

Project Manual



NEW CLASSROOM / TORNADO SHELTER ADDITION for BENTON HIGH SCHOOL

BPSB Project No. 26-02



BA Project No. 2505

14 January 2026

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NEW CLASSROOM / TORNADO SHELTER ADDITION

for BENTON HIGH SCHOOL

BENTON, LOUISIANA



SPECIFICATIONS

SECTIONS 00-12, 31,32



01/14/2026

SPECIFICATIONS

SECTIONS 21-28

BA PROJECT NO. 2505

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END OF SECTION

BID NOTICE

SEALED BIDS WILL BE RECEIVED BY THE Bossier Parish School Board Purchasing Department in the Former Benton High Gymnasium now referred to as The Ole Gym located at 110 Kelly Street, Benton, LA 71006 until March 4, 2026 at 2:00 P.M. at which time the bids will be opened and read aloud for:

PROJECT NAME: NEW CLASSROOM / TORNADO SHELTER ADDITION for Benton High School

PROJECT NUMBER: BPSB Bid # 26-02

Original complete bidding documents must be obtained at no charge from www.BidExpress.com, which has been designated as the only method and service of distribution of the bidding documents and plans.

Contractors may elect to submit bids electronically at www.BidExpress.com. Contractors that wish to submit electronic bids online may be charged a fee by BidExpress. In addition, contractors shall be required to obtain a digital signature certificate prior to submitting bids online. The bid security required by this solicitation may also be submitted online.

Questions about the bidding documents or request for approvals shall be directed to the Architect at:

Bledsoe Architects LLC
Attn: Bryan Yeates, Principal
735 Robinhood Street, Shreveport, LA 71106
(318) 219-2295
email: yeates@bledsoearchitects.com

Any person requiring special accommodations shall notify the architect of the type(s) of accommodation required not less than seven (7) days before the bid opening.

NOTE: BIDS SHALL ONLY BE ACCEPTED FROM CONTRACTORS WHO ARE LICENSED UNDER LOUISIANA CONTRACTORS LICENSING LAW FOR THE MAJOR CLASSIFICATION OF BUILDING CONSTRUCTION.

All bids must be accompanied by bid security equal to five percent (5%) of the sum of the base bid and all alternates and must be in the form of a certified check, cashier's check or bid bond written in conformance with state law. Written evidence of the authority of the person signing the bid form should be included with the bid form. See La. R.S. 38:2212 B. (2) and (5).

The successful bidder shall be required to furnish Performance, Maintenance and Payment Bonds on the forms provided by the School Board and written in accordance with state law.

The Owner reserves the right to reject any and all bids.

A MANDATORY PRE-BID CONFERENCE will be held on February 24, 2026 at 10:00 AM at Benton High School, 449 Fairburn Avenue, Benton, LA 71006 in the school Library. Attendance at the Pre-Bid Conference by an Officer or Estimator directly involved with this Project is **MANDATORY** and is a Pre-Condition for bidder eligibility. Sign-in for the Conference will be between 9:30 and 10:00 AM. The Conference will begin promptly at 10:00 AM. No one will be allowed to sign in after that time and to be eligible to bid it is necessary to attend the entire conference.

BOSSIER PARISH SCHOOL BOARD
An Equal Opportunity Employer

Kerry Douglas
Chief Procurement Officer
Bossier Parish School Board
kerry.douglas@bossierschools.org
318-549-5039

Bossier Tribune Ad Dates:
February 4, 2026
February 11, 2026
February 18, 2026

BOSSIER PARISH SCHOOL BOARD

INSTRUCTIONS TO BIDDERS

Section 00100

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ARTICLE 1

DEFINITIONS AND INTRODUCTION

- 1.1 The Bidding Documents as defined in La. R.S. 38:2211 A. (2) include the following:
Bid Notice, Instructions to Bidders, Bid Form, General Conditions of the Contract for Construction, AIA Document A201-2017 as modified, Construction Agreement between Bossier Parish School Board and Contractor, AIA Document A101-2017 as modified, Performance and Payment Bond(s), Specifications Divisions 1 through 16, Drawings (Plans), and Addenda.
- 1.2 The Owner of the proposed work is BOSSIER PARISH SCHOOL BOARD, 410 Sibley Street, Benton, Louisiana 71006
- 1.3 The title of work or project is as indicated in the Bid Notice.
- 1.4 All definitions set forth in AIA Document A201-2017, General Conditions of the Contract for Construction, as modified, may be referenced.
- 1.5 **Addendum or Addenda** are written or graphic instruments issued by the Architect prior to the opening of bids which modify or interpret the Bidding Documents by additions, deletions, clarifications, corrections and prior approvals.
- 1.6 **Bid** is a proposal to do the Work or designated portion thereof for the sums stipulated therein, submitted on the Bid Form.
- 1.7 **Base Bid** is the sum stated on the Bid Form for which the Bidder offers to perform the Work described in the Bidding Documents.
- 1.8 **Alternate Bid** (or Alternate) is an amount stated on the Bid Form for an item that may either increase or decrease the quantity of work or change the type of work within the scope of the project, material, or equipment specified in the Bidding Documents, or both.
- 1.9 **Unit Price** is an amount proposed by Bidder and stated on the Bid Form as a price per unit of measurement for materials and/or services that shall be added or deducted from the contract sum by Change Order in the event the estimated quantities of materials and/or services required by the Bidding Documents are increased or decreased from the requirements of the Bidding Documents.
- 1.10 **Bidder** is a person or entity who submits a Bid to the Owner for the work described in the Bidding Documents.
- 1.11 **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.
- 1.12 **Architects and Engineers** or their authorized representatives are the persons whose seal(s) appear on the Bidding Documents and who will administer the construction contract.
- 1.13 **Bid Form** is the Louisiana Uniform Public Work Bid Form that can be found immediately following these Instructions to Bidders.

ARTICLE 2 BIDDER'S REPRESENTATION

- 2.1 Bidder has read and understands the Bidding Documents and his Bid is made in compliance with the Bidding Documents and plans obtained only from BidExpress.
- 2.2 Bidder has visited the site(s) and has familiarized himself with all of the 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.
- 2.3 Bidder by submitting a Bid agrees that its Bid is based upon the materials, systems, and equipment described in the Bidding Documents as advertised and as modified by Addenda, without exception.
- 2.4 The Bidder is fully qualified under all Louisiana State Laws, and all local licensing laws for Contractors in effect at the time and at the location(s) of the Work before submitting his Bid, and that all of his Sub-bidders or prospective Sub-contractors are duly licensed in accordance with all laws, (if required).
- 2.5 Bidder states that his bid is not based on any verbal instructions contrary to the Bidding Documents and Addenda.
- 2.6 Bidder by submitting a bid certifies that neither it nor its principals are presently debarred, suspended, proposed for debarment, or declared ineligible from participation in any transaction or contract by any Federal department or agency. Further, Bidder is not barred from submitting its bid due to an unpaid assessment under Part X (Alternative Collection Procedures and Assessments) of Chapter 11 (Unemployment Compensation) of Title 23 of Louisiana Revised Statutes of 1950.

ARTICLE 3 BIDDING DOCUMENTS

3.1 COPIES

- 3.1.1 Bidding Documents including plans must be obtained directly as stated in the Bid Notice from BidExpress at www.BidExpress.com. BidExpress is designated as the only method and service for plan distribution. See La. R.S. 38:2212 D.
- 3.1.2 There is no charge for registration and downloads of the Bidding Documents with BidExpress.
- 3.1.3 Bidders shall use complete sets of Bidding Documents obtained from BidExpress in preparing bids; neither the Owner nor the Architect assumes responsibility for errors, omissions, and misinterpretations resulting from the use of incomplete sets of Bidding Documents. Prior to bidding, verify all specification page numbers and Drawing sheet numbers with the specified index to insure receipt of all documents.
- 3.1.4 The Owner or Architect in making copies of the Bidding Documents available at www.BidExpress.com, do so only for the purpose of obtaining bids on the Work and do not confer a license or grant permission for any other use of the Bidding Documents.

3.2 INTERPRETATION OR CORRECTION OF BIDDING DOCUMENTS

- 3.2.1 Bidders and Sub-bidders requiring clarification or interpretation of the Bidding Documents shall make a written request to reach the Architect at least seven (7) calendar days prior to the date for receipt of Bids, excluding Saturdays, Sundays, and any other legal holidays.
- 3.2.2 Interpretations, corrections, or changes of the Bidding Documents will be made by a written Addendum. Interpretations, corrections, or changes of the Bidding Documents made in any other manner will not be binding, and Bidders shall not rely upon them.

3.3 SUBSTITUTIONS- (PRIOR APPROVAL REQUIRED)

- 3.3.1 The materials, products, and equipment described in the Bidding Documents establish a standard of required function, dimension, and appearance to be used on the Project and do not restrict Bidders to the specific brand, make, manufacturer, or specification named. Bidders may propose substitute materials, products, and/or equipment. All proposed substitutions must be submitted to the Architect for approval in accordance with Paragraph 3.3.2 below.
- 3.3.2 No substitution will be considered prior to receipt of Bids unless a complete written request for approval has been submitted by a Bidder and has been received by the Architect at least seven (7) days prior to the date for receipt of Bids, excluding Saturdays, Sundays, and any other legal holidays.
- 3.3.3 All requests shall include the name of the material or equipment for which it is to be substituted, the location, and a complete description of the proposed substitute including model numbers, colors, textures, drawings, cuts, performance and test data and all other detailed information necessary for a complete evaluation. A written

statement setting forth all 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.

- 3.3.4 The burden of proof of the merit of the proposed substitution is upon the Bidder. Incomplete product submittals that fail to demonstrate that the proposed substitution will meet the specified standards, colors, textures, actual samples, sufficient dimensions, quality, and strength of materials, and other standards specified will not be reviewed and will not be added to the list of prior approvals specified by addendum.
- 3.3.5 The Architect's decision of approval or disapproval of a proposed substitution shall be final.
- 3.3.6 The Architect reserves the right to reject products for which incomplete test data, samples, telephone numbers of users of products and information has been submitted. All test data and information shall meet or exceed standards specified. Bidders are responsible for submitting all information and all additional information requested by the Architect prior to the date specified in Article 3.3.2, above. Substitutions which require substantial revision of the Contract Documents will not be considered. The Architect reserves the right to reject materials and equipment proposed for this Project.
- 3.3.7 The Contractor shall have the option to use prior approved substitutions. No extra payment by Change Order will be approved for additional Work, materials, and equipment required to incorporate prior approved substitutions.
- 3.3.8 If the Architect approves a proposed substitution prior to receipt of Bids, such approval will be set forth in a written Addendum. Bidders shall not rely upon approvals made in any other manner.
- 3.3.9 The Architect reserves the right to reject materials and equipment at a later date after opening of bids if it is detected by the Architect that incomplete or false information was submitted prior to bidding.

3.4 ADDENDA

- 3.4.1 Addenda will be transmitted to all prime Bidders who have requested Bidding Documents from BidExpress. In the event any Addenda modifying plans and specifications are issued within a period of seven (7) calendar days prior to the advertised time for the opening of the Bids or the time extended for opening of Bids, excluding Saturdays, Sundays and any legal holidays, then such Addendum shall be transmitted within twenty-four hours of the issuance of the addendum and may be delivered by a copy of the Addendum to all prime Bidders who have previously requested the Bidding Documents by one of the following methods: (1) facsimile transmission; (2) email; (3) other electronic means; (4) by hand; or (5) by overnight delivery using a nationally recognized carrier, provided the prime bidders have supplied their facsimile number or email address. If the addendum cannot be transmitted by facsimile transmission, email, other electronic means, overnight delivery using a nationally recognized carrier or otherwise by hand delivery, the bid opening shall be postponed by at least seven days.
- 3.4.2 All Bidders shall be responsible to review the BidExpress website within 72 hours prior to the date and time of opening of Bids to verify receipt of all Addenda issued by the Architect.
- 3.4.3 Addenda shall not be issued within a period of seventy-two (72) hours prior to the advertised time for the opening bids except an Addendum withdrawing the specified request for Bids, or one which includes postponement of the date for receipt of Bids. If it is necessary to issue an addendum within the seventy-two (72) hour period prior to date and time for receipt of bids, the receipt of such bids shall be extended a minimum of exactly seven (7) working days, but not more than twenty-one working days without the requirement of re-advertising. The Addendum shall state the revised time and date for the opening of bids.
- 3.4.4 Bidders shall acknowledge receipt of Addenda in the space indicated on the Bid Form.
- 3.4.5 Failure to acknowledge receipt of all Addenda issued for this Project in the space(s) specified on the Bid Form will render the proposal informal and will cause its rejection as non-responsive.
- 3.4.6 All addenda shall become part of the Bidding Documents. All Bidders shall be bound by all Addenda whether or not received by said Bidders.

ARTICLE 4 PRE-BID CONFERENCE

A pre-bid conference will be held at the time and place designated in the Bid Notice. Representatives of the Owner will be present to discuss the Project. Bidders, who want to submit a bid, shall attend and participate in the conference. **If the Bid Notice indicates that a pre-bid conference is mandatory, then only those Bidders present at the beginning and in attendance for the entire duration of the pre-bid conference may submit a bid. Attendance at a mandatory Pre-bid conference is required in accordance with La. R.S. 38:2212(I) in order to submit to a bid.**

ARTICLE 5 BIDDING PROCEDURE

5.1 FORM AND STYLE OF BIDS

- 5.1.1 Bids shall be submitted on the Louisiana Uniform Public Work Bid Form included with the Bidding Documents, or as modified by Addenda or made available electronically by Owner.
- 5.1.2 Bidders should follow the instructions on the Bid Form and provide the information in a legible form.
- 5.1.3 Where so required on the Bid Form, sums shall be expressed in both words and figures, and in case of discrepancy between the two, the written words shall govern.
- 5.1.4 All requested Alternates on the Bid Form must be bid. If no change (added or subtracted amount) in the Base Bid is required for a requested Alternate, enter "No Change" in the blanks.
- 5.1.5 The Bid Form shall include the legal name of Bidder. The Bid Form shall be signed by the person or persons legally authorized to bind the Bidder to the specified Contract. Written evidence of the authority of the person signing the Bid Form shall be included with the Bid Form. See La. R.S. 38:2212 B. (2) and (5). Failure to include a copy of the appropriate signature authorization may result in the rejection of the bid as non-responsive. See La. R.S. 38:2212 B. (2) and (5).
- 5.1.6 The Contractor is required to be licensed pursuant to La. R.S. 37:2150-2163 and is required to state his Louisiana Contractor's license number on the Bid Form and on the outside of the bid envelope.

5.2 BID SECURITY

- 5.2.1 No Bid will be considered or accepted unless the bid is accompanied by a bid security in an amount of not less than five percent (5%) of the Base Bid and all additive alternates. The bid security shall be in the form of a certified check or cashier's check drawn on a bank insured by the Federal Deposit Insurance Corporation, or a bid bond (such as AIA Document A310-1970) written by a surety company that complies with La. R.S. 38:2218 C.
- 5.2.2 Bid security furnished by the Bidder shall guarantee that the Bidder shall, if awarded the Work according to the terms of his proposal, enter into the Contract and furnish the Performance and Payment Bond(s) and insurance as required by the Bidding Documents, within ten (10) working days of written or electronic notice of intent to award of the contract and the contract is ready for his signature.
- 5.2.3 Should the Bidder refuse to enter into such Contract or fail to furnish the performance and payment bonds or insurance, or other documents required after the opening of the bids, the amount of the bid security shall be forfeited to the Owner as liquidated damages, not as penalty.
- 5.2.4 The Owner will have the right to retain the bid security of Bidders until either (a) the Contract has been executed and the bonds and insurance have been furnished, or (b) the specified time has elapsed so that Bids may be withdrawn, or (c) all Bids have been rejected.
- 5.2.5 Contractors electing to submit bids electronically may also submit the Bid Security electronically. For more information on electronic bid security, contact BidExpress, Surety 2000 or Bidder's surety agency.

5.3 SUBMISSION OF BIDS

- 5.3.1 Sealed Bids may be submitted to the address stated in the Bid Notice or online at www.BidExpress.com
- 5.3.2 The bid envelope shall be addressed to the Owner, using the Owner's address specified on the Bid Notice and shall be identified on the outside of the bid envelope with the name of the Project, the name and address of the Bidder, and Louisiana Contractor's license number of the Bidder, and sealed bid number indicated on the Bid Notice.
- 5.3.3 Sealed Bids will be received by the Owner until the time and date and at the location specified in the Bid Notice or as modified by addenda or online at www.BidExpress.com for electronically submitted bids. Contractors desiring to submit electronic bids must register with BidExpress and pay a fee. All bids submitted electronically shall include a digital signature as required by Louisiana State law.
- 5.3.4 Bidders submitting bids to the Owner's bid receipt location shall assume full responsibility for the timely delivery and Owner's receipt of bids at the specified location prior to the time and date specified for receipt of Bids.
- 5.3.5 Owner's receipt of a bid for any reason after the date and time stipulated on the Bid Notice or as amended by Addenda, including but not limited to late delivery by carrier service, late mail, late hand delivery by anyone, leaving bid(s) with someone not specifically designated by the Owner to receive bid(s) prior to bid receipt, incorrect addresses, misunderstood information, misunderstood directions, or all other types of late delivery, and excuses shall disqualify the bid.
- 5.3.6 It is suggested that bidders thoroughly review Bid Form early to ensure having all of the required information on time.
- 5.3.7 Bids received after the time and date specified for the receipt of bids will be returned unopened.

- 5.3.8 Oral, telephonic, "faxed", or telegraphic Bids or modifications to bids are invalid and shall not receive consideration. The Owner will not consider notations written on the outside of the Bid Envelope which have the effect of the Bidder trying to amend its Bid.
- 5.3.9 If a mandatory Pre- Bid Conference is required, bids will be accepted only from Bidders that attended the entire Pre-Bid Conference from the beginning of the Conference through the close of the Conference. Date, time and location of the Pre-Bid Conference is indicated in the Bid Notice.
- 5.3.10 Bidders electing to submit bids electronically shall follow the procedure as established by BidExpress. Proper and timely submission of an electronic bid is the responsibility of the Bidder. Bidders are encouraged to complete the electronic bid documents in advance of the date and time for the opening of the bids. Late bids due to malfunction of Internet infrastructure, certificate service providers, electronic bid bond providers or other interruptions shall not be accepted.

5.4 MODIFICATION OR WITHDRAWAL OF BID

- 5.4.1 A bid may not be modified, withdrawn or cancelled by the Bidder after the time and bid date designated for the receipt of bids, and the Bidder so agrees in submitting his Bid, except in accordance with La. R.S. 2214 C, which states, in part, "Bids containing patently obvious, unintentional and substantial mechanical, clerical, or mathematical errors, or errors of unintentional omission of a substantial quantity of work, labor, materials or services made directly in the compilation of the bid, may be withdrawn by the Contractor if clear and convincing sworn, written evidence of such errors is furnished to the public entity (Owner) within forty-eight (48) hours of the bid opening excluding Saturdays, Sundays and legal holidays".
- 5.4.2 Prior to the time and date designated for receipt of Bids, Bids submitted early may be modified or withdrawn only by notice to the Owner prior to the time designated for receipt of Bids.
- 5.4.3 Withdrawn bids prior to the time and date designated for receipt of bids may be changed, re-sealed, and resubmitted up to the time designated for the receipt of Bids provided that they are then fully in conformance with these Instructions to Bidders and all of the Bidding Documents. Bid Security shall be in an amount sufficient for the Bid as modified or resubmitted.

ARTICLE 6 CONSIDERATION OF BIDS

6.1 RECEIPT OF BIDS

- 6.1.1 All properly identified Bids received on time shall at the time and place stated in the Bid Notice be publicly opened and read aloud as required by La. R.S. 38:2214 A.
- 6.1.2 Bids without Louisiana Contractor's license numbers on the bid envelopes will not be opened.
- 6.1.3 Any and all bidders' information shall be available upon request, either no sooner than fourteen days following the bid opening or after the recommendation of award by the Owner or the design professional, whichever occurs first, and the requester shall pay reasonable reproduction costs.

6.2 INFORMATION TO BE SUBMITTED BY APPARENT LOW BIDDER AFTER OPENING OF BIDS

Within ten (10) calendar days after the date of the Bid Opening, the apparent low bidder shall: comply with the requirements of La. R.S. 38:2227 by submitting to the Owner an Affidavit of No Convictions using the form attached to the Bidding Documents; comply with the provisions of R.S. 38:2224 by submitting a completed and signed Non-solicitation/No Debarment Affidavit that is attached to the Bidding Documents; comply with provisions of La. R.S. 38:2212.10 by submitting a sworn affidavit regarding registration and participation in an employee status verification system using the form attached to the Bidding Documents; and submit any other documents not allowed to be submitted with the Bid Form but required by the Bidding Documents. The failure of the apparent low bidder to submit the proper information or documentation required by Bidding Documents within the ten-day period after the date of the Bid opening such Bidder shall be declared non-responsive and the next low bidder will be allowed not less than ten (10) calendar days from the date the apparent low Bidder is declared non-responsive, to submit the proper information and documentation required by the Bidding Documents. La. R. S. 38: 2212 A. (3)(a)

6.3 REJECTION OF BIDS

The Owner will have the right to reject any or all Bids that are nonresponsive or for just cause and in particular to reject a Bid not accompanied by a required bid security or data or information required by the Bid Form or reject a Bid which is in any way incomplete, irregular, or not in compliance with the Bidding Documents.

6.4 ACCEPTANCE OF BID (AWARD)

- 6.4.1 The Owner will have the right to waive all informalities or irregularities in all Bid(s) received in accordance with public bid law, and to accept the Bid(s) which, in the Owner's judgment, is in the Owner's own best interest. Determination of the low Bidder shall be on the basis of the sum of the Base Bid and the Alternates accepted by the Owner, (if any).
- 6.4.2 The Owner reserves the right to accept or reject alternates which, in the Owner's judgment, are in the Owner's own best interest.
- 6.4.3 If the Owner decides to accept one (1) or more Alternates, (if any), and if accepting certain Alternates determines a low bidder, Alternate(s) will be accepted in numerical order.
- 6.4.4 If the Owner decides to accept one (1) or more Alternates, (if any), and if accepting certain Alternates does not determine a low bidder, Alternate(s) may be accepted out of numerical order.
- 6.4.5 The Owner shall act not later than forty-five (45) calendar days after the date of opening of the bids to award the public works contract to the lowest responsible and responsive bidder or reject all bids. However, the deadline may be extended as provided in La. R.S. 38:2215. After the contract is awarded, the Owner and the lowest responsive and responsible bidder shall execute the contract within sixty (60) calendar days after the award.

**ARTICLE 7
OTHER SUBMISSIONS**

- 7.1 Upon request by the Architect or the Owner, the apparent low bidder may be required to submit properly executed AIA Document A 305, Contractor's Qualification Statements. In addition, any bidder may be required, at the discretion of the Owner, to furnish evidence satisfactory to the Owner that his proposed subcontractors have sufficient means and experience in the types of work called for to assure completion of the contract in a satisfactory manner.
- 7.2 After the Bids are opened, any of the Bidders may, within forty-eight (48) of the opening of the Bids, submit to the Owner any evidence of a preference claimed should the Bidder's state of domicile provide a percentage preference in favor of contractors domiciled in the Bidder's state of domicile over Louisiana resident contractors for the same type of work. If there is a preference, a Bidder may submit the information as to the percentage and other supporting documentation.

**ARTICLE 8
PERFORMANCE AND
PAYMENT BOND AND INSURANCE**

8.1 BOND REQUIREMENTS

The successful Bidder shall be required to furnish a Performance and Payment Bond written on the Owner's form by a company licensed to do business in Louisiana, in an amount equal to 100% of the Contract amount. Surety must comply with the requirements of La. R.S. 38:2219.

8.2 TIME OF DELIVERY

- 8.2.1 The Bidder shall be responsible for delivering contract to the bonding agency, securing the required, signed bond(s) and delivering same to the and Owner within ten (10) days of the date of the Notice of Award. No company will be allowed to use or provide the bonds on its own bond form.
- 8.2.2 The bond(s) shall be dated on the date indicated on the Contract.
- 8.2.3 The Bidder shall require the Attorney-in-Fact who executes the required bond(s) on behalf of the surety to affix thereto a certified and current copy of his power of Attorney.
- 8.2.4 Original insurance certificates, signed in ink, indicating amounts of insurance required, Louisiana Workmen's Compensation, and all other specified insurance shall be presented to the Owner with the bond(s). Copies of originals and "faxed" copies of certificates of insurance are not acceptable.
- 8.2.5 No actual physical on-site work shall begin prior to securing specified insurance and bonds.

ARTICLE 9 FORM OF AGREEMENT BETWEEN OWNER AND CONTRACTOR

Unless otherwise specified, the form of the Contract to be used shall be the AIA Document A101- 2007 Standard Form of Agreement Between Owner and Contractor where the basis of payment is a STIPULATED SUM, as modified. The Agreement form will be prepared by the Owner and issued to the Contractor for execution and returned to the Owner for signature. Executed bonds and insurance certificate must be submitted to the Owner by the Contractor within ten (10) days of the date of the Notice of Award.

ARTICLE 10 PRE-CONSTRUCTION CONFERENCE

At the Pre-Construction Conference, the Contractor shall submit the following information to the Architect:

- A designation of the work to be performed by the Contractor with his own forces.
- A breakdown of the contract cost attributable to each item listed in the Schedule of Values Form. No payments will be made to the Contractor until this is received.
- A list of names and business domiciles of all Subcontractors, manufacturers, suppliers or other persons or organizations (including those who are to furnish materials or equipment fabricated to a special design) proposed for the principal portions of the work. It is the preference of the Owner that, to the greatest extent possible or practical, the Contractor utilize Louisiana and Bossier Parish Subcontractors, manufacturers, suppliers and labor.

ARTICLE 11 CONTRACT TIME

The Bidder by submitting a Bid agrees to commence the Work under the Contract on a date specified in the Notice to Proceed and to complete the Project no later than 425 consecutive calendar days, subject to such extensions as may be granted under the General Conditions.

ARTICLE 12 ENVIRONMENTAL CONSIDERATIONS

Inspection and Testing for Asbestos Content of Building Materials:

NOTICE!

