements are indicated by the text "or (approved) equal", “(approved) equal product”, "product options”, “equivalent” or “(approved) equal manufacturer”. All equal proprietary requirements shall be considered closed proprietary requirements for the purpose of this Contract

5. Comparable Proprietary Requirements: Comparable proprietary requirements are indicated by the text "or (approved) comparable", "(approved) comparable product", "(approved) comparable manufacturer" or "basis-of-design".

D. Recycled Content: Post-consumer Recycled Content or Pre-consumer Recycled Content as defined by ISO 14021.
   1. Post-consumer Recycled Content: waste material generated by households or by commercial, industrial, and institutional facilities in their role as end users of the product, which can no longer be used for its intended purpose.
   2. Pre-consumer Recycled Content: material diverted from the waste stream during the manufacturing process. Excluded is reutilization of materials such as rework, regrind, or scrap generated in a process and capable of being reclaimed within the same process that generated it.

E. Certified Wood: materials 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" (www.fscus.org).

F. Wood-containing Products: Wood-containing products are products or component of products made of solid wood, wood chip, wood fiber.

G. Composite Wood Products or Composite Agrifiber Products: particleboard, medium density fiberboard, wheatboard, plywood, strawboard, panel substrates and door cores.
   1. Materials considered fit-out, furniture, and equipment are not included.

1.04 ADMINISTRATIVE REQUIREMENTS

A. Scheduling Lead Time: As soon as practical after commencement of the Work, but at no time later than a time which would delay the Work, inquire of manufacturers and suppliers for time necessary to furnish required products. Schedule adequate time to perform coordination, submittal, ordering, manufacturing, fabrication, delivery, installation, and other related Work. Product selection will not be limited as a result of Contractor's failure to timely perform activities necessary to furnish products. Contract Time will not be extended as a result of Contractor's failure to timely perform activities necessary to furnish products.

1.05 SUBMITTALS

A. Comparable Product Request: number and procedures as required for Product Submittals indicated elsewhere.

1.06 QUALITY ASSURANCE

A. Source Limitations:
   1. Unless otherwise indicated, furnish the following products or materials from a single source, a single supplier, a single fabricator (if any), and a single manufacturer:
      a. Products or materials with identical and no differing requirements.

b. Products with requirements which differ only in one or more of the following:
   1) color
   2) pattern
   3) texture
   4) size
   5) thickness
   6) profile

c. Each individual item listed in source limitations requirements in individual Specification Sections. Where an item description encompasses more than one product or type of product, furnish all products matching item description through a single source, supplier, fabricator, and manufacturer.

2. Without negating requirements, to the extent reasonably feasible, furnish products with similar requirements or indicated in the same individual Specification Section from a single source, a single supplier, a single fabricator (if any), and a single manufacturer.

1.07 DELIVERY, STORAGE, AND HANDLING

A. General: Deliver, store, and handle products using means and methods that will prevent damage, introduction of moisture, deterioration, and loss, including theft. Comply with manufacturer's instructions and recommendations. Obtain and comply with material safety data sheets.

B. Delivery
   1. Damage: Deliver products and materials to Site in undamaged condition.
   2. Scheduling:
      a. Schedule deliveries to minimize space and time requirements for storage of materials and equipment at Project site and to prevent overcrowding of construction spaces.
      b. Coordinate delivery with installation time to minimize holding time for items that are flammable, hazardous, easily damaged, or sensitive to deterioration, theft, and other losses.
   3. Packaging: Deliver products to Project site in an undamaged condition in manufacturer's original sealed container or other packaging system, complete with labels and instructions for handling, storing, unpacking, protecting, and installing.
   4. Inspection: Inspect products on delivery to ensure compliance with the Contract Documents and to ensure that products are undamaged and properly protected.

C. Storage:
   1. Inspection: Store products to allow for inspection and measurement of quantity or counting of units.
   2. Structural Loading: Store materials in a manner that will not endanger building structures.
   3. Weather Protection: Store products that are subject to damage by the elements under cover, in a weathertight enclosure, above ground, with ventilation adequate to prevent condensation.

4. Storage Conditions: Comply with product manufacturer's written instructions for temperature, humidity, ventilation, and weather-protection requirements for storage.
5. Protection: Protect products from damage including surface contamination, aging, corrosion, damaging temperatures and humidity, soiling, condensation, dirt, debris, stains, abrasion, and construction traffic.
6. Finishes: Protect prefinished products, products with factory finishes and surfaces subject to damage with removable temporary covers adequate to protect surfaces from damage.
7. Wood: Store wood materials stacked with spacers to provide air circulation around stacks and under coverings.
8. Foam Plastic: Protect foam plastic from exposure to sunlight, except to extent necessary for period of installation and concealment.
9. Liquids: Deliver liquid materials in original containers with seals unbroken, labeled with manufacturer's name, product brand name and type, date of manufacture, shelf life, and directions for storing and mixing with other components. Store liquid materials in their original undamaged containers in a clean, dry, protected location and within the temperature and humidity range required by manufacturer and protected from freezing.
10. Volatile Materials: Close and seal tightly all partly used containers of volatile, corrosive, or flammable materials including sealant and adhesive and store protected in well ventilated fire-safe area at moderate temperature.
11. Shelf Life: Use materials with limited shelf life within period indicated. Remove and replace materials that cannot be installed within stated shelf life.
12. Sunlight: Protect stored materials subject to damage by ultraviolet radiation from direct sunlight.
13. Combustible Materials: Protect flammable and combustible materials against heat sources and ignition at all times.
14. Powders and Cementitious Materials: Store powdered and cementitious materials off the ground, on elevated platforms, under cover, and in a dry enclosed location under permanent or temporary but substantial roof construction. Remove and furnish new materials that have become damp. Protect granular materials from erosion and contamination by foreign materials.
15. Fabrics: Protect fabric materials from dust, tearing and puncture
16. Heavy Materials: Use sling to handle heavy objects subject to surface damage. If size requires, handle heavy objects by crane or lift. Lift objects only at designated lifting or supporting locations.
17. Porous or Absorptive Materials: Prevent moisture contamination of porous and absorptive materials. Dispose of porous and absorptive materials which become wet as construction waste.
18. Metals: Store metal items, to prevent corrosion and accumulation of dirt or oil.
19. Moisture: Dispose of materials which become contaminated by mold or are irreparably damaged by moisture as construction waste.

D. Handling: Handle products in a manner to prevent bending, warping, twisting, deformation, sagging, and surface damage.

PART 2 - PRODUCTS

2.01 OWNER FURNISHED PRODUCTS

A. Owner Furnished Products Schedule: Unless otherwise indicated, the Contactor shall install items which are indicated to be Owner furnished in individual specification Sections, on the Drawings or elsewhere.

B. Owner Furnished Product Requirements: Where items are indicated to be furnished by Owner:
   1. Contractor shall provide support systems to receive Owner-furnished items including plumbing, mechanical, and electrical connections.
   2. Owner will arrange for and deliver Shop Drawings and Product Data to Contractor.
   3. Owner will arrange and pay for delivery of Owner-furnished items according to Contractor's Construction Schedule.
   4. After delivery, Owner will inspect delivered items for damage. Contractor shall be present for and assist in Owner's inspection.
   5. If Owner-furnished items are damaged, defective, or missing, Owner will arrange for replacement.
   6. Owner will arrange for manufacturer's service representative and for delivery of manufacturer's warranties to Contractor.
   7. Owner will furnish Contractor the earliest possible delivery date for Owner-furnished products. Using Owner-furnished earliest possible delivery dates, Contractor shall designate delivery dates of Owner-furnished items in Contractor's Construction Schedule.
   8. Contractor shall review Shop Drawings and Product Data and return them to Architect noting discrepancies or anticipated problems in use of product.
   9. Contractor is responsible for receiving, unloading, and handling Owner-furnished items at Project site.
   10. Contractor is responsible for protecting Owner-furnished items from damage during storage and handling, including damage from exposure to the elements.
   11. If Owner-furnished items are damaged as a result of Contractor's operations, Contractor shall correct them.
   12. Contractor is responsible for incorporating Owner supplied submittals as corrected as Record Documents.
   13. Contractor shall prepare operation and maintenance manual and provide demonstration and training as required elsewhere.

2.02 PRODUCT REQUIREMENTS

A. Approved Products: Do not incorporate products into the Work unless such products have been approved through the Product Submittal process or are explicitly required by the Contract Documents. For this purpose, products which are required by reference to other documents are not considered explicitly required by the Contract Documents. Obtain approval for products which are required by reference to other documents and are not explicitly required by the Contract Documents.

B. Compatibility of Options: If Contractor is given option of selecting between two or more products for use on Project, product selected shall be compatible with products previously selected, even if previously selected products were also options.

C. Product Preferences: At Contractor's option, and where various products are available for Contractor's selection, select products for use which have the following characteristics where applicable:
   1. low-emitting, low-volatility, low-odor
   2. recyclable, reusable
   3. low-polluting, low-toxicity

D. Hazardous Materials: Do no knowingly use products in the performance of the Work which contains asbestos, polychlorinated biphenyl (PCB), or other recognized hazardous material.

E. Complete Products: Unless otherwise indicated, provide products that are complete with accessories, trim, finish, fasteners, and other items needed for a complete installation and indicated use and effect.

F. New Products: Unless otherwise indicated, provide undamaged and unused products that have not been previously incorporated into another project or facility, and have not been salvaged or reused, except that product consisting of recycled-content materials are allowed, unless explicitly stated otherwise.

G. Conflicting Requirements: Where a conflict or overlap exists between two or more product or other requirements, comply with correlation and intent of the contract documents requirements of the Conditions of the Contract.

H. Descriptive Requirements: Where requirements describe exact characteristics of a product, with or without named product or manufacturer, provide a product that provides the characteristics and otherwise complies with requirements.

I. Performance Requirements: Where performance or design requirements are indicated, provide a product that complies with these and other requirements and are recommended by the manufacturer or fabricator for the application indicated. General overall performance of a product is implied where the product is indicated for a specific application. Manufacturer's recommendations may be contained in published product literature, or by the manufacturer's certification of performance.

J. Referenced Requirements: Where compliance with a code, standard or regulation is required, provide a product that complies with the standards, codes or regulations and other requirements indicated elsewhere.

K. Warranty Requirements: Where warranties are required, provide a product compiling with warranty requirements indicated elsewhere. Limit selections to products with warranties not in conflict with requirements of the Contract Documents.

L. Allowances: Refer to Allowance requirements indicated elsewhere that control product selection and for procedures required for processing such selections.

M. Proprietary Requirements: Comply with the following for named products and named manufacturers:
   1. Multiple Named Products and Manufacturers: Where Contract Documents name multiple products or manufacturers, Contractor shall select one of the multiple products or manufacturers and comply with requirements for named product or manufacturer.
   2. Named Manufacturers: If named manufacturer designation is not current, named manufacturer shall be the legal successor performing the same business activity as determined by the Architect. Identification of a named manufacturer does not indicate that the entity so identified is approved or complies with the requirements of the Contract Documents.
   3. Named Products: If named product designation is not current, named product shall be the updated designation of the same product unless product qualities are not identical as determined by the Architect. Identification of a named manufacturer does not indicate that the entity so identified is approved or complies with the requirements of the Contract Documents.
   4. Compliance with Other Requirements: Use in the Work of a named product or a product produced by a named manufacturer is subject to compliance with other requirements of the Contract Documents. The naming of a product or manufacturer does not change or diminish the Contractor's obligations to perform the Work in compliance with the Contract Documents.
   5. Proprietary Requirements: Where Contract Documents name a product or manufacturer, comply with one of the following applicable requirements.
      a. Closed Proprietary Requirements: The intent of the Contract Documents is to provide either the named product or product by the named manufacturer. Substitutions or comparable products will not be considered or permitted. Subject to compliance with requirements, provide products as follows:
         1) (Closed) Product: Where a product is named, provide the named product. No product substitutions or comparable products will be permitted.
         2) (Closed) Manufacturer: Where a manufacturer is named, provide a product produced by the named manufacturer. No product substitutions or comparable products will be permitted.
      b. Equal Proprietary Requirements: the same as closed proprietary requirements above.
      c. Comparable Proprietary Requirements: The intent of the Contract Documents is to provide either the named product, product produced by the named manufacturer or another approved comparable product. A Comparable product is approved through the Product Submittal process and is not a Substitution if there is no change in the intent of the Contract Documents. Subject to compliance with requirements, provide products as follows:
         1) Comparable Product: Where a product is named, provide the named product or comply with the Comparable Products Article in Part 3 to obtain approval for use of an unnamed product.
         2) Comparable Manufacturer: Where a manufacturer is named, provide a product produced by the named manufacturer or comply with the Comparable Products Article in Part 3 to obtain approval for use of an unnamed product by an unnamed manufacturer.
         3) Comparable Product, Closed Manufacturer: Where a product is named accompanied with another named closed manufacturer,

provide either the named product or comply with the Comparable Products Article in Part 3 to obtain approval for use of an unnamed product by the other named closed manufacturer. No product substitutions or comparable manufacturers will be permitted for the named closed manufacturer.

N. Sample Matching: Where required to match an indicated Sample, provide a product that complies with requirements and manifests no apparent difference in material type, cut, form, detail, color, grain, texture, or finish with Sample. Sample shall be Architect's sample unless otherwise indicated. Architect's decision will be final on whether a proposed product matches satisfactorily.
   1. If no product available within specified category matches satisfactorily and complies with other specified requirements, comply with Substitutions requirements of substitution procedures General Requirements for selection of a matching product.
   2. Contractor's failure to schedule adequate time for ordering, fabrication and delivery shall not restrict the product requirements.

O. Finish Selection: Where selection of product colors, patterns, textures, other finishes or options is required, provide a product that complies with other requirements and the following:
   1. Standard Range: Where no term indicated below or the term "standard" or "basic" is used in conjunction with range of options, selection will be from manufacturer's standard product options that are commonly available with no additional cost or time.
   2. Full Range: Where the term "full", "premium" or "complete" is used in conjunction with range of options, selection will be from manufacturer's full product options that include both standard range and those commonly available with additional cost or time.
   3. Custom Range: Where the term "custom" or "special" is used in conjunction with range of options, selection will be from manufacturer's custom product options that include standard range, full range and options which require special fabrication including custom color mixing and matching, custom pattern application or custom texturing.
   4. Selection will be by Architect unless otherwise indicated.

2.03 ADHESIVES AND SEALANTS REQUIREMENTS

A. Adhesives and Sealants Requirements: For onsite applications that are inside the weatherproofing system, use adhesives and sealants that comply with the following limits for VOC content when calculated according to 40 CFR 59, Subpart D (EPA Method 24):
   1. Wood Glues: 30 g/L.
   2. Metal-to-Metal Adhesives: 30 g/L.
   3. Adhesives for Porous Materials (Except Wood): 50 g/L.
   4. Subfloor Adhesives: 50 g/L.
   5. Plastic Foam Adhesives: 50 g/L.
   6. Carpet Adhesives: 50 g/L.
   7. Carpet Pad Adhesives: 50 g/L.
   8. VCT and Asphalt Tile Adhesives: 50 g/L.

9. Cove Base Adhesives: 50 g/L.
10. Gypsum Board and Panel Adhesives: 50 g/L.
11. Rubber Floor Adhesives: 60 g/L.
12. Ceramic Tile Adhesives: 65 g/L.
13. Multipurpose Construction Adhesives: 70 g/L.
14. Fiberglass Adhesives: 80 g/L.
15. Contact Adhesive: 80 g/L.
16. Structural Glazing Adhesives: 100 g/L.
17. Wood Flooring Adhesive: 100 g/L.
18. Structural Wood Member Adhesive: 140 g/L.
19. Single-Ply Roof Membrane Adhesive: 250 g/L.
20. Special-Purpose Contact Adhesive (contact adhesive that is used to bond melamine-covered board, metal, unsupported vinyl, rubber, or wood veneer 1/16 inch or less in thickness to any surface): 250 g/L.
21. Top and Trim Adhesive: 250 g/L.
22. Plastic Cement Welding Compounds: 250 g/L.
23. ABS Welding Compounds: 325 g/L.
24. CPVC Welding Compounds: 490 g/L.
25. PVC Welding Compounds: 510 g/L.
26. Adhesive Primer for Plastic: 550 g/L.
27. Sheet-Applied Rubber Lining Adhesive: 850 g/L.
28. Aerosol Adhesive, General-Purpose Mist Spray: 65 percent by weight.
29. Aerosol Adhesive, General-Purpose Web Spray: 55 percent by weight.
30. Special-Purpose Aerosol Adhesive (All Types): 70 percent by weight.
31. Other Adhesives: 250 g/L.
32. Architectural Sealants: 250 g/L.
33. Nonmembrane Roof Sealants: 300 g/L.
34. Single-Ply Roof Membrane Sealants: 450 g/L.
35. Other Sealants: 420 g/L.
36. Sealant Primers for Nonporous Substrates: 250 g/L.
37. Sealant Primers for Porous Substrates: 775 g/L.
38. Modified Bituminous Sealant Primers: 500 g/L.
39. Other Sealant Primers: 750 g/L.

2.04 COATINGS REQUIREMENTS

A. Coatings Requirements: For onsite applications that are inside the weatherproofing system, use coatings that comply with the following limits for VOC content when calculated according to 40 CFR 59, Subpart D (EPA Method 24):
1. Flat Paints and Coatings: VOC not more than 50 g/L.
2. Nonflat Paints and Coatings: VOC not more than 150 g/L.
3. Dry-Fog Coatings: VOC not more than 400 g/L.
4. Primers, Sealers, and Undercoaters: VOC not more than 200 g/L.
5. Anticorrosive and Antirust Paints Applied to Ferrous Metals: VOC not more than 250 g/L.
6. Zinc-Rich Industrial Maintenance Primers: VOC not more than 340 g/L.
7. Pretreatment Wash Primers: VOC not more than 420 g/L.
8. Clear Wood Finishes, Varnishes: VOC not more than 350 g/L.
9. Clear Wood Finishes, Lacquers: VOC not more than 550 g/L.
10. Floor Coatings: VOC not more than 100 g/L.

11. Shellacs, Clear: VOC not more than 730 g/L.
12. Shellacs, Pigmented: VOC not more than 550 g/L.
13. Stains: VOC not more than 250 g/L.

PART 3 - EXECUTION

3.01 COMPARABLE PRODUCTS

A. Comparable Product Requests: Submit comparable product requests as follows:
   1. Named Manufacturer(s): Where a comparable proprietary requirement indicates named manufacturer(s) without indicating a named product, Contractor shall select a product by (one of) the named manufacturer(s) which complies with other requirements. This product will be considered to be the named product for comparable product evaluation purposes.
   2. Submittal Procedures: Comply with procedures and information required for Product Submittals indicated elsewhere.
   3. Qualities: Include comparison of qualities of unnamed product with qualities required by the Contract Documents (such as warranty coverage, descriptive requirements, performance requirements, and standards compliance). When requested or necessary to evidence qualities, provide Product Data, Certifications, Sample Warranties, Qualification Statements or Samples.
   4. Past Experience: When requested, include list of similar installations for completed projects with project names and location and names and contact information of responsible design professional and owners.
   5. Certification: Include Contractor's certification that unnamed product:
      a. complies with requirements in the Contract Documents,
      b. is appropriate for applications indicated,
      c. has received necessary approvals of authorities having jurisdiction,
      d. is compatible with other portions of the Project, and
      e. has been coordinated with other portions of the Project.

B. Conditions: Architect will consider Contractor's comparable product request when the request complies with requirements for comparable product requests and the use of unnamed product:
   1. complies with the requirements and intent of the Contract Documents,
   2. will produce indicated results,
   3. will not adversely affect Contractor's Construction Schedule or Contract Time, and
   4. will not affect Contract Sum.

C. Reasons: Comparable product request may only be submitted when permitted by comparable proprietary requirements.

D. Criteria: The criteria for evaluating approval of a proposed comparable product are the following:
   1. The explicit or referential requirements of the Contract Documents.
   2. The compatibility of the proposed product with the Project.
   3. The comparable similarity of the proposed product with the named product. Comparable similarity is established as follows.

a. Restricted Selection: Where selection of proposed product is limited by requirements, including an accompanying list of manufacturers, comparable similarity is established if, among the range of selection, the proposed product is most similar to the named comparable product.
b. Unrestricted Selection: Where selection of proposed product is not limited by requirements, comparable similarity is established if the proposed product resembles the named product or product of named manufacturer.

E. Approval: Comparable product requests will be processed compliant with Product Submittals requirements indicated elsewhere.

END OF SECTION 016000

SECTION 017300 – EXECUTION REQUIREMENTS

PART 1 - GENERAL

1.01 SECTION INCLUDES

- A. Site Conditions
  - 1. Ambient Conditions
  - 2. Field Measurements
  - 3. Existing Conditions
    - a. Utilities
- B. Cleaning Supplies
  - 1. Cleaning Agents
  - 2. Floor Polish
- C. Examination
  - 1. Acceptance of Conditions
- D. Preparation
  - 1. Preparatory Cleaning
  - 2. Preparatory Protection
- E. Field Engineering
- F. Construction Layout
- G. Installation
  - 1. Manufacturer’s Instructions and Recommendations
  - 2. Tolerances
  - 3. Attachment
- H. Cutting and Patching
- I. Progress Cleaning
- J. Construction Waste
  - 1. Construction Waste Practices
- K. Site Quality Control
  - 1. Installer’s site reports
  - 2. Manufacturer's site reports
- L. Construction Indoor Air Quality (IAQ) Management
  - 1. Construction IAQ Requirements
  - 2. Occupancy IAQ Requirements
  - 3. Construction IAQ Management Plan
- M. System Startup
- N. Adjusting
- O. Protection
- P. Maintenance
- Q. Final Cleaning
  - 1. Extent
  - 2. Methods
- R. Correction
  - 1. Restoration
  - 2. Repair
  - 3. Replacement

1.02 RELATED REQUIREMENT

A. Quality Requirements
   1. Qualifications
      a. Installer
      b. Manufacturers Service Representative
B. References
   1. Definitions
      a. Finished Spaces, Finished Areas, Unfinished Spaces, Unfinished Areas
C. Temporary Facilities and Controls
   1. Utilities for Interruptions
   2. Controls for Safe Egress
   3. Permanent air handling systems use during construction
   4. Temporary Barriers
      a. Building Enclosure
      b. Dust and Noise Partitions
      c. Dust Curtain
D. Product Requirements
   1. Delivery, Storage, and Handling
E. Renovation Work
   1. Patching Requirements for Existing Construction
   2. Waste Management for Removed Materials
F. Closeout Procedures
   1. Record Documents
G. Individual Specification Sections
   1. Site Conditions
   2. Execution Requirements
   3. Moisture Testing
H. HVAC
   1. Air Filters

1.03 DEFINITIONS

A. Manufacturer's Instructions and Recommendations: When referring to manufacturer's information, "instructions" are manufacturer's written documentation of procedures for installing or operating a product or equipment published prior to or as part of approval of product for incorporation into the Work. When referring to manufacturer's information, "recommendations" are manufacturer's or manufacturer's authorized representative's verbal or written information regarding procedures, guidelines, suggestions and advice for installing or operating a product.

B. Cutting: Removal of existing construction or in-place Work necessary to permit installation or performance of other Work.

C. Patching: Fitting and repair work required to restore surfaces to original conditions after installation of other Work.

D. Construction Waste: Except for clean water, construction waste is liquid or solid waste generated at the Project Site in the performance of the Work.
   1. Waste is foreign or excess matter or matter that has reached the end of its useful life in its intended use in the performance of the Work.

2. Construction waste includes: excavated soil and land-clearing debris, cut-off or surplus building materials, packaging, unserviceable construction aids, rubbish, trash, debris, dust, dirt, and rubble resulting from demolition, construction, cutting and patching, renovation, correction and repair operations. Construction waste also includes personal waste generated by workers and visitors at the Site such as newspapers, food containers, and litter.

E. Diverted Waste: construction waste which is not disposed in a landfill nor incinerated AND is recycled or reused as follows:
   1. Recycle: To lawfully remove construction waste from the Project site for processing into a new material for use by others.
   2. Reuse: To lawfully reuse construction waste in some manner on site as permitted by the Contract Documents or off site.

F. Finished Spaces, Finished Areas, Unfinished Spaces, Unfinished Areas: as defined elsewhere.

G. Replace: remove, cut and patch construction and provide new replacement Work.

H. Remove: detach from construction and legally dispose of off-site, unless indicated to be removed and salvaged or removed and reinstalled.

1.04 QUALITY ASSURANCE

A. Waste Management Coordinator Qualifications: Qualified; Experienced three (3) projects, two (2) years; with a record of successful waste management coordination of projects with similar requirements; Employee of or Subcontractor to the Contractor.

B. Hazardous Methods: Do not knowingly use tools, equipment, cleaning procedure or other methods in the performance of the Work which use asbestos, polychlorinated biphenyl (PCB), or other recognized hazardous material.

C. Warranty Requirements: Where warranties are required install, execute and otherwise perform the Work to ensure validity of warranty requirements indicated elsewhere.

1.05 SITE CONDITIONS

A. Ambient Conditions: Unless otherwise indicated or approved by Architect, ensure the following environmental conditions:
   1. Manufacturer's Instructions: Comply with manufacturer's written instructions for substrate temperature and moisture content, ambient temperature and humidity, forecasted weather conditions, ventilation, and other project conditions.
      a. Maintain ambient conditions including temperature, humidity, and ventilation within limits recommended by manufacturer for optimum results. Do not install products under environmental conditions outside manufacturer's absolute limits.
   2. Liquid or Toweled Materials: Proceed with application of liquid or toweled materials only under the following conditions:
      a. Relative humidity is less than 85 percent.

b. Ambient temperatures are more than 5 degrees Fahrenheit above dew point.
c. Ambient temperature is between 40 and 90 degrees Fahrenheit.
d. Substrates are cured, dry and unfrozen.
e. Windy condition do not exists that may cause materials to be blown onto surfaces not intended to be coated.
f. Ventilation is maintained during application and curing of by natural means or, where this is inadequate, forced-air circulation.
g. Ambient conditions are maintained as required for interior products installed after permanent or temporary building enclosure below.

3. Interior Products Installed after Permanent or Temporary Building Enclosure: Maintain relative humidity planned for building occupants and an ambient temperature between 40 and 90 degrees Fahrenheit in spaces in which a product is to be installed for at least 3 days before installation, during installation, and for at least 3 days after installation. After installation and until Substantial Completion, maintain relative humidity and ambient temperature planned for building occupants but not less than 60 degrees Fahrenheit.
4. Weather Conditions: Do not apply materials in snow, rain, fog, or mist, or when such weather conditions are imminent during the installation and curing period (if any).

B. Finish Work: Do install interior finish Work until building is enclosed and weatherproof, wet work in space is completed and nominally dry and a lighting level of not less than 15 foot-candles is provided on the surfaces to receive interior finish Work.

C. Conditioning: For materials susceptible to detrimental dimensional changes due to changes in temperature or humidity, maintain relative humidity planned for building occupants and an ambient temperature between 60 and 80 degrees Fahrenheit for at least three days before installation, during installation, and remainder of construction period in interior spaces to receive materials. Store unpacked and opened materials to allow acclimatization. Do not install material until it adjusts to the relative humidity of and is at the same temperature as the space where it is to be installed.
1. Construction Packaged Dry Products Pre-ventilation: refer to Construction IAQ Management in Part 3 for pre-ventilation conditioning.

D. Site (Field) Measurements: Take site measurements as required to fit the Work properly. Recheck measurements before installing each product. Where portions of the Work are indicated to fit to other construction, verify dimensions of other construction by site measurements before fabrication. Where shop drawings are required for a product, indicate site measurements on shop drawings before fabrication. Coordinate fabrication schedule with construction progress to avoid delaying the Work. Notify Architect of installation conditions that vary from Drawings.

E. Existing Site Conditions: The existence and location of site improvements, underground and other utilities, and other construction indicated as existing are not guaranteed. Before beginning construction activities, investigate and verify the existence and location of underground utilities and other construction affecting the Work.
1. Utility Location: Before construction, verify the location, invert elevations and points of connection of utility services (if any).

2. Utility Information: Provide location data information necessary to adjust, move, or relocate existing utility structures, utility poles, lines, services, or other utility appurtenances located in or affected by construction. Furnish information to utilities serving Project Site and other entities to perform such work. Coordinate with utility entities and authorities having jurisdiction.

F. Service Interruptions: Do not interrupt utilities or services serving occupied facilities, weather occupied by Owner or others, unless the following conditions have been satisfied.
1. Notify Owner and other occupants affected by interruption not less than three (3) days in advance of proposed interruptions.
2. Do not proceed with service interruptions without permission of Owner and other occupants affected by interruption.
3. If service is anticipated to be interrupted, or in fact is interrupted, for more than three (3) days, provide temporary utilities and services according to requirements indicated elsewhere to restore service to occupied areas.
4. Where services provide a life safety function including fire protection, emergency notification or emergency lighting, do not proceed with service interruptions without permission of authorities having jurisdiction.

G. Public Ways: Do not obstruct or make unsafe streets, walks, exits, passages, doors, egress windows or other means of egress or public ways of occupied or used facilities, weather occupied by Owner or others, without permission from Owner, other occupants affected and authorities having jurisdiction. Provide alternate routes around obstructed public ways if required by regulations or authorities having jurisdiction.

H. Public Safety: Provide temporary barricades, warning signs, lights, covered walkways, walks, fences, railings, canopies and other forms of protection to ensure safety and protection of the public from injury due to construction operations.

PART 2 - PRODUCTS

2.01 CLEANING SUPPLIES

A. Cleaning Agents: Use cleaning agents recommended by manufacturer or fabricator of the surface to be cleaned which comply with requirements. Do not use cleaning agents that are potentially hazardous to health or property or that might damage finished surfaces.
1. VOC Content for Interior Applications: 100 g/L maximum / 40 CFR 59, Subpart D (EPA Method 24)

2. Use cleaning products that comply with Green Seal's GS-37, or if GS-37 is not applicable, use products that comply with the California Code of Regulations maximum allowable VOC levels or U.S. EPA Design for the Environment (DfE) label.
3. It is preferable, but not required, to use cleaning products with biobased content (www.biobased.oce.usda.gov)
4. Use natural cleaning materials where feasible. Natural cleaning materials include:

a. Abrasive Cleaners: substitute 1/2 lemon dipped in borax.
b. Ammonia: substitute vinegar, salt and water mixture, or baking soda and water.
c. Disinfectants: substitute 1/2 cup borax in gallon water.
d. Drain Cleaners: substitute 1/4 cup baking soda and 1/4 cup vinegar in boiling water.
e. Upholstery Cleaners: substitute dry cornstarch.

B. Floor Polish: Commercially available acrylic based product approved by flooring manufacturer and compatible with Owner's maintenance practices; 15% minimum solids; ASTM D 2047 dry slip resistance.
1. VOC Content for Interior Applications: 100 g/L maximum / 40 CFR 59, Subpart D (EPA Method 24)

2.02 PATCHING MATERIALS

A. Materials for New Construction: Where patching of construction installed as part of the Work is required, use materials complying with requirements for the Work.

PART 3 - EXECUTION

3.01 EXAMINATION

A. Acceptance of Conditions: Examine substrates, areas, and conditions, with installer or applicator present, for compliance with requirements, for dimensional, alignment, levelness, smoothness and other installation tolerances, for anchorage and bearing capacities, for presence of foreign substances, for moisture, porosity, and texture of substrate, and for other conditions affecting performance. Record observations.
1. Installer's Site Reports: If detrimental conditions, unacceptable tolerances or conditions which may affect other requirements including warranty, durability, longevity and performance requirements are encountered, prepare and submit installer's site report as required by Site Quality Control Article in this Part.
2. Verify compatibility with and suitability of substrates, including compatibility with in-place finishes or primers.
3. Examine roughing-in for mechanical and electrical systems to verify actual locations of connections before equipment and fixture installation.
4. Verify that anchorages, embedded or built in items, and other adjacent and integrated construction are properly sized, installed, located, and coordinated.
5. Proceed with installation only after unsatisfactory conditions have been corrected. Proceeding with the Work indicates acceptance of surfaces and conditions.

3.02 PREPARATION

A. Preparatory Cleaning: Clean Work area as well as substrates and surfaces to receive Work of dirt, dust, moisture, protrusions, textural defects and other foreign substances,

which may adversely affect performance of the Work including adhesion, longevity and durability. Prepare substrates according to manufacturer's recommendations.

B. Preparatory Protection: Protect in place-construction to remain and Work in progress, against damage during construction. Provide protective measures to ensure protection from damage or deterioration at Substantial Completion.

C. Site Protection: Protect existing site improvements, appurtenances, landscaping, trees and shrubs to remain to ensure they are not damaged from construction operations.

D. Space Requirements: Verify space requirements and dimensions of items shown diagrammatically on Drawings.

3.03 CONSTRUCTION LAYOUT

A. Verification: Before proceeding to lay out the Work, verify layout information shown on Drawings, in relation to the property survey and benchmarks. If discrepancies are discovered, notify Architect promptly.

B. General: Lay out the Work using accepted surveying practices.
   1. Establish benchmarks and control points to set lines and levels at each story of construction and elsewhere as needed to locate each element of Project.
   2. Establish dimensions within tolerances indicated. Do not scale Drawings to obtain required dimensions.
   3. Inform installers of lines and levels to which they must comply.
   4. Check the location, level and plumb, of every major element as the Work progresses.
   5. Notify Architect when deviations from required lines and levels exceed allowable tolerances.
   6. Close site surveys with an error of closure equal to or less than the standard established by authorities having jurisdiction.

C. Building Lines and Levels: Locate and lay out control lines and levels for structures, building foundations, column grids, and floor levels, including those required for mechanical and electrical work. Transfer survey markings and elevations for use with control lines and levels. Level foundations and piers from two or more locations.

3.04 INSTALLATION

A. General: Locate the Work and components of the Work accurately, in correct alignment and elevation, as indicated.
   1. Make vertical work plumb to within 1/4 inch in 10 feet unless otherwise indicated.
   2. Make horizontal work level to within 1/4 inch in 10 feet unless otherwise indicated.
   3. Where space is limited, install components to maximize space available for maintenance and ease of removal for replacement.
   4. Conceal pipes, ducts, and wiring in finished areas, unless otherwise indicated.
   5. Unless otherwise indicated, maintain minimum headroom clearance of 8 feet in spaces without a suspended ceiling.

B. Standards: Where compliance with a code, standard or regulation is required, install Work in compliance with the standards, codes or regulations and other requirements indicated.

C. Manufacturer's Instructions: Unless otherwise indicated, comply with manufacturer's written instructions and recommendations for installing products in applications indicated.
   1. Should manufacturers' instructions conflict with Contract Documents, request interpretation from Architect before proceeding.

D. Site Conditions: Install products at the time and under conditions that will ensure the best possible results. Maintain conditions required for product performance until Substantial Completion.

E. Structural Loading: Conduct construction operations so no part of the Work is subjected to damaging operations or loading in excess of that expected during normal conditions of occupancy.

F. Sequencing: Sequence the Work and allow adequate clearances to accommodate movement of construction items on site and placement in permanent locations.

G. Templates: Where indicated, where installation precision is to within ¼ inch, or as required to obtain results indicated, obtain and distribute to the parties involved templates to ensure accurate fit. Check Shop Drawings of other work to confirm that adequate provisions are made for locating and installing products to comply with indicated requirements.

H. Attachment: Provide blocking, attachment plates, anchors and fasteners of adequate size and number to secure each component in place, accurately located and aligned with other portions of the Work.
   1. Coordination: Coordinate installation of anchorages. Furnish setting drawings, templates, and directions for installing anchorages, including sleeves, concrete inserts, anchor bolts, and items with integral anchors, that are to be embedded in concrete or masonry. Deliver such items to Project site in time for installation.
   2. Where size and type of attachments are not indicated, verify size and type required for load conditions.
   3. Mounting Heights: Where mounting heights are not indicated, install individual components at standard mounting heights recognized within the industry for the particular application indicated. Where applicable, comply with the American with disabilities Act Accessibility Guidelines (ADAAG). Where uncertain or ambiguous, mount components at heights directed by Architect.
   4. Allow for building movement, including thermal expansion and contraction.
   5. Secure products in place with positive anchorage devices designed and sized to withstand stresses, vibration, physical distortion, and disfigurement.
   6. Adjust and reinforce substrate as necessary for proper installation and operation.

I. Isolation: Isolate each portion of the completed construction from incompatible material as necessary to prevent deterioration.

J. Joints: Make joints of uniform width. Where joint locations in exposed work are not indicated, arrange joints for the best visual effect as directed by Architect. Unless otherwise indicated, fit exposed connections together to form hairline joints.

K. Record Documents: As soon as practical after installation of products, equipment, and distribution systems, carefully and accurately record actual installed locations on Record Documents with special attention to Work which will be concealed in the final construction or which varies from the Contract Documents. Comply with requirements for record documents elsewhere. If unable to record information, make intermediate and accurate records for transcription at next available date.

3.05 CUTTING AND PATCHING

A. General: Employ skilled workers to perform cutting and patching. Proceed with cutting and patching at the earliest feasible time, and complete without delay. Sequence construction activities to minimize cutting and patching. Cut in place construction to provide for installation of other components or performance of other construction, and subsequently patch to restore surfaces to their original condition.

B. Structural Elements: Do not cut and patch structural elements in a manner that could change their load-carrying capacity or load-deflection ratio. Provide temporary support of work to be cut.

C. Operational Elements: Do not cut and patch operating elements and related components in a manner that results in reducing their capacity to perform as intended, that could change their load-carrying capacity or that results in increased maintenance or decreased operational life or safety.

D. Protection: Protect in place construction during cutting and patching to prevent damage. Provide protection from adverse weather conditions for portions of Project that might be exposed during cutting and patching operations.

E. Visual Requirements: Do not cut and patch construction in a manner that results in visual evidence of cutting and patching. Do not cut and patch construction exposed on the exterior or in occupied spaces in a manner that would, in Architect's opinion, reduce the building's aesthetic qualities. Remove and replace construction that has been cut and patched in a visually unsatisfactory manner.

F. Installer: Retain original installer or fabricator to cut and patch in place construction installed as part of the Work.

G. Cutting: Cut in place construction by sawing, drilling, breaking, chipping, grinding, and similar operations, including excavation, using methods least likely to damage elements retained or adjoining construction to remain. If possible, review proposed procedures with original installer; comply with original installer's recommendations.
   1. Openings: Cut holes and slots as small as possible, neatly to size required, and with minimum disturbance of adjacent surfaces.
   2. Finished Surfaces: Use hand tools or small power tools designed for sawing or grinding, not hammering and chopping, to minimize disturbance of adjacent

surfaces to remain. Cut or drill from the exposed or finished side into concealed surfaces to avoid marring finished surfaces.

3. Flame Cutting: Do not use cutting torches until work area is cleared of flammable materials. At concealed spaces, such as duct and pipe interiors, verify condition and contents of hidden space before starting flame-cutting operations. Maintain fire watch and portable fire-suppression devices during flame-cutting operations. Maintain adequate ventilation when using cutting torches.
4. Concrete or Masonry Cutting: Cut concrete or masonry using a cutting machine, such as a water safe abrasive saw, a water safe diamond-core drill or a high pressure water cutting stream. Ensure that cutting is done in the presence of liquid water such that particulate debris from cutting is mixed with liquid water to prevent dust from becoming airborne. Protect adjacent construction and continuously and immediately collect water to prevent damage to construction and contamination of environment. Do not use power-driven impact tools except for slab-on-grade conditions. Demolish in small sections. Cut to a depth of at least 2 inches at junctures with construction to remain. Dislodge concrete and masonry from reinforcement at perimeter of areas being demolished, cut reinforcement, and then remove remainder of concrete or masonry using cutting machine. Neatly trim openings. For slabs-on-grade, use removal methods that will not crack or structurally disturb adjacent slabs or partitions; through saw-cut perimeter of area to be demolished, then break up and remove.
5. Pipe and Conduit: Unless otherwise indicated, cut pipe or conduit in concealed locations. Cap, valve, or plug and seal remaining portion of pipe or conduit to prevent entrance of moisture or other foreign matter after cutting.
6. Air-Conditioning Equipment: Cut equipment without releasing refrigerants.
7. Proceed with patching after construction operations requiring cutting are complete.

H. Patching: Patch construction by filling, repairing, refinishing, closing up, and similar operations following performance of other Work. Provide materials and comply with installation requirements specified in other Sections of these Specifications.
   1. Inspection: Test and inspect patched areas after completion to demonstrate integrity of installation.
   2. Exposed Finishes: 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. Patch with durable seams that are not visible when observed from 48 inches under 50 foot-candle illumination with the naked eye.
      a. Clean piping, conduit, and similar features before applying paint or other finishing materials.
      b. Restore damaged pipe covering to its original condition.
      c. Where patching occurs in a painted surface, prepare substrate and apply primer and intermediate paint coats appropriate for substrate over the patch, and apply final paint coat over entire unbroken surface containing the patch. Provide additional coats until patch blends with adjacent surfaces.
   3. Cut Partitions: Where walls or partitions that are removed, extend one finished area into another, patch and repair floor, ceiling, and wall surfaces in the new space to provide an even surface of uniform finish, color, texture, and appearance. Remove in place floor, ceiling, and wall coverings and finishes and

replace with new materials, if necessary, to achieve uniform color and appearance.

4. Coatings: Where patching occurs in a painted or other coated finished surface, apply primer and intermediate paint coats over the patch and apply final paint coat over entire unbroken surface containing the patch. Provide additional coats until patch blends with adjacent surfaces.
5. Suspended Ceilings: Patch, repair, or re-hang ceilings as necessary to provide an even-plane surface of uniform appearance.
6. Exterior Building Enclosure: patched in a manner that restores enclosure to a weathertight condition and ensures thermal and moisture integrity of building enclosure.
7. Mechanical and Electrical Equipment: Patch all penetrations and blemishes in floor, wall, partition, ceiling and other exposed assemblies where mechanical, electrical, or other equipment is removed.
8. Testing and Inspection: Where testing or inspection is required for construction, test and inspect patched portions thereof.

I. Cleaning: Clean areas and spaces where cutting and patching are performed. Remove paint, mortar, oils, putty, and similar materials from adjacent finished surfaces.

3.06 PROGRESS CLEANING

A. General: Clean Project site and work areas daily, including common areas. Coordinate progress cleaning for joint-use areas where more than one installer has worked. Enforce requirements strictly. Dispose of waste materials lawfully.
   1. Remove liquid spills promptly and keep interior areas dry.
   2. Combustible Waste: Comply with requirements in NFPA 241 for removal of combustible waste materials and debris.
   3. Do not hold waste materials more than seven (7) days during normal weather or three (3) days if the temperature is expected to rise above 80 deg F.
   4. Containerize hazardous and unsanitary waste materials separately from other waste. Mark containers appropriately and dispose of legally, according to regulations.
      a. Use containers intended for holding waste materials of type to be stored.

B. Debris Handling: Remove and transport debris in a manner that will prevent spillage on adjacent surfaces and areas.
   1. Remove debris from elevated portions of building by chute, hoist, or other device that will convey debris to grade level in a controlled descent.

C. Adjacent Areas: Clean adjacent structures, improvements and areas of dust, dirt, and debris caused by construction operations. Unless otherwise indicated, return adjacent areas to condition existing before construction operations began.

D. Site: Maintain Project site free of waste materials and debris.
   1. Snow Plowing: Remove snow and ice from temporary roads and walkways as required for construction operation and emergency egress and access to site and building.
   2. Mowing: Unless otherwise indicated, keep site lawn areas mowed to 3 inches until Substantial Completion.

3. Metal: Use magnetic roller to pick up all nails, screws and metal foreign objects around site prior to the installation of final grading or topsoil

E. Work Areas: Clean areas where work is in progress to the level of cleanliness necessary for proper execution of the Work.
   1. Remove liquid spills promptly.
   2. Where dust would impair proper execution of the Work, broom-clean or vacuum the entire work area, as appropriate.

F. Installed Work: Keep installed work clean. Clean installed surfaces according to instructions of manufacturer of product installed, using only cleaning materials specifically recommended. If specific cleaning materials are not recommended, use cleaning materials that are not hazardous to health or property and that will not damage exposed surfaces.

G. Concealed Spaces: Remove construction waste from concealed spaces before enclosing the space. Vacuum and remove dust from the following:
   1. Cavities without loose fill insulation
   2. Air plenums

H. Interior Contamination: Control access to the construction site to minimize traffic through interior areas and the tracking in of contaminants. Provide temporary grates and mats at the entryways to remove moisture and contaminants from shoes.

I. Exposed Surfaces: Clean surfaces exposed in the completed Work and protect as necessary to ensure freedom from damage, deterioration, and contamination at time of Substantial Completion.
   1. Contamination: Immediately remove foreign substances from environmental (including moisture, ice, soil), construction operations (including concrete, adhesive, grout, mortar, plaster, joint compound, coating and sealant, if any), or other sources which are not indicated to be applied to surfaces.

J. Cutting and Patching: Clean areas and spaces where cutting and patching are performed. Completely remove paint, mortar, oils, putty, and similar materials.
   1. Thoroughly clean piping, conduit, and similar features before applying paint or other finishing materials. Restore damaged pipe covering to its original condition.

K. Waste Disposal: Comply with construction waste practice requirements for construction waste generated from progress cleaning.

L. Dust Control: Comply with Construction IAQ management requirements in this Part. Clean up dust generated by construction activities in interior areas where dust accumulation is noted and to prevent tracking dust on shoes and in all areas to comply with governing environmental-protection regulations and authorities having jurisdiction. Control dust generated on-site to minimize dust and to prevent visible airborne dust from migrating off site due to low humidity, wind, or other factors.
   1. Use construction practices that minimize the production of dust.
   2. Use equipment with integral dust collection where feasible.

3. Centralize indoor cutting or other dust-generating activities to areas where clean-up can be carried out easily and contaminants will not be tracked into other areas.
4. Dust Control Methods: Use dust-control treatment that is nonpolluting and nontracking. Do not use water for dust control when it may damage existing construction or create hazardous or objectionable conditions, such as ice, flooding, moisture damage and pollution.
    a. Use wet rags, damp mops and vacuum cleaners with high-efficiency particulate (HEPA) filters to clean up building dust.
    b. Use sweeping compounds, water mist, temporary enclosures, and other suitable methods to limit spread of building dust.
    c. Use water mist, calcium chloride, and other suitable methods to limit spread of site dust.

M. Pollution Controls: Provide services for effective air and water pollution controls as required by authorities having jurisdiction. Conduct cleaning and waste-removal operations to comply with local laws and ordinances and Federal and local environmental and antipollution regulations. Do not discharge volatile, harmful, or dangerous materials into drainage systems.

3.07 CONSTRUCTION WASTE PRACTICES

A. General: Except for site-reused construction waste, remove construction waste from Project Site and dispose of lawfully. Conduct waste-removal operations to comply with environmental and pollution regulations.
1. If required by authorities having jurisdiction, provide separate containers, clearly labeled, for each class of construction waste to be disposed.

B. Regulations: Conduct cleaning and waste-removal operations to comply with local laws and ordinances and Federal and local environmental and antipollution regulations. Comply with safety standards for cleaning. Do not discharge volatile, harmful, or dangerous materials into drainage systems. Remove waste materials from Project site and dispose of lawfully.
1. Do not wash waste materials down sewers or into waterway.

C. Burning: Do not burn waste.

D. Burying: Do not bury waste on Site unless specifically permitted by regulations and Contract Documents as diverted waste able to be reused on Site and which does not pose a source of contamination and will not harmfully impact the performance of the Work and is indicated to be buried in an approved Waste Management Plan.
1. Do not bury metal, wood, paper, plastic, liquid, trash or litter containing waste.
2. Where buried waste is to replace earthwork backfill, do not bury waste which after incorporation into the materials required for earthwork backfill, create a resultant material which does not meet the requirements for earthwork backfill.

E. Construction Waste Requiring Special Handling: Safely separate, store in designated containers, and lawfully dispose of non-hazardous volatile, harmful, dangerous, toxic, flammable, corrosive, and reactive waste and do not discharge the same into drainage systems or in such a way as to contaminate the environment.

1. Combustible Waste: Comply with requirements in NFPA 241 for removal of combustible waste materials and debris.

F. Hazardous Construction Waste: Comply with Conditions of the Contract and regulations for definition and disposition of hazardous materials.

G. Waste Minimization: Employ processes that ensure the generation of as little construction waste as possible due to error, poor planning, breakage, mishandling, contamination, or other factors. Practice efficient waste management in the use of materials in the course of the Work. Use all reasonable means to divert construction and demolition waste from landfills and incinerators.
   1. Use trigger operated spray nozzles for water hoses.

H. Waste Handling: Remove and transport construction waste in a manner that will prevent spillage on adjacent surfaces and areas.
   1. Remove construction waste from elevated portions of building by chute, hoist, or other device that will convey debris to grade level in a controlled descent.

I. Waste Separation: Set aide, sort, separate, store, protect, handle and schedule for timely pick-up construction waste in order to prevent contamination of materials and to maximize recycle and reuse potential. Clearly mark, keep neat and clean specific areas at the Site for separation and collection of construction waste.
   1. Clean materials that are contaminated prior to placing in collection containers. Deliver materials in accordance with recycling or reuse facility requirements (e.g., free of dirt, adhesives, solvents, petroleum contamination, and other substances deleterious to recycling process).
   2. Provide appropriately marked containers or bins for controlling waste until they are removed from Project site. Include list of acceptable and unacceptable materials at each container and bin.
      a. Inspect containers and bins for contamination weekly and remove contaminated materials if found.

J. Transporting: Do not allow construction waste to accumulate on-site beyond two full size truck loads for each type of separate waste. Transport construction waste in covered vehicles to prevent contamination or littering of surrounding areas.

K. Required Diversion: Dispose of the following types construction waste as diverted waste:
   a. Non-deposit beverage containers
   b. Materials required by public authorities to be recycled by consumers in jurisdiction in which Project is located.
   c. Materials for which free or fee-based recycling is available from a public authority or from a private entity when such entity is mandated or contracted to provide recycling services by a public authority.
   d. Paper as follows:
      1) Newsprint
      2) Corrugated cardboard
      3) Boxboard
      4) Fiberboard
      5) Office paper (white or colored)
   e. Plastic as follows:

1) #1 PETE Polyethylene Terephthalate
2) #2 HDPE High Density Polyethylene

f. Glass as follows:
1) Glass bottles and jars

g. Metal as follows:
1) Metal cans

3.08 SITE QUALITY CONTROL

A. Installer's Site Reports: Where installer's site reports are required, prepare written information documenting installer's tests, observations and inspections. Include the following, as applicable:
1. Name, contract information and signature of installer making report.
2. Description of the Work.
3. Statement on condition of substrates and their acceptability for installation of product. Include:
a. List of detrimental conditions, including substrates.
b. List of unacceptable installation tolerances.
c. Recommended corrections.
4. Statement that installer accepts conditions under which work is to be preformed.
5. Summary of installation procedures being followed, whether they comply with requirements and, if not, what corrective action was taken.
6. Results of operational and other tests and a statement of whether observed performance complies with requirements.
7. Statement whether conditions, products, and installation will affect warranty.
8. Other required items indicated in individual Specification Sections.
9. Submittal: Manufacturer's service representative shall submit five (5) copies of report to Contractor. Contractor shall submit three (3) copies to Architect. Contractor shall include one (1) copy in appropriate portion of each Operation and Maintenance Manual.

B. Manufacturer's Site Reports: Where manufacturer's site reports are required in individual Specification Sections or elsewhere, engage a manufacturer's service representative to observe and inspect the installation of the Work.
1. Manufacturer's service representative shall prepare written report documenting manufacturer's service representative's tests, observations and inspections. Include the following, as applicable:
a. Name, contract information and signature of manufacturer's service representative making report.
b. Examination of and statement on condition of substrates and their acceptability for installation of product.
c. Verification of and statement that products at Project site comply with requirements as installed.
d. Observation and statement of Installer activities
e. Summary of installation procedures being followed, whether they comply with requirements and, if not, what corrective action was taken.
f. Results of operational and other tests and a statement of whether observed performance complies with requirements.
g. Inspection and statement of completed portions of the Work

h. Statement whether conditions, products, and installation will affect warranty.
i. Other required items indicated in individual Specification Sections or elsewhere.

2. Submittal: Manufacturer's service representative shall submit five (5) copies of report to Contractor. Contractor shall submit three (3) copies to Architect. Contractor shall include one (1) copy in appropriate portion of each Operation and Maintenance Manual.

C. Moisture Testing: At the Owner option, Owner may retain and pay for a testing agency to perform the following tests in addition to other testing indicated elsewhere:
1. Testing for Moisture Content: Test moisture content of porous materials and absorptive materials to ensure that they are dry before sealing them into an assembly. Document and report results of testing. Where tests are not satisfactory, dry materials and retest. If satisfactory results cannot be obtained with retest, remove and replace with new materials.
a. Concrete: Moisture test as per one or more of the following:
1) ASTM D4263 Test Method for Indicating Moisture in Concrete by the Plastic Sheet Method
2) ASTM F1869 Test Method for Measuring Moisture Vapor Emission Rate of Concrete Subfloor Using Anhydrous Calcium Chloride
3) ASTM F2170 Test Method for Determining Relative Humidity in Concrete Floor Slabs Using In Situ Probes
b. Wood: Moisture test as per ASTM D4444 - Standard Test Methods for Use and Calibration of Hand-Held Moisture Meters.
c. Gypsum Board, Gypsum Plaster, Insulation, and other absorptive materials: Moisture test with a Pinless Moisture Meter to assess patterns of moisture, if any.
2. Testing for Moisture Penetration:
a. Windows: Test as per ASTM E1105 Test Method for Field Determination of Water Penetration of Installed Exterior Windows, Skylights, Doors, and Curtain Walls by Uniform or Cyclic Static Air Pressure Difference.
b. Horizontal Waterproofing (not roofing): Test as per ASTM D5957 Standard Guide for Flood Testing Horizontal Waterproofing Installations.
c. Masonry: Test as per ASTM C1601 Standard Test Method for Field Determination of Water Penetration of Masonry Wall Surfaces.
d. Exterior Walls:
1) Air tightness of the enclosure test: ASTM E779 Standard Test Method for Determining Air Leakage Rate by Fan Pressurization or ASTM E1827 Standard Test Methods for Determining Air tightness of Buildings Using an Orifice Blower Door.
2) Water Leakage: Review as per ASTM E2128 Standard Guide for Evaluating Water Leakage of Building Walls.
3. Testing for Support of Microbial Growth: Test and report in accordance with ASTM D6329 Standard Guide for Developing Methodology for Evaluating the Ability of Indoor Materials to Support Microbial Growth Using Static Environmental Chambers. Indicate susceptibility of product or material to colonization and amplification of microorganisms. Identify microorganisms and conditions of testing.
a. Normal conditions: Perform testing at 35 degrees Centigrade and 50 percent relative humidity.

b. Extreme conditions: Perform worst case scenarios screening tests by providing an atmosphere where environmental conditions may be favorable for microbial growth.
c. Perform testing for the following:
    1) Fireproofing material on appropriate substrate.
    2) Ceiling tile.
    3) Wallcovering.

3.09 CONSTRUCTION INDOOR-AIR-QUALITY (IAQ) MANAGEMENT

A. Construction IAQ Requirements:
1. Comply with the recommended Control Measures of the Sheet Metal and Air Conditioning National Contractors Association (SMACNA) IAQ Guidelines for Occupied Buildings under Construction, 2nd Edition 2007, ANSI/SMACNA 008-2008, Chapter 3.
2. Pathway Interruption: Isolate areas of work as necessary to prevent contamination of clean or occupied spaces (if any). Provide pressure differentials or temporary barriers indicated elsewhere or both to protect clean or occupied spaces (if any).
3. Housekeeping: During construction, maintain Project and building products and systems to prevent contamination of building spaces.
4. Construction Ventilation Requirements:
    a. Definitions: For the following construction ventilation requirements, the following definitions apply:
        1) Adequate Ventilation: Ventilation, including air circulation and air changes, required to cure materials, dissipate humidity, and prevent accumulation of particulates, dust, fumes, vapors, or gases.
        2) Interior Final Finishes: Materials and products that will be exposed at interior, occupied spaces; including flooring, wallcovering, finish carpentry, and ceilings.
        3) Packaged Dry Products: Materials and products that are installed in dry form and are delivered to the site in manufacturer's packaging; including carpets, resilient flooring, ceiling tiles, and insulation.
        4) Wet Products: Materials and products installed in wet form, including paints, sealants, adhesives, special coatings, and other materials which require curing.
    b. Construction Packaged Dry Products Pre-ventilation: Provide minimum 48 hour pre-ventilation of packaged dry products prior to installation. Remove from packaging and ventilate in a secure and dry space free from strong contaminant sources and residues and ventilated at 1.5 ACH (air changes per hour) minimum. Provide a temperature range of 60 degrees F minimum to 90 degree F maximum continuously during the pre-ventilation period. Do not pre-ventilate within limits of interior Work unless otherwise approved by Architect.
    c. Construction Interior Final Finishes and Wet Products Ventilation: Provide adequate ventilation during and after installation of interior wet products and interior final finishes.
    d. Construction Ventilation Sequencing: Schedule construction operations involving wet products prior to packaged dry products to the greatest extent possible.

B. Moisture Protection: Protect stored on site and installed absorptive materials from moisture damage.
   1. Controlled Construction Phase of Construction: Prior to the full operation of permanent HVAC systems, maintain as follows:
      a. Control moisture and humidity inside building by maintaining effective dry-in conditions.
      b. Comply with manufacturer's written instructions for temperature, relative humidity, and exposure to water limits.
         1) Hygroscopic materials that may support mold growth, including wood and gypsum-based products, that become wet during the course of construction and remain wet for 48 hours are considered defective.
         2) Measure moisture content of materials that have been exposed to moisture during construction operations or after installation. Record readings beginning at time of exposure and continuing daily for 48 hours. Identify materials containing moisture levels higher than allowed. Report findings in writing to Architect.
         3) Remove materials that cannot be completely restored to their manufactured moisture level within 48 hours.
   2. Inspections: Document and report results of inspections in Construction IAQ Management Plan; state whether or not inspections indicate satisfactory conditions.
      a. Delivery:
         1) Examine materials for dampness as they arrive. If acceptable to Architect, dry damp materials, not indicated to be damp, completely prior to installation; otherwise, reject materials, not indicated to be damp, that arrive damp.
         2) Examine materials for mold as they arrive and reject materials that arrive contaminated with mold.
      b. Storage: Inspect stored and installed absorptive materials regularly for dampness and mold growth. Inspect bi-weekly and after each rain event of more than ½ inch precipitation in a 24 hour period.
         1) Where stored on-site or installed absorptive materials become wet, notify Architect. Inspect for damage. If acceptable to Architect, dry completely prior to closing in assemblies; otherwise, remove and replace with new materials.
      c. Basement: Monitor basement humidity, and dehumidify when relative humidity is greater than 85 percent for more than 2 weeks or at the first sign of mold growth.
      d. Site drainage: Verify that final grades of site work and landscaping drain surface water and ground water away from the building.
      e. Plumbing: Verify satisfactory pressure test of pipes and drains is performed before closing in and insulating lines.
      f. HVAC: Inspect HVAC system and following components (if any) as required for Commissioning (if any) and, inspect HVAC to verify:
         1) Condensate pans are sloped and plumbed correctly.
         2) Access panels are installed to allow for inspection and cleaning of coils and ductwork downstream of coils.
         3) Ductwork and return plenums are air sealed.
         4) Duct insulation is installed and sealed.
         5) Chilled water line and refrigerant line insulation are installed and sealed.

C. Temporary Filtration Media: Do not use permanent air handling systems unless permitted by requirements indicate elsewhere. If permanent air handling systems are used during construction, install and maintain air filters at each return air inlet for the air handling system.
   1. Filtration Media: MERV 8 / ASHRAE 52.2.

D. Filtration Media Replacement: Replace all air filters immediately (i.e. no sooner than seven (7) days) prior to occupancy at Substantial Completion with air filters comply with requirements for new air filters indicated elsewhere. Without damaging air filter, legibly write date of installation on filter so date can be read upon opening equipment access but by not removing filter.

E. Occupancy IAQ Requirements: Comply with one of the following requirements:
   1. Building Flush Out Before Occupancy: After all interior finishes are installed and prior to occupancy and Substantial Completion, perform a building flush-out by supplying a total volume of 14000 cu. ft. of outdoor air per sq. ft. of floor area while maintaining an internal temperature of at least 60 deg F and a relative humidity no higher than 60 percent.
   2. Building Flush Out During Occupancy:
      a. Initial Flush Out: After all interior finishes are installed and prior to occupancy and Substantial Completion perform initial building flush-out by supplying a minimum of 3500 cu. ft. of outdoor air per sq. ft. of floor area to the space.
      b. Occupancy Flush Out: After all interior finishes are installed and prior to Final Completion perform continuing building flush-out by ventilating at a minimum rate of 1) 0.30 cfm per sq. ft. of outside air or 2) the design minimum outside air rate determined to meet the minimum requirements of Sections 4 through 7 of ASHRAE Standard 62.1-2007 “Ventilation for Acceptable Indoor Air Quality (with errata but without addenda)”, whichever is greater. During each day of occupancy flush-out period, ventilation shall begin a minimum of three hours prior to occupancy and continue during occupancy. These conditions shall be maintained until a total of 14000 cu. ft./sq. ft. of outside air has been delivered to the space.

3.10 SYSTEM STARTUP

A. Verification: Start equipment and operating components to confirm proper operation. Remove malfunctioning units, replace with new units, and retest.

B. Commissioning: Test each piece of equipment to verify proper operation. Test and adjust controls and safeties. Replace damaged and malfunctioning controls and equipment. Comply with commissioning requirements indicated elsewhere.

3.11 ADJUSTING

A. Adjusting: Adjust operating components for proper operation without binding. Adjust equipment for proper operation. Adjust and lubricate operable components to ensure operability without damaging effects.

3.12 PROTECTION

A. Progress Protection: During handling and installation, protect construction in progress and adjoining materials already in place. Apply protective covering where required to ensure protection from damage or deterioration at Substantial Completion.

B. Final Protection: Provide final protection and maintain conditions that ensure installed Work and existing construction to remain is without damage or deterioration at time of Substantial Completion.
   1. Comply with manufacturer's instructions for temperature and relative humidity.

C. Limiting Exposures: Supervise construction operations to ensure that no part of the construction, completed or in progress, is subject to harmful, dangerous, damaging, or otherwise deleterious exposure during the construction period. Where applicable, such exposures include, but are not limited to, the following:
   1. Excessive static or dynamic loading
   2. Excessive internal or external pressures
   3. Excessively high or low temperatures
   4. Thermal shock
   5. Excessively high or low humidity
   6. Air contamination or pollution
   7. Water or ice
   8. Solvents
   9. Chemicals
   10. Light
   11. Radiation
   12. Puncture
   13. Abrasion
   14. Heavy traffic
   15. Soiling, staining and corrosion
   16. Bacteria
   17. Rodent and insect infestation
   18. Combustion
   19. Electrical current
   20. High speed operation
   21. Improper lubrication
   22. Unusual wear or other misuse
   23. Contact between incompatible materials
   24. Destructive testing
   25. Misalignment
   26. Excessive weathering
   27. Unprotected storage
   28. Improper shipping or handling
   29. Theft
   30. Vandalism

D. Traffic: Prohibit traffic on horizontal surfaces which are setting, curing, or easily damaged. Protect floor coverings from mars, marks, indentations, and other damage from construction operations and placement of equipment and fixtures during remainder of construction period.

3.13 MAINTENANCE

A. Progress Maintenance: Provide periodic maintenance on completed construction and equipment at frequency recommended by manufacturer or more frequently for abnormal conditions. Adjust and lubricate operable components to ensure operability without damaging effects. Protect equipment from dust contamination; inspect and change filters at end of service life.
   1. Duration: Provide maintenance through Substantial Completion and thereafter until completion of required Owner's Demonstration and Training and required approved Maintenance and Operational Manuals are provided.

3.14 FINAL CLEANING

A. Extent: With the exception of the Owner's existing furnishings (if any), it shall be the Contractor's responsibility to provide final cleaning throughout only the following areas.
   1. Exterior: area(s) of the Work and area(s) disturbed by construction activities.
   2. Interior: entire Project building including area(s) unaffected by the Work (if any)

B. Time: complete final cleaning after site work and interior finishes are complete and before Substantial Completion, unless otherwise indicated.

C. Cleaning: Except for items indicated in individual Specifications Sections to have protective cover remain in place at time of completion and the surfaces of which are of new and clean condition, clean the following:

D. Cleaning:
   1. Employ experienced workers or professional cleaners for final cleaning.
   2. Clean each surface or unit as required by the Contract Documents (including this Article). At a minimum, clean each surface or unit to condition expected in a commercial building cleaning and maintenance program.
   3. Comply with product manufacturer's cleaning instructions.
   4. After cleaning, remove cleaning supplies and equipment and leave areas ready for occupancy.
   5. Comply with provisions of Progress Cleaning Article in this Part.
   6. Labels: Remove labels that are not permanent. Clean permanent labels to make easily readable.
   7. Ensure cleaning requirements indicated in individual Specification Sections have been completed and maintained in a clean condition. Provide the following final cleaning as a minimum and comply with requirements for cleaning specified in individual Specification Sections for both the Work and existing construction similar to the Work (if any):
      a. Site and Exterior: Clean adjacent areas affected by construction operations, Project site, yard, and grounds, including landscape development areas, of rubbish, waste material, litter, and visible foreign substances.
         1) Paving: Sweep paved areas broom clean or clean with water. Remove spills (including petrochemical), stains, and other foreign deposits. Remove snow and ice to provide safe access to building.

2) Site: Rake grounds that are neither planted nor paved to a smooth, even-textured surface. Remove tools, construction equipment, machinery, and surplus material.
3) Hard Surfaces: Clean exposed hard-surfaced finishes to a dirt-free condition, free of films, streaks, and foreign substances. Avoid disturbing natural weathering of exterior surfaces. Clean surface visible through louvers, vents, and grilles. Horizontal surfaces shall be cleaned with water. Non-horizontal and vertical surfaces shall be cleaned with dusting cloth, water or vacuum at Contractor's option.
4) Light Fixtures: Clean light fixtures, lamps, globes, and reflectors to function with full efficiency. Vacuum light fixtures to remove dust and wash light fixture lenses.

b. Interior Unfinished Spaces: Remove debris. Remove dust from exposed surfaces using vacuum.
1) Equipment: Clean exposed surfaces of operational, mechanical and electrical equipment with dusting cloth, liquid cleanser or vacuum at Contractor's option. Remove excess lubrication, paint, mortar droppings, and visible foreign substances. Clean permanent (non-disposable) air filters.
a) Clean ducts, plenums, blowers, and coils of mechanical equipment and air distribution systems if operated without filters during construction in compliance with NADCA Standard 1992-01. Provide written report on completion of cleaning

c. Interior Finished Spaces: cleaned exposed surfaces to a dirt-free condition, free of stains, films, streaks and visible foreign substances.
1) Non-Floor Exposed Surfaces: Restore reflective surfaces to reflective condition. Clean surfaces visible through louvers, vents, diffusers, registers and grilles.
a) Glass: Clean both sides of interior and exterior transparent or translucent materials, including mirrors and glass in doors and windows with glass cleaner. Remove excess glazing compounds and other noticeable, vision-obscuring materials. Polish mirrors and glass, taking care not to scratch surfaces.
b) Light Fixtures: Clean light fixtures, lamps, globes, and reflectors to function with full efficiency. Vacuum light fixtures to remove dust and wash light fixture lenses.
c) Plumbing Fixtures: Clean plumbing fixtures with disinfectant cleanser to a sanitary condition, free of stains, including stains resulting from water exposure.
d) Metal Surfaces: Clean painted metal surfaces with liquid cleanser, taking care not to scratch surfaces. Clean unpainted metal surfaces with metal polish, taking care not to scratch surfaces.
e) Clearcoated Wood Surfaces: Clean clearcoated wood surfaces with wood polish, taking care not to scratch surfaces.
f) Soft Surfaces: Clean fabrics, textiles, leather, plush wall coverings, plush acoustic treatment and similar surfaces with brush or vacuum and then as instructed by manufacturer.
g) Other Surfaces Not Listed Above: Horizontal surfaces below 8 feet from floor shall be first cleaned with dusting cloth or

vacuum and then cleaned with liquid cleanser. Horizontal surfaces above 8 feet from floor, including ceilings, non-horizontal, and vertical surfaces shall be cleaned with dusting cloth, liquid cleanser or vacuum at Contractor's option.

2) Polished Flooring: Wax and polish resilient and other flooring commonly or instructed by manufacturer to be waxed by stripping of previous wax coats, thoroughly cleaning, and applying at least two (2) coats of floor polish.
3) Carpeted Flooring: Vacuum with CRI Green Label heavy duty commercial machine with face-beater element. If carpet has been in place more than 90 days or if visible soil or stains remain after vacuuming, shampoo and steam clean.
4) Other Flooring Not Listed Above: Vacuum, damp-mop, and machine or hand scrub non-carpeted or non-polished flooring.

3.15 CORRECTION

A. Replace: Before Substantial Completion, replace:
   1. Glass and Reflective Surfaces: Remove and replace chipped, scratched, and broken glass, reflective surfaces, and other damaged transparent materials which are part of the Work.
   2. Lighting: Where part of the Work or used in the performance of the Work, replace:
      a. Replace burned-out lamps and those noticeably dimmed by use.
      b. Replace defective and noisy starters in fluorescent and mercury vapor fixtures to comply with requirements for new fixtures.
   3. Filtration Media Replacement: replace air filters as required for Construction IAQ Requirements indicated in this Part

B. Restoration: Unless otherwise indicated, restore existing facilities used during construction to condition existing before commencement of the Work.

C. Non-conforming Work: The following Work fails to conform to the requirements of the Contract Documents:
   1. Surfaces of the completed Work with defects visible when viewed with the naked human eye from a distance of 36 inches under 50 foot-candle illumination.
   2. Work which does not match approved mockups or Samples.
   3. Extraneous noise generate by the ordinary use of the completed Work which is not intended as Work result and which produces sound greater than 55 decibels when measured in normally occupied or finished spaces.
   4. Odors generated by the completed Work which are not intended as a result of the Work and which are reasonably noxious, unpleasant or offensive to occupants.
   5. Work which fails to conform to the requirements of the Contract Documents or is rejected by the Architect under the provisions of the General Conditions.

D. Damage to Property: Pursuant to and not limiting the effect of the Conditions of the Contract, Contractor shall correct, repair, and remediate the following damages to property at or adjacent to the Project site when such damages are caused in whole or in part and intentionally or unintentionally a result of performing the Work:

1. Surfaces with defects visible when viewed with the naked human eye from a distance of 72 inches under 50 foot-candle illumination.
2. Damage which causes extraneous noise to be generated which produces sound greater than 55 decibels when measured in normally occupied or finished spaces.
3. Damage which causes odors to be generated which are reasonably noxious, unpleasant or offensive to occupants.
4. Damage to materials or equipment which result in failure to function, perform or operate as originally intended or to the capacity in which they functioned, preformed or operated before the commencement of the Work.
5. Contamination by substances deleterious or corrosive to occupants, the Work, property, or the environment.

E. Correction Methods: Correct, repair, and remediate non-conforming work and damage to property by the following methods:
   1. Repair surfaces to produce surface with no visible evidence of repair when viewed with the naked human eye from a distance of 36 inches under 50 foot-candle illumination.
   2. Repair damaged materials and equipment to function, perform and operate as new.
   3. Return new items of the Work that cannot be adequately refinished at the site to the original manufacturer, make required alterations and repairs, and refinish entire unit. Install repaired units.
   4. Remove defective parts and provide new parts.
   5. Remove nonconforming Work and provide new Work.
   6. With the Owner's consent, remove damaged portions of grounds, buildings, equipment and furnishings at the Project site and provide replacements approved by the Owner.
   7. All others methods and means necessary to correct, repair, and remediate these conditions and which are approved by the Owner.

END OF SECTION 017300

SECTION 017700 - CLOSEOUT PROCEDURES

PART 1 - GENERAL

1.01 SUMMARY

A. Closeout Preinstallation Conference

B. Maintenance Materials
   1. Spare Parts
   2. Extra Stock Materials
   3. Tools & Software

C. Record Documents
   1. Record Drawings.
      a. Record Shop Drawings
   2. Record Specifications
   3. Record Submittals
   4. Miscellaneous Record Documents

D. Record Samples

E. Facility Operation Binders

F. Executed Warranties Submittal

G. Operation and Maintenance Data

H. Operation and Maintenance Manuals

I. Demonstration and Training
   1. Demonstration and Training Schedule
   2. Instruction Program

1.02 RELATED REQUIREMENTS

A. Payment Procedures
   1. Closeout Procedures
      a. Substantial Completion
      b. Final Completion
   2. Lien Waivers
   3. Punch List

B. Project Management and Coordination
   1. Permit Submittals
   2. Coordination Drawings

C. Submittal Procedures
   1. Sample Warranties
   2. Record Submittal Disposition
   3. Record Sample Disposition

D. Qualification Requirements
   1. Manufacturer's Service Representative Qualifications

E. Execution Requirements
   1. Installer's Site Reports Submittals
   2. Manufacturer's Site Reports Submittals

F. General Requirements for MEP Specifications
   1. Additional closeout requirements for MEP systems.

G. Individual Specification Sections
   1. Maintenance Materials Submittals
   2. Warranties Requirements
   3. Project Record Documents Requirements
   4. Operation and Maintenance Data Requirements
   5. Demonstration and Training Requirements

1.03 PRICE AND PAYMENT PROCEDURES

A. Substantial Completion Procedures: as required for payment procedures indicated in the General Conditions.

B. Final Completion Procedures: as required for payment procedures indicated in the General Conditions.

1.04 DEFINITIONS

A. System: An organized collection of parts, equipment, or subsystems united by regular interaction.

B. Subsystem: A portion of a system with characteristics similar to a system.

1.05 ADMINISTRATIVE REQUIREMENTS

A. Demonstration and Training Scheduling: Obtain list of names and positions of participants from Owner. Coordinate instruction schedule with Owner's operations. Adjust schedule as required to minimize disrupting Owner's operations and to ensure availability of Owner's personnel. Schedule instruction with Owner with at least fifteen (15) days advance notice. For equipment that requires seasonal operation, provide similar instruction at start of each season.
   1. Do not conduct instruction program until Operation and Maintenance Manual has been reviewed and approved by Architect.

B. Demonstration and Training Coordination: Coordinate instructors, including providing notification of dates, times, length of instruction time, and course content. Coordinate content of instruction modules with content of approved Operation, and Maintenance Manuals.

C. Closeout Preinstallation Conference: Schedule and conduct a project closeout conference, at a time convenient to Owner and Architect, but no later than sixty (60) days prior to the scheduled date of Substantial Completion.
   1. Attendees: Participants at the conference shall be familiar with Project and authorized to conclude matters relating to the Work. Attendees shall include authorized representatives of the following.
      a. Owner
      b. Architect
      c. Consultants
      d. Contractor's personnel
         1) Project Manager
         2) Superintendent
         3) Waste management coordinator
      e. Demonstration and Training Instructors
      f. Operation and Maintenance Manual Preparers
      g. Demonstration and Training Videographer
      h. Major Subcontractors and suppliers
      i. Other concerned parties
   2. Agenda: Discuss items of significance that could affect or delay Project closeout, including the following:
      a. Review requirements and responsibilities related to Project closeout
      b. Occupancy and other closeout permits and inspections
      c. Owner's occupancy requirements
      d. Installation of Owner's furniture, fixtures, and equipment
      e. Security changeover
      f. Final cleaning
      g. Utility reading and changeover
      h. Insurance changeover
      i. Coordination of work by Owner and separate contracts
      j. Removing temporary facilities and controls
      k. Commissioning
      l. Preparation of Record Documents
      m. Procedures required prior to inspection for Substantial Completion and for final inspection for acceptance
      n. Preparation of Punch List
      o. Closeout submittal procedures
      p. Submittal of executed warranties
      q. Preparing Operations and Maintenance Manuals
      r. Delivery of extra materials, attic stock, and spare parts
      s. Demonstration and Training
      t. Consent of surety
      u. Procedures for processing Applications for Payment at Substantial Completion and for Final Payment

1.06 SUBMITTALS

A. Selection Samples: Facilities operation binders cover color.

B. Facility Operation Binders: three (3) each.

C. Record Samples: one (1) original.

D. Record Drawings: one (1) hardcopy original.

E. Record Specifications: one (1) hardcopy original.

F. Record Submittals: one (1) hardcopy original.

G. Miscellaneous Record Documents: one (1) hardcopy original.

H. Operation and Maintenance Manuals: three (3) each.

I. Demonstration and Training Schedule: three (3) copies sixty (60) days or more in advance of first proposed instruction. Include for each program instruction module:
   1. Outline or summary of instruction module contents
   2. Preliminary schedule of proposed dates
   3. Proposed length of instruction time
   4. Name of instructors
   5. Name of instructor's employer
   6. Name of installer's representative
   7. Name of installer representative's employer
   8. Instruction locations
   9. Special facilities required for instruction

1.07 MAINTENANCE MATERIALS

A. Spare Parts: Where required in individual Specification sections, furnish indicated quantities of spare parts that match parts installed and that are packaged with protective covering for storage and identified with labels describing contents. Deliver spare parts to storage location designated by Owner at Project site.

B. Extra Stock Materials: Where required in individual Specification sections, furnish indicated quantities of extra stock materials from the same product run for indicated products that match products installed and that are packaged with protective covering for storage and identified with labels describing contents. Deliver extra materials to storage location designated by Owner at Project site.
   1. Where "attic stock" or "extra materials" are indicated, comply with requirements for "extra stock materials".

C. Tools & Software: Where required in individual Specification sections, furnish indicated quantities of tools & extra software. Deliver tools & extra software to storage location designated by Owner at Project site.
   1. Software shall match that installed or as required for restoration of operation and be identified with labels describing contents.

2. Tools shall be those intended for use by Owner in facility operation and maintenance and packaged with protective re-usable packaging for storage and identified with labels describing contents.

1.08 QUALITY ASSURANCE

A. Instructor Qualifications: trained and approved by manufacturer of products or equipment of subject with the technical and instructional expertise necessary to train in and demonstrate to onsite maintenance personnel the observation, inspection, diagnosis, adjusting, troubleshooting, repairing, operation and maintenance procedures of manufacturer's products or equipment that are similar in material, design, and extent to those indicated for this Project.

1.09 WARRANTY

A. Submittal of Executed Warranties: Where warranties, bonds (but not bonds for the payment of the Work, if any), guarantees, maintenance contracts, or similar requirements are required:
   1. Form and Number: submit one (1) executed original document.
      a. Match Sample Warranties as approved.
   2. Format: Include executed warranties in appropriate Owner’s copy of Facilities Operation Binders and at location as required for Operation and Maintenance Manuals.

PART 2 - PRODUCTS

2.01 FACILITY OPERATION BINDERS

A. Binders: heavy duty; vinyl covered; loose leaf; to receive 8-1/2-by-11-inch paper
   1. Rings: 3
   2. Size: 3-inch thick minimum or as necessary to accommodate contents
   3. Front Cover: transparent plastic insert sleeve full extent
   4. Spine Cover: transparent plastic insert sleeve full extent
   5. Pocket Folders: inside front and back covers for folded information or oversize drawings.
   6. Color: as selected by Architect from standard range.
   7. Dividers: heavy-paper dividers with plastic-covered tabs for each section. Mark each tab to indicate contents.
   8. Drawings: Attach reinforced, punched binder tabs on drawings and bind with text.
      a. If oversize drawings are necessary, fold drawings to same size as text pages and use as foldouts.
      b. If drawings are too large to be used as foldouts, fold and place drawings in labeled envelopes and include envelopes in rear of binders. At appropriate locations in binders, insert typewritten pages indicating drawing titles, descriptions of contents, and drawing locations.

B. Number and Contents: Provide a set of matching color binders. Include in each binder a set of tabbed index dividers with the individual Specification Section numbers relevant to that binder. Submit the following binders with matching printed labels inserted in both spine and cover sleeves:
   1. “Morganton Community House Phase 2 - RECORD SUBMITTALS - Divisions: X through X - Owner's Copy”
   2. “Morganton Community House Phase 2 - - OPERATION & MAINTENANCE MANUALS with WARRANTIES - Divisions: X through X - Owner's Copy”

C. Use of Binders: Safely store Owner’s copies at the Record Document location. Binders will be used to facilitate the submittal, record document, operational and maintenance manual, and warranty process. Use Owner’s copy to store and file Record Submittals. Do not use Record Submittals except as necessary to record information for Record Document purposes.

2.02 RECORD DOCUMENTS

A. Record Drawings: Record Shop Drawings and copies of Contract Drawings, incorporating new and revised drawings as revisions are issued, and incorporating content indicated below.
   1. Preparation: as indicated in Part 3 and:
      a. Identify and date each Record Drawing.
      b. Include the designation "PROJECT RECORD DRAWING" in a prominent location on each sheet.
      c. Binding: Organize paper Record Drawings and into manageable sets. Bind each set with durable paper or plastic cover sheets.
      d. Mark Contract Drawings or Record Shop Drawings, whichever is most completely and accurately capable of showing actual physical conditions. Where Shop Drawings are marked, show reference on Contract Drawings.
   2. Content: Mark Record Drawings to show the actual installation where installation varies from that shown originally. Mark important additional installation information that was either shown schematically or not included on original Drawings. Types of items requiring marking, reference, or inclusion include the following:
      a. Information on concealed elements that would be difficult to identify or measure and record later
      b. Dimensional changes
      c. Revisions to details shown
      d. Depths of foundations below first floor
      e. Locations and depths of underground utilities
      f. Pipes and structures encountered below grade
      g. Location and depth of rock and unsuitable soil materials encountered below grade
      h. Revisions to routing of piping and conduits
      i. Revisions to electrical circuitry
      j. Actual equipment locations
      k. Duct size and routing
      l. Locations control devices and units requiring periodic maintenance
      m. Pipe size and routing
      n. Locations of unions and valves correlated with valve (tag) identification

o. Locations of concealed internal utilities
p. Contract modifications (such as changes made by Change Order or Construction Change Directive)
q. Appropriate Architect's interpretations
r. Appropriate details
s. Appropriate site reports for variable and concealed conditions
t. Appropriate Coordination Drawings prepared

3. Content: Mark Record Drawings to show the actual installation where installation varies from that shown originally. Mark important additional installation information that was either shown schematically or not included on original Drawings. Types of items requiring marking, reference, or inclusion include the following:
   a. Information on concealed elements that would be difficult to identify or measure and record later
   b. Dimensional changes
   c. Revisions to details shown
   d. Revisions to electrical circuitry
   e. Actual equipment locations
   f. Locations control devices and units requiring periodic maintenance
   g. Contract modifications (such as changes made by Change Order or Construction Change Directive)
   h. Appropriate Architect's interpretations
   i. Appropriate details
   j. Appropriate site reports for variable and concealed conditions
   k. Appropriate Coordination Drawings prepared

B. Record Specifications: Contract Specifications, including addenda and applicable contract modifications and incorporating content indicated below.
   1. Preparation: as indicated in Part 3 and:
      a. Include the designation "PROJECT RECORD SPECIFICATIONS" in a prominent location on each cover.
      b. Binding: Organize paper Record Specification and into manageable volumes. Bind each set with durable paper or plastic covers.
   2. Content: Mark Record Specifications to show the actual product or method used in the Work where installation varies from that originally indicated. Types of items requiring marking include the following:
      a. Information on selected products and methods including:
         1) Name of manufacturer
         2) Proprietary name and model number of products
         3) Name of supplier
         4) Name of installer
         5) Other information necessary to provide a record of selections made
         6) Methods used
      b. Reference applicable Record Submittals

C. Record Submittals: Owner-furnished Products Submittals (if any), processed Record (Product) Submittals, other than Record Shop Drawings and incorporating content indicated below.
   1. Preparation: as indicated in Part 3 and:
      a. Include the designation "PROJECT RECORD SUBMITTAL" in a prominent location on cover of each submittal.

b. Binding: Organize paper Record Submittals in appropriate Owner's copy of Facilities Operation Binder.

2. Content: Mark Record Submittals to show the actual product or method used in the Work where installation varies from that originally shown.
   a. Include identification information and action taken by Architect or Consultants.
   b. Types of items requiring marking include the following:
      1) Actual product or method used in the Work where installation varies from that originally shown
      2) Finish alterations
      3) Wiring diagram alternations
      4) Additional or different accessories
      5) Different coordination procedures
      6) Alternate Manufacturer's Instructions or Recommendations followed

D. Miscellaneous Record Documents: Administrative and execution submittals indicated in content below.
1. Preparation: as indicated in Part 3 and:
   a. Include the designation "PROJECT MISCELLANEOUS RECORD DOCUMENTS" in a prominent location on each cover.
   b. Binding: Organize paper Miscellaneous Record Documents and into manageable volumes. Bind each set with durable paper or plastic covers.
      1) If necessary, add a list of specific submittals.
2. Content:
   a. Table of contents at beginning of each volume
   b. Permits obtained by or required to be obtained by Contractor
   c. Installer's Site Reports
   d. Manufacturer's Site Reports
   e. Other Record Documents required by individual Specification Sections or elsewhere which are not included as part of Record Drawings, Record Submittals, or Record Specifications.

2.03 OPERATION AND MAINTENANCE DATA

A. Required Operation and Maintenance Data:
1. Provide Operation and Maintenance Data indicating in individual Specification Sections.
2. Provide Operation and Maintenance Data indicating the operation and maintenance of each system, subsystem, and piece of operational, mechanical or electrical equipment not part of a system or subsystem.
3. Provide Descriptive Data, Contact Data, and Spare Parts List and Source Information portions Operation and Maintenance Data where required for Operation and Maintenance Manuals

B. Operation and Maintenance Data: Operation and Maintenance Data shall be Operation and Maintenance Data indicated in individual Specification Sections and the following as applicable:
1. Descriptive Data:
   1) Product or Equipment name and model number
   2) Manufacturer's name

3) Serial number of each component
4) Equipment function
5) A description of product characteristics by the following means as necessary to provide a description of product characteristics:
   a) Copies of portions of Record Specification
   b) Copies of portions of Record Submittals
   c) Supplemental data as indicated in Part 3

2. Contact Data: Contact's name, email address and telephone number of:
   a. Installer
   b. Supplier
   c. Manufacturer's service representative
   d. Manufacturer
3. Commissioning Data:
   a. Copies of operating permits, certificates of use, acceptance certificates, inspection certificates, inspection reports, or similar documents established for compliance with regulations bearing on the Work issued by a testing agency or authority having jurisdiction.
   b. Full details of any Owner contracted tests
   c. Performance data, ratings and curves, including fan and pump curves
   d. Full factory testing reports, if any
   e. Installation and checkout materials that are actually shipped with product or equipment
   f. Actual field checkout sheet forms to be used by the factory or on site technicians
   g. Manufacturer's Site Reports
   h. Installer Site Reports
4. Operation Data:
   a. Emergency Instructions and Procedures: Where applicable for each type of emergency indicated below, describe and explain warnings, trouble indications, error messages, and similar codes and signals. Include responsibilities of Owner's operating personnel for notification of installer, supplier, and manufacturer to maintain warranties. Include instructions on stopping, shutdown instructions for each type of emergency, operating instructions for conditions outside normal operating limits, required sequences for electric or electronic systems, special operating instructions and procedures.
      1) Fire
      2) Flood
      3) Gas leak
      4) Water leak
      5) Power failure
      6) Water outage
      7) System, subsystem, or equipment failure
      8) Chemical release or spill
   b. Operating procedures:
      1) Equipment or system break-in procedures
      2) Routine and normal operating instructions
      3) Regulation and control procedures
      4) Normal shutdown or stopping instructions
      5) Normal start up and break-in instructions
      6) Manual operating instructions

7) Seasonal and weekend operating instructions
8) Required sequences for electric or electronic systems
9) Special operating instructions and procedures
10) Precautions against improper use
11) Operating characteristics
12) Operating standards
13) Operating logs
14) Piped system diagrams
15) Limiting conditions
16) Performance curves
17) Engineering data and tests

c. Systems and Equipment Controls: Describe the sequence of operation, and diagram controls as installed:
1) Control diagrams
2) Piping diagrams and identify color-coding where required for identification
3) Wiring diagrams

d. Performance and design criteria if Contractor is delegated design responsibility

e. Operating logs

5. Maintenance Data:

a. Maintenance Procedures:
1) Manufacturer's standard printed maintenance instructions and bulletins
2) Drawings, diagrams, and instructions required for maintenance, including disassembly and component removal, replacement, and assembly
3) Complete identification of nomenclature and part number of components edited to omit reference to items which do not apply to this installation
4) Inspection procedures
5) Types of cleaning agents to be used and methods of cleaning
6) List of cleaning agents and methods of cleaning detrimental to product
7) Schedule for routine cleaning
8) A list of special tools required to service or maintain the equipment
9) Repair instructions and procedures
10) Test and inspection instructions and procedures
11) Troubleshooting guide
12) Precautions against improper maintenance
13) Disassembly; component removal, repair, and replacement; and reassembly instructions and procedures
14) Aligning, adjusting, and checking instructions
15) Manufacturer's standard demonstration and training videos

b. Maintenance and Service Schedules: Include service and lubrication requirements, list of required lubricants for equipment, and separate schedules for preventive and routine maintenance and service with standard time allotment.
1) Scheduled Maintenance and Service: Tabulate actions for daily, weekly, monthly, quarterly, semiannual, annual or other periodic frequencies.

2) Maintenance and Service Record: Include manufacturers' forms for recording maintenance.
3) License requirements including inspection and renewal dates

c. Spare Parts List and Source Information: Include lists of replacement and repair parts.
1) Lists of materials and local sources of materials and related services
2) Lists of parts and local sources of parts and related services
3) List of items recommended to be stocked as spare parts

d. Maintenance Service Contracts: Include copies of maintenance agreements with name and telephone number of service agent.

2.04 DEMONSTRATION AND TRAINING PROGRAM

A. Program Modules: Develop a demonstration and training program such that topics required by individual Specification Sections and topics listed below are included in at least one instruction module.
1. Openings
   a. Door Hardware
2. Specialties
   a. Folding Panel Partitions
   b. Fireplaces and Stoves
3. Equipment
   a. Motorized Projection Screen
   b. Motorized Projection Mounts
4. Conveying Equipment
   a. Elevators
5. Plumbing
6. Heating, Ventilating, and Air-Conditioning (HVAC)
7. Electrical
8. Communications
   a. Data Communications Equipment
   b. Voice Communications Equipment

B. Instruction Module Content: Develop a learning objective and teaching outline for each instruction module. Include a description of specific skills and knowledge that participant is expected to master. For each module, include instruction for the following as applicable to the system, equipment, or component:
1. Description
2. Review Documentation
3. Emergencies Procedures
4. Operations
5. Adjustments
6. Troubleshooting
7. Maintenance
8. Repairs

PART 3 - EXECUTION

3.01 RECORD DOCUMENT PROCEDURES

A. Record Documents: Provide Record Documents indicated in Part 2, individual Specification Sections, and elsewhere.
   1. Maintain one paper copy of each Contract Drawing, Contract Specification and Record Submittal during the construction period for Record Document purposes.

B. Record Document Location: agreed to by Owner, Architect, and Contractor; a safe and secure location accessible during normal business hours; convenient to Contractor; away from Contractor's documents used in construction operations; not in Contractor's field office, unless maintenance and misuse prevention can be ensured.

C. Recording Procedure: Post changes and modifications, including Contract modifications, to Record Documents as they occur. Record data as soon as possible after obtaining it but no later than three (3) days. Do not wait until the end of Project to record data. Do not permanently conceal Work until information has been recorded. Record and check the markup before enclosing concealed installations.

D. Preparation: Require individual or entity who obtained record data, whether individual or entity is installer, Subcontractor, or similar entity, to provide information for preparation of corresponding marked-up Record Documents. Use proficient personnel to completely and accurately record information in an acceptable, understandable and legible drawing or writing technique:
   1. Mark with colored electronic media or erasable colored pen or pencil. Use colors to distinguish between changes for different categories of the Work at same location.
   2. Make copies of appropriate alterations (such as addenda, substitutions or Change Orders) on light colored (non-white) paper and attach to each Record Document the corresponding items which relate to that document only. Attach such that relevant information is not obscured. Identify source of information.
   3. Reference Addendum numbers, Construction Change Directive numbers, Alternate numbers, Change Order numbers, and similar identification, where applicable.
   4. Where appropriate, supplement with acceptable and legible photographs.

E. Maintenance of Record Documents and Record Samples: Do not use Record Documents for construction purposes. Maintain Record Documents in good order and in a clean, dry, legible condition, protected from deterioration and loss. Provide access to Project Record Documents for reference during normal working hours.

F. Record Documents Submission: At end of construction period as indicated elsewhere, submit Record Documents to Architect for review. Architect will indicate whether general scope of changes, additional information recorded, and quality of documents (including legibility and drafting) are acceptable. Add or modify Record Documents to comply with requirements and as directed by Architect.

3.02 OPERATION AND MAINTENANCE MANUALS

A. Operation and Maintenance Documentation Directory: Prepare a single, comprehensive directory of Operation and Maintenance Data and Manuals, listing items and their location to facilitate ready access to desired information.
   1. Include a section in the directory for each of the following:
      a. List of documents
      b. List of Sections
      c. Table of contents
   2. Tables of Contents: Include a table of contents for each Operation and Maintenance Manual.

B. Operation and Maintenance Data Collection Coordination: Establish procedures which assure the comprehensive collection and storage of Operation and Maintenance Data contents during construction and do not wait until end of construction. Establish procedures that ensure Operation and Maintenance Data which arrive at the Project site with materials or by other means are collected and safely stored. Record Document Location may be used for collection purposes.

C. Operation and Maintenance Manual Preparation: Prepare a complete set of Operation and Maintenance Manuals in appropriate Owner's copy of Facilities Operation Binders. Provide additional binders if necessary to accommodate data. Prepare Manuals as follows:
   1. Correlate information with title page and table of contents for each manual.
   2. Relevant Data: Where manuals contain standard printed data, include only sheets pertinent to product or component installed. Mark each sheet to clearly identify each product or component incorporated into the Work. Edit data to omit reference to products or data not applicable to this installation. If data include more than one item in a tabular format, identify each item using appropriate references from the Contract Documents. Identify data applicable to the Work and delete references to information not applicable.
   3. Supplemental Data:
      a. Prepare custom prepared supplementary text and drawings if:
         1) Necessary to provide additional information to supplement data included in the Operating and Maintenance Manuals or Record Documents
         2) Printed data are not available
         3) Additional information is necessary for proper understanding, operation and maintenance of product, equipment or systems.
      b. Prepare text and drawings supplementing printed data to illustrate the relationship of component parts of equipment and systems and to illustrate control sequence and flow diagrams. Coordinate these drawings with information contained in Record Drawings to ensure correct illustration of completed installation.
   4. Record Documents: Do not use original Record Documents as part of Operation and Maintenance Manuals. Make copies of record Documents where information is required for Operation and Maintenance Manuals.
   5. Preparers: Contents of operation and maintenance manuals shall be prepared by entities experienced with such manual preparation. Contents of manuals relating to a portion of the Work shall be prepared by the installer as assisted by

the supplier and manufacturer's service representative of that portion of the Work.

6. Do not handwrite contents.

D. Operation and Maintenance Manual Organization: Organize Operation and Maintenance Manuals sequentially as follows:
   1. Title Page: For each manual binder, enclose title page in transparent plastic sleeve. Include the following information:
      a. Title: Subject matter included in manual.
      b. Name and address of Project
      c. Name of Owner
      d. Date of manual
      e. Name, address, and telephone number of Contractor
      f. Name of Architect
   2. Table of Contents: Provide the Section name and number for each Section in the Project Manual. List each product, system, subsystem, and piece of equipment not part of a system included in manual by Section.
   3. Section Tabs: For each Section number provide divider with clear non-colored numbered tab.
      a. No Operation and Maintenance Data Required: For products or equipment which are not part of a system or subsystem and where Operation or Maintenance Data is not required by individual Specification Sections, provide the following for Work performed under each Section:
         1) Contact Data as indicated in Part 2
         2) Descriptive Data as indicated in Part 2
         3) Spare Parts List and Source Information portion of Maintenance Data as indicated in Part 2 if applicable
         4) Executed Warranties, if any
   4. Provide Operation and Maintenance Data indicating in individual Specification Sections.
      a. Operation and Maintenance Data Required: Where operational or maintenance data is required by individual Specification Sections, or for each system, subsystem, and piece of operational, mechanical or electrical equipment not part of a system or subsystem provide Operation and Maintenance Data as indicated in Part 2, divide Operation and Maintenance Data under the Section Tab into Chapter Tabs with content as indicated below.
         1) Chapter Tabs: Provide the following chapters in sequence with the chapter titles indicated below as 24 point underlined text printed on a double weight colored sheet and followed by the information indicated below.
            a) <u>Contacts:</u> Include Contact Data as indicated in Part 2.
            b) Include telephone number for emergency service
            c) <u>Description:</u> Include Descriptive Data as indicated in Part 2.
            d) <u>Maintenance Summary:</u> Include condensed, tabulated and typewritten summary of Maintenance and Service Schedules and Spare Parts List and Source Information as indicated in Part 2.
            e) <u>Operation and Maintenance Instructions:</u> Include Operation and Maintenance Data as indicated in Part 2 other than Contact Data, Descriptive Data, or Commissioning Data

f) Record Information: Include copies of Record Documents which contain operation or maintenance data.
g) Warranties: Include Executed Warranties, if any.

3.03 DEMONSTRATION AND TRAINING

A. Instructors: Engage and pay for instructors to demonstrate and train Owner's personnel in each instruction module.
   1. Engage and pay for representative of installers of products or equipment which are the subject of instruction module to be present during instruction. Representative shall be installer's personnel most familiar with installation. Representative shall assist instructor and be available to answer questions regarding installation.

B. Preparation: Complete preparation of Operation and Maintenance Manuals. Assemble educational materials necessary for instruction. Assemble instructional modules contents into a training manual organized in coordination with Operation and Maintenance Data. Set up instructional and recording equipment at instruction location.

C. Training Location: Conduct training on-site in the completed and fully operational facility using the actual equipment in-place.

D. Evaluation: At conclusion of each training module, assess and document each participant's mastery of module by use of an oral and demonstration performance based test.

E. Instruction: Instruct, demonstrate to, and train Owner's personnel in each program module indicated in Part 2.

F. Cleanup: Collect used and leftover educational materials and give to Owner. Remove instructional equipment. Restore systems and equipment to condition existing before initial training use.

END OF SECTION 017700

SECTION 033000 - CAST-IN-PLACE CONCRETE

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 01 Specification Sections, apply to this Section.

1.2 SUMMARY

A. Section includes cast-in-place concrete, including formwork, reinforcement, concrete materials, mixture design, placement procedures, and finishes, for the following:

1. Footings.
2. Elevator walls.
3. Slabs-on-grade.

1.3 DEFINITIONS

A. Cementitious Materials: Portland cement alone or in combination with one or more of the following: blended hydraulic cement, fly ash and other pozzolans, ground granulated blast-furnace slag, and silica fume; subject to compliance with requirements.

1.4 ACTION SUBMITTALS

A. Product Data: For each type of product indicated.

B. Design Mixtures: For each concrete mixture. Submit alternate design mixtures when characteristics of materials, Project conditions, weather, test results, or other circumstances warrant adjustments.

C. Steel Reinforcement Shop Drawings: Placing drawings that detail fabrication, bending, and placement. Include bar sizes, lengths, material, grade, bar schedules, stirrup spacing, bent bar diagrams, bar arrangement, splices and laps, mechanical connections, tie spacing, hoop spacing, and supports for concrete reinforcement.

1.5 INFORMATIONAL SUBMITTALS

A. Material Certificates: For each of the following, signed by manufacturers:

1. Cementitious materials.
2. Admixtures.
3. Steel reinforcement and accessories.
4. Curing compounds.

B. Material Test Reports: For the following, from a qualified testing agency, indicating compliance with requirements:

1. Aggregates

1.6 QUALITY ASSURANCE

A. Testing Agency Qualifications: An independent agency, qualified according to ASTM C 1077 and ASTM E 329 for testing indicated.

1. Personnel conducting field tests shall be qualified as ACI Concrete Field Testing Technician, Grade 1, according to ACI CP-1 or an equivalent certification program.
2. Personnel performing laboratory tests shall be ACI-certified Concrete Strength Testing Technician and Concrete Laboratory Testing Technician - Grade I. Testing Agency laboratory supervisor shall be an ACI-certified Concrete Laboratory Testing Technician - Grade II.

B. ACI Publications: Comply with the following unless modified by requirements in the Contract Documents:

1. ACI 301, "Specifications for Structural Concrete"
2. ACI 117, "Specifications for Tolerances for Concrete Construction and Materials."

C. Concrete Testing Service: Engage a qualified independent testing agency to perform material evaluation tests and to design concrete mixtures.

1.7 DELIVERY, STORAGE, AND HANDLING

A. Steel Reinforcement: Deliver, store, and handle steel reinforcement to prevent bending and damage.

PART 2 - PRODUCTS

2.1 FORM-FACING MATERIALS

A. Smooth-Formed Finished Concrete: Form-facing panels that will provide continuous, true, and smooth concrete surfaces. Furnish in largest practicable sizes to minimize number of joints.

1. Plywood, metal, or other approved panel materials.
2. Exterior-grade plywood panels, suitable for concrete forms, complying with DOC PS 1, and as follows:

a. High-density overlay, Class 1 or better.
b. Medium-density overlay, Class 1 or better; mill-release agent treated and edge sealed.
c. Structural 1, B-B or better; mill oiled and edge sealed.
d. B-B (Concrete Form), Class 1 or better; mill oiled and edge sealed.

B. Rough-Formed Finished Concrete: Plywood, lumber, metal, or another approved material. Provide lumber dressed on at least two edges and one side for tight fit.

C. Form-Release Agent: Commercially formulated form-release agent that will not bond with, stain, or adversely affect concrete surfaces and will not impair subsequent treatments of concrete surfaces.

D. Form Ties: Factory-fabricated, removable or snap-off metal or glass-fiber-reinforced plastic form ties designed to resist lateral pressure of fresh concrete on forms and to prevent spalling of concrete on removal.

1. Furnish units that will leave no corrodible metal closer than 1 inch to the plane of exposed concrete surface.
2. Furnish ties that, when removed, will leave holes no larger than 1 inch in diameter in concrete surface.

2.2 STEEL REINFORCEMENT

A. Reinforcing Bars: ASTM A 615/A 615M, Grade 60, deformed.

B. Plain-Steel Welded Wire Reinforcement: ASTM A 185/A 185M, plain, fabricated from as-drawn steel wire into flat sheets.

2.3 REINFORCEMENT ACCESSORIES

A. Bar Supports: Bolsters, chairs, spacers, and other devices for spacing, supporting, and fastening reinforcing bars and welded wire reinforcement in place. Manufacture bar supports from steel wire, plastic, or precast concrete according to CRSI's "Manual of Standard Practice," of greater compressive strength than concrete and as follows:

1. For concrete surfaces exposed to view where legs of wire bar supports contact forms, use CRSI Class 1 plastic-protected steel wire or CRSI Class 2 stainless-steel bar supports.

2.4 CONCRETE MATERIALS

A. Cementitious Material: Use the following cementitious materials, of the same type, brand, and source, throughout Project:

1. Portland Cement: ASTM C 150, **Type I/II/III**

B. Normal-Weight Aggregates: ASTM C 33, **Class 3S** coarse aggregate or better, graded. Provide aggregates from a single source.

C. Retain coarse-aggregate size from three options in first subparagraph below; insert gradation requirements if preferred. Aggregate size limits relate to spacing of steel reinforcement, depth of slab, or thickness of concrete member.

1. Maximum Coarse-Aggregate Size: **3/4 inch** nominal.
2. Fine Aggregate: Free of materials with deleterious reactivity to alkali in cement.

D. Water: ASTM C 94/C 94M **and potable**.

2.5 ADMIXTURES

A. Air-Entraining Admixture: ASTM C 260.

B. Chemical Admixtures: Provide admixtures certified by manufacturer to be compatible with other admixtures and that will not contribute water-soluble chloride ions exceeding those permitted in hardened concrete. Do not use calcium chloride or admixtures containing calcium chloride.

C. Set-Accelerating Corrosion-Inhibiting Admixture: Commercially formulated, anodic inhibitor or mixed cathodic and anodic inhibitor; capable of forming a protective barrier and minimizing chloride reactions with steel reinforcement in concrete and complying with ASTM C 494/C 494M, Type C.

2.6 CURING MATERIALS

A. Evaporation Retarder: Waterborne, monomolecular film forming, manufactured for application to fresh concrete.

B. Absorptive Cover: AASHTO M 182, Class 2, burlap cloth made from jute or kenaf, weighing approximately 9 oz./sq. yd. when dry.

C. Moisture-Retaining Cover: ASTM C 171, polyethylene film or white burlap-polyethylene sheet.

D. Water: Potable.

E. Clear, Waterborne, Membrane-Forming Curing Compound: ASTM C 309, Type 1, Class B, dissipating.

F. Clear, Waterborne, Membrane-Forming Curing Compound: ASTM C 309, Type 1, Class B, nondissipating.

2.7 RELATED MATERIALS

A. Expansion- and Isolation-Joint-Filler Strips: **ASTM D 1751, asphalt-saturated cellulosic fiber or ASTM D 1752, cork or self-expanding cork**.

B. Bonding Agent: ASTM C 1059/C 1059M, Type II, non-redispersible, acrylic emulsion or styrene butadiene.

C. Epoxy Bonding Adhesive: ASTM C 881, two-component epoxy resin, capable of humid curing and bonding to damp surfaces, of class suitable for application temperature and of grade to suit requirements.

2.8 CONCRETE MIXTURES, GENERAL

A. Prepare design mixtures for each type and strength of concrete, proportioned on the basis of laboratory trial mixture or field test data, or both, according to ACI 301.

B. Admixtures: Use admixtures according to manufacturer's written instructions.

1. Use **water-reducing, high-range water-reducing or plasticizing** admixture in concrete, as required, for placement and workability.

C. Color Pigment: Add color pigment to concrete mixture according to manufacturer's written instructions and to result in hardened concrete color consistent with approved mockup.

2.9 FABRICATING REINFORCEMENT

A. Fabricate steel reinforcement according to CRSI's "Manual of Standard Practice."

2.10 CONCRETE MIXING

A. Ready-Mixed Concrete: Measure, batch, mix, and deliver concrete according to ASTM C 94/C 94M, and furnish batch ticket information.

1. When air temperature is between 85 and 90 deg F, reduce mixing and delivery time from 1-1/2 hours to 75 minutes; when air temperature is above 90 deg F, reduce mixing and delivery time to 60 minutes.

B. Project-Site Mixing: Measure, batch, and mix concrete materials and concrete according to ASTM C 94/C 94M. Mix concrete materials in appropriate drum-type batch machine mixer.

1. For mixer capacity of 1 cu. yd. or smaller, continue mixing at least 1-1/2 minutes, but not more than 5 minutes after ingredients are in mixer, before any part of batch is released.
2. For mixer capacity larger than 1 cu. yd., increase mixing time by 15 seconds for each additional 1 cu. yd..
3. Provide batch ticket for each batch discharged and used in the Work, indicating Project identification name and number, date, mixture type, mixture time, quantity, and amount of water added. Record approximate location of final deposit in structure.

PART 3 - EXECUTION

3.1 FORMWORK

A. Design, erect, shore, brace, and maintain formwork, according to ACI 301, to support vertical, lateral, static, and dynamic loads, and construction loads that might be applied, until structure can support such loads.

B. Construct formwork so concrete members and structures are of size, shape, alignment, elevation, and position indicated, within tolerance limits of ACI 117.

C. Construct forms tight enough to prevent loss of concrete mortar.

D. Fabricate forms for easy removal without hammering or prying against concrete surfaces. Provide crush or wrecking plates where stripping may damage cast concrete surfaces.

E. Set edge forms, bulkheads, and intermediate screed strips for slabs to achieve required elevations and slopes in finished concrete surfaces. Provide and secure units to support screed strips; use strike-off templates or compacting-type screeds.

F. Clean forms and adjacent surfaces to receive concrete. Remove chips, wood, sawdust, dirt, and other debris just before placing concrete.

G. Retighten forms and bracing before placing concrete, as required, to prevent mortar leaks and maintain proper alignment.

H. Coat contact surfaces of forms with form-release agent, according to manufacturer's written instructions, before placing reinforcement.

3.2 REMOVING AND REUSING FORMS

A. General: Formwork for sides of walls that does not support weight of concrete may be removed after cumulatively curing at not less than 50 deg F for **24** hours after placing concrete. Concrete has to be hard enough to not be damaged by form-removal operations and curing and protection operations need to be maintained.

B. Clean and repair surfaces of forms to be reused in the Work. Split, frayed, delaminated, or otherwise damaged form-facing material will not be acceptable for exposed surfaces. Apply new form-release agent.

C. When forms are reused, clean surfaces, remove fins and laitance, and tighten to close joints. Align and secure joints to avoid offsets.

3.3 STEEL REINFORCEMENT

A. General: Comply with CRSI's "Manual of Standard Practice" for placing reinforcement.

B. Clean reinforcement of loose rust and mill scale, earth, ice, and other foreign materials that would reduce bond to concrete.

C. Accurately position, support, and secure reinforcement against displacement. Locate and support reinforcement with bar supports to maintain minimum concrete cover. Do not tack weld crossing reinforcing bars.

D. Set wire ties with ends directed into concrete, not toward exposed concrete surfaces.

E. Install welded wire reinforcement in longest practicable lengths on bar supports spaced to minimize sagging. Lap edges and ends of adjoining sheets at least one mesh spacing. Offset laps of adjoining sheet widths to prevent continuous laps in either direction. Lace overlaps with wire.

3.4 JOINTS

A. General: Construct joints true to line with faces perpendicular to surface plane of concrete.

B. Construction Joints: Install so strength and appearance of concrete are not impaired, at locations indicated or as approved by Architect.

1. Place joints perpendicular to main reinforcement. Continue reinforcement across construction joint.
2. Use a bonding agent at locations where fresh concrete is placed against concrete surfaces.
3. Use epoxy-bonding adhesive at locations where fresh concrete is placed against hardened or partially hardened concrete surfaces.

3.5 CONCRETE PLACEMENT

A. Before placing concrete, verify that installation of formwork and reinforcement is complete and that required inspections have been performed.

B. Do not add water to concrete during delivery, at Project site, or during placement unless approved by Architect.

C. Deposit concrete continuously in one layer or in horizontal layers of such thickness that no new concrete will be placed on concrete that has hardened enough to cause seams or planes of weakness.

1. Deposit concrete in horizontal layers of depth to not exceed formwork design pressures and in a manner to avoid inclined construction joints.
2. Consolidate placed concrete with mechanical vibrating equipment according to ACI 301.

D. Deposit and consolidate concrete for floors and slabs in a continuous operation.

1. Consolidate concrete during placement operations so concrete is thoroughly worked around reinforcement and other embedded items and into corners.
2. Maintain reinforcement in position on chairs during concrete placement.
3. Screed slab surfaces with a straightedge and strike off to correct elevations.
4. Begin initial floating using bull floats or darbies to form a uniform and open-textured surface plane, before excess bleedwater appears on the surface. Do not further disturb slab surfaces before starting finishing operations.

3.6 FINISHING FORMED SURFACES

A. Rough-Formed Finish: As-cast concrete texture imparted by form-facing material with tie holes and defects repaired and patched. Remove fins and other projections that exceed specified limits on formed-surface irregularities.

1. Apply to concrete surfaces **not exposed to public view**.

3.7 FINISHING FLOORS AND SLABS

A. General: Comply with ACI 302.1R recommendations for screeding, restraightening, and finishing operations for concrete surfaces. Do not wet concrete surfaces.

B. Float Finish: Consolidate surface by hand floating. Restraighten, cut down high spots, and fill low spots. Repeat float passes and restraightening until surface is left with a uniform, smooth, granular texture.

1. Apply float finish to surfaces **to receive trowel finish**

C. Trowel Finish: After applying float finish, apply first troweling and consolidate concrete by hand trowel. Continue troweling passes and restraighten until surface is free of trowel marks and uniform in texture and appearance. Grind smooth any surface defects that would telegraph through floor coverings.

3.8 ITEMS

A. Filling In: Provide miscellaneous concrete filling as required to complete the Work.

3.9 CONCRETE PROTECTING AND CURING

A. General: Protect freshly placed concrete from premature drying and excessive cold or hot temperatures. Comply with ACI 306.1 for cold-weather protection and ACI 301 for hot-weather protection during curing.

B. Evaporation Retarder: Apply evaporation retarder to unformed concrete surfaces if hot, dry, or windy conditions cause moisture loss approaching 0.2 lb/sq. ft. x h before and during finishing operations. Apply according to manufacturer's written instructions after placing, screeding, and bull floating concrete, but before float finishing.

C. Formed Surfaces: Cure formed concrete surfaces. If forms remain during curing period, moist cure after loosening forms. If removing forms before end of curing period, continue curing for the remainder of the curing period.

D. Unformed Surfaces: Begin curing immediately after finishing concrete. Cure unformed surfaces, including floors and slabs, concrete floor toppings, and other surfaces.

E. Cure concrete according to ACI 308.1, by one or a combination of the following methods:

1. Moisture Curing: Keep surfaces continuously moist for not less than seven days with the following materials:

a. Water.
b. Continuous water-fog spray.
c. Absorptive cover, water saturated, and kept continuously wet. Cover concrete surfaces and edges with 12-inch lap over adjacent absorptive covers.

2. Moisture-Retaining-Cover Curing: Cover concrete surfaces with moisture-retaining cover for curing concrete, placed in widest practicable width, with sides and ends lapped

at least 12 inches (300 mm), and sealed by waterproof tape or adhesive. Cure for not less than seven days. Immediately repair any holes or tears during curing period using cover material and waterproof tape.

a. Moisture cure or use moisture-retaining covers to cure concrete surfaces to receive floor coverings.
b. Cure concrete surfaces to receive floor coverings with either a moisture-retaining cover or a curing compound that the manufacturer certifies will not interfere with bonding of floor covering used on Project.

3. Curing Compound: Apply uniformly in continuous operation by power spray or roller according to manufacturer's written instructions. Maintain continuity of coating and repair damage during curing period.

a. Removal: After curing period has elapsed, remove curing compound without damaging concrete surfaces by method recommended by curing compound manufacturer.

4. Curing and Sealing Compound: Apply uniformly to floors and slabs indicated in a continuous operation by power spray or roller according to manufacturer's written instructions. Repeat process 24 hours later and apply a second coat. Maintain continuity of coating and repair damage during curing period.

3.10 CONCRETE SURFACE REPAIRS

A. Defective Concrete: Repair and patch defective areas when approved by Architect. Remove and replace concrete that cannot be repaired and patched to Architect's approval.

B. Patching Mortar: Mix dry-pack patching mortar, consisting of one part portland cement to two and one-half parts fine aggregate passing a No. 16 sieve, using only enough water for handling and placing.

C. Repairing Formed Surfaces: Surface defects include color and texture irregularities, cracks, spalls, air bubbles, honeycombs, rock pockets, fins and other projections on the surface, and stains and other discolorations that cannot be removed by cleaning.

1. Immediately after form removal, cut out honeycombs, rock pockets, and voids more than 1/2 inch in any dimension to solid concrete. Limit cut depth to 3/4 inch. Make edges of cuts perpendicular to concrete surface. Clean, dampen with water, and brush-coat holes and voids with bonding agent. Fill and compact with patching mortar before bonding agent has dried. Fill form-tie voids with patching mortar or cone plugs secured in place with bonding agent.
2. Repair defects on concealed formed surfaces that affect concrete's durability and structural performance as determined by Architect.

D. Repairing Unformed Surfaces: Test unformed surfaces, such as floors and slabs, for finish and verify surface tolerances specified for each surface. Correct low and high areas.

1. Repair finished surfaces containing defects. Surface defects include spalls, popouts, honeycombs, rock pockets, crazing and cracks in excess of 0.01 inch wide or that penetrate to reinforcement.
2. After concrete has cured at least 14 days, correct high areas by grinding.
3. Correct localized low areas during or immediately after completing surface finishing operations by cutting out low areas and replacing with patching mortar. Finish repaired areas to blend into adjacent concrete.
4. Correct other low areas scheduled to receive floor coverings with a repair underlayment. Prepare, mix, and apply repair underlayment and primer according to manufacturer's written instructions to produce a smooth, uniform, plane, and level surface. Feather edges to match adjacent floor elevations.
5. Repair defective areas, except random cracks and single holes 1 inch or less in diameter, by cutting out and replacing with fresh concrete. Remove defective areas with clean, square cuts and expose steel reinforcement with at least a 3/4-inch clearance all around. Dampen concrete surfaces in contact with patching concrete and apply bonding agent. Mix patching concrete of same materials and mixture as original concrete except without coarse aggregate. Place, compact, and finish to blend with adjacent finished concrete. Cure in same manner as adjacent concrete.
6. Repair random cracks and single holes 1 inch or less in diameter with patching mortar. Groove top of cracks and cut out holes to sound concrete and clean off dust, dirt, and loose particles. Dampen cleaned concrete surfaces and apply bonding agent. Place patching mortar before bonding agent has dried. Compact patching mortar and finish to match adjacent concrete. Keep patched area continuously moist for at least 72 hours.

E. Perform structural repairs of concrete, subject to Architect's approval, using epoxy adhesive and patching mortar.

F. Repair materials and installation not specified above may be used, subject to Architect's approval.

3.11 FIELD QUALITY CONTROL

A. Concrete Tests: Testing of composite samples of fresh concrete obtained according to ASTM C 172 shall be performed according to the following requirements:

1. Testing Frequency: Obtain one composite sample for each day's pour of the elevator wall.

2. Slump: ASTM C 143/C 143M; one test at point of placement for each composite sample,
3. Air Content: ASTM C 231, pressure method, for normal-weight concrete; one test for each composite sample.
4. Concrete Temperature: ASTM C 1064/C 1064M; one test for each composite sample.
5. Compression Test Specimens: ASTM C 31/C 31M.

    a. Cast and laboratory cure two sets of two standard cylinder specimens for each composite sample.

6. Compressive-Strength Tests: ASTM C 39/C 39M; test one set of two laboratory-cured specimens at 7 days and one set of two specimens at 28 days.

a. A compressive-strength test shall be the average compressive strength from a set of two specimens obtained from same composite sample and tested at age indicated.

7. Test results shall be reported in writing to Architect, concrete manufacturer, and Contractor within 48 hours of testing. Reports of compressive-strength tests shall contain Project identification name and number, date of concrete placement, name of concrete testing and inspecting agency, location of concrete batch in Work, design compressive strength at 28 days, concrete mixture proportions and materials, compressive breaking strength, and type of break for both 7- and 28-day tests.
8. Nondestructive Testing: Impact hammer, sonoscope, or other nondestructive device may be permitted by Architect but will not be used as sole basis for approval or rejection of concrete.
9. Additional Tests: Testing and inspecting agency shall make additional tests of concrete when test results indicate that slump, air entrainment, compressive strengths, or other requirements have not been met, as directed by Architect. Testing and inspecting agency may conduct tests to determine adequacy of concrete by cored cylinders complying with ASTM C 42/C 42M or by other methods as directed by Architect.
10. Additional testing and inspecting, at Contractor's expense, will be performed to determine compliance of replaced or additional work with specified requirements.
11. Correct deficiencies in the Work that test reports and inspections indicate do not comply with the Contract Documents.

END OF SECTION 033000

SECTION 04 0120 - BRICK CUTTING AND PATCHING

PART 1 GENERAL

1.01 SECTION INCLUDES

A. BRICK

B. MORTAR

1.02 RELATED REQUIREMENTS

A. Onsite Coating
   1. PAINTING

1.03 SUBMITTALS

A. Verification Samples: face brick units to illustrate matching color, texture and extremes of color range.

1.04 QUALITY ASSURANCE

A. Comply with provisions of ACI 530/ASCE 5/TMS 402 and ACI 530.1/ASCE 6/TMS 602, except where exceeded by requirements of the Contract Documents.

1.05 SITE CONDITIONS

A. Cold and Hot Weather Requirements for Masonry Work: Comply with requirements of ACI 530.1/ASCE 6/TMS 602 or applicable building code, whichever is more stringent.

PART 2 PRODUCTS

2.01 BRICK

A. Facing Brick: ASTM C 216, Type FBS, FBA or FBX (to match existing), Grade SW.
   1. Color and texture: to match existing.
   2. Nominal size: to match existing.
   3. Special shapes: Molded units as required by conditions indicated, unless standard units can be sawn to produce equivalent effect.

2.02 MORTAR

A. Type N / ASTM C 270 using the proportion specification and exclusively the following materials as indicated in this Part:
   1. Masonry cement
   2. Aggregate
   3. Water

2.03 MASONRY CEMENT

A. ASTM C 91, Type N.

2.04 AGGREGATE

A. Washed.

B. Natural or manufactured sand / ASTM C 144 .

C. Fine aggregate / ASTM C 33 except for the following:
   1. Grading requirements, other than limits for deleterious substances, shall not apply.
   2. Aggregate shall be considered to be subject to wetting and shall meet the requirements for restriction on reactive materials.
      a. Aggregate shall be evaluated as satisfactorily, as determined by the Architect, based on methods for evaluating potential for deleterious expansion due to alkali reactivity of an aggregate contained in the appendix of ASTM C 33.
      b. Innocuous / ASTM C 289.
   3. Soundness Test: preformed using sodium sulfate and magnesium sulfate. Use of aggregate failing in the soundness test is prohibited in all cases.

4. Limits for Fine Material: 3.0 percent maximum passing 75 micron (0.075 mm or No. 200) sieve regardless of classification of aggregate as natural or manufactured sand.
5. Limits for Coal and Lignite: 0.5 mass percent maximum of total sample. Coke shall be classed as coal or lignite.
6. Use aggregate failing the organic impurities test due to discoloration is prohibited in all cases.

D. Aggregate Staining Potential: No brown (within 30 minutes on exposure to air and light) or blue-green (within 5 to 10 minutes) gelatinous precipitate is formed when aggregate is immersed in a lime slurry.

2.05 WATER / Mortar

A. Clean and potable.

PART 3 EXECUTION

3.01 CUTTING

A. Use full-size units without cutting if possible. If cutting is required to provide a continuous pattern or to fit adjoining construction, cut units with motor-driven saws. Unless otherwise indicated, provide clean, straight and sharp, unchipped edges.

B. Install cut units with cut surfaces and, where possible, cut edges concealed.

C. Do not use less-than-half-size units at corners, jambs, and, where possible, at other locations.

D. Do not use less-than-quarter-size units.

3.02 PLACING AND BEDDING MASONRY

A. Solid Masonry: Lay solid masonry units with completely filled bed and head joints; butter ends with sufficient mortar to fill head joints and shove into place. Do not deeply furrow bed joints or slush head joints.

B. Remove excess mortar and grout as work progresses.

C. Do not shift or tap masonry units after mortar has achieved initial set. Where adjustment must be made, remove mortar and replace.

3.03 PROGRESS AND FINAL CLEANING

A. Immediately remove stains, efflorescence, or other excess resulting from the work of this section.

B. Remove excess mortar, smears, and droppings as work proceeds and upon completion.

C. Clean surrounding surfaces.

3.04 PAINTING

A. Paint brick to match existing paint as required for onsite coating indicated elsewhere.

END OF SECTION

SECTION 042200 - CONCRETE UNIT MASONRY

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 01 Specification Sections, apply to this Section.

1.2 SUMMARY

A. Section Includes:

1. Concrete masonry units.
2. Mortar and grout.
3. Steel reinforcing bars.
4. Masonry joint reinforcement.

1.3 DEFINITIONS

A. CMU(s): Concrete masonry unit(s).

B. Reinforced Masonry: Masonry containing reinforcing steel in grouted cells.

1.4 ACTION SUBMITTALS

A. Shop Drawings: For the following:
1. Reinforcing Steel: Detail bending and placement of unit masonry reinforcing bars. Comply with ACI 315, "Details and Detailing of Concrete Reinforcement.

1.5 QUALITY ASSURANCE

A. Masonry Standard: Comply with ACI 530.1/ASCE 6/TMS 602 unless modified by requirements in the Contract Documents.

1.6 DELIVERY, STORAGE, AND HANDLING

A. Store masonry units on elevated platforms in a dry location. If units are not stored in an enclosed location, cover tops and sides of stacks with waterproof sheeting, securely tied. If units become wet, do not install until they are dry.

B. Store cementitious materials on elevated platforms, under cover, and in a dry location. Do not use cementitious materials that have become damp.

C. Store aggregates where grading and other required characteristics can be maintained and contamination avoided.

D. Deliver preblended, dry mortar mix in moisture-resistant containers designed for use with dispensing silos. Store preblended, dry mortar mix in delivery containers on elevated platforms, under cover, and in a dry location or in covered weatherproof dispensing silos.

E. Store masonry accessories, including metal items, to prevent corrosion and accumulation of dirt and oil.

1.7 PROJECT CONDITIONS

A. Do not apply uniform floor or roof loads for at least 12 hours and concentrated loads for at least three days after building masonry walls or columns.

PART 2 - PRODUCTS

2.1 MASONRY UNITS, GENERAL

A. Defective Units: Referenced masonry unit standards may allow a certain percentage of units to contain chips, cracks, or other defects exceeding limits stated in the standard

B. CMUs: ASTM C 90.

1. Unit Compressive Strength: Provide units with minimum average net-area compressive strength of **2150 psi**.
2. Density Classification: **Normal weight**
3. Size (Width): Manufactured to dimensions 3/8 inch less than nominal dimensions.

2.2 **MASONRY** LINTELS

A. Masonry Lintels: Built-in-place masonry lintels made from bond beam CMUs with reinforcing bars placed as indicated and filled with coarse grout.

2.3 MORTAR AND GROUT MATERIALS

A. Portland Cement: ASTM C 150, Type I or II, except Type III may be used for cold-weather construction. Hydrated Lime: ASTM C 207, Type S.

B. Portland Cement-Lime Mix: Packaged blend of portland cement and hydrated lime containing no other ingredients.

C. Aggregate for Mortar: ASTM C 144.

D. Aggregate for Grout: ASTM C 404.

E. Water: Potable.

2.4 REINFORCEMENT

A. Uncoated Steel Reinforcing Bars: ASTM A 615/A 615M or ASTM A 996/A 996M, Grade 60.

B. Masonry Joint Reinforcement, General: ASTM A 951/A 951M.

1. Interior Walls: **Hot-dip** galvanized, carbon steel.
2. Exterior Walls: **Hot-dip galvanized, carbon** steel.

C. Masonry Joint Reinforcement for Single-Wythe Masonry: Either ladder or truss type with single pair of side rods.

2.5 MISCELLANEOUS ANCHORS

A. Anchor Bolts: Steel bolts complying with ASTM A 307, Grade A; with ASTM A 563 hex nuts and, where indicated, flat washers; hot-dip galvanized to comply with ASTM A 153/A 153M, Class C; of dimensions indicated.

2.6 MISCELLANEOUS MASONRY ACCESSORIES

A. Reinforcing Bar Positioners: Wire units designed to fit into mortar bed joints spanning masonry unit cells and hold reinforcing bars in center of cells. Units are formed from 0.148-inch steel wire, hot-dip galvanized after fabrication. Provide units designed for number of bars indicated.

2.7 MORTAR AND GROUT MIXES

A. General: Do not use admixtures, including pigments, air-entraining agents, accelerators, retarders, water-repellent agents, antifreeze compounds, or other admixtures unless otherwise indicated.

1. Do not use calcium chloride in mortar or grout.
2. Use **portland cement-lime** mortar.

B. Mortar for Unit Masonry: Comply with ASTM C 270, **Property** Specification. Provide the following types of mortar for applications stated.

1. For masonry below grade or in contact with earth, use **Type S**.
2. For reinforced masonry, use **Type S**.

C. Grout for Unit Masonry: Comply with ASTM C 476.
1. Proportion grout in accordance with ASTM C 476, **paragraph 4.2.2 for specified 28-day compressive strength of 2000 psi**.
2. Provide grout with a slump of **8 to 11 inches** as measured according to ASTM C 143/C 143M.

PART 3 - EXECUTION

3.1 INSTALLATION, GENERAL

A. Use full-size units without cutting if possible. If cutting is required to provide a continuous pattern or to fit adjoining construction, cut units with motor-driven saws; provide clean, sharp, unchipped edges. Allow units to dry before laying unless wetting of units is specified. Install cut units with cut surfaces and, where possible, cut edges concealed.

3.2 TOLERANCES

A. Dimensions and Locations of Elements:

1. For dimensions in cross section or elevation do not vary by more than plus 1/2 inch or minus 1/4 inch.
2. For location of elements in plan do not vary from that indicated by more than plus or minus 1/2 inch.
3. For location of elements in elevation do not vary from that indicated by more than plus or minus 1/4 inch in a story height or 1/2 inch total.

B. Lines and Levels:

1. For bed joints and top surfaces of bearing walls do not vary from level by more than 1/4 inch in 10 feet, or 1/2 inch maximum.
2. For conspicuous horizontal lines, such as lintels, sills, parapets, and reveals, do not vary from level by more than 1/8 inch in 10 feet, 1/4 inch in 20 feet, or 1/2 inch maximum.
3. For vertical lines and surfaces do not vary from plumb by more than 1/4 inch in 10 feet, 3/8 inch in 20 feet, or 1/2 inch maximum.
4. For conspicuous vertical lines, such as external corners, door jambs, reveals, and expansion and control joints, do not vary from plumb by more than 1/8 inch in 10 feet, 1/4 inch in 20 feet, or 1/2 inch maximum.
5. For lines and surfaces do not vary from straight by more than 1/4 inch in 10 feet, 3/8 inch in 20 feet, or 1/2 inch maximum.
6. For vertical alignment of exposed head joints, do not vary from plumb by more than 1/4 inch in 10 feet, or 1/2 inch maximum.

C. Joints:

1. For bed joints, do not vary from thickness indicated by more than plus or minus 1/8 inch, with a maximum thickness limited to 1/2 inch.
2. For exposed bed joints, do not vary from bed-joint thickness of adjacent courses by more than 1/8 inch.
3. For head and collar joints, do not vary from thickness indicated by more than plus 3/8 inch or minus 1/4 inch.
4. For exposed head joints, do not vary from thickness indicated by more than plus or minus 1/8 inch.

3.3 LAYING MASONRY WALLS

A. Lay out walls in advance for accurate spacing of surface bond patterns with uniform joint thicknesses and for accurate location of openings, movement-type joints, returns, and offsets. Avoid using less-than-half-size units, particularly at corners, jambs, and, where possible, at other locations.

B. Bond Pattern for Exposed Masonry: Lay exposed masonry in **running bond**; do not use units with less than nominal 4-inch horizontal face dimensions at corners or jambs.

C. Stopping and Resuming Work: Stop work by racking back units in each course from those in course below; do not tooth. When resuming work, clean masonry surfaces that are to receive mortar before laying fresh masonry.

3.4 MORTAR BEDDING AND JOINTING

A. Lay hollow CMUs as follows:

1. With face shells fully bedded in mortar and with head joints of depth equal to bed joints.
2. With webs fully bedded in mortar in all courses of piers, columns, and pilasters.
3. With webs fully bedded in mortar in grouted masonry, including starting course on footings.
4. With entire units, including areas under cells, fully bedded in mortar at starting course on footings where cells are not grouted.

B. Tool exposed joints slightly concave when thumbprint hard, using a jointer larger than joint thickness unless otherwise indicated.

C. Cut joints flush for masonry walls to receive plaster or other direct-applied finishes (other than paint) unless otherwise indicated.

3.5 MASONRY JOINT REINFORCEMENT

A. General: Install entire length of longitudinal side rods in mortar with a minimum cover of 5/8 inch on exterior side of walls, 1/2 inch elsewhere. Lap reinforcement a minimum of 6 inches.

1. Space reinforcement not more than 16 inches o.c.
2. Provide reinforcement not more than 8 inches above and below wall openings and extending 12 inches beyond openings **in addition to continuous reinforcement**.

B. Provide continuity at corners by using prefabricated L-shaped units.

3.6 ANCHORING MASONRY TO CONCRETE

A. Anchor masonry to concrete where masonry abuts concrete to comply with the following:
1. Anchor masonry with #3 rebar embedded in masonry joints and attached to concrete by epoxying rebar in 6” drilled holes.
2. Space anchors 16 inches o.c. vertically.

3.7 LINTELS

A. Provide **masonry** lintels where shown.

3.8 REINFORCED UNIT MASONRY INSTALLATION

A. Temporary Formwork and Shores: Construct formwork and shores as needed to support reinforced masonry elements during construction.

1. Construct formwork to provide shape, line, and dimensions of completed masonry as indicated. Make forms sufficiently tight to prevent leakage of mortar and grout. Brace, tie, and support forms to maintain position and shape during construction and curing of reinforced masonry.
2. Do not remove forms and shores until reinforced masonry members have hardened sufficiently to carry their own weight and other loads that may be placed on them during construction.

B. Placing Reinforcement: Comply with requirements in ACI 530.1/ASCE 6/TMS 602.

C. Grouting: Do not place grout until entire height of masonry to be grouted has attained enough strength to resist grout pressure.

1. Comply with requirements in ACI 530.1/ASCE 6/TMS 602 for cleanouts and for grout placement, including minimum grout space and maximum pour height.
2. Limit height of vertical grout pours to not more than **60 inches**.

3.9 FIELD QUALITY CONTROL

A. Mortar Aggregate Ratio Test (Proportion Specification): For each mix provided, according to ASTM C 780.

B. Mortar Test (Property Specification): For each mix provided, according to ASTM C 780. Test mortar for [**mortar air content**] [**and**] [**compressive strength**].

C. Grout Test (Compressive Strength): For each mix provided, according to ASTM C 1019.

D. Prism Test: For each type of construction provided, according to ASTM C 1314 at [**7 days and at** 28 days.

3.10 REPAIRING, POINTING, AND CLEANING

A. Remove and replace masonry units that are loose, chipped, broken, stained, or otherwise damaged or that do not match adjoining units. Install new units to match adjoining units; install in fresh mortar, pointed to eliminate evidence of replacement.

B. Pointing: During the tooling of joints, enlarge voids and holes, except weep holes, and completely fill with mortar. Point up joints, including corners, openings, and adjacent construction, to provide a neat, uniform appearance.

C. In-Progress Cleaning: Clean unit masonry as work progresses by dry brushing to remove mortar fins and smears before tooling joints.

D. Final Cleaning: After mortar is thoroughly set and cured, clean exposed masonry as follows:

1. Remove large mortar particles by hand with wooden paddles and nonmetallic scrape hoes or chisels.
2. Test cleaning methods on sample wall panel; leave one-half of panel uncleaned for comparison purposes. Obtain Architect's approval of sample cleaning before proceeding with cleaning of masonry.
3. Wet wall surfaces with water before applying cleaners; remove cleaners promptly by rinsing surfaces thoroughly with clear water.

3.11 MASONRY WASTE DISPOSAL

A. Salvageable Materials: Unless otherwise indicated, excess masonry materials are Contractor's property. At completion of unit masonry work, remove from Project site.

END OF SECTION 042200

SECTION 04 2300 - GLASS UNIT MASONRY

PART 1 GENERAL

1.01 SUBMITTALS

A. Product Data:
   1. Grout VOC content and material descriptions .
   2. Glass Block .

B. Verification Samples:
   1. Glass Block: unit .

C. Mockup Reports:
   1. Glass Block

1.02 QUALITY ASSURANCE

A. Glass Block Mockups: one glass block window
   1. Location: as directed.
   2. Disposition: Approved undamaged mockups may be incorporated into the Work.

PART 2 PRODUCTS

2.01 GLASS BLOCK

A. Product: Vistabrik Solid Glass Block / Pittsburgh Corning Corporation

B. Size: 8" x 8" x 3"

2.02 GROUT / Glass Block

A. Supplied by glass block manufacturer for applications indicated.
   1. Color: white opaque

PART 3 EXECUTION

3.01 INSTALLATION

A. Provide full mortar joints. Furrowing is not permitted. Remove excess mortar.

B. Maintain uniform joint width of 3/8 inch.

3.02 TOLERANCES

A. Variation From Joint Width: 1/16 inch

B. Maximum Variation from Plane of Unit to Adjacent Unit: 1/32 inch.

C. Maximum Variation of Panel from Plane: 1/8 inch.

3.03 CLEANING

A. Clean and polish faces of glass unit masonry, using materials and technique that will not scratch or deface units.

END OF SECTION

SECTION 05 0514 - FACTORY APPLIED METAL FINISHES

PART 1 GENERAL

1.01 SECTION INCLUDES

A. Section Includes: Factory applied metal finish requirements for the products or Work indicated in the Related Requirements Article in this Part (hereafter "other Work"). These requirements are in addition to requirements indicated elsewhere in other Sections or on the Drawings. Where a conflict or overlap exists between this Section and requirements for other Work indicated elsewhere, the requirements indicated elsewhere shall apply to the Contract Documents. Where a requirement of this Section is not applicable to the other Work, it shall not apply.

1.02 RELATED REQUIREMENTS

A. Metal railings, handrails, and guardrails.

1.03 QUALITY ASSURANCE

A. Factory Applied Metal Finish Applicator Qualifications: Qualified; An entity employing competent control personnel to conduct continuing, effective quality-control program to ensure compliance with requirements; Experienced 10 projects, 5 years.

B. Finish Variations: Provide factory applied metal finishes without the following defects when visible with the naked human eye from a distance of 24 inches under 100 foot-candle illumination:
   1. Color, texture, or pattern or other finish appearance variations in same piece, component or surface.
   2. Where Verifiation Samples have not been approved: color, texture, or pattern or other finish appearance variations in adjoining or adjacent piece(s), component(s) or surface(s).
   3. Color, texture, or pattern variations in same piece or suurface.
   4. Where Verifiation Samples have been approved: Variations in appearance of adjoining or adjacent components are acceptable if they are within the range of approved Samples and are assembled or installed to minimize contrast.

PART 2 PRODUCTS

2.01 MATERIALS

A. Product requirements for coating materials may be indicated in Finishes Article appropriate to substrate in this Part.

2.02 FINISHES, GENERAL

A. Comply with recommendations for applying finishes in NAAMM's "Metal Finishes Manual for Architectural and Metal Products" .

B. Finish items after factory fabrication and assembly, unless otherwise indicated.

C. Finish exposed surfaces to remove tool and die marks and stretch lines, and to blend into surrounding surface.

D. Factory prepare, treat, coat, and cure metal to comply with finish manufacturer's instructions.

E. Coordination: Coordinate selection of shop primers with topcoats to be applied over them. Comply with paint and coating manufacturers' written recommendations to ensure that shop primers and topcoats are compatible with one another.

2.03 STEEL FINISHES

A. Mill Finish: manufacturer's standard mill finish.

B. Galvanized Finish:
   1. Fabricated: For products indicated to be shop fabricated and assembled before galvanizing, comply with ASTM A 123:

a. Overall Coating Thickness: 2.0 mils (1.2 oz/sf - Coating Grade 50 micrometers) overall minimum in addition to requirments of ASTM A 123.
b. Surface Preparation: prepare surfaces to be galvanized to comply with:
1) Exposed and Semi-Exposed Surfaces: SSPC-SP 10/NACE No. 2 (Near-White Blast Cleaning)
2) Concealed Surfaces:
(a) Before Shop Assembly: SSPC-SP 7/NACE No. 4 (Brush-Off Blast Cleaning)
(b) After Shop Assembly: SSPC-SP 1 (Solvent Cleaning)
c. Galzanizing Method: batch hot-dip galvanizing with the following pregalvanizing baths:
1) Caustic Cleaning: chemically active degreasing detergent.
2) Acid Pickling: oxidized steel remover.
3) Fluxing Method: dry flux (zinc ammonium chloride, others), or wet flux (molten flux blanket on the zinc bath surface).

2. Unfabricated and Stock: For products which are not shop fabricated or for shop fabricated products indicated to be assembled with galvanized components, comply with:
a. ASTM A 123 for products made from rolled, pressed, and forged steel shapes, castings, plates, bars, and strips.
b. ASTM A 653 for steel sheet.
1) If no coating designation is indicated elsewhere, provide G60 minimum.
c. ASTM A 153 for steel and iron hardware.

3. After Galvanizing:
a. Unless indicated to remain as weep holes, plug vent and drain holes that will be exposed in finished Work with zinc solder and file smooth.
b. For items to be primed or topcoated:
1) Do not quench or apply post-galvanizing treatments that might interfere with paint adhesion.
2) Thoroughly clean decorative metal of grease, dirt, oil, flux, and other foreign matter.
3) Treat with MPI#25 etching cleaner.

C. Primed Finish: Comply with requirements in SSPC-PA 1, "Paint Application Specification No. 1: Shop, Field, and Maintenance Painting of Steel," for shop painting.
1. Prepare uncoated non-galvanized ferrous-metal surfaces to comply with:
a. Exteriors (SSPC Zone 1B): SSPC-SP 6//NACE No. 3, "Commercial Blast Cleaning."
b. Interiors (SSPC Zone 1A): SSPC-SP 7//NACE No. 4, "Brush-off Blast Cleaning."
c. Treat prepared metal with iron-phosphate pretreatment to rinse and seal surfaces.
2. Prepare galvanized metal by thoroughly removing grease, dirt, oil, flux, and other foreign matter. Treat prepared galvanized metal with zinc-phosphate pretreatment to rinse and seal surfaces.
3. Immediately after cleaning and pretreatment, apply 2 coats primer to surfaces that will be exposed after assembly and installation, and to concealed, non-galvanized surfaces; 1 mil minimum dry film thickness per coat.
a. Primer for Non-galvanized Steel: compatible with topcoat; one of the following at Contractor's option:
1) Zinc-rich air-dried rust-inhibitive primer / SSPC-Paint 20 or SSPC-Paint 29
2) Fast-curing, lead- and chromate-free, universal modified-alkyd primer / MPI#79
3) Epoxy zinc-rich primer / MPI#20
b. Primer for Galvanized Steel: compatible with topcoat; one of the following at Contractor's option:
1) Zinc-dust, zinc-oxide air-dried rust-inhibitive primer / SSPC-Paint 5
2) Cementitious galvanized metal primer/ MPI#26
3) Vinyl wash primer / MPI#80
4) Water-based galvanized metal primer/ MPI#134

SECTION 051200 - STRUCTURAL STEEL FRAMING

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 01 Specification Sections, apply to this Section.

1.2 SUMMARY

A. Section Includes:

1. Structural steel.
2. Grout.

B. Related Sections:
1. Section 055000 "Metal Fabrications" for **other metal items** not defined as structural steel.

1.3 DEFINITIONS

A. Structural Steel: Elements of structural-steel frame, as classified by AISC 303, "Code of Standard Practice for Steel Buildings and Bridges."

1.4 PERFORMANCE REQUIREMENTS

1.5 ACTION SUBMITTALS

A. Shop Drawings: Show fabrication of structural-steel components.

1. Include details of cuts, connections, splices, camber, holes, and other pertinent data.
2. Include embedment drawings.
3. Indicate welds by standard AWS symbols, distinguishing between shop and field welds, and show size, length, and type of each weld. Show backing bars that are to be removed and supplemental fillet welds where backing bars are to remain.
4. Indicate type, size, and length of bolts.

1.6 QUALITY ASSURANCE

A. Welding Qualifications: Qualify procedures and personnel according to AWS D1.1/D1.1M, "Structural Welding Code - Steel."

B. Comply with applicable provisions of the following specifications and documents:

1. AISC 303.
2. AISC 341 and AISC 341s1.
3. AISC 360.
4. RCSC's "Specification for Structural Joints Using ASTM A 325 or A 490 Bolts."

1.7 DELIVERY, STORAGE, AND HANDLING

A. Store materials to permit easy access for inspection and identification. Keep steel members off ground and spaced by using pallets, dunnage, or other supports and spacers. Protect steel members and packaged materials from corrosion and deterioration.

1. Do not store materials on structure in a manner that might cause distortion, damage, or overload to members or supporting structures. Repair or replace damaged materials or structures as directed.

B. Store fasteners in a protected place in sealed containers with manufacturer's labels intact.

1. Fasteners may be repackaged provided Owner's testing and inspecting agency observes repackaging and seals containers.
2. Clean and relubricate bolts and nuts that become dry or rusty before use.

1.8 COORDINATION

A. Coordinate installation of anchorage items to be embedded in or attached to other construction without delaying the Work. Provide setting diagrams, sheet metal templates, instructions, and directions for installation.

PART 2 - PRODUCTS

2.1 STRUCTURAL-STEEL MATERIALS

A. Recycled Content of Steel Products: Postconsumer recycled content plus one-half of preconsumer recycled content not less than [**25**] [**50**] **<Insert number>** percent.

B. W-Shapes: **ASTM A 992/A 992M**.

C. Channels, Angles: **ASTM A 36/A 36M**.

D. Plate and Bar: **ASTM A 36/A 36M**.

E. Cold-Formed Hollow Structural Sections: ASTM A 500, Grade **B** structural tubing.

F. Steel Pipe: ASTM A 53/A 53M, Type E or S, Grade B.

1. Weight Class: **Extra strong**.

G. Welding Electrodes: Comply with AWS requirements.

2.2 BOLTS, CONNECTORS, AND ANCHORS

A. High-Strength Bolts, Nuts, and Washers: ASTM A 325, Type 1, heavy-hex steel structural bolts; ASTM A 563, Grade C, heavy-hex carbon-steel nuts; and ASTM F 436, Type 1, hardened carbon-steel washers; all with plain finish.

1. Direct-Tension Indicators: ASTM F 959, Type 325, compressible-washer type with plain finish.

B. Threaded Rods: **ASTM A 36/A 36M.**

1. Nuts: ASTM A 563 hex carbon steel.
2. Washers: **ASTM F, Type 1, hardened**.
3. Finish: **Plain**.

2.3 PRIMER

A. Low-Emitting Materials: Paints and coatings shall comply with the testing and product requirements of the California Department of Health Services' "Standard Practice for the Testing of Volatile Organic Emissions from Various Sources Using Small-Scale Environmental Chambers."

B. Primer: SSPC-Paint 25, zinc oxide, alkyd, linseed oil primer.

2.4 GROUT

A. Metallic, Shrinkage-Resistant Grout: ASTM C 1107, factory-packaged, metallic aggregate grout, mixed with water to consistency suitable for application and a 30-minute working time.

B. Nonmetallic, Shrinkage-Resistant Grout: ASTM C 1107, factory-packaged, nonmetallic aggregate grout, noncorrosive and nonstaining, mixed with water to consistency suitable for application and a 30-minute working time.

2.5 FABRICATION

A. Structural Steel: Fabricate and assemble in shop to greatest extent possible. Fabricate according to AISC's "Code of Standard Practice for Steel Buildings and Bridges" and AISC 360.

1. Fabricate beams with rolling camber up.
2. Mark and match-mark materials for field assembly.
3. Complete structural-steel assemblies, including welding of units, before starting shop-priming operations.

B. Thermal Cutting: Perform thermal cutting by machine to greatest extent possible.

1. Plane thermally cut edges to be welded to comply with requirements in AWS D1.1/D1.1M.

C. Bolt Holes: Cut, drill, or punch standard bolt holes perpendicular to metal surfaces.

D. Finishing: Accurately finish ends of columns and other members transmitting bearing loads.

E. Cleaning: Clean and prepare steel surfaces that are to remain unpainted according to **SSPC-SP 1, "Solvent Cleaning** or **SSPC-SP 2, "Hand Tool Cleaning.**

F. Holes: Provide holes required for securing other work to structural steel and for other work to pass through steel framing members.

1. Cut, drill, or punch holes perpendicular to steel surfaces.
2. Baseplate Holes: Cut, drill, mechanically thermal cut, or punch holes perpendicular to steel surfaces.

2.6 SHOP CONNECTIONS

A. High-Strength Bolts: Shop install high-strength bolts according to RCSC's "Specification for Structural Joints Using ASTM A 325 or A 490 Bolts" for type of bolt and type of joint specified.

1. Joint Type: **Pretensioned**.

B. Weld Connections: Comply with AWS D1.1/D1.1M for tolerances, appearances, welding procedure specifications, weld quality, and methods used in correcting welding work.

1. Assemble and weld built-up sections by methods that will maintain true alignment of axes without exceeding tolerances in AISC 303 for mill material.

2.7 SHOP PRIMING

A. Shop prime steel surfaces except the following:

1. Surfaces embedded in concrete or mortar. Extend priming of partially embedded members to a depth of 2 inches.
2. Surfaces to be field welded.
3. Galvanized surfaces.

B. Surface Preparation: Clean surfaces to be painted. Remove loose rust and mill scale and spatter, slag, or flux deposits. Prepare surfaces according to the following specifications and standards:

1. SSPC-SP 2, "Hand Tool Cleaning."
2. SSPC-SP 3, "Power Tool Cleaning."

C. Priming: Immediately after surface preparation, apply primer according to manufacturer's written instructions and at rate recommended by SSPC to provide a minimum dry film thickness of 1.5 mils. Use priming methods that result in full coverage of joints, corners, edges, and exposed surfaces.

1. Stripe paint corners, crevices, bolts, welds, and sharp edges.

2. Apply two coats of shop paint to surfaces that are inaccessible after assembly or erection. Change color of second coat to distinguish it from first.

2.8 GALVANIZING

A. Hot-Dip Galvanized Finish: Apply zinc coating by the hot-dip process to structural steel according to ASTM A 123/A 123M.

1. Fill vent and drain holes that will be exposed in the finished Work unless they will function as weep holes, by plugging with zinc solder and filing off smooth.
2. Galvanize **lintels and shelf angles** located in exterior walls.

2.9 SOURCE QUALITY CONTROL

PART 3 - EXECUTION

3.1 EXAMINATION

A. Verify, with steel Erector present, elevations of concrete- and masonry-bearing surfaces and locations of anchor rods, bearing plates, and other embedments for compliance with requirements.

1. Prepare a certified survey of bearing surfaces, anchor rods, bearing plates, and other embedments showing dimensions, locations, angles, and elevations.

B. Proceed with installation only after unsatisfactory conditions have been corrected.

3.2 PREPARATION

A. Provide temporary shores, guys, braces, and other supports during erection to keep structural steel secure, plumb, and in alignment against temporary construction loads and loads equal in intensity to design loads. Remove temporary supports when permanent structural steel, connections, and bracing are in place unless otherwise indicated.

3.3 ERECTION

A. Set structural steel accurately in locations and to elevations indicated and according to AISC 303 and AISC 360.

B. Base and **Bearing** Plates: Clean concrete- and masonry-bearing surfaces of bond-reducing materials, and roughen surfaces prior to setting plates. Clean bottom surface of plates.

1. Set plates for structural members on wedges, shims, or setting nuts as required.
2. **Snug-tighten** anchor rods after supported members have been positioned and plumbed. Do not remove wedges or shims but, if protruding, cut off flush with edge of plate before packing with grout.

3. Promptly pack grout solidly between bearing surfaces and plates so no voids remain. Neatly finish exposed surfaces; protect grout and allow to cure. **Comply with manufacturer's written installation instructions for shrinkage-resistant grouts**]

C. Maintain erection tolerances of structural steel within AISC's "Code of Standard Practice for Steel Buildings and Bridges."

D. Align and adjust various members that form part of complete frame or structure before permanently fastening. Before assembly, clean bearing surfaces and other surfaces that will be in permanent contact with members. Perform necessary adjustments to compensate for discrepancies in elevations and alignment.

1. Level and plumb individual members of structure.

E. Splice members only where indicated.

F. Do not use thermal cutting during erection **unless approved by Architect. Finish thermally cut sections within smoothness limits in AWS D1.1/D1.1M**.

3.4 FIELD CONNECTIONS

A. High-Strength Bolts: Install high-strength bolts according to RCSC's "Specification for Structural Joints Using ASTM A 325 or A 490 Bolts" for type of bolt and type of joint specified.

1. Joint Type: **Pretensioned**.

B. Weld Connections: Comply with AWS D1.1/D1.1M for tolerances, appearances, welding procedure specifications, weld quality, and methods used in correcting welding work.

1. Comply with AISC 303 and AISC 360 for bearing, alignment, adequacy of temporary connections, and removal of paint on surfaces adjacent to field welds.
2. Remove backing bars or runoff tabs, back gouge, and grind steel smooth.
3. Assemble and weld built-up sections by methods that will maintain true alignment of axes without exceeding tolerances in AISC's "Code of Standard Practice for Steel Buildings and Bridges" for mill material.

3.5 REPAIRS AND PROTECTION

A. Galvanized Surfaces: Clean areas where galvanizing is damaged or missing and repair galvanizing to comply with ASTM A 780.

B. Touchup Painting: Immediately after erection, clean exposed areas where primer is damaged or missing and paint with the same material as used for shop painting to comply with SSPC-PA 1 for touching up shop-painted surfaces.

1. Clean and prepare surfaces by SSPC-SP 2 hand-tool cleaning or SSPC-SP 3 power-tool cleaning.

C. Touchup Painting: Cleaning and touchup painting are specified in Section 099113 "Exterior Painting"Section 099123 "Interior Painting."

END OF SECTION 051200

2.04 STAINLESS STEEL FINISHES

A. Surface Preparation: Remove weld spatter. Remove scratches, forming marks, tool marks, die marks and stretch lines, or blend into finish.

B. Polished Finishes: Except for No. 1 and No. 2 finishes, grind and polish surfaces to produce uniform finish, free of cross scratches.
   1. Run grain of directional finishes with long dimension of each piece.
   2. When polishing is completed, passivate and rinse surfaces. Remove embedded foreign matter and leave surfaces chemically clean.

2.05 ALUMINUM FINISHES

A. Mill Finish: manufacturer's standard mill finish.

B. Colored, Class I Anodic Finish: Factory applied AA-M12C22A42/A44 (Mechanical Finish: nonspecular as fabricated; Chemical Finish: etched, medium matte; Anodic Coating: Architectural Class I, integrally colored or electrolytically deposited color coating 0.7 mils or thicker) / AA.
   1. Comply with AAMA 611.

PART 3 EXECUTION

3.01 CLEANING AFTER INSTALLATION

A. Remove temporary protective coverings and strippable films when there is no possibility of damage from other construction operations yet to be performed at same location and during final cleaning (if any) and before Substantial Completion. Remove coverings simultaneously from similarly finished items to preclude nonuniform oxidation and discoloration.

B. Clean exposed factory finished metal surfaces to leave an undamaged and uniform finish free of streaks, marks, and foreign substances and matching approved mockups (if any) and Samples (if any). Use cleaning methods which are not damaging and comply with metal finisher's cleaning instructions or, if manufacturer has no instructions, use the following cleaning method:
   1. Clean with water diluted detergent not harmful to finishes.
   2. Thoroughly rinse surfaces with clean water.
   3. Thoroughly dry surfaces.

3.02 NON-CONFORMING WORK

A. Repair deterioration, defects, abrasions, and damage to factory applied metal finishes to factory-finished appearance so no evidence remains of corrective work when viewed with the naked human eye from a distance of 36 inches under 50 foot-candle illumination.
   1. Repair finishes with touch up coating and complying with methods of SSPC-PA 1 and not less than dry film thickness reuired for original finish.
   2. Galvanized Surfaces: Repair galvanizing with touch up coating and complying with methods of ASTM A 780.

B. For the following conditions, remove in-place and provide new Work to eliminate evidence of replacement:
   1. Completed Work not matching approved mockups or samples.
   2. Non-conforming Work which can not be corrected by repair alone.

END OF SECTION

SECTION 05 5000 - METAL FABRICATIONS

PART 1 GENERAL

1.01 SECTION INCLUDES

A. FABRICATED METAL FRAMING / Stone Countertops

B. METAL LADDERS / Elevator Pit

1.02 RELATED REQUIREMENTS

A. Factory Applied Metal Finishes
   1. Requirements for shop priming.

B. Gypsum Board Assemblies: Concealed substrate reinforcing, framing and blocking for metal fabrication support.

C. Onsite Coating
   1. Requirements for shop and onsite painting.

D. Elevator: coordination of metal fabrications which serve to install, support or provide access to elevator equipment.

1.03 ADMINISTRATIVE REQUIREMENTS

A. Coordination:
   1. Reinforced Substrates: Coordinate sizes and locations of framing, blocking, furring, reinforcements, and other related Work to ensure that metal fabrications can be supported and installed as indicated. Ensure substrates for metal fabrications are one of the following of adequate bearing capacity:
      a. Concrete.
      b. Metal superstructure (structural steel).
      c. Solid wood framing reinforced and clearly marked for benefit of the metal fabrications installer.

1.04 SUBMITTALS

A. Shop Drawings: each item listed in Section Includes Article in this Part

1.05 QUALITY ASSURANCE

A. Metal Fabrications Fabricator Qualifications: Qualified and Experienced 5 projects, 3 years.

PART 2 PRODUCTS

2.01 FABRICATED METAL FRAMING / Stone Countetop Supports

A. Description: Tubular steel frame with flanges for anchoring to building structure. Tubular

B. Performance:
   1. Structural Performance: Furnish and install fabrication with horizontal surfaces able to limit deflection of a uniformly distributed load of 100 psf and a point load at any location of 300 pounds to not more than 1/720 of a span or 1/4 inch at any location.

C. Material: Steel tube, shapes, plate, and bar.
   1. Profiles: 3/4 inch square tubular steel unless otherwise indicated.
      a. Gage: 0.065 inch (16 gage) minimmum thickness wall.

D. Fabrication: shop fabricate in parts for site assembly, welding and installation.

E. Fasteners to Building Strcuture:
   1. Provide fastening components of type, grade, and class required to securely, and in a corrosion resistant manner, anchor metal fabrications and suitable for substrate condition.
   2. Material: stainless-steel; Type 304 / ASTM F 593; unless otherwise indicated.
   3. Wood Substrate: 1/4 inch minimmum diameter hex head lag screws with plain washers and pipe spaces where necessary to ensure fit and alignment.

4. Conctere Substrate: 3/8 inch minimmum diameter all thread ASTM C 881 chemical anchors with cap nuts, plain washers and pipe spaces where necessary to ensure fit and alignment.

F. Finish:
   1. Exposed Finish: Factory primed.
      a. After shop fabrication, shop paint as required for onsite coating to greatest extent possible. Touch up site welded and other finish defects as required for onsite coatings.

2.02 METAL LADDERS / Elevator Pit

A. Material: steel

B. Design and Performance: ASME A17.1

C. Factory Fabrication: complete welding and component assemblies in shop to avoid onsite welding. Limit fastener type for onsite assembly and installation to mechanical and chemical.

D. Fasteners: Provide zinc-plated; Fe-Zn 8 service condition 2 (moderate) / ASTM B 633 or ASTM F 1941 fasteneing components of type, grade, and class required and suitable to secure ladder to substrate.

E. Finish: factory prime; site paint.

2.03 MISCELLANEOUS MATERIALS

A. Welding Materials: AWS compliant; type required for materials being welded.

2.04 FABRICATION

A. Metal Surfaces: Provide metal fabrications with smooth, flat surfaces unless otherwise indicated. For metal fabrications exposed to view in the completed Work, provide materials without seam marks, roller marks, rolled trade names, or blemishes.

B. Shop Assembly: Preassemble items in the shop to greatest extent possible. Disassemble units only as necessary for shipping and handling limitations. Use connections that maintain structural value of joined pieces. Do not use onsite welded or brazed connections for metal fabrications with a factory finish which is not indicated for onsite coating. Clearly mark units for reassembly and coordinated installation.

C. Fitting and Forming:
   1. Cut, drill, and punch metals cleanly and accurately.
   2. Remove burrs, sharp or rough areas.
   3. Form metal to required shapes and sizes, true to line and level with true curves and accurate angles and surfaces and straight edges.
   4. Form bent-metal corners to smallest radius possible without causing grain separation or otherwise impairing work.
   5. Exposed Work:
      a. Ease edges to a consistent radius of 1/32 inch unless otherwise indicated.
      b. Form connections with hairline, tight, flush and smooth joints. Cope or miter corner joints. Locate joints where least conspicuous.
      c. Grind joints flush and smooth with adjacent finish surface.
      d. Finish surfaces to smooth, sharp, well-defined lines and arris.

D. Fusion: Comply with AWS for recommended practices for shop welding and brazing.
   1. Use materials and methods that minimize distortion and develop strength and corrosion resistance of base metals. Weld and braze behind finished surfaces without distorting or discoloring exposed side.
   2. Obtain fusion without undercut or overlap.
   3. Clean exposed welded and brazed joints of flux, and dress exposed and contact surfaces.
   4. Where possible, weld and braze at locations concealed (regardless of coatings) in completed Work.

a. Concealed (regardless of coatings) Welding and Brazing Appearance: One of the following at Contractor's option:
   1) Type 4 Welds (good quality, uniform undressed weld with minimal splatter) / NOMMA's "Voluntary Joint Finish Standards"
   2) Type 3 Welds (partially dressed weld with spatter removed) / NOMMA's "Voluntary Joint Finish Standards"
b. Concealed (regardless of coatings) Joints: continuously or intermittent welded or brazed.

5. Where concealed (regardless of coatings) welding and brazing is not possible, provide exposed (regardless of coatings) welding and brazing as follows:
   a. Exposed (regardless of coatings) Welding and Brazing Appearance: One of the following at Contractor's option:
      1) Type 1 Welds (no evidence of a welded joint) / NOMMA's "Voluntary Joint Finish Standards"
      2) Type 2 Welds (completely sanded joint, some undercutting and pinholes okay / NOMMA's "Voluntary Joint Finish Standards"; fill undercutting and pinholes with 100% polyester (epoxy) resin filler
   b. Exposed (regardless of coatings) Joints: intermittent welded or brazed with 100% polyester (epoxy) resin filler or continuously welded or brazed.

E. Weathering: Fabricate seams and other connections that will be exposed to weather in a manner to exclude water. Provide weep holes where water may accumulate. Locate weep holes in inconspicuous locations.

F. Fasteners and Hardware:
1. Cut, reinforce, drill, and tap metal fabrications as indicated to receive finish hardware, screws, and similar items. Provide rebates, lugs, straps, plates, attachment clips, splice sleeves, and brackets necessary to assemble units and to attach to other construction.
2. Provide for anchorage of type indicated; coordinate with supporting structure. Space anchoring devices to secure metal fabrications rigidly in place and to support indicated loads.

G. Fabrication Tolerances:
1. Squareness: 1/8 inch maximum difference in diagonal measurements.
2. Offset Between Faces: 1/16 inch maximum.
3. Misalignment of Adjacent Members: 1/16 inch maximum.
4. Bow: 1/16 inch in 48 inches maximum.
5. Deviation From Plane: 1/16 inch in 48 inches maximum.

2.05 FINISHES

A. Factory Finishes: as required for factory applied metal finishes indicated elsewhere.
1. Except where indicated to be shop final finish painted, as required for onsite coating indicated elsewhere.

B. Site Finishes: as required for onsite coating indicated elsewhere.

PART 3 EXECUTION

3.01 EXAMINATION

A. At framed substrates, ensure substrate reinforcement or framing required by gypsum board assemblies is clearly marked to facilitate accurate placement of fasteners and anchors.

B. Ensure that metal fabriation support devices not installed by the metal fabriation installer are correctly placed .

3.02 INSTALLATION, GENERAL

A. Cutting, Fitting, and Placement:
1. Perform cutting, drilling, and fitting required for installing metal fabrications.

2. Set metal fabrications accurately in location, alignment, and elevation; with edges and surfaces level, plumb, true, and free of rack; and measured from established lines and levels.
3. Fit exposed connections accurately together to form tight, hairline joints or, where indicated, uniform reveals and spaces for sealants and joint fillers.
4. Provide temporary bracing or anchors in formwork for items that are to be built into concrete, masonry, or similar construction.

B. Factory Finishes:
1. Do not cut or abrade factory finishes that cannot be completely restored in the field. Return items with such finishes to the shop for required alterations, followed by complete refinishing, or provide new units.
2. Restore temporary protective coverings that have been damaged during shipment or installation.

C. Welding and Brazing: Do not onsite weld or onsite braze metal fabrications with a factory finish which is not indicated to be coated onsite. Metal fabrications with primed factory finish, in concealed locations, and not indicated to be coated onsite may be onsite welded or onsite brazed if primed finish is restored as required for onsite coating indicated elsewhere. Weld and braze as required for fabrication indicated in Part 2.

D. Securing: Provide anchorage devices and fasteners where metal fabrications are required to be fastened to in-place construction. Provide threaded fasteners for use with concrete and masonry inserts, toggle bolts, through bolts, lag screws, wood screws, and other connectors.

E. Framing and Supports: Anchor framing and supports securely to and rigidly braced from building structure.

F. Installation Tolerances:
1. True Position: 1/4 inch maximum variation.
2. True Alignment: 1/16 inch maximum offset; 1/16 inch maximum cumulative.
3. Plumb and Level: 1/8 inch in 48 inches maximum variation.

END OF SECTION

SECTION 05 5213 - METAL RAILINGS

PART 1 GENERAL

1.01 SECTION INCLUDES

A. RAILINGS
   1. HANDRAILS / Railings
   2. Components / Handrails:
      a. BRACKETS / Wall Mounted Handrail
         1) Fasteners / Handrail Brackets
   3. ANCHORS / Railings

B. Materials / Railings
   1. ALUMINUM
   2. Primer

1.02 RELATED REQUIREMENTS

A. Factory Applied Metal Finishes

B. Gypsum Board Assemblies: Concealed substrate reinforcing, framing and blocking for railing support.

1.03 ADMINISTRATIVE REQUIREMENTS

A. Coordination:
   1. Reinforced Substrates: Coordinate sizes and locations of framing, blocking, furring, reinforcements, and other related Work to ensure that railings can be supported and installed as indicated. Ensure substrates for railings are one of the following of adequate bearing capacity:
      a. Metal or solid wood framing reinforced and clearly marked for benefit of the railing installer.

B. Sequencing Handrails: Mount wall mounted handrails on walls which are, except for surface applied finishes, complete.

1.04 SUBMITTALS

A. Product Data:
   1. Bracket for Wall Mounted Handrail: Include dimensions of individual components and profiles, finishes, and location of site connections .

B. Shop Drawings:
   1. Handrails: Include elevations, sections, details, attachments to other work, dimensions, demarcation of factory and field assembled work, method of field assembly, and substrate reinforcement requirements.

C. Selection Samples:
   1. Handrail: color.

D. Verification Samples:
   1. Handrail Bracket: one unit with factory finish applied. Approved undamaged sample may be incorporated into the Work. Also submit 6 inch section of handrail if the finish on the handrail will not match the bracket in sheen, color, or other variation.

PART 2 PRODUCTS

2.01 RAILINGS

A. Handrail: A steel assembly meeting indicated design and perfromance requirements and consisting of handrail, bracket, and anchor components indicated in this Part in configurations indicated on Drawings fabricated accurately for anchorage to each other and to building structure.

B. Railing Quality Standards: Furnish and install railings in accordance with the most stringent requirements of ASTM E 985.

C. Metal Jointing and Finish Grades: Architectural / NAAMM "Metal Stairs Manual"
   1. Architectural: All joints as inconspicuous as possible, whether welded or mechanical.
      a. Welded Joints: Continuously welded and ground smooth and flush.
      b. Mechanical Joints: Butted tight, flush, and hairline; concealed fastenings only.
      c. Exposed Edges and Corners: Eased to small uniform radius.
      d. Metal Surfaces to be Painted: Sanded or ground smooth, suitable for highest quality gloss finish.

D. Fasteners: Same material or compatible with materials being fastened; type consistent with design and specified quality level.

E. Provide mechanical fittings to join lengths, seal open ends, and conceal exposed mounting bolts and nuts, including but not limited to elbows, T-shapes, splice connectors, flanges, escutcheons, and wall brackets.

2.02 HANDRAILS

A. Material: Aluminum, unless otherwise indicated.
   1. Aluminum Extrusions: ASTM B 221 (ASTM B 221M), Alloy 6063-T52.
   2. Aluminum-Alloy Sand Castings: ASTM B 26.
   3. Aluminum-Alloy Die Castings: ASTM B 85.

B. Product: 6934 / Julius Blum & Co., Inc.,

C. Profile: match Julius Blum 6934

D. Attachment:
   1. Wall Mounted: mechanical fastened to mechanically anchored brackets, unless otherwise indicated.

E. Wall Return: Unless otherwise indicated, at ends of wall mounted handrails, return end of handrail to 1/4 to 1/2 inch from and parallel with wall.
   1. Product: 6934c / Julius Blum & Co., Inc.,

F. Brackets for Wall Mounted Handrails:
   1. Product: 371 / Julius Blum & Co., Inc.,
   2. Material: forged or cast steel or same material as handrail .
   3. Finish: same as handrail.
   4. Anchor: One concealed fitting centered on 3-1/8 inch diameter mounting flange.
   5. Standoff Dimension: 1-1/2 clearance between handrail and obstructions. To achieve clearance, Contractor to provide one of the following at Contractor's option:
      a. Round aluminum spacer matching bracket flang in diameter and finish.
      b. Offset center of handrail from bracket attachement to handrail.
   6. Capacity: Tested to 300 pound concentrated load.
   7. At brackets fastened through plaster or gypsum board, provide fillers made from steel or other means to transfer wall loads through wall finishes to structural supports and prevent bracket or fitting rotation and crushing of substrate.

G. Exposed Finish: Factory colored, class I anodic all exposed handrail and component surfaces.
   1. Color: Dark bronze anodized.
   2. Sequencing: The manufacturer indicated above does not provide finihes on aluminum components. After manufacturer and fabrication, deliver all aluminum componnents to anodizing facility for final finishing.

2.03 FABRICATION

A. Accurately form components to suit specific project conditions and for proper connection to building structure.

B. Fit and shop assemble components in largest practical sizes for delivery to site.

SECTION 061000 - ROUGH CARPENTRY

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 01 Specification Sections, apply to this Section.

1.2 SUMMARY

A. Section Includes:

1. Framing with dimension lumber.

B. Related Requirements:

1.3 DEFINITIONS

A. Exposed Framing: Framing not concealed by other construction.

B. Dimension Lumber: Lumber of 2 inches nominal or greater but less than 5 inches nominal in least dimension.

C. Lumber grading agencies, and the abbreviations used to reference them, include the following:
1. SPIB: The Southern Pine Inspection Bureau.

1.4 INFORMATIONAL SUBMITTALS

A. Material Certificates: For dimension lumber specified to comply with minimum allowable unit stresses. Indicate species and grade selected for each use and design values approved by the ALSC Board of Review.

1.5 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.

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: **15 percent**

2.2 WOOD-PRESERVATIVE-TREATED LUMBER

A. Preservative Treatment by Pressure Process: AWPA U1; Use Category UC2See Evaluations for information about treatment chemicals.

1. Preservative Chemicals: Acceptable to authorities having jurisdiction and containing no arsenic or chromium.

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
1. Wood sills, sleepers, blocking and similar concealed members in contact with masonry or concrete.

2.3 DIMENSION LUMBER FRAMING

A. Joists and miscellaneous framing: **No. 2** grade.

1. Species:
a. Southern pine; SPIB.

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.

B. For items of dimension lumber size, provide **Construction or No. 2**
1. Mixed southern pine; SPIB.
2. Spruce-pine-fir (south); NeLMA, WCLIB, or WWPA.

C. 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.

D. For blocking and nailers used for attachment of other construction, select and cut lumber to eliminate knots and other defects that will interfere with attachment of other work.

2.5 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**.

B. Nails: ASTM F 1667.

C. Power-Driven Fasteners: NES NER-272.

D. Wood Screws: ASME B18.6.1.

E. Bolts: Steel bolts complying with ASTM A 307, Grade A; with ASTM A 563 hex nuts and, where indicated, flat washers.

2.6 METAL FRAMING ANCHORS

A. Basis-of-Design Product: Subject to compliance with requirements, provide **product indicated on Drawings**:
1. Simpson Strong-Tie Co., Inc.

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 nailers, blocking, 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. Metal Framing Anchors: Install metal framing anchors to comply with manufacturer's written instructions. Install fasteners through each fastener hole.

D. Install sill sealer gasket to form continuous seal between sill plates and foundation walls.

E. Do not splice structural members between supports unless otherwise indicated.

F. Provide blocking and framing as indicated and as required to support facing materials, fixtures, specialty items, and trim.

G. 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.

H. 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.

I. 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.

J. 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.

3.2 WOOD BLOCKING, AND NAILER INSTALLATION

A. Install where indicated and where required for attaching other work. Form to shapes indicated and cut as required for true line and level of attached work. Coordinate locations with other work involved.

B. Attach items to substrates to support applied loading. Recess bolts and nuts flush with surfaces unless otherwise indicated.

3.3 FLOOR JOIST FRAMING INSTALLATION

A. General: Install floor joists with crown edge up and support ends of each member with not less than 1-1/2 inches of bearing on wood or metal, or 3 inches on masonry. Attach floor joists as follows:

1. Where supported on wood members, by **toe nailing or by** using metal framing anchors.
2. Where framed into wood supporting members, by using metal joist hangers.

B. Do not bore holes larger than 1/4 depth of joist; do not locate closer than 3 inches from top or bottom.

C. Provide solid blocking of 2-inch nominal thickness by depth of joist at ends of joists unless nailed to header or band.

D. Lap members framing from opposite sides of beams, girders, or partitions not less than 4 inches or securely tie opposing members together. Provide solid blocking of 2-inch nominal thickness by depth of joist over supports.

3.4 PROTECTION

A. Protect wood that has been treated with inorganic boron (SBX) from weather. If, despite protection, inorganic boron-treated wood becomes wet, apply EPA-registered borate treatment. Apply borate solution by spraying to comply with EPA-registered label.

B. Protect rough carpentry from weather. If, despite protection, rough carpentry becomes, apply EPA-registered borate treatment. Apply borate solution by spraying to comply with EPA-registered label.

END OF SECTION 061000

C. Fabricate components with joints tightly fitted and secured. Provide spigots and sleeves to accommodate site assembly and installation.