Building materials which are scheduled to be incorporated into the work under the agreement shall first either be certified by the Manufacturer to be asbestos free or be inspected and tested by accredited parties and certified to be free of asbestos content in accordance with by EPA, AHERA, and 1982 School Rules.

"Asbestos" means the Asbestiform varieties of: Chrysotile (Serpentine), Crocidolite (Riebecrite), Amosite (cummingtonite-grunerite), Anthophyllite, Tremolite and Actinolite.

Materials shall not be incorporated into the work prior to the receipt of either manufacturer certification or accredited laboratory test results indicating the building material is asbestos free. Copies of the test reports shall be furnished to the Owner and the Architect.

The Owner reserves the right to inspect and take samples at random at the job site. Materials containing asbestos shall be removed immediately at the Contractor's expense using current EPA protocol for the removal of asbestos containing materials.

ARTICLE 13 UNIT PRICES

13.1 Unit prices other than those requested on the Bid Form shall not be quoted or submitted with any Bid.

13.2 If required on the Bid Form, unit prices furnished by the Bidder shall not be construed as an authorization to perform the Work or spend monies. Any change in the Work must be authorized by a written Change Order and signed in accordance with the Contract Documents.

**ARTICLE 14
MAINTENANCE BOND**

The Contractor awarded the Contract shall furnish a Maintenance Bond written by a company licensed to do business in Louisiana. The Bond shall be for a period of two years from the date of the substantial completion of the Project with the obligation limited to ten percent (10%) of the Contract Sum which is the Penal Sum. The Surety or insurance company should have a current A.M. Best rating of 'A-' (Excellent), Financial Size C VII with a "stable" outlook. The Owner's form is attached.

**ARTICLE 15
LIQUIDATED DAMAGES**

By submitting a Bid, a Bidder agrees, in the event awarded the Contract, to pay as Liquidated Damages the sum of One Thousand One Hundred Dollars (\$1100.00) for each consecutive calendar day for which the Work is not complete beginning with the first day beyond the contract time established for the Contract. In addition, by submitting a Bid, a Bidder agrees to pay the amount of Liquidated Damages in the sum of One Thousand One Hundred Dollars (\$1100.00) for each consecutive calendar day for which any item on the list of items to be completed or corrected (Punch List) is not complete beginning with the forty-sixth (46) day after the date of the recording of the Certificate of Substantial Completion. Said amounts are agreed as damages stipulated and not by way of penalty and agreed upon in advance by the submission of a Bid.

END OF SECTION 00100

Bossier Parish School Board Utility Notice



TO: Contractors on Bossier Parish School Board Facilities
Principals and Site Administrators

From: Jason Cottom, P.E., BPS Engineer
Telephone (318) 549-7090
Jason.Cottom@bossierschools.org

Stacy Roge', Supervisor of Maintenance
Telephone (318) 549-7093
Stacy.Roge@bossierschools.org

Date: Rev. December 1, 2024

**RE: Independent Contractors for Bossier Parish School Board
Use of Utilities and Services**

The Bossier Parish School Board has adopted a parish-wide BPSB Policy / Procedure EBD, Energy Conservation. This Program has provided the district with substantial energy savings simply by setting air conditioning thermostats on comfortable settings during hours of use and by turning off ALL lighting and utilities during unoccupied hours.

We are requiring all vendors or independent contractors using our metered utilities to follow our current Energy Conservation Guidelines that have been approved by the School Board. Refuse Collection is also closely monitored. (See Below.)

The attached guidelines for our utilities will apply. Failure or refusal to comply will be a breach of contract and cause for charges, as outlined in BPSB Procedure KFA and associated Facility Usage Guidelines, to be deducted from the contract.

Thank you for your cooperation. Any questions pertaining to these guidelines may be addressed to Jason Cottom or Stacy Roge' at the telephone numbers above.

Ventilation: We recognize that proper ventilation is required. All Doors and windows will remain CLOSED anytime the heat or air conditioning is on. Contractor may provide fans for use to ventilate employee work areas.

Air Conditioning: While adequate ventilation is required occupation and construction, provisions for complete Air Conditioning is not automatically included in the contracts for construction. Separate arrangements for use of our air conditioning must be made with the Supervisor of Maintenance. Each contractor (prime) must designate (a) person(s) authorized to request air conditioning schedules. This will be subject to approval, with the Architect's or Engineer's recommendation. Charges for use may apply.

Thermostats: All Thermostats are to be set as follows:

Heat = 68 – 72 degrees

A/C = 75 – 78 degrees

Thermostat Fans: Fans are to be set in the AUTO mode, and the Heat/Cool option is to be set on the right-hand side.

Lighting: All hallway, classroom, and office lighting will only be used as necessary. Light will only be on in the areas where the workers are working. Once the work is completed in any area, all lights must be turned off. Any exceptions to this policy must be approved by Supervisor of Maintenance.

Water: The use of water in our schools other than the restrooms or water fountains is to be approved by Supervisor of Maintenance.

Refuse Collection: All Contractors and their subcontractors shall make arrangements for their own refuse collection. A dump fee will be charged to the Contractor by deduction from Application for Payment for use of BPSB refuse containers unless other prior arrangements have been made with the Supervisor of Maintenance. Refuse containers are sized and scheduled for authorized BPSB use only. A fee of \$55 per container per dump will be assessed for the first use and \$100 per use for each additional instance.

END OF SECTION 00210



P.O. Box 2000, Benton, Louisiana 71006-2000 / Telephone (318) 549-5000 / FAX (318) 549-5044 /
www.bossierschools.org

TO: Short-term Workers, Contractors, and Repairmen

FROM: Tim Dupree, Fire, Safety & Environmental Compliance Coordinator

DATE: December 1, 2024

SUBJECT: Notification of Asbestos Containing Building Material (ACBM)
Asbestos Hazard Emergency Response Act (AHERA)
AHERA Designated Persons

The final rule requires Local Education Agencies (LEA's) to designate a person to carry out certain duties and ensure that such person receives training adequate to perform duties. There are two LEA designated persons for AHERA. You may contact BPSB Maintenance Department at (318) 549-7095 for assistance.

Paragraph 763.84 of CFR part 763, AHERA, requires all local Education Agencies (LEA's) to ensure that Short-term workers (e.g. telephone repair workers) who may come in contact with asbestos in a school are provided information about locations of asbestos containing building material (ACBM). Locations of ACBM are noted in the Management Plan as well as labeled in areas such as the boiler rooms.

Inspections of Facilities and the Management Plans are available for review at each location in the school office. These show the location of the ACBM by building and homogeneous area. The Management Plans are also on file at the Bossier Parish School Board Maintenance Department, 1715 Palmetto Road, Benton, Louisiana.

This notice is provided in partial fulfillment of Paragraph 763.84 of CFR part 763, AHERA.

Attention Maintenance & Purchasing: This notice should accompany ALL purchase orders or work orders issued for maintenance contract work by outside contractors.

TO: Bossier Parish School Board
Attn: Purchasing Dept
110 Kelly Street
Benton, LA 71006

(Owner to provide name and address of owner)

BID FOR: NEW CLASSROOM /
TORNADO SHELTER ADDITION for
BENTON HIGH SCHOOL
BPSB Project No. 26-02

(Owner to provide name of project and other identifying information)

The undersigned bidder hereby declares and represents that she/he: a) has carefully examined and understands the Bidding Documents, b) has not received, relied on, or based his bid on any verbal instructions contrary to the Bidding Documents or any addenda, c) has personally inspected and is familiar with the project site, and hereby proposes to provide all labor, materials, tools, appliances and facilities as required to perform, in a workmanlike manner, all work and services for the construction and completion of the referenced project, all in strict accordance with the Bidding Documents prepared by: Bledsoe Architects LLC and dated: 14 January 2026

(Owner to provide name of entity preparing bidding documents.)

Bidders must acknowledge all addenda. The Bidder acknowledges receipt of the following **ADDENDA:** (Enter the number the Designer has assigned to each of the addenda that the Bidder is acknowledging) _____

TOTAL BASE BID: For all work required by the Bidding Documents (including any and all unit prices designated "Base Bid" * but not alternates) the sum of:

_____ Dollars (\$_____)

ALTERNATES: For any and all work required by the Bidding Documents for Alternates including any and all unit prices designated as alternates in the unit price description.

Alternate No. 1 (Owner to provide description of alternate and state whether add or deduct) for the lump sum of:

N/A _____ Dollars (\$_____)

Alternate No. 2 (Owner to provide description of alternate and state whether add or deduct) for the lump sum of:

N/A _____ Dollars (\$_____)

Alternate No. 3 (Owner to provide description of alternate and state whether add or deduct) for the lump sum of:

N/A _____ Dollars (\$_____)

NAME OF BIDDER: _____

ADDRESS OF BIDDER: _____

LOUISIANA CONTRACTOR'S LICENSE NUMBER: _____

NAME OF AUTHORIZED SIGNATORY OF BIDDER: _____

TITLE OF AUTHORIZED SIGNATORY OF BIDDER: _____

SIGNATURE OF AUTHORIZED SIGNATORY OF BIDDER **: _____

DATE: _____

THE FOLLOWING ITEMS ARE TO BE INCLUDED WITH THE SUBMISSION OF THIS LOUISIANA UNIFORM PUBLIC WORK BID FORM:

* The Unit Price Form shall be used if the contract includes unit prices. Otherwise it is not required and need not be included with the form. The number of unit prices that may be included is not limited and additional sheets may be included if needed.

** **A CORPORATE RESOLUTION OR WRITTEN EVIDENCE** of the authority of the person signing the bid for the public work as prescribed by LA R.S. 38:2212(B)(5).

BID SECURITY in the form of a bid bond, certified check or cashier's check as prescribed by LA R.S. 38:2218(A) attached to and made a part of this bid.

BID BOND
FOR
BOSSIER PARISH SCHOOL BOARD PROJECTS

Date: _____

KNOW ALL MEN BY THESE PRESENTS:

That _____ of _____, as

Principal, and _____, as Surety, are held and firmly bound unto the Bossier Parish School Board (Obligee), in the full and just sum of five (5%) percent of the total amount of this proposal, including all alternates, lawful money of the United States, for payment of which sum, well and truly be made, we bind ourselves, our heirs, executors, administrators, successors and assigns, jointly and severally firmly by these presents.

Surety represents that it is listed on the current U. S. Department of the Treasury Financial Management Service list of approved bonding companies as approved for an amount equal to or greater than the amount for which it obligates itself in this instrument or that it is a Louisiana domiciled insurance company with at least an A - rating in the latest printing of the A. M. Best's Key Rating Guide. If surety qualifies by virtue of its Best's listing, the Bond amount may not exceed ten percent of policyholders' surplus as shown in the latest A. M. Best's Key Rating Guide.

Surety further represents that it is licensed to do business in the State of Louisiana and that this Bond is signed by surety's agent or attorney-in-fact. This Bid Bond is accompanied by appropriate power of attorney.

THE CONDITION OF THIS OBLIGATION IS SUCH that, whereas said Principal is herewith submitting its proposal to the Obligee on a Contract for:

Insert Bid Number and Name Here

NOW, THEREFORE, if the said Contract be awarded to the Principal and the Principal shall, within such time as may be specified, enter into the Contract in writing and give a good and sufficient bond to secure the performance of the terms and conditions of the Contract with surety acceptable to the Obligee, then this obligation shall be void; otherwise this obligation shall become due and payable.

PRINCIPAL (BIDDER)

SURETY

BY: _____
AUTHORIZED OFFICER-OWNER-PARTNER

BY: _____
AGENT OR ATTORNEY-IN-FACT(SEAL)

NON-SOLICITATION/NO DEBARMENT AFFIDAVIT

STATE OF LOUISIANA

PARISH OF _____

PROJECT NAME

NEW CLASSROOM / TORNADO
SHELTER ADDITION for
BENTON HIGH SCHOOL

LOCATION

Bossier Parish

Before me, the undersigned authority, duly commissioned and qualified within and for the state and parish aforesaid, personally came and appeared _____ representing _____ who, being by me first duly sworn deposed and said that he has read this affidavit and does in connection with the above described Project hereby agree under oath to comply with all provisions Louisiana Revised Statutes 38:2224 and, in particular:

- (1) That affiant and his firm employed no person, corporation, firm, association, or other organization, either directly or indirectly, to secure the public contract for the above-referenced Project with the Bossier Parish School Board under which he will, if awarded the contract, receive or received payment, other than persons regularly employed by the affiant whose services in connection with the construction, alteration or demolition of the public building or project or in securing the public contract were in the regular course of their duties for affiant; and
- (2) That no part of the contract price to be received or received by affiant or his firm was paid or will be paid to any person, corporation, firm, association, or other organization for soliciting the contract, other than the payment of their normal compensation to persons regularly employed by the affiant whose services in connection with the construction of the public building or project were in the regular course of their duties for affiant.

In addition, affiant states and certifies that neither he, his firm nor any of its principals are presently debarred, suspended, proposed for debarment or otherwise declared ineligible to participate in any transaction with any Federal department or agency.

Bidder/Contractor representative to sign
and type name below signature.→

Affiant

Printed Name

SWORN TO AND SUBSCRIBED BEFORE ME THIS ____ DAY OF _____, 20 ____.

NOTARY PUBLIC

Note -

Only the apparent low bidder is to remove this form, complete, and submit to the owner within ten (10) days from the date of the bid opening

AFFIDAVIT

LA. R.S. 38:2212:10 Verification of Employees

STATE OF LOUISIANA

PARISH OF _____

BEFORE ME, the undersigned authority, personally came and appeared _____, who after being by me duly sworn deposed and said that he/she is the fully authorized _____ of _____ (hereinafter referred to as the Bidding Entity), which submitted a bid to be opened on _____, 20____ to the **Bossier Parish School Board** for _____, Bid No. _____, and said affiant further said and attested:

- A. That the Bidding Entity is registered and participants in a status verification system to verify that all of its new employees in the state of Louisiana are legal citizens of the United States or are legal aliens.
- B. If awarded the contract, the Bidding Entity shall continue, during the term of the contract, to utilize a status verification system to verify the legal status of all new employees in the state of Louisiana.
- C. If awarded the contract, the Bidding Entity shall require all subcontractors to submit to it a sworn affidavit verifying compliance with Paragraphs (A) and (B) above (La. R.S. 38:2212.10 C).

NAME OF BIDDING ENTITY

NAME OF AUTHORIZED SIGNATORY OF BIDDER

TITLE OF AUTHORIZED SIGNATORY OF BIDDER

SIGNATURE

SWORN TO AND SUBSCRIBED BEFORE ME THIS _____ DAY OF _____, 20____.

Notary Public

Note -

Only the apparent low bidder is to remove this form, complete, and submit to the owner within ten (10) days from the date of the bid opening

AFFIDAVIT NO CONVICTIONS

STATE OF LOUISIANA

PARISH OF _____

BEFORE ME, the undersigned authority, personally came and appeared _____, who after being by me duly sworn deposed and said that he/she is the fully authorized _____ of _____ (hereinafter referred to as Bidder), the party who submitted a bid opened on _____, 20__ to the **Bossier Parish School Board** for _____, Bid No. _____, and said affiant further said and attested:

He/she personally has not been convicted of, nor has he/she entered a plea of guilty or nolo contendere to, any of the crimes or equivalent federal crimes listed below. That further, no individual partner, incorporator, director, manager, officer, organizer, or member, who has a minimum of a ten percent ownership in the bidding entity, has been convicted of, or has entered a plea of guilty or nolo contendere to, any of the crimes or equivalent federal crimes listed below.

A conviction of, or plea of guilty or nolo contendere to, the following state crimes or equivalent federal crimes shall permanently bar any person or the bidding entity from bidding on public projects:

- a. Public bribery (R.S. 14:118)
- b. Corrupt influencing (R.S.14:120)
- c. Extortion (R.S. 14:66)
- d. Money laundering (R.S. 14:230)

A conviction of, or plea of guilty or nolo contendere to, the following state crimes or equivalent federal crimes shall bar any person or the bidding entity from bidding on public projects for a period of five years from the date of conviction or from the date of the entrance of the plea of guilty or nolo contendere:

a. Theft (R.S. 14:67)	f. Bank fraud (R.S. 14:71.1)
b. Identity theft (R.S. 14:67.16)	g. Forgery (R.S. 14:72)
c. Theft of a business record (R.S. 14:67.20)	h. Contractors; misapplication of payments (R.S. 14:202)
d. False accounting (R.S. 14:70)	i. Malfeasance in office (R.S. 14:134)
e. Issuing worthless checks (R.S. 14:71)	

Print Name: _____ Signature: _____

SWORN TO AND SUBSCRIBED BEFORE ME THIS _____ DAY OF _____, 20__.

NOTARY PUBLIC

The five-year prohibition provided for in R.S. 38:2227 B(2) shall apply only if the crime was committed during the solicitation or execution of a contract or bid awarded pursuant to these provisions. If evidence is submitted to the School Board substantiating that a false attestation has been made and the project must be re-advertised or the contract cancelled, the awarded entity making the false attestation shall be responsible to the School Board for the costs of rebidding, additional costs due to increased costs of bids and any and all delay costs due to the rebid or cancellation of the above described project as provided in R.S. 38:2227 C(2).

Note -

Only the apparent low bidder is to remove this form, complete, and submit to the owner within ten (10) days from the date of the bid opening



AIA® Document A101® – 2017

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

AGREEMENT made as of the _____ day of _____ in the year 2024
(In words, indicate day, month and year.)

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

Bossier Parish School Board
P.O. Box 2000
410 Sibley Road
Benton, Louisiana 71006

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

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

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

The Owner and Contractor agree as follows.

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

The parties should complete A101®-2017, Exhibit A, Insurance and Bonds, contemporaneously with this Agreement. AIA Document A201®-2017, General Conditions of the Contract for Construction, is adopted in this document by reference. Do not use with other general conditions unless this document is modified.

TABLE OF ARTICLES

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

EXHIBIT A INSURANCE AND BONDS

ARTICLE 1 THE CONTRACT DOCUMENTS

The Contract Documents consist of this Agreement, the Owner's Modified AIA Document A201-2017 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:

(Check one of the following boxes.)

- ☐ The date of this Agreement.
- ☒ A date set forth in a notice to proceed issued by the Owner.
- ☐ Established as follows:
(Insert a date or a means to determine the date of commencement of the Work.)

If a date of commencement of the Work is not selected, then the date of commencement shall be the date of this Agreement.

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

§ 3.3 Substantial Completion

§ 3.3.1 Subject to adjustments of the Contract Time as provided in the Contract Documents, the Contractor shall achieve Substantial Completion of the entire Work:

(Check one of the following boxes and complete the necessary information.)

Init.

[] Not later than () calendar days from the date of commencement of the Work.

[] By the following date:

§ 3.3.2 Subject to adjustments of the Contract Time as provided in the Contract Documents, if portions of the Work are to be completed prior to Substantial Completion of the entire Work, the Contractor shall achieve Substantial Completion of such portions by the following dates:

Portion of Work	Substantial Completion Date

§ 3.3.3 If the Contractor fails to achieve Substantial Completion as provided in this Section 3.3, liquidated damages, if any, shall be assessed as set forth in Section 4.5.

ARTICLE 4 CONTRACT SUM

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

§ 4.2 Alternates

§ 4.2.1 Alternates, if any, included in the Contract Sum:

Item	Price

§ 4.2.2 Subject to the conditions noted below, the following alternates may be accepted by the Owner following execution of this Agreement. Upon acceptance, the Owner shall issue a Modification to this Agreement.
(Insert below each alternate and the conditions that must be met for the Owner to accept the alternate.)

Item	Price	Conditions for Acceptance

§ 4.3 Allowances, if any, included in the Contract Sum:
(Identify each allowance.)

Item	Price

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

Item	Units and Limitations	Price per Unit (\$0.00)

§ 4.5 Liquidated damages, if any:
(Insert terms and conditions for liquidated damages, if any.)

It is mutually agreed by the Contractor and the Owner that time is an essential part of this Contract and in case of the Contractor's failure to complete the Project within the time specified above and agreed upon, the Owner will be damaged thereby; and because it is difficult to definitely ascertain and prove the amount of said damages, it is hereby agreed that the amount of Liquidated Damages shall be the sum of Five hundred and no/100s Dollars (\$500.00) for each consecutive calendar day of delay for which the Project is not substantially complete beginning with the first day of beyond the completion time stated above. Contractor hereby agrees that said sum(s) shall be deducted from monies due Contractor by a Construction Change Directive under this Contract or if no money is due Contractor, the Contractor hereby agrees to pay to the Owner as liquidated damages, and not by way of penalty, such total sum as shall be due for each delay, computed as stated above.

§ 4.6 Other:

(Insert provisions for bonus or other incentives, if any, that might result in a change to the Contract Sum.)

ARTICLE 5 PAYMENTS

§ 5.1 Progress Payments

§ 5.1.1 Based upon Applications for Payment properly 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:

NA

§ 5.1.3 Provided that an Application for Payment is received by the Architect for the value of labor and materials incorporated into the work as of the last day of the previous month not later than the 5th day of a month, the Owner within fifteen (15) days after the Owner's receipt of the Architect's Certificate for Payment shall make payment of the amount certified to the Contractor ~~not later than the day of the month~~ Contractor. If an Application for Payment is received by the Architect after the application date fixed above, payment of the amount certified shall be made by the Owner not later than thirty (30) days after the Architect receives the Application for Payment. Erroneous Applications for Payment may cause delay in processing of a payment; however, such delays shall not constitute cause for claims for compensation for any addition to the Contract Sum nor for adjustment of the Contract Time. *(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 of values 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 In accordance with Owner's Modified AIA Document A201™-2017, General Conditions of the Contract for Construction, and subject to other provisions of the Contract Documents, the amount of each progress payment shall be computed as follows:

§ 5.1.6.1 The amount of each progress payment shall first include:

- .1 That portion of the Contract Sum properly allocable to completed Work;
- .2 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 bonded location agreed upon in writing; and
- .3 That portion of Construction Change Directives that the Architect determines, in the Architect's professional judgment, to be reasonably justified.

§ 5.1.6.2 The amount of each progress payment shall then be reduced by:

- .1 The aggregate of any amounts previously paid by the Owner;
- .2 The amount, if any, for Work that remains uncorrected and for which the Architect has previously withheld a Certificate for Payment as provided in Article 9 of Owner's Modified AIA Document A201-2017;
- .3 Any amount for which the Contractor does not intend to pay a Subcontractor or material supplier, unless the Work has been performed by others the Contractor intends to pay;

- .4 For Work performed or defects discovered since the last payment application, any amount for which the Architect may withhold payment, or nullify a Certificate of Payment in whole or in part, as provided in Article 9 of Owner's Modified AIA Document A201-2017; and
- .5 Retainage withheld pursuant to Section 5.1.7.

§ 5.1.7 Retainage

§ 5.1.7.1 For each progress payment made prior to Substantial Completion of the Work, the Owner may withhold the following amount, as retainage, from the payment otherwise due:

(Insert a percentage or amount to be withheld as retainage from each Application for Payment. The amount of retainage may be limited by governing law.)

Five percent (5%) for a Contract Sum of \$500,000.00 or more. Ten percent (10%) if the Contract Sum is less than \$500,000.00.

§ 5.1.7.1.1 The following items are not subject to retainage:

(Insert any items not subject to the withholding of retainage, such as general conditions, insurance, etc.)

NA

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

(If the retainage established in Section 5.1.7.1 is to be modified prior to Substantial Completion of the entire Work, including modifications for Substantial Completion of portions of the Work as provided in Section 3.3.2, insert provisions for such modifications.)

NA

§ 5.1.7.3 Except as set forth in this Section 5.1.7.3, upon Substantial Completion of the Work, the Contractor may submit an Application for Payment that includes the retainage withheld from prior Applications for Payment pursuant to this Section 5.1.7. The Application for Payment submitted at Substantial Completion shall not include retainage as follows:

(Insert any other conditions for release of retainage upon Substantial Completion.)

in excess of the punch list items with values based on cost estimates provided by the Architect and the appropriate percentage identified in Section 5.1.7.1. Retainage shall not become due until the Contractor submits a Clear Lien Certificate issued by the Bossier Parish Clerk of Court forty-six (46) days or later following the recordation of the Certificate of Substantial Completion or as otherwise provided by La. R.S. 38:2248 B.

§ 5.1.8 If final completion of the Work is materially delayed through no fault of the Contractor, the Owner shall pay the Contractor any additional amounts in accordance with Article 9 of Owner's Modified AIA Document A201-2017.

§ 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 nonconforming Work as provided in Article 12 of Owner's Modified AIA Document A201-2017, 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~~ and as follows:

The Contractor has furnished all close out documents to the Owner's representative and all such documents including as-builts are accepted by the Owner. See Sections 9.10.2, 9.10.2.1, and 9.10.2.2 of the Owner's Modified AIA Document A201-2017.

§ 5.3 Interest

Payments due and unpaid under the Contract shall bear no 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.)

—%

due.

ARTICLE 6 DISPUTE RESOLUTION

§ 6.1 Initial Decision Maker

The Architect will serve as the Initial Decision Maker pursuant to Article 15 of Owner's Modified AIA Document A201–2017, unless the parties appoint below another individual, not a party to this Agreement, to serve as the Initial Decision Maker.

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

§ 6.2 Binding Dispute Resolution

For any Claim subject to, but not resolved by, mediation pursuant to Article 15 of AIA Document A201–2017, the method of binding dispute resolution shall be as follows:

(Check the appropriate box.)

☐ Arbitration pursuant to Section 15.4 of AIA Document A201–2017

☒ Litigation in a court of competent jurisdiction

☐ Other *(Specify)*

If the Owner and Contractor do not select a method of binding dispute resolution, 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.

ARTICLE 7 TERMINATION OR SUSPENSION

§ 7.1 The Contract may be terminated by the Owner or the Contractor as provided in Article 14 of Owner's Modified AIA Document A201–2017.

§ 7.1.1 If the Contract is terminated for the Owner's convenience in accordance with Article 14 of Owner's Modified AIA Document A201–2017, then the Owner shall pay the Contractor a termination fee as follows:

(Insert the amount of, or method for determining, the fee, if any, payable to the Contractor following a termination for the Owner's convenience.)

No termination fee is provided.

§ 7.2 The Work may be suspended by the Owner as provided in Article 14 of Owner's Modified AIA Document A201–2017.

ARTICLE 8 MISCELLANEOUS PROVISIONS

§ 8.1 Where reference is made in this Agreement to a provision of AIA Document A201–2017 or another Contract Document, the reference refers to that provision as amended or supplemented by other provisions of the Contract Documents.

Init.

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

Jason Rowland, Superintendent
Bossier Parish Schools
P. O. Box 2000
410 Sibley Street
Benton, LA 71006

Jason Cottom, PE
Bossier Parish Schools Engineer
BPSB Palmetto Shop
1715 Palmetto Road
Benton, LA 71006
Telephone: (318) 549-7090
Email: jason.cottom@bossierschools.org

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

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

§ 8.5 Insurance and Bonds

§ 8.5.1 The Owner and the Contractor shall purchase and maintain insurance as set forth in Owner's Modified AIA Document A101™-2017, Standard Form of Agreement Between Owner and Contractor where the basis of payment is a Stipulated Sum, Exhibit A, Insurance and Bonds, A to AIA Document A101-2017 Owner and Contractor Agreement, and elsewhere in the Contract Documents.

§ 8.5.2 The Contractor shall provide bonds as set forth in AIA Document A101™-2017 Exhibit A, Exhibit A to AIA Document A101-2017 Owner and Contractor Agreement, and elsewhere in the Contract Documents.

§ 8.6 Notice in electronic format, pursuant to Article 1 of Owner's Modified AIA Document A201-2017, may be given in accordance with AIA Document E203™-2013, Building Information Modeling and Digital Data Exhibit, if completed, or as otherwise set forth below:

(If other than in accordance with AIA Document E203-2013, insert requirements for delivering notice in electronic format such as name, title, and email address of the recipient and whether and how the system will be required to generate a read receipt for the transmission.)

§ 8.7 Other provisions:

Init.

§8.6.1 This Agreement shall be governed by the laws of the State of Louisiana. Further the mandatory and exclusive venue for any dispute or claim shall be the 26th Judicial District Court in and for the Parish of Bossier, in which the Owner's administrative office is located.

§8.6.2 As a material consideration of making this Agreement, the modifications of this Agreement shall not be construed against the maker of said modifications.

§8.6.3 Notwithstanding anything to the contrary in this Agreement or in any document that forms a part hereof, there shall be no mandatory arbitration for any dispute arising hereunder.

§8.6.4 Contractor shall require all construction workers and laborers, whether the Contractor's own employees or forces or the employees or forces of Subcontractors to wear identification tags on the front of their person all times that they are on the Owner's property. All such personnel may be subject to a criminal background check at Contractor's expense.

ARTICLE 9 ENUMERATION OF CONTRACT DOCUMENTS

§ 9.1 This Agreement is comprised of the following documents:

- .1 Owner's Modified AIA Document A101™-2017, Standard Form of Agreement Between Owner and Contractor
- .2 AIA Document A101™-2017, Exhibit A, Insurance and Bonds-Exhibit A to AIA Document A101-2017 Owner and Contractor Agreement
- .3 Owner's Modified AIA Document A201™-2017, General Conditions of the Contract for Construction
- .4 AIA Document E203™-2013, Building Information Modeling and Digital Data Exhibit, dated as indicated below:
(Insert the date of the E203-2013 incorporated into this Agreement.)

NONE

- .5 Drawings

Number	Title	Date

- .6 Specifications

Section	Title	Date	Pages

- .7 Addenda, if any:

Number	Date	Pages

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

- .8 Other Exhibits:
(Check all boxes that apply and include appropriate information identifying the exhibit where required.)

[NONE] AIA Document E204™-2017, Sustainable Projects Exhibit, dated as indicated below:
(Insert the date of the E204-2017 incorporated into this Agreement.)

[NONE] The Sustainability Plan:

Title	Date	Pages

[**NONE**] Supplementary and other Conditions of the Contract:

Document	Title	Date	Pages

.9 Other documents, if any, listed below:

(List here any additional documents that are intended to form part of the Contract Documents. AIA Document A201™–2017 provides that the advertisement or invitation to bid, Instructions to Bidders, sample forms, the Contractor's bid or proposal, portions of Addenda relating to bidding or proposal requirements, and other information furnished by the Owner in anticipation of receiving bids or proposals, are not part of the Contract Documents unless enumerated in this Agreement. Any such documents should be listed here only if intended to be part of the Contract Documents.)

The Project Manual
Advertisement for Bids
Instructions to Bidders
Contractor's Bid Form
Signed Non-Collusion Affidavit
Signed Affidavit of No Convictions
Signed Non-Solicitation/No Debarment Affidavit
Signed Affidavit Employee Status Verification

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

Bossier Parish School Board

 OWNER (Signature)

 Jason Rowland, Superintendent
 (Printed name and title)

 CONTRACTOR (Signature)

 (Printed name and title)

Init.

Certification of Document's Authenticity

AIA® Document D401™ – 2003

I, , hereby certify, to the best of my knowledge, information and belief, that I created the attached final document simultaneously with this certification from AIA Contract Documents software and that in preparing the attached final document I made no changes to the original text of AIA® Document A101™ – 2017, Standard Form of Agreement Between Owner and Contractor where the basis of payment is a Stipulated Sum, other than changes shown in the attached final document by underscoring added text and striking over deleted text.

Kenneth F. Sills

(Signed)

Attorney

(Title)

January 12, 2026

(Dated)

EXHIBIT A to AIA Document A101-2017 Owner and Contractor Agreement

INSURANCE REQUIREMENTS FOR NEW CONSTRUCTION, ADDITIONS AND RENOVATIONS

The Contractor shall be responsible for the procurement of the following insurance coverage:

11.1 CONTRACTOR'S LIABILITY INSURANCE

The Contractor shall purchase and maintain without interruption for the duration of the contract insurance against claims for injuries to persons or damages to property which may arise from or in connection with the performance of the Work hereunder by the Contractor, its agents, representatives, employees, or subcontractors. The duration of the insurance shall be from the inception of the contract until expiration of the one-year period for correction of Work.

11.2 MINIMUM SCOPE AND LIMITS OF INSURANCE

11.2.1 Worker's Compensation

Worker's Compensation insurance shall be in compliance with the Worker's Compensation laws of the State of Louisiana. Employers Liability is included with a minimum limit of \$1,000,000 per accident/per disease/per employee. If Work is to be performed over water and involves maritime exposure, applicable LHWCA, Jones Act or other maritime law coverage shall be included. A.M. Best's insurance company rating requirement may be waived for Worker's compensation coverage only. This rating shall not apply to self-insured funds.

11.2.2 Commercial General Liability

Commercial General Liability insurance, including Premise-Operations, use of Independent Contractors and Subcontractors, Personal and Advertising Injury, Liability and Products and Completed Operations Liability shall have a minimum limit per occurrence of \$5,000,000. The Insurance Services Office (ISO) Commercial General Liability occurrence coverage form CG 00 01 (current form 04 13 approved for use in Louisiana), or equivalent, is to be used in the policy. Any Claims-made form is unacceptable. Total required liability limits may be secured through a combination of General Liability and Umbrella policies.

11.2.3 Automobile Liability

Automobile Liability Insurance shall have a minimum combined single limit per occurrence of \$1,000,000. ISO form number CA 00 01 (current form 10 13) approved for use in Louisiana), or equivalent, is to be used in the policy. This insurance shall include coverage for bodily injury and property damage liability for owned, hired and non-owned automobiles.

11.2.4 Umbrella

Umbrella Insurance may be used to meet the minimum requirements for General Liability and Automobile Liability only. In no event shall any umbrella liability insurance provide narrower coverage than the primary policy. The umbrella policy shall not require the exhaustion of the underlying limits only through the actual payment of the underlying insurance.

11.2.5 Builder's Risk

Builder's Risk Insurance shall be in an amount equal to the amount of the construction contract including any amendments and shall be upon the entire Work included in the contract. The policy shall provide coverage equivalent to the ISO form number CP 10 30, Special Form Causes of Loss (extended, if necessary, to include the perils of wind, earthquake, collapse, vandalism/malicious mischief, and theft, including theft of materials whether or not attached to any structure). The policy must include engineer and engineer's fees necessary to provide plans, specifications, and supervision of Work for the repair and/or replacement of property damage caused by a covered peril, not to exceed 10% of the cost of the repair and/or replacement.

The policy must include coverage for the Owner, Contractor and any subcontractors as their interests may appear and the Owner is a Loss Payee in the Builder's Risk policy.

11.2.6 Pollution Liability (*required when asbestos or other hazardous material abatement is included in the contract*)

Pollution Liability insurance, including gradual release as well as sudden and accidental, shall have a minimum limit of not less than \$2,000,000 per claim. A claims-made form will be acceptable. A policy period inception date of no later than the first day of anticipated Work under this contract and an expiration date of no earlier than 30 days after anticipated completion of all Work under the contract shall be provided. There shall be an extended reporting period of at least 24 months, with full reinstatement of limits, from the expiration date of the policy if the policy is not renewed. The policy shall not be cancelled for any reason, except non-payment of premium.

11.2.7 Deductibles and Self-Insured Retentions

Any deductibles or self-insured retentions must be declared to and accepted by the Owner. The Contractor shall be responsible for the payment of all deductibles and self-insured retentions.

11.3 OTHER INSURANCE PROVISIONS

The policies are to contain, or be endorsed to contain, the following provisions:

11.3.1 Worker's Compensation and Employers Liability Coverage

11.3.1.1 To the fullest extent allowed by law, coverage shall include a Waiver of Subrogation in favor of the Owner and its officers, agents, employees, and volunteers for losses arising from Work performed by the Contractor for the Owner.

11.3.1.2 The policy shall include the Alternate Employer endorsement.

11.3.2 Commercial General Liability Coverage

11.3.2.1 The Owner, its officers, agents, employees and volunteers are to be added as additional insureds for liability arising out of activities performed by or on behalf of the Contractor; products and completed operations of the Contractor, premises owned, occupied or used by the Contractor. ISO Form CG 20 10 (for ongoing

work) AND CG 20 37 (for completed work) (current forms 04 13 approved for use in Louisiana), or equivalent, are to be used.

11.3.2.2 The Contractor's insurance shall be primary and non-contributory for any and all losses that occur under the contract. The coverage shall contain no special limitations on the scope of protection afforded to the Owner, its officers, officials, employees or volunteers. Any insurance or self-insurance maintained by the Owner shall be excess and non-contributory of the Contractor's insurance. In the event Contractor's insurer does not include Primary and Non-Contributory liability as required, then the Contractor shall furnish a Waiver of Subrogation in favor of the Owner on the Contractor's General Liability insurance and Owners and Contractors Protective Liability (OCP) coverage and name the Bossier Parish School Board as the "Insured". For a Project between \$250,000 and \$1,000,000 the amount of coverage per occurrence is \$1,000,000.00. For a Project over \$1,000,000.00 the amount of coverage per occurrence is \$3,000,000.00.

11.3.2.3 CGL insurance must also contain an endorsement providing that the aggregate loss limit must apply to each project. ISO form CG 25 03 (current form 05 09 approved for use in Louisiana), or equivalent, shall also be submitted. The Owner's project number, including the Owner's project name shall be included on the endorsement.

11.3.2.4 Any endorsements or other policy language that materially reduce or exclude coverages that are commonly expected to be provided on a Contractor's General Liability insurance shall be disclosed on the Certificate of Insurance prior to the commencement of work, or prior to coverage renewal if work has already commenced.

11.3.3 All Coverages

11.3.3.1 All policies must be endorsed to require 30 days written notice of cancellation to the Owner. Ten-day written notice of cancellation is acceptable for non-payment of premium. Notifications shall comply with the standard cancellation provisions in the Contractor's policy. In addition, Contractor is required to notify the Owner of any policy cancellations or reductions in limits.

11.3.3.2 Neither the acceptance of the completed Work nor the payment thereof shall release the Contractor from the obligations of the insurance requirements or indemnification agreement.

11.3.3.3 The insurance companies issuing the policies shall have no recourse against the Owner for payment of premiums or for assessments under any form of the policies.

11.3.3.4 Any failure of the Contractor to comply with reporting provisions of the policy shall not affect coverage provided to the Owner, its officers, agents, employees and volunteers.

11.3.4 Acceptability of Insurers

All required insurance shall be provided by a company or companies lawfully authorized to do business in the jurisdiction in which the Project is located. Insurance shall be

placed with insurers with an A.M. Best's rating of **A-: VII or higher with a "Stable" outlook**. This rating requirement may be waived for Worker's compensation coverage only. This waiver shall not be applicable to Self-insured Funds.

If at any time an insurer issuing any such policy does not meet the minimum A.M. Best rating, the Contractor shall obtain a policy with an insurer that meets the A.M. Best rating and shall submit another certificate of insurance within 30 days.

11.3.5 Verification of Coverage

Contractor shall furnish the Owner with Certificates of Insurance reflecting proof of required coverage. The Certificates are to be received and approved by the Owner before Work commences and upon any contract renewal or insurance policy renewal thereafter. Include information about any "reserve" of any portion of the Umbrella policy coverage at the time of issuance of the Certificate of Insurance. The Certificate Holder must be listed as follows:

Bossier Parish School Board
P.O. Box 2000
Benton, LA 71006-2000
Attn: Purchasing Dept. Project # _____

The Owner reserves the right to request complete certified copies of all required insurance policies at any time. Upon request, the Contractor shall within thirty days deliver the certified copies of any requested insurance policies to the Owner's Representative.

Upon failure of the Contractor to furnish, deliver and maintain required insurance, this contract, at the election of the Owner, may be suspended, discontinued, or terminated. Failure of the Contractor to purchase and/or maintain any required insurance shall not relieve the Contractor from any liability or indemnification under the contract.

If the Contractor does not meet the insurance requirements at policy renewal, at the option of the Owner, payment to the Contractor may be withheld until the requirements have been met, or the Owner may pay the renewal premium and withhold such payment from any monies due the Contractor, OR the contract may be suspended or terminated for cause.

11.3.6 Subcontractors

Contractor shall include all subcontractors as insureds under its policies OR shall be responsible for verifying and maintaining the certificates provided by each subcontractor. Subcontractors shall be subject to all the requirements stated herein. The Owner reserves the right to request copies of subcontractor's certificates at any time.

If Contractor does not verify subcontractors' insurance as described above, Owner has the right to withhold payments to the Contractor until the requirements have been met.

11.3.7 Worker's Compensation Indemnity

In the event Contractor is not required to provide Worker's compensation coverage, the parties hereby agree the Contractor, its Owners, agents, and employees shall have no cause of action

against, and shall not assert a claim against, the Owner, Owner's agents and employees as an employer, whether pursuant to the Louisiana Worker's Compensation Act or otherwise, under any circumstance. The parties also hereby agree that the Owner, its departments, agencies, agents, and employees shall be, or considered as, the employer or statutory employer of Contractor, its Owners, agents and employees. The parties further agree that Contractor is a wholly independent Contractor and is exclusively responsible for its employees, owners, and agents. Contractor hereby agrees to protect, defend, indemnify and hold the Owner, its agents and employees harmless from any such assertion or claim that may arise from the performance of this contract.

11.3.8 Indemnification/Hold Harmless Agreement

Contractor agrees to protect, defend, indemnify, save, and hold harmless, the Owner, its officers, agents, servants, employees, volunteers, insurers from and against any and all claims, damages, expenses and liability arising out of injury or death to any person or the damage, loss or destruction of any property which may occur, or in any way grow out of, any act or omission of Contractor, its agents, subcontractors, servants and employees, or any and all costs, expenses and/or attorney fees incurred by Owner as a result of any claims, demands, suits or causes of action, except those claims, demands, suits or causes of action arising out of the negligence of the Owner, its officers, agents, servants, employees and volunteers.

Contractor agrees to investigate, handle, respond to, provide defense for and defend any such claims, demands, suits or causes of action at its sole expense and agrees to bear all other costs, attorney fees, and expenses related thereto, even if the claims, demands, suits, or causes of action are groundless, false or fraudulent. The Owner may, but is not required to, consult with the Contractor in the defense of claims, but this shall not affect the Contractor's responsibility for the handling and expenses of all claims.

11.4 PERFORMANCE AND PAYMENT BONDS

11.4.1 Each bond is to be in the full amount of the Contract Price.

11.4.2 Recordation of Contract and Bond [La R.S. 38:2241 thru 38:2241.1]

The Owner shall record within thirty (30) days of signing the Contract Between Owner and Contractor and Performance and Payment Bonds with the Clerk of Court in the 26th Judicial Court, Parish of Bossier, Louisiana.

11.5 MAINTENANCE BOND

Contractor shall furnish a Maintenance Bond using the Owner's bond form in favor of the Owner for a minimum period of two (2) years after the date of Substantial Completion of the entire Project.

PERFORMANCE AND PAYMENT BOND

KNOW ALL MEN BY THESE PRESENTS that

_____,
(Insert above the full name of Contractor)

(Insert above the address of Contractor)
as Principal, hereinafter called Contractor, and,

_____,
(Insert above the full name of Surety)

(insert above the address of Surety)
a corporation duly organized under the laws of the State of _____, and
authorized to do business in the State of Louisiana, as Surety, hereinafter called Surety, are held and
firmly bound unto **BOSSIER PARISH SCHOOL BOARD**, 410 Sibley Street, Benton, Louisiana, 71006,
Obligee, hereinafter called Owner, in the amount of

Dollars (\$_____) for the payment whereof Contractor and Surety bind themselves, their heirs,
executors, administrators, successors and assigns, jointly and severally, firmly by these presents.

WHEREAS, Contractor has by written agreement dated _____, _____, entered into a
contract with Owner for

(insert above the full name, location, and description of project)
in accordance with the Drawings and Specifications for Construction prepared by

(insert above the full name of Architect/Engineer/Professional of Record)

(insert above the address of Architect/Engineer/Professional of Record)
which Contract and the Contract Documents referred to therein are and by reference made a part hereof
as if copied verbatim herein, and is hereinafter referred to as the Contract.

NOW, THEREFORE, THE FIRST CONDITION of this obligation is such that, if the said Contractor shall
promptly and faithfully perform all and singular the obligations assumed by said Contractor in the
aforesaid Contract during the term of said Contract and any extension thereof that may be granted by the
BOSSIER PARISH SCHOOL BOARD, with or without notice to the Surety, and during the life of any term
or condition, including but not limited to any guaranty required under the Contract, or by law, and shall
also perform and fulfill all the undertakings, covenants, terms, conditions, and agreements of any and all
duly authorized modifications of said Contract or Change Orders that may hereafter be made, notice of
modifications or Change Orders to the Surety being hereby waived; and shall fully secure and protect the
said **BOSSIER PARISH SCHOOL BOARD**, its legal successor and representative, from all liability in the
premises, and from all loss or expense of any kind, including all costs of court, all expenses, liquidated
damages and all attorney's fees made necessary or arising from the failure, refusal or neglect of the
Contractor, to comply with the obligations assumed by Contractor, then this Condition of the Bond shall
be null and void; otherwise, it shall remain in full force and effect. The only right of action which shall
accrue on this Condition of the Bond is solely to the benefit of the Obligee named herein and its
successors or assigns, and no other person shall have any right of action based thereon.

NOW, FURTHER, THE FOLLOWING CONDITION is a statutory bond of this obligation pursuant to the provisions of Louisiana Revised Statute 38:2241 et seq., such that, if the said Contractor shall well and faithfully and shall promptly pay all claimants as provided by law in Louisiana Revised Statutes 38:2242 and pay all wages of laborers, workmen, or mechanics, to be employed by Contractor for all work done or labor performed, or who may be employed by any sub-contractor; and shall promptly pay all furnishers of material, supplied to Contractor, or by or to sub-contractors, and used in the construction, erection, alteration, installation, or repair called for by the aforesaid Contract; and shall promptly pay for all materials or supplies furnished to said Contractor, or by or to any sub-contractor, for use in machines used by the Contractor, or any sub-contractor, in the construction, erection, alteration, installation, or repair of the work specified in the aforesaid Contract; and shall fully secure and protect the **BOSSIER PARISH SCHOOL BOARD**, its legal successor and representative, from all liability in the premises, and from all loss or expense of any kind, incurred by the Owner, including all costs of court and all attorney's fees made necessary or arising from the failure, refusal or neglect of the Contractor to comply with the obligations assumed by Contractor; and, likewise, shall deliver all such work to the said **BOSSIER PARISH SCHOOL BOARD** free from all claims, liens and expenses, then this bond shall become null and void, otherwise, it shall remain in full force and effect.

Contractor and Surety do, by act of signing the Contract and this Bond, consent and yield to the jurisdiction of the 26th Judicial District Court for the Parish of Bossier, Benton, Louisiana, and do formally waive any plea of lack of jurisdiction, on account of their residence elsewhere, in the event of any legal proceeding under the Contract or this Bond.

Signed and Sealed this ____ day of _____, ____.

CONTRACTOR AS PRINCIPAL

SURETY

Company (Corporate Seal)

Company (Corporate Seal)

Signature: _____

Signature: _____

Name and Title

Name and Title

(Surety Attach certified copy of Power of Attorney)

Address _____

Telephone Number _____

TEN PERCENT (10%) MAINTENANCE BOND

STATE OF LOUISIANA

PARISH OF BOSSIER

KNOW ALL MEN BY THESE PRESENTS:

That the undersigned contractor, herein the Principal _____ and his/her/their/its Surety _____ are held and firmly bound unto Bossier Parish School Board, State of Louisiana, in the penal sum of _____ Dollars and _____ Cents (\$_____) which is 10% of the contract amount, to be paid to the Bossier Parish School Board, its successors or assigns, for the payment of which said sum, well and truly to be made, we do hereby firmly bind ourselves, our heirs, executors, administrators and successors, jointly and severable by these presents.

The condition of the above obligation is such that the Principal shall enter into a contract with Bossier Parish School Board for the furnishing of all labor, materials, equipment, rentals and other services and supplies specified in said contract for the following:

Project Name:

Project Number:

Now, therefore, the obligation of the Principal, without modifying any of the terms of the contract, furnishes this additional financial assurance guaranteeing the entire work against defective materials and/or workmanship in connection with the work to include, though it is expressly and specifically not limited to, the payment to Bossier Parish School Board for damage, loss, and expense due to the maintenance and repair of any and all defective workmanship or materials which may develop or occur in the above-referenced project, for a period of two (2) years from the date of the substantial completion of the Project. The limit for the maintenance portion of the obligation shall be up to the penal sum stated above.

Provided further, that the Surety, for value received, hereby stipulates and agrees that no change, extension of time, alteration, or addition to the terms of the contract, or the work to be performed thereunder, or the specifications accompanying the same, shall in any way affect its obligations on this bond and it does hereby waive notice of any such change, extension of time, alteration, or modification.

Principal and Surety do, by act of signing the Contract and this Bond, consent and yield to the jurisdiction of the 26th Judicial District Court for the Parish of Bossier, Benton, Louisiana, and do formally waive any plea of lack of jurisdiction, on account of their residence elsewhere, in the event of any legal proceeding under the Contract or this Bond.

Provided further, that the Principal and Surety hereby stipulate and agree that this Bond shall be in full force and effect as of the effective date of the above referenced contract.

IN TESTIMONY WHEREOF, the Principal has hereunto set his hand; the Surety has caused these presents to be extended in its name and its corporate seal to be hereunto affixed by its attorney-in-fact; and the undersigned attorney-in-fact hereby attests that s/he is duly authorized on this date and under the conditions set forth herein so to do.

WITNESSES:

Signature of witness

Typed or printed name of witness

Signature of witness

Typed or printed name of witness

Name of Principal

BY: _____
Signature

Typed or printed name

WITNESSES:

Signature of witness

Typed or printed name of witness

Signature of witness

Typed or printed name of witness

Name of Surety

BY: _____

Typed or printed name of Attorney-in-Fact

Signed, sealed, and acknowledged before me _____, the
undersigned notary, duly commissioned and qualified in the Parish of _____
and on this _____ day of _____, 20____.

NOTARY PUBLIC

Typed or printed name of notary

Attorney Bar Roll /Notary No.: _____

Date commission expires: _____



AIA® Document A201® – 2017

General Conditions of the Contract for Construction

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

Bossier Parish School Board
P.O. Box 2000
410 Sibley Road
Benton, Louisiana 71006

THE OWNER:
(Name, legal status and address)

THE ARCHITECT:
(Name, legal status and address)

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For guidance in modifying this document to include supplementary conditions, see AIA Document A503™, Guide for Supplementary Conditions.

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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~~ The Contract Documents do include the advertisement or invitation to bid, Instructions to Bidders, ~~sample forms, Bid Form, sample forms and/or affidavits,~~ 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 or proposal requirements.

§ 1.1.2 The Contract

The Contract Documents form the Contract for Construction. The Contract together with the Performance Bond and the Payment Bond 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. The Initial Decision Maker shall not show partiality to the Owner or Contractor and shall not be liable for results of interpretations or decisions rendered in good faith. The Prime Designer of the Project is the Initial Decision Maker unless otherwise agreed to by the Owner and Contractor.

§ 1.1.9 Project Manual

The Project Manual is a volume assembled for the Work that included the Bidding Documents, sample forms and affidavits, the bidding requirements, the Advertisement for Bids, the Instructions to Bidders, the Agreement, and the

Conditions of the Contract and Specifications. The Project Manual may exist in electronic form only, or in paper format, or both.

§ 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. In the event of a discrepancy in the Contract Documents, the more specific and more detailed requirement will take precedence over the general and less detailed requirement. In case of doubt, Contractor shall assume that Owner intends that the more complete method, system, or process is required. Any work, labor, materials, or equipment that may reasonably be inferred from the Contract Documents as being required to produce a functionally complete Project or part thereof, will be supplied at no additional cost by the Contractor whether specifically stated in the Contract Documents. Reference to standard specifications, manuals, or codes of any technical society, organization, or association or to the laws or regulations of any governmental authority, whether such reference is specific or by implication shall mean the latest standard specifications, manual, code or laws or regulations in effect at the time of the opening of the bids (or the date of the Contract if no advertised bids), unless otherwise specifically stated. However, no provision of any standard specification, manual, or code shall be effective to change the duties or the responsibilities of the Owner, Contractor or Architect or any of their consultants, agents, or employees from those set forth in the Contract Documents. The Architect, in case of a conflict, may interpret or construe the documents so as to obtain the most substantial and complete performance of the Work consistent with the Contract Documents and reasonably inferable therefrom and in the best interest of the Owner; 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 therefrom in the best interest of the Owner.