2.04 TOUCH UP COATING

A. As required for factory applied metal finishes indicated elsewhere.

2.05 FINISHES

A. Factory Finishes: as required for factory applied metal finishes indicated elsewhere.

B. Site Finishes: as required for site finishing indicated elsewhere.

PART 3 EXECUTION

3.01 INSTALLATION

A. Install components plumb and level, accurately fitted, free from distortion or defects, with tight joints.

B. Install railings in compliance with ADA Standards for accessible design at applicable locations.

C. Anchor railings securely to structure.

D. Conceal anchor bolts and screws whenever possible.

3.02 ERECTION TOLERANCES

A. Maximum Variation From Plumb: 1/4 inch per floor level, non-cumulative.

B. Maximum Offset From True Alignment: 1/4 inch.

C. Maximum Out-of-Position: 1/4 inch.

END OF SECTION

SECTION 06 2000 - FINISH CARPENTRY

PART 1 GENERAL

1.01 SECTION INCLUDES

A. BOARD WOOD LUMBER = / Interior Opaque Finish
   1. WOOD TRIM

B. WOOD FRAMES / Doors

C. PLYWOOD / Exposed, Interior Transparent Finish

D. CEILING MEDALLIONS / Rossets for Connely Room Ceiling

E. Fasteners / Finish Carpentry

1.02 RELATED REQUIREMENTS

A. Onsite Coating:
   1. WOOD FILLER

1.03 SUBMITTALS

A. Product Data:

B. Verification Samples:
   1. Interior Wood Trim: 24 inch length with half of sample fully finished and half not finished.
   2. Plywood: 12 inch square with half of sample fully finished and half not finished.

1.04 QUALITY ASSURANCE

A. Wood Frames:
   1. Fire-rated Assemblies: Where fire-rating is indicated, provide assemblies complying with NFPA 80 that are listed and each component labeled by UL, WH, or independent testing agency acceptable to authorities having jurisdiction for fire-protection ratings indicated / NFPA 252 for doors and NFPA 257 for windows.
      a. Oversize Assemblies: For fire-rated assemblies units exceeding sizes of tested assemblies, provide manufacturer's certification that assemblies conform to all standard construction requirements of tested and labeled fire-rated assemblies except for size.

B. Finish Carpentry Referenced Quality Standards: Furnish and install exposed finish carpentry in accordance with AWI Architectural Woodwork Quality Standards Illustrated (QSI) grade as follows, unless otherwise indicated:
   1. Interior: Custom / AWI QSI.

C. Marking: Ensure that no marks including grade stamps and painted ends are exposed in finished Work except for ends required to be site finished.

1.05 DELIVERY, STORAGE, AND HANDLING

A. 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.

1.06 SITE CONDITIONS

A. Ambient Conditions: Maintain ambient temperature and relative humidity planned for building occupants in spaces to receive interior finish carpentry for at least 3 days before installation, during installation, and until Substantial Completion.

PART 2 PRODUCTS

2.01 BOARD WOOD LUMBER / Interior Opaque Finish

A. Grade: D Select, MC-15 / NLGA; grade stamped.

B. Species: Yellow Poplar (Liriodendron tulipifera)
   1. Selection: greenish yellow heartwood.
C. Cut: Plain sawn
D. Finish: Factory natural; site finish.
E. Surface: S4S, unless otherwise indicated.
F. Profile: as indicated on Drawings .
G. Moisture Content: 12 % maximum upon delivery and installation and 9 % maximum for finishing, if any.
H. Glued Lumber: glued and finger jointed products complying with WWPA 1.70 are permitted.
   1. Glue: exterior waterproof.

2.02 CEILING MEDALLIONS / Rossets for Connely Room Ceiling

A. Cast resing plastic molding
B. Comparable Product: U-MED10 / Resinart East, Inc., Fletcher NC
   1. Manufacturers:
      a. Classic Ceilings Corporation
      b. Worthington Millwork

2.03 WOOD FRAMES / Doors

A. Material: As required for board wood lumber indicated in this Part except as follows:
B. Grade: Custom / Section 900 Frames & Jambs and related provisions including materials and installation of AWI QSI.
   1. Custom Grade Joints: as for exterior premium plant assembled joints.
C. Stop: split-jamb, double rabbet, single rabbet, or cased opening as indicated and to suit application. .
D. Profile: as indicated on Drawings or to match jamb width if not indicated.
E. Construction: solid wood; typical. Where required to meet fire-resistance required at fire rated assemblies, veneer over core construction may be substituted for solid wood as follows:
   1. Core: fire-retardant medium-density fiberboard or solid fire-retardant-treated wood.
      a. Containing no added urea formaldehyde resins.
   2. Veneer: cut from solid wood, unless otherwise indicated.
      a. Adhesive: Containing no added urea-formaldehyde resins .
      b. Thickness: 1/16 inch minimum.
   3. Manufacturers:
      a. Same as door manufacturer
      b. Algoma Hardwoods, Inc.
      c. Eggers Industries.
      d. Maiman Company (The).
      e. Marshfield DoorSystems, Inc.

2.04 PLYWOOD / Exposed, Interior Transparent Finished

A. Exterior, unless otherwise indicated, A-B face veneers / DOC PS 1.
B. Thickness: 3/4 inch unless otherwise indicated.
C. Face Veneer Species: Maple
D. Face Veneer Cut: rotary cut unless otherwsie indicated / AWI/AWMAC Architectural Woodwork Quality Standards Illustrated.
E. Core: veneer.
F. Containing no added urea formaldehyde resins.

2.05 ADHESIVE / Finish Carpentry

A. Type as permitted by referenced standard and to suit application. Waterproof type at exterior and wet area locations.

B. Urea-formaldehyde Resins: none added for laminating and other adhesives for composite wood or agrifiber shop or site assembled finish carpentry at interior applications.

C. VOC Limits for Interior Installation Adhesives and Glues: Use installation adhesives that comply with the following limits for VOC content when calculated according to 40 CFR 59, Subpart D (EPA Method 24):
   1. Wood Glues: 30 g/L.
   2. Contact Adhesive: 80 g/L.

2.06 FASTENERS / Finish Carpentry

A. Interior: nickel-plated-where-exposed steel nails, screws, and other fasteners of types indicated on Drawings or required for application. Concealed where required by referenced standard, as indicated, and where possible.

B. Exterior Exposed: Type 304 or 316 stainless-steel contersunk screws, and other fasteners of types indicated on Drawings or required for application. Nails not permitted.

C. Exterior Concealed: Hot dip galvanized / ASTM A 153

PART 3 EXECUTION

3.01 EXAMINATION

A. Verify adequacy of backing and support framing.

3.02 PREPARATION

A. Back Prime: For finish carpentry indicated to be site finished, apply the first coat of such site finish to concealed and exposed surfaces of finish carpentry before installation and to cut surfaces during installation.
   1. Apply finish as required for site finishing indicated elsewhere.

B. Material Selection:
   1. Do not install finish carpentry materials that are wet, moisture damaged, or mold damaged.
   2. Do not use materials that are unsound, warped, improperly treated or finished, inadequately seasoned, or too small to fabricate with proper jointing arrangements.

3.03 BLOCKING, NAILERS, AND SUPPORTS

A. Provide framing and blocking members as indicated or as required to support finishes, fixtures, specialty items, and trim.

3.04 INSTALLATION / Typical

A. Install finish carpentry level, plumb, true, and aligned with adjacent materials. Provide cutouts and otherwise coordinate materials and mechanical, electrical, or other systems in or adjacent to finish carpentry.

B. Lengths: Install finish carpentry with minimum number of joints possible, using full-length pieces from maximum lengths of material available.

3.05 INSTALLATION / Interior

A. Exposed Fasteners, where Permitted: Unless otherwise indicated, countersink, fill surface flush with wood filler and sand as required for site finishing indicated elsewhere.
   1. Evenly space exposed fasteners to be left exposed in a regular ortahgonal pattern.

B. Exposed Grade: Custom / AWI QSI, unless otherwise indicated.

C. Cutting and Fitting: Scribe and cope at inside corners and miter at outside corners to produce tight-fitting joints with full-surface contact throughout length of joint. Stagger joints in adjacent standing or running trim. Use scarf joints for end-to-end joints. Plane backs of casings to

provide uniform thickness across joints where necessary for alignment. Use concealed shims where necessary for alignment.

3.06 WOOD DOOR FRAME INSTALLATION

A. Fire-rated Assemblies and Components: NFPA 80.

3.07 PREPARATION FOR SITE FINISHING

A. Set exposed fasteners. Apply wood filler in exposed fastener indentations. Sand work smooth.

3.08 TOLERANCES

A. True Position including Level and Plumb: 1/8 inch maximum variation in 96 inches maximum variation

B. True Alignment with Abutting Materials Indicated to be Aligned: 1/16 inch maximum offset.

C. Wood Ceiling Baffles: Install per tolerances of

3.09 ADJUSTING

A. Adjust joinery for uniform appearance.

B. Remove and provide new finish carpentry that is mold, moisture, or otherwise damaged or does not comply with requirements. Finish carpentry may be repaired or refinished if work complies with requirements and shows no evidence of repair or refinishing.

END OF SECTION

SECTION 07 1713 - BENTONITE PANEL WATERPROOFING

PART 1 GENERAL

1.01 SECTION INCLUDES

A. BENTONITE WATERPROOFING = BENTONITE WATERPROOFING MEMBRANE

B. Accessories / Bentonite Waterproofing, Typical

C. PROTECTION COURSE / Bentonite Waterproofing

1.02 RELATED REQUIREMENTS

A. Fill.

B. Subdrainage and foundation drainage.

C. Concrete

D. Joint Treatment/ Sealants, Flashing and sheet metal, and Insulation

E. Construction penetrating waterproofing

1.03 SCHEDULING

A. Coordinate schedule and installation of waterproofing with other construction activities including those listed in the Related Requirments Article to ensure waterproofing is installed in the proper sequence and time.

1.04 SYSTEM DESCRIPTION

A. Provide waterproofing system to prevent the passage of liquid water and install without defects, damage or failure. Waterproofing shall be a bentonite technology with all applicable accessory products.

1.05 SUBMITTALS

A. Product Data: include VOC content of selaers and adhesives:
   1. Membrane
   2. Drainage Composite
   3. Waterstops
   4. Accessories

B. Sample Warranties: waterproofing manufacturer's warranty, waterproofing installer's warranty.

C. Source Quality Control Submittals: Testing agency reports.

D. Manufactuer's Site Water Test Report: as performed by waterproofing manufacturer.

E. Installer's Field Report: waterproofing.

F. Qualification Statements: waterproofing installer, testing agency. Include required manufacturer authorization.

G. Executed Warranties: waterproofing manufacturer's warranty, waterproofing installer's warranty.

1.06 QUALITY ASSURANCE

A. Perform Work in accordance with NRCA Waterproofing and Dampproofing Manual.

B. Installer Qualifications: Qualified; Experienced: 5 projects, 3 years; approved by manufacturer.

C. Testing Agency Qualifications: authorized by waterproofing manufacturer to monitor waterproofing material installation.

D. Pre-Installation Conference: attendees include testing agency, concrete installer, earthwork installer, and installers of Work penetrating waterproofing.

1.07 SITE CONDITIONS

A. Site Water Sample: Collection and ship one liter of actual project site water sample to waterproofing manufacturer for analysis. Manufacturer shall conduct test free of charge.

B. Weather Conditions: Perform work only when existing and forecasted weather conditions are within the guidelines established by the manufacturer of the waterproofing materials. Do not apply waterproofing materials into standing water or over ice and snow.

1.08 WARRANTY

A. Waterproofing Manufacturer's Warranty: Provide waterproofing manufacturer's standard written warranty in which manufacturer agrees to repair or replace waterproofing that fails due to defects in materials, factory workmanship, or site insallation within specified warranty period.
   1. Warranty Period: 5 years

B. Waterproofing Installer's Warranty: Contractor and waterproofing installer shall provide a special project warranty, on warranty form at end of this Section, signed by waterproofing installer and Contractor, covering Work of this Section, in which installer and Contractor agree to repair or replace products that fail to perform as intended or fail to conform to the requirements of the Contract Documents due to defects in materials or workmanship within the warranty period.
   1. Warranty Period: 5 years

PART 2 PRODUCTS

2.01 WATERPROOFING

A. Waterproofing: Assembly of membrane, drainage composite, and accessories.

2.02 MEMBRANE

A. Products:
   1. TREMCO Paraseal LG Composite Sheet Membrane Waterproofing System
   2. CARLISLE CCW MiraCLAY Bentonite Clay Waterprooofing
   3. CETCO VOLTEX Bentonite-Geotextile Waterproofing System

2.03 ACCESSORIES

A. VOC Limitations: For joint sealants used interior of the wether resisting envelope, provide only products having lower volatile organic compound (VOC) content than required by the more stringent of the South Coast Air Quality Management District (SCAQMD) Rule No.1168 and Bay Area Air Quality Management District Regulation 8, Rule 51.

B. Accessories: the following waterproofing acessories in manufacture's standard forms:
   1. Trowel grade bentonite compound used as a detailing mastic around penetrations, corner transitions and grade terminations.
   2. Water soluble tube container filled with granular bentonite
   3. Bag of granular bentonite.
   4. Butyl rubber sealant tape.
   5. Termination Bar: aluminum bar with pre-punched fastening holes.

C. Protection Course: Drainage composite or other mat or board effective to protect waterproofing and approved by waterproofing installer and manufacturer. Do not use expanded polystyrene (bead board) as a protection course.

D. Fasteners:
   1. Membrane to Substrate Fasteners: fasteners of the type and length suitable for the substrate, shall be used in conjunction with washers, of at least 1” diameter, to attach the membrane to the substrate.
   2. Membrane to Membrane Fasteners: box-stapler or similar device for horizontal applications.

E. Waterstop Adhesive: Gray, non-flammable, latex and water based adhesive approved by waterstop manufacturer.

2.04 MATERIALS

A. Bentonite: Granulated pure, dry, bentonite clay comprised of 90 percent minimum sodium montmorillonite; 90 percent minimum passing No. 20 mesh sieve and 10 percent maximum passing No. 200 mesh sieve.

PART 3 EXECUTION

3.01 EXAMINATION

A. Installer's Field Report: with testing agency of site conditions prior to installation of waterproofing.

B. Surfaces: verify surfaces of foundation to recieve waterproofing are monolithic, level and smooth monolithic without ridges, protrusions, honeycombing, aggregate pockets, tie-rod holes, other voids detrimental to performance of waterproofing system.

3.02 PREPARATION

A. Substrate for Slab-on-grade Application: If substrate consists of large aggregate, place as required for earthwork: a high-strength geotextile layer over the aggregate and then provide several inches of compacted soil or sand for uniform support and containment of waterproofing sheets.

B. Remove dirt, debris, oil, grease, cement laitance, or other foreign matter which will impair or negatively affect the performance of the waterproofing and drainage system.

C. Protect adjacent work areas and finish surfaces from damage or contamination from waterproofing products during installation operations.

3.03 APPLICATION / Foundation Walls

A. Seal edges of site cut membrane panels.

B. At vertical surfaces, install membrane with fasteners.

C. Membrane Panels: install:
   1. with strater course coordinated with foundation drainage.
   2. cut to fit penetrations.
   3. repair any large Panel damage by placing a new panel into position.
   4. typically 1 overlapping layer with staggered joints between courses.
      a. Elevated Hydrostatic Conditions: install two layer of membrane panels where hydrostatic head conditions are greater than 33 feet.
         1) Install first Panel layer with edges butted, not overlapped. Fasten butted vertical Panels securely to concrete surface with washer-headed fasteners.
         2) The second Panel layer is placed directly over the first Panel layer so that the seams of the two Panels layers stagger and do not match. The second Panel layer should mask the seams of the first Panel layer. Again, butt the second Panel layer edges together - do not overlap the Panel edges.

D. Trowel Grade Bentonite Compound: install:
   1. over concrete construction joints 1/8 inch thick by 3 inches wide.
   2. over each grouted form tie hole 1/8 inch thick.
   3. inside corner transitions 3/4 inch continuous fillet.
   4. around penetrations 3/4 inch thick fillet and extending onto panel 1-1/2 inches at 1/8 inch thick.
   5. repair small panel damage by applying a 1/2 inch thick.

E. Tube Containers: Before backfilling, lay tube containers against the base of the first course at the wall/footing transition. tube containers should be positioned end-to-end forming a continuous line. Manually place and tamp a shovel of backfill over tube containers to hold them in position prior to main backfill operation.

F. Drainage Composite: Where indicated on Darwings or where required by manufacturer or installer to meet waterproofing requirements, install drainage composite.
   1. Install to ensure positve flow to foundation subdrainage system.

3.04 APPLICATION / Below Slab-on-grade

A. Membrane Panels: install:
   1. under footings, elevator pits and grade beams.
   2. in slab form on properly prepared substrate.
   3. typically 1 overlapping layer.
   4. cut to fit penetrations.
   5. repair any large Panel damage by placing a new panel into position.
   6. extend panels up vertical surfaces minimum 12 inches to overlap vertically applied bentonite panels.

B. Trowel Grade Bentonite Compound: install:
   1. over concrete construction joints 1/8 inch thick by 3 inches wide.
   2. over each grouted form tie hole 1/8 inch thick.
   3. inside corner transitions 3/4 inch continuous fillet.
   4. around penetrations 3/4 inch thick fillet and extending onto panel 2 inches at 1/8 inch thick and up penetration 2 inches at 1/8 inch thick.
   5. repair small panel damage by applying a 1/2 inch thick.

C. Granular Bentonite: install granular bentonite from bag:
   1. slab penetrations, grade beams, and pile caps, 1/4 inch thick layer extending a 6 inches radius.

D. Polyethylene Sheet: cover waterproofing accessories from damage, contamination and contact with personnel with cut-to-fit polyethylene sheet.

3.05 SITE (FIELD) QUALITY CONTROL:

A. Testing Agency: Contractor shall engange and pay for teating agency to preform field quality control as required by quality assurance general requirements and as follows:
   1. Monitor waterproofing material installation compliance with the project contract documents.
   2. Include digital photographs in reports as necessary.
   3. Preform the following inspections: substrate examination, beginning of waterproofing installation, periodic intervals, and final inspection prior to concrete or backfill placement against the waterproofing.

3.06 PROTECTION

A. If backfill contains debris or loose gravel larger than 1-1/2" or other materials detrimental to waterproofing (38 mm) or where indicated, install a protection course to protect waterproofng from damage.

B. Do not permit traffic over unprotected or uncovered waterproofing.

WATERPROOFING INSTALLER'S WARRANTY

IDENTIFICATION

Waterproofing Installer:

_____

Waterproofing Installer Address:

_____

Contractor:

_____

Contractor Address:

_____

Owner:

_____

Owner Address:

_____

Project Name:

_____

Phase or Portion of Project (if not complete Project):

_____

Acceptance Date:

_____

Warranty Period: 5 years

Expiration Date:

_____

WARRANTY

WHEREAS Waterproofing Installer, has performed roofing and associated Work (hereafter "work") on the above referenced Project (and portion thereof, if any is indicated),

AND WHEREAS Waterproofing Installer has contracted (either directly with Owner or indirectly as a subcontractor) to warrant said work against leaks and faulty or defective materials and workmanship for designated Warranty Period,

NOW THEREFORE Waterproofing Installer hereby warrants, subject to terms and conditions herein set forth, that during Warranty Period Waterproofing Installer will, at Waterproofing Installer's own cost and expense, make or cause to be made such repairs to or replacements of said work as are necessary to correct faulty and defective work and as are necessary to maintain said work in a watertight condition.

This Warranty is made subject to the following terms and conditions:

1. Specifically excluded from this Warranty are damages to work and other parts of the building, and to building contents, caused by:
    a. Fire;
    b. Failure of of waterproofing system substrate, including cracking, settlement, excessive deflection, deterioration, and decomposition;
    c. Abuse of waterproofing by others after concealment, including maintenance personnel, other persons, and animals, whether authorized or unauthorized by Owner
2. When work has been damaged by any of foregoing causes, Warranty shall be null and void until such damage has been repaired by Waterproofing Installer and until cost and expense thereof have been paid by Owner or by another responsible party so designated.

3. Waterproofing Installer is responsible for damage to work covered by this Warranty but is not liable for consequential damages to building or building contents resulting from leaks or faults or defects of work.
4. During Warranty Period, if Owner allows alteration of waterproofing Work by anyone other than Waterproofing Installer, including cutting, patching, penetrations, or attachment of other work this Warranty shall become null and void on date of said alterations, but only to the extent said alterations affect work covered by this Warranty. If Owner engages Waterproofing Installer to perform said alterations, Warranty shall not become null and void unless Waterproofing Installer, before starting said work, shall have notified Owner in writing, showing reasonable cause for claim, that said alterations would likely damage or deteriorate work, thereby reasonably justifying a limitation or termination of this Warranty.
5. In the case that the Waterproofing Installer fails to perform work as required by this warranty, the Contractor shall assume all responsibilities of the Waterproofing Installer under this warranty.
6. Owner shall promptly notify Roofing Installer of observed, known, or suspected leaks, defects, or deterioration and shall afford reasonable opportunity for Waterproofing Installer to inspect work and to examine evidence of such leaks, defects, or deterioration.
7. This Warranty is recognized to be the only warranty of Waterproofing Installer on said work and shall not operate to restrict or cut off Owner from other remedies and resources lawfully available to Owner in cases of roofing failure. Specifically, this Warranty shall not operate to relieve Waterproofing Installer of responsibility for performance of original work according to requirements of the Contract Documents, regardless of whether Contract was a contract directly with Owner or a subcontract with Owner's General Contractor.

CERTIFICATION

IN WITNESS THEREOF, this instrument has been duly executed

WATERPROOFING INSTALLER:

Authorized Signature:

_____

Name:

_____

Title:

_____

Date:

_____

CONTRACTOR:

Authorized Signature:

_____

Name:

_____

Title:

_____

Date:

_____

END OF SECTION

SECTION 07 2100 - THERMAL INSULATION

PART 1 GENERAL

1.01 SECTION INCLUDES

A. BATT INSULATION = ACOUSTIC INSULATION

1.02 RELATED REQUIREMENTS

A. Joint Sealants:
   1. FOAMED SEALANT

B. Gypsum Board Assemblies to receive acoustic insulation.

1.03 SUBMITTALS

A. Product Data:
   1. Acoustic Insulation: Include urea formaldehyde content, material descriptions, and standards compliance .

PART 2 PRODUCTS

2.01 ACOUSTIC INSULATION

A. Preformed batt; friction fit.

B. Type 1 (unfaced) / ASTM C 655.

C. Material: Rock or slag fiber; glass fiber if specifically labeled by manufacturer for sound control applications.

D. Flame Spread Index: 0 / ASTM E 84.

E. Smoke Developed Index: 0 / ASTM E 84.

F. Combustibility: Non-combustible / ASTM E 136.

G. Formaldehyde Content: None.

H. Thermal Resistance: R of 3.5 per inch.

I. Thickness: to fill cavity unless otherwise indicated.

J. Facing: Unfaced.

K. Products:
   1. Roxul AFB / Roxul, Inc.
   2. Sound Control Batts / Johns Manville
   3. Sound Attenuation Fire Batt (SAFB) Insulation / Fibrex Insulations Inc.
   4. Sound Attenuation Fire Blankets (SAFB) / Thermafiber Inc.

2.02 FOAM SEALANT

A. As required for joint sealant indicated elsewhere.

2.03 FASTENERS / Rigid Insulation where insulation is not adequately secured by other means.

A. Nails or Staples: Steel wire; electroplated or galvanized; type and size to suit application.

PART 3 EXECUTION

3.01 ACOUSTIC AND BATT INSULATION INSTALLATION

A. Trim insulation neatly to fit spaces. Insulate miscellaneous gaps and voids.

B. Fit insulation tightly in cavities and tightly to exterior side of mechanical and electrical services within the plane of the insulation.

END OF SECTION

SECTION 07 8400 - FIRESTOPPING

PART 1 GENERAL

1.01 SECTION INCLUDES

A. FIRESTOPPING

1.02 PERFORMANCE REQUIREMENTS

A. Firestopping Locations: For the following constructions, provide through-penetration firestop systems that are produced and installed to resist spread of fire according to requirements indicated, resist passage of smoke and other gases, and maintain original fire-resistance rating of assembly penetrated or otherwise discontinuous.
   1. Floors.
   2. Fire resistive membrane applied to bottom of roofs.
   3. Walls and partitions with fire-protection-rated openings
   4. Assemblies indicated to have a fire resistance rating.

B. Firestopping Ratings: Provide through-penetration firestop systems with T-ratings and F-ratings not less than that equaling or exceeding the fire-resistance rating of firestopped construction assembly when identical products have been tested in that type of assembly per ASTM E 814 by UL or another testing agency acceptable to authorities having jurisdiction.
   1. Unless otherwise indicated, provide firestopping with 1-hour minimum T and F rating.
   2. Provide products with ASTM E 84 flame-spread ratings of less than 25 and smoke-developed ratings of less than 450.

C. Exposed: For through-penetration firestop systems exposed to view, traffic, moisture, and physical damage, provide products that after curing do not deteriorate when exposed to these conditions both during and after construction.
   1. For water piping penetrations, provide moisture-resistant through-penetration firestop systems.
   2. For floor penetrations with annular spaces exceeding 4 inches in width and exposed to possible loading and traffic, provide firestop systems capable of supporting floor loads involved either by installing floor plates or by other means.
   3. For insulated piping penetrations, provide through-penetration firestop systems not requiring removal of insulation.

1.03 SUBMITTALS

A. Product Data: For each type of through-penetration firestop system product required. Submit manufacturer’s details for each system and application listed on Firestopping Product Schedule based on tested products.
   1. Product Test Reports: From a qualified testing agency indicating through-penetration firestop system complies with requirements, based on comprehensive testing of current products. Manufacturer’s product data indicating compliance may be substituted for Product Test Reports if acceptable to authority having jurisdiction.
   2. Submit VOC content documentation for all non-preformed materials.

B. Shop Drawings:
   1. Firestopping Product Schedule: For each combination of rating, location, construction, and penetrating item listed below requiring firestopping on the Project, list through-penetration firestop system proposed conforming to designations listed in UL's "Fire Resistance Directory" under product Category XHEZ.
      a. Fire resistance Rating: as indicated
      b. Locations:
         1) wall
         2) floor
         3) both wall and floor
      c. Construction:

1) Concrete floors
2) Framed floors
3) Concrete or masonry walls with a minimum thickness less than or equal to 8 inches
4) Concrete or masonry walls with a minimum thickness greater than 8 inches
5) Framed walls

d. Penetrating item:
1) Metallic pipe, conduit, or tubing
2) Nonmetallic pipe, conduit, or tubing
3) Electrical cables
4) Cable trays with electrical cables
5) Insulated pipes
6) Miscellaneous electrical penetrants such as bus ducts
7) Miscellaneous mechanical penetrants such as air ducts
8) Groupings of penetrations including any combination of items listed above

2. Additional Shop Drawings: Where project conditions require modification of UL's or another testing agency's acceptable to authorities having jurisdiction to suit a particular through-penetration firestop condition, submit illustration, with modifications marked, approved by through-penetration firestop system manufacturer's fire-protection engineer.

C. Selection Samples: exposed firestopping color.

1.04 QUALITY ASSURANCE

A. Firestopping Installer Qualifications: Qualified; experienced 5 projects, 3 years

PART 2 PRODUCTS

2.01 FIRESTOPPING

A. Firestopping: Do not use cementitious mortar for firestopping, unless otherwise indicated. Provide sealants, devices, intumescent materials, foams and fill as recommended by manufacturer for each.

B. Color of Exposed Firestopping: as selected from standard range for each application.

C. Manufacturers:
1. Hilti Construction Chemicals, Inc.
2. Isolatek International.
3. 3M Fire Protection Products.
4. Tremco.

D. Compatibility: Provide through-penetration firestop systems that are compatible with one another, with the substrates forming openings, and with the items, if any, penetrating through-penetration firestop systems, under conditions of service and application, as demonstrated by through-penetration firestop system manufacturer based on testing and field experience.

E. Accessories: Provide components for each through-penetration firestop system that are needed to install fill materials and to comply with performance requirements. Use only components specified by through-penetration firestop system manufacturer and approved by the qualified testing and inspecting agency for firestop systems indicated. Accessories include forming/damming/backing, forming materials, primers, collars and steel sleeves.

PART 3 EXECUTION

3.01 PREPARATION

A. Surface Cleaning: Clean out openings immediately before installing through-penetration firestop systems:
1. Remove from surfaces of opening substrates and from penetrating items foreign materials that could interfere with adhesion of through-penetration firestop systems.

2. Clean opening substrates and penetrating items to produce clean, sound surfaces capable of developing optimum bond with through-penetration firestop systems. Remove loose particles remaining from cleaning operation.
3. Remove laitance and form-release agents from concrete.

B. Priming: Prime substrates where recommended in writing by through-penetration firestop system manufacturer using that manufacturer's recommended products and methods. Confine primers to areas of bond; do not allow spillage and migration onto exposed surfaces.

C. Masking Tape: Use masking tape to prevent through-penetration firestop systems from contacting adjoining surfaces that will remain exposed on completion of Work and that would otherwise be permanently stained or damaged by such contact or by cleaning methods used to remove smears from firestop system materials. Remove tape as soon as possible without disturbing firestop system's seal with substrates.

D. Mixing: For those products requiring mixing before application, comply with through-penetration firestop system manufacturer's written instructions for accurate proportioning of materials, water (if required), type of mixing equipment, selection of mixer speeds, mixing containers, mixing time, and other items or procedures needed to produce products of uniform quality with optimum performance characteristics for application indicated.

3.02 INSTALLATION

A. Accessories: Install forming/damming/backing materials and other accessories of types required to support fill materials during their application and in the position needed to produce cross-sectional shapes and depths required to achieve fire ratings indicated.
1. After installing fill materials, remove combustible forming materials and other accessories not indicated as permanent components of firestop systems.

B. Firestopping: Install fill materials for firestop systems by proven techniques to produce the following results:
1. Fill voids and cavities formed by openings, forming materials, accessories, and penetrating items as required to achieve fire-resistance ratings indicated.
2. Apply materials so they contact and adhere to substrates formed by openings and penetrating items.
3. For fill materials that will remain exposed after completing Work, finish to produce smooth, uniform surfaces that are flush with adjoining finishes.

3.03 CLEANING AND PROTECTION

A. Inspection: Do not cover up through-penetration firestop system installations that will become concealed behind other construction until building inspector, if required by authorities having jurisdiction, has examined each installation.

B. Cleaning: Clean off excess fill materials adjacent to openings as Work progresses by methods and with cleaning materials that are approved in writing by through-penetration firestop system manufacturers and that do not damage materials in which openings occur.

C. Protection: Provide final protection and maintain conditions during and after installation that ensure through-penetration firestop systems are without damage or deterioration at time of Substantial Completion. Cut out and remove damaged or deteriorated through-penetration firestop systems immediately and install new materials to produce through-penetration firestop systems complying with specified requirements.

END OF SECTION

SECTION 07 9005 - JOINT SEALANTS

PART 1 GENERAL

1.01 SECTION INCLUDES

A. JOINT SEALANTS
   1. Solvent Release Curing
      a. Acrylic Sealant
      b. Butyl Sealant
   2. Latex
      a. Acrylic Emulsion Sealant
   3. Acoustic Sealant
   4. FOAMED SEALANTS
      a. High Expansion Foamed In Place Sealant
      b. Typical Foamed In Place Sealant
      c. Low Expansion Foamed In Place Sealant

B. JOINT SEALANT BACKING
   1. JOINT FILLERS = BACKER ROD
      a. Plastic Foam
      b. Elastomeric Tubing
   2. BOND-BREAKER TAPE

1.02 RELATED REQUIREMENTS

A. Joint sealant substrates

B. Gypsum board assemblies

1.03 SUBMITTALS

A. Product Data:
   1. Acrylic Sealant: Include VOC content and standards compliance .
   2. Butyl Sealant: Include VOC content and standards compliance .
   3. Acrylic Emulsion Sealant: Include VOC content and standards compliance .
   4. High Expansion Foamed In Place Sealant: Include VOC content and standards compliance .
   5. Typical Foamed In Place Sealant: Include VOC content and standards compliance .
   6. Low Expansion Foamed In Place Sealant: Include VOC content and standards compliance .
   7. Plastic Foam: Include material descriptions and standards compliance .
   8. Elastomeric Tubing: Include VOC content, material descriptions, and standards compliance .
   9. Bond-breaker Tape: Include material descriptions and standards compliance .

B. Selection Samples:
   1. Silicone Sealant: color.
   2. Urethane Sealant: color.
   3. Acrylic Sealant: color.

1.04 QUALITY ASSURANCE

A. Mockup: Building Envelope Assembly Mockup indicated elsewhere.

PART 2 PRODUCTS

2.01 MATERIALS

A. Firestopping: Where joint selants are required to have a fire-resistance rating as part of a fire-rated assembly or otherwise, substitute firestopping as required for firestopping indicated elsewhere in lieu of joint sealants

B. VOC Content of Interior Sealants: Provide sealants and sealant primers for use inside the weatherproofing system that comply with the following limits for VOC content when calculated according to 40 CFR 59, Subpart D (EPA Method 24):
   1. Architectural Sealants: 250 g/L.
   2. Nonmembrane Roof Sealants: 300 g/L.
   3. Single-Ply Roof Membrane Sealants: 450 g/L.
   4. Other Sealants: 420 g/L.
   5. Sealant Primers for Nonporous Substrates: 250 g/L.
   6. Sealant Primers for Porous Substrates: 775 g/L.
   7. Modified Bituminous Sealant Primers: 500 g/L.
   8. Other Sealant Primers: 750 g/L.

C. 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 sealant manufacturer based on testing and field experience.

D. Colors of Exposed Joint Sealants: 2 colors may be used for each application as selected from standard range. .

2.02 SOLVENT-RELEASE JOINT SEALANTS

A. Acrylic Sealant: Acrylic-Based Solvent-Release Joint Sealant; ASTM C 1311 or FS TT-S-00230.
   1. Comparable Products:
      a. Schnee-Moorehead, Inc.; Acryl-R Acrylic Sealant.
      b. Tremco; Mono 555.
   2. Color: one color as selected from standard range

B. Butyl Sealant: Butyl-Rubber-Based Solvent-Release Joint Sealant; ASTM C 1085.
   1. Comparable Products:
      a. Bostik Findley; Bostik 300.
      b. Fuller, H. B. Company; SC-0296.
      c. Fuller, H. B. Company; SC-0288.
      d. Pecora Corporation; BC-158.
      e. Polymeric Systems Inc.; PSI-301
      f. Sonneborn, Division of ChemRex Inc.; Sonneborn Multi-Purpose Sealant.
      g. Tremco; Tremco Butyl Sealant.
   2. Color: black

2.03 LATEX JOINT SEALANTS

A. Acrylic-Emulsion Sealant: Paintable latex sealant; ASTM C 834, Type P, Grade NF.
   1. Comparable Products:
      a. Bostik Findley; Chem-Calk 600.
      b. Pecora Corporation; AC-20+.
      c. Schnee-Morehead, Inc.; SM 8200.
      d. Sonneborn, Division of ChemRex Inc.; Sonolac.
      e. Tremco; Tremflex 834.
   2. Color: white. Field paint exposed surfaces.
   3. acoustic sealants

B. Acoustic Sealant: acrylic-emulsion sealant above.
   1. Color: white. Field paint exposed surfaces.

2.04 FOAMED SEALANTS

A. High Expansion Foamed in Place Joint Sealant: Triple-expanding, single-component, closed-cell polyurethane foam sealant.
   1. Expansion: 300% minimum
   2. Applied with a reusable gun applicator.
   3. Rated for interioror exterior use.

4. Paintable
5. Sandable
6. UL-listed
7. Comparable Products: .
    a. Touch 'n Foam Triple Expanding Sealant / Convenience Products
    b. GREAT STUFF Big Gap Filler / The Dow Chemical Company

B. Typical Foamed in Place Joint Sealant: Minimal expanding, single-component, closed-cell polyurethane foam sealant.
1. Expansion: 100% to 275%
2. Applied with a reusable gun applicator.
3. UL Listed
4. Color: Orange
5. Comparable Products:
    a. GREAT STUFF Pro Gaps & Cracks / The Dow Chemical Company
    b. ENERFOAM / The Dow Chemical Company
    c. Touch 'n Foam All-Purpose Sealant / Convenience Products
    d. Touch 'n Foam Minimal Expanding Sealant / Convenience Products

C. Low Expansion Foamed in Place Joint Sealant: Minimal expanding, single-component, flexible, closed-cell polyurethane foam sealant.
1. Expansion: 100% to 275%
2. low pressure, self-venting allowing trapped gas to leaves the product without expanding foam
3. Proven not to bow windows or doors.
4. Applied with a reusable gun applicator.
5. Comparable Products:
    a. GREAT STUFF Pro Window & Door / The Dow Chemical Company
    b. Touch 'n Foam Window and Door Sealant / Convenience Products
    c. DAPtex Plus Window & Door Foam Sealant / DAP Products Inc.

2.05 JOINT-SEALANT BACKING

A. General: Provide sealant backings of material and type 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. Plastic Foam Joint Fillers: cylindrical; ASTM C 1330, of size and density to control sealant depth and otherwise contribute to producing optimum sealant performance.

C. Elastomeric Tubing Joint Fillers: neoprene, butyl, EPDM, or silicone tubing complying with ASTM D 1056, nonabsorbent to water and gas, and capable of remaining resilient at temperatures down to minus 26 deg F. Provide products with low compression set and of size and shape to provide a secondary seal, to control sealant depth, and otherwise contribute to optimum sealant performance.

D. 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 where such adhesion would result in sealant failure. Provide self-adhesive tape where applicable.

2.06 MATERIALS

A. Primer: Material recommended by joint sealant manufacturer where required for adhesion of sealant to joint substrates indicated, as determined from preconstruction joint-sealant-substrate tests and field tests.

B. Cleaners for Nonporous Surfaces: Chemical cleaners acceptable to manufacturers of sealants and sealant backing materials, free of oily residues or other substances capable of staining or

harming joint substrates and adjacent nonporous surfaces in any way, and formulated to promote optimum adhesion of sealants with joint substrates.

C. Masking Tape: Nonstaining, nonabsorbent material compatible with joint sealants and surfaces adjacent to joints.

PART 3 EXECUTION

3.01 PREPARATION

A. Preparatory Cleaning: 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, blast cleaning, 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 from above cleaning operations by vacuuming or blowing out joints with oil-free compressed air. Porous joint surfaces include the following:
      a. Concrete.
   3. Clean nonporous surfaces with chemical cleaners or other means that do not stain, harm substrates, or leave residues capable of interfering with adhesion of joint sealants.
      a. Metal.
      b. Glass.

B. Joint Priming: Prime joint substrates where recommended in writing by joint sealant manufacturer, based on preconstruction joint-sealant-substrate tests or prior experience. Apply primer to comply with joint sealant manufacturer's written instructions. Confine primers to areas of joint-sealant bond; do not allow spillage or migration onto adjoining surfaces.

C. Masking Tape: Use masking tape where required to prevent contact of sealant with adjoining surfaces that otherwise would be permanently stained or damaged by such contact or by cleaning methods required to remove sealant smears. Remove tape immediately after tooling without disturbing joint seal.

3.02 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. Where possible, rake sealant back ¼" min. from adjacent surfaces.

B. Sealant Installation Standard: Comply with recommendations of ASTM C 1193 for use of joint sealants as applicable to materials, applications, and conditions indicated.

C. Acoustical Sealant Application Standard: Comply with recommendations in ASTM C 919 for use of joint sealants in acoustical applications as applicable to materials, applications, and conditions indicated.

D. Joint Fillers: Install sealant backings of type 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.

E. Bond-breaker Tape: Install bond-breaker tape behind sealants where sealant backings are not used between sealants and back of joints.

F. Sealant Installation: Install sealants by proven techniques to 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 provided for each joint configuration.
3. Produce uniform, cross-sectional shapes and depths relative to joint widths that allow optimum sealant movement capability.

G. Foamed in Place Sealant:
1. Install foamed in place sealant with cartridge refillable gun applicator with stainless steel delivery tip.
2. Ensure electrical equipment including wiring, conduit and device boxes are braced or fastened securely so that expansion of foam sealant shall not cause wiring to "float". Ensure electrical equipment is located within the wall/ceiling cavity to be foamed, so as to prevent damage to electrical equipment during the trimming and/or planing of the foam.
3. Hold exterior air sealing materials to the outside of the spaces around rough openings to allow a jamb to framing seal.
4. Install foamed in place sealant to prevent the expanding foam from bowing or springing window frames, door frames or other penetrations.
5. Ensure foamed in place sealant is at least 65 deg F from 1 hour before until immediately after application.
6. Trim foam flush with adjacent surfaces. Remove foam from finished surfaces.

H. Tooling of Nonsag Sealants: Immediately after sealant application and before skinning or curing begins, tool sealants according to requirements specified 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 sealants from surfaces adjacent to joint.
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 configuration per Figure 5A in ASTM C 1193, unless otherwise indicated.
4. Provide recessed joint configuration, per Figure 5C in ASTM C 1193, of recess depth and at locations indicated.
    a. Use masking tape to protect adjacent surfaces of recessed tooled joints.

3.03 CLEANING

A. Cleaning: Clean off excess sealants 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.

3.04 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 the original work.

3.05 JOINT SEALANT APPLICATION SCHEDULE

A. Acrylic Sealant: used in the following applications:
1. Unpainted Exposed Interior: Where exposed joints not intended to be field painted occur in building interior but not formed in part by concrete or countertops.

B. Butyl Sealant: used in the following applications:
1. Concealed Joints: Where concealed joints occur but not formed in part by concrete or applications for foamed in place joint sealants.
    a. Waterproofing joints
2. Vapor Retarders: Joints and anchorage.

C. Acrylic-Emulsion Sealant: used in the following applications:

1. Painted Exposed Interior: Where exposed joints intended to be field painted occur in building interior but not in concrete.

D. Acoustic Sealant: used in the following applications:
   1. Acoustical Control: Where acoustic sealant is specified elsewhere for acoustical control.

E. Foamed Sealants:
   1. Used in the following applications:
      a. Where indicated.
      b. Inaccessible: Where concealed locations in insulated assemblies are inaccessible or not practical for standard insulation.
      c. Infiltration: Where concealed locations in insulated assemblies occur and expanding foam provides for superior performance to reduce air infiltration at critical joints.
      d. Rigid Insulation: Joints and perimeter sealing.
   2. Use the following types:
      a. Gaps greater than 1-1/2 inch in least dimension formed by high compressive strength construction: High expansion foamed in place joint sealant.
      b. Gaps less than 1-1/2 inch in least dimension formed by high compressive strength construction: Typical foamed in place joint sealant.
      c. Gaps formed by Windows, Doors, and other Openings where deflection may occur due to foam expansion: Low expansion foamed in place joint sealant.

3.06 JOINT SEALANT BACKING APPLICATION SCHEDULE

A. Plastic Foam Joint Fillers: used in the following applications:
   1. Joint Control: Where required to control sealant depth and promote wetting of joint substrates during tooling.
   2. Where indicated.

B. Elastomeric Tubing Joint Fillers: used in the following applications:
   1. Temporary Seal: Where required to control sealant depth and promote wetting of joint substrates during tooling in locations where joint filler will also serve as a temporary joint seal.

C. Bond-Breaker Tape: used in the following applications:
   1. Adhesion Prevention: Where required to prevent adhesion of sealants where this can not be accomplished by joint fillers or where there is insufficient depth of joint recess for joint filler installation.

END OF SECTION

SECTION 08 1113 - STEEL DOORS AND FRAMES

PART 1 GENERAL

1.01 SECTION INCLUDES

A. STEEL FRAMES = HOLLOW (PRESSED) METAL FRAMES / Steel Doors, Wood Doors, Interior Windows

B. STEEL DOORS = HOLLOW (PRESSED) METAL DOORS

C. Finishing Materials:
   1. Touch Up Coating / Primer

1.02 RELATED REQUIREMENTS

A. Factory Applied Metal Finishes

B. Building Insulation
   1. Acoustic Insulation
   2. Rigid Insulation

C. Joint Sealants
   1. Foamed Sealant

D. Wood Doors

E. Door Hardware

F. Glazing

G. Site Finishing

1.03 ADMINISTRATIVE REQUIREMENTS

A. Coordination:
   1. Mounting Devices: Coordinate and timely furnish frames, anchors, brackets, and other supports for steel frames which are installed in other Work and which are not installed by the steel frame installer.

1.04 SUBMITTALS

A. Product Data:
   1. Steel Frames: Include testing labels, construction details, material descriptions, finishes, standards compliance, and product test reports indicating compliance with required standards for determining required criteria .
   2. Steel Doors: Include testing labels, construction details, material descriptions, finishes, and standards compliance .

B. Shop Drawings: .
   1. Steel Frames: Include glazing, coordinated throat dimension, conduit and preparations for electrical power and control systems, product schedule, elevations, sections, roughing-in diagrams with tolerances, reinforcement type and locations, hardware locations,,,, factory finishes demarkation, notation of dimensions established by field measurement, and demarcation of factory and field assembled work.
      a. Product Schedule: use same reference designation as on Drawings. Coordinate with door hardware schedule.
   2. Steel Doors: Include louvers, glazing, conduit and preparations for electrical power and control systems, product schedule, elevations, roughing-in diagrams with tolerances, reinforcement type and locations, hardware locations,, and factory finishes demarkation.
      a. Product Schedule: use same reference designation as on Drawings. Coordinate with door hardware schedule.

C. Product Certificates: assemblies required to be fire rated and exceeding limitations of labeled assemblies.

1.05 QUALITY ASSURANCE

A. Accessibility: Comply with ANSI/ICC A117.1.

B. Fire-rated Assemblies: Where fire-rating is indicated, provide assemblies complying with NFPA 80 that are listed and each component labeled by UL, WH, or independent testing agency acceptable to authorities having jurisdiction for fire-protection ratings indicated / UL 10C ("positive pressure") for doors and NFPA 257 or UL 9 for windows.
   1. Rate of Temperature Rise Across Door Thickness for Exit Enclosure Doors: 450 F degrees maximum in 30 minutes of fire exposure.
   2. Oversize Assemblies: For fire-rated door assemblies units exceeding sizes of tested assemblies, provide manufacturer's certification that doors conform to all standard construction requirements of tested and labeled fire-rated door assemblies except for size.

1.06 DELIVERY, STORAGE, AND HANDLING

A. Store and Handle: ANSI(SDI-100) A250.8.

B. Packaging : cardboard-wrapped, crated, or other resilient packaging to provide protection from impact and moisture during transit and storage.

PART 2 PRODUCTS

2.01 STEEL DOORS

A. Fire-rated: as required in Part 1.

B. Material at Exterior Openings and Openings in Wet Areas: galvannealed steel sheet: Designation SS, HSLAS, or HSLAS-F, Grade 50 or higher, Any Class, Coating A60 / ASTM A 653

C. Grade for Exterior Doors: Level 3 (MSG No. 16), physical performance Level A (extra heavy duty), Model 2 (seamless) / ANSI(SDI-100) A250.8

D. Grade for Interior Doors: Level 2 (MSG No. 18), physical performance Level B (heavy duty), Model 2 (seamless) / ANSI(SDI-100) A250.8

E. Core for Fire Rated Doors: manufacturer's standard as required to provide fire-protection and temperature-rise ratings indicated.

F. Insulating Value of Exterior Doors: R 4.0 deg F x h x sq. ft./Btu minimum / ASTM C 1363

G. Top Closures for Outswinging Exterior Doors: flush with top of faces and edges; 0.042 inch minimum thickness end closure. Where exposed to weather, factory seal joints in top edges of doors against water penetration.

H. Bottom Closures for Exterior Doors: with weep-hole openings to permit moisture to escape; 0.042 inch minimum thickness end closure.
   1. Exterior Doors: Provide weep-hole openings in bottom of exterior doors to permit moisture to escape. Seal joints in top edges of doors against water penetration.

I. Edge Profile: manufacturer's standard.

J. Thickness: 1-3/4 inches, unless otherwise indicated.

K. Design: flush panel.

L. Texture: Smooth faces.

M. Exposed Finish: Factory primed; Site paint.
   1. Prime Finish: ANSI/SDI A250.10

N. Manufacturer: Same as steel frame.

2.02 STEEL FRAMES

A. Fire-rated: as required in Part 1.

B. Material at Exterior Openings and Openings in Wet Areas: galvannealed steel sheet: Designation SS, HSLAS, or HSLAS-F, Grade 50 or higher, Any Class, Coating A60 / ASTM A 653

C. Grade for Frames for Steel Doors: Comply with the ANSI(SDI-100) A250.8 requirements of grade specified for corresponding door.

D. Grade for Frames for Wood Doors: ANSI A250.8 for Level 1, 18 gage

E. Exposed Finish: Factory primed; Site paint.
   1. Prime Finish: ANSI/SDI A250.10

F. Joint Construction:: .
   1. Exterior:: Fully welded type; themally separated (broken).
   2. Interior, Typical:: Knock-down type.

G. Size: as indicated on Drawings
   1. Throat Dimension at Framed Openings: not more than 1/8 inch clearance from frame to face of substrate surface flush with wall finish, unless otherwise indicated. No trim or blocking is permitted to infill or otherwise compensate for excessive clearance. Adjustable frames are not permitted to compensate for excessive clearance.
   2. Face Dimension: as indicated on Drawings, or if not indicated with 2 inch face profile.
      a. Return, Typical: as indicated on Drawings, or if not indicated, nominal 1/2 inch return to face of wall covering, not including trim.

H. Reinforcing for Frames Wider than 48 Inches: Steel sheet channel fitted tightly into frame head, flush with top, unless otherwise indicated.

I. Fasteners and Anchors: system of the following components of type suitable for application indicated, fabricated from corrosion-resistant materials, for attaching frames of type indicated by concealed method, unless otherwise indicated.
   1. Anchors:
      a. Material, Typical: fabricated of electrolytic zinc-coated steel wire, steel pipe, or steel steel, Coating 40Z / ASTM A 591.
      b. Material at Exterior Openings and Openings in Wet Areas: fabricated of steel wire, steel pipe, or cold-rolled steel sheet Designation SS, HSLAS, or HSLAS-F, Grade 50 or higher, Any Class / ASTM A 1008 hot-dip galvanized after fabrication Class B1 (3.0 mil or 1.8 ounce per square foot) / ASTM A 153.
      c. Type:
         1) Stud-wall Jambs: frame manufacturer's standard type for concealed fastening, unless otherwise indicated. Locate anchors as required for fire-rating but not more than 18 inches from top and bottom of frame and 32 inches maximum between.
   2. Inserts, Bolts, and Fasteners: Hot-dip galvanized after fabrication / ASTM A 153.
   3. Powder-Actuated fasteners with clips or other accessory devices

J. Silencers: Resilient rubber, fitted into drilled hole; 3 on strike side of single door, 3 on center mullion of pairs, and 2 on head of pairs without center mullions.

K. Temporary Frame Spreaders: Provide for all factory assembled frames.

L. Manufacturer:
   1. Assa Abloy Ceco, Curries, or Fleming www.assaabloydss.com.
   2. Amweld Building Products, LLC.
   3. Benchmark; a division of Therma-Tru Corporation.
   4. Ceco Door Products; an Assa Abloy Group company.
   5. Curries Company; an Assa Abloy Group company.
   6. DeLa Fontaine Doors
   7. Firedoor Corporation.
   8. Fleming Door Products Ltd.; an Assa Abloy Group company.

9. Habersham Metal Products Company.
10. Kewanee Corporation (The).
11. Security Metal Products Corp.
12. Steelcraft; an Ingersoll-Rand company www.steelcraft.com.
13. Windsor Republic Doors www.republicdoor.com.

2.03 INSULATION / Steel Frames

A. Exterior, Non-fire-rated Frames: Rigid insulation as required for building insulation indicated elsewhere with gaps filled with foamed sealant as required for joint sealants indicated elsewhere.

B. Interior, Non-fire-rated Frames: Acoustic insulation as required for building insulation indicated elsewhere.

C. Fire-rated Frames: Acoustic insulation as required for building insulation indicated elsewhere meeting product requirements for firestopping indicated elsewhere

2.04 PRIMER / Factory

A. Manufacturer's standard, fast-curing, lead- and chromate-free primer complying with ANSI/SDI A250.10 acceptance criteria; recommended by primer manufacturer for substrate; compatible with substrate and site-applied coatings despite prolonged exposure.

B. Air-drying, rust-inhibitive primer, compatible with primer and finish coats:

2.05 TOUCH UP COATING / Primer

A. Factory primer manufacturer's standard, air-drying, rust-inhibitive, fast-curing, lead-free primer complying with ANSI/SDI A250.10 acceptance criteria; recommended by primer manufacturer for substrate; compatible with substrate and site-applied coatings despite prolonged exposure.

B. VOC Content for Interior Application: 50 g/L maximum / 40 CFR 59, Subpart D (EPA Method 24).

2.06 FABRICATION

A. Fit and assemble units in manufacturer's factory. To ensure proper assembly at Project site, clearly identify work that cannot be permanently factory assembled before shipment.

B. Tolerances: SDI 117.

C. Hardware Preparation: reinforced for surface applied hardware; ANSI/SDI A250.6 requirements specified in door grade standard; ANSI/DHI A115 Series; to receive door hardware indicated elsewhere.

D. Coordinate locations of conduit and wiring boxes for electrical connections.

PART 3 EXECUTION

3.01 EXAMINATION

A. Ensure that frame and support devices not installed by the frame installer are correctly placed .

B. Ensure in-place openings are within tolerances for plumb and size.

3.02 PREPARATION

A. Hardware: Drill and tap doors and frames to receive nontemplated, mortised, and surface-mounted door hardware.

3.03 INSTALLATION

A. ANSI/SDI A250.11 with the requirements of the specified grade standard .

B. Fire-rated Assemblies and Components: NFPA 80.

C. Door Silencers: installed in frames .

D. Filling Frames: unless otherwise indicated:

1. Exterior: Coordinate with wall installation to solidly fill space between frames and substrate with insulation.
2. Interior, Stud-wall: Coordinate with wall installation to solidly fill space between frames and substrate with insulation.

E. Interface with Other Work: Coordinate with installation of door hardware, glazing, and site finishing indicated elsewhere.

3.04 TOLERANCES

A. Frames: Adjust frames for squareness, alignment, twist, and plumb 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 at floor.

B. Doors: Fit doors accurately in frames, within clearances specified below. Shim as necessary.
1. Non-Fire-Rated Steel Doors: ANSI A250.8
2. Fire-Rated Doors: NFPA 80.
3. Smoke-Control Doors: NFPA 105.

C. Maximum Diagonal Distortion: 1/16 in measured with straight edge, corner to corner.

3.05 NON-CONFORMING WORK

A. Repair deterioration, defects or damage to finishes, to factory-finished appearance, including primer, so no evidence remains of corrective work when viewed with the naked human eye from a distance of 72 inches under 50 foot-candle illumination.
1. Repair finishes with touch up coating.

B. For the following conditions, remove in-place and provide new Work to eliminate evidence of replacement:
1. Non-conforming Work which can not be corrected by repair alone.
2. Completed Work that is stained, warped, bowed, or otherwise damaged.

3.06 ADJUSTING

A. Adjust for smooth and balanced door movement to produce fully functioning units that comply with requirements and operate easily without binding.

3.07 CLEANING

A. Exposed Surfaces: Immediately remove plaster and other foreign substances which are not indicated to be applied to surfaces.

B. Prime-Coated Touchup: Immediately after erection, sand smooth rusted or damaged areas of prime coat and apply touch up coating.

END OF SECTION

SECTION 08 1416 - FLUSH WOOD DOORS

PART 1 GENERAL

1.01 SECTION INCLUDES

A. FLUSH WOOD DOORS = WOOD DOORS

B. Touch Up Coating / Flush Wood Doors

1.02 RELATED REQUIREMENTS

A. Hollow Metal Doors and Frames: Steel frames for doors.

B. Finish Carpentry: Wood frames for doors.

C. Joint Sealants

D. Door Hardware

E. Site Finishing: site finishing doors.

1.03 ADMINISTRATIVE REQUIREMENTS

A. Coordination:
   1. Placement Information: Coordinate and timely furnish information regarding rough openings and clearances required for flush wood doors.

B. Sequencing: Do not install interior flush wood doors until spaces to receive them are permanently enclosed, weathertight, clean, dry, and ready for their installation.

1.04 SUBMITTALS

A. Product Data:
   1. Flush Wood Doors: Include testing labels, urea formaldehyde content, construction details, material descriptions, finishes, and standards compliance .

B. Shop Drawings: Flush Wood Doors: Include louvers, glazing, blocking, edge profiles, hardware preparation, cutout dimension, conduit and preparations for electrical power and control systems, product schedule, elevations, dimensions, roughing-in diagrams with tolerances, reinforcement type and locations, hardware locations, and factory finishes demarcation.
   1. Product Schedule: use same reference designation as on Drawings. Coordinate with door hardware schedule.

C. Sample Warranties: Flush Wood Doors Manufacturer's Warranty.

D. Product Certificates: assemblies required to be fire rated and exceeding limitations of labeled assemblies.

E. Maintenance Data: Flush wood doors.

F. Executed Warranties: Flush Wood Door Manufacturer's Warranty: .

1.05 QUALITY ASSURANCE

A. Accessibility: Comply with ANSI/ICC A117.1.

B. Fire-rated Assemblies: Where fire-rating is indicated, provide assemblies complying with NFPA 80 that are listed and each component labeled by UL, WH, or independent testing agency acceptable to authorities having jurisdiction for fire-protection ratings indicated / UL 10C ("positive pressure") for doors .
   1. Fire-resistance Seals: Provide doors without any visible seals when door is closed.
   2. Rate of Temperature Rise Across Door Thickness for Exit Enclosure Doors: 450 F degrees maximum in 30 minutes of fire exposure.
   3. Oversize Assemblies: For fire-rated door assemblies units exceeding sizes of tested assemblies, provide manufacturer's certification that doors conform to all standard construction requirements of tested and labeled fire-rated door assemblies except for size.

C. Flush Wood Door Referenced Quality Standards: Furnish and install flush wood doors in accordance with AWI Architectural Woodwork Quality Standards Illustrated (QSI) grade as indicated in Part 2, unless otherwise indicated.
   1. Requirements for tightness and flushness of plant assembled joints shall apply to field assembled joints.

D. Source Limitations: flush wood doors.

1.06 DELIVERY, STORAGE, AND HANDLING

A. Store doors to protect veneer from bleaching due to sunlight.

B. Flush Wood Door Packaging : waterproof and resilient packaging to prevent damage and provide protection from impact and moisture during transit and storage.

1.07 SITE CONDITIONS

A. Ambient Conditions: Maintain relative humidity between 25 and 55 percent and an ambient temperature between 60 and 85 degrees Fahrenheit in spaces to receive flush wood doors for at least 3 days before installation, during installation, and until Substantial Completion.

B. Conditioning: Move flush wood doors into spaces where they will be installed, no later 3 days before installation. Immediately after moving flush wood doors into spaces in which it will be installed, open sealed packages to allow flush wood doors to acclimatize. Do not install flush wood doors until adjusted to relative humidity of, and is at same temperature as, space where it is to be installed.

1.08 WARRANTY

A. Flush Wood Door Manufacturer's Warranty: Provide flush wood door manufacturer's standard written warranty in which manufacturer agrees to repair or replace flush wood doors that fails due to defects in materials or factory workmanship within specified warranty period.
   1. Warranty Period for Interior Doors: life of installation.
   2. Failures include delamination of veneer, warping beyond specified installation tolerances, telegraphing core construction, and defects not complying with quality standard.

PART 2 PRODUCTS

2.01 FLUSH WOOD DOORS

A. Grade: Custom / Section 1300 Architectural Flush Doors and related provisions including materials, finishing and installation of AWI QSI, unless otherwise indicated.
   1. Requirements for tightness and flushness of plant assembled joints shall apply to field assembled joints.

B. Urea-formaldehyde Resins: none added .

C. Construction: 5-ply flush .

D. Thickness: 1-3/4 inches unless otherwise indicated.

E. Faces MDO veneer for site opaque finish .

F. Assembly Adhesive: Type I - waterproof or Type II - water resistant / AWI QSI or WDMA I.S.1

G. Core: solid ; bonded.
   1. Non-Rated Solid Core and 20 Minute Fire-rated Doors: Type structural composite lumber core (SCLC).
   2. Fire-rated Doors, Typical: Mineral core, Type FD with core blocking as required to provide adequate anchorage of hardware without through-bolting.

H. Edges: As permitted by quality standard for grade. Profile as follows unless otherwise indicated:
   1. Typical: rectangular; no bevel.
   2. Strike: Bevel 1/8 inch in 2 inches
   3. Hinge, Typical: Bevel 1/8 inch in 2 inches.

4. Hinge, Fire-rated Doors: rectangular; no bevel.
5. Door and Fixed Transom Panel Meeting: rabbeted.

I. Manufacturers:
1. Algoma Hardwoods, Inc.
2. Eggers Industries.
3. Graham; an Assa Abloy Group company.
4. Marshfield Door Systems, Inc.
5. Mohawk Flush Doors, Inc.; a Masonite company.

2.02 FABRICATION

A. Hardware Preparation: Factory machine doors for hardware that is not surface applied. Locate hardware to comply with DHI-WDHS-3. Comply with final door hardware schedules, door frame Shop Drawings, DHI A115-W series standards, and hardware templates.
1. Metal Frames: Coordinate with hardware mortises in metal frames to verify dimensions and alignment before factory machining.

B. Factory fit doors for frame opening dimensions identified on approved Shop Drawings, with edge clearances in accordance with quality standard and fire-rating requirements .
1. Exception: Non-fire-rated doors to be site finished may be factory or site fit at Contractor's option.

2.03 FINISHING

A. Factory Primed Finished Doors: After fabrication, but before application of hardware or accessories, factory prime all door surfaces, including four edges, cutouts and mortises.

PART 3 EXECUTION

3.01 EXAMINATION

A. Ensure frame openings are within tolerances for plumb and size.

3.02 INSTALLATION

A. Install doors in accordance specified quality standard.

B. Fire-rated Assemblies and Components: NFPA 80.

C. Factory Finished Products: Do not field cut or trim. If fit or clearance is not correct, remove and provide new Work.

D. Field Finished Products:
1. Adjust width of non-fire-rated doors by cutting equally on both jamb edges.
2. Trim maximum of 3/4 inch off bottom edges.
3. Trim fire-rated products in strict compliance with fire rating limitations.
4. Seal cut surfaces with touch up coating or primer corresponding to type of finish.

E. Interface with Other Work: Coordinate with installation of frames, door hardware, glazing, site finishing, and electrical components indicated elsewhere.

3.03 TOLERANCES

A. Conform to specified quality standard for fit, distortion and clearance tolerances.

3.04 ADJUSTING

A. Adjust Work for smooth and balanced door movement to produce fully functioning units that comply with requirements and operate easily without binding.

3.05 CLEANING

A. Exposed Surfaces: Immediately remove coating and other foreign substances which are not indicated to be applied to surfaces.

B. Remove temporary protective coverings and strippable films.

C. Clean surfaces with methods not harmful to finishes to remove foreign material. Ensure surfaces are without residue and dry.

END OF SECTION

SECTION 08 1433 - STILE AND RAIL WOOD DOORS

PART 1 GENERAL

1.01 SECTION INCLUDES

A. STILE AND RAIL WOOD DOORS

1.02 RELATED REQUIREMENTS

A. Joint Sealants

B. Door Hardware

C. Site Finishing: site finishing doors.

1.03 ADMINISTRATIVE REQUIREMENTS

A. Coordination:
   1. Placement Information: Coordinate and timely furnish information regarding rough openings and clearances required for stile and rail wood doors.

B. Sequencing: Do not install interior stile and rail wood doors until spaces to receive them are permanently enclosed, weathertight, clean, dry, and ready for their installation.

1.04 SUBMITTALS

A. Product Data:
   1. Stile and Rail Wood Doors: Include testing labels, regional products report, recycled content report, urea formaldehyde content, construction details, material descriptions, finishes, and standards compliance .

B. Shop Drawings: Stile and Rail Wood Doors: Include louvers, glazing, blocking, edge profiles, hardware preparation, cutout dimension, conduit and preparations for electrical power and control systems, product schedule, elevations, dimensions, roughing-in diagrams with tolerances, reinforcement type and locations, hardware locations, and factory finishes demarcation.
   1. Product Schedule: use same reference designation as on Drawings. Coordinate with door hardware schedule.

1.05 QUALITY ASSURANCE

A. Accessibility: Comply with ANSI/ICC A117.1.

B. Stile and Rail Wood Doors Referenced Quality Standards: Furnish and install stile and rail wood doors in accordance with AWI Architectural Woodwork Quality Standards Illustrated (QSI) grade as indicated in Part 2, unless otherwise indicated.
   1. Requirements for tightness and flushness of plant assembled joints shall apply to field assembled joints.

C. Source Limitations: stile and rail wood doors.

D. Stile and Rail Wood Door Manufacturer Qualifications: Qualified and Experienced 10 projects and 5 years.

1.06 DELIVERY, STORAGE, AND HANDLING

A. Stile and Rail Wood Door Packaging : waterproof and resilient packaging to prevent damage and provide protection from impact and moisture during transit and storage.

1.07 SITE CONDITIONS

A. Ambient Conditions: Maintain relative humidity between 25 and 55 percent and an ambient temperature between 60 and 85 degrees Fahrenheit in spaces to receive stile and rail wood doors for at least 3 days before installation, during installation, and until Substantial Completion.

B. Conditioning: Move stile and rail wood doors into spaces where they will be installed, no later 3 days before installation. Immediately after moving stile and rail wood doors into spaces in which

it will be installed, open sealed packages to allow stile and rail wood doors to acclimatize. Do not install stile and rail wood doors until adjusted to relative humidity of, and is at same temperature as, space where it is to be installed.

1.08 WARRANTY

A. Stile and Rail Wood Door Manufacturer's Warranty: Provide stile and rail wood door manufacturer's standard written warranty in which manufacturer agrees to repair or replace stile and rail wood doors that fails due to defects in materials or factory workmanship within specified warranty period.
   1. Warranty Period for Interior Doors: life of installation.
   2. Failures include delamination of veneer, warping beyond specified installation tolerances, telegraphing core construction, and defects not complying with quality standard.

PART 2 PRODUCTS

2.01 STILE AND RAIL WOOD DOORS

A. Grade: Custom Grade / AWI QSI.
   1. Except Grade A veneer may be substituted for Grade AA veneer.

B. Wood Species: match exisintg unless otherwise indicated.

C. Thickness: match original.

D. Stile and Rail Construction: clear solid wood lumber. No edge or end (finger-jointed) joints.
   1. Joints: mortised and tenoned.

E. Panel Construction: veneered panel product.
   1. Match panel layout indicated on Drawings and existing door panel layout as appropriate.

F. Veneer: wood
   1. Thickness: 1/16 inch minimum.
   2. Cut: rotary, unless otherwise indicated.

G. Assembly Adhesive: Type I - waterproof / AWI QSI or WDMA I.S.1

H. Manufacturers:
   1. Algoma Hardwoods, Inc.
   2. Trustile

2.02 FABRICATION

A. Hardware Preparation: Factory machine doors for hardware that is not surface applied. Locate hardware to comply with DHI-WDHS-3. Comply with final door hardware schedules, door frame Shop Drawings, DHI A115-W series standards, and hardware templates.
   1. Metal Frames: Coordinate with hardware mortises in metal frames to verify dimensions and alignment before factory machining.

B. Factory fit doors for frame opening dimensions identified on approved Shop Drawings, with edge clearances in accordance with quality standard and fire-rating requirements .
   1. Exception: Non-fire-rated doors to be site finished may be factory or site fit at Contractor's option.

C. Prehung Doors: At Contractor's option, provide stile and rail wood doors as prehung units including doors, frames, and hardware which attaches door to frame.

2.03 FINISHING

A. Site Opaque Finished Doors: After fabrication, but before application of hardware or accessories, shop prime all door surfaces, including four edges, cutouts and mortises, with one coat of wood primer compatible with site finishing indicated elsewhere.

PART 3 EXECUTION

3.01 EXAMINATION

A. Ensure frame openings are within tolerances for plumb and size.

3.02 INSTALLATION

A. Install doors in accordance specified quality standard.

B. Field Finished Products:
   1. Adjust width of non-fire-rated doors by cutting equally on both jamb edges.
   2. Trim maximum of 3/4 inch off bottom edges.
   3. Trim fire-rated products in strict compliance with fire rating limitations.
   4. Seal cut surfaces with touch up coating or primer corresponding to type of finish.

C. Interface with Other Work: Coordinate with installation of frames, door hardware, glazing, site finishing, and electrical components indicated elsewhere.

3.03 TOLERANCES

A. Conform to specified quality standard for fit, distortion and clearance tolerances.

3.04 NON-CONFORMING WORK

A. Repair deterioration, defects or damage to finishes, to factory-finished appearance so no evidence remains of corrective work when viewed with the naked human eye from a distance of 36 inches under 50 foot-candle illumination.
   1. Repair finishes with touch up coating.

B. For the following conditions, remove in-place and provide new Work to eliminate evidence of replacement:
   1. Non-conforming Work which can not be corrected by repair alone.
   2. Completed Work that is stained, faded, scratched, warped, bowed, or otherwise damaged.
   3. Completed Work not matching approved mockups or samples.
   4. Work damaged by exposure to moisture, water, or sunlight or other damaging conditions

3.05 ADJUSTING

A. Adjust Work for smooth and balanced door movement to produce fully functioning units that comply with requirements and operate easily without binding.

3.06 CLEANING

A. Exposed Surfaces: Immediately remove coating and other foreign substances which are not indicated to be applied to surfaces.

B. Remove temporary protective coverings and strippable films.

C. Clean surfaces with methods not harmful to finishes to remove foreign material. Ensure surfaces are without residue and dry.

END OF SECTION

SECTION 08 71 00
DOOR HARDWARE

PART 1 GENERAL

1.01 SECTION INCLUDES

A. Work under this section includes furnishing and the installation of finish and security hardware specified herein and noted on drawings for a complete and operational system, including any electrified door hardware components including finish and security hardware and auto operators for entrance doors.

Items include, but are not limited to:

1. Hinges/Continuous Hinges
2. Flush Bolts
3. Exit Devices
4. Locksets and Cylinders
5. Push Plates - Pulls
6. Closers/ADA Operators
7. Kick, Mop and Protection Plates
8. Stops, Wall Bumpers, Overhead Controls
9. Thresholds, Gasketing and Door Bottoms
10. Silencers
11. Miscellaneous Trim and Accessories
12. Electrified Hardware Items, Controls and Power Supplies

B. RELATED SECTIONS:

1. Division 06 – Carpentry
2. Section 08 11 00 – Metal Doors and Frames
3. Section 08 14 00 – Wood Doors
4. Section 08 41 00 – Entrances and Storefronts
5. Division 26 – Electrical
6. Division 28 – Electronic Safety and Security

C. Alternates

1. Refer to Division 01 in the project manual for project alternates.

1.02 REFERENCES

A. The following references are used in this section.

1. NFPA 80 – Standard for Fire Doors, 2007.
2. Installation Guide for Doors and Hardware, DHI, 1984.
3. ANSI / BHMA A156.18, Materials and Finishes, 2006.

1.03 GENERAL REQUIREMENTS

A. Provide items, articles, materials, operations and methods listed, mentioned or scheduled herein or on drawings, in quantities as required to complete project. Provide hardware that functions properly. Prior to furnishing hardware, advise Architect of items that will not operate properly, are improper for conditions, or will not remain permanently anchored.

B. DESCRIPTION OF WORK

1.04 SUBMITTALS

A. Hardware Schedule: Submit 5 copies of hardware schedule in vertical format as illustrated by the Sequence of Format for the Hardware Schedule as published by the Door and Hardware Institute. Schedules which do not comply will be returned for correction before checking.

B. Hardware schedule shall clearly indicate architect's hardware group and manufacturer of each item proposed.

C. The schedule shall be reviewed prior to submission by a certified Architectural Hardware Consultant (AHC), who shall affix his or her seal attesting to the completeness and correctness of the schedule.
   1. Provide 2 copies of illustrations from manufacturer's catalogs and data in brochure form.
   2. Check specified hardware for suitability and adaptability to details and surrounding conditions. Indicate unsuitable or incompatible items and proposed substitutions in hardware schedule.
   3. Provide listing of manufacturer's template numbers for each item of hardware in hardware schedule.
   4. Furnish other Contractors and Subcontractors concerned with copies of final approved hardware schedule. Submit necessary templates and schedules as soon as possible to hollow metal, wood door, and aluminum door fabricators in accordance with schedule they require for fabrication.
   5. Samples: Lever design or finish sample: Provide 3 samples if requested by architect.

D. Wiring Diagrams: Provide complete and detailed system operation and elevation diagrams specially developed for each opening requiring electrified hardware, except openings where only magnetic hold-opens or door position switches are specified. Provide these diagrams with hardware schedule submittal for approval. Provide detailed wiring diagrams with hardware delivery to jobsite.

E. Installation Instructions: Provide manufacturer's written installation and adjustment instructions for finish hardware. Send installation instructions to site with hardware.

F. Templates: Submit templates and "reviewed Hardware Schedule" to door and frame supplier and others as applicable to enable proper and accurate sizing and locations of cutouts and reinforcing.

G. Contract Closeout Submittals: Comply with Section 01700 including specific requirements indicated below.
   1. Operating and maintenance manuals: Submit 3 sets containing the following:
   2. Complete information in care, maintenance, and adjustment, and data on repair and replacement parts, and information on preservation of finishes.
   3. Catalog pages for each product.
   4. Name, address, and phone number of local representative for each manufacturer.
   5. Parts list for each product.
   6. Copy of final approved hardware schedule, edited to reflect "As installed".
   7. Copy of final keying schedule.
   8. As installed "Wiring Diagrams" for each opening connected to power, both low voltage and 110 volts.
   9. One complete set of special tools required for maintenance and adjustment of hardware, including changing of cylinders.

1.05 QUALITY ASSURANCE

A. General Contractor's Investigation: Prior to Contract Execution, the General Contractor shall have thoroughly investigated the entities that will be performing work or supplying materials, products, equipment, or systems for this project, to ensure that they comply with all of the qualifications and requirements mentioned or implied in the Contract Documents. If it is later determined that any of the previously mentioned entities do not comply with the qualifications and requirements specified in the Contract Documents, the General Contractor will be required to replace that entity with a qualified entity at no increase in Contract Sum or Contract Time.

B. Manufacturer: Obtain each type of hardware (ie. latch and locksets, hinges, closers) from single manufacturer, although several may be indicated as offering products complying with requirements.

C. Qualifications of the Hardware Supplier: A recognized architectural door hardware supplier, with warehousing facilities, who has been furnishing hardware and installation in the Project's vicinity for a period of not less than 4 years. The supplier shall be, or shall employ, an Architectural Hardware Consultant (AHC) who is available, at reasonable times during the course of the work, for consultation about the Project's hardware requirements, to the Owner, Architect, and Contractor. An Architectural Hardware Consultant (AHC) shall prepare all hardware and access control schedules. This Supplier shall be responsible for proper coordination of all finish hardware items and access control items with related sections to insure compatibility of products.

1. Hardware supplier must be an authorized, direct factory distributor of all door hardware products specified herein to insure compliance and service of these products.
2. Require supplier to meet with Owner to finalize keying requirements and to obtain final instructions in writing.

D. Qualifications of Installer: The hardware installer shall have documented experience in the installation of hardware of similar quantities and types as required for this project. The installer's qualifications shall be submitted to the architect, in writing, for approval by the architect before any work shall commence.

E. Fire-Rated Openings: Furnish door hardware for fire-rated openings that complies with NFPA Standard No. 80 and requirements of the Authorities Having Jurisdiction. Furnish only items, of door hardware, that are listed and are identical to products tested by UL, ITS-WH, FM, or other testing and inspecting organization acceptable to the Authorities Having Jurisdiction, for use on types and sizes of doors indicated, in compliance with the requirements of fire-rated door and door frame labels.

Project requires door assemblies and components that are compliant with positive pressure and S Label requirements. Specifications must be cross-referenced and coordinated with door and frame manufacturers to ensure that total door opening engineering is compatible with UL10C Standard for Positive Pressure Fire Tests of Door Assemblies.

Where emergency exit devices are required on fire-rated doors (with supplementary marking on doors' UL or FM labels including "Fire Door to be Equipped with Fire Exit Hardware") provide UL/WHI or FM label on exit devices indicating "Fire Exit Hardware".

F. Substitutions: All substitution requests are required to be submitted prior to the bid date and complying with the procedures and time frame as outlined in Division 01, General Requirements. Approval of submitted products is at the discretion of the architect and his hardware consultant.

G. At the Project's Completion, the Owner's Representative shall accompany the Architect and General Contractor during the Door Hardware and Access Control Items punch list phase of the project close-out, insuring the Owner's Representative is familiar with all applications and systems, as installed. Refer to additional requirements under 3.0 EXECUTION.

H. Pre-Installation Meeting: Prior to door hardware installation, the General Contractor / Construction Manager shall request a hardware installation meeting to be held at the project location. This meeting shall convene prior to the hardware's installation. The types of hardware this meeting shall include are: locksets, exit devices, and door closers. The manufacturer's representatives of the above listed products, in conjunction with the hardware supplier for this project, shall conduct the installation training. All hardware installers shall be required to attend this meeting to receive certificate of authorized training. This meeting shall serve as door openings coordination and review of all shop drawings from related trades prior to the hardware installation. The Hardware Supplier shall include any related meeting costs in their proposal.

I. Electrified Hardware and Security Hardware Systems: Prior to ordering the electrified hardware, the General Contractor shall request a coordination meeting. This meeting shall convene prior to or after the Door Hardware Schedule and the wiring diagrams have been submitted to the General Contractor. All related trades shall be represented at this meeting, which shall also include the architect, the Owner's representative, the hardware supplier, and the hardware manufacturer's representative as requested. This meeting shall serve as a review and coordination of all electrified hardware, wiring, connections, location for power supplies, and remote switches, and door functions. All related trades shall make any required changes, and resubmit schedules, diagrams, and any other required data, no later than one (1) week following this meeting.

1.06 DELIVERY, STORAGE AND HANDLING

A. Tag each item or package separately with identification related to final hardware schedule, and include basic installation instructions with each item or package.

B. Packaging of door hardware is the responsibility of the supplier. As material is received by the hardware supplier from various manufacturers, sort and repackage in containers clearly marked with appropriate hardware set numbers to match the set numbers of the approved hardware schedule. Two or more identical sets may be packed in the same container.

C. The door hardware supplier shall deliver all individually packaged hardware items in a timely fashion to the place of installation (Shop or Project Site); direct factory shipments are not acceptable unless agreed upon beforehand. Hardware supplier shall coordinate delivery times and schedules with the contractor.

D. The General Contractor, door hardware supplier, access control supplier, and installers shall count, coordinate, and store all door hardware and access control items herein, verifying complete counts of all items scheduled and furnished. The contractor must report all shortages (discrepancies with shipping documents) within five (5) working days. The manufacturers' and Owner's representatives will inspect the installation of the door hardware and access control items during that phase of construction. Any deficiencies in installation of all materials included herein shall be corrected before installation continues.

E. The General Contractor shall provide a secure lock-up for the door hardware and security equipment delivered to the Project, but not yet installed. Control handling and installation of the hardware items that are not immediately replaceable, so that completion of the work will not be delayed by hardware losses, both before and after installation.

1.07 WARRANTY

A. All materials must be warranted against defects in workmanship and materials for a period of one (1) year from date of acceptance of this project, unless otherwise noted. Any evidence of misuse or abuse voids all warranties. These warranties shall be each manufacturers' standard written warranty.

B. Special Warranties:

1. Continuous Geared Hinges: Life of the Door Opening.
2. Mortise Latchsets and Locksets: Three (3) Year Period.
3. Exit Devices: Three (3) Year Period.
4. Door Closers: Thirty (30) Year Period.
5. Electromagnetic Door Holders: Two (2) Year Period.
6. Saddle Thresholds, Bumper Thresholds, Door Sweeps, Self-Adhesive Gasketing, Perimeter Seals, Astragal Seals, Self-Adhesive Astragal Gasketing, Mullion Seals, Interlocking Seals, and Drip Strips: Five (5) Year Period.

C. Any manufacturer whose standard written warranty does not equal or exceed the requirements listed above must provide a letter stating that they will extend their warranty to comply with the requirements of this specification.

D. All of the manufacturer's fasteners and attachments supplied with each hardware item must be installed to maintain the manufacturer's fire listing and/or warranty.

E. Refer to Section 01 - Closeout Procedures for additional warranty requirements.

1.08 MAINTENANCE

A. Maintenance Tools and Instructions: General Contractor shall furnish a complete set of specialized tools and maintenance instructions as needed for the Owner's continued adjustment, maintenance, and removal and replacement of door hardware.

PART 2 PRODUCTS

2.1 BUTTS AND HINGES

A. Acceptable Manufacturers:

Ives	Bommer	Stanley
3CB1	LB8002	CB1900R
3CB1	LB8000	CB1960R
3CB1HW	LB8006	CB1901R
3CB1HW	LB8004	CB1961R
5BB1SCHW	BB5024	FBB268
5BB1	BB5000	FBB179
5BB1	BB5001	FBB191
5BB1HW	BB5004	FBB168
5BB1HW	BB5005	FBB199

B. Application:
   1. Provide NRP (non-removable pins) at out-swinging lockable doors.

C. Quantity:
   1. Two hinges per leaf for openings through 60 inches high.
   2. One additional hinge per leaf for each additional 30 inches in height or fraction thereof.
   3. Four hinges for Dutch doors up to 90 inches in height.

2.2 FLUSH BOLTS AND DUSTPROOF STRIKES

A. Acceptable manufacturers:

Ives	Trimco	Burns
FB31P	3810	7842
FB41P	3815	7942
FB51P	3820 x 3810	7845
FB61P	3825 x 3815	7945
FB358	3913	591
FB458	3915	590
DP2	3910	545

B. Provide automatic and manual flush bolts with forged bronze face plates, extruded brass levers, and with wrought brass guides and strikes. Provide 12 inch steel or brass rods at doors up to 90 inches in height. Top rods at manual flush bolts for doors over 90 inches in height shall be increased by 6 inches for each additional 6 inches of door height. Provide dust-proof strikes at each bottom flush bolt.

2.3 LOCKSETS – CYLINDRICAL – GRADE 2

A. Acceptable Manufacturer and Series:

Schlage	Sargent	Best
AL Series x NEP	7 Line x LP	7KC Series x 14D

B. Provide lock functions specified in Hardware Groups, with following provisions:

1. Cylinders: Refer to “KEYING” article, herein.
2. Locks shall meet UL A label; to have a minimum listing for single doors 4’ x 8’.
3. Levers shall be bi-directional.
4. Levers shall be solid. Manufacturers utilizing lever fillers are not acceptable.
5. Furnish “Knurled” or “Tactile” outside levers as indicated in the door Hardware Sets. “Abrasive” outside levers shall not be acceptable.
6. Lockset adjustment plate shall be threaded for door thickness adjustment for doors 1 5/8” to 2 1/8” thickness. The adjustment plate shall have visual chassis marking for doors 1 ¾” thick.
7. Locks shall have field reversible handing.
8. Latchbolt to be steel with minimum ½” throw latch.
9. Strikes shall have curved lip of sufficient length to clear trim.

2.4 EXIT DEVICES

A. Acceptable Manufacturers:

Von Duprin	Detex	Precision
98/99 Series	Advantex Series	Apex Series

B. Provide exit device series and functions as specified in Hardware Groups. Von Duprin product numbers are referenced in the Hardware Groups.

C. All exit devices shall be UL listed for panic. Exit devices for labeled doors shall be UL listed as "Fire Exit Hardware".

D. Where lever trim is specified, provide lever design to match lockset levers.

E. Provide lever trim with breakaway feature.

F. Provide cylinders for exit devices with locking trim and cylinder dogging.

G. Provide exit devices with stainless steel touch bars. Load bearing plastic parts are not acceptable.

H. Provide exit devices with cast metal, flush end caps.

I. Provide deadlocking latchbolt feature for exit devices.

J. Provide roller strikes on all rim exit devices.

2.5 KEYING

A. Master key or Grand master key cylinders and key in groups, unless otherwise specified. Factory masterkey with manufacturer retaining permanent keying records.

B. Provide 6 masterkeys for each masterkey set. Provide 3 change keys for each lock. Provide 2 control keys for core removal. Stamp keys "DO NOT DUPLICATE."

C. Submit proposed keying schedule to Architect. If requested, meet with Owner and Architect to review schedule.

D. Provide removable core cylinders, with patented key control, for each lock with temporary keyed brass construction cores. Permanent cores shall be installed upon completion of the project.

2.6 DOOR TRIM

A. Acceptable Manufacturers and Types:

Ives	Trimco	Burns
8200	1001-9	56

B. Push Plates:
   1. Ives type 8200 6 inches by 16 inch unless otherwise indicated.
   2. Where width of door stile prevents use of 6 inch wide plate, provide push plate one inch less than width of stile but not less than 4 inches wide.

C. Pull Plates and Pulls:
   1. Rockwood pull plate: 76, 4 inches by 16 inches unless otherwise indicated.
   2. Rockwood door pull: 147

D. Push Bars:
   1. Ives type 9100, unless otherwise indicated.

E. Pulls:
   1. Ives Series 8190, unless otherwise indicated.
   2. Where required, mount back to back with push bars.

F. Kick Plates and Armor Plates: Ives 8400 Series, minimum of 0.050 inch thick, beveled 4 edges.
   1. At single doors provide width two inches less than door width on stop side and one inch less than door width on pull side.
   2. At pairs of doors provide width one inch less than door width on both sides.
   3. Height of 10 inches, unless otherwise indicated.
   4. Provide plates with countersunk screw holes.

2.7 DOOR CLOSERS

A. Acceptable Manufacturers and Types of Large Bore Exposed Closers:

LCN	Sargent	Norton
4050 Series	351 Series	7500 Series

1. Provide door closers conforming to ANSI/BHMA A156.4 Grade 1 requirements by BHMA certified independent testing laboratory.
2. Provide door closers with fully hydraulic, full rack and pinion action with cast aluminum cylinder.
3. Closer Body: 1-1/2 inch (38 mm) diameter, with 11/16 inch (17 mm) diameter heat-treated pinion journal and full complement bearings.
4. Hydraulic Fluid: Fireproof, passing requirements of UL10C, and requiring no seasonal closer adjustment for temperatures ranging from 120 degrees F to -30 degrees F.
5. Spring Power: Continuously adjustable over full range of closer sizes, and providing reduced opening force as required by accessibility codes and standards.
6. Hydraulic Regulation: By tamper-proof, non-critical valves, with separate adjustment for latch speed, general speed, and back check.
7. Pressure Relief Valve (PRV) Technology: not permitted.
8. Provide stick on and special templates, drop plates, mounting brackets, or adapters for arms as required for details, overhead stops, and other door hardware items interfering with closer mounting.

B. Acceptable Manufacturers and Types of Medium Bore Exposed Closers:

LCN	Sargent	Norton
1450 Series	1331 Series	8501/8501BF Series

1. Provide door closers conforming to ANSI/BHMA A156.4 Grade 1 requirements by BHMA certified independent testing laboratory.
2. Provide door closers with fully hydraulic, full rack and pinion action with cast aluminum cylinder.
3. Closer Body: 1-1/4 inch (32 mm) diameter, with 5/8 inch (16 mm) diameter heat-treated pinion journal and full complement bearings.
4. Hydraulic Fluid: Fireproof, passing requirements of UL10C, and requiring no seasonal closer adjustment for temperatures ranging from 120 degrees F to -30 degrees F.
5. Spring Power: Continuously adjustable over full range of closer sizes, and providing reduced opening force as required by accessibility codes and standards.
6. Hydraulic Regulation: By tamper-proof, non-critical valves, with separate adjustment for latch speed, general speed, and back check.
7. Pressure Relief Valve (PRV) Technology: not permitted.
8. Provide stick on and special templates, drop plates, mounting brackets, or adapters for arms as required for details, overhead stops, and other door hardware items interfering with closer mounting.