§ 1.2.1.1 The invalidity of any provision of the Contract Documents shall not invalidate the Contract or its remaining provisions. If it is determined that any provision of the Contract Documents violates any law, or is otherwise invalid or unenforceable, then that provision shall be revised to the extent necessary to make that provision legal and enforceable. In such case the Contract Documents shall be construed, to the fullest extent permitted by law, to give effect to the parties' intentions and purposes in executing the Contract.

§ 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.

§ 1.2.4 During the course of the Work, should any conflict be found in or between the Contract Documents, the Contractor shall be deemed to have estimated the Work on the basis of the greater quality, or the most stringent requirement, unless the Contractor obtained on interpretation in writing from the Architect as to what shall govern before the submission of his bid. The Architect, in case of such conflict, may interpret or construe the documents so as to obtain the most substantial and complete performance of the Work consistent with the Contract Documents and reasonably inferable therefrom, in the best interest of the Owner, for a functionally complete Project or Work or part thereof. The terms and conditions of this clause shall not relieve any party of any other obligation under the Contract Documents. The Contractor shall request any clarification in enough time to avoid delays and additional costs, in accordance with the provisions of Section 4.2.11.

§ 1.2.5 At various sections of the Specifications, a subparagraph may identify related works specified elsewhere. Such subparagraph is to serve solely as a guideline and is not to be construed as a listing of all related work. The Contractor shall be solely responsible for complying with all requirements of the Contract Documents, regardless whether areas of related work are identified in a particular subparagraph. Should there be internal inconsistencies, the Contractor shall either seek clarification from the Architect, or base its bids and construction on the most expensive combination of quality and quantity of Work indicated.

§ 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. If there is a conflict in the terms or conditions in the Contract Documents, the more stringent requirements shall govern.

§ 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. As provided in L.A. R.S. 38:2317, the Owner, as a public entity, is the owner of the drawings, specifications and other Instruments of Service. The Architect and the Architect's Consultants are the authors of their respective Instruments of Service, including the Drawings and Specifications, and retain all common-law, statutory, statutory and other reserved rights in their Instruments of Service, including copyrights. The Contractor, Subcontractors, Sub-subcontractors, and 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 the 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 suppliers are authorized to use and reproduce the Instruments of Service provided to them, subject to any protocols established pursuant to Sections 1.7 and 1.8, 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 suppliers may not use the Instruments of Service on other projects or for additions to the Project outside the scope of the Work without the specific written consent of the Owner, Architect, and the Architect's consultants.

§ 1.6 Notice

§ 1.6.1 Except as otherwise provided in Section 1.6.2, where the Contract Documents require one party to notify or give notice to the other party, such notice shall be provided in writing to the designated representative of the party to whom the notice is addressed and shall be deemed to have been duly served if delivered in person, by mail, by courier, or by electronic transmission ~~if a such as email, View Point software unless a different method for electronic transmission is set forth in the Agreement.~~

§ 1.6.2 Notice of Claims as provided in Section 15.1.3 shall be provided in writing and shall be deemed to have been duly served only if delivered to the designated representative of the party to whom the notice is addressed by certified or registered mail, or by courier providing proof of delivery.

§ 1.7 Digital Data Use and Transmission

The parties shall agree upon protocols governing the transmission and use of Instruments of Service or any other information or documentation in digital form. The parties will use AIA Document E203™-2013, Building Information Modeling and Digital Data Exhibit, to establish the protocols for the development, use, transmission, and exchange of digital data.

§ 1.8 Building Information Models Use and Reliance

Any use of, or reliance on, all or a portion of a building information model without agreement to protocols governing the use of, and reliance on, the information contained in the model and without having those protocols set forth in AIA Document E203™-2013, Building Information Modeling and Digital Data Exhibit, and the requisite AIA Document G202™-2013, Project Building Information Modeling Protocol Form, shall be at the using or relying party's sole risk and without liability to the other party and its contractors or consultants, the authors of, or contributors to, the building information model, and each of their agents and employees.

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, representative, its Superintendent of Schools or designee.

§ 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. requires for all Projects with a Contract Sum more than \$10,000,000.00 that the Contractor, all subcontractors, and material suppliers provide sworn lien releases on the Owner's forms with each of the Contractor's pay applications. The Owner may exercise this requirement for Projects with a Contract Sum less than \$10,000,000.00. The Owner reserves the right to withhold progress payments until such lien releases are received for all work for which prior progress payments have been made to the Contractor. The Contractor, all subcontractors and material suppliers shall provide such releases with every Contractor's payment request until Final Acceptance of the Project.

§ 2.2 Evidence of the Owner's Financial Arrangements

The Owner, being a political subdivision of the State of Louisiana must have the funds in the full amount of the Contractor on hand prior to the award and signing the Contract Documents for the Project.

§ 2.2.1 Prior to commencement of the Work and upon written request by the Contractor, the Owner shall furnish to the Contractor reasonable evidence that the Owner has made financial arrangements to fulfill the Owner's obligations under the Contract. The Contractor shall have no obligation to commence the Work until the Owner provides such evidence. If commencement of the Work is delayed under this Section 2.2.1, the Contract Time shall be extended appropriately. Where the Owner has designated information furnished under this Section 2.2 as "confidential," the Contractor shall keep the information confidential and shall not disclose it to any other person. However, the Contractor may disclose "confidential" information, after seven (7) days' notice to the Owner, where disclosure is required by law, including a subpoena or other form of compulsory legal process issued by a court or governmental entity, or by court or arbitrator(s) order. The Contractor may also disclose "confidential" information to its employees, consultants, sureties, Subcontractors and their employees, Sub-subcontractors, and others who need to know the content of such information solely and exclusively for the Project and who agree to maintain the confidentiality of such information.

§ 2.2.2 Following commencement of the Work and upon written request by the Contractor, the Owner shall furnish to the Contractor reasonable evidence that the Owner has made financial arrangements to fulfill the Owner's obligations under the Contract only if (1) the Owner fails to make payments to the Contractor as the Contract Documents require; (2) the Contractor identifies in writing a reasonable concern regarding the Owner's ability to make payment when due; or (3) a change in the Work materially changes the Contract Sum. If the Owner fails to provide such evidence, as required, within fourteen days of the Contractor's request, the Contractor may immediately stop the Work and, in that event, shall notify the Owner that the Work has stopped. However, if the request is made because a change in the Work materially changes the Contract Sum under (3) above, the Contractor may immediately stop only that portion of the Work affected by the change until reasonable evidence is provided. If the Work is stopped under this Section 2.2.2, the Contract Time shall be extended appropriately and the Contract Sum shall be increased by the amount of the Contractor's reasonable costs of shutdown, delay and start-up, plus interest as provided in the Contract Documents.

§ 2.2.3 After the Owner furnishes evidence of financial arrangements under this Section 2.2, the Owner shall not materially vary such financial arrangements without prior notice to the Contractor.

§ 2.2.4 Where the Owner has designated information furnished under this Section 2.2 as "confidential," the Contractor shall keep the information confidential and shall not disclose it to any other person. However, the Contractor may disclose "confidential" information, after seven (7) days' notice to the Owner, where disclosure is required by law, including a subpoena or other form of compulsory legal process issued by a court or governmental entity, or by court or arbitrator(s) order. The Contractor may also disclose "confidential" information to its employees, consultants, sureties, Subcontractors and their employees, Sub-subcontractors, and others who need to know the content of such information solely and exclusively for the Project and who agree to maintain the confidentiality of such information.

§ 2.3 Information and Services Required of the Owner

§ 2.3.1 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.

§ 2.3.2 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. The term "Architect" when used herein and in the Contract Documents shall mean the Prime Designer (Architect, Engineer or Landscape Architect). 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.

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

§ 2.3.4 The Owner shall may 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 if furnished by the Owner but shall exercise proper precautions relating to the safe performance of the Work. The Contractor shall confirm and verify the location of each utility required for the Project and make further investigation of all structural, surface, and subsurface conditions including any soil borings of the site of the Project.

§ 2.3.5 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.

§ 2.3.6 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.

§ 2.4 Owner's Right to Stop the Work

If the Contractor fails to correct Work or a portion of the Work or the Work at one or more sites in a multiple site Project 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, or fails or refuses to provide a sufficient number of properly supervised and coordinated labor or amount of materials or equipment to complete the Work within the Contract Time, 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. Stoppage of the Work by the Owner pursuant to this Subsection shall not result in a claim by the Contractor for delay or for any extension of the Contract Time.

§ 2.5 Owner's Right to Carry Out the Work

If the Contractor defaults or neglects to carry out the Work or a portion of the Work or the Work at one or more sites in a multiple site Project in accordance with the Contract Documents and fails within a ten-day period after receipt of 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 default or neglect. Such action by the Owner and amounts charged to the Contractor are both subject to prior review and approval of the Architect and the Architect may, pursuant to Section 9.5.1, withhold or nullify a Certificate for Payment in whole or in part, to the extent reasonably necessary to reimburse the Owner for the reasonable cost of correcting such deficiencies, including Owner's expenses and compensation for the Architect's additional services and expenses made necessary by such default, neglect, or failure. If current and future payments are not sufficient to cover such amounts, the Contractor or its Surety shall pay the difference to the Owner. If the Contractor disagrees with the actions of the Owner or the Architect, or the amounts claimed as costs to the Owner, the Contractor may file a Claim pursuant to Article 15.

§ 2.6 Owner's Right to Audit

§ 2.6.1 The Contractor shall keep full and accurate records of all costs incurred and items invoiced in connection with the Work and shall keep and maintain all records related to this Project, for a period of five (5) years after Final Payment, or five (5) years after any Grant close-out (if applicable), whichever is longer. The Contractor shall require

the same of its subcontractors, suppliers, or any entity involved in the Project or Work. Such records of the Contractor and its subcontractors shall be open to audit by the Owner and/or its authorized representatives, and by the Legislative Auditor for the State of Louisiana, during the performance of the Work and during the referenced five (5) year period.

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 and in accordance with any industry or quality standards.

§ 3.1.3 The Contractor shall not be relieved of its obligations to perform the Work in accordance with the Contract Documents either by activities or duties of the Owner or 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. Quality control (i.e., ensuring compliance with the Contract Documents) is the responsibility of the Contractor. Testing, observations and or inspections performed or provided by the Owner are for quality assurance (i.e., confirming compliance with the Contract Documents) purposes and are solely for the benefit of the Owner.

§ 3.1.4 The Contractor stipulates and agrees that the Owner has no duty to discover any design errors or omissions in the Drawings, Plans, Specifications, and other Documents and has no duty to notify Contractor of the same. The Contractor acknowledges that the Owner does not warrant the adequacy and accuracy of any Drawings, Plans, Specifications, or other Documents.

§ 3.1.5 The Contractor will establish to the satisfaction of the Architect the reliability and responsibility of the Subcontractors to furnish and perform the Work described in the sections of the Specifications pertaining to the Subcontractor's respective trades. See Section 5.2 for the procedures regarding Subcontractors.

§ 3.1.6 The Contractor or its designated representative shall attend all periodic construction meetings scheduled by the Architect and Owner when its presence is required and any meeting with the School Board when its presence is required.

§ 3.1.7 The Contractor is solely responsible for providing a safe place for the performance of the Work.

§ 3.1.8 The Contractor shall comply with the provisions of the Louisiana Underground Utilities and Facilities Damage Prevention law, R.S. 40:1749.11 *et seq.*, as amended prior to proceeding with any portion of the Work that may require excavation including but not limited to pile driving, digging, auguring, boring, backfilling, dredging, compressing, plowing-in, trenching, ditching, tunneling, land leveling, grading and or mechanical probing. Damage to any existing underground utilities by the Contractor shall be repaired at the Contractor's sole cost and expense. Such damage must be reported immediately to the Architect and the Owner's representative. The Contractor shall undertake to make such further investigations, including without limitation, all structural, surface, and subsurface conditions, including soil borings and otherwise of the Project site, regardless of whether shown in the Contract Documents.

§ 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 2.3.4, 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 and the Owner any errors, inconsistencies or omissions discovered by or made known to the Contractor as a request for information in such form as the Architect or Owner 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. Before ordering any materials or proceeding with the Work, Contractor and Subcontractors shall verify measurements at the Project site and shall be responsible for the correctness of the measurements.

§ 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 report, in writing, to the Owner and 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 submit 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, subject to Section 15.1.7, 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. If the Contract Documents give specific instructions concerning construction means, methods, techniques, sequences, or procedures, the Contractor shall evaluate the jobsite safety thereof and shall be 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 notice to the Owner and Architect, and shall propose alternative means, methods, techniques, sequences, or procedures. The Architect shall evaluate the proposed alternative solely for conformance with the design intent for the completed construction. Unless the Architect objects to the Contractor's proposed alternative, the Contractor shall perform the Work using its alternative 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. In the event the Owner or the Architect notify the Contractor of any such acts or omissions, The Contractor shall immediately cure such acts or omissions, or results thereof.

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

§ 3.3.4 The Contractor shall review any survey provided and establish the building grades, lines, levels, column, wall, and partition lines required by the various subcontractors in laying out their work, including but not limited to, all underground work in accordance with the Contract Documents. The Contractor shall properly and effectively coordinate the timing, scheduling, and routing of all Work performed by all trades and subcontractors.

§ 3.3.5 Before ordering any material or performing any work, Contractor shall verify dimensions and check conditions to ensure that they properly reflect those on the Drawings. Any inconsistency shall be brought to the attention of the Architect. If discrepancies occur between ordered material and actual conditions, of which the Architect was not notified beforehand, costs to correct such discrepancies shall be borne by the Contractor.

§ 3.3.6 On trench excavations more than five feet in depth, the Contractor shall bear sole responsibility for design and execution of acceptable trenching and shoring procedures in accordance with State regulations and OSHA 29 CFR 1926, Subpart P, Inspection Procedures for Enforcing the Excavation Standards. Contractor shall engage the services

of a qualified engineer, licensed to practice in the state where the Project is located, to prepare detailed plans and specifications directing Contractor in safe execution of trenching and shoring.

§ 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 approved by the Architect in accordance with Section 3.12.8 or ordered by the Architect in accordance with Section 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. Failure to schedule the ordering of any item is not a valid reason to support a request for a substitution of an item.

§ 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. For a Project site that includes a school in session with children present in or adjacent to the Project, the Contractor's employees, and its Subcontractors' employees are subject to a criminal background check as set forth in La. R.S. 17:15 and La. R.S. 15:587.1, upon the request of the Owner. Any unfit person based on a background check shall be immediately removed from the Project site. The Contractor's employees, and all other persons including all Subcontractors, Sub-subcontractors and suppliers carrying out any work on the Project site required by the Contract Documents, shall wear appropriate identification on their shirt always when on the Project site. The Owner shall not be responsible or liable to Contractor or any subcontractor for any additional costs, expenses, losses, claims, or damages incurred by Contractor or Subcontractor because of any removal of an unfit person or compliance with this section.

§ 3.4.4 Building materials, including but not limited to, all drywall materials to be incorporated into the Work shall either be certified, in writing, by the manufacturer to be asbestos free or be inspected and tested by accredited testing laboratories and certified to be free of asbestos content in accordance with the applicable federal standards, including but not limited to the Asbestos Hazard Emergency Response Act (AHERA) and the Toxic Substance Control Act (TSCA). The word "asbestos" means the Asbestiform, Tremolite, and Actinolite. Copies of test reports shall be furnished to the Architect and the Owner's representative. Material discovered to contain asbestos shall be removed immediately at the Contractor's sole cost and expense using current standards of the Louisiana Department of Environmental Quality (DEQ). Drywall materials must be free of any volatile chemicals that have identified emissions of sulfurous gases.

§ 3.5 Warranty

§ 3.5.1 The Contractor warrants to the Owner and Architect that materials and equipment furnished under the Contract will be of good quality and new unless 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, Architect or the Owner, the Contractor shall furnish satisfactory evidence as to the kind and quality of materials and equipment. The Contractor's warranty includes any and all specific warranties set forth in the Contract Documents and all warranties provided by law including, but not limited to any actions or claims that may be asserted as provided in La. R.S. 38:2189. Nothing herein or otherwise provided in the Contract Documents limits in any way all warranties allowed by law.

§ 3.5.2 All material, equipment, or other special warranties required by the Contract Documents shall be issued in the name of the Owner, or shall be transferable to the Owner, and shall commence in accordance with Section 9.8.4.

§ 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. § 3.6.1 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 except as provided in the Contract Documents.

§ 3.6.2 In the event the Contract Documents designate the Project for exemption of sales and use taxes, the Contractor is informed that La. R.S. 47:301(8)(c) exempts the State of Louisiana, cities, parishes and other political subdivisions and their agencies, boards and commissions from state and local sales and use taxes. The Contractor is hereby made aware that materials and equipment which are affixed to and made a part of the Project such that they become immovable property and permanently incorporated into the Project or Work may qualify for the exemption. The Contractor as an Agent of the Owner shall execute any documentation required to effectuate this exemption. The Contractor is still responsible for payment of all taxes on nonexempt items necessary in the construction of the Project.

§ 3.6.3 After the Contract is executed, the Owner will furnish the Contractor a Louisiana Department of Revenue Form R-1020 entitled "Designation of Construction Contractor as Agent of Governmental Entity and Exemption Certificate" for use by the Contractor, Subcontractors, and Material Suppliers for the Project which is required by the State of Louisiana Department of Revenue and Taxation, Sales Tax Division.

§ 3.6.4 If designated and in accordance with La. R.S. 47:301(8)(c), the Contractor shall not pay any State or local sales taxes or State or local use taxes on materials and equipment which are affixed to and made a part of the real estate of the Project or Work (hereinafter referred to as "exempt items").

§ 3.6.5 All purchases of "exempt items" for the Project shall be made by the Contractor on behalf of and for the Owner.

§ 3.6.6 Payment requests for materials and equipment that are tax exempt shall be submitted separately but at the same time with progress payment requests. The payment request shall include a description of each item purchased, name of supplier, invoice number and date, and the cost of each item excluding taxes. The "Tax Exempt" payment requests shall not include any amount for the Contractor's or Subcontractor's labor. Copies of invoices shall be attached to the Progress Payment request.

§ 3.6.7 When applicable and the exemption is exercised, the Contractor and all Subcontractors shall record all purchases of materials and equipment to be permanently installed or permanently incorporated into the Work. Preparing, maintaining, and preserving these records shall be in accordance with applicable State laws and local ordinances and resolutions except that the records shall be preserved for not less than five (5) years from the date of Final Payment. In addition to making the records available to the Louisiana Department of Revenue and Taxation and/or local taxing authorities, copies of the records shall also be made available to the Owner upon request.

§ 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 ~~44 days~~ 48 hours 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 that an equitable adjustment be made 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, stating the reasons. If either party disputes the Architect's determination or recommendation, that party may submit a Claim 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~~ Architect and follow all procedures mandated by State and Federal law, including but not limited to La. R.S. 8:671, et seq., La. R.S. 49:213.1, et seq., and Sections 401 and 404 of the Federal Clean Water Act. 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 any cash allowances stated in the Contract Documents and as may be allowed by La. R.S. 38:2212(K) limited to hardware, face brick, landscaping, electrical light fixtures, miscellaneous steel, tile, wallpaper and other exterior finishes, fixtures and furnishings, and carpeting. Or other Items covered by 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.

§ 3.8.4 If any materials are specified as to quantity only, such are not considered a cash allowance. The provisions stated in the information in the Specifications about any quantity will be applicable regarding any credit to the Owner.

§ 3.9 Superintendent

§ 3.9.1 The Contractor shall employ a competent Project Manager, a competent superintendent and necessary assistants who shall be in attendance at the Project site during performance of the Work. The Project Manager, and if no Project Manager, 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 notify the Owner~~ Contract and prior to the Preconstruction meeting, shall notify the Owner's representative and Architect of the name and qualifications of a proposed superintendent. Within 14 days of receipt of the information, the Architect may notify the Contractor, stating whether the Owner or the Architect (1) has reasonable objection to the proposed superintendent or (2) requires additional time for review. Failure of the Owner or Architect to provide notice 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 written consent, which shall not unreasonably be withheld or delayed.

§ 3.10 Contractor's Construction and Submittal Schedules

§ 3.10.1 The Contractor, promptly after being awarded the Contract, shall submit for the Owner's representative and Architect's information a Contractor's construction schedule for the Work in such form and detail as specified in the Contract Documents. The schedule shall contain detail appropriate for the Project, including (1) the date of commencement of the Work, interim schedule milestone dates, and the date of Substantial Completion; (2) an apportionment of the Work by construction activity; and (3) the time required for completion of each portion of the Work. The schedule shall provide for the orderly progression of the Work to completion and shall not exceed time limits current under the Contract Documents. The schedule shall be revised at appropriate intervals as required by the conditions of the Work and Project. The date of Commencement to begin the Work is the date set forth in the Contract or such other date as may be established in a Notice to Proceed. The schedule must show a completion of the Work within the Contract Time. A schedule showing early completion dates will not be accepted without written acceptance of the Owner. 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. The Schedule may be used as a means of determining the Contractor's progress in performance of the Work, but neither the Contractor by providing the schedule to the Architect and Owner, nor its acceptance or use by the Architect or Owner, acts in any way to relieve the Contractor of any of the Contractor's obligations under the Contract. All float is owned by the Owner. The schedule shall include a network analysis to identify those tasks that will lengthen the Project completion date.

§ 3.10.2 The Contractor, promptly after being awarded the Contract and thereafter as necessary to maintain a current submittal schedule, shall submit a submittal schedule for the Architect's and the Owner's approval. The Architect's and the Owner's approval shall not be unreasonably delayed or withheld. The submittal schedule shall (1) be coordinated with the Contractor's construction schedule, and (2) allow the Architect and the Owner reasonable time to review submittals. If the Contractor fails to submit a submittal schedule, or fails to provide submittals in accordance with the approved 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. If the work is not on schedule as determined by the Architect and the Contractor fails to take action to correct, then the Contractor shall be deemed in default and the progress of the Work shall be deemed unsatisfactory. Such default may be considered as a ground for termination by Owner for cause in accordance with Section 14.2.

§ 3.11 Documents and Samples at the Site

The Contractor shall make available, at the Project site, the Contract Documents, including Change Orders, Construction Change Directives, and other Modifications, in good order and marked currently to indicate field changes and selections made during construction, and the approved Shop Drawings, Product Data, Samples, and similar required submittals. Contractor shall prepare and update as-built drawings monthly. These shall be in electronic form or paper copy, available to the Architect and Owner, and before Final Payment is made, 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 how 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. Should the Contractor, subcontractor or sub-subcontractor install, construct, erect or perform any portion of the Work without approval of any required submittal, the Contractor shall bear the cost, responsibility and delay for removal, replacement and/or correction of any and all items, materials and/or labor.

§ 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 the requirements of the Contract Documents by the Architect's approval of Shop Drawings, Product Data, Samples, or similar submittals, unless the Contractor has specifically notified the Architect of such deviation at the time of submittal and (1) the Architect with the prior approval of the Owner's representative 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 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.

§ 3.12.10.1 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 be entitled to rely upon the adequacy and accuracy of the performance and design criteria provided in the Contract Documents. The Contractor shall cause such services or certifications to be provided by an appropriately 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 and accuracy of the services, certifications, and approvals performed or provided by such design professionals, provided the Owner and Architect have specified to the Contractor the performance and design criteria that such services must satisfy. Pursuant to this Section 3.12.10, the Architect will review and 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.

§ 3.12.10.2 If the Contract Documents require the Contractor's design professional to certify that the Work has been performed in accordance with the design criteria, the Contractor shall furnish such certifications to the Architect at the time and in the form specified by the Architect.

§ 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, lawful orders of public authorities, and the Contract Documents and shall not unreasonably encumber the site with materials or equipment.~~ **§ 3.13.1** The Contractor shall confine operations at the site to areas permitted by applicable laws, statutes, ordinances, codes, rules and regulations, lawful orders of public authorities, and the Contract Documents and shall not unreasonably encumber the site with materials or equipment. The Contractor inspected the site prior to award and accepted the areas for parking, storage and lay-down of materials and access to the site and the Owner will not be required to alter or interrupt any other operations at the Project site.

§ 3.13.2 The Contractor shall take all precautions necessary to prevent loss or damage caused by vandalism, theft, burglary, pilferage, or unexplained disappearance of property of the Owner, whether or not forming part of the Work located in the areas of the Project to which the Contractor has access. The Contractor shall provide for security of the Owner's property to prevent any such loss, damage, or injury, except as may be directly caused by agents or employees of the Owner.

§ 3.13.3 No sign shall be placed or erected on the Project site without the prior written consent of the Owner's Representative.

§ 3.13.4 Without the prior written approval of the Owner, the Contractor shall not permit any workers to use any existing facilities or facilities under construction (lavatories, toilets, entrances, or related items) at the Project site other than those designated in the Contract Documents.

§ 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, or patching shall be restored to the condition existing prior to the cutting, fitting, or 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 construction by the Owner or a Separate Contractor except with written consent of the Owner and of the Separate Contractor. Consent shall not be unreasonably withheld. The Contractor shall not unreasonably withhold, from the Owner or a Separate Contractor, its 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 and 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. For the Project Site, Contractor is responsible for vermin-control, grounds up-keep, sidewalk maintenance, lawn mowing, weed control and grounds cleaning.

§ 3.15.2 If the Contractor fails to clean up as provided in the Contract Documents, ~~the Owner may do so upon fifteen (15) days from written notice from the Owner or Architect, the Owner may do so,~~ and the Owner shall be entitled to reimbursement from the Contractor.

§ 3.16 Access to Work

The Contractor shall provide the Owner and Architect with 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 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 an infringement of a copyright or patent is discovered by, or made known to, the Contractor, the Contractor shall be responsible for the loss unless the information is promptly furnished to the Architect and the Owner's representative.

§ 3.18 Indemnification

§ 3.18.1 To the fullest extent permitted by law, the Contractor shall indemnify and hold harmless the Owner, the 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.

§ 3.19 Log of Changes

The Contractor shall maintain a current log of all Request for Information (RFI's), Change Proposal Requests (CPRs), Change Orders and Construction Change Directives at the site of the Project and shall provide the Owner, the Program Manager and Architect said logs monthly, not later than the tenth (10th) day of the following month.