2.8 OVERHEAD STOPS

A. Acceptable Manufacturers

Glynn Johnson	Rixson	Sargent
450	10 Series	1540 Series
410	5 Series	1530 Series
90	9 Series	590 Series
100	1 Series	690 Series

B. Provide overhead stops for interior doors equipped with regular arm surface type closer for doors that open against equipment, casework, sidelights, other objects that would make wall stops inappropriate.

C. Provide sex bolt attachments for mineral core door application.

2.9 WALL STOPS AND HOLDERS

A. Acceptable Manufacturers and Types:

Ives	Trimco	Door Controls
WS406/407CVX	1270WXCP	3211
WS406/407CCV	1270WVP	3211T
WS445	1207	3267X
FS436	W1211	3310X
WS40	1254	3487X

B. Provide WS406/407CCV Series wall stop for each door leaf unless otherwise specified, or where conditions require the use of an overhead stop.

C. Floor or base stops shall be used only where definitely specified or absolutely unavoidable.

2.10 THRESHOLDS

A. Acceptable Manufacturers and Product:

National Guard	Reese	Zero
425E	S425A	8655A

B. Where thresholds are specified in hardware groups, provide 8655A thresholds unless detailed otherwise.

C. Refer to drawings for special details. Provide accessories, shims and fasteners.

D. Where thresholds occur at openings with one or more mullions, they shall be cut for the mullions and extended continuously for the entire opening.

2.11 WEATHERSTRIPPING

A. Acceptable Manufacturers and Product:

	National Guard	Reese	Zero
Sweeps	201NA	323C	39A
Jambs	700SA	755C	429A
Rain Drips	16A	R201C	142A

B. Where weatherstripping is specified in hardware groups, provide 429A unless detailed otherwise.

C. Provide self-tapping fasteners for weatherstripping being applied to hollow metal frames.

D. Where sweeps are specified in hardware groups, provide 39A unless detailed otherwise.

E. Where rain drips are specified in hardware groups, provide 142A x full frame width, unless detailed otherwise.

2.12 GASKETING

A. Acceptable Manufacturers:

National Guard	Reese	Zero
5050	F-797B	188S

B. Where smoke gasket is specified in hardware groups, provide 188S, unless detailed otherwise.

C. Provide gaskets for 20-minute doors and doors designated for smoke and draft control.

D. Where frame applied intumescent seals are required by the manufacturer, provide gaskets that comply with UBC 7-2, 1997 and UL 10C positive pressure tests.

2.13 MAGNETIC HOLDERS

A. Acceptable Manufacturers and Types:

LCN	Dorma	Edwards
SEM 7850	EM504	1504

B. Where magnetic holders are specified in the Hardware Groups, provide LCN SEM 7850, unless detailed otherwise.

1. Verify voltage with Electrical Contractor.

C. Provide magnetic holders made of cast metal material. Plastic or stamped material will not be accepted.

2.14 SILENCERS

A. Acceptable Manufacturers and types:

Ives	Steelcraft	Don-Jo
SR64	Q146	1608

B. Provide grey rubber silencers featuring pneumatic design that, once installed, forms an air pocket to absorb shock and reduce noise of door closing.

C. Provide three (3) silencers per hollow metal strike jamb; two (2) per hollow metal double door head. Omit at doors scheduled to receive perimeter weatherstripping or smoke gasket.

D. Silencers shall meet ANSI/BHMA A156.16, L03011

2.15 FASTENERS

A. Including, but not limited to, wood or machine screws, bolts, bolts, nuts, anchors, etc. of proper type, material, and finish required for installation of hardware.

B. Use phillips head for exposed screws. Do not use aluminum screws to attach hardware.

C. Provide self-tapping (TEC) screws for attachment of sweeps and stop-applied weatherstripping only.

2.16 TYPICAL FINISHES AND MATERIALS

A. Finishes, unless otherwise specified:
1. Butts
    a. 613 or 640
2. Flush Bolts:
    a. 613
3. Exit Devices:
    a. 613
4. Locks and Latches:
    a. 613
5. Push Plates, Pulls and Push Bars:
    a. 613
6. Kick Plates, Armor Plates, and Edge Guards:
    a. 613
7. Overhead Stops and Holders:
    a. 613
8. Closers: Surface mounted.
    a. 695 (Dark Bronze)
9. Miscellaneous Hardware:
    a. 613 or 640

PART 3 EXECUTION

3.1 EXAMINATION

A. Examine doors, frames, and related items for conditions that would prevent the proper application of finish hardware. Do not proceed until defects are corrected.

3.2 INSTALLATION

A. Mount hardware units at heights indicated in the following applicable publications, except as specifically indicated or required to comply with governing regulations and, except as otherwise indicated, by the Architect.

1. “Recommended Locations for Builders Hardware for Standard Steel Doors and Frames” by the Door and Hardware Institute.

B. Install each hardware item in compliance with the manufacturer’s instructions and recommendations. Where cutting and fitting is required to install hardware onto or into surfaces that are later to be painted or finished in another way, coordinate removal, storage, and reinstallation or application of surface protection with finishing work specified in the Division 09 Sections. Do not install surface-mounted items until finishes have been completed on the substrates involved.

C. Sets units level, plumb, and true to line and location. Adjust and reinforce the attachment substrate as necessary for proper installation and operation.

D. Where scheduled, door pulls shall be through-bolted with bolt heads concealed behind push plates.

E. Drill and countersink units that are not factory prepared for anchorage fasteners. Space fasteners and anchors in accordance with industry standards.

F. Set thresholds, for exterior and interior doors, in a full bed of butyl-rubber or polyisobutylene mastic sealant complying with requirements specified in Division 07 - Joint Sealers.

G. Weatherstripping and Seals: Comply with manufacturer’s instructions and recommendations to the extent installation requirements are not otherwise indicated.

H. The hardware installer shall be responsible for installation of all mechanical and electromechanical hardware items contained within this specification, in accordance with the manufacturer’s technical installation guidance, and in addition to all applicable code requirements.

3.3 FIELD QUALITY CONTROL

A. After installation has been completed, provide services of qualified hardware consultant to check Project to determine proper application of finish hardware according to schedule. Also check operation and adjustment of hardware items.

B. Adjust door control devices to compensate for final operation of heating and ventilating equipment.

3.4 ADJUSTING AND CLEANING

A. At final completion, hardware shall be left clean and free from disfigurement. Make final adjustment to door closers and other items of hardware. Where hardware is found defective repair or replace or otherwise correct as directed.

B. Adjust door closers to meet opening force requirements of Uniform Federal Accessibility Standards.

C. Final Adjustment: Wherever hardware installation is made more than one month prior to acceptance or occupancy of space or area, return to work during week prior to acceptance or occupancy, and make final check and adjustment of hardware items in such space or area. Clean operating items as necessary to restore proper function and finish of hardware and doors.

D. Instruct Owner's personnel in proper adjustment and maintenance of door hardware and hardware finishes.

E. Clean adjacent surfaces soiled by hardware installation.

3.5 PROTECTION

A. Provide for proper protection of items of hardware until Owner accepts Project as complete.

3.6 HARDWARE GROUPS

A. The following schedule of hardware groups shall be considered a guide only, and the supplier is cautioned to refer to general conditions, special conditions, and the preamble to this section. It shall be the hardware supplier's responsibility to furnish all required hardware.

B. Refer to the door schedule for hardware group required at each door opening.

HARDWARE GROUP NO. 01

FOR USE ON MARK/DOOR #(S):
001

PROVIDE EACH SGL DOOR(S) WITH THE FOLLOWING:

QTY		DESCRIPTION	CATALOG NUMBER	FINISH	MFR
3	EA	HINGE	5BB1 4.5 X 4.5	640	IVE
1	EA	PASSAGE SET	AL10S JUP	613	SCH
1	EA	SURFACE CLOSER	1450 EDA	695	LCN
1	EA	KICK PLATE	8400 10" X 1 1/2" LDW B-CS	613	IVE
1	EA	WALL STOP	WS406/407CCV	613	IVE
1	EA	GASKETING	188S-BR	S-BR	ZER

HARDWARE GROUP NO. 02

FOR USE ON MARK/DOOR #(S):
002

PROVIDE EACH SGL DOOR(S) WITH THE FOLLOWING:

QTY		DESCRIPTION	CATALOG NUMBER	FINISH	MFR
3	EA	HW HINGE	5BB1HW 5 X 4.5	640	IVE
1	EA	PASSAGE SET	AL10S JUP	613	SCH
1	EA	SURFACE CLOSER	1450 REG	695	LCN
1	EA	FIRE/LIFE WALL MAG	SEM7850	695	LCN
1	EA	GASKETING	188S-BR	S-BR	ZER

COORDINATE WITH ELECTRICAL AND FIRE SYSTEMS.

DOOR NORMALLY HELD OPEN BY MAGNET. WHEN FIRE ALARM CLOSES MAGNET WILL RELEASE DOOR TO CLOSE AND LATCH. WHEN DOOR IS CLOSED, FREE PASSAGE THROUGH THE OPENING FROM BOTH DIRECTIONS IS ALLOWED.

HARDWARE GROUP NO. 03

FOR USE ON MARK/DOOR #(S):
003 005

PROVIDE EACH SGL DOOR(S) WITH THE FOLLOWING:

QTY		DESCRIPTION	CATALOG NUMBER	FINISH	MFR
3	EA	HINGE	5BB1 4.5 X 4.5	640	IVE
1	EA	PASSAGE SET	AL10S JUP	613	SCH

1	EA	SURFACE CLOSER	1450 REG	695	LCN
1	EA	KICK PLATE	8400 10" X 1 1/2" LDW B-CS	613	IVE
1	EA	WALL STOP	WS406/407CCV	613	IVE
1	EA	GASKETING	188S-BR	S-BR	ZER

HARDWARE GROUP NO. 04

FOR USE ON MARK/DOOR #(S):
004 008 010

PROVIDE EACH PR DOOR(S) WITH THE FOLLOWING:

QTY		DESCRIPTION	CATALOG NUMBER	FINISH	MFR
6	EA	HINGE	5BB1 4.5 X 4.5	640	IVE
2	EA	MANUAL FLUSH BOLT	FB358	613	IVE
1	EA	DUST PROOF STRIKE	DP2	613	IVE
1	EA	STOREROOM LOCK	AL80RD JUP	613	SCH
2	EA	SURFACE CLOSER	1450 SCUSH	695	LCN
1	EA	GASKETING	188S-BR	S-BR	ZER
1	EA	MEETING STILE	328D	D	ZER

HARDWARE GROUP NO. 05

FOR USE ON MARK/DOOR #(S):
105 106

PROVIDE EACH SGL DOOR(S) WITH THE FOLLOWING:

QTY		DESCRIPTION	CATALOG NUMBER	FINISH	MFR
3	EA	HINGE	5BB1 4.5 X 4.5	640	IVE
1	EA	PUSH PLATE	8200 6" X 16"	613	IVE
1	EA	DOOR PULL	147	613	ROC
1	EA	PULL PLATE	76	613	ROC
1	EA	OH STOP	90S	613	GLY
1	EA	SURFACE CLOSER	1450 REG	695	LCN
1	EA	KICK PLATE	8400 10" X 1 1/2" LDW B-CS	613	IVE
1	EA	GASKETING	188S-BR	S-BR	ZER

HARDWARE GROUP NO. 06

FOR USE ON MARK/DOOR #(S):
006 101 E118

PROVIDE EACH PR DOOR(S) WITH THE FOLLOWING:

QTY		DESCRIPTION	CATALOG NUMBER	FINISH	MFR
6	EA	HW HINGE	5BB1HW 4.5 X 4.5 NRP	613	IVE
1	EA	PANIC HARDWARE	9827-EO-LBR	613	VON
1	EA	PANIC HARDWARE	9827-NL-OP-LBR-110WD	613	VON
1	EA	RIM CYLINDER	20-057	613	SCH
1	EA	FSIC CORE	23-030	606	SCH

2	EA	DOOR PULL	147	613	ROC
2	EA	PULL PLATE	76	613	ROC
2	EA	SURFACE CLOSER	4050 SCUSH	695	LCN
1	EA	GASKETING	429D DK BRZ	A	ZER
1	EA	MEETING STILE	328D	D	ZER
2	EA	DOOR SWEEP	39D	D	ZER
1	EA	THRESHOLD	8655D DK BRZ	A	ZER

HARDWARE GROUP NO. 07

FOR USE ON MARK/DOOR #(S):
007 009 011 012

PROVIDE EACH SGL DOOR(S) WITH THE FOLLOWING:

QTY		DESCRIPTION	CATALOG NUMBER	FINISH	MFR
3	EA	HINGE	5BB1 4.5 X 4.5	640	IVE
1	EA	STOREROOM LOCK	AL80RD JUP	613	SCH
1	EA	SURFACE CLOSER	1450 SCUSH	695	LCN
1	EA	GASKETING	188S-BR	S-BR	ZER

HARDWARE GROUP NO. 08

FOR USE ON MARK/DOOR #(S):
014 015

PROVIDE EACH SGL DOOR(S) WITH THE FOLLOWING:

QTY		DESCRIPTION	CATALOG NUMBER	FINISH	MFR
3	EA	HINGE	5BB1 4.5 X 4.5	640	IVE
1	EA	SGL CYL DEADBOLT	B660R	613	SCH
1	EA	PUSH PLATE	8200 6" X 16"	613	IVE
1	EA	DOOR PULL	147	613	ROC
1	EA	PULL PLATE	76	613	ROC
1	EA	SURFACE CLOSER	1450 EDA	695	LCN
1	EA	KICK PLATE	8400 10" X 1 1/2" LDW B-CS	613	IVE
1	EA	WALL STOP	WS406/407CCV	613	IVE
1	EA	GASKETING	188S-BR	S-BR	ZER

HARDWARE GROUP NO. 09

FOR USE ON MARK/DOOR #(S):
102 110

PROVIDE EACH PR DOOR(S) WITH THE FOLLOWING:

QTY		DESCRIPTION	CATALOG NUMBER	FINISH	MFR
6	EA	HINGE	5BB1 4.5 X 4.5	640	IVE
2	EA	MANUAL FLUSH BOLT	FB358	613	IVE

1	EA	DUST PROOF STRIKE	DP2	613	IVE
1	EA	STOREROOM LOCK	AL80RD JUP	613	SCH
2	EA	OH STOP	90S	613	GLY

HARDWARE GROUP NO. 10

FOR USE ON MARK/DOOR #(S):
103 E115 E117

PROVIDE EACH PR DOOR(S) WITH THE FOLLOWING:

QTY		DESCRIPTION	CATALOG NUMBER	FINISH	MFR
6	EA	HW HINGE	5BB1HW 4.5 X 4.5 NRP	613	IVE
1	EA	KEYED REMOVABLE MULLION	KR4954	695	VON
1	EA	PANIC HARDWARE	98-EO	613	VON
1	EA	PANIC HARDWARE	98-NL-OP-110WD	613	VON
1	EA	RIM CYLINDER	20-057	613	SCH
1	EA	MORTISE CYLINDER	20-061	613	SCH
1	EA	FSIC CORE	23-030	606	SCH
2	EA	DOOR PULL	147	613	ROC
2	EA	PULL PLATE	76	613	ROC
2	EA	SURFACE CLOSER	1450 SCUSH	695	LCN

HARDWARE GROUP NO. 11

FOR USE ON MARK/DOOR #(S):
E116

PROVIDE EACH PR DOOR(S) WITH THE FOLLOWING:

QTY		DESCRIPTION	CATALOG NUMBER	FINISH	MFR
6	EA	HW HINGE	5BB1HW 4.5 X 4.5 NRP	613	IVE
1	EA	PANIC HARDWARE	9827-EO-LBR	613	VON
1	EA	PANIC HARDWARE	9827-NL-OP-LBR-110WD	613	VON
1	EA	RIM CYLINDER	20-057	613	SCH
1	EA	FSIC CORE	23-030	606	SCH
2	EA	DOOR PULL	147	613	ROC
2	EA	PULL PLATE	76	613	ROC
2	EA	SURFACE CLOSER	1450 SCUSH	695	LCN

HARDWARE GROUP NO. 12

FOR USE ON MARK/DOOR #(S):
108

PROVIDE EACH SGL DOOR(S) WITH THE FOLLOWING:

QTY		DESCRIPTION	CATALOG NUMBER	FINISH	MFR
3	EA	HINGE	5BB1 4.5 X 4.5	640	IVE
1	EA	SGL CYL DEADBOLT	B660R	613	SCH

1	EA	PUSH PLATE	8200 6" X 16"	613	IVE
1	EA	DOOR PULL	147	613	ROC
1	EA	PULL PLATE	76	613	ROC
1	EA	SURFACE CLOSER	1450 SCUSH	695	LCN
1	EA	KICK PLATE	8400 10" X 1 1/2" LDW B-CS	613	IVE
1	EA	GASKETING	188S-BR	S-BR	ZER

HARDWARE GROUP NO. 13

FOR USE ON MARK/DOOR #(S):
109 111

PROVIDE EACH SGL DOOR(S) WITH THE FOLLOWING:

QTY		DESCRIPTION	CATALOG NUMBER	FINISH	MFR
3	EA	HINGE	5BB1 4.5 X 4.5	640	IVE
1	EA	ENTRANCE/OFFICE LOCK	AL50RD JUP	613	SCH
1	EA	OH STOP	90S	613	GLY
1	EA	SURFACE CLOSER	1450 REG	695	LCN
1	EA	KICK PLATE	8400 10" X 1 1/2" LDW B-CS	613	IVE
1	EA	GASKETING	188S-BR	S-BR	ZER

HARDWARE GROUP NO. 14

FOR USE ON MARK/DOOR #(S):
E016

PROVIDE EACH PR DOOR(S) WITH THE FOLLOWING:

QTY		DESCRIPTION	CATALOG NUMBER	FINISH	MFR
6	EA	HINGE	5BB1 4.5 X 4.5	640	IVE
1	EA	KEYED REMOVABLE MULLION	KR4954	695	VON
1	EA	PANIC HARDWARE	98-EO	613	VON
1	EA	PANIC HARDWARE	98-NL-OP-110MD	613	VON
1	EA	RIM CYLINDER	20-057	613	SCH
1	EA	MORTISE CYLINDER	20-061	613	SCH
2	EA	FSIC CORE	23-030	606	SCH
2	EA	DOOR PULL	147	613	ROC
2	EA	PULL PLATE	76	613	ROC
2	EA	OH STOP	90S	613	GLY
2	EA	SURFACE CLOSER	1450 REG	695	LCN
2	EA	KICK PLATE	8400 10" X 1" LDW B-CS	613	IVE
1	EA	GASKETING	188S-BR	S-BR	ZER
1	EA	MEETING STILE	328D DK BRZ	D	ZER

HARDWARE GROUP NO. 15

FOR USE ON MARK/DOOR #(S):
E113

PROVIDE EACH SGL DOOR(S) WITH THE FOLLOWING:

QTY		DESCRIPTION	CATALOG NUMBER	FINISH	MFR
3	EA	HW HINGE	5BB1HW 4.5 X 4.5 NRP	613	IVE
1	EA	PANIC HARDWARE	98-NL-OP-110MD	613	VON
1	EA	DOOR PULL	147	613	ROC
1	EA	PULL PLATE	76	613	ROC
1	EA	SURFACE CLOSER	4050 SCUSH	695	LCN
1	EA	KICK PLATE	8400 10" X 1 1/2" LDW B-CS	613	IVE
1	EA	GASKETING	429D DK BRZ	A	ZER
1	EA	DOOR SWEEP	39D	D	ZER
1	EA	THRESHOLD	8655D DK BRZ	A	ZER
1	EA	RAIN DRIP	142D	D	ZER

HARDWARE GROUP NO. 16

FOR USE ON MARK/DOOR #(S):
E112 E114

PROVIDE EACH SGL DOOR(S) WITH THE FOLLOWING:

QTY		DESCRIPTION	CATALOG NUMBER	FINISH	MFR
3	EA	HW HINGE	5BB1HW 4.5 X 4.5 NRP	613	IVE
1	EA	SGL CYL DEADBOLT	B660R	613	SCH
1	EA	PUSH PLATE	8200 6" X 16"	613	IVE
1	EA	DOOR PULL	147	613	ROC
1	EA	PULL PLATE	76	613	ROC
1	EA	SURFACE CLOSER	4050 SCUSH	695	LCN
1	EA	KICK PLATE	8400 10" X 1 1/2" LDW B-CS	613	IVE
1	EA	GASKETING	429D DK BRZ	A	ZER
1	EA	DOOR SWEEP	39D	D	ZER
1	EA	THRESHOLD	8655D DK BRZ	A	ZER
1	EA	RAIN DRIP	142D	D	ZER

END OF SECTION

Door/Hardware Index

Mark #	HWSet #	Remarks
001	01	
002	02	
003	03	
004	04	
005	03	
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011	07	
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E016	14	
E112	16	
E113	15	
E114	16	
E115	10	
E116	11	
E117	10	
E118	06	

SECTION 09 2116 - GYPSUM BOARD ASSEMBLIES

PART 1 GENERAL

1.01 SECTION INCLUDES

A. Non-Loadbearing Metal Framing System Components
   1. RIGID FURRING CHANNELS = HAT CHANNEL, METAL FURRING (where no other qualifier for furring type is indicated)
   2. RESILIENT FURRING CHANNELS
   3. SUBSTRATE REINFORCEMENT = BLOCKING
   4. BRIDGING

B. Panels Materials
   1. GYPSUM BOARD = GYPSUM WALLBOARD / Typical
   2. WATER RESISTANT GYPSUM BOARD = MOISTURE RESISTANT GYPSUM BOARD, GREEN BOARD

C. Materials and Accessories
   1. CORNERBEAD
   2. EDGE TRIM / Gypsum Based Panel Edges where Exposed or Abbutting other Construction
      a. LC-BEAD = J-BEAD
   3. EXPANSION JOINT = CONTROL JOINT / Gypsum Based Panels
   4. Joint Treatment Materials
   5. Fasteners / Gypsum Based Panels or Cementitious Backer Board

1.02 RELATED REQUIREMENTS

A. Rough Carpentry
   1. Wood framing for gypsum board partition and ceiling assemblies.
   2. Wood blocking used for substrate reinforcement

B. Thermal Insulation: Acoustic insulation.

C. Firestopping: Acoustic sealant required as part of a part of fire rated assembly.

D. Joint Sealants: Acoustic sealant not required as part of a part of fire rated assembly

E. Onsite Coating

1.03 SUBMITTALS

A. Product Data:
   1. Rigid Furring Channels .
   2. Resilient Furring Channels .
   3. Gypsum Board: Include material descriptions and standards compliance .
   4. Water Resistant Gypsum Board: Include recycled content report .
   5. Cornerbead .
   6. LC-Bead: Include material descriptions and dimensions of individual components and profiles .
   7. Expansion Joint .
   8. Drying Type Joint Treatment Materials .

1.04 QUALITY ASSURANCE

A. Perform Work in accordance with ASTM C 840. Comply with requirements of GA-600 for fire-rated assemblies.

B. Applicator Qualifications: Company specializing in performing gypsum board application and finishing, with minimum 5 years of documented experience.

PART 2 PRODUCTS

2.01 GYPSUM BOARD ASSEMBLIES

A. Fire Rated Assemblies: Provide completed assemblies with the following characteristics:
   1. Provide materials and construction identical to those tested in assembly indicated according to ASTM E 119 by an independent testing agency.
   2. Where UL Assembly Numbers are Indicated: Provide construction equivalent to that listed for the particular assembly in the current UL Fire Resistance Directory.

2.02 METAL FRAMING SYSTEMS

A. Loadbearing Framing Systems: For gypsum board assemblies subjected to loads other than the dead weight of the assembly and associated fixtures and fitting (including wind, masonry veneer, live loads, and dead weight of other construction), provide framing systems as required for the following indicated elsewhere depending on application:
   1. Structural Metal (Steel)
   2. Cold Formed Metal Framing

B. Non-Loadbearing Framing System: composed of wood framing components, of size and properties as indicated for rough carpentry and as necessary to provide maximum deflection of wall framing indicated below.
   1. Deflection of Wall Framing: L/360 at 10 psf maximum
   2. Unless otherwise indicated, provide non-loadbearing framing systems of the following componets indicated in this Part:
      a. Ceilings, Framed:
         1) Wood studs.
      b. Partition Walls:
         1) Wood studs.
         2) Blocking as required to support fixtures and fitting attached to partition wall.
      c. Other Assemblies: as indicated on Drawings

2.03 RIGID FURRING CHANNELS

A. ASTM C 645

B. Hat-Shaped, 7/8 inch deep unless otherwise indicated.

C. Metal Thickness: 0.024 inches (24 gage) minimum before coating.

2.04 RESILIENT FURRING CHANNELS

A. Asymmetrical 1/2 inch deep members designed to reduce sound transmission with face attached to single flange by a slotted leg (web).

B. Material: G40 hot-dip galvanized steel sheet / ASTM A 653

2.05 SUBSTRATE REINFORCEMENT / Non-Loadbearing Framing

A. One of the following at Contractor's option:
   1. Flat strap and backing plate. Steel sheet for blocking and bracing in length and width indicated.
      a. Metal Thickness: 0.024 inches (24 gage) minimum before coating.
   2. Wood blocking as required for carpentry indicated elsewhere.

2.06 GYPSUM BOARD

A. Gypsum wallboard / ASTM C 1396. Sizes to minimize joints in place; ends square cut.
   1. Thickness: 5/8 inch, typical.
   2. Edges: Tapered.
   3. At Assemblies Indicated with Fire-Rating: Use type required by indicated tested assembly; if no tested assembly is indicated, use Type X / UL or WH rated.

2.07 WATER RESISTANT GYPSUM BOARD

A. Water-resistant gypsum backing board / ASTM C 1396 or ASTM C 630; ends square cut.
   1. Thickness: 5/8 inch, typical.
   2. Edges: Tapered.
   3. At Assemblies Indicated with Fire-Rating: Use type required by indicated tested assembly; if no tested assembly is indicated, use Type X / UL or WH rated.

2.08 CEMENTITIOUS BACKER BOARD

A. ANSI A118.9, aggregated Portland cement panels with glass fiber mesh embedded in front and back surfaces.
   1. Thickness: 1/2 inch, typical.
   2. Edges: Square.

2.09 COATED BACKER BOARD

A. Gypsum panels with moisture-resistant core and coated inorganic fiberglass mat on both surfaces and integral acrylic coating vapor retarder on front surface.

B. Glass mat water-resistant gypsum backing panel / ASTM C 1178.

C. Water-resistant gypsum backing board / ASTM C 1396.

D. Resist growth of mold and mildew / ASTM D 3273.

E. Glass mat gypsum substrate / ASTM C 1177.

F. Mold resistant / ASTM D 3273.

G. Products:
   1. DensShield Tile Guard / G-P Gypsum.
   2. CertainTeed Corporation Diamondback GlasRoc Tile Backer

2.10 FIBER CEMENT BOARD

A. Product: James Hardie Building Products Inc. 500 CEMENT BOARD

B. Thickness: 0.42 inch

2.11 CORNERBEAD

A. Cornerbead / ASTM C 1047 fabricated from galvanized steel, rolled zinc, or rigid plastic.

2.12 LC-BEAD

A. LC-Bead / ASTM C 1047 fabricated from galvanized steel or rolled zinc.

B. Exposed long flange receives joint compound.

2.13 EXPANSION JOINT / Gypsum Based Panels

A. Expansion joint / ASTM C 1047 fabricated from galvanized steel, rolled zinc, or rigid plastic.

2.14 JOINT TREATMENT MATERIALS

A. Joint Materials: ASTM C 475 and as recommended by gypsum board manufacturer for project conditions.
   1. Joint Tape: 2 inch wide, coated glass fiber meash tape for joints and corners, except as otherwise indicated.
   2. Joint Compond, Typical: one of the following at Contractor's option:
      a. Ready-mixed vinyl-based joint compound.
      b. Powder-type vinyl-based joint compound.
   3. Joint Compound at Tile: bond coat (mortar) as required for tile indicated elsewhere.

2.15 FASTENERS / Gypsum Based Panels or Cementitious Backer Board

A. Anchorage to Substrate: Tie wire, nails, screws, and other metal supports, of type and size to suit application; to rigidly secure materials in place.

B. Interior Fasteners:

1. For wood framing, attach gypsum based panels to comply with ASTM C 1002.
2. For fastening cementitious backer board, use screws of type and size recommended by panel manufacturer.

PART 3 EXECUTION

3.01 EXAMINATION

A. Verify that project conditions are appropriate for work of this section to commence.

3.02 ACOUSTIC INSULATION INSTALLATION

A. Place tightly within spaces, around cut openings, behind and around electrical and mechanical items within partitions, tight to items passing through partitions, and as required for acoustic insulation indicated elsewhere.

3.03 ACOUSTIC SEALANT INSTALLATION

A. Unless otherwise indicated, install acoustic sealant as follows and as required for joint sealants and firestopping indicated elsehere:
   1. Place one bead continuously on substrate before installation of perimeter framing members.
   2. Place continuous bead at perimeter of each layer of gypsum board.
   3. Seal around all penetrations by conduit, pipe, ducts, and rough-in boxes.
   4. Place one bead continuously at perimeter joints concealed by trim or other overlaying construction.

3.04 GYPSUM BOARD INSTALLATION

A. Comply with ASTM C 840. Install to minimize butt end joints, especially in highly visible locations.

B. Single-Layer Non-Rated: Install gypsum board perpendicular to framing, with ends and edges occurring over firm bearing.

C. Double-Layer Non-Rated: Use gypsum board for first layer, placed parallel to framing or furring members, with ends and edges occurring over firm bearing. Use glass mat faced gypsum board at exterior walls and at other locations as indicated. Place second layer perpendicular to framing or furring members. Offset joints of second layer from joints of first layer.

D. Fire-Rated Construction: Install gypsum board in strict compliance with requirements of listing authority.

E. Curved Surfaces: Apply gypsum board to curved substrates in accordance with GA-226.

3.05 BACKER BOARD INSTALATION

A. Cementitious Backer Board: over substrates indicated / ANSI A108.11. Wrap cut edges with mesh joint tape before installing. Space perimeter joints and field joints 1/8 to 1/4 inch and fill with joint compound before embedding joint tape.

B. Coated Backer Board: Install coated backer board as for gypsum board except, fasten with corrosion-resistant bugle head drywall screws and use joint treatment indicated.

C. Where backer board abuts other types of panels in same plane, shim surfaces to produce a uniform plane across panel surfaces, unless otherwise indicated.

D. At tile, finish backer board using joing compound as required for tile indicated elsewhere, otherwise, finish backer board as for gypsum board indicated in this Section.

3.06 TRIM AND ACCESSORIES INSTALLATION

A. Control Joints: Place control joints consistent with lines of building spaces and as indicated.
   1. Not more than 30 feet apart on walls and ceilings over 50 feet long.

B. Corner Beads: Install at external corners, using longest practical lengths.

C. Edge Trim: Install at locations where gypsum board abuts dissimilar materials.

3.07 JOINT TREATMENT APPLICATION

A. Paper Faced Gypsum Board: Use paper joint tape, bedded with ready-mixed vinyl-based joint compound and finished with ready-mixed vinyl-based joint compound.

B. Tape, fill, and sand exposed joints, edges, and corners to produce smooth surface ready to receive finishes.
   1. Feather coats of joint compound so that camber is maximum 1/32 inch.
   2. Sanding is not required at surfaces behind adhesive applied ceramic tile and fixed cabinetry.
   3. Taping, filling and sanding is not required at base layer of double layer applications, unless required for fire-resistive construction.

C. Fill and finish joints and corners of cementitious backing board as recommended by manufacturer.

3.08 TOLERANCES

A. Maximum Variation of Finished Gypsum Board Surface from True Flatness: 1/8 inch in 10 feet in any direction.

3.09 FINISH LEVEL SCHEDULE

A. Finish all gypsum board in accordance with ASTM C 840 as follows:
   1. Level 3: Walls scheduled to receive tile.
   2. Level 4:
      a. Typical unless otherwise indicated.

3.10 GYPSUM BOARD APPLICATION SCHEDULE

A. Where gypsum board or other panels products specified in this Section are indicated elsewhere, use the following types:
   1. Gypsum Board:
      a. Typical
   2. Water Resistant Gypsum Board:
      a. Wall and ceiling surfaces in rooms with toilets, baths, or showers.
      b. Where indicated.
   3. Tile Backer Board: For wall tile, use one of the following as indicated in Part 2 at Contractor's option:
      a. Coated Backer Board
      b. Fiber Cement Board
      c. Cementitious Backer Board

END OF SECTION

SECTION 09 2613 - ACOUSTICAL GYPSUM PLASTERING

PART 1 GENERAL

1.01 SECTION INCLUDES

A. Gypsum veneer plaster on gypsum board.

1.02 SUBMITTALS

A. Product Data: Provide data on veneer plaster products.

B. Mockup Reports:
   1. Acoustic Plaster Mockup

1.03 QUALITY ASSURANCE

A. Perform Work in accordance with ASTM C 843, ASTM C 844 .

B. Acoustic Plaster Mockup: complete ceiling mockup with half unpainted and half painted
   1. Location: as directed.
   2. Size: 10 foot square.
   3. Disposition: Approved undamaged mockups may be incorporated into the Work.

PART 2 PRODUCTS

2.01 ACOUSTIC GYPSUM PLASTER

A. Product: USG Acoustical Plaster Finish

B. Description: sound-rated interior spray-applied setting-type plaster texture finish.

C. Finish: color integral white

PART 3 EXECUTION

3.01 EXAMINATION

A. Verify that substrates are ready to receive work.

B. Verify gypsum board substrate is flat, joints are taped and sanded, and surface is ready to receive work of this Section. Verify joint and surface perimeter accessories are in place.

3.02 PREPARATION

A. Clean surfaces of dust or loose matter.

3.03 INSTALLATION

A. Spray apply acoustic plaster in a single 1/2 inch thickness layer.

B. Finish shall be be evenly spread and free from runs, sags and other blemishes. Use only mixing equipment and pump sizes (piston pump, rotor/stator and peristaltic pump) per manufacurer's instructions.

END OF SECTION

SECTION 09 3000 - TILING

PART 1 GENERAL

1.01 SECTION INCLUDES

A. TILE
   1. CERAMIC WALL TILE
   2. CERAMIC FLOOR TILE

B. STONE THRESHOLDS / Tile Flooring

C. Mortar Materials / Tile

D. Grout Materials / Tile

E. CLEAVAGE MEMBRANE = UNCOUPLING MEMBRANE / Tile

F. Sealer

1.02 RELATED REQUIREMENTS

A. Joint Sealants
   1. Sealant for sealant-grouted joints.

B. Flooring Preparation:
   1. Substrate Site Quality Control
   2. UNDERLAYMENT
   3. PATCHING COMPOUND
   4. LEVELING COMPOUND

1.03 SUBMITTALS

A. Product Data:
   1. Wall Tile: Include regional products report, material descriptions, and standards compliance . Include manufacturer's instructions for installation and required substrate tolerances.
   2. Floor Tile: Include regional products report, material descriptions, and standards compliance . Include manufacturer's instructions for installation and required substrate tolerances.
   3. Stone Thresholds: Include regional raw materials report, regional manufactured products report, and material descriptions .
   4. Mortar Material, Each: Include VOC content and standards compliance .
   5. Grout Material, Each: Include VOC content and standards compliance .
   6. Cleavage Membrane: Include regional products report, recycled content report, and manufacturer's product specifications .
   7. Sealer: Include VOC content and compatibility test reports .

B. Verification Samples:
   1. Each Type of Tile: unit .

C. Maintenance Data: Include recommended cleaning methods, cleaning materials, stain removal methods, and polishes and waxes.

D. Extra Stock Materials:
   1. Each Type of Tile: 0.5 percent of each type, color, pattern, and texture installed

1.04 QUALITY ASSURANCE

A. Source Limitations: Tile of same type; grout.

B. Tile Installer Qualifications: Qualified and Experienced 5 projects, 3 years.

1.05 SITE CONDITIONS

A. Ambient Conditions: Maintain ambient temperature and relative humidity planned for building occupants in spaces to receive tile for at least 3 days before installation, during installation, and until Substantial Completion.

PART 2 PRODUCTS

2.01 CERAMIC WALL TILE / Typical

A. Product: Crossville Virtue Porcelain Stone SHT (Satin finish with Hydrotect) <http://crossvilleinc.com/products/virtue/>

B. Size: 3”x6””

C. Layout Pattern: standard bond

2.02 CERAMIC WALL TILE / Women's Restroom Backsplash

A. Product: Crossville Virtue Porcelain Stone SHT (Satin finish with Hydrotect) <http://crossvilleinc.com/products/virtue/>

B. Size: 1”x3”

C. Layout Pattern: herringbone

2.03 CERAMIC FLOOR TILE

A. Product: Crossville Yin @ Yang Lotus Blossom Natural Finish YY06/10103HB

B. Size: 12”x24”

C. Layout Pattern: standard bond

2.04 TRIM / Tile

A. Trim for Tile: Same material as tile and as indicated on Drawings. If not specifically indicated, provide accessories as required to prevent exposure of unfinished tile edges at corners, transitions, and terminations. If tile trim accessories are not detailed or otherwise specifically identified, provide units that are consistent in style and finish with other accessories in the same space, dimensioned appropriately for each application.

2.05 STONE THRESHOLDS

A. Marble; ASTM C 503 with a minimum abrasion resistance of 12 per ASTM C 1353 or ASTM C 241 and with honed finish.
   1. Description: Uniform, fine to medium grained white stone with gray veining.

B. Fabricate to sizes and profiles indicated or required to provide transition between adjacent floor finishes.
   1. Bevel edges at 1:2 slope, aligning lower edge of bevel with adjacent floor finish. Limit height of bevel to 1/2 inch or less, and finish bevel to match face of threshold.

2.06 MORTAR MATERIALS

A. Latex-Portland Cement Mortar: ANSI A A118.4
   1. Polymer Type: Ethylene vinyl acetate, in dry, redispersible form, prepackaged with other dry ingredients to which only water is added at Project site.

2.07 GROUT MATERIALS

A. Polymer Modified Cement Grout: ANSI A A118.7
   1. Colors: To be selected from manufacturer's standard range.
   2. Polymer Type: Ethylene vinyl acetate, in dry, redispersible form, prepackaged with other dry ingredients to which only water is added at Project site.
   3. Unsanded grout mixture for joints 1/8 inch and narrower.
   4. Sanded or unsanded grout mixture, at Contractor's option, for joints 1/8 inch and wider.

2.08 CLEAVAGE MEMBRANE

A. 1/8 inch thick polyurethane matting with three-dimensional grid structure with dovetail shaped cavities and fleece webbing laminated to the underside to provide a mechanical bond to the substrate adhesive.

B. Product: Schluter-DITRA / Schluter Systems, L.P..

2.09 CLEANER

A. Neutral non-acidic cleaner capable of removing soil and residue without harming tile and grout surfaces, specifically approved for materials and installations indicated by tile and grout manufacturers.

2.10 GROUT SEALER

A. Manufacturer's standard silicone product for sealing grout joints that does not change color or appearance of grout.

B. Products:
   1. Bonsal, W. R., Company; Grout Sealer.
   2. Bostik; CeramaSeal Grout Sealer.
   3. C-Cure; Penetrating Sealer 978.

C. VOC Limitation: 250 g/L maximum / 40 CFR 59, Subpart D (EPA Method 24)

PART 3 EXECUTION

3.01 EXAMINATION

A. Examine substrate as required for flooring preparation indicated elsewhere.

3.02 PREPARATION

A. Flooring: Prepare substrate as required for flooring preparation indicated elsewhere.

3.03 TILE INSTALLATION

A. Install tile and grout in accordance with applicable requirements of ANSI A108.1 through A108.13, manufacturer's instructions, and TCA Installation Guidelines recommendations.

B. Cut and fit tile to penetrations through tile, leaving sealant joint space. Form corners and bases neatly. Unless otherwise indicated, Align floor, base, and wall joints.
   1. Accurately form intersections and returns. Perform cutting and drilling of tile without marring visible surfaces. Carefully grind cut edges of tile abutting trim, finish, or built-in items for straight aligned joints. Fit tile closely to electrical outlets, piping, fixtures, and other penetrations so plates, collars, or covers overlap tile.
   2. Extend tile work into recesses and under or behind equipment and fixtures to form complete covering without interruptions, unless otherwise indicated. Terminate work neatly at obstructions, edges, and corners without disrupting pattern or joint alignments.

C. Place tile joints uniform in width, subject to variance in tolerance allowed in tile size. Make grout joints without voids, cracks, excess mortar or excess grout, or too little grout.
   1. Jointing Pattern: Lay tile in grid pattern, unless otherwise indicated. Align joints when adjoining tiles on floor, base, walls, and trim are same size. Lay out tile work and center tile fields in both directions in each space or on each wall area. Adjust to minimize tile cutting. Provide uniform joint widths, unless otherwise indicated.
      a. For tile mounted in sheets, make joints between tile sheets same width as joints within tile sheets so joints between sheets are not apparent in finished work.
      b. Lay out tile wainscots to next full tile beyond dimensions indicated.
   2. Form internal angles square and external angles bullnosed.

D. Sound tile after setting. Replace hollow sounding units.

E. Joint Sealant: Apply joint sealant where indciated elsewhere and on Drawings and to junction of tile and dissimilar materials. Mask areas adjacent to joints to prevent smears and stains. Install joint sealants as required for joint sealants indicated elsewhere.

3.04 THRESHOLD INSTALLATION

A. Stone Thresholds: Install stone set in same type of setting bed as abutting field tile, unless otherwise indicated.
   1. Locations: Where:
      a. tile terminates at doors.
      b. indicated on Drawings.

3.05 INSTALLATION METHODS AND SCHEDULE

A. TCA Installation Guidelines: Comply with TCA's "Handbook for Ceramic Tile Installation." methods indicated and as modified below:

B. THINSET / Floors: TCA F133 with the following materials:
   1. Substrate: cured concrete slab or underlayment as required for flooring prepartaion indicated elsewhere.
   2. Membrane: cleavage membrane substituted for waterproofing.
   3. Bond Coat: latex portland cement mortar.
   4. Grout: polymer modified cement grout.
   5. Tile: as indicated elsewhere.
   6. Joint Widths: 3/16 inch, unless otherwise indicated.

3.06 CLEANING

A. Progress Cleaning: Immediately remove adhesive, grout, mortar, joint sealant, and other foreign substances which are not indicated to be applied to surfaces.

B. Final Cleaning: Clean exposed tile and grout surfaces with methods not harmful to finishes to remove foreign material. Thoroughly rinse and dry surfaces.
   1. Use only cleaners and methods recommended by tile and grout manufacturers and only after determining that cleaners are safe, innocuous, undamaging, and not detimental to use by testing on 4 foot by 4 foot area of surfaces to be cleaned. Protect non-tile and non-grout surfaces from cleaner.
   2. Clean grout smears and haze from exposed tile and grout surfaces.
   3. Remove temporary protective coverings and strippable films. Trap and remove coating to prevent it from clogging drains.

C. Grout Sealer: As soon as grout sealer has penetrated grout joints, remove excess sealer and sealer that has gotten on tile faces by wiping with soft cloth.

3.07 PROTECTION

A. Protect installed tile from subsequent construction operations.

B. Except for clean foot traffic after 7 days, do not permit traffic over unprotected floor surface.

END OF SECTION

SECTION 09 5100 - ACOUSTICAL CEILINGS

PART 1 GENERAL

1.01 SECTION INCLUDES

A. ACOUSTIC PANELS / Direct Attached

B. SUSPENDED ACOUSTICAL CEILINGS
   1. ACOUSTIC PANEL = ACT, ACOUSTIC CEILING TILE / Suspended Acoustical Ceilings
   2. SUSPENSION SYSTEM = CEILING GRID

1.02 RELATED REQUIREMENTS

A. Joint Sealants: Acoustic sealant.

B. Gypsum Board Assemblies
   1. Suspended gypsum board ceilings
   2. RIGID FURRING and fasteners for direct attached acoustic panels

C. Air diffusion, fire suppression, and other mechanical devices in ceiling.

D. Light fixtures, fire alarm, and other electrical devices in ceiling system.

1.03 ADMINISTRATIVE REQUIREMENTS

A. Sequence work to ensure acoustical ceilings are not installed until building is enclosed, sufficient heat is provided, dust generating activities have terminated, and overhead work is completed, tested, and approved.

B. Do not install acoustical units until after interior wet work is dry.

1.04 SUBMITTALS

A. Product Data:
   1. Acoustic Panel for Suspended Ceilings: Include recycled content report, material descriptions, and manufacturer's product specifications .
   2. Suspension System: Include manufacturer's product specifications and standards compliance .
   3. Acousctic Sealant: Include VOC content and manufacturer's product specifications .

B. Sample Warranties: Acoustic Panel Manufacturer's Warranty.

C. Executed Warranties: Acoustic Panel Manufacturer's Warranty.

1.05 WARRANTY

A. Acoustic Panel Manufacturer's Warranty: Provide acoustic panel manufacturer's standard written warranty in which manufacturer agrees to repair or replace acoustic panels that fails due to defects in materials or factory workmanship within specified warranty period.
   1. Warranty Period: as indicated in Part 2

PART 2 PRODUCTS

2.01 ACOUSTIC PANELS / Typical Suspended Ceilings

A. Type III (mineral base with painted finish), Form 1 (Nodular) , Pattern EI (lightly textured, embossed), Class A (FS<25, SD<50) / ASTM E 1264

B. Size: 24 x 24 inches.

C. Thickness: 3/4 inches.

D. Light Reflectance: 0.90 / ASTM E 1264.

E. NRC Range: 0.70 / ASTM E 1264.

F. Ceiling Attenuation Class (CAC): 33 / ASTM E 1264.

G. Surface Color: White.

H. Sag Resistance Treatment: HumiGuard Plus

I. Anti-microbial Treatment: BioBlock +

J. Comparable Product: Armstrong Ultima Vector 1920 (www.armstrong.com)
   1. Manufacturers:
      a. CertainTeed Corp. (formerly BPB America Inc., Celotex, Gyptone, and Capaul) (www.bpb-na.com)
      b. USG (www.usg.com)

K. Warranty Period: 30 year

2.02 SUSPENSION SYSTEMS

A. Intermediate-duty / ASTM C 635.

B. Material: Formed and die cut commercial quality cold rolled galvanized steel.

C. Profile: Tee; 15/16 inch wide face.

D. Construction: Double web

E. Finish: Factory White painted .

F. Accessories: Provide with stabilizer bars, clips, splices, and perimeter moldings as required.

G. Support Channels and Hangers: Galvanized steel; size and type to suit application, seismic requirements, and ceiling system flatness requirement specified.

H. Manufacturers:
   1. Armstrong World Industries, Inc: www.armstrong.com.
   2. CertainTeed Corp. (formerly BPB America Inc., Celotex, Gyptone, and Capaul) (www.bpb-na.com)
   3. Chicago Metallic Corporation: www.chicagometallic.com.
   4. USG: www.usg.com.

PART 3 EXECUTION

3.01 SUSPENSION SYSTEM INSTALLATION

A. Install suspension system in accordance with ASTM C 636 and applicable portions of Ceilings & Interior Systems Construction Association (CISCA) "Ceiling Systems Handbook".

B. Rigidly secure system, including integral mechanical and electrical components, for maximum deflection of 1:360.

C. Install after major above-ceiling work is complete. Coordinate the location of support channels and hangers with other work.

D. Hang suspension system independent of walls, columns, ducts, pipes and conduit. Where carrying members are spliced, avoid visible displacement of face plane of adjacent members.

E. Where ducts or other equipment prevent the regular spacing of hangers, reinforce the nearest affected hangers and related carrying channels to span the extra distance.

F. Do not support components on main runners or cross runners if weight causes total dead load to exceed deflection capability.

G. Support fixture loads using supplementary hangers located within 6 inches of each corner, or support components independently.

H. Do not eccentrically load system or induce rotation of runners.

I. Perimeter Molding: Install at intersection of ceiling and vertical surfaces and at junctions with other interruptions.
   1. Install in bed of acoustical sealant as required for joint sealants indicated elsewhere.
   2. Use longest practical lengths.
   3. Miter corners.

3.02 SUSPENDED TILE INSTALLATION

A. Fit acoustical units in place, free from damaged edges or other defects detrimental to appearance and function.

B. Fit border trim neatly against abutting surfaces.

C. Install units after above-ceiling work is complete.

D. Install acoustical units level, in uniform plane, and free from twist, warp, and dents.

E. Cutting Acoustical Units:
   1. Make field cut edges of same profile as factory edges.

F. Where round obstructions occur, provide preformed closures to match perimeter molding.

3.03 ERECTION TOLERANCES / Suspended Acoustic Ceilings

A. Maximum Variation from Flat and Level Surface: 1/8 inch in 10 feet.

B. Maximum Variation from Plumb of Grid Members Caused by Eccentric Loads: 2 degrees.

END OF SECTION

SECTION 09 6011 - FLOORING PREPARATION

PART 1 GENERAL

1.01 SECTION INCLUDES

A. UNDERLAYMENT = SUBFLOOR

B. ADHESIVE / Underlayment

C. FASTENERS / Underlayment

D. Patching Compound

E. Leveling Compound

1.02 RELATED REQUIREMENTS

A. Tile

B. Resilient Flooring

C. Carpet

D. Carpet Tile

1.03 SUBMITTALS

A. Product Data:
   1. Underlayment: Include recycled content report, VOC content, urea formaldehyde content, material descriptions, and standards compliance .
   2. Adhesive for Underlayment: Include VOC content, urea formaldehyde content, compatibility test reports, and material descriptions .
   3. Patching Compound: Include VOC content, compatibility test reports, and material descriptions .
   4. Leveling Compound: Include VOC content, compatibility test reports, and material descriptions .
   5. Fasteners: Include material descriptions, dimensions of individual components and profiles, and finishes .

B. Qualification Statements: testing agency. List trainings, certifications and other industry recognized education for types of testing indicated.

C. Site Quality Control Submittals: by entity responsible for testing indicated in Part 3.

1.04 QUALITY ASSURANCE

A. Flooring Preparation Testing Agency Qualifications: Qualified and Experienced 5 projects, 3 years. Testing agency may be an independent testing agency or the flooring installer provided the flooring installer is a subcontractor as opposed to the Contractor.

B. Prepare substrates according to finish flooring manufacturer's written instructions.

C. Flooring Preparation Installer Qualifications: Installer of corresponding finish flooring or approved by installer of corresponding finish flooring for each different type of finish flooring.

1.05 SITE CONDITIONS

A. Ambient Conditions: Maintain relative humidity planned for building occupants and an ambient temperature between 65 and 95 degrees Fahrenheit in spaces to receive preparation for finish flooring for at least 3 days before installation, during installation, and for at least 3 days after installation. After installation and until Substantial Completion, maintain relative humidity and ambient temperature planned for building occupants but not less than 65 degrees Fahrenheit.

PART 2 PRODUCTS

2.01 UNDERLAYMENT

A. APA Underlayment A-C, Exterior exposure class / APA; plywood. Provide fully sanded faces at resilient flooring.

B. Edges: Straight, except tounge and groove at unsupported edges.

C. Thickness: 3/8 inch minimum.

D. Containing no added urea formaldehyde resins.

2.02 ADHESIVE / Underlayment

A. APA AFG-01

B. ASTM D 3498

C. Approved for use by manufacturers of both adhesives and underlayment.

D. VOC Content: 50 g/L maximum / 40 CFR 59, Subpart D (EPA Method 24).

2.03 FASTENERS / Underlayment

A. Nails: Rosin coated ring shanked nails; ASTM F 1667
   1. For power actuated installation in concrete.

2.04 PATCHING COMPOUND

A. Trowelable compound for flash-patching and approved by finish flooring manufacturer for applications indicated.
   1. Minimum Compressive Strength: 3,500 psi. after 28 days
   2. Composition: Portland cement, latex polymer, limestone, aggregate and fillers, and manufacturer's other standard materials. Latex polymer may be either premixed powder or liquid additive.

2.05 LEVELING COMPOUND

A. A system which, when mixed, becomes a trowelable, self-drying, fast-setting cement compound for skim-coating and flash-patching capable of featheredge to ¼ inch thickness applications and approved by finish flooring manufacturer for applications indicated.
   1. Minimum Compressive Strength: 4,200 psi.after 28 days
   2. Composition: Provide leveling underlayment composed of Portland cement, latex polymer, aggregate and fillers, and manufacturer's other standard materials. Latex polymer shall be premixed in powder.
   3. Available Products: Subject to compliance with requirements, products which may be incorporated include but are not limited to:
      a. Ardex SD-P Instant Patch / Ardex Engineered Cements Inc.
      b. S-194 Patch, Underlayment & Embossing Leveler / Armstrong World Industries.

PART 3 EXECUTION

3.01 EXAMINATION

A. Verify that finishes of new substrates comply with tolerances and other requirements specified in other Sections.

3.02 PREPARATION

A. Dry substrate.

B. Allow new concrete substrates to cure for 30 days.

C. Flatten and clean concrete substrates using a terrazzo or concrete grinder, a drum sander, or a polishing machine equipped with a heavy-duty wire brush, or other methods. Do not use solvents.

D. Remove scale, sealers, silicone containing materials, paint, varnishes, oils, wax, coatings, curing compounds, hardeners, soap, and substances that are incompatible with flooring or adhesives.

E. Before installation of products indicated in this Section, remove ridges, protrusions bumps, rough surfaces, or high spots to produce substrates surfaces to the following tolerances. Finish and measure surface so gap at any point between surface and an unleveled, freestanding, 2

foot long straightedge resting on 2 high spots and placed anywhere on the surface does not exceed gap dimension indicated below for the following directly overlaying materials:

1. Acoustic Mat, Underlayment, or Sheet (Cleavage or Waterproofing) Membrane for Tile: 1/16 inch gap.
2. Resilient Flooring and substrate surfaces to be exposed: 1/32 inch gap.

F. Prepare concrete substrates per ASTM F 710.

3.03 SITE (FIELD) QUALITY CONTROL

A. Only preform site (field) quality control indicated in this Article on concrete substrates, unless otherwise indicated.

B. Preform site (field) quality control after preparation and before installation of flooring.

C. Alkalinity and Adhesion Testing: Contractor shall hire and pay for testing agency to perform tests recommended by finish flooring manufacturer and as follows. Proceed with flooring installation only after substrates pass testing. Obtain instructions if test results are not within limits recommended by finish flooring manufacturer and adhesive materials manufacturer and as indicated below.

1. Testing Frequency: At areas of new concrete substrate installations, at least one test for every 1,000 square feet of floor area, but in no case fewer than three tests.
2. Perform pH test / ASTM F 710. Proceed with installation only after substrates have a pH range of 5-9.

D. Moisture Testing: Contractor shall hire and pay for testing agency to perform tests recommended by manufacturer and as follows. Proceed with flooring installation only after substrates pass testing. Obtain instructions if test results are not within limits recommended by finish flooring manufacturer and adhesive materials manufacturer and as indicated below.

1. Testing Frequency: At areas of new concrete substrate installations, at least one test for every 1,000 square feet of floor area, but in no case fewer than three tests.
2. Perform anhydrous calcium chloride test / ASTM F 1869. Proceed with installation only after substrates have maximum moisture-vapor-emission rate of 3 lb of water/1000 sq. ft. in 24 hours.
3. Perform relative humidity test using in situ probes / ASTM F 2170. Proceed with installation only after substrates have maximum 75 percent relative humidity level measurement.

3.04 UNDERLAYMENT INSTALLATION

A. Install underlayment before patching or leveling.

B. Underlayment: place one layer of underlayment.

1. Attachment to Continuous Wood Substrate : Glue with adhesive and nail or screw 6 inches spacing both ways and 4 inches at perimeter.
2. Attachment to Concrete Substrate: Glue with adhesive and nail 6 inches spacing both ways and 4 inches at perimeter.

C. Sand and fill joints to comply with tolerances indicated.

D. Installed underlayment shall be considered a susbstrate for the requirements of this Section which follow.

3.05 PATCHING COMPOUND APPLICATION

A. Patching: Patch holes (less than 3/16 inch across), cracks (less than 1/16 inch across), and minor imperfections in substrate and level to a smooth surface with patching compound.

3.06 LEVELING COMPOUND APPLICATION

A. Leveling: Use leveling compound to level cracks, holes, rough textures, residual materials, depressions in substrates and other imperfections not able to be corrected with patching compound to produce a smooth surface.

3.07 TOLERANCES

A. Underlayment Levelness: overall F(L) 25 and local F(L) 17 values / ASTM E 1155.

B. Produce substrate surfaces to the following tolerances. Finish and measure surface so gap at any point between surface and an unleveled, freestanding,10 foot long straightedge resting on 2 high spots and placed anywhere on the surface does not exceed gap dimension indicated below for the following directly overlaying materials:
   1. Sheet (Cleavage or Waterproofing) Membrane for Tile: 1/16 inch gap.
   2. Resilient Flooring and substrate surfaces to be exposed: 1/32 inch gap; overall values of flatness F(F) 35 with minimum local value of flatness F(F) 24 / ASTM E 1155 for concrete slabs-on-grade and other substrates.

3.08 CLEANING

A. Cleaning: Broom and vacuum clean substrates to be covered by flooring immediately before flooring installation.

3.09 PROTECTION

A. Do not mechanically fasten through acoustic mat, unless otherwise indicated.

B. Prohibit traffic until patching and leveling compounds are fully cured.

END OF SECTION

SECTION 09 6500 - RESILIENT FLOORING AND ACCESSORIES

PART 1 GENERAL

1.01 SECTION INCLUDES

A. Resilient Flooring
   1. RESILIENT TILE FLOORING
      a. VINYL COMPOSITION TILE
      b. RUBBER COMPOSITION TILE

B. Adhesives / Resilient Flooring, Resilient Accessories

1.02 RELATED REQUIREMENTS

A. Flooring Preparation:
   1. Substrate Site Quality Control
   2. UNDERLAYMENT
   3. ADHESIVE / Underlayment
   4. FASTENERS / Underlayment
   5. PATCHING COMPOUND
   6. LEVELING COMPOUND

1.03 SUBMITTALS

A. Product Data:
   1. VCT: Include material descriptions and standards compliance .
   2. Rubber Composition Tile: Include recycled content report, VOC content, material descriptions, and standards compliance .
   3. Adhesives: Include VOC content and FloorScore certification.

B. Maintenance Data: Resilient flooring.

C. Extra Stock Materials:
   1. VCT: 0.5 percent of each type, color, pattern, and texture installed

1.04 ENVIRONMENTAL REQUIREMENTS

A. Maintain temperature in storage area between 55 degrees F and 90 degrees F.

B. Store materials for not less than 48 hours prior to installation in area of installation at a temperature of 70 degrees F to achieve temperature stability. Thereafter, maintain conditions above 55 degrees F.

PART 2 PRODUCTS

2.01 VINYL COMPOSITION TILE

A. Homogeneous, with color extending throughout thickness.

B. Class corresponding to type specified / ASTM F 1066.

C. Critical Radiant Flux (CRF): Minimum 0.45 watt per square centimeter, when tested in accordance with ASTM E 648 or NFPA 253.

D. Product: Mohawk Group C0009 Secoya, Hot and Heavy Collection

E. Color: 827 Picton Park

F. Size: 9 x 59 inch.

G. Thickness: 0.20 inch.

2.02 STAIR TREADS

A. Rubber; full width and depth of stair tread in one piece; tapered thickness; nosing not less than 1-5/8 inch deep.
   1. requirements corresponding to type specified / FS RR-T-650.

2. Critical Radiant Flux (CRF): Minimum 0.45 watt per square centimeter / ASTM E 648 or NFPA 253.
3. Nominal Thickness: 0.1875 inch.
4. Nosing: Square.
5. Design: Molded, in square pattern.
6. Colors : match Johnsonite 29 Moon Rock.
7. Pattern: Solid.
8. Manufacturers:
   a. BurkeMercer Flooring Products: www.burkemercer.com.
   b. Johnsonite, Inc: www.johnsonite.com.
   c. Roppe Corp: www.roppe.com.

2.03 STAIR LANDINGS

A. Rubber tile meeting product requirements of stair treads.

B. Manufacturer: manufacturer of stair treads.

2.04 ADHESIVES / Resilient Flooring, Resilient Accessories

A. Adhesives: Water-resistant type recommended by manufacturer to suit floor tile and substrate conditions indicated.
   1. 50 g/L maximum VOC content when calculated according to 40 CFR 59, Subpart D (EPA Method 24).

PART 3 EXECUTION

3.01 EXAMINATION

A. Examine substrates as required for flooring preparation indicated elsewhere.

3.02 PREPARATION

A. Prepare substrate as required for flooring preparation indicated elsewhere.

3.03 INSTALLATION - TILE FLOORING

A. Install resilient tile at landings of stairs with resilinet treads.

B. Mix tile from container to ensure shade variations are consistent when tile is placed.

C. Spread only enough adhesive to permit installation of materials before initial set.

D. Install VCT loose laid with adhesive only at perimeter

E. Set flooring in place, press with heavy roller to attain full adhesion.

F. Lay flooring with joints and seams parallel to building lines to produce symmetrical tile pattern.

G. Where floor finishes are different on opposite sides of door, terminate flooring under centerline of door.

H. Scribe flooring to walls, columns, cabinets, floor outlets, and other appurtenances to produce tight joints.

3.04 CLEANING

A. Remove excess adhesive from floor, base, and wall surfaces without damage.

END OF SECTION

SECTION 09 6800 - CARPETING

PART 1 GENERAL

1.01 SECTION INCLUDES

A. CARPET

B. Adhesives / Carpet

1.02 RELATED REQUIREMENTS

A. Flooring Preparation:
   1. Substrate Site Quality Control
   2. UNDERLAYMENT
   3. PATCHING COMPOUND
   4. LEVELING COMPOUND

1.03 SUBMITTALS

A. Product Data:
   1. Carpet: Include CRI certifcation, material descriptions, and standards compliance .
   2. Adhesives: Include CRI certifcation and VOC content .

B. Verification Samples:
   1. Each Carpet: 12 inch by 12 inch .

C. Maintenance Data: Carpet. Include recommended maintenance materials and suggested schedule and methods for cleaning.

PART 2 PRODUCTS

2.01 CARPET

A. Carpet:
   1. Product: Mohawk Aladdin Commercial
   2. Color: 523 Cobblestone.

2.02 ADHESIVES / Carpet

A. VOC Content: 50g/L maximum / 40 CFR 59, Subpart D (EPA method 24).

B. CRI Green Label certified.

C. Carpet Adhesives: Water-resistant, mildew-resistant, nonstaining type to suit products and subfloor conditions indicated, that complies with flammability requirements for installed carpet and is recommended or provided by carpet manufacturer.

D. Seam Adhesive: Hot-melt adhesive tape or similar product recommended by carpet manufacturer for sealing and taping seams and butting cut edges at backing to form secure seams and to prevent pile loss at seams.

PART 3 EXECUTION

3.01 EXAMINATION

A. Examine substrate as required for flooring preparation indicated elsewhere.

3.02 PREPARATION

A. Prepare substrate as required for flooring preparation indicated elsewhere.

3.03 CARPET INSTALLATION

A. Installation Method: Install carpet and cushion in accordance with CRI 104 and as follows.
   1. Glue-down Installation: typical.
      a. No cushion
      b. Typical: Direct Glue-Down Installation / Section 9 CRI 104.

B. Lay out carpet :

1. Locate seams in area of least traffic, out of areas of pivoting traffic, and parallel to main traffic.
2. At doorways with seams, center seams under the door in closed position. Do not locate seams perpendicular through door openings.
3. Align run of pile in same direction as anticipated traffic and in same direction on adjacent pieces.
4. Verify carpet match before cutting to ensure minimal variation between dye lots.
5. Provide monolithic color, pattern, and texture match within any one area.
6. Extend carpet into toe spaces, door reveals, closets, open-bottomed obstructions, removable flanges, alcoves, and similar openings.

C. Cut and fit carpet to butt tightly to vertical surfaces, permanent fixtures, and built-in furniture including cabinets, pipes, outlets, edgings, thresholds, and nosings.

D. Install carpet tight and flat on subfloor, well fastened at edges, with a uniform appearance.

3.04 GLUE DOWN INSTALLATION

A. Double cut carpet seams . Make cuts straight, true, and unfrayed. Apply seam adhesive to cut edges of woven carpet immediately.

B. Apply adhesive to floor uniformly at rate recommended by manufacturer. After sufficient open time, press carpet into adhesive.

C. Apply seam adhesive to the base of the edge glued down. Lay adjoining piece with seam straight, not overlapped or peaked, and free of gaps.

D. Roll with appropriate roller for complete contact of adhesive to carpet backing.

E. Trim carpet neatly at walls and around interruptions.

3.05 CLEANING

A. Immediately remove excess adhesive, seam sealer, and other surface blemishes using cleaner recommended by carpet manufacturer.

B. Remove yarns that protrude from carpet surface.

C. Immediately remove excess adhesive from floor and wall surfaces without damage.

D. Clean carpet of stain, debris, waste, and foreign substances. Vacuum with CRI Green Label heavy duty commercial machine with face-beater element.

3.06 PROTECTION

A. Installed Carpet: Protection of Indoor Installations / Section 16 CRI 104.

B. Protect carpet against damage from construction operations and placement of equipment and fixtures during the remainder of construction period. Use protection methods indicated or recommended in writing by carpet manufacturer.

END OF SECTION

SECTION 09 6813 - TILE CARPETING

PART 1 GENERAL

1.01 SECTION INCLUDES

A. CARPET TILE
   1. Adhesive / Carpet Tile

1.02 RELATED REQUIREMENTS

A. Flooring Preparation:
   1. Substrate Site Quality Control
   2. UNDERLAYMENT
   3. PATCHING COMPOUND
   4. LEVELING COMPOUND

B. Resilient Flooring: termination accessories

1.03 SUBMITTALS

A. Product Data: Provide data on specified products, describing physical and performance characteristics; sizes, patterns, colors available, and method of installation.

B. Maintenance Data: Include maintenance procedures, recommended maintenance materials, and suggested schedule for cleaning.

C. Maintenance Materials: Furnish the following for Owner's use in maintenance of project.
   1. Extra Carpet Tiles: Quantity equal to 0.5 percent of total installed of each color and pattern installed.

PART 2 PRODUCTS

2.01 MATERIALS

A. Carpet Tile:
   1. Product: Mohawk Aladdin Commercial
   2. Color: 919 Circuit.
   3. Critical Radiant Flux: Minimum of 0.22 watts/sq cm, when tested in accordance with ASTM E648 or NFPA 253.
   4. VOC Content: Provide CRI Green Label Plus certified product.

2.02 ACCESSORIES

A. Adhesives: Acceptable to carpet manufacturers, compatible with materials being adhered; maximum VOC of 50 g/L; CRI Green Label certified.

PART 3 EXECUTION

3.01 EXAMINATION

A. Examine substrate as required for flooring preparation indicated elsewhere.

3.02 PREPARATION

A. Prepare substrate as required for flooring preparation indicated elsewhere.

3.03 INSTALLATION

A. Install carpet tile in accordance with manufacturer's instructions and CRI 104.

B. Blend carpet from different cartons to ensure minimal variation in color match.

C. Cut carpet tile clean. Fit carpet tight to intersection with vertical surfaces without gaps.

D. Lay carpet tile in square pattern, with pile direction parallel to next unit, set parallel to building lines.

E. Trim carpet tile neatly at walls and around interruptions.

F. Complete installation of edge strips, concealing exposed edges.

END OF SECTION

SECTION 09 7200 - WALL COVERINGS

PART 1 GENERAL

1.01 SECTION INCLUDES

A. WALL COVERINGS = /

B. ADHESIVE / Wall Coverings

C. SUBSTRATE FILLER / Wall Coverings

D. SUBSTRATE PRIMER AND SEALER / Wall Coverings

1.02 PRICE AND PAYMENT PROCEDURES

A. Alternate 3 - Wallpaper: Provide a bid alternate to substitute wall covering for painted walls on wall surfaces above wainscote and as indicated on sheet A7. Base Bid is to provide painted wall surfaces as required for onsite coatings..

1.03 ADMINISTRATIVE REQUIREMENTS

A. Sequencing: Do not install wall covering until spaces to receive them are permanently enclosed, weathertight, clean, dry, and ready for their installation.

1.04 SUBMITTALS

A. Presubmittal Conference: At Contractor's option, conduct a presubmittal conference.

B. Product Data:
   1. Wall Coverings: Include material descriptions, finishes, and product test reports indicating compliance with ASTM E 84 for determining surface burning characteristics. Product certificates may be submitted in lieu of product test reports .
   2. Adhesive: Include VOC content, compatibility test reports, and material descriptions .
   3. Substrate Filler: Include VOC content, compatibility test reports, manufacturer's recommendations, and material descriptions .
   4. Substrate Primer and Sealer: Include VOC content, compatibility test reports, manufacturer's recommendations, and material descriptions .

C. Verification Samples:
   1. Wall Coverings: 8" x 8" each color, pattern, and texture required.

D. Mockup Reports: each benchmark sample.

E. Maintenance Data: wall coverings.

F. Extra Stock Materials:
   1. Wall Coverings: 0.5 percent of each type, color, pattern, and texture installed

1.05 QUALITY ASSURANCE

A. Wall Coverings Mockups: benchmark sample of each color, pattern, and texture of wall covering installed.
   1. Location: as directed.
   2. Size: 8 feet high by 8 feet wide.
   3. Disposition: Approved undamaged mockups may be incorporated into the completed Work.

PART 2 PRODUCTS

2.01 WALL COVERINGS

A. Product: Sellers and Josephson; The Denver Collection

B. Pattern: 2678-42

C. Color: Sand

2.02 ADHESIVE

A. Type recommended by wall covering manufacturer to suit application to substrate.

B. VOC Content: 250 g/L maximum / 40 CFR 59, Subpart D (EPA Method 24)

2.03 SUBSTRATE FILLER

A. As recommended by adhesive and wall covering manufacturers; compatible with substrate.

2.04 SUBSTRATE PRIMER AND SEALER

A. As recommended by adhesive and wall covering manufacturers; compatible with substrate.

B. VOC Content: 50 g/L maximum / 40 CFR 59, Subpart D (EPA Method 24).

PART 3 EXECUTION

3.01 EXAMINATION

A. Verify that substrate surfaces are prime painted and ready to receive work, and conform to requirements of the wall covering manufacturer.

B. Measure moisture content of surfaces using an electronic moisture meter. Do not apply wall coverings if moisture content of substrate exceeds level recommended by wall covering manufacturer.

C. Verify flatness tolerance of surfaces does not vary more than 1/8 inch in 10 feet nor vary at a rate greater than 1/16 inch/ft.

3.02 PREPARATION

A. Fill cracks in substrate and smooth irregularities with filler; sand smooth.

B. Surface Appurtenances: Remove or mask electrical plates, hardware, light fixture trim, escutcheons, and fittings prior to preparing surfaces or finishing.

C. Surfaces: Correct defects and clean surfaces that affect work of this section. Remove existing coatings that exhibit loose surface defects.

D. Apply one coat of primer sealer to substrate surfaces. Allow to dry. Lightly sand smooth.

E. Vacuum clean surfaces free of loose particles.

3.03 INSTALLATION

A. Apply adhesive and wall covering in accordance with manufacturer's instructions.

B. Apply wall covering smooth, without wrinkles, gaps or overlaps. Eliminate air pockets and ensure full bond to substrate surface. Butt edges tightly.

C. Horizontal seams are not acceptable unless otherwise indicated on Drawings.

D. Do not seam within 2 inches of internal corners or within 6 inches of external corners.

E. Install wall covering before installation of bases, cabinets, and hardware and items attached to or spaced slightly from wall surface.

F. Do not install wall covering more than 1/4 inch below top of resilient base.

3.04 NON-CONFORMING WORK

A. Repair deterioration, defects or damage to finishes, to factory-finished appearance so no evidence remains of corrective work when viewed with the naked human eye from a distance of 36 inches under 50 foot-candle illumination.

B. For the following conditions, remove in-place and provide new Work to eliminate evidence of replacement:
   1. Non-conforming Work which can not be corrected by repair alone.
   2. Completed Work that is stained, faded, torn, punctured, scratched, or otherwise damaged.
   3. Completed Work not matching approved mockups or samples.
   4. Work damaged by exposure to moisture, water, or sunlight or other damaging conditions.

3.05 CLEANING

A. Clean wall coverings of excess adhesive, dust, dirt, and other contaminants.

B. Reinstall wall plates and accessories removed prior to work of this section.

END OF SECTION

SECTION 09 9000 - ONSITE COATING (PAINTING, STAINING, CLEARCOATING)

PART 1 GENERAL

1.01 SECTION INCLUDES

A. PAINT

B. CLEARCOAT
   1. WOOD CLEARCOAT / Interior

C. STAIN
   1. WOOD STAIN / Interior

1.02 RELATED REQUIREMENTS

A. Surface preparation, priming, and finish coats specified in this Section are in addition to shop-priming and surface treatment specified under other Sections.

B. Joint Sealants

C. Surface preparation of gypsum board.

1.03 SUBMITTALS

A. Product Data:
   1. Each Site Finishing Product or Material Indicated: Include ingredient analysis and VOC content . Include manufacturer's instructions for installation, preparation of substrates, and recommendations for cleaning and protection. For manufacturer's optional application methods and instructions, identify application methods to be used.
      a. Ingredient Analysis: Technical analysis of typical white base consisting of the percentage by weight of any ingredient or component making up more than 0.1% by weight of the content.

B. Selection Samples:
   1. Each Finish Coat: color.

C. Mockup Reports:
   1. Broad Application Site Finishing .
   2. Linear Application Site Finishing .

D. Site Quality Control Submittals: by entity responsible for testing or examination indicated in Part 3.
   1. Plant Based Substrate Reports: include moisture meter manufacturer and model, calibration proceedures, substrate location, substrate condition, ambient temperature, substrate temperature, and ambient humidity.

1.04 QUALITY ASSURANCE

A. Substrate Testing Agency Qualifications: Qualified. Testing agency may be an independent testing agency or the site finishes applicator provided the site finishes applicator is a subcontractor as opposed to the Contractor.
   1. Moisture meter operator shall be trained and experienced in the use of the moisture meter.

B. Broad Application Site Finishing Mockups: two. Apply after permanent lighting and other environmental services have been activated.
   1. Location: as directed.
   2. Size: 10 feet high by 10 feet wide of broad areas to be site finished.
   3. Disposition: Approved undamaged mockups may be incorporated into the completed Work.

C. Linear Application Site Finishing Mockups: one. Apply after permanent lighting and other environmental services have been activated.
   1. Location: as directed.

2. Size: 8 foot minimum lenght of linear items to be site finished.
3. Disposition: Approved undamaged mockups may be incorporated into the completed Work.

PART 2 PRODUCTS

2.01 MATERIALS

A. Material Quality: Provide manufacturer's best-quality material of the various coating types specified that are factory formulated and recommended by manufacturer for application indicated.

B. Material Compatibility: Provide primers, and finish-coat materials that are compatible with one another and with the substrates indicated under conditions of service and application, as demonstrated by manufacturer based on testing and field experience.

C. Colors : as selected from full range.
   1. Number:
      a. one for each paint system or substrate.
      b. Interior Walls: up to 4.

D. VOC Content of Site-Applied Interior Paints and Coatings: Provide interior-applied products that comply with the following limits for VOC content, exclusive of colorants added to a tint base, when calculated according to 40 CFR 59, Subpart D (EPA Method 24). These requirements do not apply to paints and coatings that are applied and cured off-site:
   1. Flat Paints, Coatings, and Primers: 50 g/L maximum.
   2. Nonflat Paints, Coatings, and Primers: 50 g/L maximum.
   3. Anti-Corrosive and Anti-Rust Paints Applied to Ferrous Metals: 250 g/L maximum.
   4. Clear Wood Finishes, Varnishes: 350 g/L maximum.
   5. Clear Wood Finishes, Lacquers: 550 g/L maximum.
   6. Floor Coatings: 100 g/L maximum.
   7. Shellacs, Clear: 730 g/L maximum.
   8. Shellacs, Pigmented: 550 g/L maximum.
   9. Stains: 250 g/L.

2.02 EXTERIOR MATERIALS

A. Concrete and Masonry Primer: Factory-formulated alkali-resistant primer for exterior application.
   1. Binder: acrylic latex.
   2. Reflectivity: manufacturer's standard.
   3. On concrete block use block filler formulated to fill pores in block.
   4. Manufacturer: same as finish coat.

B. Concrete and Masonry Finish Paint: Factory-formulated for exterior application.
   1. Binder: alkyd enamel or 100% acrylic latex at Contractor's option to best match existing.
   2. Reflectivity: medium gloss or semi gloss.
   3. Manufacturers:
      a. American Formulating & Manufacturing (AFM) (www.afmsafecoat.com)
      b. Benjamin Moore & Co.
      c. PPG Industries, Inc.
      d. Sherwin-Williams Co.

2.03 INTERIOR MATERIALS

A. Wood Sealer: Factory-formulated wood sealer compatible with topcoats.
   1. Binder: shellac.
   2. Reflectivity: manufacturer's standard.

B. Wood Filler: Factory-formulated paste wood filler color to match final finish compatible with topcoats.

C. Concrete and Masonry Primer: same product as for exterior application.

D. Ferrous-Metal Primer: Factory-formulated rust-inhibitive metal primer.
   1. Binder: alkyd.
   2. Reflectivity: manufacturer's standard.
   3. Manufacturer: same as finish coat.

E. Zinc-Coated Metal Primer: Factory-formulated galvanized metal primer.
   1. Binder: alkyd.
   2. Reflectivity: manufacturer's standard.
   3. Manufacturer: same as finish coat.

F. Gypsum Board Primer: Factory-formulated primer for interior application.
   1. Binder: vinyl acrylic or acrylic latex.
   2. Reflectivity: manufacturer's standard.
   3. Manufacturer: same as finish coat.

G. Wood Primer: Factory-formulated interior wood primer.
   1. Binder: acrylic latex.
   2. Reflectivity: manufacturer's standard.
   3. Manufacturer: same as finish coat.

H. Concrete Wall Finish Paint: Factory-formulated.
   1. Binder: 100% acrylic latex.
   2. Reflectivity: high gloss or medium gloss.
   3. Manufacturers:
      a. American Formulating & Manufacturing (AFM) (www.afmsafecoat.com)
      b. Benjamin Moore & Co.
      c. ICI Dulux Paint Centers.
      d. PPG Industries, Inc.
      e. Sherwin-Williams Co.

I. Wall Finish Paint: Factory-formulated interior enamel.
   1. Binder: acrylic latex.
   2. Reflectivity: satin or eggshell.
   3. Manufacturers:
      a. American Formulating & Manufacturing (AFM) (www.afmsafecoat.com)
      b. Benjamin Moore & Co.
      c. PPG Industries, Inc.
      d. Sherwin-Williams Co.

J. Ceiling Finish Paint: Factory-formulated interior paint.
   1. Binder: vinyl acrylic or acrylic latex.
   2. Reflectivity: velvet or flat.
   3. Manufacturers: same as wall finish paint

K. Trim and Other Finish Paint Including Wood and Metal: Factory-formulated interior enamel.
   1. Binder: 100% acrylic latex.
   2. Reflectivity: medium gloss or semi gloss.
   3. Manufacturers:
      a. Benjamin Moore & Co.
      b. ICI Dulux Paint Centers.
      c. PPG Industries, Inc.
      d. Sherwin-Williams Co.

L. Wood Stain: Factory-formulated semitransparent wood stain compatible with topcoats.
   1. Binder: acrylic.

M. Wood Clearcoat: Factory-formulated waterborne clear satin acrylic polyurethane varnish.

1. Binder: polyurethane.
2. Reflectivity: eggshell, velvet, or flat.
3. Factory-formulated waterborne clear satin acrylic polyurethane varnish.
4. Containing agricultural dairy byproducts
5. Comparable Product: Polywhey / Vermont Natural Coatings
    a. Manufacturers:
        1) American Formulating & Manufacturing (AFM) (www.afmsafecoat.com)
        2) Benjamin Moore & Co.
        3) PPG Industries, Inc.
        4) Sherwin-Williams Co.

PART 3 EXECUTION

3.01 EXAMINATION

A. Examination: Examine substrates, areas, and conditions, with applicator present, for compliance with requirements for site finishes application. Comply with procedures specified in PDCA P4.

B. Installer's Site Report: Submit installer's site report if moisture content of wood in not within requirements for site finishing.

C. Substrate Temperature Conditions:
1. Ensure temperatures of substrates to receive waterborne site finishes are between 50°F and 90°F.
2. Ensure temperatures of substrates to receive solvent-thinned site finishes are between 45°F and 95°F.
3. Ensure temperatures of substrates are more than 5°F over the dew point.

D. Substrate Microorganism Conditions: Do not apply finishes to substrates which have the presence of mold, mildew, or fungi.
1. Test for the presence of mold of mildew by applying a few drops of chlorine bleach to the surface. If the discoloration disappears, it is probably that mold or mildew is present.
2. Fungi in wood is indicated by the presence of blue stain. If Fungi is encountered or suspected, notify Architect and do not proceed until fungi is remediated.
    a. For existing substrates, proceed with cleaning as directed by Architect. If the Architect determines cleaning will not be adequate, remove substrate and provide new substrate to match existing as a Contract Modificatiion.
    b. For new substrates, remove substrate and provide new as part of the Work.

E. Plant Based Substrate Moisture Conditions: Ensure substrates which contain plant materials (including wood, agrifiber, cellulose, grass, paper-faced gypsum panels, including fiber cement materials and composite materials) have a maximum moisture content as follows unless a lower limit is indicated elsewhere or recommended by site finish manufactuer:
1. Interior Non-conditioned Spaces: 12%
2. Interior Conditioned Spaces: 9%
3. Exterior: 15%

F. Cementitious Substrate Alkalinity Conditions: Ensure substrates which contain cementitious or pozzoulanic materials (including mortar, grout, stucco, concrete, fiber cement, concrete masonry, concrete units, joint compound, and plaster) have a alkalinity as follows unless a lower limit is indicated elsewhere or recommended by site finish manufactuer:
1. pH range: 5-9.

G. Cementitious Substrate Moisture Conditions: Ensure substrates which contain cementitious or pozzoulanic materials (including mortar, grout, stucco, concrete, fiber cement, concrete masonry, concrete units, joint compound, and plaster) have a maximum moisture content as follows unless a lower limit is indicated elsewhere or recommended by site finish manufactuer:
1. Interior Non-conditioned Spaces: 10%
2. Interior Conditioned Spaces: 8%

3. Exterior: 12%

3.02 SUBSTRATE SITE QUALITY CONTROL

A. Contractor shall engage and pay for testing agency to perform substrate site quality control and testing agency responsibilities as follows in this Article and as required by quality assurance general requirements indicated elsewhere:

B. Sequence: Preform substrate site quality control after preparation of substrates and before application of site finishes. Preform substrate site quality control on plant based substrate no more than 24 hours before application of first coat.

C. Plant Based Substrate Moisture Conditions:
   1. Moisture Meter: well maintained and providing the followig cababilities:
      a. Type: dielectric pad or combination pin probe resistive and dielectric pad with dielectric pad used as primary testing device. Pin probe resistive type is not acceptable except where used in combination with dielectric pad type to obtain additional moisture content data or where a dielectric pad is not able to be used due to the size of substrate, non-flat profile of substrate, or presence of metal in or behind substrate.
      b. Able to be calibrated for wood species, ambient temperature, and humidity.
      c. Display: digital
      d. Scale: both wood and relative scale capabilties.
      e. Able to measure to a depth of at least 1 inch in softwoods.
      f. Accuracy: plus or minus 1.5% maximum for susbtrate type as determined by moisture meter manufacturer
   2. Procedures: Using moisture meter indicated in this Article, measure moisture content as follows:
      a. Calibrate moisture meter for substrate type, susbstrate preservative or fire-retardant treatment, substrate density, ambient temperature, substrate temperature, and ambient humidity.
      b. Calibrate moisture meter to a known dry sample of same material if possible.
      c. Testing Frequency: Test moisture content of the following substrates and record readings in site report:
         1) Carpentry and Plant Material Containing Substrates: 3 tests per 50 sq.ft.but not less than one test for each type (differing in material, size, profile, or coatings) of substrate. Make measurements in solid plant materials not less than 12 inches from the end of the substrate.
         2) Paper Faced Gypsum Panels: 3 tests per 1000 sq. ft. but not less than one per room.
         3) Cementitious Substrates: 3 tests per 500 sq. ft. but not less than one per room.

D. Proceed with site finihes application only after substrates pass testing.

3.03 PREPARATION

A. New Surfaces: Prepare substrates as recommended in "MPI Architectural Painting Specification Manual" applicable to substrates and paint systems indicated.

B. Existing Surfaces: Prepare substrates as recommended in "MPI Maintenance Repainting Manual" applicable to substrates and paint systems indicated.

C. Fixtures: Remove hardware and hardware accessories, plates, machined surfaces, lighting fixtures, and similar items already installed that are not to be painted. If removal is impractical or impossible because of size or weight of the item, provide surface-applied protection before surface preparation and site finishing.
   1. After completing site finishing operations in each space or area, reinstall items removed using qualified installers.

D. Cleaning: Clean substrates of substances that could impair bond of site finishes, including dirt, oil, grease, and incompatible coatings and encapsulants.

1. Remove incompatible coatings and recoat substrate with compatible primers or barrier coats as required to produce site finish systems indicated.
2. Schedule cleaning and site finishing so dust and other contaminants from the cleaning process will not fall on wet, newly coated surfaces.
3. Mold or Mildew: Clean mold of mildew from substrates with a solution of mild dishwashing detergent or commercial remover and scrubbing. Verify acceptability of cleaning with site finish manufacuturer.

E. Substrate Preparation:
   1. Cementitious Substrates: Prepare substrates which contain cementitious materials (including mortar, grout, stucco, concrete, fiber cement, concrete masonry, concrete units, joint compound, and plaster) as follows:
      a. Remove efflorescence, chalk, dust, dirt, grease, oils, curing compounds, and release agents.
      b. Roughen as required to remove glaze. If hardeners or sealers have been used to improve curing, use mechanical methods of surface preparation.
      c. Floors:
         1) Cleaning: Clean concrete floors to be site finished with concrete floor cleaner. Rinse with clean water to remove cleaner. Neutralize acidic cleaners. Dry and vacuum substrates.
         2) Conditioning: Condition concrete floors to be site finished with concrete floor conditioner.
      d. Do not apply site finishes to mortar, grout, stucco, concrete, fiber cement, concrete masonry, and concrete units substrates which have not cured for less than 28 days.
      e. Do not apply site finishes to joint compound and plaster substrates which have not cured for less than 7 days.
   2. Plant Based Substrates: Prepare substrates which contain plant materials (including wood, agrifiber, cellulose, grass, paper-faced gypsum panels, including composite materials, but not fiber cement) as follows:
      a. Clean surfaces of dirt, oil, unsound (flaking, peeling, chalking) coatings, and other foreign substances with scrapers, cleaners, heat, and sandpaper. Hand wash previously coated surfaces with cleaning agent.
      b. Sand surfaces exposed to view smooth and dust off. Where the grain or nap has been raised due to peparation operations, coat with primer indicated to stabalize grain and resand and then reapply primer.
      c. For opaque finished surfaces, scrape and clean knots, and apply a coat of wood sealer. After priming, fill holes and imperfections in finish surfaces with wood filler. Sand smooth when dried.
      d. Seal uncoated plant based substrates to be site finished immediately on delivery with first coat of site finish indicated. Seal edges, ends, faces, undersides, concealed and back sides. Seal site cuts.
      e. Spot prime heads of steel fasteners which may have been abraded by cleaning preparation operations as required for steel.
   3. Ferrous Metals: Prepare iron and steel substrates which have not been metallically coated or shop coated as follows:
      a. Remove oil, grease, dirt, loose mill scale, and other foreign substances.
      b. Use solvent or mechanical cleaning methods that comply with SSPC's recommendations.
      c. Blast steel surfaces clean as recommended by site finish manufacturer and according to SSPC-SP 10 / NACE No. 2.
      d. Treat bare and sandblasted or pickled clean metal with a metal treatment wash coat before priming.
      e. Touch up bare areas and shop-applied prime coats that have been damaged. Wire-brush, clean with solvents recommended by site finish manufacturer, and touch up with same material as the shop coating.

4. Metallically Coated Metals: Prepare metal substrates which have been metallically coated (incuding galvanized, galvaneeled, galvalume, zinc, aluminum, nickle, tin, or otherwise plated) and not shop primed as follows:
   a. Remove grease and oil residue by nonpetroleum-based solvents or mechanical methods to produce clean, lightly etched surfaces that promote adhesion of subsequently applied site finishes.
      1) Manually abrade surface of prefinished metal siding to be onsite painted to ensure proper adhesion of primer and finish coats.
5. Plant Based Substrates: Prepare substrates which contain plant materials (including wood, agrifiber, cellulose, grass, paper-faced gypsum panels) as follows:
   a. Clean surfaces of dirt, oil, unsound (flaking, peeling, or chalking) coatings, and other foreign substances with scrapers, cleaners, heat, sandpaper or a combination thereof. Do not use heat removal interior.
   b. Sand surfaces exposed to view smooth and dust off.
   c. For opaque finished surfaces, scrape and clean knots, and apply a coat of wood sealer. After priming, fill holes and imperfections in finish surfaces with wood filler. Sand smooth when dried.
   d. Seal uncoated plant based substrates to be site finished immediately on delivery with first coat of site finish indicated. Seal edges, ends, faces, undersides, concealed and back sides. Seal site cuts.
   e. Do not allow exterior substrate to be site finished to be exposed to the weather for more than 21 days before applying first layer of site finish.

F. Material Preparation:
1. Maintain containers used in mixing and applying paint in a clean condition, free of foreign materials and residue.
2. Stir material before application to produce a mixture of uniform density. Stir as required during application. Do not stir surface film into material. If necessary, remove surface film and strain material before using.
3. Back mix site finished by topping off low amounts in containers with new material to ensure uniformity of color.
4. Use only thinners approved by paint manufacturer and only within recommended limits.
5. Do not mix catalyzed finishes in quantities greater than can be applied within time period recommended by manufacturer.

3.04 APPLICATION

A. Site Finishing Application Schedule: Provide finishes indicated in site finishing application schedule in Part 4 and to comply with this Article.

B. Exposed Surfaces: Site finish exposed surfaces, except where these Specifications or Drawings indicate that the surface or material is not to be site finished or is to remain natural. If an item or a surface is not specifically mentioned, site finish the item or surface the same as similar adjacent materials or surfaces.
1. Site finish surfaces behind movable equipment and furniture the same as similar exposed surfaces. Before final installation of equipment, finish surfaces behind permanently fixed equipment or furniture with prime coat only.
2. Site finish back sides of access panels and removable or hinged covers to match exposed surfaces.

C. Prefinished Items: Do not site finish prefinished items, concealed surfaces, finished metal surfaces, operating parts, and labels.
1. Prefinished items include the following factory-finished components:
   a. Manufactured casework.
   b. Finished mechanical and electrical equipment.
   c. Light fixtures.
2. Concealed surfaces include walls or ceilings in the following generally inaccessible spaces:

a. Foundation spaces.
b. Furred areas.
c. Ceiling plenums.
d. Pipe spaces.
e. Duct shafts.

3. Finished metal surfaces include the following:
   a. Anodized aluminum.
   b. Stainless steel.
   c. Chromium plate.
   d. Copper and copper alloys.
   e. Bronze and brass.
   f. Fluorocarbon coated metal.
4. Operating parts include moving parts of operating equipment and the following:
   a. Valve and damper operators.
   b. Linkages.
   c. Sensing devices.
   d. Motor and fan shafts.
5. Labels: Do not paint over UL, FMG, or other code-required labels or equipment name, identification, performance rating, or nomenclature plates.

D. Mechanical and Electrical Work: Site finishing of mechanical and electrical work is limited to items exposed in occupied spaces.
   1. Mechanical items to be painted include, but are not limited to, the following:
      a. Uninsulated piping.
      b. Pipe hangers and supports.
      c. Tanks that do not have factory-applied final finishes.
      d. Visible portions of internal surfaces of metal ducts, without liner, behind air inlets and outlets.
      e. Ducts and hangers and supports.
      f. Duct, equipment, and pipe insulation having "all-service jacket" or other paintable jacket material.
      g. Mechanical equipment that is indicated to have a factory-primed finish for site finishing.
   2. Electrical items to be painted include, but are not limited to, the following:
      a. Panelboards.
      b. Electrical equipment that is indicated to have a factory-primed finish.
      c. Exposed electrical conduits.
      d. Steel and iron supports.

E. Scheduling Painting: Apply first coat to surfaces that have been cleaned, pretreated, or otherwise prepared for painting as soon as practicable after preparation and before subsequent surface deterioration.

F. Application:
   1. Do not paint over dirt, rust, scale, grease, moisture, scuffed surfaces, or conditions detrimental to formation of a durable paint film.
   2. Provide finish coats that are compatible with primers used.
   3. If undercoats, stains, or other conditions show through final coat of paint, apply additional coats until final film is of uniform finish, color, and appearance. Give special attention to ensure that edges, corners, crevices, welds, and exposed fasteners receive a dry film thickness equivalent to that of flat surfaces.
   4. Allow sufficient time between successive coats to permit proper drying. Do not recoat surfaces until previous coat has dried or cured to where it feels firm, and does not deform or feel sticky under moderate thumb pressure, and until application of another coat does not cause undercoat to lift or lose adhesion.

G. Application Methods: Use applicators and techniques best suited for substrate and type of material being applied. Apply paints and coatings by brush or roller.
   1. Do not use spray application, unless approved.
   2. Brushes: Use brushes best suited for type of material applied. Use brush of appropriate size for surface or item being painted.
   3. Rollers: Use rollers of carpet, velvet-back, or high-pile sheep's wool as recommended by manufacturer for material and texture required.

H. Sanding: Sand lightly between each succeeding coat of transparent, semi-transparent and translucent finishes. If sanding is required to produce a smooth, even surface according to manufacturer's written instructions, sand between coats.

I. Minimum Coating Thickness: Apply paint materials no thinner than manufacturer's recommended spreading rate. Provide total dry film thickness of the entire system as recommended by manufacturer.

J. Prime Coats: Before applying finish coats, apply a prime coat, as recommended by manufacturer, to material that is required to be finished and that has not been previously prime coated. Recoat primed or sealed surfaces where evidence of suction spots or unsealed areas in first coat appears, to ensure a finish coat with no burn-through or other defects due to insufficient sealing.

K. Opaque Finishes: Completely cover surfaces as necessary to provide a smooth, opaque surface of uniform finish, color, appearance, and coverage. Cloudiness, spotting, holidays, laps, brush marks, runs, sags, ropiness, or other surface imperfections will not be acceptable.

L. Transparent and Semi Transparent Finishes: Use multiple coats to produce a glass-smooth surface film of even luster. Provide a finish free of laps, runs, cloudiness, color irregularity, brush marks, orange peel, nail holes, or other surface imperfections.

3.05 CLEANING

A. Progress Cleanup: At the end of each workday, remove empty cans, rags, rubbish, and other discarded finishing materials from Project site.

B. Final Cleaning: After completing site finishing, clean glass and spattered surfaces. Remove spattered coatings by washing and scraping without scratching or damaging adjacent finished surfaces.

3.06 PROTECTION

A. Protection: Protect other property, whether being site finished or not, against damage from site finishing. Correct damage by cleaning, repairing or replacing, and repainting, as approved by Architect.

PART 4 SITE FINISHING APPLICATION SCHEDULE

4.01 EXTERIOR SITE FINISHING SCHEDULE

A. Masonry and Concrete: Only where indicated on Drawing to be painted, provide two finish paint coats over primer. Otherwise, protect and do not site finish.

4.02 INTERIOR SITE FINISHING SCHEDULE

A. Masonry and Non-floor Concrete: Provide two finish paint coats over primer.

B. Gypsum Board: Two finish paint coats over primer.

C. Ferrous or Shop Primed Metal: Two finish paint coats over primer. Omit primer over metal surfaces that have been shop primed and touch up coated.

D. Zinc-Coated Metal: Two finish coats over primer.

E. Opaque Finished (Painted) Wood: Two finish paint coats over primer. Omit primer over surfaces that have been shop primed and touch up coated.

F. Transparent Finished (Clearcoated) Wood: Two clearcoats over an optional stain coat as directed by Architect.

END OF SECTION

SECTION 10 1400 - SIGNAGE

PART 1 GENERAL

1.01 SECTION INCLUDES

A. ROOM SIGNS

B. FIRE ALARM ZONE PLAN

1.02 SUBMITTALS

A. Shop Drawings: Each item listed in Section Includes Article in this Part: Include product schedule, elevations, attachments to other work, dimensions, locations of supplementary supports, mounting heights, and substrate reinforcement requirements.
   1. Product Schedule: include room number, room name, other copy and graphic elements, type font and size, and foreground and background colors.
      a. When content of signs is indicated to be determined later, timely request and obtain such information from Architect.

B. Selection Samples: color for materials indicated to be selected. Font where indicated to be selected.
   1. Identification Devices: font and color.

PART 2 PRODUCTS

2.01 ROOM SIGNS

A. Size: 10-inches horizontal x 6-inches vertical minimum unless indicated otherwise or required by content to be larger

B. Frame / Trim: None

C. Backplate: None

D. Copyplate: 0.125-inch (1/8") thickness plastic laminate
   1. Face color: As selected from full range.
   2. Fabrication of Copy: Engraved in face of copyplate to expose core background and to produce raised copy.

E. Coverplate: None.

F. Copy: As follows with Braille:
   1. Room Name: 3/4 inches (assume up to 15 characters for each sign)
   2. Pictogram: All toilets shall have men, women, or unisex pictogram. All accessible toilets shall have wheelchair pictogram.
   3. Type Face or Font: As selected from standard line and to comply with ADA

G. Edge Condition: Square cut

H. Corner Condition: Rounded to 1/8" radius

I. Attachment: Adhered

J. Manufacturers:
   1. ACE Sign Systems, Inc.
   2. Advance Corporation; Braille-Tac Division.
   3. APCO Graphics, Inc.
   4. ASI-Modulex, Inc.
   5. Best Sign Systems Inc.
   6. Innerface Sign Systems, Inc.
   7. InPro Corporation
   8. Mohawk Sign Systems.
   9. Seton Identification Products.
   10. Supersine Company (The)

2.02 FIRE ALARM ZONE PLAN

A. Size: 9-inches horizontal x 12-inches vertical

B. Frame / Trim: none.

C. Backplate: 0.25-inch thickness opaque acrylic
   1. Color: as selected from full range.

D. Coverplate: 0.080-inch clear acrylic
   1. Coverplate to be secured to backplate with 4 stainless steel phillips pan head machine screws.

E. Copy: Floor plan insert furnished by Owner

F. Edge Condition: Square cut

G. Corner Condition: Rounded to 1/4" radius

H. Attachment: Adhered

I. Manufacturer: same as stairway signs

2.03 FASTENERS / Identification Devices

A. Tape Adhesive: Double sided tape, permanent adhesive.

PART 3 EXECUTION

3.01 INSTALLATION

A. Install neatly, with horizontal edges level.

B. Locate signs where indicated:
   1. Room and Door Signs: Locate on wall at latch side of door with centerline of sign at 60 inches above finished floor.
   2. If no location is indicated obtain Owner's instructions.

3.02 SCHEDULE

A. Room Signs:
   1. Each restroom
   2. Where indicated on Drawings

B. Fire Alarm Zone Plan: Provide a fire alarm zone plan at each fire alarm annunciator panel.

END OF SECTION

SECTION 10 2113.19 - TOILET COMPARTMENTS

PART 1 GENERAL

1.01 SECTION INCLUDES

A. Compartment Assemblies:
   1. TOILET COMPARTMENTS / Toilet Compartments for Toilet Enclosure
   2. URINAL SCREENS / Toilet Compartments for Urinal Screening

B. Compartment Components:
   1. Panels
   2. Panel Brackets
   3. Pilaster Shoes
   4. Pilaster Heads
   5. Headrails
   6. Headrail Bracket
   7. Door Hinges
   8. Door Latch
   9. Door Pull
   10. Coat Hook, Door Bumper
   11. Fasteners

1.02 RELATED REQUIREMENTS

A. Gypsum Board Assemblies: Concealed substrate reinforcing, framing and blocking for compartment support.

B. Joint Sealants

C. Toilet, Bath, and Laundry Accessories: Washroom assessories mounted to compartments.

1.03 ADMINISTRATIVE REQUIREMENTS

A. Coordination:
   1. Reinforced Substrates: Coordinate sizes and locations of framing, blocking, furring, reinforcements, and other related Work to ensure that compartments can be supported and installed as indicated. Ensure substrates for compartments are one of the following of adequate bearing capacity:
      a. Concrete.
      b. Metal or solid wood framing reinforced and clearly marked for benefit of the compartment installer.

1.04 SUBMITTALS

A. Product Data:
   1. Panels: Include urea formaldehyde content, material descriptions, finishes, and manufacturer's product specifications .
   2. Panel Brackets: Include construction details, material descriptions, dimensions of individual components and profiles, and finishes .
   3. Pilaster Shoes and Heads: Include construction details, material descriptions, and finishes .
   4. Headrails and Headrail Brackets: Include construction details, material descriptions, dimensions of individual components and profiles, and finishes .
   5. Door Hinges: Include accessibility compliance, construction details, material descriptions, and finishes .
   6. Door Latch: Include accessibility compliance, construction details, material descriptions, and finishes .
   7. Door Pull: Include accessibility compliance, construction details, material descriptions, and finishes .

8. Coat Hook, Door Bumper: Include accessibility compliance, construction details, material descriptions, and finishes .

B. Shop Drawings: Toilet Compartments and Urinal Screens: Include accessibility compliance, cutouts and reinforcements for compartment-mounted accessories, product schedule, plans, attachments to other work, imposed loads, anchoring and fastening methods, hardware locations,, and substrate reinforcement requirements.

C. Selection Samples:
1. Panels: color.

D. Maintenance Data: compartments.

1.05 DELIVERY, STORAGE, AND HANDLING

A. Compartment Packaging : cardboard-wrapped, crated, or other resilient packaging to prevent damage and provide protection from impact and moisture during transit and storage.

1.06 SITE CONDITIONS

A. Site (Field) Measurements: Verify dimensions and layout of compartments required to be coordinated with other Work by site measurements before fabrication and indicate measurements on Shop Drawings .

PART 2 PRODUCTS

2.01 COMPARTMENTS / Toilet Compartments and Urinal Screens

A. Assembly of the all components indicated in this Part and of the following configurations:
1. Toilet Compartments: floor-mounted and headrail braced to wall pilasters ; wall and pilaster hung separation panels; pilaster hung doors.
Verify ceiling-hung is desired per page 319 or RFP as sheet A701 shows floor mounted.
2. Urinal Screens: wall-hung hung separation panels.

B. Structural Performance Requirements: Provide compartments to withstand the following forces applied to any point finished Work:
1. Grab Bars: forces which may be applied to conform with ANSI 117.1 with no more than 1/4" deflection.
2. Lateral Force: 200 pounds horizontally with no more then 1/4" deflection at any point.
3. Vertical Force: 300 pounds vertically with no more than 1/2" deflection at any point. Force may be applied to tops of open doors and overhead braces.
4. Compartments are shown on Drawings diagramatically. Provide compartment components required to meet performance requirments.

C. Comparable Product: Scranton Products Hiny Hiders Line
1. Manufacturers:
a. Ampco.
b. Bradley Corporation; Mills Partitions.
c. Comtec Industries.
d. General Partitions Mfg. Corp.
e. Global Steel Products Corp.
f. Metpar Corp.
g. Santana Products, Inc.
h. Sanymetal; a Crane Plumbing Company.

2.02 PANELS

A. Doors, Pilasters, and Separation Panels: Solid high density polyethylene (HDPE), compression-molded solid polymer resin with homogenous color throughout with cutouts, drilled holes, and internal reinforcement to receive compartment components and compartment-mounted hardware including as required for washroom accessories indicated elsewhere.

1. Thickness: 1 inch.
2. Door Width: 24 inch.
3. Door Width for Handicapped Use: 36 inch, out-swinging.
4. Pilaster Height: 84 inch.
5. Door and Separation Panel Height: 55 inch.
6. Thickness of Pilasters: 1 inch.
7. Edges: seamless construction with edges eased
8. Colors, Pattern, and Patterns: as selected from standard range.

2.03 PILASTER SHOES, PILASTER HEADS / Exposed

A. Description: formed 3 inch high stainless steel cover; concealing floor fastenings.

B. Adjustable for mounting variations with concealed screw jack through steel saddles integral with pilaster.

2.04 HEADRAILS

A. Hollow anodized aluminum channel, 1 x 1-5/8 inch size .

2.05 HEADRAIL BRACKET

A. At Headrail End Supports: cast or formed metal matching headrail for exposed fastening.

2.06 PANEL BRACKETS

A. Pilaster Brackets: continuous type; extruded aluminum.

B. Wall Brackets: continuous type; extruded aluminum.

2.07 FASTENERS

A. Screws, Bolts, Nuts, Washers: Stainless steel, tamper proof type.

2.08 DOOR HINGES

A. Material: stainless steel.

B. Pivot, gravity type; two per door.

2.09 DOOR LATCH

A. Door Latch: assembly of door-mounted latch and pilatser-mounted strike
   1. Material: stainless steel.
   2. Strike: with rubber bumper and latch keeper

2.10 DOOR PULL

A. D shaped pull.

B. Material: stainless steel.

C. Provide one pull for outswinging doors and inside of accessible compartments where latch does not met accessibility requirements.

2.11 COAT HOOK, DOOR BUMPER

A. Material: stainless steel, with rubber bumper.

B. Size: to prevent door from hitting partition-mounted accessories or adjacent contruction.

C. Door Bumper: Provide one for outswinging doors.

D. Coat Hook: Provide one per toilet compartment, mounted on door.

2.12 FINISHES

A. Exposed Metal:
   1. Stainless Steel: Factory No. 4 (directional satin) / ASTM 480, unless otherwise indicated
   2. Steel: Factory stain chrome.
   3. Aluminum: Factory clear, class II anodic.

B. Concealed Steel: hot-dip galvanized, cadmium-plated, or other rust-resistant protective-coating.

PART 3 EXECUTION

3.01 EXAMINATION

A. At framed substrates, ensure substrate reinforcement or framing required by rough carpenty and gypsum board assemblies is clearly marked to facilitate accurate placement of fasteners.

B. Ensure that compartment support devices not installed by the compartment installer are correctly placed .

3.02 INSTALLATION

A. Install compartments secure, rigid, plumb, and level.

B. Floor-mounted, Overhead Headrail Braced Units: Tops of sepaparation panels level with tops of closed doors. Locate head rail joints at pilaster center lines.

C. Panel Brackets: Secure using fasteners.
   1. Continuous: to within 2 inches of each panel end with fasteners evenly spaced 12 inches maximum.
   2. Tile Substrate: Locate brackets so holes for fasteners occur in tile joints.

3.03 ERECTION TOLERANCES

A. True Position: 1/4 inch maximum variation

B. Plumb and Level: 1/8 inch in 48 inches maximum variation

C. Clearances:
   1. Pilasters and Panels: 1/4 inch to 1/2 inch maximum
   2. Panels and Walls: 1/2 inch to 1 inch maximum

3.04 NON-CONFORMING WORK

A. Repair deterioration, defects or damage to finishes, to factory-finished appearance so no evidence remains of corrective work when viewed with the naked human eye from a distance of 36 inches under 50 foot-candle illumination.

B. For the following conditions, remove in-place and provide new compartment components to eliminate evidence of replacement:
   1. Non-conforming Work which can not be corrected by repair alone.
   2. Completed Work that is loose, stained, faded, scratched, warped, bowed, or otherwise damaged.

3.05 ADJUSTING

A. Adjust and align hardware to uniform clearance at vertical edge of doors, not exceeding 3/16 inch.

B. Adjust hinges to position doors in partial opening position when unlatched. Return out-swinging doors to closed position.

3.06 CLEANING

A. Remove temporary protective coverings and strippable films.

B. Clean surfaces with water and a mild soap or detergent not harmful to finishes to remove foreign material. Thoroughly rinse surfaces and dry.

END OF SECTION

SECTION 10 2226.33 - FOLDING PANEL PARTITIONS

PART 1 GENERAL

1.01 SECTION INCLUDES

A. Folding panel partitions.

B. FOLDING PARTITIONS

C. Ceiling track, ceiling guards, and operating hardware.

1.02 SUBMITTALS

A. Product Data: Provide data on partition materials, operation, hardware and accessories, electric operating components, track switching components, and colors and finishes available.

B. Shop Drawings: Indicate opening sizes, track layout, details of track and required supports, static and dynamic loads, location and details of pass door and frame, adjacent construction and finish trim, and stacking depth.

C. Maintenance Data: Include recommended cleaning methods, cleaning materials, and stain removal methods. Describe cleaning materials detrimental to finish surfaces and hardware finish.

PART 2 PRODUCTS

2.01 FOLDING PARTITIONS

A. Equal Product: Modernfold Acousti-Seal Single Panel Systems 931

B. Operable Panel Partition: Side opening; individual panels; side stacking; manually operated.
   1. Panel Finish: Factory applied reinforced vinyl fabric.
      a. Color: Igneous II Biscuit 111873-549
   2. Sound Transmission Class (STC): 52 calculated in accordance with ASTM E413, based on tests conducted in accordance with ASTM E90, on panel size of 100 sq ft.

C. Core: 16 gage, 0.0598 inch thick formed sheet steel frame top, bottom, jambs, and intermediates; welded construction, with acoustical insulation fill.
   1. Thickness with Finish: 3 inches.
   2. Factory applied surface finish.
   3. Trim: Trimless.
   4. Panel to Panel Seals: Grooved and gasketed astragals, with continuous flexible ribbed vinyl seal fitted to panel edge construction; color to match panel finish.

D. Track: Formed steel; 1-1/4 by 1-1/4 inch size; thickness and profile designed to support loads, steel sub-channel and track connectors, and track switches.

E. Carriers: Nylon wheels on trolley carrier at top of every second panel, sized to carry imposed loads, with threaded pendant bolt for vertical adjustment.

F. Hardware: Latching door handles of cast steel, satin chrome finish; lock cylinder keyed to building keying systemmaster keyed to building keying system; pull bars.

G. Acoustic Seals: Flexible acoustic seals at jambs, meeting mullions, ceilings, retractable floor and ceiling seals, and above track to structure acoustic seal.

H. Accessories: White enameled ceiling closure;aluminum jamband head molding, fittings and attachments.

PART 3 EXECUTION

3.01 INSTALLATION

A. Install partition in accordance with manufacturer's instructions and ASTM E557.

B. Fit and align partition assembly level and plumb.

3.02 ADJUSTING

A. Adjust partition assembly to provide smooth operation from stacked to full open position. Do not over-compress acoustic seals.

B. Visually inspect partition in full extended position for light leaks to identify a potential acoustical leak.

END OF SECTION

SECTION 10 2800 - TOILET, BATH, AND LAUNDRY ACCESSORIES

PART 1 GENERAL

1.01 SECTION INCLUDES

A. TOILET PAPER DISPENSER = TOILET TISSUE DISPENSER
B. PAPER TOWEL DISPENSER
C. WASTE RECEPTACLE
D. SOAP DISPENSER
E. UNIT MIRROR = MIRROR
F. GRAB BARS
G. SANITARY NAPKIN DISPOSAL UNIT
H. UNDERLAVATORY GUARDS
I. DIAPER CHANGING STATION

1.02 RELATED REQUIREMENTS

A. Rough Carpentry
B. Gypsum Board Assemblies
C. Toilet Compartments
    1. Stall Hooks

1.03 COORDINATION

A. Coordinate accessory locations with other work to prevent interference with clearances required for access by people with disabilities, and for proper installation, adjustment, operation, cleaning, and servicing of accessories.
B. Placement Requirements: Timely coordinate information on requirements for accessories support construction not installed by the accessory installer. Include diagrams for placement and other information on location, rough opening, anchors, brackets, and reinforced substrate required for accessories.

1.04 SUBMITTALS

A. Product Data:
    1. Each item listed in Section Includes Article in this Part.: Include construction details, material descriptions, dimensions of individual components and profiles, and finishes .
B. Operation and Maintenance Data: each item listed in Section Includes Article in this Part.

PART 2 PRODUCTS

2.01 TOILET PAPER DISPENSER

A. Double-roll dispenser with hoods.
B. Mounting: Surface mounted.
C. Material: stainless steel.
    1. Finish: satin
D. Operation: Noncontrol delivery.
E. Capacity: Two 5 inch diameter roll.
F. Spindle: spring-loaded two-part metal tube.
G. Comparable Product: B-69997 Surface-Mounted Toilet Tissue Dispenser with Hoods / Bobrick Washroom Equipment, Inc.
    1. Manufacturers:
        a. A & J Washroom Accessories, Inc.

b. American Specialties, Inc.
c. Bradley Corporation.
d. General Accessory Manufacturing Co. (GAMCO).

2.02 PAPER TOWEL DISPENSER

A. Paper Towel Dispenser: Folded paper type, stainless steel, surface-mounted, with viewing slots on sides as refill indicator and tumbler lock.
   1. Capacity: 300 C-fold minimum.

B. Manufacturers:
   1. A & J Washroom Accessories, Inc.
   2. American Specialties, Inc.
   3. Bobrick Washroom Equipment, Inc.
   4. Bradley Corporation.
   5. General Accessory Manufacturing Co. (GAMCO).

2.03 WASTE RECEPTACLE

A. Owner furnished and installed individual unmounted unit.

2.04 SOAP DISPENSER / Lavatory Fixtures

A. Owner furnished and installed individual unmounted bottles.

2.05 SOAP DISPENSER / Stone Contertops

A. Description: Designed for dispensing soap in liquid or lotion form.

B. Mounting: Deck mounted through countertop.

C. Construction: polyethylene container concealed below deck; piston and of stainless steel with bright polished finish; chrome-plated deck escutcheon.

D. Capacity: 32 ounces.

E. Spout Length: 6 inches minimum.

F. Comparable Product: 6326-68 Six Inch Spout Pump Soap Dispenser / Bradley Corporation
   1. Manufacturers:
      a. A & J Washroom Accessories, Inc.
      b. American Specialties, Inc.
      c. Bobrick Washroom Equipment, Inc.
      d. General Accessory Manufacturing Co. (GAMCO).

2.06 UNIT MIRROR

A. Owner furnished and Contractor installed.

B. Description: Manufactured mirror unit with a decorative wood frame and concealed fasteners.

2.07 GRAB BARS

A. Mounting: concealed flange.

B. Material: stainless steel, 0.05 inch minimum thickness.
   1. Finish: Smooth, No. 4 finish (satin) finish with slip-resistant texture in grip area.

C. Outside Diameter: 1-1/2 inches.

D. Length and Configuration: As indicated on Drawings.

E. Manufacturers:
   1. A & J Washroom Accessories, Inc.
   2. American Specialties, Inc.
   3. Bobrick Washroom Equipment, Inc.
   4. Bradley Corporation.
   5. General Accessory Manufacturing Co. (GAMCO).
   6. McKinney/Parker Washroom Accessories Corp.

2.08 SANITARY NAPKIN DISPOSAL UNIT

A. Mounting: Partition mounted

B. Material: No. 4 finish (satin) stainless steel

C. Operation: self-closing door, locking bottom panel with full-length stainless steel piano-type hinge, removable receptacle.

D. Capacity: 0.7 gallon

E. Comparable Product: B-4354 ConturaSeries Partition-Mounted Sanitary Napkin Disposal / Bobrick Washroom Equipment, Inc.
   1. Manufacturers:
      a. A & J Washroom Accessories, Inc.
      b. American Specialties, Inc.
      c. Bradley Corporation.
      d. General Accessory Manufacturing Co. (GAMCO).

2.09 UNDERLAVATORY GUARDS

A. Mounting: Surface

B. Description: One piece high impact-resistant, antimicrobial, white plastic enclosure to conceal supply and drain piping assemblies, that prevent direct contact with and burns from piping.
   1. Comply with ADA Article 4.19.4

C. Comparable Product: Lav Shield 2 / Truebro, Inc.
   1. Manufacturers:
      a. Plumberex Specialty Products, Inc.
      b. TCI Products.

2.10 DIAPER-CHANGING STATION

A. Description: Horizontal unit that opens by folding down from stored position and with child-protection strap and concave changing area and two hooks.
   1. Engineered to support a minimum of 250-lb static load when opened.

B. Mounting: Surface; unit projecting not more than 4 inches (100 mm) from wall when closed.

C. Material: High-density polyethylene in cream color.

D. Liner Dispenser: Built in.

E. Product: 9632 Horizontal Baby Changing Station / Bradley Corporation.
   1. Even if these Contract Documents allowed for substitutions, which they do not, Koala Kare Products Division of Bobrick would not be considered for substitution as the manufacturer's logo is too large.

PART 3 - EXECUTION

3.01 EXAMINATION

A. At framed substrates, ensure substrate reinforcement or framing required by gypsum board assemblies is clearly marked to facilitate accurate placement of fasteners.

3.02 INSTALLATION

A. Install plumb and level, securely and rigidly anchored to substrate.

B. Mounting Heights and Locations: As required by accessibility regulations and as indicated on Drawings

C. Grab Bars: Install to withstand a downward load of at least 250 lbf, when tested according to method in ASTM F 446.

3.03 ADJUSTING AND CLEANING

A. Adjust accessories for unencumbered, smooth operation. Replace damaged or defective items.

B. Remove temporary labels and protective coatings.

C. Clean and polish exposed surfaces according to manufacturer's written recommendations.

3.04 SCHEDULE

A. Unless otherwise indicated, provide accessories at the following locations:
   1. Toilet Paper Dispenser: one at each toilet.
   2. Paper Towel Dispenser: one (or more as indicated on Drawings) in each restroom.
   3. Soap Dispenser: one each stone contertop lavatory.
   4. Unit MIrrors: one each lavatory
   5. Sanitary Napkin Disposal Unit: one each toilet in multiple toilet women's restroom.
   6. Diaper Changing Station: indicated on Drawings.
   7. Grab Bar: provide at each accessible toilet and as indicated.
   8. Underlavatory Guards: provide at each accessible lavatory and sink which do not have wood panel enclosure and as indicated.

END OF SECTION

SECTION 10 3100 - MANUFACTURED FIREPLACES

PART 1 GENERAL

1.01 SECTION INCLUDES

A. MANUFACTURED FIREPLACES = FIREPLACES

B. FIREPLACE FLUE = FIREPLACE CHIMNEY / Top Vented Manufactured Fireplaces

C. FIREPLACE FLUE CAP = FIREPLACE CHIMNEY CAP / Top Vented Manufactured Fireplaces

1.02 RELATED REQUIREMENTS

A. Framed openings for flue.

B. Enclosure and wall cladding surrounding fireplace box.

C. Gas piping to fire box.

D. Countertops
   1. Hearth surface and finish.

E. Equipment Wiring and Conduit.

1.03 PRICE AND PAYMENT PROCEDURES

A. Alternate 1 - Add Fireplace: Provide a bid alternate to furnish and install fireplace, flue, and flue cap as indicated in this Section. Base Bid includes the following if Alternate is not accepted:
   1. Framing and painted gypsum board assembly in place of fireplace opening
   2. Fireplace surround and stone hearth
   3. Gas piping to fireplace

1.04 SUBMITTALS

A. Product Data:
   1. Manufacturerd Fireplaces, Flues, and Flue Cap: Include location and size of each site connection, required clearances with tolerances, dimensions of individual components and profiles, stock wiring diagrams, and product test reports indicating compliance with UL 127 for determining rating. Product certificates may be submitted in lieu of product test reports .

B. Operation and Maintenance Data: Manufacturerd Fireplaces.

PART 2 PRODUCTS

2.01 MANUFACTURED FIREPLACE

A. Product: Superior 36” WRT 4500 Series WRT4536RH Wood Burning Fireplace.

B. Fuel: Natural gas.

C. Flue Configuration: top vented .

D. Fire Box: Formed insulated steel cabinet, triangular corner shaped interior, refractory brick lining.
   1. Brick liners: one of the following as selected by Architect:
      a. Large traditional style ceramic refractory
      b. Herringbone style ceramic refractory
   2. Burner System: Insta-Flame radiant ceramic burner system.
   3. Andirons: Cast iron.
   4. Logs: 8-piece, extra large, carved, split oak, ceramic fiber logs.

E. Exposed Cladding: Prepainted steel.

F. Combustion Air Source: Ducted outside air with screened grilles and ducts.

G. Fire Box Closure: Clear tempered ceramic glass doors; butt hinged; friction catch.
   1. Frame: Non-obtrusive black steel type which can be framed by architectural surround indicated elsewhere; butt hinged; friction catch.

2. Provide woven steel wire mesh screen inside door with head track and steel pull chains.

H. Hearth: as required for stone hearths indicated elsewhere.

I. Controls:
   1. Operating Controls: key operated remote wall mounted control.
      a. On-off control with sleep timer function.

2.02 FIREPLACE FLUE / Top Vented Manufactured Fireplaces

A. Flue: Top vented, with automatic pressure sensitive barometric contol to turn fireplace off if draft is insufficient.

B. Diameter: 4-1/2 inches minimum nominal inside.

C. Construction: Insulated double wall steel sandwich construction, modular sized sections with elbows and spacing collars to permit site assembly, air and fire stop collars, elbows, elbow offsets, tees, and supports.

D. Damper: none. Air seal fireplace by fire box closure doors.

E. Roof Penetration: Provide roofing storm collar and roof flashing.

2.03 FIREPLACE FLUE CAP / Top Veted Manufactured Fireplaces

A. Terminations: Round terminal cap

B. Manufacturer's standard type in architectural enclosure indicated elsewhere.

2.04 COMPONENTS

PART 3 EXECUTION

3.01 EXAMINATION

A. Examine roughing-in for electrical and mechanical systems for fireplace systems to verify actual locations of connections before installation.

B. Verify that prepared supporting construction and openings are ready to receive work and opening dimensions are as instructed by the manufacturer.

3.02 INSTALLATION

A. Install fireplace unit and flue assembly in accordance with UL requirements.

B. Install roof flashings to ensure moisture is shed from chimney flue.

3.03 ERECTION TOLERANCES

A. Maximum Variation of Chimney From Plumb: 1/2 inch.

END OF SECTION

SECTION 10 4400 - FIRE PROTECTION SPECIALTIES

PART 1 GENERAL

1.01 SECTION INCLUDES

A. FIRE EXTINGUISHER CABINETS

B. WALL HUNG FIRE EXTINGUISHERS

C. Fire Extinguishers

1.02 RELATED REQUIREMENTS

A. Factory applied metal finishes.

B. Gypsum board assemblies.

1.03 COORDINATION

A. Placement Requirements: Timely coordinate information on requirements for fire protection specialties support construction including framing, blocking, furring, reinforcements, and other related Work not installed by the fire protection specialties installer. Include diagrams for placement and other information on location, rough opening, anchors, brackets, and reinforced substrate required for fire protection specialties.

1.04 SUBMITTALS

A. Product Data:
   1. Fire Rated Cabinets: Include regulatory requirements compliance .
   2. Fire Extinguishers .
   3. Mounting bracket.

B. Sample Warranties:
   1. Fire Extinguisher Manufacturer's Warranty.

C. Executed Warranties:
   1. Fire Extinguisher Manufacturer's Warranty.

1.05 QUALITY ASSURANCE

1.06 WARRANTY

A. Fire Extinguisher Manufacturer Warranty: Provide fire extinguisher manufacturer's standard written warranty in which manufacturer agrees to repair or replace fire extinguisher that fails due to defects in materials or factory workmanship within specified warranty period.
   1. Failures include, but are not limited to, the following:
      a. Failure of hydrostatic test according to NFPA 10.
      b. Faulty operation of valves or release levers.
   2. Warranty Period: 6 years

PART 2 PRODUCTS

2.01 FIRE EXTINGUISHERS

A. Comply with product requirements of NFPA 10.
   1. Provide extinguishers labeled by Underwriters Laboratories Inc. for the purpose specified and indicated.
   2. Instruction Labels: Include pictorial marking system complying with NFPA 10, Appendix B .

B. Valves: Manufacturer's standard.

C. Handles and Levers: Manufacturer's standard.

D. Fire Extinguisher, Typical: Multipurpose dry-chemical type; UL-rated 4-A:60-B:C, 10-lb nominal capacity, with monoammonium phosphate-based dry chemical; with pressure-indicating gage.
   1. Container: Manufacturer's standard enameled.

a. Color: white.

E. Manufacturers:
1. Amerex Corporation.
2. Ansul Incorporated; Tyco International Ltd.
3. Badger Fire Protection; a Kidde company.
4. Buckeye Fire Equipment Company.
5. Fire End & Croker Corporation.
6. J. L. Industries, Inc.; a division of Activar Construction Products Group.
7. Kidde Residential and Commercial Division; Subsidiary of Kidde plc.
8. Larsen's Manufacturing Company.
9. Pem All Fire Extinguisher Corp.; a division of PEM Systems, Inc.
10. Potter Roemer LLC.
11. Pyro-Chem; Tyco Safety Products.

2.02 WALL HUNG FIRE EXTINGUISHERS

A. Provide one fire extinguisher on mounting bracket per wall hung fire extinguisher.

B. Mounting Brackets: Extinguisher manufacturer's standard steel, designed to secure fire extinguisher to wall or structure, of sizes required for types and capacities of fire extinguishers indicated.
1. Finish: baked enamel.
2. Manufacturer: same as fire extinguisher.

C. Identification: In public areas, provide vertically oriented self adhering vinyl decal acceptable to authorities having jurisdiction with directional arrow and the words "FIRE EXTINGUISHER" in green letters on white background and locate as directed by Architect.

2.03 FIRE EXTINGUISHER CABINETS

A. Size: to accommodate fire extinguisher or as indicated elsewhere, whichever is larger.

B. Accessories: Provide one fire extinguisher per cabinet.

C. Fire Resistive Construction: Unless the opening, as indicated elsewhere, into which a cabinet is to be mounted continues the fire resistive rating of the wall regardless of the fire resistive rating of the cabinet, either provide construction assemblies approved by the Architect to continue the fire resistive rating of the wall or provide cabinets listed and labeled to comply with requirements in ASTM E 814 for the fire-resistance rating of walls where they are installed.
1. Construct fire-rated cabinets with double walls fabricated from cold-rolled steel sheet lined with minimum 5/8-inch- thick, fire-barrier material. Provide factory-drilled mounting holes.

D. Cabinet: Semi recessed type.

E. Cabinet Box:
1. Material: Cold-rolled steel sheet.
a. Inside Finish: Factory powder coated.
1) Color: white.
b. Outside Finish: Factory primed; Site paint.

F. Cabinet Face:
1. Trim: Exposed and returned to wall surface, with 2 inch projection, 1 inch wide face.
a. Corner Configuration: rolled 1/2 inch nominal radius.
2. Material: Cold-rolled steel sheet.
a. Outside Finish: Factory primed; Site paint.

G. Door: Solid panel.
1. Frame Material: Cold-rolled steel sheet.
a. Exposed Finish: Factory primed; Site paint.
1) Color: As selected from standard range.
2. Glazing Material: Tempered float glass set in resilient channel gasket.

3. Latch: manufacturer's standard .
4. Hinge: manufacturer's standard hinge appropriate for type of door.

H. Cabinet Mounting Hardware: Appropriate to cabinet pre-drilled for fasteners.

I. Identification: Identify fire extinguisher in cabinet with the words "FIRE EXTINGUISHER " in lettering complying with authorities having jurisdiction.
1. Location: Applied to cabinet door.
2. Application Process: Engraved.
3. Orientation: Vertical.

J. Identification on Wall: In addition to indentification on cabinet above, identify fire extinguisher with the words "FIRE EXTINGUISHER " in lettering complying with authorities having jurisdiction.
1. Application Process: Decals.
2. Lettering Color: green.
3. Orientation: Vertical.

K. Comparbale Product: Ambassidor Series / J. L. Industries, Inc., a division of Activar Construction Products Group.
1. Manufacturers: .
   a. Fire End & Croker Corporation.
   b. Kidde Residential and Commercial Division, Subsidiary of Kidde plc.
   c. Larsen's Manufacturing Company.
   d. Potter Roemer LLC.
   e. Watrous Division, American Specialties, Inc.

PART 3 EXECUTION

3.01 INSTALLATION

A. Install wall hung fire extinguishers 54 inches above finished floor to top of fire extinguisher unless otherwise indicated. Attach fire extinguisher to mounting bracket.

B. Install cabinets in locations and at mounting heights indicated or if not indicated at heights acceptable to authorities having jurisdiction not to exceed the following distances from the finish floor to the top of the fire extinguisher or hose valve if no extinguisher.
1. 60 inches for fire extinguishers weighing 40 lb or less .
2. 42 inches for fire extinguishers weighing more than 40 lb.

C. Apply site applied identification on walls as indicated in Part 2 after site finishing is complete and cured.

END OF SECTION

SECTION 11 5213 - PROJECTION SCREENS

PART 1 GENERAL

Verify no projection screens are required

1.01 SECTION INCLUDES

A. Projection screens

1.02 SUBMITTALS

A. Product Data: projection screens.

B. Operation and Maintenance Data: projection screens.

PART 2 PRODUCTS

2.01 PROJECTION SCREENS

A. Product: Day-Lite Professional Electrol motorized, concealed screens

B. Ceiling recessed motorized projection screen

C. Construction: Factory assembled case and fabric.

D. Dimensions: 80 inches by 80 inches, unless otherwsie inidcated.

E. Mouting: ceiling recessed.

F. Fabric: Light diffusing screen fabric; washable, flame retardant and mildew resistant.
   1. Material: Matte white vinyl on fiberglass backing, with nominal gain of 1.0 over viewing angle not less than 70 degrees from axis, horizontally and vertically.

G. Screen Cases: Aluminum; Aluminum; integral roller brackets.
   1. Door Slat: Self trim; self-closing and -opening.
   2. Case Finish: Baked enamel.

H. Electrically-Operated Screens:
   1. Roller: 2 inch aluminum, with locking device.
   2. Vertical Tensioning: Screen fabric weighted at bottom with steel bar with plastic end caps.
   3. Horizontal Tensioning: Tab-guided cable system.

I. Provide mounting hardware, brackets, supports, fasteners, and other mounting accessories required for a complete installation, in accordance with manufacturer's recommendations for specified substrates and mountings.

2.02 ELECTRICAL COMPONENTS

A. Electrical Components: Listed and classified by UL as suitable for the purpose specified and indicated.

B. Motors: Direct drive, 110 V, 60 Hz.
   1. Screen Motor: Mounted inside roller; three wire with ground; quick reverse type and lifetime lubricated; equipped with thermal overload cut-off, internal junction box, electric brake, and pre-set accessible limit switches.
      a. Electrical Characteristics: 1.2 amps.
      b. Motor mounted on sound absorber.

C. Controls: Three (3) position control switch with plate.

PART 3 EXECUTION

3.01 INSTALLATION

A. Do not field cut screens.

B. Install screens in mountings as specified and as indicated on drawings.

C. Install plumb and level.

D. Install electrically operated screens ready for connection to power and control systems by others.

E. Adjust projection screens and related hardware in accordance with manufacturer's instructions for proper placement and operation.

F. Test electrical screens for proper working condition. Adjust as needed.

END OF SECTION

SECTION 12 3530 - MANUFACTURED CASEWORK

PART 1 GENERAL

1.01 SECTION INCLUDES

A. CABINETS
   1. WALL CABINETS
   2. BASE CABINETS

B. Components
   1. DOOR FRONTS
   2. DRAWER FRONTS
   3. END PANELS
   4. CABINET BOX
   5. SOFTWOOD LUMBER / Cabinets
   6. HARDWOOD LUMBER / Cabinets
   7. HARDWOOD FACED PLYWOOD / Cabinets
   8. Adhesive / Cabinets
   9. FASTENERS / Cabinets
   10. SHELF SUPPORTS
   11. PULLS / Cabinets
   12. DRAWER SLIDES / Typical
   13. HINGES / Cabinets

1.02 RELATED REQUIREMENTS

A. Countertops

B. Gypsum Board Assemblies
   1. Requirements for substrate reinforcing for wall mounted cabinets

1.03 ADMINISTRATIVE REQUIREMENTS

A. Sequencing: Do not deliver or install casework until building is enclosed, wet-work is complete..

B. Placement Requirements: Timely coordinate information on requirements for manufactured casework support construction not installed by the manufactured casework installer. Include diagrams for placement and other information on location, rough opening, anchors, brackets, and reinforced substrate required for manufactured casework. For the following substrates, ensure reinforcement is as follows:
   1. At Non-resilient Gypsum Board Assemblies: solid wood or metal framing properly reinforced and clearly marked for benefit of installer.
   2. At Resilient Gypsum Board Assemblies: solid wood or metal framing properly reinforced and clearly marked for benefit of installer installed as to minimize acoustical performance degradation.

C. Preinstallation Conference: conduct preinstallation conference as required for countertops indicated elsewhere.

1.04 SUBMITTALS

A. Product Data: Provide component dimensions and construction details.
   1. Cabinets: Include urea formaldehyde content and standards compliance .
   2. Cabinets
   3. Hinges
   4. Pulls
   5. Drawer guides
   6. Shelf rests
   7. Other hardware

B. Shop Drawings: Cabinets: Include plans, elevations, sections, details, attachments to other work, dimensions, identification of products, installation drawings, roughing-in diagrams with tolerances, anchoring and fastening methods, required clearances with tolerances, hardware locations, factory finishes demarcation, notation of coordination requirements, notation of dimensions established by field measurement, demarcation of factory and field assembled work, method of field assembly, substrate reinforcement requirements, and supplementary support requirements.

C. Selection Samples:
   1. Cabinets: color and pattern.
   2. Hardware: color and style.

D. Preinstallation Conference Minutes.

1.05 QUALITY ASSURANCE

A. Manufactured Casework Quality Standard:
   1. Complying with KCMA A161.1 and KCMA Certified.

1.06 PROJECT CONDITIONS

A. Established Dimensions: Where casework is indicated to fit to other construction, establish dimensions for areas where casework is to fit. Coordinate construction to ensure that actual dimensions correspond to established dimensions. Provide fillers and scribes to allow for trimming and fitting.

PART 2 PRODUCTS

2.01 CABINETS

A. ANSI/KCMA A161.1, Performance and Construction Standard for Kitchen and Vanity Cabinets

B. KCMA Severe Use Specifications.

C. Fomaldehyde Emmission: Composite wood used shall meet 93120-93120.12, Title 17, California Code of Regulations California Air Resources Board (CARB) Airborne Toxic Control Measure (ATCM) to control formaldehyde emissions from composite wood products (CARB 2). Solid wood shall have no added formaldehyde.

D. Comparable Product: Extreme Series / Advanta Cabinets of ACProducts, Inc. dba ACPi (formerly Armstong Cabinets)
   1. Manufacturers:
      a. Crotone Kitchens Inc.
      b. S&W Cabinets, Inc.
      c. Republic Industries of Texas, L.P.
      d. Mid-America Cabinets
      e. Legacy Cabinets Inc.
      f. Local custom cabinet manufacturer

E. Construction: Provide cabinets of the following construction and components as indicated below and in this Part:
   1. Particleboard: not permitted component. Medium density fiberboard is permitted.
   2. Wood Species: Birch for face venners and solid wood.
   3. Cabinet Style: 3/4 inch maximmum reveal flush overlay on face frame.
   4. Face Frame: solid hardwood lumber.
   5. Cabinet Box Construction: 1/2 inch (except for 1/4 inch back panels) with matching edges.
   6. Box Construction: Hardwood veneer plywood with matching edges.
   7. Shelf Construction: Hardwood Faced Plywood; shelf rest in multiple holes with matching edges.
   8. Cabinet Doors, Drawer Fronts, and Other Exposed Panels: Solid wood or hardwood veneer.

a. Joints: mortised and tenoned or doweled and glued. Mating and sticking not permitted.
b. Style: as selected from standard range

9. Drawer Construction: lock shoulder, glued and pin nailed permalam with matching edges.
10. Drawer Bottom: 1/4 inch thick
11. Toe Board: 3/4 inch

F. Finish: Factory finished.
1. Color as selected from standard range.

2.02 SHELF RESTS / Cabinets

A. Grade 2 / BHMA A156.9

B. Pins: one

C. Hold Down Function: none.

D. Material: metal

E. Finish: plated.

2.03 PULLS / Door and Drawer Fronts

A. Product: 117 DBAC / Advanta Cabinets of ACProducts, Inc. dba ACPi (formerly Armstong Cabinets)

B. Color: Dark rbonze.

2.04 DRAWER SLIDES

A. B05091, Heavy Duty (Grade 1HD-100 and Grade 1HD-200) / BHMA A156.9

B. Mounting: side.

C. Degree of Extension: standard extension.

D. Static Load Capacity: 75 pounds (commercial).

E. Stop: integral type requiring ten times the normal opening force to remove drawer.

F. Closing: self closing and stay closed type. Drawer slides will self-close with their related dynamic load when the drawer is 2 inches from the fully closed position and not bounce open when properly adjusted.

G. Finish: Factory baked enamel or powder coated.

2.05 HINGES / Cabinets

A. Grade 2 / BHMA A156.9

B. Style: as selected from standard range.

C. Fully concealed.

D. Adjustable.

E. Self closing.

F. Degree of Opening: 170.

2.06 CATCHES

A. None; hinges and drawers are self closing.

2.07 FABRICATION

A. Shop assemble casework for delivery to site in units easily handled and to permit passage through building openings.

B. Fabricate corners and joints without gaps or inaccessible spaces or areas where dirt or moisture could accumulate.

C. Form smooth edges. Form material for countertops, facing, shelves, and drain boards from continuous sheets.

D. Provide cutouts for plumbing fixtures, appliances, and fixtures and fittings. Prime paint contact surfaces of cut edges.

E. When necessary to cut and fit on site, provide materials with ample allowance for cutting. Provide trim for scribing and site cutting.

F. At cabinet doors and drawer fronts with protruding hardware, provide filler strips at inside corners to permit opening with adequate clearance to perpendicular cabinets.

2.08 FINISHES

PART 3 EXECUTION

3.01 EXAMINATION

A. At framed substrates and non-concrete, non-masonry substrates, ensure concealed substrate reinforcement required by gypsum board assemblies is clearly marked for benefit of installer.

3.02 INSTALLATION

A. Cabinets: Install cabinets with no variations in flushness of adjoining surfaces; use concealed shims. Where cabinets abut other finished work, scribe and cut for accurate fit. Provide filler strips, scribe strips, and moldings in finish to match cabinet face. Use filler strips, not additional overlay trim, for this purpose.
   1. Install cabinet without distortion so doors and drawers fit openings and are aligned. Complete installation of hardware and accessories as indicated.

B. Anchoring: Fasten cabinets to adjacent units and to backing.
   1. Fasten wall cabinets through back, near top and bottom, at ends and not less than 24 inch spacing with No.10 wafer-head screws sized for 1-inch penetration into framing, blocking, or hanging strips.

3.03 TOLERANCES

A. Maximum Variation from True Position: 1/16 inch.

B. Maximum Offset from True Alignment with Non-countertop Abutting Materials: 1/32 inch.

C. Maximum Offset from True Alignment for Countertops: 1/64 inch.

D. Maximum Variation from Level and Plumb: 1/8 inch in 8 feet.

E. Maximum Gaps with Abutting Non-manufactured Casework Construction: 1/32 inch.

3.04 ADJUSTING

A. Adjusting: Adjust hardware so doors and drawers are centered in openings and operate smoothly without warp or bind. Lubricate operating hardware as recommended by manufacturer.

3.05 CLEANING

A. Clean surfaces with water and a mild soap or detergent not harmful to finishes to remove foreign material. Thoroughly rinse surfaces and dry.

B. Repair deterioration, defects or damage to finishes, to factory-finished appearance so no evidence remains of corrective work when viewed with the naked human eye from a distance of 36 inches under 50 foot-candle illumination.

END OF SECTION

SECTION 12 3600 - COUNTERTOPS

PART 1 GENERAL

1.01 SECTION INCLUDES

A. FIREPLACE HEARTH

B. STONE COUNTERTOPS .
   1. GRANITE COUNTERTOPS

C. SUBTOPS / Stone Countertops

D. Fasteners / Countertops

E. Adhesive / Countertop Laminating or Anchoring Laminated Countertops

1.02 RELATED REQUIREMENTS

A. Joint Sealants

B. Manufactured Casework.

1.03 PRICE AND PAYMENT PROCEDURES

A. Allowance 123600 - Stone Countertops: Provide a material only lump sum allowance for the amount indicated in Section 012100 for stone countertops and fireplace hearth. Allowance only applies to purchase of raw stone materials. Fabrication (including cutouts) and installation of contertops is to be included in non-allowance Contract Sum.

1.04 ADMINISTRATIVE REQUIREMENTS

A. Coordination:
   1. Reinforced Substrates: Coordinate sizes and locations of framing, blocking, furring, reinforcements, and other related Work to ensure that countertops can be supported and installed as indicated. Ensure substrates for countertops are one of the following of adequate bearing capacity:
      a. Manufactured Casework
      b. Metal Fabrications: steel framing

B. Preinstallation Conference: Attendance to include appliance installer, cabinet installer, countertop installer, plumbing installer, electrical installer, gas supply installer, and support framing installer.

1.05 SUBMITTALS

A. Product Data:
   1. Stone: Include regional products report, material descriptions, and standards compliance .
   2. Subtops: Include urea formaldehyde content, material descriptions, and standards compliance .
   3. Adhesives: Include VOC content and urea formaldehyde content .

B. Shop Drawings:
   1. Stone Countertops: Include plans, sections, details, attachments to other work, dimensions, imposed loads, anchoring and fastening methods, factory finishes demarkation, demarcation of factory and field assembled work, method of field assembly, and substrate reinforcement requirements.

C. Verification Samples:
   1. Stone Countertops: 8 inch square with 2 edges, a seam, and backsplash .

D. Preinstallation Conference Minutes.

E. Maintenance Data: countertops.

1.06 QUALITY ASSURANCE

A. Structural Performance: Furnish and install countertops with horizontal surfaces able to limit deflection of a uniformly distributed load of 100 psf and a point load at any location of 300 pounds to not more than 1/720 of a span or 1/4 inch at any location.

1.07 DELIVERY, STORAGE, AND HANDLING

A. Countertop Packaging : cardboard-wrapped, crated, or other resilient packaging to prevent damage and provide protection from impact and moisture during transit and storage.

1.08 SITE CONDITIONS

A. Ambient Conditions: Maintain relative humidity planned for building occupants and an ambient temperature between 65 and 80 degrees Fahrenheit in spaces to receive countertops for at least 3 days before installation, during installation, and for at least 3 days after installation. After installation and until Substantial Completion, maintain relative humidity and ambient temperature planned for building occupants but not less than 55 degrees Fahrenheit.

B. Site (Field) Measurements: Verify dimensions and layout of countertops required to be coordinated with other Work by site measurements before fabrication and indicate measurements on Shop Drawings .

PART 2 PRODUCTS

2.01 FIREPLACE HEARTH

A. Provide fireplace hearth as required for stone contertops except without seams, backsplashes and surface finish shall be non-glare honed.

2.02 STONE CONTERTOPS

A. Stone Countertops: Shop fabricated stone, with cutouts indicated, of thickness required for structural performance without substrate, subtop, or core .

B. Fixtures and Fitting: As required for washroom accessories, plumbing fixtures, and other Work indicated elsewhere and site installed.

C. Stone: Granite; ASTM C 615.
   1. Granite without cracks, voids, or pin holes .
   2. Description: color as selected by Allowance; medium-grained without veining.
   3. Surface Finish: Polished.

D. Thickness: 1-1/4 inches, minimum, unless otherwise indicated. Gage backs to provide units of identical thickness.

E. Exposed Front and End Edges: straight, slightly eased at top, unless otherwise indicated.

F. Backsplashes and Endsplashes: Provide wherever counter edge abuts vertical surface, unless otherwise indicated.
   1. Material: same as countertop, unless otherwise indicated.
   2. Thickness: 3/4 inch, minimum, unless otherwise indicated.
   3. Height: 4 inches, unless otherwise indicated.
   4. Top Edge: 3/8-inch bevel, unless otherwise indicated.
   5. Attachment, Typical: Secure to countertop with adhesive at shop or site. Unless otherwise indicated, provide 1/16 inch to 1/8 inch gap between splash and finished vertical substrate for filling with joint sealant.

G. Countertop Joints: 1/64 inch or less in width by bonding or, where required, splined joints. Accurately cut kerfs in edges at joints for insertion of metal splines to maintain alignment of surfaces at joints. Make width of cuts slightly more than thickness of splines to, unless otherwise indicated.

H. Fabrication: comply with applicable portions of NBGQA's "Specifications for Architectural Granite" .

2.03 SUBTOPS / Stone Countertops

A. Subtop: Plywood; PS 1 Exterior Type, AC veneer grade, minimum 5-ply; minimum 3/4 inch thick.

B. Provide composite wood and agrifiber products containing no added urea-formaldehyde resins.

2.04 FASTENERS

A. Screws, Bolts, Threaded Rod, Nuts, Washers, Lags, Pins, Clips and Screws: Of size and type to suit application.
   1. Material, Typical: galvanized, zinc-coated, or nickel finished steel .
   2. Material, Exposed or Wet Areas: mill finished stainless steel .

2.05 ADHESIVE / Stone Countertop Anchoring

A. Water-cleanable epoxy adhesive; ANSI A118.3

B. Manufacturers:
   1. Bonsal, W. R. Company.
   2. Bonstone Materials Corporation.
   3. C-Cure.
   4. Custom Building Products.
   5. Laticrete International, Inc.
   6. MAPEI Corp.
   7. Summitville Tiles, Inc.

C. VOC: Use installation adhesives that comply with the following limits for VOC content when calculated according to 40 CFR 59, Subpart D (EPA Method 24):
   1. Contact Adhesive: 80 g/L.
   2. Other Adhesives: 250 g/L

2.06 ADHESIVE / Stone Bonding

A. Stone Adhesive: 2-part epoxy or polyester adhesive, formulated specifically for bonding stone to stone, with an initial set time of not more than 2 hours at 70 deg F

B. Products:
   1. Akepox / Akemi North America
   2. Akabond Epoxy / Axson North America, Inc., Wood & Stone Company
   3. Touchstone Ratio Pac Clear Gel Epoxy/ Bonstone Materials Corporation
   4. Touchstone Last Patch / Bonstone Materials Corporation
   5. Platinum Clear Polyester Adhesive / Akemi North America
   6. Wood & Stone Polyester / Axson North America, Inc., Wood & Stone Company
   7. Gripstone L-200KG / Bonstone Materials Corporation

C. VOC: Use installation adhesives that comply with the following limits for VOC content when calculated according to 40 CFR 59, Subpart D (EPA Method 24):
   1. Other Adhesives: 250 g/L

2.07 FABRICATION

A. Stone:
   1. Select stone for intended use to prevent fabricated units from containing cracks, seams, and starts that could impair structural integrity or function.
      a. Repairs that are characteristic of the varieties specified are acceptable provided they do not impair structural integrity or function and are not aesthetically unpleasing, as judged by Architect.
   2. Clean sawed backs of stones to remove rust stains and iron particles.
   3. Dress joints straight and at right angle to face, unless otherwise indicated.

B. Cut and drill sinkages and holes for anchors, supports, and attachments.

C. Cutouts and Fitting: Provide cutouts, holes, openings, reveals, and similar features to fit and accommodate site-verified project conditions and fixtures and fitting to be installed in countertops.
   1. Through-counter Fixtures: Make cutouts for through-counter fixtures, with exposed counter edge, in shop using template or pattern furnished by fixture manufacturer. Form cutouts to smooth, even curves.
      a. Cutout Edges: Provide vertical edges, rounded to 3/8-inch radius at juncture of cutout edges with top surface of countertop, slightly eased at bottom, and projecting 3/16 inch into fixture opening.
   2. Undercounter Fixtures: Make cutouts for undercounter fixtures in shop using template or pattern furnished by fixture manufacturer. Form cutouts to smooth, even curves.
      a. Cutout Edges: Provide vertical edges, rounded to 3/8-inch radius at juncture of cutout edges with top surface of countertop, slightly eased at bottom, and projecting 3/16 inch into fixture opening.
   3. Counter-Mounted Fixtures: Prepare countertops in shop for field cutting openings for counter-mounted fixtures concealing counter edge. Mark tops for cutouts and drill holes at corners of cutout locations. Make corner holes of largest radius practical.

PART 3 EXECUTION

3.01 EXAMINATION

A. Ensure that countertop support devices not installed by the countertop installer are correctly placed .

3.02 PREPARATION

A. Clean dirty or stained countertop surfaces by removing soil, stains, and foreign materials before setting. Clean by thoroughly scrubbing with fiber brushes and then drenching with clear water. Use only mild cleaning compounds that contain no caustic or harsh materials or abrasives. Allow to dry before installing.

3.03 INSTALLATION

A. Cutting: Do not cut countertop in field, unless otherwise indicated. If countertops or splashes require additional fabrication not specified to be performed at Project site, return to fabrication shop for adjustment.

B. Setting Countertops: Securely attach countertops using concealed fasteners and adhesive.

C. Bonded Joints: Bond joints with adhesive and draw tight as countertops are set. Mask areas of countertops adjacent to joints to prevent adhesive smears.

3.04 TOLERANCES

A. True Position: 1/4 inch maximum variation

B. True Alignment: 1/8 inch maximum offset; 3/8 inch maximum cumulative.

C. Adjacent Surfaces:

D. Adjacent Edges:

E. Surfaces Adjacent to Joint: 1/64 inch maximum offset.

F. Edges Adjacent to Joint: 1/64 inch maximum offset.

G. Plumb: 1/16 inch in 48 inches maximum variation

H. Level: 1/8 inch in 96 inches maximum variation; 1/4 inch maximum variation.

I. Joint Width: 0.25 times width indicated maximum variation.

3.05 NON-CONFORMING WORK

A. Repair deterioration, defects or damage to finishes, to factory-finished appearance so no evidence remains of corrective work when viewed with the naked human eye from a distance of 24 inches under 50 foot-candle illumination.

1. Repair finishes with touch up coating.

B. For the following conditions, remove in-place and provide new countertop to eliminate evidence of replacement:
   1. Non-conforming Work which can not be corrected by repair alone.
   2. Completed Work that is loose, chipped, broken, stained, scratched, or otherwise damaged.
   3. Completed Work not matching approved mockups or samples.

3.06 CLEANING

A. Exposed Surfaces: Immediately remove adhesive and other foreign substances which are not indicated to be applied to surfaces.

B. Remove temporary protective coverings and strippable films.

C. Clean countertop surfaces with cleaner leaving surface dry without cleaner residue. Do not use wire brushes or other methods that could damage stone.

3.07 PROTECTION

A. Protect installed countertops from subsequent construction operations.

END OF SECTION

SECTION 14 2010 - PASSENGER ELEVATORS

PART 1 GENERAL

1.01 SECTION INCLUDES

A. ELEVATORS
B. POWER UNITS
C. HOISTWAY ENTRANCES
D. CAR ENCLOSURE
E. HALL STATIONS

1.02 RELATED REQUIREMENTS

A. Temporary barricades and other facilities and controls.
B. Elevator machine room foundation.
C. Enclosed hoistways and fire resistance rated construction of hoistway enclosures.
D. Elevator pits .
E. Installation of anchors for elevator equipment not installed by elevator installer.
F. Elevator pit ladder.
G. Smoke venting.
H. Provisions for hoistway and machine room access.
I. Security devices including locking elevator machine rooms.
J. Car finish flooring.
K. Pit sump pump.
L. Elevator hoistway pressurization.
M. Ventilation, humidity, and temperature control for elevator machine room and control space, if any.
N. Conduit to elevator equipment devices remote from elevator machine room or hoistway.
O. Emergency (standby) electrical power supply.
P. Electrical illumination in machine room, hoistway and pit.
Q. Convenience outlets in machine room, hoistway and pit.
R. Electrical service, disconnect and overload protection for elevator equipment.
S. Electrical disconnecting devices for elevator equipment prior to activation of sprinkler system.
T. Telephone service.

1.03 ADMINISTRATIVE REQUIREMENTS

A. Preinstallation Conference: include attendance by elevator installer, mechanical (including fire suppression and plumbing) installer, electrical (including telephone, fire alarm and emergency generators) installer, hoistway installers.
B. Coordination: Timely coordinate information on requirements for elevator related Work items listed below which are not installed by the elevator installer:
    1. Elevator equipment support devices. Include imposed maximum dynamic and static loads, alignment tolerances, setting templates, diagrams for placement of embedded items, fastening and anchoring requirements, locations and instructions.
    2. Elevator equipment enclosure construction. Include imposed loads, alignment tolerances, , rough openings, fire resistance ratings, construction sequencing, locations and instructions
    3. Access for service and installation personnel and access to elevator equipment and controls. Include information for access doors and panels.

4. Mechanical systems, rough in and service connections. Include information for ventilation rates and capacities, temperature and humidity requirements, heat dissipation of elevator equipment, pressurization rates, fire suppression flow and coverage, drainage rates.
5. Electrical systems, rough in and service connections. Include information for power characteristics, overload protection, interrupted power interface, illumination levels, maintenance power requirements, fire alarm interfaces, telephone and communication interfaces, raceway location and sizes, device box location and sizes.
6. Access control system. Include information on requirements of control interface.
7. Elevator system requirements of other Work including Work indicated in Related Requirements Article in this Part. Include all pertinent information relating to elevator system requirements.

C. Sequencing: Construct hoistway entrance walls and install finished flooring at hoistway entrances after elevator hoistway entrances are installed.

1.04 SUBMITTALS

A. Product Data:
1. Power Unit: Include electrical characteristics and connection information .
2. Hoistway Equipment: Include finishes .
3. Hoistway Entrances: Include regulatory requirements compliance .
4. Door Operation: Include operational characteristics and range diagrams .
5. Car Enclosure: Include dimensions of individual components and profiles and finishes .
6. Car Operating Station: Include dimensions of individual components and profiles and finishes .
7. Control Systems: Include operational characteristics and range diagrams .
8. Hall Stations: Include dimensions of individual components and profiles and finishes .

B. Shop Drawings: Work indicated in this Section: Include attachments to other work, location of each site connection, imposed loads, roughing-in diagrams with tolerances, setting diagrams with tolerances, required clearances with tolerances, custom wiring diagrams, compliance with indicated standards, applicable seismic design data, and information required by Administrative Requirements Article in this Part.

C. Selection Samples:
1. Work indicated in this Section requiring the selection of a finish: color, pattern, and texture.

D. Sample Warranties:
1. Elevator Manufacturer's Warranty.

E. Sample Maintenance Contracts: Elevator Service Agreement as indicated in Part 3.

F. Qualification Statements: Elevator installer including approval of or authorization by manufacturer.

G. Preinstallation Conference Minutes.

H. Installer's Site Report: as indicated in Part3.

I. Inspection Certificates: Elevator.

J. Executed Maintenance Contracts: Elevator Service Agreement as indicated in Part 3.

K. Operation and Maintenance Data: Elevator.

L. Executed Warranties:
1. Elevator Manufacturer's Warranty.

M. Record Documentation: Elevator. Include schematic of hydraulic piping and wiring diagrams of installed electrical equipment. List symbols corresponding to identity or markings on machine room and hoistway apparatus.

N. Demonstration and Training Schedule: for demonstration and training indicated in Part 3.

O. Demonstration and Training Record: for demonstration and training indicated in Part 3.

1.05 QUALITY ASSURANCE

A. Regulatory Requirements: Perform Work in accordance with the following .
   1. ASME A17.1 Safety Code for Elevators and Escalators shall govern except where codes having legal jurisdiction include more stringent requirements or conflict with the ANSI A17.1 Code.
      a. Seismic Risk Zones: Effective peak velocity acceleration (Av) for Project's location is as indicated on Drawings.
   2. Elevator design requirements for earthquake loads in ASCE 7.
      a. Earthquake Emergency Operation: Comply with requirements in ASME A17.1 .
      b. Design earthquake spectral response acceleration, short period (Sds) for Project is as indicated on Drawings.
      c. Project's seismic design category is as indicated on Drawings.
      d. Elevator importance factor is 1.0
   3. NFPA 70 National Electrical Code.
   4. Products Requiring Electrical Connection: Listed and classified by Underwriters Laboratories, Inc. as suitable for the purpose specified and indicated.
   5. Fire-Rated Hoistway Entrance Assemblies: Door and frame assemblies complying with NFPA 80 that are listed and labeled by a testing and inspecting agency acceptable to authorities having jurisdiction, for fire-protection ratings indicated, based on testing at as close to neutral pressure as possible according to NFPA 252 or UL 10B.
   6. Accessibility Guidelines for Buildings and Facilities (ADAAG), including:
      a. Mark controls including buttons and switches with standard identification for required use or function / ASME A17.1. Use both tactile symbols and Braille / ADAAG.
   7. Authorities having jurisdiction, including inspection and testing, to obtain operating permit for use of elevators.

B. Source Limitations: all elevators from a single source.

C. Elevator Installer Qualifications: Qualified; Experienced: 5 projects, 3 years. Installer shall be elevator manufacturer or manufacturer's authorized representative who is trained and approved by the manufacturer.

D. Perform welding of steel in accordance with AWS D1.1 for workmanship and for qualifications of welding operators.

1.06 SITE CONDITIONS

A. Temporary Use Prohibited: Do not use elevators for temporary service during construction before an operating permit has been issued by the authority having jurisdiction.
   1. Do not use elevators for temporary service during construction before Substantial Completion.

1.07 WARRANTY

A. Elevator Warranty: Provide elevator manufacturer's standard written warranty in which manufacturer agrees to repair or replace components that fails due to defects in materials or factory workmanship within specified warranty period.
   1. Warranty Period: as indicated in Part 2

PART 2 PRODUCTS

2.01 ELEVATORS - GENERAL

A. Elevators: Manufacturer's complete pre-engineered elevator systems.

B. Not Required: The following are not required for Elevators on this Project:
   1. Fire command center annunciator panel.
   2. Firefighters' two-way telephone communication service.
   3. Card reader operation.
   4. Keypad operation.

5. Security activation or deactivation of hall or car push buttons.
6. Car-to-lobby security inspection recall.
7. Elevator management systems.
8. Future car provisions.
9. Music speakers in cars.
10. Video surveillance in cars.
11. Landing passing signal.
12. Synthesized voice messages.
13. Intercom.

2.02 ELEVATOR

A. Elevator: Include the following requirements and components indicated in this Article:

B. GENERAL ELEVATOR REQUIREMENTS
1. Comparable Product: Schindler 3300 MRL Traction Elevator
   a. Manufacturers:
      1) ThyssenKrupp Elevator
      2) Otis Elevator Co.
      3) Fujitec America, Inc.
      4) KONE Inc.
2. Rated Capacity: 3500 pounds.
3. Freight Loading Class: Not rated for freight.
4. Rated Speed: 150 feet per minute.
5. Landing Levels: 2 total
6. Front Entrances: 1.
7. Rear Entrances: 1.
8. Hoistway Size: as indicated on Drawings.
   a. Pit Size: as indicated on Drawings.
   b. Overhead Size: as indicated on Drawings.
9. Elevator Warranty Period: 1 year
10. Elevator Maintenance Service Duration: 12 months.
    a. Call Back Service Hours and Response Time: During all hours (24-hour-per-day, 7-day-per-week); 4 hour arrival time.

C. POWER UNIT
1. Machine Room Location: As indicated on Drawings.
2. Power Characteristics: 208 Volts, 3 Phase.
3. Horse Power: 40 to be verified by elevator manufacturer.
4. Machine: Traction.
5. Drive: Gearless.
6. Motor: Wye-delta starting.

D. HOISTWAY EQUIPMENT
1. Hoisting Mechanism: In-hoistway (holeless) telescopic jack.
2. Car Frame: Steel
3. Guide Rails: Steel
4. Guides: Roller.
5. Buffers: Spring.
6. Terminal Limit Switches: Failsafe
7. Self-Leveling: Automatic, independent

E. HOISTWAY ENTRANCES
1. Hoistway Entrance Size: 4' - 0" wide x 7' - 0" high.
2. Construction: 18 gauge metal doors and 14 gauge metal frames.
3. Fire Rating for Hoistway Entrance Assemblies: Class B or 1-1/2 hour, unless otherwise indicated.

4. Entrance Configuration: Side opening
5. Finish at Floors : unlesss otherwise indicated:
    a. Doors: baked enameled steel; color as selected by Archiect from standard range.
    b. Frames: No. 4 brushed stainless steel.
    c. Floor Sills: extruded aluminum or extruded nickel silver thresholds.

F. DOOR OPERATION
1. Door Operation: Two speed automatic.
2. Door Protection Devices: 2 dimensional infra-red.

G. CAR ENCLOSURE
1. Cab Height: 8' - 0" nominal.
2. Walls: Flush plastic laminate; color and pattern as selected from standard range.
    a. Rear Wall: Same as typical walls.
    b. Base, Frieze and Reveals Between Raised Wall Panels: baked enameled steel; color as selected by Archiect from standard range.
3. Handrail: profile as selected from standard range, brushed aluminum or No. 4 brushed stainless steel.
4. Front Columns and Transom: No. 4 brushed stainless steel in manufacturer's standard configuration.
5. Cab Sills: extruded aluminum or extruded nickel silver thresholds.
6. Doors: baked enameled steel; color as selected by Archiect from standard range.
7. Canopy: 14 gauge steel
8. Ceiling: Metal frame supporting panels .
    a. Frame: Exposed baked enameled steel; color as selected by Archiect from standard range.
    b. Panels: Individual downlights in soild panel finished with plastic laminate; color and pattern as selected from standard range.
    c. Lighting: elevator manufacturer's starndard.
9. Finished Floor: carpet tile as required for carpet tile indicated elsewhere.
10. Ventilation Fan: Manufacturer's standard number of speeds speed with automatic operation setting.
11. Protection Pads: Removable. Provide 2 sets.
12. Inspection Station: Car top mounted.

H. CAR OPERATING STATION
1. Car Operating Station: Manufacturer's standard type.
    a. Access: Applied or hinged panel type at Contractor's option.
    b. Number: Provide one car control station in car.
2. Certificate Frame: Metal and finish to match car front.
3. Position Indicator: Illuminated
4. Emergency Light: White LED
5. Emergency Communications System: ADAAG compliant
6. Car Riding Lantern: Door jamb mounted.
7. Landing Passing Signal: Not required
8. Service Panel: Manufacturer's standard, if any.
9. Synthesized Voice Messages: Not required.
10. Intercom: Not required.

I. CONTROL SYSTEMS
1. Controller Operation System: Microprocessor based.
2. Operation: Simplex; single automatic / ASME A17.1.
3. Inspection Switch: Key operated.
4. Independent Service: Key operated.
5. Bypass Operation: Not required.
6. Dispatching of Loaded Car: Not required.

7. Call Cancel: Not required.
8. Group Parking: Not required
9. Emergency Operation: Lowering automatic operation.
10. Diagnostic Module: Not required.

J. HALL STATIONS
1. Floor Identification Pads: Mounted to both hoistway entrance jambs.
2. Fire Safety Signs: Mounted below each hall station unless otherwise indicated..
3. Hall Stations: Manufacturer's standard type.
4. Hall Station Metal and Finish: baked enameled steel; color as selected by Archiect from standard range or No. 4 brushed stainless steel.
5. Number of Stations: 1 station per floor .
6. Phase 1 Firefighter's Service Key Switch: At designated level
7. Hall Position Indicator: None required.
8. Hall Lanterns: None required.
9. Flashing Fire Sign: None required.
10. Hoistway Access Switch: None required.

2.03 HOISTWAY EQUIPMENT

A. Steel Belts or Ropes: Polyurethane coated, high-tensile-grade, zinc-plated steel.

B. Steel Car Frame: a frame consisting of platform, sling and overhead. Refer to Car Enclosure Article in this Part for additional car requirement.
1. Platform: Fabricated frame of formed or structural steel shapes, gusseted and rigidly welded with a metal laminated wood subfloor. Underside of the platform shall be fireproofed. Load weighing device shall be mounted under the platform.
2. Sling and Overhead: Steel stiles affixed to a steel crosshead and bolstered with adequate bracing members to remove strain from the car enclosure.

C. Steel Guide Rails: Steel; fastened to the building structure with steel brackets.

D. Sliding Guides: Slide guides mounted on top and bottom of the car. Provide a leakproof reservoir on top of upper guide shoes with wool felt wiper capable of applying an even, uniform flow of lubricant to thoroughly cover face of guide rail.

E. Roller Guides: Adjustable rubber roller guides at top and bottom of car and counterweight frames.

F. Spring Buffers: Helical coil spring type buffers in the elevator pit. Mount buffers on a steel template that is fastened to the pit floor or continuous channels fastened to the elevator guide rail or securely anchored to the pit floor. Provide extensions if required by project conditions.

G. Failsafe Terminal Limit Switches: Limit switches in the hoistway near the terminal landings. Limit switches shall be designed to cut off the electric current and stop the car if it runs beyond either terminal landing.

H. Automatic, Independent Self-Leveling: A self-leveling feature to automatically bring the car to the landings and correct for overtravel or undertravel. Self-leveling shall, within its zone, be automatic and independent of the operating device. The car shall be maintained approximately level with the landing irrespective of its load.

2.04 HOISTWAY ENTRANCES

A. 18 Gauge Doors and 14 Gauge Frames: Hollow metal type hoistway entrances at each hoistway opening UL rated to meet required fire resistance rating:
1. Manufacturer's standard entrance design consisting of 14 gauge frames with 2 inch (50 mm) profile, 18 gauge doors, hangers, hanger supports, hanger covers, fascia plates, sight guards, and necessary hardware.
a. Sight Guards: matching door edges.
2. Elevator wall interface with hoistway entrance assembly shall comply with elevator manufacturer's requirements.

3. Doors: Flush construction.
4. Frames: Formed and bolted or fully welded construction.

B. Extruded Hoistway Sills: grooved in top surface. Where sills must be anchored with fasteners, provide holes in sill for fasteners and provide fasteners appropriate to substrate to match metal and finish of sills, except use stainless steel fasteners for aluminum sills and brass fasteners for bronze sills.

C. Cab Released Interlocks: Equip each hoistway entrance with an approved type interlock tested as required by code. Interlocks shall be designed to prevent movement of the car away from the landing until the doors are locked in the closed position as defined by code and shall prevent opening the doors at any landing from the corridor side unless the car is at rest at that landing or is in the leveling zone and stopping at that landing.

D. Two Point Suspension Door Hanger and Tracks: Sheave type two point suspension hangers and tracks for each hoistway horizontal sliding door.
1. Sheaves: Polyurethane tires with ball bearings properly sealed to retain grease.
2. Hangers: Provide an adjustable device beneath the track to limit the up-thrust of the doors during operation.
3. Tracks: Drawn steel shapes, smooth surface and shaped to conform to the hanger sheaves.

2.05 DOOR OPERATION

A. Automatic Door Operation: Provide a direct current motor driven heavy duty operator designed to operate the car and hoistway doors simultaneously. Door movements shall be electrically cushioned at both limits of travel and the door operating mechanism shall be arranged for manual operation in event of power failure. Doors shall automatically open when the car arrives at the landing and automatically close after an adjustable time interval or when the car is dispatched to another landing. Closed-loop, microprocessor controlled motor-driven linear door operator, with adjustable torque limits, also acceptable. The microprocessor will monitor the door's actual position and velocity compared to its desired position and velocity. If variations are detected in the profile the command will be automatically corrected. AC controlled units with oil checks or other deviations are not acceptable.
1. No Un-Necessary Door Operation: Car door shall open only if the car is stopping for a car or hall call, answering a car or hall call at the present position or selected as the next car up.
2. Door Open Time Saver: If a car is stopping in response to a car call assignment only (no coincident hall call), the current door hold open time is changed to a shorter site programmable time when the electronic door protection device is activated.
3. Reassignment Operation: When a car stops at a landing with concurrent up and down hall calls, no car calls, and no other hall call assignments, the car door opens to answer the hall call in the direction of the car's current travel. If an onward car call is not registered before the door closes to within 6 inches of fully closed, the travel will reverse and the door will reopen to answer the other call.
4. Nudging Operation: The doors shall remain open as long as the electronic detector senses the presence of a passenger or object in the door opening. If door movement is obstructed for a site programmable time, a buzzer will sound. If the door protection system detects a person or object while closing, the doors will stop and resume closing after the obstruction has been removed.
5. Limited Door Reversal: If the doors are closing and the door protection system detects an obstruction, the doors will reverse and reopen partially. After the obstruction is cleared, the doors will begin to close.
6. Door Open Sentinel: If the doors are opening, but do not fully open after a site adjustable time, the doors will recycle closed then open six times to try and correct the fault.
7. Door Close Sentinel: If the doors are closing, but do not fully close after a site adjustable time, the doors will recycle open then close six times to try and correct the fault.

8. Door Close Assist: When the doors have failed to fully close and are in the recycle mode, the door drive motor shall have increased torque applied to possibly overcome mechanical resistance or differential air pressure and allow the door to close.

B. 2 Dimensional Infra-red Door Protection Devices: A door protection system using microprocessor controlled multi-beam array of infra-red light. The beams shall project across the car opening detecting the presence of a passenger or object. If door movement is obstructed, the doors shall immediately reopen. A mechanical reopening device is not acceptable.
   1. Under normal operation and for any door position, the system shall detect as a blockage an opaque object that is equal to or greater than 1.3 inches in diameter when inserted between the car doors at vertical positions from within 1 inch above the sill to 71 inches above the sill. Under degraded conditions (one or more blocked or failed beams), the primary protection shall detect opaque objects that are equal to or greater than 4" in diameter for the same vertical coverage. If the system performance is degraded to the point that the 4" object cannot be detected, the system shall maintain the doors open or permit closing only under nudging force conditions.

2.06 CAR ENCLOSURE

A. Walls:
   1. For flush walls, provide material indicated either internally reinforced or laminated to moisture protected core.
   2. For raised panel walls, provide material indicated laminated to moisture protected core. Mount panels to 16 gauge cold rolled steel sheet factory finished with opaque finish for concealed surfaces and either internally reinforced or laminated to moisture protected core.

B. Handrail: Metal bar of profile and finished metal indicated on side and rear walls on front opening cars and side walls on front and rear opening cars.

C. Front Columns and Transom: Panels of finished metal and configuration indicated. For rear opening cabs, provide rear columns and transoms to match front.

D. Doors: Horizontal sliding car doors of finished metal indicated and reinforced with steel for panel rigidity. Hang doors on sheave type hangers with polyurethane tires that roll on a polished steel track and are guided at the bottom by non-metallic sliding guides.

E. 14 Gauge Steel Canopy: Reinforced 14 gauge cold-rolled steel with hinged exit finished with two coats factory applied reflective baked enamel.

F. Ventilation Fan: Fan with speed settings indicated mounted in cab transom or canopy with rubber anchors to prevent the transmission of structural vibration and include a baffle to diffuse audible noise.
   1. Where automatic operation setting is indicated, provide "ON-AUTO-OFF" key operated switch. In the AUTO setting the fan shall start upon the upon the pressing of a car or landing call button and shall stop at an adjustable predetermined time after the car has answered the last registered call.

G. Removable Protection Pads: Not less than one set of quilted, soil resistant, fire-retardant vinyl protection pads with metal grommets to fit elevator. Provide pad buttons to temporarily hold pads in place of same metal and finish as car front. Provide individual pads for front, rear and both sides of car. Clearly and permanently factory label pads as to orientation, location, and car.

H. Car Top Inspection Station: Provide inspection station mounted at location indicated with an "Auto-Inspection" switch, an "emergency stop" switch, and constant pressure "up and down" direction and safety buttons to make the normal operating devices inoperative. The station will give the inspector complete control of the elevator. Car top located inspection stations shall be mounted in the door operator assembly. A 125V 15 amperes factory installed utility outlet with ground-fault circuit-interrupter protection shall be provided within 3 feet of inspection station.

2.07 CAR OPERATING STATION

A. Car Operating Station: Provide type of station indicated housing the devices required for operation. Provided ADAAG compliant raised numerals and Braille markings for button, lever switched, and key switched controls. Provide elevator data plate marked with elevator capacity and car number. No applied symbols or floor indications or symbols on the buttons shall be permitted.
   1. Provide "No Smoking" sign matching car operating station, either integral with car operating station or mounted adjacent to it.
   2. Where manufacturer's type vandal resistance car operating station is indicated, substitute buttons without halo and with manufacturer's standard option to resist damage.
   3. Panel Finish: match front columns and transom
   4. Button Material: Match panel.
   5. Button Illumination Color: Green.
   6. Button Projection: Raised
   7. Hinged Panels Access, Where hinged panel access is indicated, car operating station shall be opened by integral hinged swing return panel requiring no applied faceplate. Swing return shall be of metal and finish to match cab front.
   8. Applied Panel Access: Where applied panel access is indicated, car operating station shall be opened by integral flat panel applied to cab front.
   9. Provide the following at locations indicated on station:
      a. Top: fire service features, including operating instructions, and:
         1) Light keyed switch.
         2) Fan keyed switch.
         3) Inspection keyed switch.
         4) Firefighter's hat.
         5) Firefighter's Phase II keyed switch.
      b. Intermediate:
         1) Floor served buttons.
         2) Other controls indicated in this Article and controls indicated in Control Systems Article to be located on car operating station.
      c. Bottom:
         1) Emergency alarm button connected to an audible alarm mounted on the top of the car that serves as an emergency signal. Alarm shall have a rated sound pressure level of 80 dba at a distance of 10 feet from the device. Alarm shall respond with a delay of not more than 1 second after the switch or push button has been pressed.
         2) Door open and door close buttons.
         3) Emergency stop keyed switch connected to a bell that serves as an emergency signal.

B. Certificate Frame: where indicated, provide a certificate frame of metal and finish to match cab front located on car operating station.