§ 3.20 Failure to Perform Work

Contractor shall be liable to the Owner for all costs or damages that the Owner incurs as result of the Contractor's failure to perform the Work, or any part thereof, in accordance with Contract Documents. Contractor's failure to perform shall include, but not be limited to, the failure of its subcontractors and/or suppliers of any tier to perform. The Contractor's liability to the Owner shall include, but not be limited to (1) the increase costs of performance, including services of the Architect and other consultants, resulting from the Contractor's failure to comply with the Contract Documents; (2) costs of removal of defective or noncompliant work; (3) costs of corrective or warranty work; (4) liability to third parties caused by Contractor's failure to perform the Work or any part thereof; (5) re-procurement costs; (6) attorney fees and related costs, including costs incurred in enforcing Owner's rights under the Contract Documents; and (7) liquidated and/or stipulated damages.

§ 3.21 Liens

§ 3.21.1 The term "lien" as used in this Section 3.21 and in Article 9 of these General Conditions and in Article 5 of the Agreement Between Owner and Contractor, AIA A101, refers to "claims" as provided in La. R.S. 38:2242, which authorizes "claimants" who perform work, labor, or provide materials or supplies for a public work to file "claims" with the governing authority. The term "lien" is used in the referenced sections instead of the word "claim" solely to avoid confusion with the "Claims" that may be filed by the Contractor and/or Owner pursuant to the Contract Documents, as provided in Article 15 of these General Conditions.

§ 3.21.2 In the event a Lien is filed by anyone in relation to the Work, the Owner shall have the right (1) to require the Contractor to furnish to the Owner a release of a Lien or claim that has been recorded by the person or entity filing the claim; (2) to require the Contractor to discharge the Lien by posting a bond with the Clerk of Court for the Parish of Bossier within five (5) calendar days of notice by the Owner to the Contractor; (3) obtain a Notice of Cancellation Certificate for each filed lien; and/or (4) to retain out of any payment due or thereafter to become due an amount sufficient to indemnify the Owner against any Lien or claim of a Lien, including bond premiums and attorney fees, and to apply the same in such manner as Owner deems necessary to satisfy such claims and Liens.

§ 3.21.3 In the event such Lien is not discharged, the Contractor at its sole cost and expense, including attorney's fees, shall hold harmless and defend the Owner of and from any and all claims, lawsuits, causes of actions and demands of any person or entity asserting or claiming any right as a result of any Lien or claim, recorded or unrecorded, against the

Contract Funds or the Owner's property. In the event such Lien is not discharged, the Contractor shall be deemed in default and the Owner shall have the right to terminate the Contract for said default. The Owner shall also have the right, but not the obligation, to bond said Lien(s), and Contractor shall be responsible for all costs incurred as a result thereof, including but not limited to, bond premiums and attorney fees.

§ 3.21.4 Prior to the receipt of any partial payment, or of Final Payment, Contractor shall provide the Owner a partial release or a final release, as appropriate, of all Liens and claims of any persons furnishing labor and/or materials to the Work. Contractor shall not receive Final Payment before providing to the Owner satisfactory evidence (i.e., clear lien certificate) that there are no other Liens or claims whatsoever outstanding against the Work or Contract.

§ 3.22 Work in Existing Facilities

§ 3.22.1 The Contractor shall not perform Work in existing buildings that will interfere with normal school operations, teaching or normal traffic flow or produce excessive noise without twenty-four (24) hours written notice to the Owner's representative and then only with their concurrence. Security of the Owner's property may require the services of a guard during the nights or weekends if required by the nature of the Work at no additional cost to the Owner.

§ 3.22.2 All means of egress shall always be maintained during school occupancy to comply with exit requirements in the NFPA 101 Life Safety Code.

§ 3.22.3 The Contractor shall not allow traffic or operations to encumber school vehicle or pedestrian traffic during school hours to include before school and after school programs. Space for parking of Contractor's personnel and subcontractors is designated in the Contract Documents.

§ 3.22.4 Any Work required of the Contractor before the opening of the school after summer vacation, caused by the failure of the Contractor to meet his Contract completion date, will be performed as stated above at no additional expense to the Owner. This includes overtime Work after normal school hours, during workdays and on weekends, when required to accomplish the Work necessary to maintain the construction schedule. This provision does not prohibit operation during normal work hours when prior arrangements have been completed with the Architect and the Owner.

ARTICLE 4 ARCHITECT

§ 4.1 General

§ 4.1.1 The Architect is the person or entity retained by the Owner pursuant to Section 2.3.2 and identified as such in the Agreement. The term "Architect" when used herein and in the Contract Documents shall mean the Prime Designer (Architect, Engineer or Landscape Architect).

§ 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.

§ 4.2 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. The Architect shall remain an Owner's representative from time to time during the one-year period for correction of Work described in Section 12.2.2.1. The Owner may request the Architect's assistance and review any time during the five (5) year warranty period as allowed by La. R.S. 38:2189. 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 and its applicable consultants will visit the site at least weekly and at other times as requested by the Owner and 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.

§ 4.2.3 ~~On the basis of~~ Based on the site visits, the Architect will keep the Owner reasonably informed about the progress and quality of the portion of the Work completed, and promptly report to the Owner (1) known deviations from the Contract Documents, (2) known deviations from the most recent construction schedule submitted by the Contractor, and (3) 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 and the Owner 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

The Owner and Contractor shall include the Architect in all communications that relate to or affect the Architect's services or professional responsibilities. The Owner shall promptly notify the Architect of the substance of any direct communications between the Owner and the Contractor otherwise relating to the Project. Communications by and with the Architect's consultants shall be through the Architect. Communications by and with Subcontractors and suppliers shall be through the Contractor. Communications by and with Separate Contractors shall be through the Owner. The Contract Documents may specify other communication protocols.

§ 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 or a portion of the Work or the Work at one or more sites of a multiple site Project 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 13.4.2 and 13.4.3, whether or not the 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, 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 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 Directives and may~~ with the approval of the Owner's representative order 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 and its consultants 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 Owner shall notify the Contractor of any change in the

duties, responsibilities and limitations of authority of the Project representatives. There is no requirement on the Owner to agree to have a Project representative.

§ 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. If no separate time within which an interpretation is required of the Architect in compliance with this Section 4.2 is stated, then delay shall not be recognized on account of the lack by the Architect to furnish such interpretation until after a written request is made by Contractor and furnished to the Owner and Architect.

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 the subcontractors of a Separate Contractor. As applicable based upon the value of the Work, subcontractors shall be duly licensed in accordance with La. R.S. 37:2150, et seq. and local laws.

§ 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, the Contractor, ~~as soon as practicable after award of the Contract, shall notify the Owner and Architect~~ Contractor shall, prior to the Pre-Construction meeting (see § 1.3) furnish, in writing, to the Owner's representative and Architect the names and addresses of the persons or entities proposed for each principal portion of the Work, including those who are to furnish materials or equipment fabricated to a special design. Within 14 days of receipt of the information, the Architect may notify the Contractor whether the Owner or the Architect (1) has reasonable objection to any such proposed person or entity or (2) requires additional time for review. Failure of the Architect to provide notice within the 14-day period shall constitute notice of no reasonable objection. No payment shall be made to the Contractor until the requested information specified in this subsection is provided to the Architect and the Owner.

§ 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. The Contractor shall not be entitled to claims for additional time and/or an increase in the Contract Sum due to a problem with the performance or non-performance of a subcontractor. The Contractor is totally and solely responsible for any lost time or extra expense incurred due to a Subcontractor's and/or Material Supplier's failure to perform. Under no circumstances shall the Owner or Architect mitigate the Contractor's losses or reimburse the Contractor for losses caused by its Subcontractors and/or Material Suppliers.

§ 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 for one previously selected if the Owner or Architect makes reasonable objection to such substitution.

§ 5.3 Subcontractual Relations

By appropriate written agreement, 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 that the Contractor, by these Contract 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; 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 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.~~ In the event of assignment, the original Contractor shall be responsible for any additional costs incurred by the Owner because of the assignment.

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 term "Separate Contractor(s)" shall mean other contractors retained by the Owner under separate agreements. The Owner reserves the right to perform construction or operations related to the Project with the Owner's own forces, and with Separate Contractors retained under Conditions of the Contract substantially similar to those of this Contract, including those provisions of the Conditions of the Contract related to insurance and waiver of subrogation.

§ 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 any Separate Contractors and the Owner in reviewing their construction schedules. The Contractor shall make any revisions to its 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. The Contractor shall anticipate the Work of the Owner or other Contractors may delay, disrupt, or interfere with the Work and the progress schedule and Contractor shall do all cutting, fitting, and patching of the Work required to make its several parts come together properly in a manner that will not endanger any Work of others by cutting, excavating, or otherwise altering their Work without the written consent of the Owner.

§ 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 or with Separate Contractors, the Owner or its Separate Contractors shall have the same obligations and rights that the Contractor has under the Conditions of the Contract, including, without excluding others, those stated in Article 3, this Article 6, and Articles 10, 11, and 12.~~ The Owner may furnish materials or equipment to the Project site to be incorporated into the Work. For any Owner furnished equipment or materials to be incorporated into the Work, the Contractor shall perform such tasks as are necessary to coordinate and install the Owner furnished materials and/or equipment to make the Work functionally complete. If the Contractor contends that such Owner furnished materials or equipment constitutes an extra to the Work outside the requirements of the Contract Documents, the Contractor may request a change order for direct field costs incurred in installing such Owner furnished materials or equipment in accordance with the procedure set forth in Article 7.

§ 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, ~~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 notify the Architect of apparent discrepancies or defects in the construction or operations by the Owner or Separate Contractor that would render it unsuitable for proper execution and results of the Contractor's Work. Failure of the Contractor to notify the Architect of apparent discrepancies or defects prior to proceeding with the Work 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. The Contractor shall not be responsible for discrepancies or defects in the construction or operations by the Owner or Separate Contractor that are not apparent.

§ 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 that the Contractor wrongfully causes to completed or partially completed construction or to property of the Owner or Separate Contractor 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.

§ 6.4 RIGHT OF OCCUPANCY

The Owner may, in addition to other provisions of the Contract Documents, store or set-in place within the buildings of a Project, furniture, fixtures and equipment, and to occupy or use any one or all buildings before acceptance of the Project as a whole, provided such occupancy or use does not interfere with the Contractor's progress of the Work.

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. A Request for Information (RFI) is not a change in the Contract Documents nor results in any changes to the Contract Sum or the Contract Time.

§ 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. The Contractor shall proceed promptly with changes in the Work, unless otherwise provided in the Change Order, Construction Change Directive, or order for a minor change in the Work.

§ 7.1.4 The Contractor shall submit the following information at the Pre-Construction Conference, prior to the initial request for payment. The information shall be provided in a written document and the Chief Financial Officer ("CFO") of the Contractor or Subcontractor (or another officer if no CFO) shall certify its accuracy and sign such certification.

- .1 Fixed job site overhead cost for the Contractor or Subcontractor, itemized with documentation to support daily rates. Fixed job site overhead costs shall be limited solely to the items listed in Section 7.1.7 hereinbelow;
- .2 Bond premiums with supporting information from the Contractor's or Subcontractor's carrier;
- .3 Insurance rates with supporting information from the Contractor's or Subcontractor's carrier;
- .4 Labor Burden by trade for the Contractor or Subcontractor, to include only:
 - .1 Applicable payroll taxes;
 - .2 Worker's Compensation;
 - .3 Unemployment Compensation, both federal and State;
 - .4 Social Security taxes;
- .5 Fringe Benefits, to include only:
 - .1 Sick Leave;
 - .2 Vacation;
 - .3 Health Insurance;
 - .4 Life Insurance;
 - .5 Union Dues;
 - .6 Apprentice training.
- .6 Internal Rate Charges for all significant company-owned equipment for the Contractor or Subcontractor.

Failure to submit this information at the Pre-Construction Meeting then pay applications shall not be processed until such time as the Owner receive the information.

§ 7.1.5 No order, oral statement, or direction of the Architect or the Owner shall be treated as a Change Order nor shall it entitle the Contractor to an adjustment of the Contract Sum or the Contract Time. Requests for Information (RFI) shall not constitute changes to the Contract Documents and do not change the Contract Sum or Contract Time.

§ 7.1.6 Unit prices shall be inclusive of all costs, including mark-up for overhead and profit, and shall be applied to units or measure as defined in the Contract Documents for each category of Work, if any.

§ 7.1.7 Fixed job site overhead costs, for all purposes under this Contract, shall be limited solely to the following actual costs. Said costs must be actually incurred to be included in the Project's fixed site overhead costs. If the Contractor or Subcontractor has no actual costs in a particular category, then no costs shall be allowed to the Contractor or Subcontractor in that category:

- .1 Hourly billable rate for the on-site Project Management Team;
- .2 Site office costs to include only, as applicable, (1) office trailer, (2) office equipment, (3) temporary phone, (4) reproduction, (5) postage/delivery, (6) project vehicles, and (7) fuel.

- .3 Site general costs to include only, as applicable, (1) temporary water, (2) temporary electrical, (3) interim clean-up, (4) project toilets, and (5) safety.

§ 7.2 Change Orders

§ 7.2.1 A Change Order is a written instrument (AIA Document G701 – 2001) 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.

§ 7.2.2 A Change Order must comply with the requirements of La. R.S. 38:2212(A)(4)-(7). A Change Order is not final nor binding upon the Owner and may not be included in an Application for Payment, until signed by the authorized representatives of the Owner, Contractor and Architect. The Contract Sum and the Contract Time may be changed only by Change Order. A Change Order signed by the Contractor indicates his agreement therewith, including the adjustment in the Contract Sum or the Contract Time. Any reservation of rights, stipulations, or other modifications made on the Change Order by the Contractor shall have no effect. A Change Order affecting the Contract Sum shall be based on the Cost of the Work, as set forth in section 7.2.3, and Overhead and Profit, as set forth in section 7.2.4, subject to approval of the Architect and the Owner.

§ 7.2.2.1 A proposed Change Order within the scope of the Contract or a Change Order outside the scope of the Contract in an amount less than \$250,000.00 may be negotiated or let out for public bid. If negotiated, the Architect shall request a cost proposal from the Contractor for all proposed changes in the Work consisting of additions, deletions, or revisions. The Cost Proposal must be fully itemized as to costs, including material quantities, material costs, taxes, insurance, employee benefits, or other costs, profit and overhead as provided below. The Architect shall review all items on the proposed request and make a recommendation to the Owner. If there are insufficient budget funds or if the proposed Change Order exceeds 10% of the Contract Sum or \$50,000, whichever is greater, approval of a budget adjustment or approval of the Change Order is required by formal action of the Bossier Parish School Board. In such case, only after the School Board approval may the Architect prepare a formal Change Order and direct the Contractor to proceed with the revisions.

§ 7.2.3 "Cost of the Work" for the purpose of Change Orders shall be costs actually required to be incurred in performance of the work and paid by the Contractor and Subcontractors. Such costs shall consist only of the following:

7.2.3.1 Actual wages paid directly to labor personnel, with a labor burden markup exclusively limited to applicable payroll taxes, worker's compensation insurance, unemployment compensation, and social security taxes for those labor personnel performing the Work. Wages shall be the basic hourly labor rate paid an employee exclusive of fringe benefits or other employee costs. The labor burden percentage for the "Cost of the Work" is limited to categories listed herein. Employer-provided health insurance, fringe benefits, employee training (whether a requirement of employment or not), vacation pay, etc., are examples of ineligible labor burden costs which **shall not** be included, as these costs are already compensated by the Overhead and Profit markup.

Supervision shall not be included as a line item in the "Cost of the Work", except when the change results in a documented delay in the critical path, as described in Section 7.2.7.

7.2.3.2 Cost of all materials and supplies necessary and required to perform the Work, identifying each item and its individual cost, including taxes. Incidental consumables are not eligible costs and shall not be included.

7.2.3.3 Cost of each necessary piece of machinery and equipment required to perform the Work, identifying each item and its individual cost, including taxes. Incidental small tools of a specific trade (i.e., shovels, saws, hammers, air compressors, etc.) and general use vehicles, such as pickup trucks even for moving items around the site, fuel for these general use vehicles, travel, lodging, and/or meals are not eligible and shall not be included.

7.2.3.4 Eligible Insurance costs shall be limited to documented increases in "Builder's Risk" insurance premium / costs only. Commercial General Liability, Automobile Liability, and all other required

insurances, where referenced in the Contract shall be considered part of normal overhead. These costs are already compensated by the Overhead and Profit markup.

- 7.2.3.5** Cost for the General Contractor Performance and Payment Bond premium, where the documented cost of the premiums have been increased due to the Change Order.

§7.2.4 "Overhead and Profit" for the purpose of Change Order eligible costs for the Contractor and Subcontractor consists of (1) fixed job site overhead and home office fixed overhead, and (2) profits on the Cost of the Work, hereinafter called "Overhead and Profit," but such Overhead and Profit shall not exceed a combined total of 16% of the direct cost of the portion of the Work being added by the proposed Change Order. Credits to the Owner resulting from a change in the Work shall be the sum of those items above, except credit will not be required for Overhead and Profit. When a change results in both credits to the Owner and extras to the Contractor for related items, overhead and profit shall only be computed on the net extras cost to the Contractor.

§7.2.5 The cost to the Owner resulting from a change in the Work shall be the sum of: Cost of the Work (as defined at Section 7.2.3) and Overhead and Profit (as defined at Section 7.2.4), and shall be computed as follows:

7.2.5.1 When all of the Work is General Contractor Work; 8% markup on the Cost of the Work.

7.2.5.2 When the Work is all Subcontract Work; 8% markup on the Cost of the Work for Subcontractor's Overhead and Profit, plus 8% markup on the Cost of the Work, not including the Subcontractor's Overhead and Profit markup, for General Contractor's Overhead and Profit.

7.2.5.3 When the Work is a combination of General Contractor Work and Subcontract Work; that portion of the direct cost that is General Contract Work shall be computed per Section 7.2.5.1 and that portion of the direct cost that is Subcontract Work shall be computed per Section 7.2.5.2.

Premiums for the General Contractor's bond may be included, but after the markup is added to the Cost of the Work.

Premiums for the Subcontractor's Bond shall not be included.

7.2.5.4 Subcontract cost shall consist of the items in Section 7.2.3 above plus Overhead and Profit as defined in Section 7.2.4.

§ 7.2.6 The cost to the Owner resulting from a change in the Work shall be prepared and presented to the Architect and the Owner in a proposed Change Order, for their review and approval, as the sum of the "Cost of the Work" (as defined in section 7.2.3) and "Overhead and Profit" (as defined in section 7.2.4). Where a proposed Change Order results in only a credit to the Owner, credit will not be required for Overhead and Profit. Where a proposed Change Order results in both credits to the Owner and extra cost to the Contractor for related items, Overhead and Profit will only be computed on the net extra cost to the Contractor. The amount of the proposed Change Order so computed shall not be binding nor final until approved in writing by both the Architect and the Owner, as provided in section 7.2.2.1 above.

§ 7.2.7 Before a Change Order is prepared, the Contractor shall provide and deliver to the Architect and Owner's representative the following information concerning the Cost of the Work. The provision of said information is not subject to waiver, and shall be provided by the Contractor within a reasonable time after being instructed to prepare said Change Order:

.1 A detailed itemized list of labor, material and equipment costs for the General Contractor's work including quantities and unit costs for each item of labor, material, and equipment.

.2 A detailed itemized list of labor, material and equipment costs for each Subcontractor's and/or Sub-Subcontractor's work including quantities and unit costs for each item of labor, material, and equipment.

§ 7.2.8 After a Change Order has been finalized and approved by the Owner, the Contractor, and the Architect, in accordance with section 7.2.2, above (as reflected by all required signatures), no future requests for extensions of time or additional cost shall be considered for the change in the Work related in whole or in part to the events that required that Change Order. The Change Order represents the full and final amount of the change in the Contract Sum and/or the Contract Time due to the Contractor for all additional Work related to the Change Order. Contractor waives any further claims for additional costs or additional time, whether direct or indirect, for the change in the Work related to said Change Order.

.1 Nothing contained herein shall be construed as a waiver of any rights the Contractor may have under La. R.S. 38:2216(H).

.2 Contractor shall bring any such claims identified in La. R.S. 38:2216(H), to which it may be legally entitled, in accordance with the provisions of Article 15 herein below entitled "Claims and Disputes."

§ 7.2.9 The Contractor will be eligible for extended fixed jobsite overhead for time delays only when all the requirements listed herein below in this section are met. In all cases the Contractor shall notify the Architect and Owner's representative in writing and shall make a Claim pursuant to the provisions of Article 15 herein. Reasonable proof shall be required by the Architect and Owner of each of the required elements listed below.

.1 Complete stoppage of the Work occurs;

.2 Such complete stoppage of the Work also causes an extension of critical path activities (defined as such on the approved Baseline Schedule required by Section 3.10.1);

.3 Such complete stoppage of the Work also results in an extension of the Contract Time;

.4 The Contractor is unable to mitigate financial damages through replacement work;

.5 The complete stoppage of the Work is not related in whole or in part to acts or omissions attributable to the Contractor, its subcontractors or suppliers or its representatives; and

.6 The complete stoppage of the Work is due solely to acts or omissions attributable to the Owner or its representatives.

§ 7.2.10 "Cost of the Work" whether incurred by the Contractor or a Subcontractor shall not include the following:

.1 Salaries or other compensation of the Contractor's or Subcontractor's personnel at the Contractor's or Subcontractor's principal office and branch offices.

.2 Any part of the Contractor's or Subcontractor's capital expense, including interest on the Contractor's or Subcontractor's capital employed for the work.

.3 Overhead and general expenses of any kind or the cost of any item not specifically and expressly included in section 7.2.3 in Cost of the Work.

.4 Cost of supervision not specifically required by the Change Order.

.5 Cost of superintendent already on the Project unless the Contract Time is being extended in the Change Order.

§ 7.2.11 When applicable, as provided in the Contract Documents, the cost to Owner for Change Orders shall be determined by quantities and unit prices. The quantity of any item shall be submitted by the Contractor and approved by the Architect and the Owner's representative. Unit prices shall cover costs of Material, Labor, Equipment, Overhead and Profit. When Unit prices (which include Overhead and Profit) are used as the basis for the added Cost of the Work to the Owner resulting from the Change Order, Overhead and Profit shall not be duplicated by adding it again under section 7.2.4.

§ 7.2.12 Any and all changes or adjustments in the Work that are the subject of a proposed Change Order shall be supported, in addition to the cost and schedule information required elsewhere in this Article 7, by detailed specifications, plans, and/or drawings that evidence the need for the change in the Work and the propriety of the proposed method to effectuate that change.

§ 7.2.13 Any and all changes or adjustments to the Contract Time requested or claimed by the Contractor as a result of a proposed Change Order shall require documentation and justification for the adjustment by a method analysis of the Contractor's most recent schedule in use prior to the change, which shows an extension in critical path activities. Changes that affect or concern activities containing float or slack time (i.e., not on the critical path) that can be accomplished within such float or slack time shall not result in an increase in the Contract Time.

§7.2.14 When applicable as provided by the Contract, the cost to Owner for Change Orders shall be determined by quantities and unit prices. The quantity of any item shall be as submitted by the Contractor and approved by the Architect. Unit prices shall cover cost of Material, Labor, Equipment, Overhead and Profit.

§ 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. A Construction Change Directive may also be used to document the amount of liquidated damages or the additional fees for the Architect or Program Manager because of additional inspections.

§ 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 7.3.4.

§ 7.3.4 If the Contractor does not respond promptly or disagrees with the method for adjustment in the Contract Sum, the Architect shall determine 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 7.3.4 shall be limited to the following:

1. Costs of labor, including applicable payroll taxes, fringe benefits required by agreement or custom, workers' compensation insurance, and other employee costs approved by the Architect;
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, directly related to the change; and
5. Costs of supervision and field office personnel directly attributable to the change. Section 7.3.4 shall be limited as provided in Sections 7.2.3 and 7.2.4.

§ 7.3.5 If the Contractor disagrees with the adjustment in the Contract Time, the Contractor may make a Claim in accordance with applicable provisions of Article 15.

§ 7.3.6 Upon receipt of a Construction Change Directive, the Contractor shall promptly proceed with the change in the Work involved and advise the Architect and the Owner 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.

§ 7.3.7 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.

§ 7.3.8 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 with the prior approval of the Owner may order minor changes in the Work that are consistent with the intent of the Contract Documents and do not involve an adjustment in the Contract Sum or an extension of the Contract Time. The Architect's order for minor changes shall be in writing. If the Contractor believes that the proposed minor change in the Work will affect the Contract Sum or Contract Time, the Contractor shall notify the Architect and Owner and shall not proceed to implement the change in the Work. If the Contractor performs the Work set forth in the Architect's order for a minor change without prior notice to the Architect that such change will affect the Contract Sum or Contract Time, the Contractor waives any adjustment to the Contract Sum or extension of the Contract Time.

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~~ Agreement or such other date as may be stated in a Notice to Proceed.

§ 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.

§ 8.1.5 The Contract Time shall not be changed by submission of a schedule that shows an early completion date unless specifically authorized by a final, approved Change Order; and Contractor is specifically prohibited from submitting a schedule that shows an early completion date, unless specifically authorized by a final, approved Change Order.

§ 8.1.6 For all purposes of counting time provided in these Contract documents, Time shall be counted on a calendar day basis. However, unless otherwise specified, where the due date for any action, submittal or response falls on a Saturday, Sunday, or legal holiday (as identified in Section 8.1.7), such action, submittal, or response shall be considered due on the next business day which is not a Saturday, Sunday, or legal holiday. The preceding sentence shall not apply to the date of Substantial Completion.

§ 8.1.7 For purposes of Section 8.1.6, legal holidays shall include the following:

New Year's Day	January 1
Martin Luther King Day	
Mardi Gras Day	
Good Friday	
Memorial Day	Last Monday in May
Independence Day	July 4
Labor Day	First Monday in September

Thanksgiving Day	Fourth Thursday in November
Christmas Eve	December 24
Christmas Day	December 25
New Year's Eve	December 31

§ 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, commence the Work prior to the effective date of insurance required to be furnished by the Contractor and Owner.