C. Illuminated Position Indicator: Located above floor push buttons. As the car travels, its position in the hoistway shall be indicated by the illumination of the alpha/numeric character corresponding to the landing which the elevator is stopped at or passing.

D. White LED Emergency Light: Emergency light, capacity plate, and elevator number shall be integrated into the top module.The emergency light shall consist of white LED's and be capable of putting out a minimum of four (4) foot candles, one foot out and four foot in front of the car swing panel. The emergency light will illuminate automatically upon loss of the building's normal power supply.

E. ADAAG Compliant Emergency Communications System: An emergency communications device mounted integrally within the car operating station. Emergency communications device shall comply with Americans with Disabilities Act (ADAAG) requirements. The device shall

initiate two-way communication between the car and a location inside the building, switching over to another location if the call is unanswered, where personnel are available who can take the appropriate action. Provide visual indicators for call initiation and call acknowledgement.

F. Door Jamb Mounted Car Riding Lantern: Installed in the elevator cab and located in the entrance on both door jamb. The lanterns, when illuminated, will indicate the intended direction of travel. The lanterns will illuminate and a signal will sound when the car arrives at a floor where it will stop. The lanterns shall remain illuminated until the door(s) begin to close.

G. Service Panel: of type indicated mounted in car operating station.

2.08 CONTROL SYSTEMS

A. Microprocessor Based Controller Operation System: For microprocessor based controller operation system provide microprocessors and software linked together by a serial communications link free from secret codes and decaying circuits that must be periodically reprogrammed by the manufacturer. Control of the elevator shall be automatic in operation by means of push buttons in the car numbered to correspond to floors served, for registering car stops, and by "up-down" push buttons at each intermediate landing and "call" push buttons at terminal landings.
   1. Provide microprocessor based control system with one of the following:
      a. On-board diagnostics for servicing, trouble-shooting, and adjusting without requiring the use of an outside service tool.
      b. A handheld service tool or laptop computer, owner's license, and tool instructions in addition to the control system.
   2. Control Wiring:
      a. Provide 10% but not less than 2 spare conductors in each travel cable.
      b. Communication cables shall be of the shielded type.
   3. Locate the main microprocessor and car controller in the elevator machine room, control space or hoistway.
   4. Microprocessor for door operator shall be located in the door operator and control all functions of the elevator door(s). Communication to the car controller shall be serial.
   5. Electronic selector shall reside on the car top and contain hall effect transducers that detect magnetic fields. Magnets, corresponding to floor positions and top/bottom of hoistway are mounted on a perforated metal tape that runs the length of the hoistway.

B. Operation: Provide operation of type indicated:
   1. Simplex Operation: Using a microprocessor-based controller, operation shall be automatic by means of the car and hall buttons. If all calls in the system have been answered, the car shall park at the last landing served.

C. Key Operated Independent Service: Key operated switch located on the car operating station in the elevator for the purpose of removing the car from normal operation. When the switch is in the "independent service" position, the elevator will bypass all landing calls and answer only car calls. The operator will have complete control over the operation of the car. Key cannot be removed from keyswitch when car is in independent service. When in independent service, doors close only in response to door close button.

D. Loaded Car Bypass Operation: When car load exceeds 80 percent of rated capacity, car will respond only to car calls, not to hall calls.

E. Automatic Dispatching of Loaded Car: When car load exceeds 80 percent of rated capacity, doors will begin closing.

F. Nuisance Call Cancel: When car calls exceed a preset number while car load is less than a predetermined weight, all car calls are canceled. Preset number of calls and predetermined weight can be adjusted.

G. Emergency (Standby) Operation: In the event normal electrical power is lost or is unable to operate the elevator, provide type of emergency operation indicated for standby operation.

1. Lowering Automatic (Non-powered) Emergency Operation: In the event normal electrical power is lost or is unable to properly operate the elevator, elevator shall operate as follows without the need for external power. If car is at a floor it remains at that floor, opens its doors, parks with doors open and shall be removed from service. If car is between floors, it is lowered to a preselected floor, opens its doors, parks with doors open and shall be removed from service. If car is below the preselected floor, it is lowered to the next lower floor, opens its doors, parks with doors open and shall be removed from service. After an elevator which is not in service has been parked with doors open for an adjustable period of time, doors shall close and operate only by activation of the door open button in the cab (in which case it shall remain out of service), manual service activation, if required, or fire service activation, if required. When normal power is restored, the elevator shall automatically resume operation.
    a. If the manufacturer's standard elevator system is not able to preform this operation, elevator manufacturer shall provide a backup power system as part of and fully integrated into the the elevator system which does not rely on outside power to provide emergency operation. If such system uses batteries, batteries shall be rechargeable and provided with automatic recharging system connected to normal building power.

H. Remote Monitoring Diagnostic Module: A built-in remote diagnostic module in the elevator control system to relay the constant status of the elevator and control system to a 24 hours 7 days a week central monitoring facility. The remote monitoring device shall be capable of transmitting information on the current status of the elevator, including malfunction, system error or shutdown. Use remote monitoring to augment maintenance service for the duration of maintenance service period.

I. Keycard Operated Access Control: System uses card readers as required for access control indicated elsewhere at car control stations to authorize calls. Security access control system determines which landings and at what times calls require authorization by card reader.

2.09 HALL STATIONS

A. Floor Identification Pads: Locate ADAAG compliant floor identification pads where indicated at each floor.

B. Fire Safety Signs: Signs matching hall push-button stations, with text and pictorial symbol graphics indicating that in case of fire, elevators are out of service and exits should be used instead. Provide additional text as required by authorities having jurisdiction.
    1. Material and Finish: Same as hall station panel, unless otherwise indicated.
    2. Provide signs complying with 4.30 "Signage" / ADAAG, including raised and Brailled characters, regardless of the scope of ADAAG or ASME A17.1 to require such.

C. Hall Stations: Provide hall station of type, number, metal and finish indicated with illuminating halos around push buttons to indicate that a call has been registered at that floor for the indicated direction.
    1. Button Material: Match panel.
    2. Button Illumination Color: Green.
    3. Button Projection: Raised.
    4. Each terminal hall station shall contain one push button.
    5. Each intermediate hall station shall consist of two pushbuttons, one for the up direction and one for the down position.
    6. Where switches are required for emergency (standby) operation, provide switches at main lobby if not indicated otherwise and as required by ASME A17.1. Locate switches and signal in hall station unless otherwise indicated. Adjacent to switches, provide illuminated signal that indicates when normal power supply has failed.

D. Phase 1 Firefighter's Service Key Switch: where indicated, incorporate phase 1 Firefighter's service key switch with instructions into the hall station.

2.10 MATERIALS

A. Finish Materials: Provide the following materials for exposed parts and surfaces of elevator car enclosures, car doors, car operating stations, hoistway entrance doors and frames, and hall stations as indicated.
   1. Colors, Patterns, and Finishes: Unless otherwise indicated, as selected from standard range of colors, patterns, and finishes.
   2. Cold-Rolled Steel Sheet: CS (commercial steel), Type B, Exposed and Matte finish / ASTM A 1008
   3. Stainless Steel: One of the following as appropriate to application:
      a. Sheet: Type 304 / ASTM A 240.
      b. Bars: Type 304 / ASTM A 276,.
      c. Tubing: Grade MT 304 / ASTM A 554,.
   4. Aluminum: One of the following as appropriate to application:
      a. Aluminum Sheet: Alloy 3003 or 5005, Temper recommended by aluminum producer and product manufacturer for type of use and finish indicated / ASTM B 209.
      b. Aluminum Extrusions: Alloy 6063 / ASTM B 221,.
   5. Nickel Silver Extrusions: Alloy UNS No. C74500 or No. C77600 / ASTM B 151,.

PART 3 EXECUTION

3.01 EXAMINATION

A. Ensure that elevator support devices not installed by the elevator installer are correctly placed with alignment benchmarks and concealed supporting devices clearly marked for benefit of installer.

B. For each elevator, verify hoistway (including access), hoistway openings, pits (including access), machine rooms (including access), control space, supporting structures,mechanical services, electrical services, and other conditions under which elevator Work is to be preformed as satisfactory and conforming to requirements as constructed.

C. D.Installer's Site (Field) Report: by installer of elevator before installation including report of dimensional verification and site conditions.

3.02 INSTALLATION

A. Install elevator system components. Connect equipment to building utilities and services.

B. Install cable in hoistway for communication and acess control systems. Coordinate installation of car mounted devices not installed by elevator installer.

C. Locate hall signal equipment for elevators as follows, unless otherwise indicated:
   1. For single elevators, locate hall stations adjacent to elevators at location most convenient for approaching passengers.
   2. For groups of elevators, locate hall stations between two elevators at center of group or at location most convenient for approaching passengers.

D. Sound Isolation: Mount rotating and vibrating equipment on vibration-isolating mounts designed to effectively prevent transmission of vibrations to structure and thereby eliminate sources of structure-borne noise from elevator system.

E. Accommodate equipment in space indicated.

F. Connections: Provide welded connections for installing elevator work where bolted connections are not required for subsequent removal or for normal operation, adjustment, inspection, maintenance, and replacement of worn parts. Otherwise provide bolted connections using threaded bolts with metal shims and lock washers under nuts and compensate for adjustments and expansion and contraction movement.

G. Install hoistway door sills, frames, and headers and construct hoistway walls to anchor entrances and maintain required fire resistive rating of shaft by grouting in place or by providing

other suitable means to ensure anchoring and enclosure, unless otherwise indicated. Set entrances in vertical alignment with car openings and aligned with plumb hoistway lines.

H. Delay final adjustment of sills and doors until car is operable in shaft.

3.03 TOLERANCES

A. Guide Rail Alignment: Plumb and parallel to each other in accordance with ASME A17.1.

B. Cab Movement on Aligned Guide Rails: Smooth movement, with no objectionable lateral or oscillating movement or vibration.

3.04 FIELD QUALITY CONTROL

A. Inspection Testing for Operating Permit: On completion of elevator installation and before permitting use (either temporary or permanent) of elevators, perform acceptance tests as required and recommended by ASME A17.1 and by authorities having jurisdiction .

B. Site Testing: Elevator installer shall load each elevator to rated capacity and operate continuously for 30 minutes over full travel distance, stopping at each level and proceeding immediately to the next. Measure and record temperature rise of elevator machine during 30-minute test period. Record failure to perform as required and submit installer's site report.

C. Advise and schedule dates and times tests are to be performed on elevators with Owner, Architect, and authorities having jurisdiction.

D. Installer's Site (Field) Report: by elevator installer after installation including report of site testing and inspection testing.

3.05 ADJUSTING

A. Adjust and lubricate equipment for smooth and quiet operation.

B. Adjust for smooth acceleration and deceleration of car so not to cause passenger discomfort.

C. Adjust automatic floor leveling feature at each floor to achieve 1/8 inch from flush.

3.06 CLEANING

A. Remove temporary protective coverings and strippable films.

B. Machine Room Surfaces, Hoistway Surfaces, and Control Space or Control Room Surfaces, if any: Clean surfaces, remove excessive lubricants, remove rust, and remove welding oxidation and slag. Unless otherwise indicated, for each surface below, prepare and apply the coats indicated as required for site finishing indicated elsewhere:
   1. Friction Bearing Surfaces of Operating or Moving Components: do not site finish.
   2. Unpainted Metal Surfaces: one coat of primer and two opaque finish coats.
   3. Thick Galvanized Metal Surfaces: touch up damaged galvanizing with zinc rich primer.
      a. Thick Galvanized Coating: a galvanized coating thicker than G185 (1.5 mil or 0.6 ounce per square foot) / ASTM A 653 for steel sheet or Class B1 (3.0 mil or 1.8 ounce per square foot) / ASTM A 153 for steel hardware or Coating Grade 75 (3.0 mil or 1.8 ounce per square foot) / ASTM A 123 for steel materials other than sheet or hardware.
   4. Non-thick Galvanized Metal Surfaces: touch up bare metal with zinc rich primer and apply one opaque finish coat.
   5. Factory Primed Metal Surfaces: touch up bare metal with primer and apply one opaque finish coat.
   6. Damaged Factory Topcoated Metal Surfaces: touch up bare metal with primer and apply one opaque finish coat similar to factory finish in appearance as required for site finishing indicated elsewhere.
   7. Wood Surfaces: one coat primer sealer and one finish coat.

C. Non-machine Room and Non-Hoistway Exposed Finishes: Clean surfaces with cleaners not harmful to finishes to remove foreign material.
   1. Clean stainless steel with non-abrasive soap and water, rinse and dry. Do not use bleached-based cleanser.

2. Repair defects or damage to finishes, to factory-finished appearance so no evidence remains of corrective work.

3.07 PROTECTION

A. Secure, lock, and do not permit construction traffic within car or construction use of elevator after final cleaning.

B. Secure, lock, and do not permit construction traffic within car or use of elevator as required by Site Conditions Article in Part 1.

3.08 MAINTENANCE

A. Maintenance Service: Furnish elevator maintenance service for duration indicated in Part 2 from date of Substantial Completion and as follows:
   1. Service Personnel: Skilled, trained employees of, and under direct supervision of, the elevator installer or manufacturer available to ensure the fulfillment of this maintenance service, without unreasonable loss of time.
   2. Replacement Parts: Provide parts and supplies same as those used in the manufacture and installation of original equipment.
      a. Maintain an adequate stock of parts for replacement or emergency purposes within 100 miles of the Project site.
   3. Regular Maintenance: Provide monthly or more frequent maintenance as necessary to prevent elevator from becoming defective as defined in this Section, including examination of system components, repair or replacement of worn or defective components, lubrication, cleaning, and adjusting as required for proper elevator operation at rated speed and capacity. Replace wire ropes to maintain the required factor of safety. Maintain hydraulic fluid levels.
      a. Regular Maintenance Hours: Perform regular maintenance during service personnel's regular working hours. Perform work without removing cars during peak traffic periods.
   4. Call Back Service: In the event the elevator fails to operate properly, upon notification by the Owner, and if repairs can not be permissibly preformed by the Owner's personnel within 30 minutes, dispatch service personnel to the site until repairs are completed. Provide such service during the hours and within the arrival time indicated in Part 2.
   5. Repairs due to accidents, vandalism, misuse or negligence by parties other than the manufacturer or installer are not included in this maintenance service.
   6. Do not assign or transfer maintenance service to any agent or subcontractor without prior written consent of Owner.

END OF SECTION

SECTION 220110 - PLUMBING GENERAL REQUIREMENTS

PART 1 - GENERAL

1.01 REFERENCES & INTENT

A. All work of this Division shall comply with the requirements of Division 1.

B. Study all drawings and specifications before submitting bids.

C. Work under this Division includes all essential labor, materials, tools, equipment, transportation, insurance, temporary protection, supervision and incidental items for proper installation and operation of all systems even though not specifically mentioned or indicated.

D. Field verify all building dimensions. The drawings are not to be scaled for final dimensions. However, the equipment is to be installed substantially as shown.

E. It is the intent of these specifications and drawings to provide for finished systems of the quality specified, properly tested, balanced and ready for operation. This includes all devices and accessories required to make the work complete even though such items may not be expressly shown or specified. Drawings and specifications are complementary and must be so construed to determine the full scope of work.

F. Job site Conditions: The Contractor shall visit the site and familiarize himself with the existing conditions before submitting this bid. Failure to do so does not relieve the Contractor from completing the work as specified herein and after. Requests for additional payments due to the Contractor's failure to allow for work conditions will be rejected.

1.02 WORK INCLUDED

A. The following work is specifically included without limiting the generality implied by these specifications and drawings.
   1. All plumbing scope of work as specified herein and as shown on the plans.
   2. Work includes all piping, supports, anchors, insulation, labeling and identification.
   3. All associated cutting and patching.

B. Bidders shall examine equipment plans and specifications and include in their bids all labor and material required for complete installation and connection of equipment which is properly a part of their trade even if it is not provided in the equipment specifications.

1.03 RELATED WORK SPECIFIED ELSEWHERE

A. Drawings, Standard General Conditions of the Construction Contract, including Supplementary General Conditions, Division-1 Specification sections and other Division 22 specification sections, apply to work of this section. Related work is specified in other divisions as follows:
   1. Division 31 - Excavating
   2. Division 31 - Filling, Backfilling, and Finish Grading
   3. Division 3 - Cast-In-Place Concrete

4. Division 5 - Metal Fabrications: Access doors
5. Division 9 - Painting

1.04 STANDARDS AND CODES

A. All equipment with electrical components shall bear the UL label.

B. The following minimum standards apply wherever applicable:

AGA	American Gas Association, Inc.
ANSI	American National Standards Institute, Inc.
ANSI B 31.9	Building Services Piping Code
ASME/ASME Code Sec.9	American Society of Mechanical Engineers Boiler and Pressure Vessel Code -Welding and Brazing Qualifications
ASTM	American Society for Testing Materials
AWWA	American Water Works Association
AWWA C651	Disinfecting Water Mains
NBFU	National Board of Fire Underwriters
NEC	National Electric Code
NEMA	National Electrical Manufacturers Association
NFPA	National Fire Protection Association
OSHA	Occupational Safety and Health Act
MSS	Manufacturer's Standardization Society of the Valves and Fittings Industry
UL	Underwriters laboratories, listed Product Directories North Carolina Plumbing Code, 2002 – International Plumbing Code 2000

C. In the event there are conflicts between specifications and standards or codes, standards or codes shall govern unless specifications are in excess of standards.

1.05 QUALITY ASSURANCE

A. All work shall be accomplished in a neat, workmanlike manner by experienced journeymen.

B. All work shall be performed at such times as are required by the progress of the job.

C. Plumbing equipment and fixture installation shall be by a licensed plumber specializing in performing the work of this section with minimum 3 years experience.

D. Materials and installation shall be in accordance with North Carolina State Building Code 2012 Edition (Year 2009 of the International Plumbing Code as modified and approved by the NC Building Code Council).

1.06 PERMITS AND FEE

A. Make application for all necessary permits and pay applicable fees.

1.07 STRUCTURAL STEEL AND CONCRETE

A. Structural members may not be pierced without prior written approval of the Engineer.

1.08 WATERPROOFING

A. Waterproofed floors and walls may not be penetrated without prior written approval of the Engineer.

1.09 WORK SCHEDULE

A. Work schedule shall be in accordance with Division 1.

1.10 PROTECTION OF EQUIPMENT

A. Provide all necessary protection and be fully responsible for material and equipment stored or installed on the site.

B. Material or equipment stolen or damaged shall be replaced at no additional cost to the Owner.

C. Provide protection against theft, physical damage and the entry of dirt, water, corrosive fumes into the material and equipment.

D. Maintain protective covers for the duration of construction. Store equipment, such as controls subject to damage by moisture and temperature extremes in a dry, heated space.

1.11 FIRE SAFETY

A. Fire Watch: Provide a fire watch wherever welding, brazing, cutting or other processes involving an open flame or potential for generating sparks is used. Fire watch shall consist of a person with a 10 pound carbon dioxide fire extinguisher. While on fire watch, the person so assigned shall have no other duties or assignments.

B. Fire Blanket: In addition to providing a fire watch, use an approved fire blanket to cover any combustible materials in the immediate area.

1.12 GUARANTEES

A. Furnish written guarantee, 1 year labor and materials, on all work in accordance with requirements of General Conditions. Partial approval of a portion of work does not affect the validity of guarantee.

1.13 SUBMITTALS

A. It shall be noted that submittals processed by the Engineer are not change orders; that the purpose of submittals is to demonstrate to the Engineer that the Contractor understands the design concept, that he demonstrates his understanding by indicating which equipment and material he intends to furnish and install, and by detailing the fabrication and installation methods he intends to use. If deviations, discrepancies or conflicts between submittals and the contract documents in the form of design drawing and specifications are discovered either prior to or after submittals are processed by the Engineer, the design drawings and specifications shall control and shall be followed. The engineer may also require the contractor to submit samples of proposed or specified equipment for approval, with the samples to be returned to the contractor upon request.

B. Prior to procurement or manufacturing, submit for approval, appropriate shop

drawings, manufacturer's catalog data, and/or descriptive literature giving performance data, physical size, wiring diagrams, configuration, capacity, installation instructions, dimensions (including rough-in dimensions), pipe connection sizes, trim, and finishes material, etc., for all items under this Division.

C. Field verify the characteristics of all specified equipment before preparing shop drawings. This shall include available space, available voltages, suitability of substrate for receiving the specified equipment, etc.

D. Where different products have to work together, it is the contractor's responsibility to select manufacturers whose products are visually or technically compatible.

E. Prepare listing of plumbing fixture, specialty items, and piping materials for the project. A sample schedule is included at the end of this section to complete this requirement. Provide all information represented. Plumbing materials shall not be delivered to the building until the Architect has inspected and approved the completed listing.

1.14 RECORD DOCUMENTS

A. During construction, keep an accurate record of all changes and deviations from contract documents. Upon completion of this installation, the contractor shall submit to the Engineer maintenance manuals, and marked up prints, indicating any installed work that is different from what is shown on the drawings.

PART 2 – PRODUCTS

2.01 QUALITY OF MATERIAL

A. Plumbing equipment manufacturer shall be a company specializing in manufacturing the products specified in this section with minimum three years experience.

Equipment of the same general type shall be of the same make. Brand names and catalog numbers included with equipment or material specifications are used to indicate quality, rating or operating characteristics of the equipment or material.

B. All materials provided shall be new and shall be approved by the Underwriter's Laboratories, Inc. wherever that agency has applicable standards.

PART 3 - EXECUTION

3.01 CLEARANCE AND RESTORATION OF SITE

A. It may be required to temporarily remove existing ceiling tiles, piping, duct, conduits, etc. to introduce new work as specified in this Division. Contractor, after installation of new work, shall reinstall, reconnect removed items to match the existing. Installation of any new equipment shall not compromise existing fire ratings of rated assemblies. All penetrations shall be sealed to existing conditions per ALL guidelines for penetration protections. Provide offsets if required in existing piping, ducts etc. to introduce new work.

3.02 COORDINATION

A. Install all work to permit removal or maintenance of equipment and fixtures without damage to the equipment, fixtures, or the building.

B. Verify equipment space requirements, condition of substrate, voltages, etc., at the time of shop drawing submission and advise the engineer of any conflict.

C. Do not rough prior to receipt of approved shop drawings.

3.03 EQUIPMENT ARRANGEMENT AND SUPPORT

A. Support plumb, rigid and true to line all work, including equipment, fixtures, and piping furnished under this Division. Study thoroughly architectural, mechanical drawings and all related drawings to determine how equipment, fixtures and piping are to be supported, mounted or suspended.

B. Provide extra steel bolts, inserts, pipe stands, brackets and accessories for proper support as required whether or not shown on drawings. When directed, furnish for approval a drawing showing supports.

3.04 FINAL ADJUSTMENT AND TESTING

A. General: Provide all testing, preliminary and final adjustment of instrumentation for this purpose. Conduct all tests in full compliance with applicable codes prior to covering or concealing work by insulation, enclosures, etc.

B. Material found to be defective shall not be repaired. It shall be replaced with new material which tests satisfactorily. Defective workmanship only may be corrected after discovery of defect by tests.

C. Working Tests: Subject all equipment and controls to simultaneous and continuous working tests for a period of one day prior to final inspection. Make adjustments, repairs and equipment replacements as required.

3.05 LABELS, IDENTIFICATION AND TAGS

A. Label plumbing equipment and specialty items in conformance with Division 23 Section “Mechanical Painting and Identification”.

3.06 IDENTIFICATION OF ABOVE CEILING EQUIPMENT

A. Equipment, controls, valves, dampers and other devices needing service adjustments or maintenance, but located in concealed spaces and above the ceiling, shall be marked on surfaces visible from floor.

B. A small phenolic tag, plastic or clear tape label, or simple color dot sticker placed on ceiling grid at approximate location of the device shall be utilized. Assembly such as air terminal box with valves and controls can be identified by a single marker.

C. The selected marking scheme shall be coordinated with the Owner before implementation. The marking scheme shall be accompanied by a schedule or legend which shall be included in O&M manual, and posted in mechanical room. Abbreviations and color coding shall be per the University standard ANSI/ASME A13.1 as applicable.

3.07 OWNER'S RIGHT TO TEST SYSTEMS

A. Should, in the opinion of the Engineer, and during the guarantee period, reasonable doubt exist as to the proper functioning of any equipment installed under this Contract, the right is reserved for the Owner and Engineer to perform any test deemed practical to determine whether such equipment is functioning properly and performing at required capacity. If such tests show proper functioning, the cost of the test will be paid by the Owner. If the tests indicate a deficiency in equipment capacity or performance, the Contractor shall pay the cost of the test, and also make good any deficiencies shown by the test to the full satisfaction of the Owner and the Engineer.

3.08 CLEANING UP

A. The contractors performing work under this section shall at all times keep the premises and the building in a neat and orderly condition and any instructions of the Engineer in regard to the storing of material, protective measures, cleaning up of debris, etc. shall be explicitly followed. At the completion of the job, all equipment shall be cleaned to the satisfaction of the Owner.

B. Buildings will be occupied during installation of the new addition and/or alterations as described hereinafter. Thus, special care shall be taken during installation to protect equipment and other furniture in the buildings, from dust and debris generated during installation of work specified in this Division.

3.09 INSPECTION CERTIFICATES

A. Obtain all inspections required by law, ordinances, rules, and regulations of the authorities having jurisdiction and obtain and furnish to the Engineer certificates of such inspections, pay all fees, charges, and other expenses in connection therewith.

3.10 FINAL REVIEW

A. Final review and tests of the completed construction shall be performed in the presence of the Engineer or his representative, and shall be at such times as are convenient to the Engineer.

B. Final tests shall show conclusively that all fixtures and equipment perform their

intended and specified functions and that all work complies with the provisions of these specifications.

C. All material, equipment, and instruments required for the tests shall be furnished by the Contractor at his own expense.

END OF SECTION 220110

SECTION 220150 - BASIC MATERIALS AND METHODS

PART I - GENERAL

1.01 RELATED WORK SPECIFIED ELSEWHERE

A. Division 1.

B. Section 220110 - General Requirements

1.02 DESCRIPTION

A. Pipe and fittings shall be in accordance with specifications listed herein and shall be installed as outlined under applicable Divisions of the specifications. Materials shall be new and free of manufacturing defects or damage.

1.03 QUALIFICATIONS

A. The pressure ratings of pipe and fittings shall be compatible with maximum pressures anticipated in respective systems.

PART 2 - PRODUCTS

2.01 BURIED WASTE AND DRAIN PIPING

A. PVC, schedule 40 ASTM D 2665, solid core with solvent weld fittings.

2.02 DRAIN, WASTE, AND VENT PIPING ABOVE GROUND

A. PVC, schedule 40 ASTM D 2665, solid core with solvent weld fittings.

2.03 SLEEVES

A. Waterproof
   1. Sleeves through exterior walls below grade shall be a water-tight seal consisting of rubber sealing elements, and a Delrin plastic pressure plate, with length compatible to wall thickness. "Link Seal," Wayne Michigan, Wade, Zurn, or approved equal.

B. Walls and Floors
   1. Sleeves through poured concrete walls and floors, and non-bearing partition walls shall be linear polyethylene as manufactured "Crete Sleeve", Sperzel Division, Tyler or Charlotte Pipe.
   2. Sleeves through waterproof floors or where exposed in rooms with floor drains shall be coated cast iron with flashing device and under deck clamp. J.R. Smith #1720, Josam, Wade or Zurn.
   3. General Provision for Sleeves: Provide sleeves for all pipe passing through masonry fire walls, floors, foundation walls or ceilings of concrete or masonry construction. Provide a Schedule 40 galvanized steel pipe (unless specified otherwise in Item 2.03 B 1 or 2) large enough to clear pipes by 1/4 inch all around. No sheet metal sleeves are to be permitted. All floor sleeves shall

extend 1/2 inch above floor. Sleeves at walls and ceilings shall be flush at wall lines. For insulated pipes, sleeves shall be larger than the outside diameter of the insulation, and insulation shall be continuous through the sleeves. Sleeves shall be machine cut at right angles to centerline of pipe and deburred. No flame cut sleeves will be permitted.

2.04 ESCUTCHEONS

A. Escutcheons: Use chrome-plated B & C Type 40 flush escutcheons on ceiling and wall. At floors, use Ritter No. 36-A deep cup chrome-plated escutcheon. Use Ritter, Grabler, Blaw-Knox, or equal. Escutcheons shall be used at all piping in finished areas. Escutcheons on insulated piping shall fit insulation tightly.

2.05 FLASHING

A. Sheet Lead
   1. Sheet lead for general use shall weigh at least 4 pounds per square foot.

B. Sheet Copper
   1. Sheet copper for general use shall weigh at least 12 ounces per square foot and conform to ASTM B152.

PART 3 - EXECUTION

3.01 SLEEVES

A. Provide for all pipes passing through floors, walls and ceilings.

B. Sleeves shall be of sufficient size to receive insulation and of proper length to terminate 1" above finished surfaces.

C. Sleeves for covered lines shall fit over covering without unnecessarily large clearances.

D. Pipe sleeves shall be caulked with non-hardening caulking to prevent transmission of noise between floors and walls.

E. Sleeves for piping from mechanical rooms shall be made air and vapor tight by caulking with UL listed fireproof caulking equivalent to 3M cp 25 N/S.

F. Sleeves and UL approved details shall be provided at all penetrations passing through rated facilities.

3.02 ESCUTCHEONS

A. Provide for all exposed piping passing through floors, walls or ceilings, of all spaces, including equipment rooms.

3.03 FLASHING

A. Vent Piping
   1. Sanitary Vent: Extend vent 18 inches above roof.

END OF SECTION 220150

SECTION 220700 - PLUMBING INSULATION

PART 1 - GENERAL REQUIREMENTS

1.01 WORK INCLUDED

A. Provide insulation for piping and equipment installed under this contract, as indicated on the drawings and specified herein, including, but not limited to:
   1. Domestic hot and cold water piping, valves and fittings.
   2. Exposed drain and hot water piping below handicapped fixtures.

1.02 SUBMITTALS

A. Submit manufacturer's product data on all insulation products specified, including thermal resistance values, flame and smoke ratings, UL listing, and manufacturers published installation recommendations.

1.03 GENERAL REQUIREMENTS

A. For the purpose of this specification, the term "exposed" is generally intended to mean work that is visible in finished spaces and above lay-in tile ceilings. The term "concealed" is generally intended to mean work that is installed behind walls, plastered ceilings, and under floors.

B. Where subject to freezing, cover piping and fittings with single piece, double the thickness normally specified.

C. All insulation, jackets, adhesives, and other insulation materials shall be UL rated, non-combustible, with maximum permanent flame spread rating of 25, and a smoke developed rating of 50 or less and fuel contributed of 50 or less when tested in accordance with ASTM E-84. Submit smoke and flame spread ratings for every material proposed to use.

D. Unless otherwise indicated, insulation thickness or "R" value shall conform to ASHRAE Standard 90-75, and the North Carolina State Building Code, Volume X - Energy.

E. Where differences occur between any referenced standard or code the most stringent requirements shall apply.

F. All products shall be free of asbestos.

G. All insulation work shall be done by skilled tradesmen, normally employed in this field.

PART 2 – PRODUCTS

2.01 MATERIALS - GENERAL

A. Type 1 - Fiberglass pipe insulation.

1. Fiberglass sectional molded insulation, minimum density of 3.5 lb/cu.ft. with factory applied white vapor barrier jacket, .25 BTU/hr./Sq. Ft./Deg. F./in. conductivity at 75 deg. F, conforming to ASTM C-547 67.

2. The jacket shall be foil-scrim-kraft laminate. Jackets shall be vapor sealed with continuous self sealing lap strips. End joints shall be similarly sealed with factory furnished butt strips with pressure sealing adhesive.
   a. Manufacturers:
      (1) Johns Manville - J-M Flame safe AP
      (2) PPG Industries
      (3) Owens Corning
      (4) Certainteed – Certablue
      (5) Knauf
3. Insulation for valves, fittings and unions shall be the same thickness as the pipe insulation by any of the following methods, including both insulation and cover.
   a. Insulate with one pound per cubic foot density fiberglass blanket wrapped firmly under compression (minimum 2 to 1) and secure with number 20 gauge annealed steel wire.
   b. Insulate with molded fiberglass fittings secured with number 20 gauge annealed steel wire.
   c. Miter fiberglass piping insulation to form fittings, secured with number 20 gauge annealed steel wire. Use preformed angels where possible. Fiberglass batt type insulation shall NOT be used.
   d. Cover with premolded one piece PVC fitting covers secured by banding. If additional securing is required, taping and stapling may be used. Covers shall be sealed with vapor barrier pressure sensitive tape. Color to match cover.
   e. Cover with a smooth coating of cement. Open weave glass fabric to be smoothly adhered and coated with lagging adhesive. Lap glass on fabric at least 1" on itself and 2" on adjoining pipe insulation.
4. Seal all joints ands seams with tape as recommended by manufacturer.

B. Type 2 – Flexible Pipe Insulation
   1. Material – Flexible, closed cell, elastomeric thermal insulation, minimum k value .27 at 75°F conforming to ASTM C 534.
   2. Fittings - Sleeve type fitting covers and miter cut tubular form.
   3. Manufacturers:
      a. Armstrong - Armaflex AP or Self Seal 2000
      b. Johns Manville - Aerotube II
      c. Rubatex No. R-180-J

2.02 FIELD APPLIED JACKETS

A. Canvas Jacket: UL listed fabric, 8 oz/sq yd, plain weave cotton treated with dilute fire retardant lagging adhesive.

2.03 EXPOSED DRAIN AND HOT WATER PIPING BELOW HANDICAPPED FIXTURES

A. Features and construction
   1. Prefabricated insulating covers to fit traps, drains, valves and supplies,

extensions for drains, and offset tail pieces.
2. Molded, closed cell vinyl
3. Nominal 1/8” thick wall
4. Tamperproof locking straps
5. Conforms to Uniform Federal Accessibility Standards 4.19.4 GSA and ANSI Document A117-1- 1980
6. White color
7. Smooth, high gloss finish

PART 3 - EXECUTION

3.01 GENERAL

A. Apply insulation in strict accordance with manufacturer’s instructions.

B. All surfaces must be free of dirt, dust, grease, oil, scale or loose particles before insulation.

C. Do not cover fittings until required tests have been completed and accepted.

D. Insulation shall be continuous passing through walls. Size sleeves accordingly to accommodate insulation. Where insulation passes through floor or wall sleeves, pack the space outside of the insulation and inside of the sleeve with fiberglass blanket. Seal with fire rated sealant on fired rated partitions.

E. For cold lines for condensation protection or for safety protection of hot lines unions shall be insulated as follows:
1. Covering shall be terminated at each end of the union and sealed.
2. Cover union with separate section of insulation, routed out to fit over union, of section of pipe insulation whose inside diameter matches the outside diameter of the adjoining insulation, lap adjoining insulation on both sides by 3", seal vapor tight plastic tape.

F. Patching: Where connections are made to existing piping patch all existing insulation to match existing.

G. Provide insulation saddles and shields at hangers to prevent deformation or penetration of insulation by contact with hangers.

H. Cover pipe with canvas jacket in all exposed locations.

3.02 DOMESTIC WATER PIPING

A. Type 2 - For cold water piping, 1/2 " thickness for all piping.

B. Type 2 - For hot water piping , thickness as follows:
1. 1" insulation on all pipe sizes.

C. Type 2 - Cold water piping below grade and/or where in contact with concrete, such as piping to trap primers.

3.03 EXPOSED WASTE AND HOT WATER PIPING AT FIXTURES DESIGNATED HANDICAPPED.

A. Prefabricated fittings securely installed in accordance with manufacturer's instructions.

END OF SECTION 220700

SECTION 221116 - DOMESTIC WATER PIPING

PART 1- GENERAL REQUIREMENTS

1.01 WORK INCLUDED

A. Provide domestic hot and cold water piping as indicated on the drawings and as specified herein, including;
   1. Pipe and fittings
   2. Valves
   3. Testing
   4. Potable water system sterilization.

1.02 CODES AND STANDARDS

A. Comply with the provisions of the following codes and standards.
   1. North Carolina State and Building Code.
   2. Local codes, ordinances, and requirements.

1.03 SUBMITTALS

A. Submit manufacturer's product data on pipe, valves and fittings.

PART 2 - PRODUCTS

2.01 UNDERGROUND WATER PIPING

A. Pipe: Type K copper, hard or soft temper ASTM B-88

B. Avoid use of underground fittings. Where underground fittings are required, provide wrought copper and connect by silver brazing.

2.02 ABOVE GROUND WATER PIPING

A. Pipe: Type L copper, Hard temper ASTM B-88

B. Fittings: Solder water tube fittings, cast brass or wrought copper, ANSI 16.18 or ANSI 16.22

2.03 SOLDER

A. 95-5 tin - antimony solder.

B. Solders containing lead shall not be used on potable water systems.

2.04 ESCUTCHEONS

A. Nickel plated brass

PART 3 - EXECUTION

3.01 PIPE AND FITTINGS INSTALLATION

A. Piping installed below floors shall be installed with a minimum of joints and shall be completely encased in sand.

B. Changes in pipe sizes shall be made with reducing fittings.

C. All uninsulated water piping exposed in finished rooms shall be chrome plated.

D. Use dielectric connections for all joints of dissimilar metals. Protect insulating material if heat is applied to fitting.

E. Make copper piping joints with 95-5 solder, and no corrosive solder paste. Flux and solder combinations are not permitted.

F. Grade piping to low points and provide drain valves.

G. Provide domestic water branch piping to fixtures and make final connections to fixtures provided by this or other contractors.

H. Do not rough piping inside spaces, partitions, stud wall voids, plenums, or cavities subject to potential to potential freezing.

I. Provide valves at inlet and outlet of each piece of equipment, at each fixture, on branch lines and where indicated on the drawings.

J. Provide escutcheons for exposed piping passing through walls, floors or ceilings.

3.02 POTABLE WATER SYSTEM STERILIZATION

A. All pipe and fittings connected to and forming a part of a potable water supply shall be sterilized. Sterilization shall be accomplished after the pipe has passed the hydrostatic pressure tests. The method used by the contractor shall be in full accordance with the requirements of the AWWA Specification C-601, and state and local Departments of Health.

B. All new piping shall be filled with not less than 25, nor more than 50 parts per million (ppm) of available chlorine and held in contact with such for not less than 24 hours. Final tests after 24 hours shall show a minimum residual chlorine content of 25 ppm in all parts of the system. All chlorine introduced into the system shall be totally dissolved. The introduction of solid hypochlorite directly into the system is prohibited.

C. Sterilization tests shall be repeated as often as necessary and as directed by the architect and/or Department of Health, until the minimum residual chlorine content has been maintained. The chlorine solution shall be thoroughly flushed prior to placing the new sections of piping in service. The contractor is cautioned that the spent chlorine solution must be disposed of in such as way as not to be detrimental to plant, animal of aquatic life.

D. Certification of bacteriological testing for quality of the domestic water shall be conducted, accepted by the Project Engineer and submitted to the State Construction Office prior of request for final inspection and Beneficial or Final Occupancy Permit.

END OF SECTION 221116

SECTION 221119 - DOMESTIC WATER PIPING SPECIALTIES

PART 1 - GENERAL

1.01 REFERENCED SECTIONS

A. Drawings, Standard General Conditions of the Contract including Supplementary General Conditions, Division-1 Specification Sections, Specification Divisions and Sections as referenced in Division 22 Section “Plumbing General Requirements”, and Division 22 Specification Sections as follows apply to work of this section:
   1. Section 220110 - Plumbing General Requirements
   2. Section 224000 - Plumbing Fixtures
   3. Section 220150 - Basic Materials and Methods
   4. Section 220700 - Plumbing Insulation

1.02 SUBMITTALS

A. Submit under provisions of Division 1, and Division 22, “Plumbing General Requirements” the following:
   1. manufacturer’s catalog data, installation, dimensions (including rough in dimensions)
   2. operating and maintenance data for plumbing specialty items.
   3. catalog data and material certification for pipe materials and fittings.

B. Provide for all items as listed in Specification Section 221116.

1.03 QUALITY ASSURANCE

A. Equipment of the same general type shall be of the same make.

B. Brand names and catalog numbers included with equipment or material specifications are used to indicate quality, rating or operating characteristics of the equipment of material.

C. All materials provided shall be new and shall be approved by the Underwriter’s Laboratories, Inc., wherever that agency has applicable standards.

D. All work shall be accomplished in a neat, workmanlike manner by experienced journeymen.

E. All work shall be performed at such times as are required by the progress of the job.

1.04 QUALIFICATIONS

A. Manufacturer: Company specializing in manufacturing the Products specified in this section with minimum three years experience.

B. Installer: NC State licensed plumber specializing in performing the work of this section with minimum 3 years experience.

1.05 REGULATORY REQUIREMENTS

A. Installation and materials shall be in conformance with the North Carolina State Building Code 2009 Edition (Year 2006 Edition of the International Plumbing Code as modified and adopted by the North Carolina Building Code Council).

1.06 DELIVERY, STORAGE, AND HANDLING

A. Deliver, store, protect and handle products to site, under provisions of Division 1 and Division 220110, Plumbing General Requirements.

1.07 SYSTEM COMPLETION

A. Provide all bolts, nuts, gaskets, sleeves, hangers, supports, miscellaneous valves and fittings and specialties, required for complete installation of the piping and equipment to be provided.

PART 2 - PRODUCTS

2.01 FLOOR DRAINS

A. ANSI A112.21.1, coated cast iron two piece body with double drainage flange, weep holes, reversible clamping collar, and square, adjustable nickel-bronze strainer; Model Z-415S, as manufactured by Zurn, or equal by Josam, J. R. Smith, or Wade. Provide with Trap Guard in lieu of trap primers. Manufactured by Provent or equal.

2.02 CLEANOUTS

A. Line type, with lacquered cast iron body and round epoxy coated gasketed cover, and round stainless steel access cover, secured with machine screw; as manufactured by Josam, or equal by Zurn, J. R. Smith, or Wade.

2.03 HOSE BIBBS

A. Bronze or brass with integral mounting flange, hose thread spout, integral vacuum breaker, loose key operated as indicated, in conformance with ANSI/ASSE 1011; as manufactured by Wilkins, Watts, J.R. Smith,. Nibco, Woodford, or Crane.

2.04 WALL HYDRANT

A. Non-freeze type, cast bronze with Nikaloy finish, removable key, and integral vacuum breaker, combination ¾" Female and 1" Male NPT; Josam, Series 71050 or equal, as manufactured by Zurn, Woodford, or J.R. Smith.

2.05 WATER HAMMER ARRESTORS

A. ANSI A112.26.1; All stainless steel construction, meets standards PDI WH-201 and ASSE 1010, filled with glycerin, pressurized with argon, size as indicated by PDI WH 201 letter designation; Series 75000 as manufactured by Josam, or equal by J.R. Smith, or Zurn.

2.06 TRAP PRIMERS

Brass trap primer to discharge a metered amount of water upon pressure change. Provide floor drains with prime connection. PPP or equal.

2.07 ANGLE VALVES

A. Up to and including 2 Inches, MSS SP-80, Class 150, body and union bonnet of ASTM B 62 bronze, inside rising stem of bronze, brass packing gland, Teflon impregnated packing, and malleable-iron handwheel.

B. Up to and including 2 Inches, Class 300, body and union bonnet of ASTM B 61 bronze, inside rising stem of bronze, plug disc and seat ring of stainless steel, and malleable iron handwheel.

C. Over 2 inches, Class 125, Iron body, MSS SP-85, bronze mounted with body and bonnet ASTM A 126, Class B cast iron, flanged ends, outside screw and yoke, with Teflon impregnated packing and two piece packing gland assembly, and malleable iron hand wheel.

2.08 BALL VALVES

A. Up to, and including 2 inches: 150# W.O.G. rating up to 200 F, two piece brass bodies, replaceable reinforced Teflon seat, conventional port, blow proof stem, chrome plated brass ball, union, threaded, or soldered ends.

PART 3 - EXECUTION

3.01 EXAMINATION

A. Verify that excavations are required grade, dry, and not over-excavated.

3.02 PREPARATION

A. Ream pipe and tube ends. Remove burrs. Bevel plain end ferrous pipe.

B. Remove scale and dirt, on inside and outside, before assembly.

C. Prepare piping connections to equipment with flanges or unions.

D. Coordinate cutting and forming of roof and floor construction to receive drains to required invert elevations.

3.03 INSTALLATION

A. Install in accordance with manufacturer's instructions.

B. Provide non-conducting dielectric connections wherever joining dissimilar metals.

C. Route piping in orderly manner and maintain gradient.

D. Install piping to conserve building space and not interfere with use of space.

E. Group piping whenever practical at common elevations.

F. Install piping to allow for expansion and contraction without stressing pipe, joints, or connected equipment.

G. Provide Sleeves for all pipes passing through floors, walls and ceilings, of sufficient size to receive insulation, and of proper length to terminate 1" outside finished surfaces. Pipe sleeves shall be caulked with non-hardening caulking to prevent transmission of noise between floors and walls.

H. Pipe Penetrations through fire partition walls shall be made by UL penetration detail as indicated with caulking with UL listed fireproof caulking.

I. Provide clearance for installation of insulation and access to valves and fittings.

J. Provide access where valves and fittings are not exposed. Coordinate size and location of
access doors with specified in Division 8.

K. Establish elevations of buried piping outside the building to ensure not less than 3 ft of cover.

L. Where pipe support members are welded to structural building framing, scrape, brush clean, and apply one coat of zinc rich primer to welding.

M. Provide support for utility meters in accordance with requirements of utility companies.

N. Prepare pipe, fittings, supports, and accessories not prefinished, ready for finish painting. Refer to Division 9.

O. Excavate in accordance with Division 31 for work of this Section.

P. Backfill in accordance with Division 31 for work of this Section.

Q. Install bell and spigot pipe with bell end upstream.

R. Install valves with stems upright or horizontal, not inverted.

S. Provide one plug valve wrench for every ten plug valves, sized 2 inches and smaller, minimum of one. Provide each plug valve sized 2-1/2 inches and larger with a wrench with set screw.

T. Install in accordance with manufacturer's instructions.

U. Extend cleanouts to finished floor or wall surface. Lubricate threaded cleanout plugs with mixture of graphite and linseed oil. Ensure clearance at cleanout for rodding of drainage system. Encase exterior cleanouts in concrete flush with grade.

V. Pipe relief from back flow preventer to nearest drain.

W. Install water hammer arrestors complete with accessible isolation valve on hot and cold water supply piping to lavatories, sinks, water closet flush valves, and washing machine outlets.

3.04 APPLICATION

A. Use grooved mechanical couplings and fasteners only in accessible locations.

B. Install unions downstream of valves and at equipment or apparatus connections.

C. Install brass male adapters each side of valves in copper piped system. Sweat solder adapters to pipe.

D. Install gate, or ball valves for shut-off and to isolate equipment, part of systems, or vertical risers.

3.05 ERECTION TOLERANCES

A. Establish invert elevations, slopes for drainage to 1/8 or 1/4 inch per foot, as required. Maintain gradients. Slope water piping and arrange to drain at low points.

3.06 DISINFECTION OF DOMESTIC WATER PIPING SYSTEM

A. After all tests have been satisfactorily completed, disinfect the entire domestic water distribution system, including all supply outlets, with hypochlorites by the tablet method in general accordance with ANSI/AWWA C651.

B. Provide a minimum of 2 bacteriological test locations at ends of lines.

3.07 SERVICE CONNECTIONS

A. Provide new sewer services. Before commencing work check invert elevations required for sewer connections, confirm inverts and ensure that these can be properly connected with slope for drainage and cover to avoid freezing.

B. Provide new water service complete with by-pass valves pressure reducing valve, and sand strainer.

C. Provide sleeve in wall for service main and support at wall with reinforced concrete bridge. Caulk enlarged sleeve, and make watertight with pliable material. Anchor service main inside to concrete wall.

END OF SECTION 221119

SECTION 224000 - PLUMBING FIXTURES

PART 1 – GENERAL

1.01 REFERENCED SECTIONS

A. Drawings, Standard General Conditions of the Construction Contract, including Supplementary General Conditions, Division-1 Specification sections and other Division 15 specification sections apply to work of this section

B. Section 220110 - Plumbing General Requirements

C. Section 221119 - Plumbing Piping and Specialties

1.02 REFERENCES

A. The publications listed below form a part of this specification to the extent referenced. Publications are referenced in the text by basic designation.

B. Air conditioning and refrigeration institute (ARI)
   1. ANSI/ARI 1010 - Drinking Fountains and Self-Contained, Mechanically Refrigerated Drinking Water Coolers.
   2. AMERICAN SOCIETY OF MECHANICAL ENGINEERS (ASME)
      a. ANSI/ASME A112.6.1M - Supports for Off-the-Floor Plumbing Fixtures for Public
      b. ANSI/ASME A112.18.1M - Plumbing Fixture Fittings
      c. ANSI/ASME A112.19.1M - Enameled Cast Iron Plumbing Fixtures
      d. ANSI/ASME A112.19.2M - Vitreous China Plumbing Fixtures
      e. ANSI/ASME A112.19.3M - Stainless Steel Plumbing Fixtures (Designed for Residential Use)
      f. ANSI/ASME A112.19.5 - Trim for Water Closet Bowls, Tanks, and Urinals
      g. ANSI/ASME A112.19.6 - Hydraulic performance Requirements for Water closets and Urinals
   3. AMERICAN SOCIETY OF SANITARY ENGINEERS (ASSE)
      a. ASSE 1037 - Pressurized Flushing Devices (Flush-o-meters) for Plumbing Fixtures

C. Submit under provisions of Division 1 and Division 22 “Plumbing General Requirements”: listing of plumbing fixtures, including manufacturer’s catalog data, installation instructions, dimensions including rough-in dimensions, pipe connection sizes, trim, and finishes. Provide certification from Manufacturer that lead based solders were not used in fabrication of electric water coolers or fountains. No fixtures shall be delivered to the building until the Architect has inspected and approved the complete listing of fixtures.

D. Perform Work in accordance with State of North Carolina Building Code (International Plumbing Code as modified by the NC Code Council).

E. Deliver products to site, store, protect, and handle under provisions of Division 1. Accept fixtures on site in factory packaging. Inspect for damage. Protect installed fixtures from damage by securing areas and by leaving factory packaging in place to

protect fixtures and prevent use.

F. Verify that the field measurements are consistent with the dimensions as indicated on approved shop drawings. Confirm that millwork is constructed with adequate provision for the installation of countertop fixtures.

PART 2 - PRODUCTS

2.01 GENERAL

A. Unless specifically indicated otherwise, each plumbing fixture shall be provided with a trap, waste and water fittings with connections as indicated, each plumbing fixture shall be provided complete for the specified function (including water inlet(s) and waste outlet(s)) and except for stainless steel fixtures, the fixture color shall be white.

B. Vitreous china plumbing fixtures, ASME 112.19.2M, shall be thoroughly fused so that a fractured surface shall show a homogeneous mass, free from pores and with close grain. Glaze shall cover all surfaces that are exposed when the fixture is installed in its normal manner. Vitreous china fixture manufacturers shall be American Standard, Eljer or Kohler.

C. Stainless steel fixtures, 302 stainless steel, and undercoated with a sound absorbent material. Provide drillings to match faucet selection, stainless steel or chrome plated brass strainer, with trap and tailpiece to match.

D. Make terrazzo bases or receptors of marble chips cast in white Portland cement to produce a compressive strength of not less than 3000 psi 7 days after casting. Provide brass body drains with chromium-plated strainers cast integral with terrazzo.

E. Exposed piping, trimming and fittings shall be chromium or nickel plated brass with polished surfaces. Floor and wall plates shall be chromium plated brass.

2.02 WATER CLOSETS

A. Tank Type Water Closets, 1.28 GPF, white vitreous china, floor-mounted floor outlet, siphon jet, elongated bowl with white, solid, plastic, elongated open-front seat, and ANSI A112.19.5 trim. The inside of water closet bowl trapways shall be glazed.

B. Handicapped Water Closets and trim shall be specified by the manufacturer to compliance with the ADA. The rim of the handicapped toilet shall be 16-1/2” to 19-1/2” above finished floor. Flush lever shall be on wide side of stall.

2.03 LAVATORIES

A. Wall hung lavatory, ANSI/ASME A112.19.1M, white vitreous china, front overflow, shelf-backor back splash type, minimum dimensions of 20 inches wide by 18 inches front to rear. Provide ANSI/ASME A112.18.1M faucets of brass casting with a polished chromium plated finish, quality equal to that as listed in the schedule on the drawings, automatic, with 0.5-gpm aerator, and factory trim template. Provide perforated grid strainers, and 1-1/4-inch adjustable chrome plated cast brass P-traps with cleanout plug. Tubular trap shall have a wall thickness of at least 17 gauge.

B. For handicap lavatories provide an offset tailpiece if needed for code compliance.

2.04 STAINLESS STEEL SINKS

A. Countertop Stainless Steel Sink Product: ANSI/ASME A112.19.3M, 18-gage stainless steel with integral mounting rim, with undersides coated with sound dampening material. Provide top-mounted ANSI/ASME A112.18.1M cast brass dual lever faucet, 8-inch gooseneck swing spout with 1.5 gpm aerator and stainless steel drain outlet with cup strainers. Provide 1-1/2-inch adjustable cast-brass P-trap with cleanout plug and drain piping to vertical vent stack.

B. Accessible sinks shall have a maximum depth of 6", knee clearance at the front edge of the sink of 29", and knee clearance under the sink as indicated in NCSBC Volume 1C, 11.11. Hot water supply and drain lines shall not encroach within the knee clearance and shall be covered with pipe insulation packages specific to this application.

C. Provide McGuire No. 151 chrome plated forged brass basket strainer with 1-1/2" x 4" tailpiece, 1-1/2" trap, and 1-1/2" x 6" nipple.

2.05 CLEANOUTS

A. Line type, with lacquered, cast iron body, and round epoxy coated, gasketed cover, and round stainless steel access cover secured with machine screw; as manufactured by Josam, or equal by Zurn, J. R. Smith, or Wade.

PART 3 - EXECUTION

3.01 WATER CLOSET INSTALLATION

A. Cover supply pipe extending from wall with chrome plated sleeve and wall flange.

B. Provide additional wall plates where each pipe extends through finished wall.

C. Provide two rubber or plastic seat bumpers with metal holders and secure to the wainscot behind the fixture.

D. Provide connections between soil pipes and floor connected water closets with cast iron floor flanges. Slip floor flanges over the ends of the pipes and caulk in position. Use special short radius fittings where space does not permit the use of standard fittings below the flanges.

E. Wall Hung Water Closet and Urinal Connections. Provide connections to wall hung water closets and urinals, made with adjustable flanged nipples, secured to the chair supports, and non-asbestos gaskets.

3.02 LAVATORY INSTALLATION

A. Install lavatories for use by wheelchair handicapped with a rim height between 34 and 36 inches, a minimum vertical clearance of 29 inches from floor, and a minimum clear knee recess of 30 inches in width and 20 inches in depth.

B. Install trap on lavatory for use by wheelchair handicapped so as to provide maximum clearance under bowl. Insulate exposed waste, trap and hot water supply under lavatory in accordance withthe requirements for domestic hot water piping.

3.03 DRINKING FOUNTAIN INSTALLATION

A. Mount drinking fountain so that the bubbler will be 38 inches above the finished floor.

B. Mount drinking fountain for wheelchair handicapped with a maximum rim height of 34 inches above the floor.

3.04 SETTING COMPOUNDS AND GASKETS

A. Provide watertight and gas tight seals between flanges and fixtures with plumbing fixture setting compound. In sealing connections, use neither rubber gaskets nor putty. Seal watertight all voids between the flange, and the floor below the fixture, with plumbing fixture setting compound, or other approved sealing material.

3.05 OUTLET FLANGES AND ENDS OF SOIL PIPES

A. Provide outlet flanges and ends of soil pipes set the correct distance from the face of the floor or wall to make a joint with the gasket and fixture. Obtain approval for the setting of the flange prior to setting any fixture in place.

3.06 WATER SUPPLY BRANCH PIPING

A. Provide all exposed water supply branch piping, (including valves and fittings), not more than 6 feet above the floor, in toilet rooms and all piping below lavatories, finished, and chromium plated.

B. Do not bury water pipe in floor construction of any toilet room.

C. Where water piping is not sized on the drawings, comply with the sizing requirements of the National Standard Plumbing Code.

D. Provide each hot and cold water supply to each service sink, kitchen sink, battery of lavatories, and laundry trays with a ball valve or compression stop in an accessible location near the fixture.

E. Provide a ball valve on the connection to each wall hydrant, lawn faucet, and water cooler.

F. Do not use stop cocks in lieu of ball valves.

G. Run risers and drops supplying toilet rooms in chases, furred spaces, or shafts where possible.

3.07 STOP VALVE

A. All stop valves shall be heavy pattern with wheel handle. Valve shall be chromium plated. Supply pipe shall be chromium plated copper tube with tube riser.

3.08 FIXTURE HEIGHTS

A. Water Closet: 15 to 16 inches to rim.

B. Water Closet for Physically Handicapped Persons: 17 to 19 inches to top of seating surface.

C. Lavatory: 31 inches to top of trim. 34 inches to top of rim for accessible lavatories.

END OF SECTION 224000

SECTION 226400 - NATURAL GAS PIPING

PART 1 - GENERAL

1.01 RELATED DOCUMENTS

A. Drawings and general provisions of Contract, including General and Supplementary Conditions and Division-1 Specifications sections, apply to work of this section.

B. Description of work: Extent of natural gas piping systems work, is indicated on drawings and by requirements of this section.

1.02 QUALITY ASSURANCE

A. Codes and Standards:
   1. NFPA Compliance: Fabricate and install natural gas system in accordance with NFPA 54 "Natural Fuel Gas Code".
   2. NC State Gas Code
   3. ANSI Z21.15, ANSI Z21.21, ANSI B16.33 - Gas cocks shall comply with a minimum of one of the listed codes.

1.03 SUBMITTALS

A. Manufacturer's Data: Submit manufacturer's technical product data and installation instructions for natural gas systems materials and products.

PART 2 - PRODUCTS

2.01 MATERIALS AND PRODUCTS

A. General: Provide piping materials and factory-fabricated piping products of sizes, types, pressure ratings, and capacities as indicated. Where not indicated, provide proper selection as determined by Installer to comply with installation requirements.

2.02 BASIC PIPES AND PIPE FITTINGS

A. Natural Gas Piping:
   1. Pipe Size 2" and Smaller: Black steel pipe; Schedule 40, malleable iron threaded fittings.
   2. Pipe Size 2-1/2" and larger: Black steel pipe; Schedule 40; wrought steel buttwelded fittings.

2.03 SPECIAL VALVES

A. Gas Cocks:
   1. Gas Cocks 2" and Smaller: 150 psi non-shock WOG, bronze straightway cock, flat or square head, threaded ends.
   2. Gas Cocks 2-1/2" and larger: 125 psi non-shock WOG, iron body bronze mounted, straightway cock, square head, flanged ends.

PART 3 - EXECUTION

3.01 INSTALLATION OF NATURAL GAS PIPING

A. Use sealants on metal gas piping threads which are chemically resistant to natural gas. Use sealants sparingly, and apply to only male threads of metal joints.

B. Remove cutting and threading burrs before assembling piping.

C. Plug each pipe outlet, including valves, with threaded plug or cap immediately after installation and retain until continuing piping, or equipment connections are completed.

D. Ground natural gas piping electrically and continuously within project, and bond tightly to grounding connection.

E. Install drip-legs in gas piping where indicated, and where required by code or regulation.

F. Install "Tee" fitting with bottom outlet plugged or capped, at bottom of pipe risers.

G. Use dielectric unions where dissimilar metals are joined together.

H. Install piping with 1/64" per foot (1/8%) downward slope in direction of flow.

I. Install piping parallel to other piping, but maintain minimum of 12" clearance between gas piping and steam or hydronic piping above 200°F.

3.02 INSTALLATION OF VALVES

A. Gas Cocks: Provide, at connection to gas train, for each gas fired equipment item; and on risers and branches where indicated.

3.03 EQUIPMENT CONNECTIONS

A. Connect gas piping to each gas fired equipment item, with drip leg and shutoff gas cock. Comply with equipment manufacturer's instructions and FM/IRI requirements.

3.04 FIELD QUALITY CONTROL

A. Piping Tests: Inspect, test, and purge natural gas piping systems, in accordance with NFPA 54 and the NC State Gas Code.

3.05 SPARE PARTS

A. Valve Wrenches: Furnish to Owner, with receipt, 2 valve wrenches for each type of gas valve installed, requiring same.

END OF SECTION 226400

SECTION 230510 - BASIC MECHANICAL REQUIREMENTS

PART 1 - GENERAL

1.01 REFERENCES & INTENT

A. All work of this Division shall comply with the requirements of the Drawings, General Conditions, Supplementary General Conditions and Division 01 Specifications section.

B. Study all drawings and specifications before submitting bids.

C. Work under this Division includes all essential labor, materials, tools, equipment, transportation, insurance, temporary protection, supervision and incidental items for proper installation and operation of all systems even though not specifically mentioned or indicated.

D. Drawings are diagrammatic. Drawings are not intended to be absolutely precise and do not specify or show every offset, fitting, and component. The purpose of the drawings is to indicate a system concept, the main components of the systems, and the approximate geometrical relationships. Based on the systems concept, the main components, and the approximate geometrical relationships, the contractor shall provide all other components and materials necessary to make the systems fully complete and operational. Contractor shall route piping, or provide offsets to avoid interference with structural elements, equipment, electrical panels and junction boxes, etc. Verify locations, dimensions, flow directions, etc. before construction.

E. It is the intent of these specifications and drawings to provide for finished systems of the quality specified, properly tested, balanced and ready for operation. This includes all devices and accessories required to make the work complete, even though such items may not be expressly shown or specified. Drawings and specifications are complementary and must
be so construed to determine the full scope of work.

F. Jobsite Conditions: The Contractor shall visit the site and familiarize himself with the existing conditions before submitting his bid. Failure to do so does not relieve the Contractor from completing the work as specified herein and after. Requests for additional payments due to the Contractor's failure to allow for work conditions will be rejected.

1.02 WORK INCLUDED

A. The following work is specifically included without limiting the generality implied by these specifications and drawings.
   1. All mechanical scope of work specified herein and as shown on the plans. Contractor should review all drawings and include all items that are a part of his scope.
   2. All associated wiring, cutting

B. Bidders shall examine equipment, plans and specifications, and include in their bids, all labor and material required for complete installation and connection of equipment which is properly a part of their trade, even if it is not provided in the equipment

specifications.

1.03 STANDARDS AND CODES

A. All equipment with electrical components shall bear the UL label.

B. The following minimum standards apply wherever applicable:

ANSI	American National Standards
ASTM	American Society for Testing Materials
NBFU	National Board of Fire Underwriters
NEC	National Electric Code
NEMA	National Electrical Manufacturers Association
NFPA	National Fire Protection Association
OSHA	Occupational Safety and Health Act
SMACNA	Sheet Metal & Air Conditioning Contractors National Association, Incorporated

North Carolina Building Code
Any Other Applicable local and State Codes

C. In the event there are conflicts between specifications and standards or codes, standards or codes shall govern unless specifications are in excess of standards.

1.04 PERMITS AND FEE

A. Make application for all necessary permits and pay applicable fees.

1.05 STRUCTURAL STEEL AND CONCRETE

A. Structural members may not be pierced without prior written approval of the Engineer.

1.06 WATERPROOFING

A. Waterproofed floors and walls may not be cut.

1.07 WORK SCHEDULE

A. Work schedule shall be in accordance with Division 01.

B. Any demolition or installation work producing excessive dust or noise deemed to be disruptive or possibly unsafe to building operations must be, at the Owner's discretion, performed after normal working hours.

1.08 PROTECTION OF EQUIPMENT

A. Provide all necessary protection and be fully responsible for material and equipment stored or installed on the site. Material or equipment stolen or damaged shall be replaced at no additional cost to the Owner.

B. Provide protection against theft, physical damage and the entry of dirt, water or corrosive fumes into the material and equipment. Maintain protective covers for the duration of construction. Store equipment, such as controls, subject to damage by moisture and temperature extremes, in a dry, heated space.

1.09 FIRE SAFETY

A. Fire Watch: Provide a fire watch wherever welding, brazing, cutting or other processes involving an open flame or potential for generating sparks is used. Fire watch shall consist of a person with a 10 pound carbon dioxide fire extinguisher. While on fire watch, the person so assigned shall have no other duties or assignments.

B. Fire Blanket: In addition to providing a fire watch, use an approved fire blanket to cover any combustible materials in the immediate area.

1.10 GUARANTEES

A. Furnish written guarantee in accordance with requirements of General Conditions. Partial approval of a portion of work does not affect the validity of guarantee.

1.11 SHOP DRAWINGS

A. It shall be noted that shop drawing submittals, processed by the Engineer, are not change orders; that the purpose of shop drawing submittals, is to demonstrate to the Engineer, that the Contractor understands the design concept, that he demonstrates his understanding by indicating which equipment and material he intends to furnish and install, and by detailing the fabrication and installation methods he intends to use. If deviations, discrepancies or conflicts between shop drawing submittals and the contract documents in the form of design drawing and specifications are discovered either prior to or after shop drawing submittals are processed by the Engineer, the design drawings and specifications shall control and be followed. The Engineer may also require the Contractor to submit samples of proposed or specified equipment for approval with the samples to be returned to the contractor upon request.

B. Prior to procurement or manufacturing, submit for approval, appropriate shop drawings and/or descriptive literature, giving performance data, physical size, wiring diagrams, configuration, capacity, material, etc., for all items under this Division, including the following:

1. Heat Pumps
2. Testing and Balancing
3. HVAC Insulation
4. Ductwork, Dampers, and Louvers
5. Air Distribution
6. HVAC Controls

The contractor shall visit the site and familiarize himself with the project requirements and the field conditions, before preparing shop drawings and ordering equipment. Field verify the characteristics of all specified or existing equipment before preparing shop drawings. This shall include available space, available voltages, suitability of substrate for receiving the specified equipment, etc. Where existing equipment is reused, Contractor shall verify dimensions, capacities, horse-power, etc. and bring any discrepancies to the attention of the Engineer.

C. Where different products have to work together, it is the Contractor's responsibility to select manufacturers whose products are visually and/or technically compatible.

D. Prepare listing of all equipment and materials for the project. A sample schedule is included at the end of this section to complete this requirement. Provide all information represented.

1.12 RECORD DRAWINGS

A. During construction, keep an accurate record of all changes and deviations from contract documents. Upon completion of this installation, the contractor shall submit to the Engineer marked up prints indicating any installed work that is different from what is shown on the drawings.

PART 2 - PRODUCTS

2.01 QUALITY OF MATERIAL

A. Equipment of the same general type shall be of the same make. Reference is made to relays, motors, valves, motor starters, contactors, etc.

B. Brand names and catalog numbers included with equipment or material specifications are used to indicate quality, rating or operating characteristics of the equipment or material.

C. All materials provided shall be new and shall be approved and labeled by the Underwriter's Laboratories, Inc., or other accredited third party agency, wherever such agency has applicable standards. All work shall be accomplished in a neat, workmanlike manner by experienced journeymen. All work shall be performed at such times as are required by the progress of the job.

D. All components, equipment and systems shall comply with ASHRAE 90.1 and any other applicable ASHRAE standard.

PART 3 - EXECUTION

3.01 CLEARANCE AND RESTORATION OF SITE

A. It may be required to temporarily remove existing ceiling tiles, piping, duct, conduits, etc.
to introduce new work, as specified in this Division. Contractor, after installation of new work, shall reinstall, reconnect removed items to match the existing. Installation of any new equipment shall not compromise existing fire ratings of rated assemblies. All penetrations shall be sealed to existing conditions per UL guidelines for penetration protections. Provide offsets if required in existing piping, ducts etc. to introduce new work.

3.02 COORDINATION

A. Install all work to permit removal of equipment without damage to the equipment or the building. Verify equipment space requirements, condition of substrate, voltages, etc. at the time of shop drawing submission and advise the Engineer of any conflict.

B. Coordinate equipment locations as well as piping and conduit routing with Owner's representative to optimize all present and foreseen future space usage and clearance requirements.

C. Do not rough prior to receipt of approved shop drawings.

3.03 EQUIPMENT INSTALLATION AND SUPPORT

A. Install all equipment where indicated, in accordance with manufacturer's published installation instructions, and with recognized industry practices to ensure that equipment complies with requirements and serves intended purposes. Consult with Engineer if said instructions or practices conflict with the drawings/specifications.

B. Support plumb, rigid and true to line all work and equipment furnished under this Division. Study thoroughly architectural, mechanical drawings and all related drawings to determine how equipment, piping, ductwork, etc., are to be supported, mounted or suspended. Provide extra steel bolts, inserts, pipe stands, brackets and accessories for proper support as required whether or not shown on drawings. When directed, furnish for approval a drawing showing supports.

C. Any system component which may require maintenance, such as control valves, manual valves, strainers, etc. shall not be installed over electrical equipment, machinery, control panels or floor openings.

3.04 FINAL ADJUSTMENT AND TESTING

A. General: Provide all testing, preliminary and final adjustment of instrumentation for this purpose. Conduct all tests in full compliance with applicable codes prior to covering or concealing work by insulation, enclosures, etc. Material found to be defective shall not be repaired. It shall be replaced with new material which tests satisfactorily. Defective workmanship shall be corrected.

B. Working Tests: Subject all equipment and controls to simultaneous and continuous working tests for a period of one day prior to final inspection. Make adjustments, repairs and equipment replacements as required.

3.05 LABELS, IDENTIFICATION AND TAGS

A. All components or equipment shall be identified using 3/4 inch high permanent engraved bakelite nameplates or 3/4 inch high anodized aluminum nameplates, white letter, black background, with minimum 1/4 inch high letters. Nameplates shall be permanently attached with pin-head screws to device or to wall or mounting panel above device. Stick on type labels will not be acceptable.

3.06 OWNER'S RIGHT TO TEST SYSTEMS

A. Should, in the opinion of the Engineer, and during the guarantee period, reasonable doubt exist as to the proper functioning of any equipment installed under this Contract, the right is reserved for the Owner and Engineer to perform any test deemed practical to determine whether such equipment is functioning properly and performing at required capacity. If such tests show proper functioning, the cost of the test will be paid by the Owner. If the tests indicate a deficiency in equipment

capacity or performance, the Contractor shall pay the cost of the test, and also make good any deficiencies shown by the test to the full satisfaction of the Owner and the Engineer.

3.07 CLEANING UP

A. The contractors performing work under this section shall at all times keep the premises and the building in a neat and orderly condition and any instructions of the Engineer in regard

to the storing of material, protective measures, cleaning up of debris, etc., shall be explicitly followed. At the completion of the job, all equipment shall be cleaned to the satisfaction of the Owner.

B. The building will be occupied during installation of the new addition and/or alterations as described hereinafter. Thus, special care shall be taken during installation to protect equipment and other furniture in the buildings from dust and debris generated during installation of work specified in this Division.

3.08 INSPECTION CERTIFICATES

A. Obtain all inspections required by law, ordinances, rules, and regulations of the Authorities having jurisdiction, and obtain and furnish to the Engineer, certificates of such inspections, pay all fees, charges, and other expenses in connection therewith.

3.09 FINAL REVIEW

Final review and tests of the completed construction shall be performed in the presence of the Engineer or his representative, and shall be at such times as are convenient to the Engineer. Final tests shall show conclusively that all equipment performs its intended and specified function, and that all work complies with the provisions of these specifications. All material, equipment, and instruments required for the tests shall be furnished by the Contractor at his own expense.

3.10 EQUIPMENT DELIVERY AND PROTECTION

A. All material shall be delivered and unloaded by the Contractor within the project site as directed by the Owner. The Contractor shall protect all material and equipment from breakage, theft or weather damage.

3.11 OPERATING INSTRUCTIONS

A. The Contractor shall provide a minimum of six (6) hours of personal instruction to Owner's personnel in the proper operation of all equipment specified and provided. The instruction shall be provided by factory trained and certified competent personnel.

B. Maintenance Manuals shall be submitted in three (3) copies, in vinyl 3-ring binders. Each binder shall have the following:
   1. Service telephone number of the installing company, including an emergency number.
   2. Contact person, phone number, and address of manufacturer or distributor where equipment was purchased.

3. The manufacturing company's operating and maintenance manuals for each piece of equipment.
4. Copies of all approved shop drawings.

C. Furnish, for each building, permanent type charts, framed under glass, mounted where directed as follows:
1. Service organizations with day and night telephone numbers.

PRODUCTS LISTING FORM

INSTRUCTIONS

Do not use the terminology "as specified", rather indicate specifically the product proposed.

Prepared by: _____

_____

Date: _____ Project:

SPEC. SECTION	ITEM	MANUFACTURER

END OF SECTION 230510

SECTION 230530 - ELECTRICAL PROVISIONS FOR MECHANICAL WORK

PART 1 - GENERAL

1.01 RELATED DOCUMENTS

A. Drawings, Standard General Conditions of the Construction Contract, including Supplementary General Conditions, Division 1 Specification sections and other Division 23 specification sections, apply to work of this section.

B. This section is a Division 23 Basic Mechanical section, and is a part of each Division 23 section making reference to electrical provisions of Mechanical work specified within.

1.02 DESCRIPTION OF WORK

A. Extent of electrical provisions to be provided as mechanical work is indicated in other Division 23 sections, on drawings, and as further specified in this section.

B. Provide the following electrical related items. These include but are not necessarily limited to the following:
   1. Motors for mechanical equipment.
   2. All interlock and control wiring required for sequence operation of mechanical devices provided for mechanical systems
   3. All power and low voltage wiring for HVAC controls
   4. Any power wiring required for mechanical equipment not specifically shown on electrical drawings or specified in Division 26

C. Refer to other Division 23 sections for specific individual mechanical equipment electrical requirements.

D. Refer to Division-26 sections for materials and methods of other electrical components of mechanical equipment.

1.03 QUALITY ASSURANCE

A. Coordination with Electrical Work: Wherever possible, match elements of electrical provisions of mechanical work with similar elements of electrical work specified in Division 26 sections. Comply with applicable requirements of Division 26 sections for electrical work of this section, which is not otherwise specified.

B. Standards: For electrical equipment and products, comply with applicable NEMA standards, and refer to NEMA standards for definitions of terminology herein. Comply with National Electrical Code (NFPA 70) for workmanship and installation requirements. Electrical work shall be done in accordance with Codes listed and also requirements of Division 16.

1.04 SUBMITTALS

A. Listing, Motors of Mechanical Work: Concurrently with submittal of mechanical products listing (Basic Mechanical requirements), submit separate listing showing

rating, power characteristics, application (connected equipment), and general location of every motor to be provided with mechanical work. Submit updated information promptly, when, and if initial data is revised.

B. Include in listing of motors, notation of whether motor starter is furnished or installed integrally with motor or equipment containing motor.

PART 2 - PRODUCTS

2.01 MOTORS

A. Manufacturer: Except where item of mechanical equipment (which otherwise complies with requirements) must be integrally equipped with motor produced by another manufacturer, provide motors for mechanical equipment manufactured by one of the following:
   1. Baldor Electric Co.
   2. General Electric Co.
   3. Reliance Electric Co.
   4. Westinghouse Electric Corp.
   5. U.S. Electric Motor Co.

B. Motor Characteristics: Except where more stringent requirements are indicated, and except where required mechanical equipment cannot be obtained with fully complying motor, comply with the following requirements for motors of mechanical work:
   1. Temperature Rating: Rated for 40 deg. C environment with maximum 50 deg. C temperature rise for continuous duty at full load. Insulation shall be Class F.
   2. Starting Capability: Provide each motor capable of making starts as frequently as necessary by automatic control system, and not less than 5 starts per hour for manually controlled motors.

C. Phases and Current Characteristics: Unless otherwise noted, provide squirrel cage induction polyphase motors for 2 hp and larger, and provide capacitor start single phase motors for 1/3 hp and smaller, except 1/6 hp and smaller may, at equipment manufacturer's option, be split phase type. Coordinate current characteristics with power specified in Division16 sections, and with individual equipment requirements specified in other Division15 requirements. For 2 speed motors provide 2 separate windings on polyphase motors. Unless otherwise noted, all polyphase motors shall be suitable for 240 volt, 3 phase, 60 Hz service.

D. Service Factor: 1.15 for polyphase motors and 1.35 for single-phase motors.

E. Motor Construction: Provide general purpose, continuous duty motors, Design "B" except "C" where required for high starting torque. For motors controlled by variable speed drives, provide inverter duty motors that comply with NEMA MG1, Part 3 Definite Purpose Inverter Fed Motors.

F. Frames: NEMA No. 56 or Type T (unless otherwise noted)

G. Bearings: Ball or roller bearings with inner and outer shaft seals, regreasable except

permanently sealed where motor is normally inaccessible for regular maintenance.

H. Where belt drives and other drives produce lateral or axial thrust, in motor, provide bearings designed to resist thrust loading. Refer to individual sections of Division 15 for fractional
hp light duty motors where sleeve type bearings are permitted.

I. Enclosure Type: Except as otherwise indicated, provide TEFC motors. Refer to individual sections of Division 15 for other enclosure requirements.

J. Overload Protection: Provide built in thermal overload protection and, where indicated, provide internal sensing device suitable for signaling and stopping motor at starter.

K. Noise Rating: Provide "Quiet" rating on motors.

L. Efficiency: All permanently wired motors of 1 HP or more shall have a nominal full load motor efficiency not less than that required by ASHRAE 90.1. Where specified, provide premium efficiency motors.

M. Name Plate: Provide metal nameplate on each motor, indicating full identification of manufacturer, ratings, characteristics, construction, special features and similar information.

2.02 EQUIPMENT FABRICATION

A. General: Fabricate mechanical equipment for secure mounting of motors and other electrical items included in work. Provide either permanent alignment of motors with equipment, or adjustable mountings as applicable for belt drives, gear drives, special couplings and similar indirect coupling of equipment. Provide safe, secure, durable, and OSHA compliant removable guards for motor drives, arranged for lubrication and similar running maintenance without removal of guards.

2.03 WIRING

A. Low voltage wiring shall be no. 18 rubber covered, color coded wire or cable. Line voltage wiring shall be not smaller than #12 600 volt wire. All wire shall be run in rigid conduit, with outlet boxes and fittings in a manner comparable to that specified in the electrical specifications. All ground wire shall be THHN for line voltage. All wire will be pulled to every pump, disconnect, starter motor etc. Conduit shall not be used as ground.

2.04 DISCONNECTS

A. Non-Fused.
1. Wall mounted, standard duty, single throw in NEMA-l enclosure or NEMA 3R enclosure, weatherproof for exterior locations. Single pole or three pole as required with solid neutral. External handle lockable in the open position. Disconnect switches shall be provided wherever the code requires local disconnecting means.
2. Make: Square D, General Electric or Westinghouse.

B. Fused Disconnect Switches
   1. Single throw, quick make, quick break: Number of poles as required by load. NEMA-1 general purpose enclosure indoors in dry locations, NEMA 3R weatherproof enclosure outside. Standard fuse clips, lockable in open position. Rating 250 or 600 VAC as required.
   2. Make: General Electric, Square D, Westinghouse.

PART 3 - EXECUTION

3.01 INSTALLATION

A. Install motors on motor mounting systems in accordance with motor manufacturer's instructions, securely anchored to resist torque, drive thrusts, and other external forces inherent in mechanical work. Secure sheaves and other drive units to motor shafts with keys and Allen set screws, except motors of 1/3 hp and less may be secured with Allen set screws on flat surface of shaft. Unless otherwise indicated, set motor shafts parallel with machine shafts.

B. Install motor starters, in accordance with equipment manufacturer's written instructions and with recognized industry practices; complying with applicable requirements of NEC, UL and NEMA standards, to insure that products fulfill requirements.

C. Coordinate with other work, including motor and electrical wiring/cabling work, as necessary to interface installation of motor starters with other work.

D. Tighten connectors and terminals, including screws and bolts, in accordance with equipment manufacturer's published torque tightening values for equipment connectors. Where manufacturer's torquing requirements are not indicated, tighten connectors and terminals to comply with tightening torques specified in UL Std 486A.

3.02 ADJUSTING AND CLEANING

A. Inspect electrical starter's operating mechanisms for malfunctioning and, where necessary, adjust units for free mechanical movement.

B. Touch-up scratched or marred surfaces to match original finish.

3.03 FIELD QUALITY CONTROL

A. Subsequent to connecting wires/cables, energize motor starter circuitry and demonstrate functioning of equipment in accordance with requirements; where necessary correct malfunctioning units, and then retest to demonstrate compliance. Ensure that direction of rotation of each motor fulfills requirements.

END OF SECTION 230530

SECTION 230590 - MECHANICAL PAINTING AND IDENTIFICATION

PART 1 - GENERAL

1.01 RELATED DOCUMENTS

A. Drawings, Standard General Conditions of the Construction Contract, including Supplementary General Conditions, Division 01 Specification sections and other Division 23 specification sections, apply to work of this section.

1.02 SCOPE

A. Paint and/or identify the following:
   1. All mechanical equipment
   2. Control panel and control components including control dampers

1.03 SUBMITTALS

A. Manufacturer's Data: Submit manufacturer's technical product data and installation instructions.

PART 2 - PRODUCTS

2.01 PLASTIC PIPE MARKERS

A. Snap On Type: Provide manufacturer's standard preprinted, semi rigid, snap on, color coded pipe markers, complying with ANSI A13.1. Provide full band pipe markers, extending 360 degrees around pipe at each location.

B. Lettering: Manufacturer's standard preprinted nomenclature which best describes piping system in each instance, as selected by Engineer in cases of variance with name as shown or specified.

C. Arrows: Print each pipe marker with arrows indicating direction of flow, either integrally with piping system service lettering (to accommodate both directions), or as separate unit of plastic.

2.02 VALVE TAGS

A. Brass Valve Tags: Provide 19 gage polished brass valve tags with stamp engraved piping system abbreviation in 1/4" high letters and sequenced valve numbers 2" high, and with 5/32" hole for fastener.

B. Provide 1-1/2" diameter tags, except as otherwise indicated.

C. Valve Tag Fasteners: Provide solid brass chain (wire link or beaded type), or solid brass S-hooks of the sizes required for proper attachment of tags to valves, and manufactured specifically for that purpose.

2.03 ENGRAVED PLASTIC-LAMINATE SIGNS AND EQUIPMENT MARKERS

A. General: Provide engraving stock melamine plastic laminate, complying with FS L-P-387, in the sizes indicated, 1/16" thick, engraved with engraver's standard letter

style of the sizes and wording indicated, black with white core (letter color) except as otherwise indicated, punched for mechanical fastening except where adhesive mounting is necessary because of substrate.

B. Fasteners: Self tapping stainless steel screws.

PART 3 - EXECUTION

3.01 PAINTING

A. All equipment, except where otherwise specifically noted, shall be furnished in prime coat. All uninsulated black steel piping shall be prime coated and finish painted in light gray, unless otherwise required by schedule below to be color coded. All welds, on both insulated and uninsulated piping, shall be painted with one coat of primer. All miscellaneous black steel items, such as hangers and rods, machinery supports, breechings and stacks, etc., shall be prime coated, and finish painted in light gray. Exposed surfaces of insulation shall be sealed. All metal surfaces shall be thoroughly cleaned of rust and dirt, and shall be degreased before application of primer. All prime coated equipment shall be touched up where prime coats are chipped, scratched, or otherwise damaged. All prime coated equipment shall be thoroughly cleaned and left ready for finish painting. Where cast iron accessories or galvanized pipe, or equipment surfaces are to receive finish painting, the item shall be properly primed.

B. Ferrous surfaces shall be painted with the following coats:
   1. 1 coat of primer equivalent to Bruning Silathane 520-14 grey-green primer, Benjamin Moore 06- 20 red oxide alkyd primer or Richards SR-1399 red metal primer.
   2. 2 coats of finish equivalent to Bruning Silathane Gloss Enamel 520-32 quarry gray, Benjamin Moore Gloss Enamel 22-38 or Richards Gloss Enamel 1003 Series.

C. Finish painting of all equipment and piping (both insulated and un-insulated) shall be provided. Where indicated or specified, existing equipment, piping, duct, etc. shall be cleaned and painted along with new work. Do not paint piping that is provided with aluminum or PVC jacketing insulation covering. Paint piping insulation per color schedule below and provide stenciled identification or plastic pipe markers.

D. Painting and/or identification shall be in accordance with the following schedule:

ITEM	IDENTIFICATION	PIPE COLOR
Natural Gas	As noted on drawing	

E. All other un-insulated ferrous pipes shall be painted light gray with stenciled identification as specified under stenciling.

3.02 GENERAL MECHANICAL IDENTIFICATION

A. Coordination: Where identification is to be applied to surfaces which require insulation, painting or other covering or finish, including valve tags in finished mechanical spaces. Install identification after completion of covering and painting.

3.03 PIPING SYSTEM IDENTIFICATION

A. General: Install plastic pipe markers on each system indicated to receive identification.

B. Locate pipe markers and color bands as follows:
   1. Near each valve and control device.
   2. Near each branch.
   3. Near locations where pipes pass through walls or floors/ceilings, or enter non- accessible enclosures.
   4. Near major equipment items and other points of origination and termination.
   5. Spaced intermediately at maximum spacing of 50' along each piping run, except reduce spacing to 25' in congested areas of piping and equipment and in mechanical rooms.

C. Stenciling: In lieu of plastic pipe markers, stenciling may be used for identification. Apply stenciling after finished painting has been completed. Stencil indication shall be in block letters, applied with black paint (except white paint on black surface) Stencil as follows:

OD Pipe or Covering	Stencil Letter Size
3/4 in. thru 1-1/4 in.	2 in.
1-1/2 in. thru 2 in.	3/4 in.
2-1/2 in. thru 4 in.	1 in.
6 in. and larger	2 in.

D. All underground lines shall have a magnetic type warning tape installed in the backfill at least six inches below grade.

3.04 VALVE IDENTIFICATION

A. General: Provide valve tag on every valve, cock and control device in each piping system. List each tagged valve in typed valve schedule for each piping system, and post under glass
in main mechanical room and/or boiler room.

3.05 MECHANICAL EQUIPMENT IDENTIFICATION

A. General: Install engraved plastic laminate sign or plastic equipment marker on, or near each major item of mechanical equipment, and each operational device, as specified herein, if not otherwise specified for each item or device. Provide signs for the following general categories of equipment and operational devices:
   1. HVAC Units.
   2. Main control and operating valves, including safety devices.

END OF SECTION 230590

SECTION 230593 - TESTING AND BALANCING OF HVAC SYSTEMS

PART 1 - GENERAL

1.01 RELATED DOCUMENTS

A. Drawings and Standard General Conditions of the Construction Contract, including Supplementary General Conditions and Division-1 Specification sections, apply to work of this section.

1.02 DESCRIPTION OF WORK

A. The Testing and Balancing (TAB) work shall be done by an agency certified by the Associated Air Balance Council (AABC) or NEBB. The Agency shall show proof of having successfully completed at least five projects of equal size and scope within the previous three years. If the contractor is not so qualified, he shall subcontract the work to a qualified subcontractor.

B. Immediately after the award of a contract, the contractor shall perform a Design Review of the mechanical plans and specifications. He shall identify any omissions or discrepancies that will preclude the proper balancing of the systems and report same to the Owner in a formal report.