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

§ 8.2.4 The Contractor agrees to achieve Substantial Completion of the Work within the time stated in the Contract Documents, subject to any extensions as may be granted under Section 8.3 and to achieve completion of the Punch List within the time stated in the Contract Documents. Further, the Contractor agrees to commence Onsite Construction Activities, as defined below in section 8.2.2.1, no later than fourteen (14) days after the date of commencement of the Work set forth in the Agreement or in the Notice to Proceed. If all punch list items have not been completed by the end of the forty-five (45) day period, through no fault of the Owner or Architect, the Owner may hold the Contractor in default. If the Owner finds the Contractor in default, the Surety shall be notified. If, within forty-five (45) days after notification, the Surety has not completed the punch list, through no fault of the Owner or Architect, the Owner may, at Owner's sole option, contract to have the balance of the Work completed and pay for such Work with the unpaid funds remaining in the Contract Sum. Finding the Contractor in default may constitute a reason for disqualification of the Contractor from bidding on the Owner's future projects. If the surety fails to complete the punch list within the stipulated time period, the Owner may not accept bonds submitted, in the future, by the Surety. The Owner shall be entitled to collect any and all sums that are due the Owner as Liquidated Damages in any manner available, including but not limited to withholding the amounts due to the Contractor for Progress Payments or Final Payment, deducting the Liquidated Damages due by a Change Order or Construction Change Directive, or collecting the amounts due from the Contractor or the Contractor's Surety.

1. Onsite Construction Activities are those activities beyond mobilization which include actual and physical progress of the Work on the Project site. By way of example, typical Onsite Construction Activities include, but are not limited to, clearing and grubbing of the Project site, Project site fill and pile driving.
2. Should Contractor fail to commence Onsite Construction Activities timely, as set forth in this section 8.2.4, then any future claim Contractor may submit for an extension of the Contract Time shall be directly reduced by the number of days Contractor was late in the commencement of Onsite Construction Activities as defined herein.

§ 8.3 Delays and Extensions of Time

§ 8.3.1 If the Contractor is materially delayed at any time in the commencement or progress of the Work by (1) an act or neglect of the Owner or Architect, of an employee of either, or of a Separate Contractor; (2) by changes ordered in the Work; (3) by labor disputes, fire, unusual delay in deliveries, unavoidable casualties, adverse weather conditions documented in accordance with Section 15.1.6.2, or other causes beyond the Contractor's control; (4) by delay authorized by the Owner pending mediation and binding dispute resolution; or litigation; or (5) by other causes that the Contractor asserts, and the Architect determines, justify delay, then the Contract Time shall will be extended for such reasonable time as the Architect may determine-recommend, subject to the Owner's approval of a Change Order. If the claim is not made within the limits of Article 15, all rights for future claims for that month are waived.

§ 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.

§ 8.3.4 The Owner's operations will be impacted and delayed if the Project is not substantially complete within the time set forth in the Contract Documents. The Contractor and the Contractor's surety shall be liable for and shall pay to the Owner the sum stated in the Contract Documents as fixed, agreed, and liquidated damages for each consecutive calendar day (Saturday's, Sunday's and holidays included), of delay until the Work is substantially complete or, as applicable until the Work is finally complete. The Owner shall be paid the sum stated for liquidated damages in the Contract Document. Such liquidated damages shall be withheld by the Owner from the amounts due the Contractor for progress payments and deducted from the Contract Sum by a Construction Change Order or Construction Change Directive signed only by the Owner and the Architect.

ARTICLE 9 PAYMENTS AND COMPLETION

§ 9.1 Contract Sum

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

§ 9.1.2 If unit prices are stated in the Contract Documents or subsequently agreed upon, and if quantities originally contemplated are materially changed so that application of such unit prices to the actual quantities causes substantial inequity to the Owner or Contractor, the applicable unit prices shall be equitably adjusted.

§ 9.2 Schedule of Values

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

§ 9.2.1 To facilitate the review of Applications for Payment, the Schedule of Values shall be submitted for review and approval on AIA Documents G702 and G703, and shall include the following:

- .1 Contractor's cost for Contractor's fee (if applicable), bonds and insurance, mobilization, general conditions, etc. shall be listed as individual line items.
- .2 Contractor's costs for various construction items shall be detailed. For example, concrete work shall be subdivided into footings, grade beams, floor slabs, paving, etc.
- .3 On major subcontracts, such as mechanical, electrical, and plumbing, the schedule shall indicate line items and amounts in detail (for example: underground, major equipment, fixtures, installation fixtures, start-up, etc.)
- .4 Costs for subcontract work shall be listed without any additional mark-up of Contractor's costs for overhead, profit, or supervision.
- .5 If payment for stored materials is requested prior to installation, then material and labor shall be listed as separate line items.
- .6 Contractor shall provide a report of actual versus project reimbursable expenses (general conditions), updated monthly.
- .7 The Schedule of Values approved by the Architect and accepted by the Owner shall be used as a basis for reviewing the Contractor's Applications for Payment.
- .8 A clear designation of any of the Work to be performed by the Contractor with its own employees.

- .9 A list of names and business domiciles of all Subcontractors, manufacturers, suppliers or other persons or organizations (including those who are to furnish materials or equipment fabricated for a special design) proposed for the principal portions of the Work.

§ 9.2.2 The total of all items shall equal the total Contract Sum. For a multiple building site, multiple sites or multiple locations Contract, the Schedule of Values will be allocated for each separate building, site or location.

§ 9.2.3 The Contractor shall list and identify all Subcontractors, Sub-subcontractors and suppliers with their contract amount in the Schedule of Values.

§ 9.3 Applications for Payment

§ 9.3.1 At least ten days before the date established for each progress payment, Monthly, the Contractor shall submit to the Architect an itemized Application for Payment (AIA Documents G702 and G703) prepared in accordance with the schedule of values, if required under Section 9.2, for completed portions of the Work. The application shall be notarized, if required, notarized and supported by all data substantiating the Contractor's right to payment that the Owner or Architect require, such as copies of requisitions, and releases and waivers of liens from Subcontractors and suppliers, suppliers and shall reflect retainage if provided for in the Contract Documents. See section 9.3.1.3. Applications for Payment shall be submitted no later than the fifth (5th) day of each month for the value of labor and materials incorporated into the work and of materials, suitably stored at the site, as of the last day of the preceding month, less normal retainage, as set forth in Section 9.3.1.3. Offsite storage of materials may be allowed. See Section 9.3.2

§ 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, Directives, 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 supplier, unless such Work has been performed by others whom the Contractor intends to pay.

§ 9.3.1.3 Normal retainage for Projects with a Contract Sum of less than \$500,000.00 shall be 10% of the total Contract Sum. Normal Retainage for Projects with a Contract Sum of \$500,000.00 or more shall be 5% of the total Contract Sum.

§ 9.3.1.4 The normal retainage shall not be due the Contractor until after all of the following have occurred: (1) Substantial Completion has been achieved; (2) the Architect has prepared and the Owner has approved and accepted a Certificate of Substantial Completion, including an attached Punch List meeting the requirements of Section 9.8.4 and 9.8.5; and (3) the Contractor has submitted an Application for Payment for the retainage. (4) the Contractor has provided the Owner with a fully completed, executed and notarized Contractor's Conditional Waiver of Lien for Current Progress Payment and Unconditional Waiver of Lien for Prior Progress Payments, in the form attached to the Agreement Between the Owner and Contractor, AIA Document A101; (5) the forty-five (45) day lien period in La. R.S. 38:2242 has expired; and (6) the Contractor has provided the Owner and the Architect with an original, certified clear lien and privilege certificate issued by the Clerk of Court for the 26th Judicial District Court for the Parish of Bossier. If there are insufficient funds remaining in the Contract Sum to both pay the normal retainage and cover the value assigned to the Punch List (as set forth in Section 9.8.5), then the Owner shall withhold payment of the normal retainage to the extent necessary to cover the shortfall. If the value of the Punch List (as set forth in Section 9.8.5) exceeds the funds remaining in the Contract Sum, including the normal retainage, Contractor shall not be entitled to the payment of any normal retainage. Instead, Contractor and/or its Surety shall be liable for and shall pay the shortfall to the Owner.

§ 9.3.1.5 Work performed and materials supplied under a Change Order may be included for payment only after the Change Order has been approved in writing by the Owner and all other appropriate parties, as more specifically set forth in section 7.2.1 herein above.

§ 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 bonded 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, suppliers, or other persons or entities that provided labor, materials, and equipment relating to the Work.

§ 9.3.4 Each Application for Payment for a Progress Payment may upon request of Owner be accompanied by a fully completed, executed, and notarized Contractor's Conditional Waiver of Lien for Current Progress Payment and Unconditional Waiver of Lien for Prior Progress Payments, in the form attached to the Agreement Between the Owner and Contractor, AIA Document A101. The Application for Final Payment shall be accompanied by a fully completed, executed, and notarized Contractor's Unconditional Waiver of Lien Upon Final Payment, in the form attached to the Agreement Between the Owner and Contractor, AIA Document A101. Payment Applications which omit these Waivers of Liens shall not be paid.

§ 9.3.5 The Contractor further expressly undertakes to defend the Owner at the Contractor's sole expense, against any actions, lawsuits or proceedings brought against Owner as a result of liens filed against the Work, the job site and any improvements thereon, any portion of the property of the Owner, or any payments due the Contractor (referred to collectively as "liens" in this Section 9.3) by those providing labor, material or equipment on behalf of Contractor. The Contractor hereby agrees to defend, indemnify, and save Owner harmless against any such liens or claims and agrees to pay any judgment or lien resulting from any such actions, lawsuits or proceedings and all attorney fees.

§ 9.4 Certificates for Payment

§ 9.4.1 The Architect will, within seven days after receipt of the Contractor's Application for Payment, either (1) issue to the Owner a Certificate for Payment in the full amount of the Application for Payment, with a copy to the Contractor; or (2) issue to the Owner a Certificate for Payment for such amount as the Architect determines is properly due, and notify the Contractor and Owner of the Architect's reasons for withholding certification in part as provided in Section 9.5.1; or (3) withhold certification of the entire Application for Payment, and notify the Contractor and Owner of the Architect's reason for withholding certification in whole 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 in the Application for Payment, that, to the best of the Architect's knowledge, information, and belief, the Work has progressed to the point indicated, the quality of the Work is in accordance with the Contract Documents, and that the Contractor is entitled to payment in the amount certified. 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. 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 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 suppliers 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, the Contract Documents;~~
- .8 the value of the Punch List (see Section 9.8.5) of incomplete or items to be corrected exceeds the balance remaining of the Contract sum including the amount allotted for the retainage as provided in Sections 9.3.1.2 and 9.3.1.4;
- .9 if the Project is behind schedule, failure to submit a written plan indicating action by the Contractor to regain the time schedule for completion of the Work within Contract Time;
- .10 improperly completed or inadequately documented/supported Application for Payment. The omission of any required documents from the Application for Payment, including but not limited to lien waivers, all documents required herein, all documents required in the Division 01 Specifications of the Contract Documents, and all documents required elsewhere such as an approved Construction Schedule or lack of approved Schedule of Values in the Contract Documents, shall result in its rejection; or
- .11 rejection of any part of the Work by any governmental authority having jurisdiction over the Project.

§ 9.5.2 When either party disputes the Architect's decision regarding a Certificate for Payment under Section 9.5.1, in whole or in part, that party may submit a Claim in accordance with Article 15.

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

§ 9.5.4 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 supplier 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 Contractor shall reflect such payment on its next Application for Payment.

§ 9.6 Progress Payments

§ 9.6.1 After the Architect has issued a Certificate for Payment, ~~the Owner shall Payment~~ the Owner shall within fifteen (15) days after the Owner's receipt of a valid Certificate for Payment make payment in the manner and within the time provided in the Contract Documents, ~~Documents~~ and shall so notify the Architect. ~~Architect and Contractor.~~

§ 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. La. R.S. 9:2784(A) and (C) require a Contractor or Subcontractor to make payment due to each subcontractor and supplier within fourteen (14) consecutive days of receipt of payment from the Owner. If not paid, a penalty in the amount of one half of 1% per day is due, up to a maximum of fifteen percent (15%) from the expiration date until paid. The Contractor or Subcontractor, whichever is applicable, is solely responsible for the payment of any penalty.

§ 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 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 and suppliers 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 or supplier, except as may otherwise be required by law.

§ 9.6.5 The Contractor's payments to 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 or provided by 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, create any fiduciary liability or tort liability on the part of the Contractor for breach of trust, or entitle any person or entity to an award of punitive damages against the Contractor for breach of the requirements of this provision.

§ 9.6.8 Provided the Owner has fulfilled its payment obligations under the Contract Documents, the Contractor shall defend and indemnify the Owner from all loss, liability, damage or expense, including reasonable attorney's fees and litigation expenses, arising out of any lien claim or other claim for payment by any Subcontractor or supplier of any tier. Upon receipt of notice of a lien claim or other claim for payment, the Owner shall notify the Contractor. If approved by the applicable court, when required, the Contractor may substitute a surety bond for the property against which the lien or other claim for payment has been asserted.

§ 9.6.9 If the Owner receives any claim of nonpayment arising out of the Work from a Subcontractor, Sub-subcontractor, material or equipment supplier, or the like, the Owner shall deduct 125% of such claim from the remaining Contract Sum. The Contractor, or any interested party, may deposit security with the Recorder of Mortgages of Bossier Parish where the Work has been done, in accordance with La. R.S. 38:2242.2, guaranteeing payment of the claim. When the Owner receives original proof of such guarantee from the Recorder of Mortgages and/or Clerk of Court 26th Judicial District Court for the Parish of Bossier, the claim deduction will be added back to the Contract Sum.

§ 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' 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 shutdown, 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. The Architect shall determine if the Project is Substantially Complete in accordance with this Article 9.8. Also, all required occupancy permits of regulatory authorities, if any, have been issued and copies delivered to the Owner. In addition to the requirements of the first sentence of this Article 9.8.1, the following conditions must also be satisfied before the Work will be considered Substantially Complete:

.1 Where roofing work is part of the Contract, the Owner must receive the executed Roofing Contractor's

- and Roofing Manufacturer's guarantees;
- .2 All required occupancy permits must have been issued and copies delivered to the Owner;
- .3 All Project systems included in the Work must be operational as designed;
- .4 All operations and maintenance data specified has been submitted and approved, including the provision of draft as-built drawings for training purposes;
- .5 The Owner's personnel must have completed any required training in the Project's operations systems;
- .6 All finishes required by the Contract Documents must be in place;
- .7 The only remaining work must be minor in nature so that the Owner can occupy the building/construction and the Contractor's completion of that minor remaining work will not interfere with nor hamper the Owner's normal business operations;
- .8 The Contractor must certify in writing that all remaining Work will be completed within forty-five (45) consecutive calendar days, unless the Owner consents to a different time, following the date of Substantial Completion. Any remaining Work required to be performed after the date of Substantial Completion at a school that is operating and open shall be done in a manner and during times that do not interfere with school operations, at no additional cost to Owner. Owner shall have the right to direct Contractor to perform said Work, at no additional cost during non-operating hours of the school, including nights and weekends.
- .9 All warranties to be effective as of the date of substantial completion fully signed and dated.

§ 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. The Architect may add or modify the list (punch list) as necessary.

§ 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; establish responsibilities of the Owner and Contractor for security, maintenance, heat, utilities, damage to the Work and insurance; and fix the time within which the Contractor shall finish all items on the list (punch 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 the Certificate. ~~Upon such acceptance, and consent of surety if any, the Owner shall make payment of retainage applying to the Work or designated portion thereof. Such payment shall be adjusted for Work Payment shall be adjusted for Work listed on a Punch List prepared by the Architect that is incomplete or not in accordance with the requirements of the Contract Documents. The Punch List of exceptions prepared by the Architect shall itemize additional Work remaining to be done by the Contractor, and the dollar value related thereto. The Cost of these items shall be prepared in the same format as the Schedule of Values. The monetary value assigned to this Punch List will be 125% of the sum of the cost estimate for each particular item of required work and will be estimated by the Architect based on the mobilization, labor, material, and equipment costs of correcting the item. The value assigned to the Punch List shall be retained from the monies owed the Contractor, above and beyond the normal retainage. No funds assigned for the Punch List value shall be due to the Contractor before the Punch List items are completed and accepted by the Architect and the Owner. If the dollar value of the Punch List exceeds the amount of funds, less the retainage amount, in the remaining balance of the Contract, then the Project shall not be accepted as Substantially Complete. If funds remaining in the Contract are less than that required to complete the Punch List Work, then the Contractor or its Surety shall pay the difference.~~

§ 9.8.6 The Contractor shall complete the Punch List items within forty-five (45) consecutive calendar days from the date of Substantial Completion. The Owner may, as its option, consent to a different time, but such consent shall be reflected in writing. If the Contractor fails to complete all Punch List items within this forty-five-day period, through no fault of the Owner or the Architect, then the Owner may hold the Contractor in default. If the Owner finds the Contractor is in default, the Surety shall be notified. If within forty-five (45) days after notification of the Surety by the Owner, the Surety has not completed the Punch List, through no fault of the Architect or Owner, the Owner may, at his option, contract with an outside party to have the balance of the Work completed and pay for such Work with the unpaid funds remaining in the Contract Sum. Finding the Contractor in default may constitute a reason for disqualification of the Contractor from bidding on future Owner contracts. If the Surety fails to complete the Punch List within the stipulated time period, the Owner may choose to not accept bonds submitted from the Surety in the future.

§ 9.8.7 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. After such acceptance, and consent of surety, the Contractor may submit to the Owner a properly completed and supported Application for Payment seeking payment of completed Work, less the value assigned to the Punch List items, as set forth in and limited by Section 9.8.5 above. Such Application for Payment shall not request payment for Work that is incomplete and/or not in accordance with the requirements of the Contract Documents.

§ 9.8.8 After the Owner's receipt and approval of a fully executed Certificate of Substantial Completion and attached Punch List, the Owner may issue a Notice by Owner of Acceptance of Work. The Contractor shall record the Notice by Owner of Acceptance of Work with the Clerk of Court in the Parish of Bossier and shall provide written evidence of recordation to the Architect and the Owner's representative. If the Notice of Acceptance has not been recorded within seven (7) days after issuance, the Owner may record the Notice of Acceptance at the Contractor's expense.

§ 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 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, 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 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. 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 the Contract Documents and that the entire balance found to be due the Contractor and noted in the final Certificate is due and payable. If the Architect does not find the Work acceptable in accordance with the Contract Documents, the Architect shall make one additional inspection. If the Work is still not acceptable, the Architect and each of the Architect's principal consultants shall be paid \$200.00 per hour for their time, for each additional inspection authorized by the Owner to be withheld from the unpaid funds remaining of the Contract Sum. The

payment shall be paid by the Owner and deducted from the Contract Funds. If no funds remain, Contractor or its Surety shall pay the amount. 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, (3) a written statement that the Contractor knows of no 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, (5) documentation of any special warranties, such as manufacturers' warranties or specific Subcontractor warranties, and (6) if required by the Owner, other data establishing payment or satisfaction of obligations, such as receipts and 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, claim, security interest, or encumbrance. If a lien, claim, security interest, or encumbrance 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 the lien, claim, security interest, or encumbrance, including all costs and reasonable attorneys' fees.

§ 9.10.2.1 In addition to the items listed in Section 9.10.2, the Contractor shall deliver the following items to the Architect within forty-five (45) days following the date of Substantial Completion. Neither final payment nor any remaining retained percentage shall become due until the Contractor submits all the required documents and information.

1. All close-out submittals specified in the Specifications;
2. All project record documents specified in the Specifications;
3. All approved submittals;
4. All approved Shop Drawings;
5. All final as-built Drawings, in both paper and electronic (pdf) format;
6. All operations and maintenance data specified in the Specifications;
7. All warranties as required on specific products or portions of the Work, including subcontractor warranty letters;
8. All spare parts, overages, and maintenance materials specified in the Specifications;
9. Certificates of Occupancy from authorities having jurisdiction;
10. Copies of all inspection tags from authorities having jurisdiction;
11. Executed Certificates of Substantial Completion;
12. A fully completed, executed, and notarized Contractor's Unconditional Waiver of Lien Upon Final Payment, in the form approved by the Owner; and
13. Clear lien certificate from the Clerk of Court for the Parish of Bossier.

§ 9.10.2.2 Upon receipt by the Architect of all Project close-out documents and a recommendation by the Architect of acceptance of Final Completion, a close-out meeting will be scheduled by the Architect, to include the Architect, the Owner and the Contractor for the review and acceptance of all of the required items identified in this Section 9.10.2. If all items are complete and accepted by the Owner, the Owner will then authorize the issuance of Final Payment.

§ 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, corrected, 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 the 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;
- .3 terms of special warranties required by the Contract Documents; or
- .4 audits performed by the Owner, if permitted by the Contract Documents, after final payment-payment;
or
- .5 any Work found not to be done in accordance with the Contract Documents during the one-year
Correction period;
- .6 liquidated damages; or
- .7 latent defects.

§ 9.10.5 Acceptance of final payment by the Contractor, a Subcontractor, or a 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.

§ 9.11 Liquidated Damages

As more specifically set forth in AIA Document A101, Agreement Between Owner and Contractor, as modified by the Owner, the Contractor's failure to achieve Substantial Completion within the Contract Time, as set forth in the Contract Documents shall result in the imposition of Liquidated Damages upon the Contractor. As further set forth in the Agreement, and in Sections 8.2.4 and 9.8.6 above, it is mutually agreed by the Contractor and Owner that the Owner's operations will be negatively impacted and the Owner will sustain damage that will be impracticable and extremely difficult to quantify if Substantial Completion of the Project is not achieved within the time set forth in the Agreement. The Contractor and the Contractor's Surety shall be liable for and shall pay to the Owner Liquidated Damages, which shall not be considered a penalty, in the amount stated in the Contract Documents as fixed, agreed upon and Liquidated Damages for each calendar day (Saturdays, Sundays, and legal holidays included) that Substantial Completion is delayed beyond the time stated in the Agreement. The Owner shall be entitled to collect any and all sums that are due the Owner as Liquidated Damages in any manner available, including but not limited to withholding the amounts due to the Contractor for Progress Payments or Final Payment, deducting the Liquidated Damages due by a Change Order or Construction Change Directive, or collecting the amounts due from the Contractor or the Contractor's Surety. The Contractor and the Contractor's Surety hereby agree and will be held liable for any Liquidated Damages imposed in accordance with these Contract Documents.

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. The Contractor agrees that it is exclusively responsible for compliance with the Occupational Safety and Health Act (OSHA), its implementing regulations and all Louisiana State and local regulations for construction in that it is the "employer" within the meaning of the law and regulations. Neither the Architect nor the Owner are in charge of the Work.

§ 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, a Subcontractor, or a Sub-subcontractor; 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-construction; and
- .4 the indoor air quality of buildings where the Owner's students, teachers, employees, and visitors are present; and
- .5 the exhaust systems and existing fresh air intake devices to prevent dust or fume caused by the Work to enter such systems.

§ 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 the health and safety of persons or property or their protection from damage, injury, or loss.

§ 10.2.3 The Contractor shall implement, 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 the owners and users of adjacent sites and utilities of the safeguards. Contractor shall provide for the marking of all underground utilities prior to any digging, excavation or other disturbances of earth and provide the Louisiana One Call reference number to the Architect and the Owner's representative.

§ 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. The Contractor may make a Claim for the cost to remedy the damage or loss to the extent such damage or loss is 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. Contractor shall immediately make an oral report to the Architect and the Owner's representative and promptly provide a written report to the Architect and the Owner's representative, about all accidents arising out of or in connection with the Work that cause death, personal injury, interrupt utility services or property damage.

§ 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, notice of the injury or damage, whether or not insured, shall be given to the other party within a reasonable time not exceeding 24-three (3) days after discovery. The notice shall provide sufficient detail to enable the other party to investigate the matter.

§ 10.2.9 Security of Project Site

The Contractor is solely responsible for the security of all equipment, tools or other property of the Contractor, its Subcontractors, and its suppliers at the Project site to include any loss or damage due to theft or vandalism. The Contractor shall provide for any security at the site.

§ 10.3 Hazardous Materials and Substances

§ 10.3.1 The Contractor is responsible for compliance with any requirements included in the Contract Documents regarding hazardous materials or substances. 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 notify the ~~Owner and Architect of the condition~~ Owner's representative and Architect of the condition, in writing. Mold is not considered to be hazardous for the purposes of this Section; however, the Contractor must notify the Owner's representative and Architect of the presence of black mold on building components, in writing, in any affected area of a Project. The Owner is responsible to assess any area of a Project where mold is observed. The Owner will provide for remediation of mold in any affected area of a Project. The Owner will advise the Architect and Contractor upon completion of the remediation of any affected area due to the presence of mold in an area. There are no clear standards set regarding exposure levels for mold since mold is generally present everywhere. The presence of mold in an area of a Project does not affect the remaining areas of a Project and the Contractor shall continue with work in all unaffected areas of a Project.

§ 10.3.2 Upon receipt of the Contractor's 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 the material or substance or who are to perform the task of removal or safe containment of the 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 by the amount of the Contractor's reasonable additional costs of shutdown, delay, and ~~start-up-start-up, if any, of any affected area of a Project.~~

§ 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 excluding~~ 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 hazardous 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 hazardous 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 reimburse the Owner for the cost and expense the Owner incurs (1) for remediation of hazardous materials or substances 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 reimburse the Contractor for all cost and expense thereby ~~incurred-incurred~~ except when prior notice is required regarding mold or handling removal of materials with mold.

§ 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 Insurance and Bonds

§ 11.1.1 The Contractor shall purchase and maintain insurance of the types and limits of liability, containing the endorsements, and subject to the terms and conditions, as described in the Agreement or elsewhere in the Contract Documents. ~~Documents (see the Exhibit A with Owner's Modified A101).~~ The Contractor shall purchase and maintain the required insurance from an insurance company or insurance companies lawfully authorized to issue insurance in the jurisdiction where the Project is located, ~~Louisiana.~~ The Owner, Architect, and Architect's consultants shall be named as additional insureds under the Contractor's commercial general liability policy or as otherwise described in the Contract Documents.

§ 11.1.2 The Contractor shall provide surety bonds of the types, for such penal sums, and subject to such terms and conditions as required by the Contract Documents. The Contractor shall purchase and maintain the required bonds

from a company or companies lawfully authorized to issue surety bonds in the jurisdiction where the Project is located.

§ 11.1.3 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.