C. Test and balance HVAC, kitchen exhaust and kitchen make up air systems as shown and specified on the schedules and Contract Documents and make submittals as described in this Section.

1.03 SUBMITTALS

A. Submit the following to the Owner's Representative for approval:
1. Inspection reports (prior to and during testing and balancing).
2. Other tests, records, certifications and reports as specified in this Section.
3. Associated Air Balance Council (AABC) or NEBB Certification.
4. List of instruments actually used for each test. Include instrument calibration dates.
5. TAB report including preliminary and final balance data sheets) (see Paragraph 3.05); Also submit to Engineer for record.

1.04 REFERENCE STANDARDS

A. Unless shown or specified otherwise, the TAB work shall comply with the following:
1. AABC National Standards for Field measurements and Instrumentation.
2. ASHRAE 110-1985: Method of Testing Performance of Laboratory Fume Hoods.
3. HVAC Systems Testing, Adjusting, and Balancing, Sheet Metal & Air Conditioning Contractor's National Association, Inc. (SMACNA), 1993.

1.05 QUALITY ASSURANCE

A. The organization performing the TAB work shall be certified by the Associated Air Balance Council (AABC) or NEBB.

B. The work shall be performed by regular employees specifically trained in the total balancing of air systems. The work shall be continuously conducted under the direct supervision of a Qualified person who is a certified Test and Balance Engineer by AABC or NEBB and is experienced in testing and balancing of HVAC systems.

PART 2 – PRODUCTS - NOT USED

PART 3 - EXECUTION

3.01 GENERAL

A. Adjust, test and confirm air flow rates, pressure drops, pressures, temperature and heat transfer performance of HVAC system, including integrated economizers, supply, return, and outdoor air. Adjust exhaust air flow rates and confirm water flow rates.

B. Provide preliminary and final (2 phases) testing and balancing. Initiate preliminary testing and balancing immediately after certification of fan (before controls, ceilings, walls, etc. are completed). Confirm macro level performance of devices. The preliminary phase shall be followed by a submitted written report of system shortcomings which prohibit final balancing. Following preliminary testing and balancing, if balancing or control devices are not operating correctly, report these conditions to the Owner's Representative, who shall coordinate required corrections so that balancing can continue.

C. Perform the work using methods and test forms published by AABC National Standards for Field Measurements and Instrumentation (No. 71679, 2nd edition or any later edition).

D. Do not start final testing and balancing until each system has been certified to be complete.

E. Using controls and devices installed, test and balance air conditioning systems with maximum attainable internal load (lights and equipment), or simulated maximum load using automatic temperature controls, whichever is closest to design operating conditions.

F. Do the final testing and balancing of air handling systems with finished ceilings and partitions in place and doors closed.

G. Use volume control devices to regulate air quantities only to the extent that adjustments do not create objectionable air motion or sound levels. Effect volume control by duct internal devices such as dampers and splitters. Vary total system air quantities by adjustment of fan speeds. Provide drive changes required. Vary branch air quantities by damper regulation. Minimize use of balancing devices to "throttle" flow. When balanced, all volume control devices in the path to the terminal with the highest pressure drop shall be fully open.

H. Adjust OA intake on AHU's according to drawings, schedules, and specifications.

I. Have on the job site the AABC standards referred to herein, and make them available to the Mechanical Contractor and the Owner's Representative.

J. The Owner's Representative shall witness final testing and balancing of all system. The Testing and Balancing Contractor shall notify the Owner's Representative ten (10) working days prior to each system being tested and/or balanced.

K. Repair or replacement of finished products damaged as a result of testing, balancing and inspection work shall be the responsibility of the Contractor.

3.02 INSTRUMENT CALIBRATION

A. Provide written certification of the accuracy of all instruments furnished or used for Testing and Balancing. Show date and method of calibration. All instruments shall have been calibrated within six (6) months prior to the estimated completion date of balancing work.

B. Verify the accuracy of permanently installed flow measuring primary elements and their readout instruments, thermometers, sensors and pressure gauges furnished under this contract. Verification may be by calculation and calibration of the primary element and readout instrument, or by an independent measurement of the flow, temperature or pressure of the flow, of the same flowing medium using calibrated instruments. Submit a report of certification, verification, or inaccuracy of all calibrations.

3.03 BALANCING PROCEDURES AND RELATED WORK

A. Balancing shall achieve design air, within a tolerance of -5% to +10% on major equipment (AHU's, Fans) and +/- 10% at terminal points (air outlets, inlets, transfer air quantities, coil water flow rates, etc.).

B. Verify that all thermostats and other controls and the devices they control (such as dampers, constant volume, variable volume terminal box) operate as they are intended and in the sequence specified. Report device failures in bi-weekly reports.

C. Permanently installed flow-measuring elements may be used to accomplish balancing after accuracy has been verified with certified calibrated instruments. Records and report read outs of these instruments for all flows even if not required for testing and balancing results.

D. Where solid state variable speed controls have been provided, adjust and mark controls for proper setting to produce the design flow.

E. Protect readout instruments from damage, and return them in good working order to the Mechanical Contractor.

F. Only direct flow measurement may be used. Do not use indirect calculations, such as a heat balance or pressure drop in a heat exchanger.

G. Balance air system minimum and maximum damper positions for correct operation at both maximum design outside air, and minimum outside air, maximum and minimum return air, etc.

H. Balance air systems in all modes of operation, including unoccupied, occupied, warm up, cool down, Halon evacuation, and smoke control modes. Report on a room by room basis on the total flow of each room. Confirm flow at occupied and unoccupied modes.

I. Provide required openings for duct traverses. Seal test holes in ducts with snap-in plugs. In addition, plugs shall be airtight type and/or sealed air tight in 1% and dust collection leak class systems. Tape is not permitted. Repair insulation where damaged. Mark insulation where readings were taken.

J. Record the test data for each motor, supply fan, power exhaust fan, air system, condenser, fan and heat pump. Apply temperature, barometric and other correction factors for non-standard conditions and record in report.

K. Record the clean filter pressure drop across all air filters where magnahelic gauges have been provided at design operating cfm after final balancing.

3.04 TEST AND RECORDS

A. Submit a separate test report for each air system outlining actual temperatures, pressure drops and flow rates at all terminal devices (e.g., terminal boxes, air terminals, hoods, coils, etc.) and compare totals to the flow measurements taken at the source (e.g., fans and pumps) and to the design parameters.

B. In addition, record test data where applicable on the following test forms defined in Chapter 26 of the AABC National Standards.
1. Air Moving Equipment Test Sheet - Form No. 82030
2. Fan and Motor Pulley - Form No. 82034
3. Duct Traverse Readings - Form No. 82035
4. Duct Traverse Readings - Form No. 82036
5. Air Distribution Test Sheet – Form No. 82040
6. Terminal Units - Form No. 82041
7. Air Cooled Condenser - Form No. 82081
8. Cooling Coil Data - Form No. 82100

C. In addition to tests and records for the foregoing equipment, tests and records are required for the following:
1. Heat Transfer Coils; including nameplate data and, for both design and actual conditions, the following:
    a) Inlet and outlet air temperature and, for cooling, both wet and dry bulb temperatures and 2-foot vertical and horizontal centers at air handlers.
    b) Air pressure drop.
    c) Air face velocity on 2-foot vertical and horizontal centers at air handlers.
    d) Outside air temperature.

D. In addition to data required on AABC forms, the following additional information is required for all scheduled equipment:
1. Motors: Type, frame, number, serial number, and calculated brake horsepower and efficiency at final condition.
2. Fan Systems: For systems controlled by static pressure, assure by test and recording that devices, including high limit controls are calibrated to perform in accordance with Contract Documents, and provide design static pressure at the most demanding location. Furnish and coordinate static pressure setpoint of controls, as applicable, with Controls Contractor.

3.05 TESTING AND BALANCING REPORTS

A. Submit preliminary and final testing and balancing reports for approval.

B. Arrange recorded data by system, using the appropriate designations as established in the Contract Documents. Submit six signed, bound and indexed copies of both preliminary and final reports per building to the Owner's Representative.

C. Where actual measurements recorded for the final balance show deviation of more than the specified tolerance from the design, and the deviation cannot be corrected by balancing with the installed layout and elements, note this deviation in the final report with recommendations for corrective action.

D. In those cases where recorded data can be reasonably interpreted to be inaccurate, inconsistent or erroneous, the Owner's Representative may request additional testing and balancing. The Testing and Balancing Contractor shall, at no additional cost to the Owner, perform such re-testing and re-balancing as directed by and in the presence of the Owner's Representative.

E. Where, in the opinion of the Testing and Balancing Contractor, there is excessive vibration, movement or noise from any piece of equipment, ductwork, or piping, these conditions should be noted in the final report with recommendations for corrective action.

END OF SECTION 230593

SECTION 230700 - MECHANICAL INSULATION

PART 1 - GENERAL

1.01 RELATED DOCUMENTS

A. Drawings, Standard General Conditions of the Construction Contract, including Supplementary General Conditions, Division-1 Specification sections and other Division 23 specification sections, apply to work of this section.

1.02 RATING

A. All insulation systems, including jackets and adhesives shall be U.L. rated and FM approved. All insulation for indoor use shall have a maximum permanent flame spread rating of 25 or less and a smoke developed rating of 50 or less, as tested by ASTM E 84 (NFPA 255) method. Outdoor mechanical insulation may have flame spread index of 75 and smoke developed index of 150. Submit smoke and flame ratings for every material proposed for use.

B. Make: Certain Teed, Owens Corning, Johns Manville, Knauf and PPG.

1.03 SCOPE

A. Furnish and install insulation for the following: Note scope varies depending on alternates selected.
   1. All supply air ductwork.
   2. Return air ducts in unconditioned spaces (ceiling spaces, duct chases, mechanical rooms, attics, exterior etc.).
   3. Outside air ductwork.
   4. Refrigerant Piping

1.04 QUALITY ASSURANCE

A. Insulation contractor shall be member of either the National Insulation Association (NIA) or the Southeastern Insulation Contractors Association (SEICA).

1.05 SUBMITTALS

A. Submit evidence of membership in NIA or SEICA.

B. Submit manufacturer's technical product data and installation instructions for each type of mechanical insulation. Submit schedule showing manufacturer's product number, k-value, thickness, and furnished accessories for each mechanical system requiring insulation.

C. Submit, if requested by Designer, manufacturer's sample of each piping insulation type required, and of each duct and equipment insulation type required. Affix label to sample completely describing product.

PART 2 - PRODUCTS

2.01 Type 1: Thermal Pipe Insulation with Jacket. Preformed Fiberglass Pipe insulation complying with ASTM C547, Class 3, rigid, molded pipe insulation, noncombustible. Maximum K-factor of .24 at mean temperature of 75° F. All insulation shall have a jacket of white kraft paper reinforced with a glass fiber yarn and bonded to an aluminum foil, with self sealing longitudinal laps and butt strips. Jacket shall comply with ASTM C1136 (Type 1). Insulation and jacket shall be equal to Johns Manville Micro-Lok with AP-T Plus.

2.02 Insulate all fittings, valves and strainers with molded fittings, mitered segments of pipe insulation or over- sized pipe insulation held in place with wire. Finish in accordance with manufacturer's recommendations to comply with the UL Systems listing. Preformed jackets of PVC material as manufactured by Zeston, Inc., may be used at fittings.

A. Type 2: Flexible Pipe Insulation:
   1. Material – Flexible, closed cell, elastomeric thermal insulation, minimum k value .27 at 75 degrees F. conforming to ASTM C 534.
   2. Fittings - Sleeve type fitting covers and miter cut tubular form.
   3. Insulation Adhesive – As recommended by manufacturer.
   4. Make: Armstrong AP Armaflex, Rubatex No. R-180-J, or approved equal.

2.02 FIELD APPLIED JACKETS

A. PVC Plastic: Zeston 2000 or equal. One piece molded type fitting covers and jacketing material, gloss white.

B. Canvas Jacket: UL listed fabric, 6 oz/sq yd, plain weave cotton treated with dilute fire retardent lagging adhesive.

C. Aluminum Jacket: 0.016 inch thick sheet, corrugated finish, with longitudinal slip joints and 2 inch laps, die shaped fitting covers with factory attached protective liner.

D. Stainless Steel Jacket: Type 304 Stainless steel, 0.10 inch, corrugated finish.

2.03 DUCT INSULATION

A. Type A - Vapor Seal Duct Insulation
   1. Material: Fiberglass duct wrap 1 lb. density with FSK facing complying with ASTM C1290. Maximum K-factor of .31 at 75ºF. Jacket shall be FSK aluminum foil reinforced with fiber glass yarn and laminated to fire resistant kraft paper, secured with UL listed pressure sensitive tape and outward clinch expanding staples and vapor barrier mastic. Johns Manville Microlite or equal by Owens Corning or Knauf.
   2. Thickness shall be 2 inches.

B. Type B - Vapor Seal Duct Insulation - Rigid
   1. Fiberglass ductboard complying with ASTM C612, Type I. 3 lb. density with maximum K-factor of 0.23 at 75ºF mean temperature. Jacket shall be FSK aluminum foil reinforced with fiber glass yarn and laminated to fire resistant kraft paper, secured with UL listed pressure sensitive tape and outward clinch expanding staples and vapor barrier mastic. Johns Manville 800 or

equal by Owens Corning or Knauf.

PART 3 - EXECUTION

3.01 GENERAL REQUIREMENTS

A. All insulation shall be applied by experienced pipe coverers and journeymen in accordance with best trade practice. Work shall be as recommended by manufacturer's latest printed installation directions. Test, inspect, and clean all surfaces to be insulated before applying insulation. Take all possible precautions to protect work of other trades. Provide protective covering as required to accomplish this and be responsible for returning all equipment and material to its original new condition and appearance where damage occurs due to neglect.

B. For refrigerant suction piping saddle shall be integral with pre-compressed, 12 to 20 percent density fiberglass segment as manufactured by Insulcoustic.

C. Where subjected to freezing, insulate piping with double the thickness specified in this section.

D. Apply adhesive to exposed risers to prevent slipping and turning.

E. Butt covering neatly to walls, floors, ceiling. Apply bands at end and position so band covers gap between surface and insulation where exposed.

F. At butt ends of insulation the jacket material shall be pulled over exposed ends and secured with bands to give a neat and finished appearance. Exposed fiberglass material will not be permitted. In location where it will be exposed to view do not apply insulating cement until there is heat on lines.

G. Do not cover nameplates on equipment.

H. Do not insulate vibration eliminators.

I. Insulation on all cold surfaces must be applied with a continuous, unbroken vapor seal. Any hangers, supports, anchors, etc. that are secured directly to cold surfaces must be adequately insulated and vapor sealed to prevent condensation. Seal pipe terminations every four sections using Foster 30-35 or equal by Miracle or Mon-Eco Industries, Inc.

J. Provide PVC jacket on all exposed piping mounted below 10' in finished areas. Owner will select color from chart offered by manufacturer.

K. Provide aluminum jacket on all exterior piping.

L. Provide canvas jacket in mechanical rooms and on all exposed piping above 10’.

M. Insulation on piping below ground shall receive 15# felt paper wired every 12” O/C with 18 ga. Stainless steel wire. Felt paper shall be coated with an asphalt-based vapor and weather barrier equal to Chil-Pruf (CP-22/23/24) insulation coating manufactured by Childers Products Company, Inc. Felt and insulation coating shall continue for two feet where pipe comes up above ground.

N. Overlap aluminum jacket over the above-ground vapor barrier.

3.03 DUCT INSULATION SHALL BE APPLIED AS FOLLOWS

A. Type A - Vaporseal Duct Insulation.
   1. All supply air ducts inside the building.
   2. All concealed return air ducts.
   3. All outside air and return ducting in mechanical spaces.

B. Type B - Vapor Seal Duct Insulation - Rigid.
   1. Not Used

3.04 SPECIFIC REQUIREMENTS

A. Type A Insulation: Fiberglass duct wrap insulation shall be applied over clean, dry sheet metal duct. Before applying the insulation all joints and seams shall be sealed air tight. Duct wrap shall be installed to allow maximum fullness at corners. Minimum thickness at corners is one inch.

B. Insulation shall be butted tightly at joints and vapor barrier facing shall be overlapped at minimum of 2 inches. Insulation should be removed from lap prior to stapling.

C. All seams shall be stapled approximately 6 inches on center with outward clinching staples then sealed with a foil vapor barrier tape, or vapor barrier mastic.

D. Where ducts are over 24 inches in width, the duct wrap shall be additionally secured to the bottom of rectangular ducts with mechanical fasteners spaced on 18 inch centers (maximum), to prevent sagging of insulation. Seal penetrations so as to provide a vapor-tight system.

E. Insulation shall be installed according to manufacturer recommendations.

F. Insulation over the expansion joint and the flexible section shall be loose and of adequate length to permit the movement of pipe.

G. Provide insulation shield equivalent to Fee and Mason Fig. 81 at each support.

3.05 DO NOT INSULATE

A. Vibration eliminators.

END OF SECTION 230700

SECTION 230923 - DIRECT DIGITAL CONTROL

PART 1 GENERAL

1.01 RELATED WORK SPECIFIED ELSEWHERE

A. All work of this Division shall comply with the requirements of the Drawings, Standard General Conditions of the Construction Contract, including Supplementary General Conditions and Division 1 Specification Sections.

B. Section 230510 - General Provisions.

C. Division 26 - Electrical

1.02 DESCRIPTION

A. Furnish and install as herein specified, a web based Energy Monitoring and Control System with point and click graphics to provide night setback, optimized startup and other control functions. The system shall be complete in all respects, including thermostats, relays, contacts, etc. to provide the function described hereinafter regardless of whether thermostats, relays, etc. are specifically mentioned or not.

B. Alternate proposals or substitutions, where provided, must conform to plans or specifications in detail, and any deviation, no matter how minor, must be included in the list of deviations submitted with the bid. Any proposed system with deviations which, in the opinion of the Owner and/or the Engineer, alter the basic intent of the specifications will not be accepted.

C. The system being installed shall be compatible with current and future plans for control and monitoring of the HVAC systems in the building.

D. Provide the following electrical work as work of this section, complying with requirements of Section 230530 and Division 26 sections:
   1. Control wiring between field-installed controls, sensors, relays, transducers, indicating devices, and unit control panels. Include power wiring from nearest electrical breaker panel with available capacity to temperature control panels or other terminal devices.
   2. Interlock wiring between electrically-operated equipment units and between equipment and field-installed control devices.

1.03 WORK INCLUDED

A. The following work is specifically included without limiting the generality implied by these specifications and drawings.
   1. Installation of a microprocessor based direct digital control (DDC) system to control HVAC equipment and systems for space temperature control, night setback, demand limiting, etc.
   2. Cutting and patching as required for the introduction of work as shown on the plans and as specified in this Division.
   3. Tie system controller to owner’s Ethernet switch to allow access over the internet.

4. Provide all internal and external wiring for the Direct Digital Control System.

1.04 SHOP DRAWING

A. Submit for approval, apparatus bulletins and data sheets for all controls components, valves, damper, and room schedules showing size, configuration, capacity and location of all equipment. Include complete control diagrams with system description, wiring diagrams and installation and maintenance instruction.

B. All control wires on the line side of relay, starter or contactor coils, pilot lamps or other utilization components shall be color coded and labeled. All control wires on the neutral side of utilization components shall be white.

1.05 ELECTRICAL WIRING

A. Refer to Electrical Specifications for wiring required under this Section.

B. All wiring shall be done in accordance with the latest edition of National Electric Code, Division 26 and the North Carolina State Building Code.

C. All wiring associated with direct digital control and Micro-Processor System shall be by this Division.

D. Wiring methods:
1. All line voltage wiring shall be in conduit.
2. All low voltage control wiring shall be in conduit in mechanical rooms. Low voltage wiring above ceiling, in attic, or in crawl space made be run not in conduit if securely strapped and secured. Must be labeled DDC controls. Route groups of wires together in one bundle.

E. All penetrations of rated walls and floors shall be firestopped in accordance with the UL details indicated on the drawings.

1.06 GUARANTEE

A. Control system specified herein shall be guaranteed free from original defects in material and workmanship for a period of <u>two</u> years of normal use and service after final inspection and acceptance of the project. Provide a paid in full service agreement in the name of the Owner, including material and labor, for two years to run concurrently with guarantee period. This service is to include both “break down maintenance” initiated by a telephone call from the Owner and a minimum of two preventative maintenance inspections and adjustments per year. <u>Same-day service shall be guaranteed if a service call, from the Owner to Contractor, is placed before 12:00 noon.</u>

B. The control system manufacturer shall state that equipment compatible with that being bid will be available for at least three years after acceptance of this work. Support and spare parts shall be available for at least five years.

C. The manufacturer shall provide, free of cost, any upgrades to the software for a period of three years from acceptance of this work.

1.07 QUALIFICATION FOR MICROPROCESSOR BASED ENERGY MANAGEMENT

EQUIPMENT SUPPLIER

A. Acceptable manufacturers are Automated Logic, Honeywell, Schneider Electric, Distech, Trane, Alerton.

B. If the system is not installed by the manufacturer, the installing contractor's primary business shall be the installation of Temperature Control and Direct Digital Control Systems, and he shall have a minimum of three years experience in the installation and service of microprocessor based systems. Upon request, the contractor should be able to provide a list of at least three other installations where he has installed a system of similar size and scope. Failure to show at least three successful installations will disqualify the contractor.

C. The contractor shall have a local office within a 100 mile radius of the job, staffed with factory trained engineers capable of providing instruction, routine maintenance and emergency maintenance service. The local office shall also maintain an adequate stock of spare parts needed for normal servicing and repairs.

PART 2 PRODUCTS

2.01 MICROPROCESSOR BASED CONTROL SYSTEM (MPS) FOR ENERGY MANAGEMENT

A. General Requirements: Furnish and install a networking microprocessor based Energy Management System hereinafter referred to as MPS for the monitoring and control of the mechanical and electrical equipment designated. It is the intent of this specification to describe the performance requirements of the MPS. Therefore, these specifications describe the operational functions of the system and present minimal requirements for equipment to accomplish these functions. The MPS shall be comprised of the hardware and the software required to perform all designated tasks as described hereinafter. The installation may consist of one or more individual MPS panels. The term MPS refers to each individual panel as well as the entire installation. An MPS shall be able to communicate with other MPS by local network through a twisted pair or shielded wire. A local network may be comprised of more than thirty (30) MPS. The local network shall be able to interface through the Web via an Ethernet port. The MPS system shall be a true distributive processing system and each MPS shall be a self-contained programmable control and monitoring system. Each MPS shall be able to perform its control, energy management and alarming functions independently from other units. The MPS shall consist of one or more logic panels depending upon control strategy and number of points controlled and/or monitored. The MPS shall not be dependent upon master unit or CPU for control logic or data. A failure of one MPS will not adversely affect the operation of other MPS of the distributed network.

B. Hardware: Each MPS controller shall be UL listed or shall comply with UL 916 standard for Energy Management. Power Supply to the panel shall be isolated with UL labeled Class II transformer. The primary side of the transformer shall be protected by overcurrent protection, and the secondary side shall have fused disconnect. Circuit breaker type disconnect at the secondary side will not be acceptable. Primary side protection shall not be required on small Application Specific Controllers (ASC's) used to control small individual pieces of equipment (fan coil units, etc.) The MPS shall be provided as a networking stand-alone energy

management system enclosed in one or more sturdy metal enclosures containing a microcomputer, power supplies, battery backup, and input/output control boards.

C. Surge and Lightning Protection Line voltage protection: The DDC system control panels shall be powered by 120 VAC circuits provided with surge protection. This protection is in addition to any internal protection provided by the manufacturer.

2.02 GENERAL APPLICATION PROGRAMS

A. Each stand-alone networking unit shall be programmable through the integral keyboard or peripheral terminal. Software architecture shall allow both standard setups of point types, EMS Programs, loops or related parameters as well as custom program linking with math and logic. In addition, the MPS shall allow the building operators a means of interrogating input/output sensor conditions, such as interrogating the values of analog sensor input upon request, or the status of control via the standard keyboard and display unit, or through a remote CRT Terminal Unit. The MPS shall not be dependent upon a master control unit or CPU for control logic or data. The system access shall be restricted by at least three levels of password security. As a minimum, the system shall be programmed for six users each with designated three letter Operator ID and four- character password.

B. Each of the MPS units on the network shall be able to access global information. Such information as outside air temperature, demand shed commands, and enthalpy changeover etc. routines can be shared by all units on the Network.

C. Local Network status shall monitor all communication in the network. Loss of any data transfer will trigger alarms as well as default sequences to maintain system integrity. MPS will execute a pre-defined mode of operation if the system fails.

D. Building alarm monitoring and reporting shall be generated based upon the presence of abnormal alarm conditions such as high/low temperature input or abnormal change of state such as freeze stats, fire stats, filter alarm switches, etc.

E. Control Points: Output: As required to perform control function outlined in the system description hereinafter. The processor shall be capable of expanding the output control points as required for future growth.

2.03 DIRECT DIGITAL CONTROL (DDC)

A. Direct control capability using a custom control program, manual command, or time program initiated commands shall be provided as a standard feature of this system. The Digital Output board shall be used for two state commands to loads, such as stop/start, day/night, open/close, etc. The digital output board shall provide a normally closed or open dry contact output with a minimum contact rating of 1 amp at 24 volts. The Digital Input board shall accept an input voltage of 0 to 2V for OFF and 10 to 24V for an ON, which can represent status or alarm signals from monitored devices, or can count pulses from an energy demand generator. The analog input board shall accept 1 to 11 volts or 4 to 20 ma dc. Analog inputs will be scaled to readout in engineering units, as appropriate. The analog output board shall be used for varying outputs (4-20 mA, 0-20 VDC, etc.) used for controlling modulating valves, dampers, etc.

B. Enclosure: The MPS shall be in a NEMA 1, 16-gauge steel cabinet. The cabinet door shall include a key lock latch and shall be made of steel with welded seams and

corners. The cabinet will contain sufficient terminal strips for input/ output wiring and for an enclosed block for connection of 120 volts 60 Hz power. The I/O terminal shall be designed for easy installation of field cables. Terminal strips shall be clearly marked for ease of installation. The field breakdown of the panel must be possible without the need to disconnect the field wiring.

2.04 SENSORS AND TRANSMITTERS

A. Space Temperature Sensors shall be electronic type. Accuracy of the transmitter shall be plus or minus 0.7 deg. F at ambient temperature 77 deg. F. Sensors shall have a temperature range of -40 to 160 deg. F. The sensor shall be complete with a steel plated flush mounted cover. Sensors shall have a setpoint slide adjustment bar or knob and manual override button.

B. Outdoor Sensor shall be mounted in the outdoors on the north side of the building where natural air flow occurs, away from any artificial affect from mechanical sources. The temperature range shall be -40 to 220 deg. F. A sun shield and weatherproof assembly for mounting to 1/2 inch rigid conduit must be provided.

C. Duct Temperature Sensors shall have an insertion measuring probe 6 inches long with a temperature range of -40 to 250 deg. F. The sensor shall include a utility box and gasket to prevent leakage and vibration noise. For all mixed air and preheat air applications, install bendable averaging duct sensors with a minimum 5 foot long sensor element.

2.05 CONTROL AND COMPUTER INTERFACE RELAYS

A. Relays shall be plug-in type with blade type terminals (not pin type). Relays shall be furnished with separate relay base for ease of serving. Relays shall be furnished with SPDT, DPDT, 3PDT or 4PDT configuration as may be required. Relays shall have a minimal contact rating of 10 amps at 240 volts. Relay mechanical life expectancy shall be rated for 50,000,000 or more operations.

B. Coil resistance shall be low VA type.

2.06 ELECTRIC OPERATORS

A. Size electric actuators to operate their appropriate dampers or valves with sufficient reserve power to provide smooth modulating action or two-position action as specified. Actuators shall be Belimo or approved equal. Where two or more actuators are to be operated in sequence to each other, provide position feedback positive positioners with adjustable startpoint and operating range.

PART 3 EXECUTION

3.01 STARTUP

A. Calibrate and adjust all control equipment and place systems into operation. This shall include a systematic operational check of all control devices with particular attention to the following:
   1. Tag all equipment involved with this contract with permanent Bakelite

lamichord tags. Stick-on type labels will not be acceptable.
2. Check out sequence of all equipment in all operating modes.
3. Set clock for proper operation.
4. Program the system with initial schedules and setpoints after discussions with the Owner.

3.02 SYSTEM TESTING

The contractor shall perform the following tests with the Commissioning Agent and the Owner's representative. The contractor shall provide one week's notice before testing shall occur. The contractor shall provide a report on all discrepancies/errors that were uncovered and corrected during the system testing.

A. Temperature Sensors: Measure temperature with calibrated thermometer or temperature sensor. Touch or otherwise disturb the sensor to verify the sensor being measured is connected to the correct point. Verify operation of the manual override and manual adjustment where applicable.

B. Pressure Sensors and Transducers: Verify offset and gain calibration of every device.

C. Verify output operation of all relays and verify they are connected to the correct point.

D. Valves and damper strokes: Verify valve and damper stroke as compared to as-builts. Verify software stroke data corresponds with actual valve and damper strokes.

E. Provide graphical trends of all setpoint control, both PID, two position, and floating. Verify PID loops have been "loop tuned."

F. Verify each process in the Sequence of Operation.

3.03 GENERAL REQUIREMENTS

A. Install temperature sensors and manual overrides at locations shown on the drawings.

B. Manual overrides shall switch systems from unoccupied mode to occupied mode for a programmable length of time. Activation of the manual override for a particular system shall automatically bring on and control all other equipment needed by the system. This will include all needed hot water generators chillers, pumps, etc.

C. Provide alarms and trend logs as detailed in the Input/Output Schedules shown on the plans. The points shown in the Input/Output Schedule are the minimum points to be provided. The Contractor shall provide additional Input/Output points, as required, to provide the performance described in this section and sequences of operation shown on plans.

D. In the event of the MPS failure, all systems controlled by the particular MPS panel shall fail in the occupied mode of operation.

E. Equipment serving a specific building zone shall be run according to the zone's own occupancy schedule. The Owner shall provide initial occupancy schedules for each zone to the Contractor. The Contractor shall include each specific zone schedule in

the initial programming of the MPS. The Owner shall have the capability of modifying these schedules whenever desired.

F. Laminate one copy of the panel layout and install in pouch in each control panel.

G. Provide graphical programming of the system, including automatically updating graphic screens that demonstrate building conditions and the operation of each piece of equipment and system.

H. Upon startup of the system, the Owner's maintenance personnel shall be provided with 4 hours of a planned and progressively advanced on-site training by a factory trained manufacturer's representative on the operation and maintenance of the DDC Control System. System startup time shall not apply toward this training time. Additional 1 hour training sessions shall be provided 3 months and 6 months after acceptance of the system. These must be scheduled before completion of the project.

3.04 SEQUENCE OF OPERATION

A. The Contractor shall examine the Sequence of Operation in the contract documents and advise the Engineer of any anticipated problems in programming the sequence and submit specific recommendations for modifying the sequence. The Contractor shall participate in discussions with the Owner and Engineer to develop the final Sequence of Operation. It shall be the contractor's responsibility to program the sequence and make any necessary changes for proper and optimal system performance. The Contractor shall use controllers that are capable of providing the full final sequence of operation for each particular application. Any installed controllers that are proven not to have that full capability shall be replaced by the Contractor with the appropriate controllers.

See drawings for Sequence of Operation.

A meeting shall be scheduled prior to installation and programming of the DDC system between the mechanical contractor, controls subcontractor, engineer, commissioning agent, and owner to refine control strategies and determine zoning and scheduling.

END OF SECTION 230923

SECTION 232300 - REFRIGERANT PIPING AND SPECIALTIES

PART 1 - GENERAL

1.01 RELATED DOCUMENTS

A. Drawings, Standard General Conditions of the Construction Contract, including Supplementary General Conditions and Division - 1 Specification sections, apply to work of this section.

1.02 QUALITY ASSURANCE

A. Codes and Standards:
   1. ANSI Compliance: Fabricate and install refrigerant piping and specialties in accordance with ANSI B31.5, and extend applicable lower limits to pressures below 15 psig.
   2. ASHRAE Compliance: Fabricate, and install refrigerant piping, and specialties in accordance with ASHRAE 15 "Safety Code for Mechanical Refrigeration".

1.03 SUBMITTALS

A. Submit manufacturer's technical product data and installation instructions for refrigerant piping and specialties materials and products.

PART 2 – PRODUCTS

2.01 PIPE AND FITTINGS

A. Provide pipes and pipe fittings complying with Section 232160, in accordance with the following listing:
   1. Size 1" and Larger: Copper tube: Type K, soft annealed temper fittings; cast copper alloy fittings for flared copper tubes; flared joints.
   2. Size 3/4" and Smaller: Copper tube; Type ACR soft annealed temper fittings; cast copper-alloy fittings for flared copper tubes; flared joints.

B. Soldered Joints: Solder joints using silver-lead solder, ASTM B32, Grade 96 TS.

PART 3 - EXECUTION

3.01 INSTALLATION OF REFRIGERANT PIPING

A. Install refrigerant piping with 1/4" per foot (1%) downward slope in direction of oil return to compressor. Provide oil traps and double risers where indicated, and where required to provide oil return.

B. Clean refrigerant piping by swabbing with dry lineless (linen) cloth, followed by refrigerant oil soaked swab. Remove excess oil by swabbing with cloth solvent in high flash point petroleum solvent, squeezed dry.

C. Bleed dry nitrogen through refrigerant piping during brazing operations.

3.02 FIELD QUALITY CONTROL

A. Refrigerant piping Leak Test: Prior to initial operation, clean and test refrigerant piping in accordance with ANSI B31.5., "Refrigeration Piping". Perform initial test with dry nitrogen using soap solution to test all joints. Perform final test with 27" vacuum, and then 200 psi using electronic leak detector. System must be entirely leak-free.

B. Repair or replace refrigerant piping as required to eliminate leaks, and retest as specified to demonstrate compliance.

3.03 DEHYDRATION AND CHARGING SYSTEM

A. Install core in filter dryer after leak test but before evacuation.

B. Evacuate refrigerant system with vacuum pump; until temperature of 35 deg. F (2 deg. C) is indicated on vacuum dehydration indicator.

C. During evacuation, apply heat to pockets, elbows, and low spots in piping.

D. Maintain vacuum on system for minimum of 5 hours after closing valve between vacuum pump and system.

E. Break vacuum with refrigerant gas. Allow pressure to build up 2 psi.

F. Complete charging of system, using new filter dryer core in charging line. Provide full charge.

END OF SECTION 232300

SECTION 233100 - DUCTWORK AND DAMPERS

PART 1 - GENERAL

1.01 RELATED DOCUMENTS

A. Drawings, Standard General Conditions of the Construction Contract, including Supplementary General Conditions, Division-1 Specification sections and other Division 23 specification sections, apply to work of this section.

1.02 QUALITY ASSURANCE

A. Codes and Standards:
   1. NFPA Compliance: Comply with NFPA 90A "Standard for the Installation of Air Conditioning and Ventilating Systems" and NFPA 90B “Standard for the Installation of Warm Air Heating and Air Conditioning Systems”.

PART 2 - PRODUCTS

2.01 DUCTWORK MATERIALS

A. Sheet Metal: Except as otherwise indicated, fabricate ductwork from galvanized sheet steel complying with ASTM A 527, lock forming quality; with G 90 zinc coating in accordance with ASTM A 525. Exposed sheet metal ductwork is to have a mill phosphated paint grip finish.

B. Stainless Steel Sheet: Where indicated, provide stainless steel complying with ASTM A 167; Type 302, 304, or 316; with No. 4 finish where exposed to view in occupied spaces, No. 1 finish elsewhere. Protect finished surfaces with mill-applied adhesive protective paper, maintained through fabrication and installation.

C. Aluminum Sheet: Where indicated, provide aluminum sheet complying with ASTM B 209, Alloy 3003, Temper H14.

2.02 FABRICATION

A. General: All low velocity sheetmetal ductwork shall be constructed in accordance with recommendations of Low Pressure Duct Construction Standard, of Sheet Metal and Air Conditioning Contractors National Association, Inc., Fifth Edition, 1976, AIA File No. 30-D-4, hereafter abbreviated SMACNA-I and latest recommendations of the ASHRAE Handbook “HVAC Systems and Equipment.” Duct systems shall be complete including all duct fittings, turning vanes, hangers, and supports shown on drawings and in SMACNA-I. Reference to plate numbers and figure numbers apply to this Duct Manual.

B. Shop fabricated ductwork in maximum 8-ft lengths, unless otherwise indicated. Preassemble work in shop to greatest extent possible, so as to minimize field assembly of systems. Disassemble systems only to extent necessary for shipping and handling. Match-mark sections for reassembly and coordinated installation. Shop fabricate ductwork of gages and reinforcement complying with SMACNA "HVAC Duct Construction Standards" (First Edition, 1985) in accordance with the

following:

Application	Construction Pressure STD
Return Ductwork	-1" W.G.
Supply Ductwork with Fan Static Pressure Less Than 2.5" W.G.	+1" W.G.
Supply Ductwork Downstream of Air Terminals	+1" W.G.
Supply Ductwork with Fan Static Pressure Greater Than 2.5" W.G.	+2" W.G.
Supply Ductwork with Fan Static Pressure Greater than 5.0"W.G.	+3" W.G.
General Exhaust Ductwork	-1" W.G.
Special Exhaust Ductwork	As indicated on drawings

C. Cross-break all flat panels between bracing except where rigid insulation is applied.

D. Elbows shall be standard radius or square with air foil double vanes, round duct elbows shall be of five piece construction.

E. Transitions shall be made with maximum angle of 15 degrees with straight duct for diverging flow, 20 degrees for converging flow.

F. Fabricate Ductwork with duct liner in each section of duct where indicated. Laminate liner to internal surfaces of duct in accordance with instructions by manufacturers of lining adhesive, and fasten with mechanical fasteners. Note that duct sizes on the drawing are "net" and must be increased to allow for duct liner unless ductwrap type insulation is allowed in accordance with Section 230700.

2.03 FLEXIBLE DUCTWORK

A. Type B - Round - Low Pressure
1. Factory insulated with vapor barrier and factory attached clamps. Do not exceed 5 foot length. Not to exceed manufacturer recommendations for minimum bend radius. Flexible duct good for 1-1/2 inch W.G. internal S.P. and shall meet the Class I requirements of NFPA 90A.
2. Flame spread rating of 25 and smoke developed rating of 50 or under.
3. Each end shall be banded (draw type) for connection to duct fitting and mixing boxes.
4. Insulating value shall be R5.2.
5. Make: Genflex SLR-25, Owens-Corning, Jenflex, Wiremold.

2.04 TURNING VANES

A. Shall be installed in all square elbows. Vanes shall be manufactured from minimum 26 gauge electro-galvanized steel and sides shall be manufactured from minimum 24 gauge electro-galvanized steel with assembled slots located on design center of 2-1/8 inches. Turning vanes shall be high-efficiency profile. Submit shop drawing for approval.

2.05 FLEXIBLE DUCT CONNECTIONS

A. Fabricate in accordance with SMACNA HVAC Duct Construction Standards - Metal and Flexible, and as indicated.

B. Connector: Fabric crimped into metal edging strip.
1. Fabric: UL listed fire-retardant neoprene coated woven glass fiber fabric

to NFPA 90A, minimum density 30 oz per sq yd.
2. Net Fabric Width: Approximately 6 inches wide.
3. Metal: 3 inch wide, 24 gage galvanized steel.

2.06 BACKDRAFT DAMPERS

A. Gravity Backdraft Dampers, Size 18 x 18 inches or Smaller, Furnished with Air Moving Equipment: Air moving equipment manufacturer's standard construction.

B. Multi-Blade, Parallel Action Gravity Balanced Backdraft Dampers: 16 gage thick galvanized steel or extruded aluminum, with center pivoted blades of maximum 6 inch width, with felt or flexible vinyl sealed edges, linked together in rattle-free manner with 90 degree stop, steel ball bearings, and plated steel pivot pin; adjustment device to permit setting for varying differential static pressure.

2.07 DUCT TEST HOLES

A. Permanent Test Holes: Factory fabricated, air tight flanged fittings with screw cap. Provide extended neck fittings to clear insulation.

2.08 VOLUME CONTROL DAMPERS

A. Fabricate in accordance with SMACNA HVAC Duct Construction Standards - Metal and Flexible, and as indicated.

B. Single Blade Dampers: Fabricate for duct sizes up to 6 x 30 inch.

C. Multi-Blade Damper: Fabricate of opposed blade pattern with maximum blade sizes 8 x 72 inches. Assemble center and edge crimped blades in prime coated or galvanized channel frame with suitable hardware.

D. End Bearings: Except in round ductwork 12 inches and smaller, provide end bearings. On multiple blade dampers, provide oil-impregnated nylon or sintered bronze bearings.

E. Quadrants: Provide locking, indicating quadrant regulators on single and multi-blade dampers. On insulated ducts mount quadrant regulators on stand-off mounting brackets, bases, or adapters. Where rod lengths exceed 30 inches provide regulator at both ends.

2.09 DAMPER CONTROL COMPONENTS

A. Damper Motors: Size each motor to operate with sufficient reserve power to provide smooth 2-position action as specified.

B. Provide motors with spring-return motors with integral spiral-spring mechanism. Furnish entire spring mechanism in housings designed for easy removal for service or adjustment of limit switches, auxiliary switches, or feedback potentiometer. Size spring-return motors

for running torque rating of 150 inch-pounds, and breakaway torque rating of 150 inch-pounds. Motors shall be manufactured by Belimo.

C. Provide motors for outdoor locations and for outside air intakes with "0 ring" gaskets

designed to make motors completely weatherproof, and provide with internal heaters to permit normal operation at -40EF (-40EC).

D. Available Manufacturers: Subject to compliance with requirements, manufacturers offering insulated louver-dampers which may be incorporated in the work include; but are not limited to, the following:
   1. Arrow United Industries, Inc.
   2. Louvers & Dampers, Inc.
   3. Ruskin Mfg. Co.
   4. Safe-Air Inc.
   5. Vent Products Co., Inc.

PART 3 - EXECUTION

3.01 INSTALLATION OF METAL DUCTWORK

A. General: Assemble and install ductwork to achieve airtight (5% leakage for systems rated 3" and under; 1% for systems rated over 3") and noiseless (no objectionable noise) systems, capable of performing each indicated service. Install each run with minimum number of joints. Align ductwork accurately at connections, within 1/8" misalignment tolerance and with internal surfaces smooth. Rigid round, rectangular and flat oval metal ducts shall be installed with support systems in accordance with SMACNA HVAC duct construction standards. Horizontal ducts shall have a support within two feet of each elbow and within four feet of each branch intersection. Support ducts rigidly with suitable ties, braces, hangers and anchors of type which will hold ducts true-to-shape and to prevent buckling.

B. Seal all exhaust, return and supply duct joints with mastic. Do not insulate until engineer has reviewed installation. Refer to exterior duct insulation detail on drawing M-500.

C. Flexible Duct:
   1. Type B, Round, Low Pressure Factory insulated with vapor barrier and factory
      attached clamps. Do not exceed 5 foot length. Not to exceed manufacturer recommendations for minimum bend ratio.
   2. Flexible duct good for 1-1/2 inch W.G. internal S.P. and shall meet the Class 1 requirements of NFPA 90A-Underwriters.
   3. Flame spread rating of 25 and smoke developed rating of 50 or under.
   4. Each end shall be banded (draw type) for connection to duct fitting and diffuser boot.
   5. Install flexible ducts in accordance with Section III of SMACNA’s HVAC Duct Construction Standards.”
   6. Make: Genflex SLF-25, Owens-Corning, Jenflex, Wiremold, or approved equal.

D. Volume Control Dampers: Provide where specified above, where indicated on drawing and in all branches or at all supply, return air, exhaust or transfer openings required to balance system whether or not specifically shown on drawings Dampers shall be locking quadrant type, manual balancing clamps.
   1. Blades: 22 gauge minimum galvanized sheet steel for rectangular 20 gauge for round.

2. Frames: 22 gauge minimum galvanized sheet steel for rectangular, 20 gauge for round
3. Bearings: Synthetic.
4. Control shaft/hand quadrant: 3/8" square axle shaft, extending beyond frame with factory supplied locking hand quadrant for field mounting. Provide 2" hand quadrant standoff bracket for dampers installed on duct wrapped with external insulation.
5. Accessibility: All dampers shall be adjustable after building is completed. Where dampers are hidden behind furred spaces, damper rods shall be adjustable from flush mounted boxes similar to the Young concealed damper regulator.
6. Make: Ruskin MD25 for rectangular and MDRS25 for round, or equivalent by Arrow United Industries, NCA or Vent Products Co., Inc.

E. Automatic control dampers: Furnish and install where specified or indicated on drawings. Damper motors will be furnished and installed by the DDC Contractor. Control and low voltage power wiring will be provided by DDC contractor. Provide transition or blank off baffles where required to suit damper size.
1. Type: Opposed blade for modulating service or non-modulating service. Parallel blade is acceptable for non-modulating service.
2. Blades: 16 gage minimum galvanized sheet steel, interlocking design.
3. Frames: 16 gage minimum galvanized sheet steel.
4. Bearings: Nylon
5. Seals: Synthetic elastomer installed on blade edges and top and bottom strips of each damper, with flexible metal compression seal on sides.
6. Leakage: Conform to leakage requirements as prescribed by SMACNA for medium pressure duct systems.
7. Automatic Control Damper actuators shall provide pilot positioning where sequenced operation is required with adjustable starting point and range, 25% surplus power, spring return.
8. Make: Ruskin CD-60 low leakage, low noise damper or approved equal by Arrow United Industries, NCA or Vent Products Co.

F. Flexible Duct Connections: Install at all duct connections to roof top units and ducts crossing building expansion joints and where condensation may occur. Use double fabric of approved flame-proof material similar to Ventfab. However, asbestos containing materials shall not be used. Material used shall be applicable for intended use. Assemble to duct and blower with washer strip of 1 inch x 1/8 galvanized steel, bolted in o.c. leaving 2 inch slack at joints.

G. Rain Hoods: Provide galvanized sheet metal rain hood over damper motors installed outside the building (exposed to weather).

H. Trim Collars: Wherever duct passes exposed to view through walls, the opening shall be framed with 1 inch x 1 inch x 1/8 inch angles on both sides of partitions with corners mitered, welded and ground smooth.

I. Turning Vanes: Shall be installed in all square elbows. Vanes shall be manufactured from minimum 26 gauge electro-galvanized steel and sides shall be manufactured from minimum 24 gauge electro-galvanized steel with assembled slots located on design center of 2-1/8 inches. Turning vanes shall be high-efficiency profile type (H.E.P.) as manufactured by AER/DYNE Co., Los Altos, CA 94022, or equivalent by American Elgin or Ductmate Industries, Inc. Submit shop drawing for approval.

3.02 ADJUSTING AND CLEANING

A. Clean ductwork internally, unit by unit as it is installed, of dust and debris. Clean external surfaces of foreign substances which might cause corrosive deterioration of metal or, where ductwork is to be painted, might interfere with painting or cause paint deterioration.

B. Temporary Closure: At ends of ducts which are not connected to equipment or air distribution devices at time of ductwork installation, provide temporary closure of polyethylene film or other covering which will prevent entrance of dust and debris until time connections are to be completed. Similarly, provide temporary closure of ends of all prefabricated ductwork in storage.

END OF SECTION 233100

SECTION 233423 - HVAC POWER VENTILATORS

PART 1 - GENERAL

1.01 RELATED DOCUMENTS

A. Drawings and general provisions of Contract, including General and Supplementary Conditions and Division -1 Specification Sections, apply to work of this section.

1.02 QUALITY ASSURANCE

A. AMCA Compliance: Provide power ventilators which have been tested and rated in accordance with AMCA standards, and bear AMCA Certified Ratings Seal.

1.03 SUBMITTALS

A. Manufacturer's Data: Submit manufacturer's technical data for power and gravity ventilators, including specifications, capacity ratings, dimensions, weights, materials, accessories furnished and installation instructions.

PART 2- PRODUCTS

2.01 POWER VENTILATORS

A. Roof mounted exhaust fan:
   1. Centrifugal Rooftop Ventilators: Provide centrifugal wall and rooftop type power ventilators of type, size, and capacity as scheduled, and as specified herein.
   2. Centrifugal fan, direct or belt driven as scheduled. Provide spun aluminum weatherproof housing. Provide wall sleeve, of length to suit wall thickness or roof curb, flashing, etc. for rooftop installation. Provide permanent split capacitor type motor for direct driven fans, capacitor- start, induction run type motor for belt driven fans.
   3. Electrical: Provide factory wired non fusible type disconnect switch at motor in fan housing. Provide thermal overload protection in fan motor. Provide conduit chase within unit for electrical connection.
   4. Dampers: Provide gravity actuated louvered damper.

B. Ceiling Mounted Inline Exhaust Fans with Integral Grilles:
   1. Ceiling mounted exhaust fans shall be of the centrifugal direct drive type. The fan housing shall be constructed of steel. The duct collar shall be steel and shall include a backdraft damper. The grille shall be constructed of non-yellowing high impact polystyrene and attached to the housing with screws. The access for wiring shall be external. The motor disconnect shall be internal and of the plug in type. The motor shall be mounted on vibration isolators. The fan wheel shall be of the forward curved centrifugal type and shall be dynamically balanced.
   2. Fans shall be Greenheck, Penn, Cook, or approved equal.

PART 3 - EXECUTION

3.01 INSTALLATION OF POWER VENTILATORS

A. Coordinate ventilator work with work of roofing, walls, and ceilings, as necessary for proper interfacing.

3.02 FIELD QUALITY CONTROL

A. Testing: After installation of ventilators has been completed, test each ventilator to demonstrate proper operation of units at performance requirements specified.

END OF SECTION 233423

SECTION 233715 - AIR OUTLETS AND INLETS

PART 1 - GENERAL

1.01 RELATED DOCUMENTS

A. Drawings and general provisions of Contract, including General and Supplementary Conditions and Division-01 Specification sections, apply to work of this section.

1.02 DESCRIPTION OF WORK

A. Extent of air outlets and inlets work is indicated by drawings and schedules, and by requirements of this section.

B. Types of air outlets and inlets required for project include the following:
1. Diffusers
2. Grilles
3. Registers

C. Codes and Standards:
1. ARI Compliance: Test and rate air outlets and inlets in accordance with ARI 650 "Standard for Air Outlets and Inlets".
2. ASHRAE Compliance: Test and rate air outlets and inlets in accordance with ASHRAE 70 "Method of Testing for Rating the Air Flow Performance of Outlets and Inlets".
3. The grilles shall be tested in accordance with ANSI/ASHRAE Standard 70-1991.
4. NFPA Compliance: Install air outlets and inlets in accordance with NFPA 90A "Standard for the Installation of Air Conditioning and Ventilating Systems".

1.03 SUBMITTALS

A. Product Data: Submit manufacturer's technical product data for air outlets and inlets including the following:
1. Schedule of air outlets and inlets indicating drawing designation, room location, number furnished, model number, size, and accessories furnished.
2. Data sheet for each type of air outlet and inlet, and accessory furnished indicating construction, finish, and mounting details.
3. Performance data for each type of air outlet and inlet furnished, including aspiration ability, temperature and velocity traverses, throw and drop, noise criteria ratings, and minimum one-year warranty. Indicate selections on data.

B. Shop Drawings: Submit manufacturer's assembly-type shop drawing for each type of air outlet and inlet, indicating materials and methods of assembly of components.

C. Maintenance Data: Submit maintenance data, including cleaning instructions for finishes, and spare parts lists. Include this data, product data, and shop drawings in maintenance manuals.

1.04 PRODUCT DELIVERY, STORAGE AND HANDLING

A. Deliver air outlets and inlets wrapped in factory-fabricated fiberboard type containers. Identify on outside of container type of outlet or inlet and location to be installed. Avoid crushing or bending and prevent dirt and debris from entering and settling in devices.

PART 2 – PRODUCTS

2.01 SQUARE CEILING SUPPLY DIFFUSERS

A. Manufacturers:
1. Price, Model AMDA
2 MetalAire
3 Titus

B. Type: Square, Fixed pattern, Four way discharge

C. Frame: Ceiling grid mount. Reference mechanical floor plan and schedule for size of face and size of duct.

D. Fabrication: Aluminum with baked enamel white finish unless otherwise noted.

E. Damper: Provide balancing damper in duct.

F. Accessories: See schedule

2.02 LOUVERED SUPPLY DIFFUSERS

A. Manufacturers:
1. Price, Model 620
2 MetalAire
3 Titus

B. Type: Rectangular, 3/4" spacing, 45 degree discharge, double deflection

C. Frame: Hard ceiling, duct, and sidewall mount. Reference architectural reflected ceiling plan for type of frame. Reference mechanical floor plan and schedule for size of face and size of duct.

D. Fabrication: Aluminum with baked enamel white finish unless otherwise noted.

E. Damper: Provide opposed blade damper.

2.03 LOUVERED RETURN DIFFUSERS

A. Manufacturers:
1. Price, Model 635
2 MetalAire
3 Titus

B. Type: Rectangular, 3/4" spacing, 45 degree discharge, fixed deflection

C. Frame: Hard ceiling and sidewall mount. Reference architectural reflected ceiling plan for type of frame. Reference mechanical floor plan and schedule for size of

face and size of duct.

D. Fabrication: Aluminum with baked enamel white finish unless otherwise noted.

2.04 CEILING LINEAR SLOT SUPPLY GRILLES

A. Manufacturers:

1. Price, Model SDS
2 MetalAire
3 Titus

B. Type: Continuous 1 inch wide slot, with two (2) and four (4) slots as indicated on plans. Provide with adjustable vanes for left, right, or vertical discharge.

C. Fabrication: Aluminum extrusions with factory off-white enamel finish and black pattern controllers.

D. Frame: One inch margin with support clips and T bar mounting and gasket or hard ceiling as needed.

E. Plenum: Integral, galvanized steel, insulated.

PART 3 – EXECUTION

3.01 INSTALLATION

A. Install air outlets and inlets in accordance with manufacturer's written instructions and in accordance with recognized industry practices to ensure that products serve intended functions.

B. Check location of outlets and inlets and make necessary adjustments in position to conform with architectural features, symmetry, and lighting arrangement.

C. Install diffusers to ductwork with air tight connection.

D. Provide balancing dampers on duct take-off to all diffusers, and grilles and registers except wall return grills.

E. Paint ductwork visible behind air outlets and inlets matte black. Refer to Division 9.

END OF SECTION 233715

SECTION 238147 - SPLIT SYTEM AIR COOLED HEAT PUMPS

PART 1 - GENERAL

1.01 RELATED DOCUMENTS

A. Drawings and general provisions of Contract, including General and Supplementary Conditions and Division-01 Specification sections, apply to work of this section.

1.02 SUBMITTALS

A. Manufacturer's Data: Submit manufacturer's technical product data for condensing units, including rated capacities of selected model clearly indicated, weights (shipping, installed, and operating), dimensions, required clearances, and methods of assembly of components, furnished specialties and accessories; and installation and startup instructions. Submit manufacturer's technical product data for air handling units showing dimensions, weights, capacities, ratings, fan performance with operating point clearly indicated, motor electrical characteristics, gages and finishes of materials, and installation and start-up instructions.

B. Wiring Diagrams: Submit ladder type wiring diagrams for power and control wiring required for final installation of air handling units, auxiliary heaters, condensing units and controls. Clearly differentiate between portions of wiring that are factory-installed and portions to be field installed.

1.03 QUALITY ASSURANCE

A. Codes and Standards:
   1. ARI Compliance: Capacity ratings for heat pump/condensing units shall be in accordance with ARI Standard 360, "Standard for Commercial and Industrial Unitary Air Conditioning Equipment" for units of 135 MBH capacity or greater; ARI Standard 210 "Standard for Unitary Air Conditioning Equipment" for units of capacity less than 135 MBH. Air handling unit shall be rated and tested in accordance with ARI standard 340/360.
   2. AMCA Compliance: Test and rate air handling units in accordance with AMCA standards.
   3. ASHRAE 15 Compliance: Refrigeration system of heat pump/condensing units shall be constructed in accordance with ASHRAE standard ASHRAE 15 "Safety Code for Mechanical Refrigeration".
   4. NFPA Compliance: Provide air handling unit internal insulation having flame spread rating not over 25 and smoke developed rating no higher than 50; and complying with NFPA 90A "Standard for the installation of Air Conditioning and Ventilating Systems".
   5. UL Compliance: Air handling units and heat pump/condensing units shall be UL listed and labeled. Display certification symbol on units of certified models.

PART 2 - PRODUCTS

2.01 AIR-COOLED CONDENSING UNITS

A. General: Factory assembled and tested split system air-cooled heat pump/condensing units, consisting of casing, compressors, condenser coils, condenser fans

motors, and unit controls. Capacities and electrical characteristics as scheduled. Acceptable refrigerants shall be R-410A.

B. Compressor: Scroll type compressor, designed for air cooled condensing, complete with crankcase sight glass, crankcase heater, and back-seating service access valves on suction and discharge ports.

C. Controls: Operating and safety controls shall include high and low pressure cutouts, compressor winding thermostat cutout, 3-leg compressor overload protection, and condenser fan motors with thermal and overload cutouts. Provide magnetic contactors for compressor and condenser fan motors. Provide timing device to prevent excessive compressor cycling, and time delay relays for dual compressor units.

D. Condensing Section: Condenser coil shall consist of spine fin construction of aluminum material or shall be seamless copper tubing mechanically bonded to heavy duty, configured aluminum fins, with separate and independent refrigeration circuit for each compressor. Units shall include liquid accumulator and sub-cooling circuit, and back-seating liquid line service access valve. Condenser coils shall be factory tested. Coils may also be all aluminum.

2.02 INDOOR AIR HANDLING UNITS

A. General: Air handler unit shall be completely factory assembled including coil, condensate drain pan, fan motor(s), filters and controls in an insulated casing that can be applied in either vertical or horizontal configuration.

B. Unit Casing: Unit casing shall be constructed of zinc coated, heavy gauge, galvanized steel. Exterior surfaces will be cleaned, phosphatized and finished with a weather-resistant baked enamel finish. Casing shall be completely insulated with cleanable, foil faced, fire-retardant, permanent, odorless glass fiber material. All insulation edges shall be either captured or sealed. Knockouts shall be provided for unit electrical power and refrigerant piping connections. Captive screws shall be used on all access panels.

C. Evaporator Coil: Configured aluminum fin surface shall be mechanically bonded to 3/8" (9.53 mm) internally enhanced copper tubing and factory pressure and leak tested at 375 psig (2585.6 kPa). Coil shall be arranged for draw-through airflow and shall be provided with a double sloped condensate drain pan constructed of PVC plastic. The drain pan shall be removable for cleaning. The condensate drain pan can be capable of being installed in any of four positions allowing for vertical or horizontal application and shall be provided with external connections on either side of the unit.

D. Evaporator Fan: A double inlet, double width, forward curved, centrifugal-type fan with adjustable belt drive shall be provided. Thermal overload protection shall be provided on the motor. Fan and motor bearing shall be permanently lubricated

E. Single Circuit Refrigerant System: The air handler shall have a single refrigeration circuit controlled by a factory-installed thermal expansion valve.

F. Controls: Magnetic evaporator fan contactor, low voltage terminal strip, check valve, and single point power entry shall be included. All necessary controls shall be factory-installed and wired. Evaporator defrost control shall be included to prevent

compressor slugging by temporarily interrupting compressor operation when low evaporator coil temperatures are encountered.

G. Filters: 1" (25.4 mm) pleated throwaway filters shall be standard on air handler. Filters shall be accessible from either side coil access panel.

PART 3 - EXECUTION

3.01 INSTALLATION

A. General: Install air-cooled heat pump/condensing units and air handling units in accordance with manufacturer's installation instructions.

B. Install units plumb and level, firmly anchored in locations indicated, and maintain manufacturer's recommended clearances.

3.02 FIELD QUALITY CONTROL

A. Charge systems with refrigerant and oil, and test for leaks.

B. Repair leaks and replace lost refrigerant and oil.

3.03 DEMONSTRATION

A. Start-up heat pump systems in accordance with manufacturer's start-up instructions. Test controls and demonstrate compliance with requirements. Replace damaged or malfunctioning controls and equipment.

B. Train Owner's personnel on start-up and shutdown procedures, troubleshooting procedures, servicing, and preventive maintenance schedule and procedures.

C. Review with the Owner's personnel, the data contained in the Operating and Maintenance Manuals specified in Division One.

END OF SECTION 238147

SECTION 238239 - ELECTRIC WALL HEATERS

PART 1 - GENERAL

1.01 RELATED DOCUMENTS

A. Drawings, Standard General Conditions of the Construction Contract, including Supplementary General Conditions and Division-01 Specification sections, apply to work of this section.

1.02 QUALITY ASSURANCE

A. Codes and Standards:
   1. UL listed.
   2. Conforms to OSHA and NEC when installed in accordance with manufacturer's instructions.

B. Submittals:
   1. Manufacturer's Data: Submit manufacturer's specifications for terminal units showing dimensions, capacities, ratings, performance characteristics, gages and finishes of materials, and installation instructions.

PART 2 - PRODUCTS

2.01 ELECTRIC UTILITY HEATERS

A. Provide with recessed wall mounting cabinet.

B. Metal sheath heating elements. Automatic reset thermal overheat.

C. Provide with built-in thermostat with 40º F to 80º F range. The thermostat shall be two pole and serve as a service disconnect.

D. Single point power connection to be as indicated.

E. Make: Markel, Q-Mark, Berko, Nutone or approved equal.

PART 3 - EXECUTION

3.01 INSTALLATION OF ELECTRIC HEATERS

A. General: Install units as indicated, and in accordance with manufacturer's installation instructions.

B. Locate units as indicated and at elevation at least 6" above floor. Coordinate with other trades.

C. Protect units with protective covers during balance of construction.

END OF SECTION 238239

SECTION 260050 - ELECTRICAL GENERAL REQUIREMENTS

PART 1 - GENERAL

1.01 WORK COVERED BY CONTRACT DOCUMENTS

A. All work, materials, etc., shall be furnished and installed, whether or not specifically shown on the drawings and/or called for in the specifications, which may be necessary to comply with all of the requirements, due to the exigencies of the work, to complete the work and the contract in a satisfactory and approved manner.

B. The work to be done under this contract shall consist of furnishing all equipment, labor, materials required for the items listed in the proposal, and/or as shown on the contract drawings, together with all devices, connectors, splices and appurtenances, required for a safe, clean, complete and ready for service, reliable, substantial and rugged working installation, to the satisfaction of the Engineer and to execute the intent of this contract and these specifications.

C. The Contractor shall be responsible for determining the proper connection points for all power, control, and signal wiring installed under this contract, regardless of whether the connection points are in equipment furnished under this contract, existing equipment, or equipment furnished by others. The Contractor shall include in his bid prices any field surveys, wire tracing or other work required to ascertain the proper connection points for all wiring.

D. It is the intent of these specifications that the Contractor shall furnish equipment and material which is suitable for the purpose and for installation in the location as is.

E. It is also the intent of the specification that the equipment, materials and accessories, as furnished, shall be complete in all respect and ready to operate.

F. The specifications cover the general design, construction arrangement, and certain particular features, but do not purport to cover all details entering into the design of the equipment and accessories.

G. Minor revisions in construction details will be made to accommodate equipment proposed and approved on the drawings thereof, submitted by the Contractor. Major revisions shall not be made nor shall equipment be submitted for approval which cannot be installed in structures of the approximate dimensions and character specified herein.

H. Further, it is also the intent of these specifications to provide a complete contract including items which may be omitted or not shown but which are considered normal and accepted engineering practice for this type of contract at no additional cost to the Owner.

I. All work shall be done in a thorough and workmanlike manner and shall conform to the best modern practice in the manufacture and installation of high-grade equipment and materials.

Wherever possible, all parts shall be made according to standard gauge to facilitate replacement and repair.

J. All materials furnished under these items shall be the best of their respective kinds and shall be free from defects in design and workmanship.

K. All materials or equipment not meeting the specified requirements shall be rejected, and shall be replaced at once by the Contractor with materials or equipment of the specified type and quality, at no cost to the Owner.

L. All materials for which no detailed specifications are given herein shall be of the quality and character best adapted and suitable for the purpose for which they are to be used and shall be subject to the approval of the Engineer.

M. Where any material or article or the maker or distributor thereof is specified by name, this is done for the purpose of more clearly describing the type or quality desired. Any material or article of equal quality, merit and performance, in the opinion of the Engineer, will be acceptable, if approval is given in writing.

N. All materials furnished and work done by the Contractor shall be subject to the inspection of the Engineer. Defective materials shall be removed from the site of the work and defective work repaired or replaced as directed. Facilities for handling and inspection of materials and equipment and for access to the work in progress shall at all times be furnished by the Contractor.

O. Where any delay is encountered in carrying out work due to unfavorable operating conditions, the Contractor shall not be entitled to additional compensation therefore, but the time allowed equivalent to the period of actual delay.

1.02 DESCRIPTION OF WORK

A. Work includes all labor and electrical labor and equipment to install the project as represented in the drawings and specifications.

B. Unless specifically dimensioned, the work shown on the drawings is diagrammatic, and is intended only to show general arrangement.

C. Include in the work, all accessories and devices necessary for the intended operation or perfection of any system, whether or not specifically shown or specified.

D. The term ″Furnish″ shall mean to obtain and supply to the job site. The term ″Install″ shall generally mean to fix in position and connect for use. Where language indicates that one party or trade is to ″install″ and another is to ″connect″, the term ″install″ shall mean only to fix in position, and ″connect″ shall mean to make electrical connections to. The term ″Provide″ shall mean to furnish and install.

E. Furnish all documentation, such as shop drawings, as-built drawings, and operation and maintenance manuals, certify and perform all required testing as herein specified.

1. Testing & Start-Up: Assist MC in startup of all equipment. Provide As-Built Documentation, start-up and test protocol.
2. As Built Documentation: Provide a minimum of (4) sets of Ring Binders per each system with the following minimal content:
   a. Electrical As Built Drawings
   b. Equipment Data/Specification sheets and Operating Manuals and fuse sizes by equipment.
   c. List of lighting lamps by fixture

F. Provide all items as called out in “Scope of Work” on drawings.

1.03 STANDARD OF QUALITY

A. The specifications establish the standards of quality required, either by description or by references, to brand name, name of manufacturers or manufacturer's model number. All materials shall be new unless noted otherwise.

B. Where one product only is specifically identified by name or manufacturer's model number, the Contractor shall base his bid on the use of the named product. Where multiple names are used, the Contractor shall base his bid on the use of any of those products named.

C. The Contractor may submit, with his bid, the names of products which are proposed as substitutions for products named in the specifications. Each proposed substitution shall be accompanied by a written sum of money to be added or deducted from his bid. The Owner reserves the sole right to accept or reject said substitutions with or without cause.

D. When equipment and/or materials are proposed to be purchased from a manufacturer other than those specified, the Contractor shall provide complete data adequate for the Engineer's evaluation of the proposed substitution.

E. When the equipment other than that specified is used, the Contractor shall be responsible for any extra cost of required revisions such as structural steel, concrete, electrical, piping, etc. Such additional costs shall be identified at the time such substitutions are proposed.

1.04 SUBMITTALS

A. Engineer’s review of shop drawings is solely for the benefit of the Owner and in no way relieves the contractor from his obligations to furnish materials which satisfy the requirements of his contract and the design intent.

B. Shop drawings, product data and samples shall be submitted as required by the General Conditions or Project Requirements and as supplemented by this section.

C. When a specific specification section identifies that no submittal is required, the contractor shall provide the specified materials without submittals.

D. Provide to the Engineer, a schedule of shop drawing submissions identifying submittal target dates.

E. The Contractor shall review, approve and submit shop drawings, with promptness so as to cause no delay in his work or in that of others. No submissions will be accepted by the Engineer without the signed review and approval of the Contractor.

F. The Contractor shall check and verify pertinent field measurements, and quantities of equipment and materials required.

G. Submittals shall be identified by reference to the drawing(s), section(s) of specifications, or equipment symbols to which they relate.

H. Shop drawings, when required, shall include:
1. Verification of information given in Contract Documents such as performance, dimensions, weight, materials, construction, types, models, manufacturer, etc.
2. Equipment layouts drawn to scale as may be required.
3. Wiring diagrams and schematics for equipment.
4. Any special construction conditions.
5. Other information/data as may be requested.

I. All submittals shall identify the specific details of the product or assembly. All optional features being provided or proposed shall be so noted or the submittal will be rejected.

J. The Engineer will return submittals with one of the following notations stamped thereon; REVIEWED, REVIEWED AS NOTED, REVISE AND RESUBMIT, REJECTED or SUBMIT SPECIFIED ITEM AND THE FOLLOWING:
1. Review is only for general conformance with the design concept of the project and general compliance with the information given in the contract documents. Any action shown is subject to the requirements of the plans and specifications. Contractor is responsible for: dimensions which shall be confirmed and correlated at the job site; fabrication processes and techniques of construction; coordination of his work with that of all other trades; and the satisfactory performance of his work.
2. The work involved may proceed when submittals are marked REVIEWED or NO EXCEPTIONS TAKEN with no further submission required.
3. The work involved may proceed when submittals are marked REVIEWED AS NOTED providing corrections are made and submittals are resubmitted for record. Review does not authorize changes to Contract Sum unless stated in a separate letter or Change Order. In the event that any notes placed on the submittals by the Engineer are believed to result in a change in the Contract Sum, the Engineer shall be notified immediately and fabrication may not be undertaken until written authorization to proceed is issued by the Owner.
4. The work involved may not proceed when submittals are marked REVISE AND RESUBMIT. Submittals must be corrected and resubmitted for review.
5. Submittals marked REJECTED OR SUBMIT SPECIFIED ITEM are not in accordance with the Contract Documents and require a new submittal for review.
6. For items being resubmitted, clearly identify changes made from the initial submittal requested by the Engineer. The Engineer will review only those changes requested and identified by the Contractor.

1.05 PROTECTION OF WORK

A. Each Contractor is responsible for the protection of his materials, equipment, and completed work as defined in the General or Project Requirements and as supplemented herein.

B. All openings into any part of the conduit systems, all fixtures and equipment must be securely covered or otherwise protected to prevent damage due to dropped tools or materials, work by others or intrusion of grit, dirt, water, snow, ice or other foreign matter. Remove burrs, dirt, paint spots and debris. The Contractor shall be held responsible for all damage done to unprotected work or materials.

1.06 STEEL AND CONCRETE WORK FOR ELECTRICAL EQUIPMENT

A. Steel: Provide all miscellaneous steel supports and anchors required for equipment and materials installed under this Specification. Manual of Construction by American Institute of Steel Construction latest edition shall be followed in design and construction except that the second sentence of paragraph 4.2.1., Section 4 of Division 5, page 5-177 will not apply. Structural steel members shall conform to ASTM A36, and shall have a shop applied coat of rust inhibiting paint. Welding of steel shall conform to American Welding Society, Standard Code for Arc and Gas Welding in Building Construction. Bolts, nuts and washers for structural steel framing and concrete embedment shall be high tensile type minimum 3/4" diameter conforming to ASTM A325. Slotted-steel channel supports shall have flange edges turned toward web, and 9/16 inch diameter slotted holes at a maximum 2 inches o.c., in webs. Channel depth: 2-1/2 inches minimum. Channel thickness: selected to suit structural loading. Fittings and Accessories: Products of the same channel manufacturer. Channel supports and fittings shall be hot dip galvanized steel.

B. Concrete work and anchors: Refer to for concrete work and anchors.

1.07 COUNTERFLASHING

A. Where conduits or other items pass through any roof, wall or other exterior component, provide counter flashing as required.

1.08 EQUIPMENT BY OTHERS

A. Summary of Work, together with other technical sections in the Project Manual, describe equipment that will be furnished by the Owner or from other sources.

B. The responsibility for setting, installation and protection of such equipment will be defined in other sections of the Project Manual.

C. Provide services rough-in for and make final connections to this equipment as shown and specified.

D. Provide coordination to assure clearances required for moving equipment to final location.

1.09 MOVING OF EQUIPMENT

A. Verify that electrical equipment will pass through all restricting openings, and when

equipment or sections of equipment are larger than these openings, install this equipment prior to construction of enclosing walls, floors or roofs.

B. Use planking or cribbing as required to protect adjoining construction from damage.

C. Provide rigging and expert rigging personnel as required for equipment installation in difficult locations. Rigging shall include any necessary structural investigation and temporary structural support.

1.10 CUTTING AND PATCHING

A. Provide all openings through walls, floors and ceilings, etc. required for the installation of work defined on the drawings and specifications.

B. Following installation and testing, restore floors, walls and ceilings with materials equal to the original construction and finish to match existing surfaces.

C. Cutting and patching shall be performed only by tradesmen familiar with the construction involved.

1.11 IDENTIFICATION

A. Nameplates:
1. Provide each new normal power load break switch, automatic transfer switch, starter, circuit breaker, panel, remote start-stop station, pilot light or safety switch with an engraved laminated black and white phenolic nameplate, white letters on black background. Provide Fire Alarm panels with an engraved laminated red and white phenolic nameplate, white letters on red background.
2. Compose the legend so as to clearly indicate the function of the equipment. Letters and numbers to be at least 3/16 inch high.
3. Locate the nameplate in a position so as to be clearly visible and secure with screws. Rivets and adhesives are not acceptable.
4. Submit proposed nameplate legend for review.
5. Provide a nameplate on the main switchgear indicating names of the electrical contractor and the engineer and project year.

1.12 FINAL ACCEPTANCE

A. The Contractor shall perform and complete work in accordance with the Contract Documents without fault or defect of any kind. In the absence of more specific directives, the work shall:
1. Be completed in a first class manner.
2. Be placed in a thoroughly clean and unmarred condition.
3. Be checked out in a step-by-step manner to ascertain that fastenings, controls, parts, safety devices, operating devices and other required appurtenances have been provided in accordance with the Contract Documents.
4. Be free of previously condemned or rejected parts and be properly restored to an acceptable condition.
5. Be adjusted for proper operation wherever adjustments or calibrations exist in the work.

B. All systems shall be operated to demonstrate that the requirements of the Contract have been met and that the systems have been adjusted and will operate in accordance therewith.

1.13 OPERATING AND MAINTENANCE INSTRUCTIONS

A. Furnish for review, three hard bound copies of complete written instructions for the operation, care and maintenance of each piece of equipment and/or system. Include recommended frequency of inspection, cleaning, oiling, greasing, and adjustment and other action as may be required in accordance with manufacturer's recommendations. Material shall include manufacturer's brochures, catalog cuts, parts lists, wiring diagrams, service organizations, etc.

1.14 PERMITS, FEES AND CERTIFICATES OF APPROVAL

A. Contractor shall acquire all permits and certificates. Submit a final inspection certificate

from Middle-Atlantic Inspections or other NFPA affiliated agency with request for final payment.

B. Contractor shall provide all power, labor and instruments required for tests and cleaning of systems.

C. Whenever tests are required, three (3) copies of the test reports shall be submitted to the Engineer.

D. Tests may be observed by the Engineer or his representative. Notify the Engineer a minimum of three weeks in advance of test dates.

1.15 COMPLIANCE WITH CODES, STANDARDS AND REGULATIONS

A. In the absence of specific instruction in the technical specifications, equipment and installation shall conform to the following applicable codes, standards and regulations, latest editions:

1. American Society for Testing and Materials (ASTM)
2. American National Standard Institute (ANSI)
3. Underwriter's Laboratories, Inc. (UL)
4. American Welding Society Code (AWSC)
5. NFPA 70, ″National Electrical Code″, latest edition
6. National Electrical Manufacturer's Association (NEMA).
7. Occupational Safety and Health Act (OSHA).
8. National Fire Protection Association (NFPA).
9. National Electrical Safety Code (NESC)
10. North Carolina Building Code, latest edition
11. Institute of Electrical and Electronics Engineers (IEEE)
12. Illuminating Engineering Society of North American (IESNA)
13. State and Local Building, Electric, and Fire Codes and Regulations.

1.16 PAINTING

A. Cabinet trims and similar prefabricated equipment shall be factory primed and finish painted with baked enamel in color selected. This equipment shall not be painted in the field unless the factory finishes have been marred or as otherwise directed. Do not paint over UL or similar labels or mechanical/electrical nameplates.

1.17 COORDINATION OF WORK

A. Coordinate installation of conduit runs and equipment with other trades and conditions in the building and participate in all coordinated shop drawings. Variance from work shown on drawings will be subject to approval. Where interference occurs and electrical work is directed to be relocated, provide such relocation without additional cost.

B. It is the Electrical Contractor's responsibility to coordinate with the manufacturers of all new and existing pieces of equipment the different aspects of their interfaces. All additional costs
for equipment manufacturer's redesign of interfaces caused by the EC's failure to properly coordinate all aspects of the interfaces shall be borne by the EC.

1.18 ACCESS PANELS

A. Furnish access panels where required, to concealed pull boxes, junction boxes, or similar equipment located above dry wall board ceiling or behind walls. Installation of access panels shall be by mechanics of the pertinent trade under General Construction.

B. Access panels shall be 18" x 18" minimum, 16 gage wall or ceiling frame and a 14 gage panel door with not less than 1/8" fire proofing secured to the inside of the door. The door shall be provided with concealed hinges and cylinder lock, and prime-coated steel prepared for painting. Each door shall be capable of opening 180 degrees. Doors for wall panels shall be secured with suitable clips and counter sunk tamperproof screws.

C. Access panels shall have "label" fire rating equal to the ceiling or wall surface.

1.19 WARRANTY

A. The contractor and equipment manufacturers shall jointly guarantee all wiring and equipment
to be free of defects in workmanship and material for a period of one year from the date of final acceptance, unless otherwise noted.

1.20 PROJECT RECORD DOCUMENTS

A. Maintain at job site, one copy of record documents and samples as required under the General Conditions of the Contract, including Drawings, Specifications, Addenda And Bulletins, Change Orders, Shop Drawings, Product Data and Samples, Field Orders, Field Test Records and Maintenance and Operating Manuals.

B. Provide files and racks for storage of documents. Maintain documents in a clean, dry legible condition and in good order. Do not use record documents for construction

purposes. Make record documents and samples available during normal working hours for inspection.

C. Recording:
   1. Label each document ″Project Record″ in neat large letters and provide final completion date.
   2. Record information concurrently with construction progress.
   3. Do not conceal any work until required information is recorded.

D. Record Drawings - legibly mark to record actual construction as follows:
   1. A print set (blue-line or black-line) of contract drawing or shop drawing mark-ups of actual installations which vary substantially from the work as originally shown. Mark whichever drawing is most capable of showing "field" condition fully and accurately; however, where shop drawing are used for mark-up, record a cross reference at corresponding location on working drawings. Mark with red erasable pencil and, where feasible, use other colors to distinguish between variation in separate categories or work. Mark-up new information which is recognized to be of importance to Owner, but was for some reason not shown on either contract drawings or shop drawings. Give particular attention to concealed work which would be
   difficult to measure and record at a later date. Note related change order numbers where applicable.
   2. Record Specifications and Addenda, Bulletins, Requests for Information (RFI's) and Construction Clarification Sketches (CSK's) - legibly mark each Section to record:
   3. Any variations in actual work in comparison with text of specifications and modifications as issued. Give particular attention to substitutions, selection of options, and similar information work where it is concealed or cannot otherwise be readily discerned at a later date by direct observations. Note related record drawing information and product data, where applicable.
   4. Changes made by Field Order or by Change Order.

E. Product Data: Maintain one copy of each product data submittal, and mark-up significant variation in actual work in comparison with submitted information.
   1. Include both variations in product as delivered to site, and variations from manufacturer's instruction and recommendations for installation.
   2. Give particular attention to concealed products and portions of the work which cannot otherwise be readily discerned at a later date by direct observations. Note related change orders and mark-up of record drawings and specifications.

F. Record Drawings Submittal at Project Completion: Organize record drawing sheets into manageable sets, bind with durable paper cover sheets and print suitable titles, dates and other identification on cover of each set. Transfer marking required by previous paragraphs to set of reproducible transparencies. Submit complete set of transparencies to the Design Professional and two sets of blue-line prints.

G. Product Data Submittal at Project Completion: Submit three sets of marked-up product data submittals for record purposes that include resolution of all review notes and field revisions.

H. Miscellaneous Record Submittals: Refer to other sections of these specifications for requirements of miscellaneous record-keeping and submittals in connection with

actual performance of the works. Immediately prior to date(s) of substantial completion, complete miscellaneous records and place in good order properly identified and bound or filed, ready for continued use and reference. Submit to Architect/Engineer for Owner's records.

I. Maintenance Manuals: Organize maintenance-and-operating manual information into three suitable sets of manageable size, and bind into individual binders properly identified and indexed (thumb-tabbed). Include: emergency instructions; spare parts listing; warranties; wiring diagrams; recommended "turn-around" cycles; inspection and cleaning procedures; recommended frequency of testing, adjustment and any other maintenance requirements; shop drawings; product data; and similarly applicable information. Bind each manual of each set in heavy duty 2-inch, vinyl-covered ring binder, and include pocket folders for folded sheet information. Mark identification on both front and spine for each binder

END OF SECTION 260050

SECTION 260075 - ELECTRICAL IDENTIFICATION

PART 1 – GENERAL

1.01 RELATED DOCUMENTS

A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 1 Specification Sections, apply to this Section.

1.02 SUMMARY

A. This Section includes electrical identification materials and devices required to comply with ANSI C2, NFPA 70, OSHA standards, and authorities having jurisdiction.

1.03 SUBMITTALS

A. No submittals.

1.04 QUALITY ASSURANCE

A. Comply with ANSI C2.

B. Comply with NFPA 70, 2011

C. Comply with ANSI A13.1 and NFPA 70 for color-coding.

PART 2 – PRODUCTS

2.01 RACEWAY AND CABLE LABELS

A. Color: Black letters on orange field.

B. Adhesive Labels: Preprinted, flexible, self-adhesive vinyl with legend over-laminated with a clear, weather- and chemical-resistant coating.

C. Pretensioned, Wraparound Plastic Sleeves: Flexible, preprinted, color-coded, acrylic band sized to suit the diameter of the line it identifies and arranged to stay in place by pretensioned gripping action when placed in position.

D. Colored Adhesive Tape: Self-adhesive vinyl tape not less than 3 mils thick by 1 to 2 inches wide (0.08 mm thick by 25 to 51 mm wide).

E. Underground-Line Warning Tape: Permanent, bright-colored, continuous-printed, vinyl tape.
   1. Not less than 6 inches wide by 4 mils thick (152 mm wide by 0.102 mm thick).

2. Compounded for permanent direct-burial service.
3. Embedded continuous metallic strip or core.
4. Printed legend indicating type of underground line.

F. Tape Markers: Vinyl or vinyl-cloth, self-adhesive, wraparound type with preprinted numbers and letters.

G. Aluminum, Wraparound Marker Bands: Bands cut from 0.014-inch- (0.4-mm-) thick aluminum sheet, with stamped or embossed legend, and fitted with slots or ears for permanently securing around wire or cable jacket or around groups of conductors.

H. Comply with ANSI A13.1, Table 3, for minimum size of letters for legend and for minimum length of color field for each raceway and cable size.

2.02 NAMEPLATES AND SIGNS

A. Safety Signs: Comply with 29 CFR, Chapter XVII, Part 1910.145.

B. Engraved Plastic Nameplates and Signs: Engraving stock, melamine plastic laminate, minimum 1/16 inch (1.6 mm) thick for signs up to 20 sq. in. (129 sq. cm) and 1/8 inch (3.2 mm) thick for larger sizes.
1. Engraved legend with black letters on white face.
2. Punched or drilled for mechanical fasteners.

C. Baked-Enamel Signs for Interior Use: Preprinted aluminum signs, punched or drilled for fasteners, with colors, legend, and size required for the application. 1/4-inch (6.4-mm) grommets in corners for mounting.

D. Exterior, Metal-Backed, Butyrate Signs: Weather-resistant, nonfading, preprinted, cellulose-acetate butyrate signs with 0.0396-inch (1-mm) galvanized-steel backing; and with colors, legend, and size required for the application. 1/4-inch (6.4-mm) grommets in corners for mounting.

E. Fasteners for Nameplates and Signs: Self-tapping, stainless-steel screws or No. 10/32, stainless-steel machine screws with nuts and flat and lock washers.

2.03 MISCELLANEOUS IDENTIFICATION PRODUCTS

A. Cable Ties: Fungus-inert, self-extinguishing, one-piece, self-locking, Type 6/6 nylon cable ties.
1. Minimum Width: 3/16 inch (5 mm).
2. Tensile Strength: 50 lb (22.3 kg) minimum.
3. Temperature Range: Minus 40 to plus 185 deg F (Minus 40 to plus 85 deg C).
4. Color: According to color-coding.

B. Paint: Formulated for the type of surface and intended use.
1. Primer for Galvanized Metal: Single-component acrylic vehicle formulated for galvanized surfaces.
2. Primer for Concrete Masonry Units: Heavy-duty-resin block filler.
3. Primer for Concrete: Clear, alkali-resistant, binder-type sealer.

4. Enamel: Silicone-alkyd or alkyd urethane as recommended by primer manufacturer.

PART 3 – EXECUTION

3.01 INSTALLATION

A. Identification Materials and Devices: Install at locations for most convenient viewing without interference with operation and maintenance of equipment.

B. Lettering, Colors, and Graphics: Coordinate names, abbreviations, colors, and other designations with corresponding designations in the Contract Documents or with those required by codes and standards. Use consistent designations throughout Project.

C. Sequence of Work: If identification is applied to surfaces that require finish, install identification after completing finish work.

D. Self-Adhesive Identification Products: Clean surfaces before applying.

E. Circuits with More Than 600 V: Identify raceway and cable with "DANGER--HIGH VOLTAGE" in black letters 2 inches (51 mm) high, stenciled with paint at 10-foot (3-m) intervals over a continuous, painted orange background. Identify the following:
   1. Entire floor area directly above conduits running beneath and within 12 inches (305 mm) of a basement or ground floor that is in contact with earth or is framed above unexcavated space.
   2. Wall surfaces directly external to conduits concealed within wall.
   3. All accessible surfaces of concrete envelope around conduits in vertical shafts, exposed in the building, or concealed above suspended ceilings.
   4. Entire surface of exposed conduits.

F. Install painted identification according to manufacturer's written instructions and as follows:
   1. Clean surfaces of dust, loose material, and oily films before painting.
   2. Prime surfaces using type of primer specified for surface.
   3. Apply one intermediate and one finish coat of enamel.

G. Color Banding Raceways and Exposed Cables: Band exposed and accessible raceways of the systems listed below:
   1. Bands: Pretensioned, wraparound plastic sleeves; colored adhesive tape; or a combination of both. Make each color band 2 inches (51 mm) wide, completely encircling conduit, and place adjacent bands of two-color markings in contact, side by side.
   2. Band Locations: At changes in direction, at penetrations of walls and floors, at 50-foot (15-m) maximum intervals in straight runs, and at 25-foot (7.6-m) maximum intervals in congested areas.
   3. Apply the following colors to the systems listed below:
      a. Fire Alarm System: Red.
      b. Fire-Suppression Supervisory and Control System: Red and yellow.

c. Combined Fire Alarm and Security System: Red and blue.
d. Security System: Blue and yellow.
e. Mechanical and Electrical Supervisory System: Green and blue.
f. Telecommunication System: Green and yellow.