§ 11.1.4 **Notice of Cancellation or Expiration of Contractor's Required Insurance.** Within three (3) business days of the date the Contractor becomes aware of an impending or actual cancellation or expiration of any insurance required by the Contract Documents, the Contractor shall provide notice to the Owner of such impending or actual cancellation or expiration. Upon receipt of notice from the Contractor, the Owner shall, unless the lapse in coverage arises from an act or omission of the Owner, have the right to stop the Work until the lapse in coverage has been cured by the procurement of replacement coverage by the Contractor. The furnishing of notice by the Contractor shall not relieve the Contractor of any contractual obligation to provide any required coverage.

§ 11.2 Owner's Insurance

§ 11.2.1 The Owner shall ~~may~~ purchase and maintain insurance of the types and limits of liability, containing the endorsements, and subject to the terms and conditions, as described in the ~~Agreement~~ Agreement, if any, or elsewhere in the Contract Documents. The Owner shall ~~purchase and maintain the required~~ may maintain general liability and property insurance for its interests and the Owner shall purchase and maintain the insurance from an insurance company or insurance companies lawfully authorized to issue insurance in the ~~jurisdiction where the Project is located.~~ State of Louisiana.

§ 11.2.2 **Failure to Purchase Required Property Insurance.** If the Owner fails to purchase and maintain the required property insurance, with all of the coverages and in the amounts described in the Agreement or elsewhere in the Contract Documents, the Owner shall inform the Contractor in writing prior to commencement of the Work. Upon receipt of notice from the Owner, the Contractor may delay commencement of the Work and may obtain insurance that will protect the interests of the Contractor, Subcontractors, and Sub-Subcontractors in the Work. When the failure to provide coverage has been cured or resolved, the Contract Sum and Contract Time shall be equitably adjusted. In the event the Owner fails to procure coverage, the Owner waives all rights against the Contractor, Subcontractors, and Sub-subcontractors to the extent the loss to the Owner would have been covered by the insurance to have been procured by the Owner. The cost of the insurance shall be charged to the Owner by a Change Order. If the Owner does not provide written notice, and the Contractor is damaged by the failure or neglect of the Owner to purchase or maintain the required insurance, the Owner shall reimburse the Contractor for all reasonable costs and damages attributable thereto.

§ 11.2.3 **Notice of Cancellation or Expiration of Owner's Required Property Insurance.** Within three (3) business days of the date the Owner becomes aware of an impending or actual cancellation or expiration of any property insurance required by the Contract Documents, the Owner shall provide notice to the Contractor of such impending or actual cancellation or expiration. Unless the lapse in coverage arises from an act or omission of the Contractor: (1) the Contractor, upon receipt of notice from the Owner, shall have the right to stop the Work until the lapse in coverage has been cured by the procurement of replacement coverage by either the Owner or the Contractor; (2) the Contract Time and Contract Sum shall be equitably adjusted; and (3) the Owner waives all rights against the Contractor, Subcontractors, and Sub-subcontractors to the extent any loss to the Owner would have been covered by the insurance had it not expired or been cancelled. If the Contractor purchases replacement coverage, the cost of the insurance shall be charged to the Owner by an appropriate Change Order. The furnishing of notice by the Owner shall not relieve the Owner of any contractual obligation to provide required insurance.

§ 11.3 Waivers of Subrogation

§ 11.3.1 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; (2) the Architect and Architect's consultants; and (3) Separate Contractors, 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 those losses are covered by property insurance required by the Agreement or other property insurance applicable to the Project, except such rights as they have to proceeds of such insurance. The Owner or Contractor, as appropriate, shall require similar written waivers in favor of the individuals

and entities identified above from the Architect, Architect's consultants, Separate Contractors, subcontractors, and sub-subcontractors. The policies of insurance purchased and maintained by each person or entity agreeing to waive claims pursuant to this section 11.3.1 shall not prohibit this waiver of subrogation. This waiver of subrogation shall be effective as to a person or entity (1) even though that person or entity would otherwise have a duty of indemnification, contractual or otherwise, (2) even though that person or entity did not pay the insurance premium directly or indirectly, or (3) whether or not the person or entity had an insurable interest in the damaged property.

§ 11.3.2 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, to the extent permissible by such policies, the Owner waives all rights in accordance with the terms of Section 11.3.1 for damages caused by fire or other causes of loss covered by this separate property insurance.

§ 11.4 Loss of Use, Business Interruption, and Delay in Completion Insurance

The Owner, at the Owner's option, may purchase and maintain insurance that will protect the Owner against loss of use of the Owner's property, or the inability to conduct normal operations, due to fire or other causes of loss. The Owner waives all rights of action against the Contractor and Architect for loss of use of the Owner's property, due to fire or other hazards however caused.

§11.5 Adjustment and Settlement of Insured Loss

§ 11.5.1 A loss insured under the property insurance required by the Agreement 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 11.5.2. The Owner shall pay the Architect and Contractor their just shares of insurance proceeds received by the Owner, and by appropriate agreements the Architect and Contractor shall make payments to their consultants and Subcontractors in similar manner.

§ 11.5.2 Prior to settlement of an insured loss, the Owner shall notify the Contractor of the terms of the proposed settlement as well as the proposed allocation of the insurance proceeds. The Contractor shall have 14 days from receipt of notice to object to the proposed settlement or allocation of the proceeds. If the Contractor does not object, the Owner shall settle the loss and the Contractor shall be bound by the settlement and allocation. Upon receipt, the Owner shall deposit the insurance proceeds in a separate account and make the appropriate distributions. Thereafter, if no other agreement is made or the Owner does not terminate the Contract for convenience, the Owner and Contractor shall execute a Change Order for reconstruction of the damaged or destroyed Work in the amount allocated for that purpose. If the Contractor timely objects to either the terms of the proposed settlement or the allocation of the proceeds, the Owner may proceed to settle the insured loss, and any dispute between the Owner and Contractor arising out of the settlement or allocation of the proceeds shall be resolved pursuant to Article 15. Pending resolution of any dispute, the Owner may issue a Construction Change Directive for the reconstruction of the damaged or destroyed Work.

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, the Contractor shall be entitled to an equitable adjustment to the Contract Sum and Contract Time as may be appropriate. If such Work is not in accordance with the Contract Documents, the costs of uncovering the Work, and the cost of correction, shall be at the Contractor's expense.

§ 12.2 Correction of Work

§ 12.2.1 Before Substantial Completion

The Contractor shall promptly correct Work rejected by the Architect or failing to conform to the requirements of the Contract Documents, discovered before 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 any applicable special warranty required by the Contract Documents, any of the Work is found by the Architect to be not in accordance with the requirements of the Contract Documents, the Contractor shall correct it promptly after receipt of notice from the Owner to do so, ~~unless the Owner has previously given the Contractor a written acceptance of such condition. The so.~~ The Architect or 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 not to exceed twenty (20) days during that period after receipt of notice from the Owner or Architect, the Owner may correct it in accordance with Section 2.5.

§ 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 including items identified or listed in the one-year period for correction 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 of the Owner or Separate Contractors, whether completed or partially completed, 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.~~ 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.

§12.2.6 In addition, the Contractor shall furnish a Maintenance Bond using the Owner's bond form in favor of the Owner for a minimum period of two (2) years after the date of Substantial Completion of the entire Project.

§ 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, excluding that jurisdiction's choice of law rules. ~~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 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 the assignment.

§ 13.3 Rights and Remedies

§ 13.3.1 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.

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

§ 13.3.3 The 26th Judicial District Court in and for the Parish of Bossier, State of Louisiana shall have sole and exclusive jurisdiction in any action brought under the Contract or Bonds. In the event of diversity for purposes of federal court jurisdiction or any other cause of action that may allow for federal court jurisdiction or venue, the Contractor, its Surety, its Sub-contractors, and suppliers specifically waive any right or cause of action to be filed, transferred, or tried in any federal court. The sole court granted exclusive jurisdiction and venue of any action arising from this agreement or any dispute relating to the Project and/or Work is the 26th JDC in the Parish of Bossier, State of Louisiana.

§ 13.3.4 The Owner shall record the signed Contract with the Owner (A101) and the Bonds in the office of the Clerk of Court, 26th Judicial District Court for the Parish of Bossier and provide the recordation information to the Contractor and the Architect.

§ 13.4 Tests and Inspections

§ 13.4.1 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. Unless otherwise provided, the Contractor shall make arrangements for inspections and approvals with the appropriate public authority and pay the applicable permit fees. The Contractor based on the requirements of the Owner's testing laboratory or entity and applicable public authority shall provide a testing schedule and give the Architect and the Owner prior timely notice of when and where tests and inspections are to be made so that the Architect and Owner may be present for such procedures. The Owner shall bear costs of tests, inspections, or approvals that do not become requirements until after bids are received or negotiations concluded. The Owner shall directly arrange and pay for tests, inspections, or approvals where building codes or applicable laws or regulations so require.

§ 13.4.2 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 13.4.1, the Architect will, upon written authorization from the Owner, instruct the Contractor to upon notice from the Architect the Owner will make arrangements for such additional testing, inspection, or approval, by an entity acceptable to the Owner, and the approval required. The Contractor shall give timely notice to the Architect and the Owner's representative of when and where tests and inspections are to be made so that the Architect and Owner's representative may be present for such procedures. Such costs, except as provided in Section 13.4.3, shall be at the Owner's expense.

§ 13.4.3 If procedures for testing, inspection, or approval under Sections 13.4.1 and 13.4.2 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, and expenses of the Owner's testing laboratory or entity, shall be at the Contractor's expense.

§ 13.4.4 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.

§ 13.4.5 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.

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

§ 13.5 Interest

Payments due and unpaid under the Contract Documents shall bear interest from the date payment is due at the rate the parties 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, no interest.

§ 13.6 PRECONSTRUCTION, PROGRESS AND COORDINATION MEETINGS

§ 13.6.1 A Pre-Construction meeting shall be held prior to the Notice to Proceed. The following shall be in attendance: Owner, Architect and its Consultants, Contractor and Superintendent, major Subcontractors, and representatives of separate Contractors, when applicable. The Contractor shall submit to the Architect and the Owner's representative prior to or at the preconstruction meeting the following: (1) list of major Subcontractors and their phone numbers, (2) a list of Subcontractors' Superintendent and Project Manager with 24-hour phone numbers, (3) (CPM) Construction Progress Schedule both in the written and electronic formats (both native and pdf) submittal schedule, and (4) Schedule of Values.

§ 13.6.2 Progress and coordination meetings will be held monthly or more often as designated by the Owner or Architect on site or as changed in writing by the Owner's representative or Architect. The Contractor shall distribute minutes of each meeting to all participants within seven (7) days of each meeting. The following are expected to attend: The Contractor represented by its Project Manager or principal, the Contractor's Project Superintendent, the Sub-contractors, and material suppliers requested by the Owner's representative or Architect.

ARTICLE 14 TERMINATION OR SUSPENSION OF THE CONTRACT

§ 14.1 Termination by the Contractor

§ 14.1.1 The Contractor may terminate the Contract if all of the Work is stopped for a period of 30 consecutive days through no act or fault of the Contractor, a Subcontractor, a Sub-subcontractor, their agents or employees, or any other persons or entities performing portions of the Work, 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 reasonable evidence as required by Section 2.2.~~

§ 14.1.2 The Contractor may terminate the Contract if, through no act or fault of the Contractor, a Subcontractor, a Sub-subcontractor, their agents or employees, or any other persons or entities performing portions of the Work, 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' notice to the Owner and Architect, terminate the Contract and recover from the Owner payment for Work executed, as well as reasonable overhead and profit on Work not executed, as to the portion of the Work that was installed, performed and/or stored on the Project site and costs incurred by reason of such termination. The Contractor shall not be entitled nor allowed consequential damages or loss of profit or overhead or attorney fees for any portion of the Work of the Contract that has not been performed.

§ 14.1.4 If the Work is stopped for a period of 60 consecutive days through no act or fault of the Contractor, a Subcontractor, a Sub-subcontractor, or their agents or employees or any other persons or entities performing portions of the Work 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' 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 or suppliers in accordance with the respective agreements between the Contractor and the Subcontractors or suppliers;
- .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; ~~Documents; or~~
- .5 fails to complete the Punch List within the time as specified.

§ 14.2.2 When any of the reasons described in Section 14.2.1 exist, and upon certification by the Architect that sufficient cause exists to justify such action, the Owner 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' 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 or for one or more sites of a multi-site 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. Termination by the Owner shall not suspend assessment of liquidated damages against the Contractor or Surety.

§ 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 under 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 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 Owner shall pay the Contractor for Work properly executed; costs incurred by reason of the termination, including costs attributable to termination of Subcontracts; and the termination fee, if any, set forth in the Agreement. The Contractor is not entitled to recover consequential damages nor attorney fees.

ARTICLE 15 CLAIMS AND DISPUTES

§ 15.1 Claims

§ 15.1.1 Definition

A Claim is a written demand or assertion signed by one of the parties seeking, as a matter of right, payment of money, a change in the Contract Time, 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. This Section 15.1.1 does not require the Owner to file a Claim in order to impose liquidated damages in accordance with the Contract Documents. Comments made at progress meetings, walk throughs, inspections, voice mails and other communications do not meet the requirements of a notice of a claim.

§ 15.1.2 Time Limits on Claims

The Owner and Contractor shall commence all Claims and causes of action against the other and arising out of or related to the Contract, whether in contract, tort, breach of warranty or otherwise, in accordance with the requirements of the binding dispute resolution method selected in the Agreement and within the period specified by applicable law; ~~but in any case not more than 10 years after the date of Substantial Completion of the Work.~~ law. The Owner and Contractor waive all Claims and causes of action not commenced in accordance with this ~~Section 15.1.2.~~ Section 15.1.2 and La. R.S. 38:2189.

§ 15.1.3 Notice of Claims

§ 15.1.3.1 Claims by either the Owner or Contractor, where the condition giving rise to the Claim is first discovered prior to expiration of the period for correction of the Work set forth in Section 12.2.2, shall be initiated by 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 under this Section 15.1.3.1 shall 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. The Architect may provide a written decision to the Contractor and the Owner within 21 days of receipt of the Claim. The Architect may (1) approve the Claim, (2) reject the Claim in whole or part, or (3) suggest a compromise. The Architect's decision is binding on the parties but subject to mediation and/or litigation by any party. A Reservation of Rights and similar stipulations shall not be recognized under this Contract as having any effect. A party must make a claim as defined herein within the time limits provided. A written decision of the Architect is required as a condition precedent to mediation or litigation, unless 21 days have passed after claim has been referred to the Architect with no decision having been rendered by the Architect.

§ 15.1.3.2 Claims by either the Owner or Contractor, where the condition giving rise to the Claim is first discovered after expiration of the period for correction of the Work set forth in Section 12.2.2, shall be initiated by notice to the other party. In such event, no decision by the Initial Decision Maker is required.

§ 15.1.4 Continuing Contract Performance

§ 15.1.4.1 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.

§ 15.1.4.2 The Contract Sum and Contract Time shall be adjusted in accordance with the Initial Decision Maker's decision, subject to the right of either party to proceed in accordance with this Article 15. The Architect will issue Certificates for Payment in accordance with the decision of the Initial Decision Maker.

§ 15.1.5 Claims for Additional Cost

If the Contractor wishes to make a Claim for an increase in the Contract Sum, notice as provided in Section 15.1.3 shall be given before proceeding to execute the portion of the Work that is the subject of the Claim. Prior notice is not required for Claims relating to an emergency endangering life or property arising under Section 10.4.

§ 15.1.6 Claims for Additional Time

§ 15.1.6.1 If the Contractor wishes to make a Claim for an increase in the Contract Time, notice as provided in Section 15.1.3 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.

§ 15.1.6.2 If adverse weather conditions at the Project Site or unsuitable ground 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, prevented the execution of any major items of Work on the site, and had an adverse effect on the scheduled construction. Contractor shall anticipate and include in its construction schedule, rain days due to adverse weather conditions in accordance with the table below. An adverse weather day is defined as a day when rainfall at the Project site exceeds 0.50 inches during a 24-hour period, or temperatures that do not rise above that required for the day's construction activity, if such temperature requirement is specified or accepted as standard industry practice, or sustained wind in excess of twenty-five (25) m.p.h., and prevents proceeding with execution of any major items of Work for 5 continuous hours of the day or 65 percent of the normal working day. The Contract Time already considers the following as reasonably anticipated days of adverse weather monthly and are presented for informational purposes only:

January	11 days	May	5 days	September	4 days
February	10 days	June	6 days	October	3 days
March	8 days	July	6 days	November	5 days
April	7 days	August	5 days	December	8 days

The Contractor's request will be considered only for the scheduled workdays over the above stated allowable number of days. The Contract is on a calendar basis. In no case shall an increase in the Contract Time due to weather be a cause for an increase in the Contract Sum. The time stipulated for Substantial Completion of the Work is to include the anticipated delays due to normal adverse weather conditions for the months encompassed in the Project duration which number of days are stated above. Contractor shall not be allowed to make a Claim for Additional Time due to weather delays until all such weather delays exceed the TOTAL reasonable anticipated adverse weather delays for the entire contract duration stated above.

§ 15.1.6.3 If the Contractor wishes to make a Claim for an increase in the Contract Time, written notice as provided herein shall be given. Contractor's first Claim for Additional Time due to adverse weather may be submitted only after the total adverse weather days exceed the allowable days as stated in Section 15.1.6.2 above. The claim must be submitted within seven (7) calendar days of the end of the month in which the cumulative total is first exceeded and is fully document for the cumulative total of adverse weather delays resulting in the total exceeded allowed days. Thereafter, Contractor shall submit any such claim for additional time due to adverse weather monthly within seven (7) calendar days of the end of the month. Adverse weather conditions on a scheduled workday shall only result in claims for additional time and an adjustment in the Contract Time only. Adverse weather delay days will not be granted for weekends or holidays. A claim for an increase in the Contract Time will only be considered for critical path activities, as identified on approved baseline schedule.

§ 15.1.6.4 If unsuitable ground conditions are the result of Contractor's failure to properly grade and/or maintain the grounds, no additional time shall be granted.

§ 15.1.7 Waiver of 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 15.1.7 shall be deemed to preclude assessment of liquidated damages, when applicable, in accordance with the requirements of the Contract Documents.

§ 15.2 Initial Decision

§ 15.2.1 Claims, excluding those where the condition giving rise to the Claim is first discovered after expiration of the period for correction of the Work set forth in Section 12.2.2 or arising under Sections 10.3, 10.4, and 11.5, 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. If an initial decision has not been rendered within ~~30-21~~ days after the Claim has been referred to the Initial Decision Maker, the party asserting the Claim may demand mediation ~~and binding dispute resolution~~ without a 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 (Architect) will review Claims and within ~~ten-21~~ 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 compromise.~~

§ 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 the 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 receipt of an initial decision, demand ~~in writing that the other party file for mediation. If such a demand is made and the party receiving the demand fails to file for mediation within 30 days after receipt thereof, 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 15.1.7, shall be subject to mediation as a condition precedent to ~~binding dispute resolution; filing a lawsuit.~~

§ 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 Mediation Service with offices in the Parish of Bossier or Parish of Caddo. 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 Either party may, within 30 days from the date that mediation has been concluded without resolution of the dispute or 60 days after mediation has been demanded without resolution of the dispute, ~~demand in writing that the other party file for binding dispute resolution. If such a demand is made and the party receiving the demand fails to file for binding dispute resolution within 60 days after receipt thereof, then both parties waive their rights to binding dispute resolution proceedings with respect to the initial decision; file a lawsuit.~~

§ 15.3.4 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; Bossier, Louisiana unless the parties agree otherwise.~~ 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. The Arbitration shall be conducted in the place where the Project is located, ~~unless another location is mutually agreed upon.~~ 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 Subject to the rules of the American Arbitration Association or other applicable arbitration rules, either party may consolidate an arbitration conducted under this Agreement with any other arbitration. ~~Either party may consolidate a mediation or lawsuit any other mediation or lawsuit 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). Law permits consolidation.

§ 15.4.4.2 Subject to the rules of the American Arbitration Association or other applicable arbitration rules, either party 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.

ARTICLE 16 EQUAL OPPORTUNITY

§ 16.1 Contractor and all Sub-contractors shall not discriminate against any employee or applicant for employment because of race, color, sex, or national origin. The Contractor shall take affirmative action to ensure that applicants are employed and that employees are treated during employment without regard to their race, religion, color, sex, or national origin. Such action shall include, but not 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.

§ 16.2 The Contract and all Sub-contractors shall in all solicitations or advertisement for employees place by them or on their behalf state that they qualified applicants will receive consideration for employment without regard to race, religion, sex, or national origin.

§ 16.3 Contractor shall identify in the Schedule of Values all Sub-contractors and suppliers that are Minority and Women Owned Business Enterprise (MWBES).

ARTICLE 17 VERIFICATION OF EMPLOYEES INVOLVED IN PUBLIC CONTRACT WORK

The Contractor shall comply with the provisions of La. R.S. 38:2212.10(C) and continue during the term of this contract to utilize a status verification system to verify the legal status of all new employees in the State of Louisiana or as otherwise required under the statute and to require all subcontractors to verify compliance with La. R.S. 38:2212.10C.

ARTICLE 18 NON-COLLUSION AFFIDAVIT

The Contractor shall execute a non-collusion affidavit as required by La. R. S. 38:2224.

§ 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 those of the Owner and Contractor under this Agreement.

Certification of Document's Authenticity

AIA® Document D401™ – 2003

I, Kenneth F. Sills, hereby certify, to the best of my knowledge, information and belief, that I created the attached final document simultaneously with this certification at 17:44:42 ET on 01/14/2021 under Order No. 3961841817 from AIA Contract Documents software and that in preparing the attached final document I made no changes to the original text of AIA® Document A201™ – 2017, General Conditions of the Contract for Construction, as published by the AIA in its software, other than changes shown in the attached final document by underscoring added text and striking over deleted text.

Kenneth F. Sills

(Signed)

Attorney

(Title)

January 14, 2021

(Dated)

SALES TAX EXEMPTION
SECTION 00800

1.1 Sales Tax Exemption

- A. Contractor is not required to pay any state or local sales or state or local use taxes on materials and equipment which are affixed and made a part of the real estate of the project or work which is permanently incorporated into the project or work (hereinafter referred to as ("applicable materials and equipment"). All purchases of applicable materials or equipment shall be made by the Contractor on behalf of and as the agent of the Bossier Parish School Board, (OWNER), a political subdivision of the State of Louisiana. No state and local sales and use taxes are owed on applicable materials and equipment under the provisions of ACT 1029 of the 1991 Regular Session – Louisiana Revised Statute 47:301(8) (C). OWNER will furnish Contractor a certificate on a form supplied by the Louisiana Department of Revenue and Taxation and/or local taxing authorities which certifies the OWNER is not required to pay such state or local sales and use taxes. Contractor shall furnish a copy of such certificate to all vendors or suppliers of the applicable materials and equipment. The OWNER agrees to indemnify Contractor against the payment of any state or local sales taxes which Contractor may be forced to pay on the purchase of applicable materials and equipment even after the submittal of exemption documentation with all applicable materials and equipment for the work. The Contractor shall pay all other taxes which are required to be paid regarding the work or the project or materials or equipment supplied or purchased by the Contractor for the work under this contract.

Any provisions of this contract, which are or may appear to be contrary to the provisions hereof are to be interpreted within the context of this section.

The OWNER will schedule a conference for the General Contractor, Subcontractors, and vendors and/or suppliers of the project after the acceptance of bids. The OWNER will coordinate with the General Contractor to establish the time and date of the conference.

Payment Requests for Tax Exempt Items: Payment requests for materials and equipment which are tax exempt in accordance with the paragraph above entitled "Sales Tax Exemption" shall be submitted separately (but at the same time) from progress payment requests. The "tax exempt" payment requests shall include a description of each item purchased, name of supplier, invoice number and date, and the cost of each item excluding taxes. The "Tax Exempt" payment requests shall not include any amount for Contractor's or subcontractor's labor. Copies of invoices shall be attached to the Progress Payment request.



BOSSIER PARISH SCHOOLS

BPS Engineer

(318) 549-7090

MAINTENANCE SUPERVISOR COORDINATION FOR THE BOSSIER PARISH SCHOOL BOARD

rev. June, 2022

The Maintenance Supervisor (MS) has been designated to collaborate with the Professional of Record (POR) and Program Manager (PM), if applicable, and assist with determining BPSB design standards and coordination of on-site conditions and utilities and participate in construction observation. The requirements for the (POR) and the Contractor communicating with the Maintenance Supervisor are defined below.

The Contractor shall:

1. Make available to MS or designee all areas on projects under construction.
2. Send copies of submittals to MS.
3. Send copies of daily reports to MS.
4. Send copies of Requests for Information (RFI) and Change proposals with supporting data to MS. MS reserves the right to request additional data regarding change proposals.
5. Copy MS with correspondence to the Professional of Record as appropriate.
6. Notify MS in writing, in addition to POR and PM, upon discovery of adverse existing conditions and site utility conflicts.

The Professional of Record (POR) shall:

1. Invite MS to meetings with Contractor.
2. Collaborate with MS to determine existing conditions and site utilities and scope of work during schematic design phase.
3. Receive MS review & comments on design development.
4. Copy MS with all correspondence to the contractor as appropriate.
5. Copy MS with all answered RFI.
6. Receive MS comments on Contractor submittals /change order requests prior to approval.
7. Copy MS with 1 copy of reviewed and stamped submittals and recommended change orders.
8. Copy MS on site visit / observation reports.
9. Notify MS immediately in writing upon discovery of adverse existing site conditions or utility conflicts.

MAINTENANCE SUPERVISOR COORDINATION

Page 2

rev. June, 2022

The Maintenance Supervisor (MS) shall:

1. Provide direction and input to the POR and PM on building systems, equipment and hardware standards.
2. Provide assistance to POR, PM and Contractor for determining existing conditions and site utilities beginning at schematic design phase.
3. Provide input to the POR and PM on shop drawing and change proposal submittals.
4. Review field changes and take corrective action for deficiencies in existing conditions and work beyond scope of contract.
5. Provide input to the POR and PM on RFI, if applicable.
6. Provide prompt notification to the POR and PM of possible non-conforming work items.

The Bossier Parish School Engineer shall:

1. Review correspondence, RFI, site reports and recommendations received from Contractor, POR, PM and MS.
2. Copy MS on correspondence to the Contractor and POR, as applicable.
3. Provide input to the POR on RFI, if applicable.
4. Receive recommendations from MS regarding Change proposals.
5. Copy MS with 1 copy of approved changes orders.
6. Approve applications for payment.