H. Caution Labels for Indoor Boxes and Enclosures for Power and Lighting: Install pressure-sensitive, self-adhesive labels identifying system voltage with black letters on orange background. Install on exterior of door or cover.

I. Circuit Identification Labels on Boxes: Install labels externally.
1. Exposed Boxes: Pressure-sensitive, self-adhesive plastic label on cover.
2. Concealed Boxes: Plasticized card-stock tags.
3. Labeling Legend: Permanent, waterproof listing of panel and circuit number or equivalent.

J. Paths of Underground Electrical Lines: During trench backfilling, for exterior underground power, control, signal, and communication lines, install continuous underground plastic line marker located directly above line at 6 to 8 inches (150 to 200 mm) below finished grade.
Where width of multiple lines installed in a common trench or concrete envelope does not exceed 16 inches (400 mm) overall, use a single line marker. Install line marker for underground wiring, both direct-buried cables and cables in raceway.

K. Color-Coding of Secondary Phase Conductors: Use the following colors for service feeder, and branch-circuit phase conductors:
1. 208/120-V Conductors:
a. Phase A: Black.
b. Phase B: Red.
c. Phase C: Blue
2. Factory apply color the entire length of conductors, except the following field-applied, color-coding methods may be used instead of factory-coded wire for sizes larger than No. 10 AWG:
a. Colored, pressure-sensitive plastic tape in half-lapped turns for a distance of 6 inches (150 mm) from terminal points and in boxes where splices or taps are made. Apply last two turns of tape with no tension to prevent possible unwinding. Use 1-inch- (25-mm-) wide tape in colors specified. Adjust tape bands to avoid obscuring cable identification markings.
b. Colored cable ties applied in groups of three ties of specified color to each wire at each terminal or splice point starting 3 inches (76 mm) from the terminal and spaced 3 inches (76 mm) apart. Apply with a special tool or pliers, tighten to a snug fit, and cut off excess length.

L. Power-Circuit Identification: Metal tags or aluminum, wraparound marker bands for cables, feeders, and power circuits in vaults, pull and junction boxes, manholes, and switchboard rooms.
1. Legend: 1/4-inch- (6.4-mm-) steel letter and number stamping or embossing with legend corresponding to the indicated circuit designations.
2. Tag Fasteners: Nylon cable ties.
3. Band Fasteners: Integral ears.

M. Apply identification to conductors as follows:
   1. Conductors to Be Extended in the Future: Indicate source and circuit numbers.
   2. Multiple Power or Lighting Circuits in the Same Enclosure: Identify each conductor with source, voltage, circuit number, and phase. Use color-coding to identify circuits' voltage and phase.
   3. Multiple Control and Communication Circuits in the Same Enclosure: Identify each conductor by its system and circuit designation. Use a consistent system of tags, color-coding, or cable marking tape.

N. Apply warning, caution, and instruction signs as follows:
   1. Warnings, Cautions, and Instructions: Install to ensure safe operation and maintenance of electrical systems and of items to which they connect. Install engraved plastic-laminated instruction signs with approved legend where instructions are needed for system or equipment operation. Install metal-backed butyrate signs for outdoor items.

O. Equipment Identification Labels: Engraved plastic laminate. Install on each unit of equipment, including central or master unit of each system. This includes power, lighting, communication, signal, and alarm systems, unless units are specified with their own self-explanatory identification. Unless otherwise indicated, provide a single line of text with 1/2-inch- (13-mm-) high lettering on 1-1/2-inch- (38-mm-) high label; where two lines of text are required, use labels 2 inches (50 mm) high. Use white lettering on black field. Apply labels for each unit of the following categories of equipment using mechanical fasteners:
   1. Panelboards, electrical cabinets, and enclosures.
   2. Access doors and panels for concealed electrical items.
   3. Electrical switchgear and switchboards.
   4. Disconnect switches.
   5. Enclosed circuit breakers.
   6. Motor starters.
   7. Power transfer equipment.
   8. Remote-controlled switches.
   9. Control devices.
   10. Telephone switching equipment.

END OF SECTION 260075

SECTION 260080 - ELECTRICAL TESTING

PART 1 - GENERAL

1.01 RELATED DOCUMENTS

A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 1 Specification Sections, apply to this Section.

1.02 SUMMARY

A. This Section includes general requirements for electrical field testing and inspecting. Detailed requirements are specified in each Section containing components that require testing. General requirements include the following:
   1. Qualifications of testing agencies and their personnel.
   2. Suitability of test equipment.
   3. Calibration of test instruments.
   4. Coordination requirements for testing and inspecting.
   5. Reporting requirements for testing and inspecting.

B. Electrical tests and inspections specified in various Division 26 and 28 Sections shall be provided with the contract by the appropriate manufacturer’s reps. and electrical contractor.

1.03 QUALITY ASSURANCE

A. Testing Agency Qualifications: As specified in each Section containing electrical testing requirements and in subparagraph and associated subparagraph below.
   1. Independent Testing Agencies: Independent of manufacturers, suppliers, and installers of components to be tested or inspected.
      a. Testing Agency's Field Supervisor for Power Component Testing: Person currently certified by the International Electrical Testing Association or the National Institute for Certification in Engineering Technologies to supervise on-site testing specified in Division 16 power component Sections.

B. Test Equipment Suitability: Comply with NETA ATS, Section 5.2.

C. Test Equipment Calibration: Comply with NETA ATS, Section 5.3.

PART 2 - NOT USED

PART 3 - EXECUTION

3.01 GENERAL TESTS AND INSPECTIONS

A. If a group of tests are specified to be performed by an independent testing agency, prepare

systems, equipment, and components for tests and inspections, and perform preliminary tests to ensure that systems, equipment, and components are ready for independent agency testing.
Include the following minimum preparations as appropriate:

1. Perform insulation-resistance tests on all service and feeder cables.
2. Perform continuity tests.
3. Perform rotation test (for motors to be tested).
4. Provide a stable source of single-phase, 240/120-V electrical power for test instrumentation at each test location.
5. Provide service ground resistance test, see 260510.
6. Provide service voltage readings and outputs from each dry type transformer, in building.

B. Test and Inspection Reports: In addition to requirements specified elsewhere, report the following:

1. Manufacturer's written testing and inspecting instructions.
2. Calibration and adjustment settings of adjustable and interchangeable devices involved in tests.
3. Tabulation of expected measurement results made before measurements.
4. Tabulation of "as-found" and "as-left" measurement and observation results.

END OF SECTION 260080

SECTION 260120 - CONDUCTORS AND CABLES

PART 1 - GENERAL

1.01 RELATED DOCUMENTS

A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 1 Specification Sections, apply to this Section.

1.02 SUMMARY

A. This Section includes building wires and cables and associated connectors, splices, and terminations for wiring systems rated 600 V and less.

1.03 SUBMITTALS

A. Field Test Reports: Indicate and interpret test results for compliance with performance requirements.

1.04 QUALITY ASSURANCE

A. Listing and Labeling: Provide wires and cables specified in this Section that are listed and labeled.
   1. The Terms ″Listed″ and ″Labeled″ as defined in NDPA 70, Article 100.
   2. Listing and Labeling Agency Qualifications: A ″Nationally Recognized Testing Laboratory″ as defined in OSHA Regulation 1910.7.

B. Comply with NFPA 70.

1.05 DELIVERY, STORAGE AND HANDLING

A. Deliver wires and cables according to NEMA WC 26.

1.06 COORDINATION

A. Coordinate layout and installation of cables with other installations.

B. Revise locations and elevations from those indicated, as required to suit field conditions and as approved by Engineer.

PART 2 - PRODUCTS

2.01 MANUFACTURERS

A. In other Part 2 articles where subparagraph titles below introduce lists, the following requirements apply for product selection:
   1. Available Manufacturers: Subject to compliance with requirements, manufacturers offering products that may be incorporated into the Work include, but are not limited to, the manufacturers specified.

2. Manufacturers: Subject to compliance with requirements, provide products by the manufacturers specified.

2.02 CONDUCTORS AND CABLES

A. Manufacturers:
   1. American Insulated Wire Corp.; a Leviton Company.
   2. General Cable Corporation.
   3. Rome Cable Company.

B. Refer to Part 3 "Conductor and Insulation Applications" Article for insulation type, cable construction, and ratings.

C. Conductor Material: Copper complying with NEMA WC 5 or 7; solid conductor for No. 10 AWG and smaller, stranded for No. 8 AWG and larger.

D. Conductor Insulation Types: Type THHN-THWN, XHHW and XHHW-2 complying with NEMA WC 5 or 7.

E. Multiconductor Cable: MC/Armored cable with ground wire.

F. NM cable is not permitted.

G. Aluminum alloy wires are allowed in 100 Amp and larger feeders with use of crimp connectors and conductive, anti-corrosive termination grease.

2.03 CONNECTORS AND SPLICES

A. Manufacturers:
   1. AFC Cable Systems, Inc.
   2. AMP Incorporated/Tyco International.
   3. Hubbell/Anderson.
   4. O-Z/Gedney; EGS Electrical Group LLC.
   5. 3M Company; Electrical Products Division.

B. Description: Factory-fabricated connectors and splices of size, ampacity rating, material,
type, and class for application and service indicated.

PART 3 - EXECUTION

3.01 CONDUCTOR AND INSULATION APPLICATIONS

A. Underground Service Entrance: Type XHHW-2, single conductors in raceway. Aluminum alloy conductors, with crimp termination lugs and conductive termination grease, is allowed.

B. Exposed Feeders: Type THHN-THWN, single conductors in raceway.

C. Feeders Concealed in Ceilings, Walls, and Partitions: Type THHN-THWN, single conductors in raceway.

D. Feeders Concealed in Concrete, below Slabs-on-Grade, and in Crawlspaces: Type THHN-THWN, or XHHW single conductors in raceway.

E. Exposed Branch Circuits, including in Crawlspaces: Type THHN-THWN, single conductors in raceway.

F. Branch Circuits Concealed in Ceilings, Walls, and Partitions: Type THHN-THWN, single conductors in raceway or flexible metal conduit where permitted for connections to devices not exceeding 3’ in length. Branch Circuits Concealed in Concrete and below Slabs-on-Grade: Type THHN-THWN, single conductors in raceway.

G. Branch circuit homeruns exposed or concealed: Type THHN-THWN, single conductors in EMT or RMC.

H. Flexible metal conduit shall be used at all equipment locations subject to vibration. Length shall not exceed 6’ for power feeds and 36” for control devices.

I. Multi-conductor Cable: MC/Armored cable is permitted only for whips to lighting fixtures, fishing in to individual devices in existing walls where EMT installation is not feasible, and in concealed locations above ceilings and in walls.

3.02 INSTALLATION

A. Conceal conduits in finished walls, ceilings, and floors, unless otherwise indicated.

B. 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.

C. Use pulling means, including fish tape, cable, rope, and basket-weave wire/cable grips, that will not damage cables or raceway.

D. Install exposed cables parallel and perpendicular to surfaces of exposed structural members, and follow surface contours where possible.

E. Support cables according to Division 260500 Section "Common Work Results."

F. Seal around cables penetrating fire-rated elements according to Division 078400 Section "Firestopping."

G. Identify and color-code conductors and cables according to Division 260075 Section "Electrical Identification."

3.03 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 and UL 486B.

B. Make splices and taps that are compatible with conductor material and that possess equivalent or better mechanical strength and insulation ratings than un-spliced conductors.
   1. Use oxide inhibitor in each splice and tap conductor for aluminum conductors.

C. Wiring at Outlets: Install conductor at each outlet, with at least 12 inches (300 mm) of slack.

3.04 FIELD QUALITY CONTROL

A. Testing: Perform the following field quality-control testing:
   1. After installing conductors and cables and before electrical circuitry has been
      energized, test for compliance with requirements.
   2. Perform each electrical test and visual and mechanical inspection stated in NETA ATS, Section 7.3.1. Certify compliance with test parameters.

B. Test Reports: Prepare a written report to record the following:
   1. Test procedures used.
   2. Test results that comply with requirements.
   3. Test results that do not comply with requirements and corrective action taken to achieve compliance with requirements.

END OF SECTION 260120

SECTION 260130 - RACEWAYS AND BOXES

PART 1 - GENERAL

1.01 RELATED DOCUMENTS

A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 1 Specification Sections, apply to this Section.

1.02 SUMMARY

A. This Section includes raceways, fittings, boxes, enclosures, and cabinets for electrical wiring.

B. Related Sections include the following:
1. Division 3 Concrete for exterior ductbanks, manholes, and underground utility concrete work.
2. Division 078400 Section "Firestopping" for firestopping materials and installation at penetrations through walls, ceilings, and other fire-rated elements.
3. Division 260500 Section "Common Work Results" for supports, anchors, and identification products.
4. Division 262726 Section "Wiring Devices" for devices installed in boxes and for floor-box service fittings.

1.03 DEFINITIONS

A. EMT: Electrical metallic tubing.

B. ENT: Electrical nonmetallic tubing.

C. FMC: Flexible metal conduit.

D. IMC: Intermediate metal conduit.

E. LFMC: Liquidtight flexible metal conduit.

F. LFNC: Liquidtight flexible metal conduit.

G. RMC: Rigid Metal Conduit.

1.04 SUBMITTALS

A. Product Data: For surface raceways, wireways and fittings.

1.05 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. Comply with NFPA 70.

1.06 COORDINATION

A. Coordinate layout and installation of raceways, boxes, enclosures, cabinets, and suspension system with other construction that penetrates ceilings or is supported by them, including light fixtures, HVAC equipment, fire-suppression system, and partition assemblies.

PART 2 - PRODUCTS

2.01 MANUFACTURERS

A. In other Part 2 articles where subparagraph titles below introduce lists, the following requirements apply for product selection:
   1. Manufacturers: Subject to compliance with requirements, provide products by the manufacturers specified.

2.02 METAL CONDUIT AND TUBING

A. Manufacturer:
   1. AFC Cable Systems, Inc.
   2. Alflex Inc.
   3. Anamet Electrical, Inc.; Anaconda Metal Hose.
   4. Electri-Flex Co.
   5. Grinnell Co. /Tyco International; Allied Tube and Conduit Div.
   6. LTV Steel Tubular Products Company.
   7. Manhattan/CDT/Cole-Flex.
   8. O-Z Gedney; Unit of General Signal.
   9. Wheatland Tube Co.

B. Rigid Steel Conduit: ANSI C80.1.

C. IMC: ANSI C80.6.

D. EMT and Fittings: ANSI C80.3.
   1. Fittings: Compression type.

E. FMC: Zinc-coated steel.

F. LFMC: Flexible steel conduit with PVC jacket.

G. Fittings: NEMA FB 1; compatible with conduit and tubing materials.

2.03 METAL WIREWAYS

A. Manufacturer:
   1. Hoffman.
   2. Square D.

B. Material and Construction: Sheet metal sized and shaped as indicated, NEMA 1 or 3R.

C. Fittings and Accessories: Include couplings, offsets, elbows, expansion joints, adapters, hold-down straps, end caps, and other fittings to match and mate with wireways as required for complete system.

D. Select features, unless otherwise indicated, as required to complete wiring system and to comply with NFPA 70.

E. Wireway Covers: Screw cover type, Flanged and gasketed type at exterior.

F. Finish: Manufacturer's standard enamel finish.

2.04 SURFACE RACEWAYS

A. Surface Metal Raceways: Galvanized steel with snap-on covers. Finish with manufacturer's standard grey finish coat.
   1. Manufacturer:
      a. Walker Systems, Inc.; Wiremold Company (The).
      b. Wiremold Company (The); Electrical Sales Division.

B. Types, sizes, and channels as indicated and required for each application, with fittings that match and mate with raceways.

2.05 BOXES, ENCLOSURES, AND CABINETS

A. Manufacturer:
   1. Cooper Crouse-Hinds; Div. of Cooper Industries, Inc.
   2. Emerson/General Signal; Appleton Electric Company.
   3. Erickson Electrical Equipment Co.
   4. Hoffman.
   5. Hubbell, Inc.; Killark Electric Manufacturing Co.
   6. O-Z/Gedney; Unit of General Signal.
   7. RACO; Division of Hubbell, Inc.
   8. Robroy Industries, Inc.; Enclosure Division.
   9. Scott Fetzer Com.; Adalet-PLM Division.
   10. Spring City Electrical Manufacturing Co.
   11. Thomas & Betts Corporation. Walker Systems, Inc.; Wiremold Company
   12. Woodhead, Daniel Company; Woodhead Industries, Inc. Subsidiary.

B. Sheet Metal Outlet and Device Boxes: NEMA OS 1.

C. Cast-Metal Outlet and Device Boxes: NEMA FB 1, Type FD, with gasketed cover.

D. Floor Boxes: Cast metal, fully adjustable, rectangular.

E. Small Sheet Metal Pull and Junction Boxes: NEMA OS 1.

F. Cast-Metal Pull and Junction Boxes: NEMA FB 1, cast aluminum with gasketed cover.

G. Hinged-Cover Enclosures: NEMA 250, Type 1, with continuous hinge cover and flush latch.
   1. Metal Enclosures: Steel, finished inside and out with manufacturer's standard enamel.
   2. Nonmetallic Enclosures: Plastic, finished inside with radio-frequency-resistant paint.

H. Cabinets: NEMA 250, Type 1, galvanized steel box with removable interior panel and removable front, finished inside and out with manufacturer's standard enamel. Hinged door

in front cover with flush latch and concealed hinge. Key latch to match panelboards. Include metal barriers to separate wiring of different systems and voltage and include accessory feet where required for freestanding equipment.

2.06 FACTORY FINISHES

A. Finish: For raceway, enclosure, or cabinet components: provide manufacturer's standard prime-coat finish ready for field painting.
B. Finish: For raceway, enclosure, or cabinet components: provide manufacturer's standard gray paint applied to factory-assembled surface raceways, enclosures, and cabinets before shipping.

PART 3 - EXECUTION

3.01 RACEWAY APPLICATION

A. Outdoors:
   1. Exposed: Rigid steel or IMC.
   2. Concealed: Rigid steel or IMC.
   3. Connection to Vibrating Equipment (Including Transformers and Hydraulic, Pneumatic, Electric Solenoid, or Motor-Driven Equipment): LFMC.
   4. Boxes and Enclosures: NEMA 250, Type 3R or 4.

B. Indoors:
   1. Exposed: EMT.
   2. Concealed: EMT.
   3. Connection to Vibrating Equipment (Including Transformers and Hydraulic, Pneumatic, Electric Solenoid, or Motor-Driven Equipment): FMC; except use LFMC in damp or wet locations.
   4. Damp or Wet Locations: Rigid steel conduit.
   5. Boxes and Enclosures: NEMA 250, Type 1, except as follows:
      a. Damp or Wet Locations: NEMA 250, Type 4.
   6. Where subject to damage, use rigid steel or IMC.

C. Minimum Raceway Size: 3/4-inch.

D. Raceway Fittings: Compatible with raceways and suitable for use and location.
   1. Intermediate Steel Conduit: Use threaded rigid steel conduit fittings, unless otherwise indicated.

E. Install nonferrous conduit or tubing for circuits operating above 60 Hz.

3.02 INSTALLATION

A. 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.

B. Complete raceway installation before starting conductor installation.

C. Support raceways as specified in Division 260510 Section "Common Work Results."

D. Install temporary closures to prevent foreign matter from entering raceways.

E. Protect stub-ups from damage where conduits rise through floor slabs. Arrange so curved portions of bends are not visible above the finished slab.

F. Make bends and offsets so ID is not reduced. Keep legs of bends in the same plane and keep straight legs of offsets parallel, unless otherwise indicated.

G. Conceal conduit and EMT within finished walls, ceilings, and floors, unless otherwise indicated.
   1. Install concealed raceways with a minimum of bends in the shortest practical distance, considering type of building construction and obstructions, unless otherwise indicated.

H. Raceways Embedded in Slabs: Install in middle 1/3 of slab thickness where practical and leave at least 2 inches of concrete cover.
   1. Secure raceways to reinforcing rods to prevent sagging or shifting during concrete placement.
   2. Space raceways laterally to prevent voids in concrete.
   3. Run conduit larger than 1-inch trade size parallel or at right angles to main reinforcement. Where at right angles to reinforcement, place conduit close to slab support.
   4. Change from nonmetallic tubing to rigid steel conduit, or IMC before rising above the floor.

I. Install exposed raceways parallel or at right angles to nearby surfaces or structural members and follow surface contours as much as possible.
   1. Run parallel or banked raceways together on common supports.
   2. Make parallel bends in parallel or banked runs. Use factory elbows only where elbows can be installed parallel; otherwise, provide field bends for parallel raceways.

J. Join raceways with fittings designed and approved for that purpose and make joints tight.
   1. Use insulating bushings to protect conductors.

K. Terminations:
   1. Where raceways are terminated with locknuts and bushings, align raceways to enter squarely and install locknuts with dished part against box. Use two locknuts, one inside and one outside box.

2. Where raceways are terminated with threaded hubs, screw raceways or fittings tightly into hub so end bears against wire protection shoulder. Where chase nipples are used, align raceways so coupling is square to box; tighten chase nipple so no threads are exposed.

L. Install pull wires in empty raceways. Use polypropylene or monofilament plastic line with not less than 200-lb tensile strength. Leave at least 12 inches of slack at each end of pull wire.

M. Telephone and Signal System Raceways, 2-Inch Trade Size and Smaller. In addition to above requirements, install raceways in maximum lengths of 150 feet and with a maximum of two 90-degree bends or equivalent. Separate lengths with pull or junction boxes where necessary to comply with these requirements.

N. Stub-up Connections: Extend conduits through concrete floor for connection to freestanding equipment. Install with an adjustable top or coupling threaded inside for plugs set flush with

finished floor. Extend conductors to equipment with rigid steel conduit; FMC may be used 6 inches above the floor. Install screwdriver-operated, threaded plugs flush with floor for future equipment connections.

O. Flexible Connections: Use maximum of 72 inches of flexible conduit for recessed and semirecessed lighting fixtures; for equipment subject to vibration, noise transmission, or movement; and for all motors. Use LFMC in damp or wet locations. Install separate ground conductor across flexible connections.

P. Surface Raceways: Install a separate, green, ground conductor in raceways from junction box supplying raceways to receptacle or fixture ground terminals.

Q. Set floor boxes level and flush with finished floor surface.

R. Set floor boxes level. Trim after installation to fit flush with finished floor surface.

S. Install hinged-cover enclosures and cabinets plumb. Support at each corner.

T. Flexible Metal Conduit may only be used in existing walls or for short, 6’ max., connections to equipment or lights.

U. All conduit to be run concealed except where specifically reviewed and approved by owner.

V. All boxes shall be recessed wherever feasible.

3.03 PROTECTION

A. Provide final protection and maintain conditions that ensure coatings, finishes, and cabinets are without damage or deterioration at time of Substantial Completion.
1. Repair damage to galvanized finishes with zinc-rich paint recommended by manufacturer.
2. Repair damage to PVC or paint finishes with matching touchup coating recommended by manufacturer.

3.04 CLEANING

A. After completing installation of exposed, factory-finished raceways and boxes, inspect exposed finishes and repair damaged finishes.

END OF SECTION 260130

SECTION 260410 - ENCLOSED SWITCHES AND CIRCUIT BREAKERS

PART 1 - GENERAL

1.01 SUMMARY

A. This Section includes individually mounted enclosed switches and circuit breakers, rated 600 V and less, used for disconnecting and protection functions.

B. See Division 16 Section "Fuses" for fuses for fusible disconnect switches.

1.02 SUBMITTALS

A. Product Data: For each type of switch and circuit breaker indicated.

B. Shop Drawings: Include wiring diagrams for shunt-tripped circuit breakers.

C. Field quality-control test reports.

D. Operation and maintenance data.

1.03 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. Source Limitations: Obtain switches and circuit breakers through one source from a single manufacturer.

C. Comply with NFPA 70.

PART 2 - PRODUCTS

2.01 MANUFACTURERS

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. Eaton Corp.; Cutler-Hammer Products.
2. General Electric Co.; Electrical Distribution & Control Division.
3. Square D Co.
4. Bussmann – Power Module Switch.

2.02 ENCLOSED SWITCHES

A. Enclosed, Nonfusible Switch: NEMA KS 1, Type GD, with lockable handle, interlocked with cover.

B. Enclosed, Fusible Switch, 800 A and Smaller: NEMA KS 1, Type GD, with clips to accommodate specified fuses, and lockable handle, interlocked with cover.

2.03 ENCLOSED CIRCUIT BREAKERS

A. Molded-Case Circuit Breaker: NEMA AB 1, with interrupting capacity to meet available fault currents.
   1. Thermal-Magnetic Circuit Breakers: Inverse time-current element for low-level overloads, and instantaneous magnetic trip element for short circuits. Adjustable magnetic trip setting for circuit-breaker frame sizes 250 A and larger.
   2. Adjustable Instantaneous-Trip Circuit Breakers: Magnetic trip element with front-mounted, field-adjustable trip setting.
   3. Current-Limiting Circuit Breakers: Frame sizes 400 A and smaller; let-through ratings less than NEMA FU 1, RK-5.
   4. GFCI Circuit Breakers: Single- and two-pole configurations with 5-mA trip sensitivity.

B. Molded-Case Circuit-Breaker Features and Accessories: Standard frame sizes, trip ratings, and number of poles.
   1. Lugs: Suitable for number, size, trip ratings, and material of conductors.
   2. Application Listing: Appropriate for application; Type SWD for switching fluorescent lighting loads; Type HACR for heating, air-conditioning, and refrigerating equipment.
   3. Ground-Fault Protection: Integrally mounted relay and trip unit with adjustable pickup and time-delay settings, push-to-test feature, and ground-fault indicator.
   4. Shunt Trip: 120-V trip coil energized from separate circuit, set to trip at 75 percent of rated voltage.

2.04 ENCLOSURES

A. Listed for environmental conditions of installed locations, including:
   1. Outdoor Locations: NEMA 250, Type 3R.
   2. Food Service Areas: NEMA 250, Type 4X, stainless steel.
   3. Other Wet or Damp Indoor Locations: NEMA 250, Type 4.

PART 3 - EXECUTION

3.01 INSTALLATION

A. Temporary Provisions: Remove temporary lifting provisions and blocking of moving parts.

B. Identify components; provide warning signs as specified in Division 16 Section "Basic Electrical Materials and Methods."

3.02 FIELD QUALITY CONTROL

A. Testing: After installing disconnect switches and circuit breakers and after electrical circuits have been energized, demonstrate product capability and compliance with requirements.

B. Inspections and Tests for Switches and Circuit Breakers: Make internal and external

inspections and perform tests, including the following:

1. Inspect for freedom from physical damage, proper unit rating, mechanical condition, enclosure integrity, cover operation, unit anchorage, clearances, and tightness of electrical connections. If a loose electrical connection is observed on any unit, check each electrical connection for each switch and circuit breaker with a torque wrench for compliance with manufacturer's torquing instructions.
2. Test insulation resistance of each pole, phase-to-phase, and phase-to-ground, following manufacturer's written instructions. Test insulation resistance of shunt trip circuits. Use 500-V minimum test voltage for units and circuits rated up to 250 V, 1000-V minimum test voltage for units rated more than 250 V. Measured insulation resistance must be 25 megohms, minimum, for switches rated up to 250 V, and 100 megohms, minimum, for switches rated more than 250 V.
3. Test cover and other interlocks and interlock release devices for proper operation.

C. Additional Inspections and Tests for Switches: Include the following:
   1. Inspect for proper rating and fuse provisions.
   2. Check adequacy and integrity of fuseholders by removing and installing fuses.
   3. Check integrity of phase barriers.
   4. Inspect blade alignment visually while operating switch to observe adequacy of blade pressure.

D. Additional Inspections and Tests for Circuit Breakers: Include the following:
   1. Inspect for proper frame, trip, and fault current interrupting rating.
   2. Test shunt trip devices, circuits, and actuating components for proper operation.

E. Correct defective and malfunctioning units on-site, where possible, and re-inspect and retest to demonstrate compliance; otherwise, remove and replace with new units and retest.

END OF SECTION 260410

SECTION 260500 - COMMON WORK RESULTS FOR ELECTRICAL

PART 1 - GENERAL

1.01 RELATED DOCUMENTS

A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 1 Specification Sections, apply to this Section.

1.02 SUMMARY

A. This Section includes the following:
   1. Supporting devices for electrical components.
   2. Concrete equipment bases.
   3. Cutting and patching for electrical construction.
   4. Touchup painting.

1.03 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.

1.04 COORDINATION

A. Coordinate chases, slots, inserts, sleeves, and openings with general construction work and arrange in building structure during progress of construction to facilitate the electrical installations that follow.
   1. Set inserts and sleeves in poured-in-place concrete, masonry work, and other structural components as they are constructed.

B. Sequence, coordinate, and integrate installing electrical materials and equipment for efficient flow of the Work. Coordinate installing large equipment requiring positioning before closing in the building.

C. Coordinate electrical service connections to existing transformer.
   1. Coordinate installation and connection of exterior underground utilities and services.

D. Coordinate location of access panels and doors for electrical items that are concealed by finished surfaces. Access doors and panels are specified in Division 8 Section "Access Doors."

E. Coordinate electrical connections by mechanical contractor. Reference mechanical specification 230530, Section 1.2.

PART 2 – PRODUCTS

2.01 SUPPORTING DEVICES

A. Material: Cold-formed steel, with corrosion-resistant coating acceptable to authorities having jurisdiction.

B. Metal Items for use outdoors or in damp locations: Hot-dip galvanized steel.

C. Slotted-Steel Channel Supports: Flange edges turned toward web, and 9/16-inch-diameter slotted holes at a maximum of 2 inches o.c., in webs.
   1. Channel Thickness: Selected to suit structural loading.

D. Raceway and Cable Supports: Manufactured clevis hangers, riser clamps, straps, threaded C-clamps with retainers, ceiling trapeze hangers, wall brackets, and spring-steel clamps or click-type hangers.

E. Pipe Sleeves: ASTM A 53, Type E, Grade A, Schedule 40, galvanized steel, plain ends.

F. Cable Supports for Vertical Conduit: Factory-fabricated assembly consisting of threaded body and insulating wedging plug for non-armored electrical cables in riser conduits. Plugs have number and size of conductor gripping holes as required to suit individual risers. Body constructed of malleable-iron casting with hot-dip galvanized finish.

G. Expansion Anchors: Carbon-steel wedge or sleeve type.

H. Toggle Bolts: All-steel springhead type.

2.02 TOUCHUP PAINT

A. For Equipment: Equipment manufacturer's paint selected to match installed equipment finish.

B. Galvanized Surfaces: Zinc-rich paint recommended by item manufacturer.

PART 3 - EXECUTION

3.01 ELECTRICAL EQUIPMENT INSTALLATION

A. Headroom Maintenance: If mounting heights or other location criteria are not indicated, arrange and install components and equipment to provide the maximum possible headroom.

B. Materials and Components: Install level, plumb, and parallel and perpendicular to other building systems and components, unless otherwise indicated.

C. Equipment: Install to facilitate service, maintenance, and repair or replacement of components. Connect for ease of disconnecting, with minimum interference with other installations.

D. Right of Way: Give to raceways and piping systems installed at a required slope.

3.02 ELECTRICAL SUPPORTING DEVICE APPLICATION

A. Damp Locations and Outdoors: Hot-dip galvanized materials or nonmetallic, U-channel system components.

B. Dry Locations: Steel materials.

C. Selection of Supports: Comply with manufacturer's written instructions.

D. Strength of Supports: Adequate to carry present and future loads, times a safety factor of at least four; minimum of 200-lb design load.

3.03 SUPPORT INSTALLATION

A. Install support devices to securely and permanently fasten and support electrical components.

B. Install individual and multiple raceway hangers and riser clamps to support raceways. Provide U-bolts, clamps, attachments, and other hardware necessary for hanger assemblies and for securing hanger rods and conduits.

C. Support parallel runs of horizontal raceways together on trapeze- or bracket-type galvanized hangers.

D. Size supports for multiple raceway installations so capacity can be increased by a 25 percent minimum in the future.

E. Support individual horizontal raceways with separate, malleable-iron pipe hangers or clamps.

F. Install 1/4-inch- diameter or larger threaded steel hanger rods, unless otherwise indicated.

G. Spring-steel fasteners specifically designed for supporting single conduits or tubing may be used instead of malleable-iron hangers for 1-1/2-inch and smaller raceways serving lighting and receptacle branch circuits above suspended ceilings and for fastening raceways to slotted channel and angle supports.

H. Arrange supports in vertical runs so the weight of raceways and enclosed conductors is carried entirely by raceway supports, with no weight load on raceway terminals.

I. Simultaneously install vertical conductor supports with conductors.

J. Separately support cast boxes that are threaded to raceways and used for fixture support. Support sheet-metal boxes directly from the building structure or by bar hangers. If bar hangers are used, attach bar to raceways on opposite sides of the box and support the raceway with an approved fastener not more than 24 inches from the box.

K. Install metal channel racks for mounting cabinets, panelboards, disconnect switches, control enclosures, pull and junction boxes, transformers, and other devices unless components are mounted directly to structural elements of adequate strength.

L. Install sleeves for cable and raceway penetrations of concrete slabs and walls unless

core-drilled holes are used. Install sleeves for cable and raceway penetrations of masonry and fire-rated gypsum walls and of all other fire-rated floor and wall assemblies. Install sleeves during erection of concrete and masonry walls.

M. All exposed support equipment shall be galvanized.

N. Securely fasten electrical items and their supports to the building structure, unless otherwise indicated. Perform fastening according to the following unless other fastening methods are
indicated:
1. Wood: Fasten with wood screws or screw-type nails.
2. Masonry: Toggle bolts on hollow masonry units and expansion bolts on solid masonry units.
3. New Concrete: Concrete inserts with machine screws and bolts.
4. Existing Concrete: Expansion bolts.
5. Light Steel: Sheet-metal screws.
5. Fasteners: Select so the load applied to each fastener does not exceed 25 percent of its proof-test load.

3.04 CUTTING AND PATCHING

A. Cut, channel, chase, and drill floors, walls, partitions, ceilings, and other surfaces required to permit electrical installations. Perform cutting by skilled mechanics of trades involved.

B. Repair and refinish disturbed finish materials and other surfaces to match adjacent undisturbed surfaces. Install new fireproofing where existing firestopping has been disturbed. Repair and refinish materials and other surfaces by skilled mechanics of trades involved.

3.05 FIELD QUALITY CONTROL

A. Inspect installed components for damage and faulty work, including the following:
1. Supporting devices for electrical components.
2. Cutting and patching for electrical construction.
3. Touchup painting.

3.06 REFINISHING AND TOUCHUP PAINTING

A. Refinish and touch up paint. Paint materials and application requirements are specified in Division 9 Section "Painting."
1. Clean damaged and disturbed areas and apply primer, intermediate, and finish coats to suit the degree of damage at each location.
2. Follow paint manufacturer's written instructions for surface preparation and for timing and application of successive coats.
3. Repair damage to galvanized finishes with zinc-rich paint recommended by manufacturer.
4. Repair damage to PVC or paint finishes with matching touchup coating recommended by manufacturer.

3.07 CLEANING AND PROTECTION

A. On completion of installation, including outlets, fittings, and devices, inspect exposed finish. Remove burrs, dirt, paint spots, and construction debris.

B. Protect equipment and installations and maintain conditions to ensure that coatings, finishes, and cabinets are without damage or deterioration at time of Substantial Completion.

C. Protect all open device boxes from painter's sprays.

END OF SECTION 260500

SECTION 260510 - GROUNDING AND BONDING

PART 1 - GENERAL

1.01 RELATED DOCUMENTS

A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 1 Specification Sections, apply to this Section.

1.02 SUMMARY

A. This Section includes grounding of electrical systems and equipment. Grounding requirements specified in this Section may be supplemented by special requirements of systems described in other Sections.

1.03 SUBMITTALS

A. Product Data: For each type of product indicated.

B. Field Test Reports: Submit written test reports to include the following:
1. Test procedures used.
2. Test results that comply with requirements.
3. Results of failed tests and corrective action taken to achieve test results that comply with requirements.

1.04 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. Comply with UL 467.

PART - PRODUCTS

2.01 GROUNDING CONDUCTORS

A. For insulated conductors, comply with Division 260120 Section "Conductors and Cables."

B. Material: Copper.

C. Equipment Grounding Conductors: Insulated with green-colored insulation.

D. Grounding Electrode Conductors: Stranded cable.

E. Underground Conductors: Bare, tinned, stranded, and uninsulated unless otherwise indicated.

F. Bare Copper Conductors: Comply with the following:
1. Solid Conductors: ASTM B 3.
2. Assembly of Stranded Conductors: ASTM B 8.
3. Tinned Conductors: ASTM B 33.

G. Copper Bonding Conductors: As follows:

1. Bonding Cable: 28 kcmil, 14 strands of No. 17 AWG copper conductor, 1/4 inch in diameter.
2. Bonding Conductor: No. 4 or No. 6 AWG, stranded copper conductor.
3. Bonding Jumper: Bare copper tape, braided bare copper conductors, terminated with copper ferrules; 1-5/8 inches wide and 1/16 inch thick.

H. Grounding Bus: Bare, annealed copper bars of rectangular cross section, with insulators.

2.02 CONNECTOR PRODUCTS

A. Comply with IEEE 837 and UL 467; listed for use for specific types, sizes, and combinations of conductors and connected items.

B. Bolted Connectors: Bolted-pressure-type connectors, or compression type.

C. Welded Connectors: Exothermic-welded type in kit form and selected per manufacturer's written instructions.

PART 3 - EXECUTION

3.01 APPLICATION

A. Use only copper conductors for both insulated and bare grounding conductors in direct contact with earth, concrete, masonry, crushed stone and similar materials.

B. In raceways, use insulated equipment grounding conductors.

C. Exothermic-Welded Connections: Use for connections to structural steel and for underground connections.

D. Equipment Grounding Conductor Terminations: Use bolted pressure clamps.

E. Grounding Bus: Install in electrical and telephone equipment rooms, in rooms housing service equipment, and elsewhere as indicated.
1. Use insulated spacer; space 1 inch from wall and support from wall 6 inches above finished floor, unless otherwise indicated.
2. At doors, route the bus up to the top of the door frame, across the top of the doorway, and down to the specified height above the floor.

3.02 EQUIPMENT GROUNDING CONDUCTORS

A. Comply with NFPA 70, Article 250, for types, sizes, and quantities of equipment grounding conductors, unless specific types, larger sizes, or more conductors than required by NFPA 70 are indicated.

B. Install an insulated green copper equipment ground in all branch circuits and feeders.

3.03 INSTALLATION

A. Grounding Conductors: Route along shortest and straightest paths possible. Avoid obstructing access or placing conductors where they may be subjected to strain, impact, or damage. Conductors shall be in EMT conduit, bond conduit at both ends with approved bonding bushings and #6.

B. Bonding Straps and Jumpers: Install so vibration by equipment mounted on vibration isolation hangers and supports is not transmitted to rigidly mounted equipment. Use

exothermic-welded connectors for outdoor locations, unless a disconnect-type connection is required; then, use a bolted clamp. Bond straps directly to the basic structure taking care not to penetrate any adjacent parts. Install straps only in locations accessible for maintenance.

C. Bond interior metal piping systems and metal air ducts to equipment grounding conductors of associated pumps, fans, blowers, electric heaters, and air cleaners. Use braided-type bonding straps.

3.04 CONNECTIONS

A. General: Make connections so galvanic action or electrolysis possibility is minimized. Select connectors, connection hardware, conductors, and connection methods so metals in direct contact will be galvanically compatible.
   1. Use electroplated or hot-tin-coated materials to ensure high conductivity and to make contact points closer to order of galvanic series.
   2. Make connections with clean, bare metal at points of contact.
   3. Make aluminum-to-steel connections with stainless-steel separators and mechanical clamps.
   4. Make aluminum-to-galvanized steel connections with tin-plated copper jumpers and mechanical clamps.
   5. Coat and seal connections having dissimilar metals with inert material to prevent future penetration of moisture to contact surfaces.

B. Exothermic-Welded Connections: Comply with manufacturer's written instructions. Welds that are puffed up or that show convex surfaces indicating improper cleaning are not acceptable.

C. Equipment Grounding Conductor Terminations: For No. 8 AWG and larger, use pressure-type grounding lugs. No. 10 AWG and smaller grounding conductors may be terminated with winged pressure-type connectors.

D. Noncontact Metal Raceway Terminations: If metallic raceways terminate at metal housings without mechanical and electrical connection to housing, terminate each conduit with a grounding bushing. Connect grounding bushings with a bare grounding conductor to grounding bus or terminal in housing. Bond electrically non-continuous conduits at entrances and exits with grounding bushings and bare grounding conductors, unless otherwise indicated.

E. Tighten screws and bolts for grounding and bonding connectors and terminals according to manufacturers published torque-tightening values. If manufacturer's torque values are not indicated, use those specified in UL 486A.

F. Compression-Type Connections: Use hydraulic compression tools to provide correct circumferential pressure for compression connectors. Use tools and dies recommended by connector manufacturer. Provide embossing die code or other standard method to make a visible indication that a connector has been adequately compressed on grounding conductor.

G. Underground feeders shall have bare ground conductors.

END OF SECTION 260510

SECTION 262416 - PANELBOARDS

PART 1 - GENERAL

1.01 RELATED DOCUMENTS

A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 1 Specification Sections, apply to this Section.

1.02 SUMMARY

A. This Section includes the following: Distribution panelboards, and lighting and appliance branch circuit panelboards.

1.03 SUBMITTALS

A. Product Data: For each type of panelboard, overcurrent protective device, accessory, and component indicated. Include dimensions and manufacturers' technical data on features, performance, electrical characteristics, ratings, and finishes.

B. Shop Drawings: For each panelboard and related equipment.
   1. Dimensioned plans, elevations, sections, and details. Show tabulations of installed devices, equipment features, and ratings. Include the following:
      a. Enclosure types and details.
      b. Bus configuration, current, and voltage ratings.
      c. Short-circuit current rating of panelboards and overcurrent protective devices.
      d. Features, characteristics, ratings, and factory settings of individual overcurrent protective device and auxiliary components.

C. Field quality control test reports including the following:
   1. Test procedures used.
   2. Test results that comply with requirements.
   3. Results of failed tests and corrective action taken to achieve test results that comply with requirements.

D. Panelboard Schedules: On drawings for installation in panelboards.

E. Operation and Maintenance Data: For panelboards and components to include in emergency, operation, and maintenance manuals. In addition to items specified in Division 1 Section "Closeout Procedures" or "Operation and Maintenance Data," include the following:
   1. Manufacturer's written instructions for testing and adjusting overcurrent protective devices.
   2. Time-current curves, including selectable ranges for each type of overcurrent protective device.

1.04 QUALITY ASSURANCE

A. Source Limitations: Obtain panelboards, overcurrent protective devices,

B. components, and accessories through one source from a single manufacturer.

C. 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.

D. Comply with NEMA PB 1.

E. Comply with NFPA 70.

1.05 PROJECT CONDITIONS

A. Environmental Limitations: Rate equipment for continuous operation under the following conditions, unless otherwise indicated:
   1. Ambient Temperature: Not exceeding 104 deg F.

B. Interruption of Existing Electric Service: Do not interrupt electric service to facilities occupied by Owner or others unless permitted under the following conditions and then only after arranging to provide temporary electric service according to requirements indicated:
   1. Notify Owner no fewer than seven days in advance of proposed interruption of electrical service.
   2. Do not proceed with interruption of electrical service without Owner's written permission.

1.06 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, and encumbrances to workspace clearance requirements.

1.07 EXTRA MATERIALS

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. Keys: Six spares for each panelboard cabinet lock.

PART 2 – PRODUCTS

2.01 MANUFACTURED UNITS

A. Enclosures: Flush, and surface mounted cabinets, as indicated. NEMA PB 1, Type 1.
   1. Rated for environmental conditions at installed location. Outdoor Locations: NEMA 250, Type 3R. Hinged Front Cover: Entire front trim hinged to box and with standard door within hinged trim cover.
   2. Finish: Manufacturer's standard enamel finish over corrosion resistant treatment or primer coat.

3. Directory Card: With transparent protective cover, mounted in metal frame, inside panelboard door.

B. Phase and Ground Buses:
   1. Material: Hard-drawn copper, 98 percent conductivity. Equipment Ground Bus: Adequate for feeder and branch-circuit equipment ground conductors; bonded to box. Aluminum alloy bus bars are permitted, OEM standard product with all associated, and appropriately sized accessories/hardware.

C. Conductor Connectors: Suitable for use with conductor material.
   1. Main and Neutral Lugs: Mechanical type.
   2. Ground Lugs and Bus Configured Terminators: Compression type
   3. Service Equipment Label: UL labeled for use as service equipment for panelboards with service disconnect switches.

D. Future Devices: Mounting brackets, bus connections, and necessary appurtenances, provisions required for future installation of devices.

2.02 PANELBOARD SHORT-CIRCUIT RATING

A. Fully rated to interrupt symmetrical short-circuit current available at terminals. See panel schedules on drawings.

B. Series rated breakers may be used but relying on them for fault protection is not permitted.

C. Short circuit current shall be labeled on door.

2.03 DISTRIBUTION PANELBOARDS

A. Doors: Secured with vault type latch with tumbler lock; keyed alike.

B. Main Overcurrent Protective Devices in MDP:
   1. Circuit breakers where MDP fault does not exceed 40 KAIC.
   2. Current limiting breakers or fuses where fault current exceeds 40 KAIC.

2.04 LIGHTING AND APPLIANCE BRANCH-CIRCUIT PANELBOARDS

A. Branch Overcurrent Protective Devices: Bolt-on circuit breakers, replaceable without disturbing adjacent units.

B. Doors: Concealed hinges; secured with flush latch with tumbler lock; keyed alike.

2.05 OVERCURRENT PROTECTIVE DEVICES

A. Molded Case Circuit Breaker: UL 489, with interrupting capacity to meet available fault currents.
   1. Thermal Magnetic Circuit Breakers: Inverse time-current element for low-level overloads, and instantaneous magnetic trip element for short circuits.
   2. Adjustable Instantaneous-Trip Circuit Breakers: Magnetic trip element with front-mounted, field-adjustable trip setting.

B. Molded Case Circuit Breaker, Features and Accessories: Standard frame sizes, trip

ratings, and number of poles.

1. Lugs: Mechanical style, suitable for number, size, trip ratings, and conductor materials.
2. Application Listing: Appropriate for application; Type SWD for switching fluorescent lighting loads; Type HACR for heating, air-conditioning, and refrigerating equipment.
3. Multiple units enclosed in a single housing or factory assembled to operate as a single unit.

PART 3 - EXECUTION

3.01 INSTALLATION

A. Install panelboards and accessories according to NEMA PB 1.1.

B. Mount top of trim not more than 78 inches above finished floor and not less than 72 inches, unless otherwise indicated. Bottom of large panelboards shall not be closer than 6” from floor.

C. Mount plumb and rigid without distortion of box. Mount recessed panelboards with fronts uniformly flush with wall finish.

D. Install overcurrent protective devices.

1. Set field-adjustable switches and circuit-breaker trip ranges: (unless fault study provided)
   a. Panelboard Feeders: LT: Maximum, ST: Minimum
   b. Transformers: LT: Minimum, ST: Maximum
   d. Elevators: LT: Maximum, ST: Maximum
   e. Service MCB: LT: Mid range, LTD: Mid range, ST: Maximum, STD: Maximum, GF: 200 Amps, GFD: 0.5 Seconds

E. Install filler plates in unused spaces.

F. Arrange conductors in gutters into groups and bundle and wrap with wire ties.

3.02 IDENTIFICATION

A. Create a directory to indicate installed circuit loads. Obtain approval before installing. Use a computer or typewriter to create directory; handwritten directories are not acceptable.

B. Panelboard Nameplates: Label each panelboard with engraved metal or laminated-plastic nameplate mounted with corrosion-resistant screws.

3.03 CONNECTIONS

A. Ground equipment according to Division 26 Section "Grounding and Bonding."

B. Connect wiring according to Division 26 Section "Conductors and Cables."

3.04 FIELD QUALITY CONTROL

A. Prepare for acceptance tests as follows:
   1. Test insulation resistance for each panelboard bus, component, connecting supply, feeder, and control circuit.
   2. Test continuity of each circuit.

B. Perform the following field tests and inspections and prepare test reports:
   1. The panelboards shall be tested according to the manufacturer's recommendations.
   2. Balance loads, at full load conditions, to not worse than +/- 10% (20% total). Move circuits as needed.
   3. Correct malfunctioning units on-site, where possible, and retest to demonstrate compliance; otherwise, replace with new units and retest.

3.05 CLEANING

A. On completion of installation, inspect interior and exterior of panelboards. Remove paint splatters and other spots. Vacuum dirt and debris; do not use compressed air to assist in cleaning. Repair exposed surfaces to match original finish.

END OF SECTION 262416

SECTION 262726 - WIRING DEVICES

PART 1 - GENERAL

1.01 RELATED DOCUMENTS

A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 1 Specification Sections, apply to this Section.

1.02 SUMMARY

A. This Section includes the following: Single and duplex receptacles, including ground-fault circuit interrupters.
   1. Single- and double-pole snap switches.
   2. Device wall plates.
   3. Floor service outlets.

1.03 SUBMITTALS

A. Product Data: For each type of product indicated.

B. Shop Drawings: List of legends and description of materials and process used for premarking wall plates.

C. Field quality-control test reports.

1.04 QUALITY ASSURANCE

A. Source Limitations: Obtain each type of wiring device through one source from a single manufacturer.

B. 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.

1.05 COORDINATION

A. Receptacles for Owner-Furnished Equipment: Match plug configurations.

B. Cord and Plug Sets: Match equipment requirements.

PART 2 - PRODUCTS

2.01 RECEPTACLES

A. Straight-Blade-TypeReceptacles: Comply with NEMA WD 1, NEMA WD 6, DSCC W-C-596G, and UL 498.

B. Straight-Blade and Locking Receptacles: Heavy-Duty grade, 20 Amp.

C. GFCI Receptacles: Straight blade, non-feed-through type, heavy-Duty grade, with integral NEMA WD 6, Configuration 5-20R duplex receptacle; complying with UL 498 and UL 943. Design units for installation in a 2-3/4-inch- deep outlet box without an adapter.

D. Receptacles shall have separate hex-head grounding screw terminals.

E. Special purpose receptacles to match NEMA designations of various manufacturers' plugs.

2.02 CORD AND PLUG SETS

A. Description: Match voltage and current ratings and number of conductors to requirements of equipment being connected.
   1. Cord: Rubber-insulated, stranded-copper conductors, with Type SOW-jacket; with green-insulated grounding conductor and equipment-rating ampacity plus a minimum of 30 percent.
   2. Plug: Nylon body and integral cable-clamping jaws. Match cord and receptacle type for connection.

2.03 SWITCHES

A. Single, Double-Pole, or 3 Way Switches: Comply with DSCC W-C-896F and UL 20.

B. Snap Switches: Heavy-Duty grade, quiet type, 20 Amp.

C. Switches shall have separate hex-head grounding screw terminals.

2.04 WALL PLATES

A. Single and combination types to match corresponding wiring devices.
   1. Plate-Securing Screws: Metal with head color to match plate finish.
   2. Material for Finished Spaces: Brushed Stainless Steel.
   3. Material for Unfinished Spaces: Galvanized steel, with rolled edges to match box size.
   4. Material for Wet Locations: Thermoplastic with spring-loaded lift-cover, and listed and labeled for use in "wet locations" and "raintight while in use".

2.05 FINISHES

A. Color:
   1. Wiring Devices Connected to Normal Power System: Grey, unless otherwise indicated or required by NFPA 70.

PART 3 - EXECUTION

3.01 INSTALLATION

A. Install devices and assemblies level, plumb, and square with building lines.

B. Arrangement of Devices: Unless otherwise indicated, mount flush, with long dimension vertical, and with grounding terminal of receptacles on top. Group adjacent switches under single, multigang wall plates.

C. Remove wall plates and protect devices and assemblies during painting.

D. Adjust locations of floor service outlets to suit arrangement of partitions and furnishings.

3.02 IDENTIFICATION

A. Comply with Division 26 Section "Electrical Identification."
   1. Receptacles: Identify panelboard and circuit number from which served. Use hot, stamped or engraved machine printing with black-filled lettering on face of plate, and durable wire markers or tags inside outlet boxes.

3.03 CONNECTIONS

A. Ground equipment according to Division 26 Section "Grounding and Bonding."

B. Connect wiring according to Division 26 Section "Conductors and Cables."

C. Tighten electrical connectors and terminals according to manufacturers published torque-tightening values. If manufacturer's torque values are not indicated, use those specified in UL 486A and UL 486B.

3.04 FIELD QUALITY CONTROL

A. Perform the following field tests and inspections and prepare test reports:
   1. After installing wiring devices and after electrical circuitry has been energized, test for proper polarity, ground continuity, and compliance with requirements. Test GFCI receptacle operation with both local and remote fault simulations according to manufacturer's written instructions. Operation of the GFCI trip shall not interrupt power to any other receptacle on circuit unless otherwise noted.

B. Remove malfunctioning units, replace with new units, and retest as specified above.

END OF SECTION 262726

SECTION 262813 - FUSES

PART 1 - GENERAL

1.01 SUBMITTALS

A. Product Data: Catalog sheets, specifications and installation instructions.

1.02 MAINTENANCE

A. Spare Parts:
   1. Six spare fuses of each size and category, including any accessories required for a complete installation.
   2. Special tools if required for installation or removal of fuses.

PART 2 - PRODUCTS

2.01 FUSEHOLDERS

A. Equipment provided shall be furnished with fuseholders to accommodate the fuses specified.

2.02 FUSES RATED 600V OR LESS

A. Fuses for Safety Switches (Lighting and Heating Circuits):
   1. Cartridge Type (250 Volts): Single element, UL Class RK-1, 200,000 amperes R.M.S. symmetrical interrupting capacity:
      a. Cooper Industries Inc./Bussmann Div., Type KTN-R.
      b. Gould Inc./Circuit Protection Div. (Shawmut) Type A2K-R.
      c. Littlefuse Inc. Type KLN-R.

PART 3 - EXECUTION

3.01 INSTALLATION

A. Install fuses, in identical sets, in readable orientation.

B. Verify that fuse clips fit tightly on fuse.

C. Provide minimum of 10% spare fuses to owner’s on site rep.

END OF SECTION 262813

SECTION 265000 - LIGHTING CONTROLS

PART 1 - GENERAL

1.01 RELATED DOCUMENTS

A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 1 Specification Sections, apply to this Section.

1.02 SUMMARY

A. This Section includes the following lighting control devices:
   1. Time switches.
   2. Photoelectric switches.
   3. Occupancy sensors.

B. Related Sections include the following:
Division 26 Section "Wiring Devices" for wall-box dimmers and manual light-switches.

1.03 DEFINITIONS

A. LED: Light-emitting diode.

B. PIR: Passive Infrared.

1.04 SUBMITTALS

A. Product Data: For each type of product indicated.

B. Shop Drawings: Show installation details for occupancy and light-level sensors.

C. Lighting plan showing location, orientation, and coverage area of each sensor.

D. Interconnection diagrams showing field-installed wiring.

E. Field quality-control test reports.

F. Operation and Maintenance Data: For each type of product to include in emergency, operation, and maintenance manuals.

1.05 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.

1.06 COORDINATION

A. Coordinate layout and installation of ceiling-mounted devices with other construction that penetrates ceilings or is supported by them, including light fixtures, HVAC equipment, fire-suppression system, and partition assemblies.

PART 2- PRODUCTS

2.01 MANUFACTURERS

A. In other Part 2 articles where titles below introduce lists, the following requirements apply to product selection:
   1. Available Manufacturers: Subject to compliance with requirements, manufacturers offering products that may be incorporated into the Work include, but are not limited to, manufacturers specified.
   2. Manufacturers: Subject to compliance with requirements, provide products by one of the manufacturers specified.

2.02 GENERAL LIGHTING CONTROL DEVICE REQUIREMENTS

A. Line-Voltage Surge Protection: An integral part of the devices for 120-V solid-state equipment. For devices without integral line-voltage surge protection, field-mounting surge protection shall comply with IEEE C62.41 and with UL 1449.

2.03 INDOOR OCCUPANCY SENSORS

A. Manufacturers:
   1. Hubbell Lighting Inc.
   2. Leviton Mfg. Company Inc.
   3. Lithonia Lighting.
   4. Novitas, Inc.
   5. RAB Electric Manufacturing, Inc.
   6. Sensor Switch, Inc.
   7. TORK.
   8. Unenco Electronics; a Hubbell Company.

B. General Description: Wall- or ceiling-mounting, solid-state units with a separate relay unit.
   1. Operation: Unless otherwise indicated, turn lights on when covered area is occupied and off when unoccupied; with a time delay for turning lights off, adjustable over a minimum range of 1 to 15 minutes.
   2. Sensor Output: Contacts rated to operate the connected relay, complying with UL 773A. Sensor shall be powered from the relay unit.
   3. Relay Unit: Dry contacts rated for 20-A ballast load at 120 volts for 13Amp, tungsten at 120-Vac, and for 1 hp at 120-V ac. Power supply to sensor shall be 24-V
      dc, 150-mA, Class 2 power source as defined by NFPA 70.

C. Mounting:
   1. Sensor: Suitable for mounting in any position on a standard outlet box.
   2. Relay: Externally mounted though a 1/2-inch knockout in a standard electrical enclosure.

3. Time-Delay and Sensitivity Adjustments: Recessed and concealed behind hinged door.
4. Indicator: LED, to show when motion is being detected during testing and normal operation of the sensor.
5. Bypass Switch: Override the on function in case of sensor failure.

D. Switchplate Type: 3-wire, wall mounted to replace light switch.
1. Operation: Unless otherwise indicated, turn lights on when covered area is occupied and off when unoccupied; with a time delay for turning lights off, adjustable over a
minimum range of 1 to 15 minutes.
2. Sensor: Sensor shall use infrared technology, shall cover up to 900 square feet with a 180 degree field of view, and shall have a user adjustable sensitivity setting.
3. Mounting: Suitable for mounting in a standard switch box. Connect ground wire to electrical ground wire and junction box. Sensitivity adjustment and mounting hardware shall be concealed behind switchplate cover.
4. Indicator: LED, to show when motion is being detected during testing and normal operation of the sensor.
5. Bypass Switch: Override the on function in case of sensor failure.

E Dual-Technology Type: Ceiling mounting; detect occupancy by using a combination of PIR and ultrasonic detection methods in area of coverage. Particular technology or combination of technologies that controls on and off functions shall be selectable in the field by operating controls on unit.
1. Sensitivity Adjustment: Separate for each sensing technology.
2. Detector Sensitivity: Detect occurrences of 6-inch minimum movement of any portion of a human body that presents a target of at least 36 sq. in. and detect a person of average size and weight moving at least 12 inches in either a horizontal or a vertical manner at an approximate speed of 12 inches/s.
3. Detection Coverage (Standard Room): Detect occupancy anywhere within a circular area of 1000 sq. ft. when mounted on a 96-inch- high ceiling.

2.04 OUTDOOR / INDOOR PHOTOELECTRIC SWITCHES

A. Manufacturers:
1. Area Lighting Research, Inc.
2. Fisher Pierce
3. Grasslin Controls Corporation
4. Intermatic, Inc.
5. Lithonia Lighting
6. Novitas, Inc.
7. Paragon Electric Co.
8. Square D
9. TORK
10. Touchplate Technologies, Inc.

B. Description: Solid state, with SPST dry contacts rated for 1000-VA tungsten, to operate connected relay, contactor coils, microprocessor input, and complying with UL 773A.

1. Outdoor: Light-Level Monitoring Range: 1.5 to 10 fc, with an adjustment for turn-on and turn-off levels within that range.
2. Indoor: Light-Level Monitoring Range: 10 to 50 fc, with an adjustment for turn-on and turn-off levels within that range.
3. Time Delay: 15-second minimum, to prevent false operation.
4. Surge Protection: Metal-oxide varistor type, complying with IEEE C62.41 for Category A1 locations.
5. Mounting: Twist lock complying with IEEE C136.10, with base-and-stem mounting or stem- and-swivel mounting accessories as required to direct sensor to the North sky exposure.

2.05 CONDUCTORS AND CABLES

A. Power Wiring to Supply Side of Remote-Control Power Sources: Not smaller than No. 14 AWG, complying with Division 26 Section "Electrical General Requirements “

2.06 TIME CLOCK CONTROLS

A. Astronomic Dial: NSI DLC Series or equal
1. Surface mounted NEMA 1 enclosure, with lockable hasp
2. 4 Circuits or channels, SPST contacts, 20 Amp minimum, 277 VAC
3. Photocell override
4. Auto Daylight Savings and Leap Year adjustments
5. 120 VAC motor
6. Minimum of 48 ON/OFF operations
7. 24 Hour, 365 Day, Astronomic operation
8. Visual Load Status Indicators
9. Minimum 1 Month battery backup

PART 3 - EXECUTION

3.01 SENSOR INSTALLATION

A. Install outdoor photocells to avoid direct light from any local lights. Unit should face north.

B. Install indoor photocells to avoid direct light from any local lights. Units should be in skylights.

3.02 WIRING INSTALLATION

A. Wiring Method: Comply with Division 26 Section "Conductors and Cables." Minimum conduit size shall be 3/4 inch.

B. Wiring within Enclosures: Bundle, lace, and train conductors to terminal points. Separate power-limited and nonpower-limited conductors according to conductor manufacturer's written instructions.

C. Size conductors according to lighting control device manufacturer's written instructions, unless otherwise indicated.

D. Splices, Taps, and Terminations: Make connections only on numbered terminal strips in junction, pull, and outlet boxes; terminal cabinets; and equipment enclosures.

E. 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 and UL 486B.

3.03 IDENTIFICATION

A. Identify components and power and control wiring according to Division 26 “Common Work Results for Electrical”.

B. Label time switches and contactors with a unique designation.

3.04 FIELD QUALITY CONTROL

A. Perform the following field tests and inspections and prepare test reports:
1. After installing time switches and sensors, and after electrical circuitry has been energized, adjust and test for compliance with requirements.
2. Operational Test: Verify actuation of each sensor and adjust time delays.
3. Remove and replace lighting control devices where test results indicate that they do not comply with specified requirements.
4. Additional testing and inspecting, at Contractor's expense, will be performed to determine compliance of replaced or additional work with specified requirements.

3.05 ADJUSTING

A. Provide initial adjustments of sensitivity and time delay with owner.

B. Provide programming of time switch.

END OF SECTION 265000

SECTION 265100 - INTERIOR LIGHTING

PART 1 - GENERAL

1.01 RELATED DOCUMENTS

A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 1 Specification Sections, apply to this Section.

1.02 SUMMARY

A. This Section includes the following:
   1. Interior lighting fixtures with lamps and ballasts
   2. Lighting fixtures mounted on exterior building surfaces.
   3. Emergency lighting units.
   4. Exit signs.

1.03 DEFINITIONS

A. BF: Ballast factor. Ratio of light output of a given lamp(s) operated by the subject ballast to the light output of the same lamp(s) when operated on an ANSI reference circuit.

B. CRI: Color rendering index.

C. CU: Coefficient of utilization.

D. LER: Luminaire efficiency rating, which is calculated according to NEMA LE 5. This value can be estimated from photometric data using the following formula:
   1. LER is equal to the product of total rated lamp lumens times BF times luminaire efficiency, divided by input watts.

1.04 SUBMITTALS

A. Product Data: For each type of lighting fixture scheduled, arranged in order of fixture designation. Include data on features, accessories, finishes, and the following:
   1. Physical description of fixture, including dimensions and verification of indicated parameters.
   2. Emergency lighting unit battery and charger.
   3. Fluorescent ballasts.
   4. Lamps

B. Product Certificates: For each type of ballast for dimmer-controlled fixtures, signed by product manufacturer.

C. Field quality-control test reports.

D. Operation and Maintenance Data: For lighting equipment and fixtures to include in emergency, operation, and maintenance manuals. In addition to items specified in Division 1
Sections Closeout Procedures and Operation and Maintenance Data, include the following:

1. Catalog data for each fixture. Include the diffuser, ballast, and lamps installed in that fixture.
2. Warranties: Special warranties specified in this Section.

1.05 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. State of North Carolina Building Code/IBC 2000 Compliance: Comply with visibility and luminance requirements for exit signs.

1.06 COORDINATION

A. Coordinate layout and installation of lighting fixtures and suspension system with other construction that penetrates ceilings or is supported by them, including HVAC equipment, fire-suppression system, and partition assemblies.

1.07 WARRANTY

A. Special Warranty for Exit Signs: Manufacturer's standard form in which manufacturer of exit sign agrees to repair or replace components that fail in materials or workmanship within specified warranty period.

B. Warranty Period: Five years from date of Final Acceptance. Full warranty shall apply to entire unit for first three years.

C. Special Warranty for Fluorescent Ballasts: Manufacturer's standard form in which ballast manufacturer agrees to repair or replace ballasts that fail in materials or workmanship within specified warranty period.

D. Warranty Period for Electronic Ballasts: Five years from date of Final Acceptance.

PART 2 - PRODUCTS

2.01 FIXTURES AND COMPONENTS, GENERAL

A. Recessed Fixtures: Comply with NEMA LE 4 for ceiling compatibility for recessed fixtures.

B. Fluorescent Fixtures: Comply with UL 1598. Where LER is specified, test according to
NEMA LE 5 and NEMA LE 5A, as applicable.

C. HID Fixtures: Comply with UL 1598. Where LER is specified, test according to NEMA LE 5B.

D. Metal Parts: Free of burrs and sharp corners and edges.

E. Sheet Metal Components: Steel, unless otherwise indicated. Form and support to prevent warping and sagging.

F. Doors, Frames, and Other Internal Access: Smooth operating, free of light leakage under operating conditions, and designed to permit re-lamping without use of tools. Designed to prevent doors, frames, lenses, diffusers, and other components from falling accidentally during relamping and when secured in operating position.

G. Reflecting surfaces shall have minimum reflectance as follows, unless otherwise indicated:
1. White Surfaces: 85 percent.
2. Specular Surfaces: 83 percent.
3. Diffusing Specular Surfaces: 75 percent.
4. Laminated Silver Metallized Film: 90 percent.

H. Plastic Diffusers, Covers, and Globes:
1. Acrylic Lighting Diffusers: 100 percent virgin acrylic plastic. High resistance to yellowing and other changes due to aging, exposure to heat, and UV radiation.
2. Lens Thickness: At least 0.125 inch minimum unless different thickness is scheduled. UV stabilized.
3. Glass: Annealed crystal glass, unless otherwise indicated.

2.02 FLUORESCENT LAMP BALLASTS

A. Description: Include the following features, unless otherwise indicated:
1. Designed for type and quantity of lamps indicated at full light output.

B. Electronic ballasts for linear lamps shall include the following features, unless otherwise indicated:
1. Comply with NEMA C82.11.
2. Ballast Type: Instant start, unless otherwise indicated.
3. Sound Rating: Total harmonic distortion rating of less than 10 percent, according to NEMA C82.11.
4. Type: Electronic.
5. Power Factor: 90 percent, minimum.
6. Flicker: Less than 5 percent.
7. Lamp Current Crest Factor: Less than 1.
8. Electronic Ballast Operating Frequency: 20 kHz or higher. Lamp end-of-life detection and shutdown circuit.
9. Transient Protection: Comply with IEEE C62.41 for Category A1 locations.

C. Ballasts for compact lamps in non-recessed fixtures shall include the following features, unless otherwise indicated:
1. Power Factor: 90 percent, minimum.
2. Ballast Coil Temperature: 65°C, maximum.
3. Transient Protection: Comply with IEEE C62.41 for Category A1 locations.

2.03 EXIT SIGNS

A. General: Comply with UL 924; for sign colors and lettering size, comply with authorities having jurisdiction.

B. Internally Lighted Signs: Lamps: Light-emitting diodes, 70,000 hours minimum of rated lamp life.

C. Provide 90 minute battery backup.

2.04 EMERGENCY LIGHT UNITS

A. General: Comply with UL 924; provide per schedule on drawings.

2.05 FLUORESCENT LAMPS

A. Low-Mercury Lamps: Comply with Federal toxic characteristic leaching procedure test, and
yield less than 0.2 mg of mercury per liter, when tested according to NEMA LL 1.

B. T8 rapid-start low-mercury lamps, rated 32 W maximum, 2800 initial lumens (minimum), CRI of 82 (minimum), color temperature of 3500 K, and average rated life of 20,000 hours, at 3 hours operation per start unless otherwise indicated.

C. T5 rapid-start low-mercury lamps, rated 28 W maximum, 2900 initial lumens (minimum), CRI of 85 (minimum), color temperature of 3500 K, and average rated life of 30,000 hours, at 3 hours operation per start unless otherwise indicated

D. T5HO rapid-start low-mercury lamps, rated 54 W maximum, 5000 initial lumens (minimum), CRI of 85 (minimum), color temperature of 3500 K, and average rated life of 30,000 hours, at 3 hours operation per start unless otherwise indicated

E. Compact Fluorescent Lamps: CRI 80 (minimum), color temperature 3500, average rated life of 10,000 hours at 3 hours operation per start, unless otherwise indicated.
1. T4, Double-Twin Tube: Rated 18 W, 1200 initial lumens (minimum).
2. T4, Double-Twin Tube: Rated 26 W, 1700 initial lumens (minimum).
3. T4, Triple Tube: Rated 32 W, 2400 initial lumens (minimum).
4. T4, Triple Tube: Rated 42 W, 3200 initial lumens (minimum).

2.06 FIXTURE SUPPORT COMPONENTS

A. Comply with 260500 Common Work Results for channel- and angle-iron supports and nonmetallic channel and angle supports.

B. Single-Stem Hangers: 1/2-inch steel tubing with swivel ball fittings and ceiling canopy. Finish same as fixture.

C. Wires: ASTM A 641/A 641M, Class 3, soft temper, zinc-coated, 12 gage.

D. Rod Hangers: 3/16-inch- minimum diameter, cadmium-plated, threaded steel rod.

E. Aircraft Cable Support: Use cable, anchorages, and intermediate supports recommended by fixture manufacturer.

2.07 FINISHES

A. Fixtures: Brushed Aluminum, galvanized or stainless steel, unless otherwise indicated.
1. Metallic Finish: Corrosion resistant.

PART 3 - EXECUTION

3.01 INSTALLATION

A. Fixtures: Set level, plumb, and square with ceilings and walls. Install lamps in each fixture.
   1. Support for Fixtures in or on Grid-Type Suspended Ceilings: Install two ceiling support system wires for each grid mounted fixture. Locate not more than 6 inches from fixture corners.
   2. Clips: Fasten fixtures to ceiling grid members with clips that are UL listed for the application.
   3. Fixtures of Sizes Less Than Ceiling Grid: Install as indicated on reflected ceiling plans or center in acoustical panel, and support fixtures independently with at least two 3/4-inch metal channels spanning and secured to ceiling tees.
   4. Support wires shall be installed vertical, +/-15%, to structural ceiling. Wires shall be 'tensioned' to support some but not all of fixtures' weight.

C. Suspended Fixture Support: As follows:
   1. Stem-Mounted, Single-Unit Fixtures: Suspend with twin-stem hangers. Continuous Rows 8 or 12' sections: As indicated on Drawings, suspend from cable; or use tubing or stem for wiring at one point and tubing or stem for suspension for each unit length of fixture chassis, including two at each end or row. Install per fixture manufacturer's recommendation.

D. Adjust aimable fixtures with owner's representative.

E. Install lamps in fixtures.

3.02 CONNECTIONS

A. Tighten electrical connectors and terminals according to manufacturers published torque-tightening values. If manufacturer's torque values are not indicated, use those
specified in UL 486A and UL 486B.

3.03 EXIT and EMERGENCY LIGHTING, SEALED BEAM LAMPS

A. Generally, set beams to focus 30-45^{o} down from horizontal and at egress way about 15-30^{o} into egressway from wall. Intent is to cover the egress pathway.

B. Demonstrate operation and do final focusing with owner's representative upon completion of work. Units must operate for 90 minutes.

3.04 FIELD QUALITY CONTROL

A. Inspect each installed fixture for damage. Replace damaged fixtures and components.

B. Verify normal operation of each fixture after installation.

C. Test for Emergency Lighting: Interrupt power supply to demonstrate proper operation.

D. Prepare a written report of tests, inspections, observations, and verifications indicating and interpreting results. If adjustments are made to lighting system, retest to demonstrate compliance with standards.

E. Corroded Fixtures: During warranty period, replace fixtures that show any signs of corrosion.

END OF SECTION 265100

EXTERIOR LIGHTING - SECTION 265600

PART 1 - GENERAL

1.01 RELATED DOCUMENTS

A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 1 Specification Sections, apply to this Section.

1.02 SUMMARY

A. This Section includes the following:
   1. Exterior luminaires with lamps and ballasts, but not mounted on exterior surfaces of buildings.

1.03 SUBMITTALS

A. Product Data: For each luminaire, arranged in the order of lighting unit designation. Include data on features, accessories, finishes, and the following:
   1. Physical description of fixture, including dimensions and verification of indicated parameters.
   2. Luminaire dimensions, effective projected area, details of attaching luminaires, accessories, and installation and construction details.
   3. Luminaire materials.
   4. Fluorescent ballasts.
   5. Fluorescent lamps.
   6. Electrical and energy-efficiency data for ballasts.
   7. LED lamps and power supplies

B. Shop Drawings: Anchor-bolt templates keyed to specific poles and certified by manufacturer.

C. Operation and Maintenance Data: For luminaires to include in maintenance manuals.

1.04 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. Comply with IEEE C2, "National Electrical Safety Code."

PART 2 – PRODUCTS

2.01 LUMINAIRES, GENERAL

A. Complying with UL 1598 and listed for installation in wet locations.

B. Comply with IESNA RP-8 for parameters of lateral light distribution patterns indicated for luminaires.

C. Metal Parts: Free of burrs and sharp corners and edges.

D. Sheet Metal Components: Corrosion resistant aluminum, unless otherwise indicated. Form and support to prevent warping and sagging.

E. Housings: Rigidly formed, weather and light tight enclosures that will not warp, sag, or deform in use. Provide filter/breather for enclosed luminaires.

F. Doors, Frames, and Other Internal Access: Smooth operating, free of light leakage under operating conditions, and designed to permit re-lamping without use of tools. Designed to prevent doors, frames, lenses, diffusers, and other components from falling accidentally during re-lamping and when secured in operating position. Doors shall be removable for cleaning or replacing lenses. Designed to disconnect ballast when door opens.

G. Exposed Hardware Material: Stainless steel.

H. Plastic Parts: High resistance to yellowing and other changes due to aging, exposure to heat, and UV radiation.

I. Reflecting surfaces shall have minimum reflectance as follows, unless otherwise indicated:
   1. White Surfaces: 85 percent.
   2. Specular Surfaces: 83 percent.
   3. Diffusing Specular Surfaces: 75 percent.

J. Lenses and Refractors Gaskets: Use heat- and aging resistant resilient gaskets to seal and cushion lenses and refractors in luminaire doors.

K. All ballasts and power supplies shall be in wet location enclosures for mounting above grade. Except for poles and ballards, enclosures to have flush cylinder key locks and capable of being mounted flush in wall.

2.02 FACTORY FINISHES

A. Finish: Aluminum, galvanized or stainless steel. Match process and color of pole or support materials.

PART 3 - EXECUTION

3.01 INSTALLATION

A. Install lamps in each fixture.

B. Luminaire Attachment: Fasten to indicated structural supports.

C. Adjust luminaires that require field adjustment or aiming.

D. Provide ¾”x10’ copper clad ground rod and #6 wire at each light pole base.

3.02 CONNECTIONS

A. Tighten electrical connectors and terminals according to manufacturers published torque tightening values. If manufacturer's torque values are not indicated, use those specified in
UL 486A and UL 486B.

3.03 FIELD QUALITY CONTROL

A. Protect against paint and dirt contamination.

B. Inspect each installed fixture for damage. Replace damaged fixtures and components.

C. Clean each unit to be free of dirt, bugs and paint.

D. Adjust motion sensor lights for photocell pickup, motion detection sensitivity, time delay off and location of beam spreads. Perform with owner's rep. after dark.

END OF SECTION 265600

SECTION 283100 - FIRE DETECTION AND ALARM

PART 1 - GENERAL

1.01 RELATED DOCUMENTS

A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 1 Specification Sections, apply to this Section.

B. This section is intended to comply with NFPA 72, 2011 and local codes.

1.02 SUMMARY

A. This Section includes fire alarm systems.

1.03 DEFINITIONS

A. NICET: National Institute for Certification in Engineering Technologies.

B. Definitions in NFPA 72 apply to fire alarm terms used in this Section.

1.04 SYSTEM DESCRIPTION

A. Class B addressable system.

1.05 PERFORMANCE REQUIREMENTS

A. Comply with NFPA 72.

B. Fire alarm signal initiation shall be by one or more of the following devices:
   1. Smoke detectors.

C. Fire alarm signal shall initiate the following actions:
   1. All Alarm notification appliances shall operate continuously.
   2. Call out to Remote Monitoring Station.

1.06 SUBMITTALS

A. Product Data: For each type of product indicated.

B. Shop Drawings:
   1. Shop Drawings shall be prepared by persons with the following qualifications:
      a. Trained and certified by manufacturer in fire alarm system design.
      b. Fire alarm certified by NICET, minimum Level II.
   2. System Operation Description: Detailed description for this Project, including method of operation and supervision of each type of circuit and sequence of operations for manually and automatically initiated system inputs and outputs. Manufacturer's standard descriptions for generic systems are not

acceptable.

C. Qualification Data: For Installer.

D. Field quality-control test reports.

E. Operation and Maintenance Data: For fire alarm system to include in emergency, operation, and maintenance manuals.

F. Submittals to Authorities Having Jurisdiction: In addition to distribution requirements for submittals specified in Division 1 Section "Submittals," make an identical submittal to authorities having jurisdiction. Include submittal information required by the North Carolina State Building Code. To facilitate review, include copies of annotated Contract Drawings as needed to depict component locations. Resubmit if required to make clarifications or revisions to obtain approval. On receipt of comments from authorities having jurisdiction, submit them to Designer for review.

G. Documentation:
   1. Approval and Acceptance: Provide the "Record of Completion" form according to NFPA 72 to Owner, Designer, and authorities having jurisdiction.
   2. Record of Completion Documents: Provide the "Permanent Records" according to NFPA 72 to Owner, Designer, and authorities having jurisdiction. Format of the written sequence of operation shall be the optional input/output matrix.
      a. Hard copies on paper to Owner, Designer, and authorities having jurisdiction.

1.07 QUALITY ASSURANCE

A. Installer Qualifications: Personnel certified by NICET as Fire Alarm Level II.

B. 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.

1.08 EXTRA MATERIALS

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. Smoke Detectors : Quantity of (2).
   2. Pull Station : Quantity of (2).
   3. Visual Notification Strobe: Quantity of (2)
   4. Audible horn : Quantity (1)
   5. Monitor Module : Quantity (1)
   6. Control Relay : Quantity (1)
   7. Fuses: Two of each type and size installed in the system.
   8. Keys and Tools: One extra set for access to locked and tamperproof components.

PART 2 - PRODUCTS

2.01 FIRE ALARM CONTROL UNIT (FACU)

A. Circuits:
   1. Signaling Line Circuits: NFPA 72, Class B.
   2. Notification Appliance Circuits: NFPA 72, Class B.

B. Notification Appliance Circuit: Audible operation shall sound in a temporal pattern, complying with ANSI S3.41. All strobes shall be synchronized.

C. Power Supply for Supervision Equipment: Supply for audible and visual equipment for supervision of the ac power shall be from a dedicated dc power supply, and power for the dc component shall be from the ac supply.

D. Alarm Silencing, Trouble, and Supervisory Alarm Reset: Manual silence/reset at local station after initiating devices are restored to normal.
   1. Silencing-switch operation halts alarm operation of notification appliances and activates an "alarm silence" light. Display of identity of the alarm zone or device is retained.

2.02 SYSTEM SMOKE DETECTORS

A. General Description:
   1. All smoke detectors shall be analog type with automatic drift compensation features to automatically compensate for detector sensitivity changes due to ambient conditions and detector contamination.
   2. UL 268 listed, operating at 24-V dc, nominal.
   3. Plug-in Arrangement: Detector and associated electronic components shall be mounted in a plug-in module that connects to a fixed base. The fixed base shall have integral terminals for connection of building wiring.
   4. Detectors shall have built-in tamper-resistant locking device to secure the head to the base. Activate locking device after Final Acceptance of system.
   5. Self-Restoring: Detectors do not require resetting or readjustment after actuation to restore them to normal operation.
   6. Integral Visual-Indicating Light: LED type. Indicating detector has operated and power-on status.

2.03 NOTIFICATION APPLIANCES

A. Description: Equipped for mounting as indicated and with screw terminals for system connections.
   1. Combination Devices: Factory-integrated audible and visible devices in a single-mounting assembly.

B. Horns: Electric-vibrating-polarized type, 24-V dc; with provision for housing the operating mechanism behind a grille. Horns shall produce a sound-pressure level of 90 dBA, measured 10 feet from the horn.

C. Visible Alarm Devices: Xenon strobe lights listed under UL 1971, with clear or nominal white polycarbonate lens mounted on an aluminum faceplate. The word

"FIRE" is engraved in minimum 1-inch- high letters on the lens.
1. Strobe Leads: Factory connected to screw terminals.
2. Candela levels as shown on drawings, adjustable from 15 – 110 candela.

2.04 WIRE AND CABLE

A. Wire and cable for fire alarm systems shall be UL listed and labeled as complying with NFPA 70, Article 760.

1. Signaling Line Circuits: Unless otherwise indicated, Type FPL/FPLR/FPLP fire alarm cable, AWG 18 minimum, low-capacitance, twisted shielded copper pair. Size circuits as recommended by fire alarm system manufacturer. Unshielded cable, otherwise equal to the above, shall be permitted where the manufacturer's written installation instructions unequivocally require, or state a preference for, the use of unshielded cable.

B. Non-Power-Limited Circuits: Solid-copper conductors with 600-V rated, 75°C, color-coded THHN/THWN insulation; AWG 16 minimum for 24 V-dc, AWG 12 minimum for 120V. Color-code as follows:
1. Alarm notification appliance circuits: Blue (+) / Black (-).
2. Separate 24 V-dc operating power (for system equipment): Yellow (+) / Brown (-).

PART 3 - EXECUTION

3.01 EQUIPMENT INSTALLATION

A. Smoke Detector Spacing:
1. Smooth ceiling spacing shall not exceed the rating of the detector.
2. Spacing of heat detectors shall be determined based on guidelines and recommendations in NFPA 72.

B. HVAC louvers and vents: Locate detectors not closer than 2 feet louvers and vents.

C. Provide cover guards on pull stations.

D. All devices and panels, in user areas, shall be flush mounted in walls unless otherwise specifically approved by project manager and owner.

3.02 WIRING INSTALLATION

A. Install wiring according to the following:
1. NECA 1.
2. TIA/EIA 568-A.

B. Wiring Method:
1. Cables and raceways used for fire alarm circuits, and equipment control wiring associated with the fire alarm system, may not contain any other wire or cable.

2. Fire Alarm cables do not have to be installed in conduits where in concealed spaces.

C. Wiring within Enclosures: Separate power-limited and non-power-limited conductors as recommended by manufacturer. Install conductors parallel with or at right angles to sides and back of the enclosure. Bundle, lace, and train conductors to terminal points with no excess. Connect conductors that are terminated, joined, or interrupted in any enclosure associated with the fire alarm system to terminal blocks. Mark each terminal according to the system's wiring diagrams. Make all connections with approved crimp-on terminal spade lugs, pressure-type terminal blocks, or plug connectors.

D. Cable Taps: Use numbered terminal strips in junction, pull, and outlet boxes, cabinets, or equipment enclosures where circuit connections are made.

E. T-taps, of up to 10', are permitted.

F. There shall be no splices in system wiring except at device terminals, or on terminal blocks in cabinets. "Wire nuts" and crimp splices shall not be permitted. Permanent wire markers shall be used to identify all connections in the FACU and other equipment, and in terminal cabinets.

G. Color-Coding: Color-code fire alarm conductors differently from the normal building power wiring. Use one color-code for alarm circuit wiring and a different color-code for supervisory circuits. Color-code audible alarm-indicating circuits differently from alarm-initiating circuits. Use different colors for visible alarm-indicating devices. Paint fire alarm system junction boxes and covers red prior to installing cabling or wiring. In finished areas, boxes and covers shall be painted to match the surrounding finish color.

H.A framed set of Floor Plans, showing all devices, identification symbols, and Device Key; shall be installed on wall next to FACP and Remote Annunciator panels. Framing shall be finished wood with clear lens.

3.03 IDENTIFICATION

A. Identify system components, wiring, cabling, and terminals.

B. Identify individual detectors with a unique number as follows, in sequence: Addressable Loop # - Device #. Permanently mount the nameplate on each detector's base. Record each number on the as-built drawings.

3.04 GROUNDING

A. Install a ground wire from power panel to all devices via the 120 VAC circuit.

3.05 FIELD QUALITY CONTROL

A. Manufacturer's Field Service: Engage a factory-authorized service representative to inspect, test and adjust field-assembled components and equipment installation, including connections. Report results in writing.

B. A 100% system acceptance test shall be performed in accordance with the NFPA 72-2011.

C. Perform the following field tests and inspections and prepare test reports:
   1. Perform each electrical test and visual and mechanical inspection listed in NFPA 72. Certify compliance with test parameters. All tests shall be conducted under the direct supervision of a NICET technician certified under the Fire Alarm Systems program at Level II.
   2. Visual Inspection: Conduct a visual inspection before any testing. Use as-built drawings and system documentation for the inspection. Identify improperly located, damaged, or nonfunctional equipment, and correct before beginning tests.
   3. Testing: Follow procedure and record results complying with requirements in NFPA 72.
      a. Detectors, that are outside their marked sensitivity range, shall be replaced.

D. After completion of the 100% system acceptance test, submit the following documentation to the Designer:
   1. Written verification that the 100% system acceptance test was performed, and that the system has no deficiencies.
   2. NFPA 72 “Record of Completion” form, completed and signed by the Contractor.

E. Final Acceptance Review: The Contractor and Installer shall accompany the Designer and the Owner’s representative on a final acceptance review of the completed system. The Contractor shall verify all alarms, resets, and trouble signals with Remote Monitoring Station.

3.06 DOCUMENTATION AND TRAINING

A. Engage a factory-authorized service representative to train Owner's designated personnel as specified below:
   1. Train Owner's personnel on procedures and schedules for operating, troubleshooting, servicing, adjusting, and maintaining system equipment. Provide a minimum of 2 hours of training.
   2. Training Aid: Use the approved final version of the operation and maintenance manual as a training aid.
   3. Schedule training with Owner, with at least seven days' advance written notice.

B. Operation and Maintenance Manual: Provide to the Designer, for transmittal to the Owner, two copies of the system Operation and Maintenance manual. The manual shall be bound in a three-ring binder, and shall contain the following information:
   1. As-built system wiring diagram showing all loop numbers, device addresses, and wiring terminal numbers.
   2. Manufacturer’s detailed maintenance requirements.
   3. Technical literature on the equipment, alarm initiation devices, alarm notification appliances, and other system equipment.

C. A copy of the NFPA 72 “Record of Completion” shall be kept in the Administrative Office. At the Owner’s discretion, the “Record of Completion” may be kept at an alternate location.

END OF SECTION 283100