The Contractor reports to the Professional of Record, and receives directives from the Professional of Record.

The Maintenance Supervisor may discuss the project with the Contractor, the POR and the PM. The Maintenance Supervisor will not issue directives to the Contractor, but may advise the on-site superintendent of actions recommended to the POR, PM or BPSB, and participate in job site coordination of work as appropriate as the BPSB's agent and representative on-site.

The Professional of Record shall issue directives to the Contractor on behalf of the BPSB, according to contract authority, and will communicate with the Maintenance Supervisor as necessary to satisfy contract obligations.

The Bossier Parish School Engineer shall track and monitor all activities stated above and shall include Maintenance Supervisor and participate as appropriate in same.

SECTION 00 9000 - AVAILABLE PROJECT INFORMATION

PART 1 GENERAL

1.01 EXISTING CONDITIONS

- A. Certain information relating to existing surface and subsurface conditions and structures is available to bidders but will not be part of Contract Documents, as follows:
- B. Geotechnical Report: Entitled Geotechnical Investigation for Proposed Benton High School Wing Addition, Benton, Louisiana, dated December 3, 2025 by Anderson Engineering Consultants Inc., Job Number 17851.
 - 1. A copy of this report is available from the Architect upon request.
 - 2. This report identifies properties of below grade conditions and offers recommendations for the design of foundations, prepared primarily for the use of Architect.
 - 3. The recommendations described shall not be construed as a requirement of this Contract, unless specifically referenced in Contract Documents.
 - 4. This report, by its nature, cannot reveal all conditions that exist on the site. Should subsurface conditions be found to vary substantially from this report, changes in the design and construction of foundations will be made, with resulting credits or expenditures to the Contract Price accruing to Owner.

PART 2 PRODUCTS - NOT USED

PART 3 EXECUTION - NOT USED

END OF SECTION

SECTION 01 1000 - SUMMARY

PART 1 GENERAL

1.01 PROJECT

- A. Project Name: New Classroom / Tornado Shelter Addition for Benton High School.
- B. Owner's Name: Bossier Parish School Board.
- C. Architect's Name: Bledsoe Architects.
- D. The Project consists of the construction of a new classroom wing addition including tornado shelter.

1.02 CONTRACT DESCRIPTION

- A. Contract Type: A single prime contract based on a Stipulated Price as described in Document 00500 - Construction Agreement

1.03 OWNER OCCUPANCY

- A. Owner intends to continue to occupy all of the existing school building during the entire construction period.
- B. Cooperate with Owner to minimize conflict and to facilitate Owner's operations. Provide temporary protections for faculty and students as required.

1.04 CONTRACTOR USE OF SITE AND PREMISES

- A. Construction Operations: Limited to areas noted on Drawings.
 - 1. Locate and conduct construction activities in ways that will limit disturbance to site.
 - 2. Limit deliveries and debris removal to time between 4:00 PM and 7:00 AM.
- B. Arrange use of site and premises to allow:
 - 1. Owner occupancy.
 - 2. Use of site and premises by the public.
- C. Provide access to and from site as required by law and by Owner:
 - 1. Emergency Building Exits During Construction: Keep required exits required by code open during construction period.
 - 2. Do not obstruct roadways, sidewalks, or other public ways without permit.
- D. Existing building spaces may not be used for storage.
- E. Time Restrictions:
 - 1. Limit conduct of especially noisy exterior work to non-school hours.
- F. Utility Outages and Shutdown:
 - 1. Limit disruption of utility services to hours the building is unoccupied.
 - 2. Do not disrupt or shut down life safety systems, including but not limited to fire sprinklers and fire alarm system, without 24 hour notice to Owner and authorities having jurisdiction.

PART 2 PRODUCTS - NOT USED

PART 3 EXECUTION - NOT USED

END OF SECTION

SECTION 01 2000 - PRICE AND PAYMENT PROCEDURES

PART 1 GENERAL

1.01 SECTION INCLUDES

- A. Procedures for preparation and submittal of applications for progress payments.
- B. Documentation of changes in Contract Sum and Contract Time.
- C. Change procedures.
- D. Procedures for preparation and submittal of application for final payment.

1.02 RELATED REQUIREMENTS

- A. Section 00 5200 - Agreement Form: Contract Sum, retainages, payment period.
- B. Contract Type: A single prime contract based on a Stipulated Price as described in Document 00 500 - Construction Agreement.
- C. Section 00 700 - General Conditions: Additional requirements for progress payments, final payment, changes in the Work.

1.03 SCHEDULE OF VALUES

- A. Use Schedule of Values Form: AIA G703, edition stipulated in the Agreement.
- B. Electronic media printout including equivalent information will be considered in lieu of standard form specified; submit draft to Architect for approval.
- C. Forms filled out by hand will not be accepted.
- D. Submit Schedule of Values . within 15 days after date of Owner-Contractor Agreement.
- E. Format: Utilize the Table of Contents of this Project Manual. Identify each line item with number and title of the specification section. Identify site mobilization. Provide separate line items for labor and material cost on all categories in excess of \$10,000, or on those items where payment for stored material may be applicable.
- F. Break down mechanical and electrical categories using the Table of Contents of this Project Manual.
- G. Include separately from each line item, a direct proportional amount of Contractor's overhead and profit.
- H. Revise schedule to list approved Change Orders, with each Application For Payment.

1.04 APPLICATIONS FOR PROGRESS PAYMENTS

- A. Payment Period: Submit at intervals stipulated in the Agreement.
- B. Use Form AIA G702 and Form AIA G703, Continuation Sheet.
- C. Electronic media printout including equivalent information will be considered in lieu of standard form specified; submit sample to Architect for approval.
- D. Forms filled out by hand will not be accepted.
- E. For each item, provide a column for listing each of the following:
 - 1. Item Number.
 - 2. Description of work.
 - 3. Scheduled Values.
 - 4. Previous Applications.
 - 5. Work in Place and Stored Materials under this Application.
 - 6. Authorized Change Orders.
 - 7. Total Completed and Stored to Date of Application.
 - 8. Percentage of Completion.
 - 9. Balance to Finish.
 - 10. Retainage.
- F. Execute certification by signature of authorized officer.
- G. Use data from approved Schedule of Values. Provide dollar value in each column for each line item for portion of work performed and for stored products.

- H. List each authorized Change Order as a separate line item, listing Change Order number and dollar amount as for an original item of work.
- I. Submit four hard-copies of each Application for Payment.
- J. Include the following with the application:
 - 1. Construction progress schedule, revised and current as specified in Section 01 3000.
 - 2. Insurance certificates related to off-site stored products (if allowed).
- K. When Architect requires substantiating information, submit data justifying dollar amounts in question.

1.05 MODIFICATION PROCEDURES

- A. For minor changes not involving an adjustment to the Contract Sum or Contract Time, Architect will issue instructions directly to Contractor.
- B. For other required changes, Architect will issue a document signed by Owner instructing Contractor to proceed with the change, for subsequent inclusion in a Change Order.
 - 1. The document will describe the required changes and will designate method of determining any change in Contract Sum or Contract Time.
 - 2. Promptly execute the change.
- C. For changes for which advance pricing is desired, Architect will issue a document that includes a detailed description of a proposed change with supplementary or revised drawings and specifications, a change in Contract Time for executing the change . Contractor shall prepare and submit a fixed price quotation within 7 days.
- D. Contractor may propose a change by submitting a request for change to Architect, describing the proposed change and its full effect on the work, with a statement describing the reason for the change, and the effect on the Contract Sum and Contract Time with full documentation. Document any requested substitutions in accordance with Section 01 6000.
- E. Computation of Change in Contract Amount: As specified in the Agreement and Conditions of the Contract.
 - 1. For change requested by Architect for work falling under a fixed price contract, the amount will be based on Contractor's price quotation.
 - 2. For change requested by Contractor, the amount will be based on the Contractor's request for a Change Order as approved by Architect.
 - 3. For change ordered by Architect without a quotation from Contractor, the amount will be determined by Architect based on the Contractor's substantiation of costs as specified for Time and Material work.
- F. Substantiation of Costs: Provide full information required for evaluation.
 - 1. Provide the following data:
 - a. Quantities of products, labor, and equipment.
 - b. Taxes, insurance, and bonds.
 - c. Overhead and profit.
 - d. Justification for any change in Contract Time.
 - e. Credit for deletions from Contract, similarly documented.
 - 2. For Time and Material work, submit itemized account and supporting data after completion of change, within time limits indicated in the Conditions of the Contract.
- G. Execution of Change Orders: Architect will issue Change Orders for signatures of parties as provided in the Conditions of the Contract.
- H. After execution of Change Order, promptly revise Schedule of Values and Application for Payment forms to record each authorized Change Order as a separate line item and adjust the Contract Sum.
- I. Promptly revise progress schedules to reflect any change in Contract Time, revise sub-schedules to adjust times for other items of work affected by the change, and resubmit.
- J. Promptly enter changes in Project Record Documents.

1.06 APPLICATION FOR FINAL PAYMENT

- A. Prepare Application for Final Payment as specified for progress payments, identifying total adjusted Contract Sum, previous payments, and sum remaining due.

- B. Application for Final Payment will not be considered until the following have been accomplished:
1. All closeout procedures specified in Section 01 7000.
 2. Evidence of completion of Project Closeout requirements.
 3. Insurance certificates for products and completed operations where required and proof that taxes, fees, and similar obligations were paid..
 4. Updated final statement, accounting for final changes to the Contract Sum..
 5. Clear Lien Certificate has been recorded..

PART 2 PRODUCTS - NOT USED

PART 3 EXECUTION - NOT USED

END OF SECTION

SECTION 01 2500 - SUBSTITUTION PROCEDURES

PART 1 GENERAL

1.01 SECTION INCLUDES

- A. Procedural requirements for proposed substitutions.

1.02 RELATED REQUIREMENTS

- A. Section 01 6000 - Product Requirements: Fundamental product requirements, product options, delivery, storage, and handling.

1.03 DEFINITIONS

- A. Substitutions: Changes from Contract Documents requirements proposed by Contractor to materials, products, assemblies, and equipment.
 - 1. Substitutions for Convenience: Proposed due to possibility of offering substantial advantage to the Project.
 - a. Substitution requests offering advantages solely to the Contractor will not be considered.

1.04 REFERENCE STANDARDS

- A. CSI/CSC Form 1.5C - Substitution Request (During the Bidding/Negotiating Stage); Current Edition.

PART 2 PRODUCTS - NOT USED

PART 3 EXECUTION

3.01 GENERAL REQUIREMENTS

- A. A Substitution Request for products, assemblies, materials, and equipment constitutes a representation that the submitter:
 - 1. Has investigated proposed product and determined that it meets or exceeds the quality level of the specified product, equipment, assembly, or system.
 - 2. Agrees to provide the same warranty for the substitution as for the specified product.
 - 3. Agrees to provide same or equivalent maintenance service and source of replacement parts, as applicable.
 - 4. Agrees to coordinate installation and make changes to other work that may be required for the work to be complete, with no additional cost to Owner.
 - 5. Waives claims for additional costs or time extension that may subsequently become apparent.
 - 6. Agrees to reimburse Owner and Architect for review or redesign services associated with re-approval by authorities (when required).
- B. Document each request with complete data substantiating compliance of proposed substitution with Contract Documents. Burden of proof is on proposer.
 - 1. Note explicitly any non-compliant characteristics.
- C. Content: Include information necessary for tracking the status of each Substitution Request, and information necessary to provide an actionable response.
 - 1. No specific form is required. Contractor's Substitution Request documentation must include the following:
 - a. Project Information:
 - 1) Official project name and number.
 - 2) Owner's, Architect's, and Contractor's names.
 - b. Substitution Request Information:
 - 1) Indication of whether the substitution is for cause or convenience.
 - 2) Issue date.

- 3) Reference to particular Contract Document(s) specification section number, title, and article/paragraph(s).
 - 4) Description of Substitution.
 - 5) Differences between proposed substitution and specified item.
 - 6) Description of how proposed substitution affects other parts of work.
 - c. Attached Comparative Data: Provide point-by-point, side-by-side comparison addressing essential attributes specified, as appropriate and relevant for the item:
 - 1) Physical characteristics.
 - 2) In-service performance.
 - 3) Expected durability.
 - 4) Visual effect.
 - 5) Sustainable design features.
 - 6) Warranties.
 - 7) Other salient features and requirements.
 - 8) Include, as appropriate or requested, the following types of documentation:
 - a) Product Data:
 - b) Samples.
 - c) Certificates, test, reports or similar qualification data.
 - d) Drawings, when required to show impact on adjacent construction elements.
 - d. Impact of Substitution:
 - 1) Savings to Owner for accepting substitution.
 - 2) Change to Contract Time due to accepting substitution.
- D. Limit each request to a single proposed substitution item.
 - 1. Submit an electronic document, combining the request form with supporting data into single document.

3.02 SUBSTITUTION PROCEDURES DURING PROCUREMENT

- A. Submittal Time Restrictions:
 - 1. Architect will consider requests for substitutions only if submitted at least 7 days prior to the date for receipt of bids.
 - 2. No substitutions will be permitted after the receipt of bids. Use only materials and equipment specified unless previously approved in an addendum.

3.03 RESOLUTION

- A. Architect may request additional information and documentation prior to rendering a decision. Provide this data in an expeditious manner.
- B. Architect will notify Contractor in writing of decision to accept or reject request. Accepted substitutions will be published in Addenda.

END OF SECTION

SECTION 01 3000 - ADMINISTRATIVE REQUIREMENTS

PART 1 GENERAL

1.01 SECTION INCLUDES

- A. General administrative requirements.
- B. Electronic document submittal service.
- C. Preconstruction meeting.
- D. Progress meetings.
- E. Submittals for review, information, and project closeout.
- F. Requests for Information (RFI) procedures.
- G. Submittal procedures.

1.02 RELATED REQUIREMENTS

- A. Section 00 700 - General Conditions: Dates for applications for payment.
- B. Section 01 3216 - Construction Progress Schedule: Form, content, and administration of schedules.
- C. Section 01 6000 - Product Requirements: General product requirements.
- D. Section 01 7000 - Execution and Closeout Requirements: Additional coordination requirements.
- E. Section 01 7800 - Closeout Submittals: Project record documents; operation and maintenance data; warranties and bonds.
- F. Section 01 9113 - General Commissioning Requirements: Additional procedures for submittals relating to commissioning.

1.03 GENERAL ADMINISTRATIVE REQUIREMENTS

- A. Comply with requirements of Section 01 7000 - Execution and Closeout Requirements for coordination of execution of administrative tasks with timing of construction activities.

PART 2 PRODUCTS - NOT USED

PART 3 EXECUTION

3.01 ELECTRONIC DOCUMENT SUBMITTAL SERVICE

- A. All documents transmitted for purposes of administration of the contract are to be in electronic (PDF) format, as appropriate to the document, and transmitted via an Internet-based submittal service that receives, logs and stores documents, provides electronic stamping and signatures, and notifies addressees via email.
 - 1. Besides submittals for review, information, and closeout, this procedure applies to Requests for Information (RFIs), progress documentation, contract modification documents (e.g. supplementary instructions, change proposals, change orders), applications for payment, field reports and meeting minutes, Contractor's correction punchlist, and any other document any participant wishes to make part of the project record.
 - 2. Contractor and Architect are required to use this service.
 - 3. It is Contractor's responsibility to submit documents in allowable format.
 - 4. Subcontractors and Architect's consultants will be permitted to use the service at no extra charge.
 - 5. Users of the service need an email address, internet access, and PDF review software that includes ability to mark up and apply electronic stamps (such as Adobe Acrobat, www.adobe.com, or Bluebeam PDF Revu, www.bluebeam.com), unless such software capability is provided by the service provider.
 - 6. Paper document transmittals will not be reviewed; emailed electronic documents will not be reviewed.
 - 7. All other specified submittal and document transmission procedures apply, except that electronic document requirements do not apply to samples or color selection charts.

- B. Cost: The cost of the service will be paid by the Architect.
- C. Submittal Service: The selected service is:
 - 1. Newforma ConstructEx: www.newforma.com/products/constructex/#sle.
- D. Training: One, one-hour, web-based training session will be arranged for all participants, with representatives of Architect and Contractor participating; further training is the responsibility of the user of the service.
- E. Project Closeout: Architect will determine when to terminate the service for the project and is responsible for obtaining archive copies of files for Owner.

3.02 PRECONSTRUCTION MEETING

- A. Schedule meeting after Notice of Award.
- B. Attendance Required:
 - 1. Owner's representative.
 - 2. Architect.
 - 3. Contractor.
 - 4. All MEP subcontractors.
 - 5. Any subcontractors or suppliers requested by the General Contractor..
- C. Agenda:
 - 1. Execution of Owner-Contractor Agreement.
 - 2. Submission of executed bonds and insurance certificates.
 - 3. Submission of list of subcontractors, schedule of values, and progress schedule.
 - 4. Designation of personnel representing the parties, Contractor's Project Manager, Superintendent, Owner's representative and Project Architect.
 - 5. Procedures and processing of field decisions, submittals, substitutions, applications for payments, proposal request, Change Orders, and Contract closeout procedures.
 - 6. Scheduling.
 - 7. Scheduling activities of testing laboratory.
 - 8. Contractor use of site, including security and protective measures.
 - 9. Review of BPSB and school policies and coordination with construction activities.
- D. Contractor shall record minutes and distribute copies within three days after meeting to participants, with two copies to Architect, Owner, participants, and those affected by decisions made.

3.03 PROGRESS MEETINGS

- A. Schedule and administer meetings throughout progress of the work at maximum bi-monthly intervals.
- B. Make arrangements for meetings, prepare agenda with copies for participants, preside at meetings.
- C. Attendance Required:
 - 1. Contractor.
 - 2. Owner.
 - 3. Architect.
 - 4. Special consultants.
 - 5. Contractor's superintendent.
 - 6. Major subcontractors.
- D. Agenda:
 - 1. Review minutes of previous meetings and any outstanding items.
 - 2. Review of work progress.
 - 3. Field observations, problems, and decisions.
 - 4. Identification of problems that impede, or will impede, planned progress.
 - 5. Review of submittals schedule and status of submittals.
 - 6. Review of RFIs log and status of responses.
 - 7. Maintenance of progress schedule.
 - 8. Corrective measures to regain projected schedules.
 - 9. Planned progress during succeeding work period.
 - 10. Maintenance of quality and work standards.
 - 11. Effect of proposed changes on progress schedule and coordination.

12. Other business relating to work.
- E. Contractor shall record minutes and distribute copies within five days after meeting to participants, with copies to Architect, Owner, participants, and those affected by decisions made.
- F. Failure to accurately record and distribute meeting minutes in a timely manner may result in delay of processing of applications for payment.

3.04 REQUESTS FOR INFORMATION (RFI)

- A. Definition: A request seeking one of the following:
 1. An interpretation, amplification, or clarification of some requirement of Contract Documents arising from inability to determine from them the exact material, process, or system to be installed; or when the elements of construction are required to occupy the same space (interference); or when an item of work is described differently at more than one place in Contract Documents.
 2. A resolution to an issue which has arisen due to field conditions and affects design intent.
- B. Whenever possible, request clarifications at the next appropriate project progress meeting, with response entered into meeting minutes, rendering unnecessary the issuance of a formal RFI.
- C. Preparation: Prepare an RFI immediately upon discovery of a need for interpretation of Contract Documents. Failure to submit a RFI in a timely manner is not a legitimate cause for claiming additional costs or delays in execution of the work.
 1. Prepare a separate RFI for each specific item.
 - a. Review, coordinate, and comment on requests originating with subcontractors and/or materials suppliers.
 - b. Do not forward requests which solely require internal coordination between subcontractors.
 2. Prepare using software provided by the Electronic Document Submittal Service.
 3. Combine RFI and its attachments into a single electronic file.
- D. Reason for the RFI: Prior to initiation of an RFI, carefully study all Contract Documents to confirm that information sufficient for their interpretation is definitely not included.
 1. Include in each request Contractor's signature attesting to good faith effort to determine from Contract Documents information requiring interpretation.
 2. Unacceptable Uses for RFIs: Do not use RFIs to request the following:
 - a. Approval of submittals (use procedures specified elsewhere in this section).
 - b. Approval of substitutions (see Section - 01 6000 - Product Requirements)
 - c. Changes that entail change in Contract Time and Contract Sum (comply with provisions of the Conditions of the Contract).
 - d. Different methods of performing work than those indicated in the Contract Drawings and Specifications (comply with provisions of the Conditions of the Contract).
 3. Frivolous RFIs: Requests regarding information that is clearly indicated on, or reasonably inferable from, Contract Documents, with no additional input required to clarify the question. They will be returned without a response.
- E. Content: Include identifiers necessary for tracking the status of each RFI, and information necessary to provide an actionable response.
 1. Official Project name and number.
 2. Owner's, Architect's, and Contractor's names.
 3. Discrete and consecutive RFI number, and descriptive subject/title.
 4. Issue date, and requested reply date.
 5. Reference to particular Contract Document(s) requiring additional information/interpretation. Identify pertinent drawing and detail number and/or specification section number, title, and paragraph(s).
 6. Annotations: Field dimensions and/or description of conditions which have engendered the request.
 7. Contractor's suggested resolution: A written and/or a graphic solution, to scale, is required in cases where clarification of coordination issues is involved, for example; routing, clearances, and/or specific locations of work shown diagrammatically in Contract Documents. If applicable, state the likely impact of the suggested resolution on Contract Time or the Contract Sum.

- F. Attachments: Include sketches, coordination drawings, descriptions, photos, submittals, and other information necessary to substantiate the reason for the request.
- G. RFI Log: Prepare and maintain a tabular log of RFIs for the duration of the project.
 - 1. Indicate current status of every RFI. Update log promptly and on a regular basis.
 - 2. Note dates of when each request is made, and when a response is received.
 - 3. Highlight items requiring priority or expedited response.
- H. Review Time: Architect will respond and return RFIs to Contractor within seven calendar days of receipt. For the purpose of establishing the start of the mandated response period, RFIs received after 12:00 noon will be considered as having been received on the following regular working day.
 - 1. Response period may be shortened or lengthened for specific items, subject to mutual agreement, and recorded in a timely manner in progress meeting minutes.
- I. Responses: Content of answered RFIs will not constitute in any manner a directive or authorization to perform extra work or delay the project. If in Contractor's belief it is likely to lead to a change to Contract Sum or Contract Time, promptly issue a notice to this effect, and follow up with an appropriate Change Order request to Owner.
 - 1. Response may include a request for additional information, in which case the original RFI will be deemed as having been answered, and an amended one is to be issued forthwith. Identify the amended RFI with an R suffix to the original number.
 - 2. Do not extend applicability of a response to specific item to encompass other similar conditions, unless specifically so noted in the response.
 - 3. Upon receipt of a response, promptly review and distribute it to all affected parties, and update the RFI Log.
 - 4. Notify Architect within seven calendar days if an additional or corrected response is required by submitting an amended version of the original RFI, identified as specified above.

3.05 SUBMITTALS FOR REVIEW

- A. When the following are specified in individual sections, submit them for review:
 - 1. Product data.
 - 2. Shop drawings.
 - 3. Samples for selection.
 - 4. Samples for verification.
- B. Submit to Architect for review for the limited purpose of checking for compliance with information given and the design concept expressed in Contract Documents.
- C. Samples will be reviewed for aesthetic, color, or finish selection.
- D. After review, provide copies and distribute in accordance with SUBMITTAL PROCEDURES article below and for record documents purposes described in Section 01 7800 - Closeout Submittals.

3.06 SUBMITTALS FOR INFORMATION

- A. When the following are specified in individual sections, submit them for information:
 - 1. Design data.
 - 2. Certificates.
 - 3. Test reports.
 - 4. Inspection reports.
 - 5. Manufacturer's instructions.
 - 6. Manufacturer's field reports.
 - 7. Other types indicated.
- B. Submit for Architect's knowledge as contract administrator or for Owner.

3.07 SUBMITTALS FOR PROJECT CLOSEOUT

- A. Submit Correction Punch List for Substantial Completion.
- B. Submit Final Correction Punch List for Substantial Completion.
- C. When the following are specified in individual sections, submit them at project closeout in compliance with requirements of Section 01 7800 - Closeout Submittals:

1. Project record documents.
 2. Operation and maintenance data.
 3. Warranties.
 4. Bonds.
 5. Other types as indicated.
- D. Submit for Owner's benefit during and after project completion.

3.08 NUMBER OF COPIES OF SUBMITTALS

- A. Electronic Documents: Submit one electronic copy in PDF format; an electronically-marked up file will be returned. Create PDFs at native size and right-side up; illegible files will be rejected.
- B. Samples: Submit the number specified in individual specification sections; one of which will be retained by Architect.
1. Upload transmittal with a PDF copy of the submitted samples to the electronic document service. This submittal document will be reviewed and stamped by the Architect with the appropriate marking and comments for the sample.
 2. Deliver the actual physical samples to the Architect for review.
 3. After review, produce duplicates for use on-site for verification of finishes during installation.
 4. Retained samples will not be returned to Contractor unless specifically so stated.

3.09 ELECTRONIC SUBMITTAL PROCEDURES

- A. General Requirements:
1. Use a single transmittal for related items. Do not separate related items (ie. ceiling tile & ceiling grid). Provide a single submittal for related items.
 2. Submit separate packages of submittals for review and submittals for information, when included in the same specification section.
 3. Transmit using approved form.
 - a. Use form generated by Electronic Document Submittal Service software.
 4. Sequentially identify each item. For revised submittals use original number and a sequential numerical suffix.
 5. Identify: Project; Contractor; subcontractor or supplier; pertinent drawing and detail number; and specification section number and article/paragraph, as appropriate on each copy.
 6. Apply Contractor's stamp, signed or initialed certifying that review, approval, verification of products required, field dimensions, adjacent construction work, and coordination of information is in accordance with the requirements of the work and Contract Documents.
 - a. Submittals from sources other than the Contractor, or without Contractor's stamp will not be acknowledged, reviewed, or returned.
 7. Deliver each submittal on date noted in submittal schedule, unless an earlier date has been agreed to by all affected parties, and is of the benefit to the project.
 - a. Upload submittals in electronic form to Electronic Document Submittal Service website.
 8. Schedule submittals to expedite the Project, and coordinate submission of related items.
 - a. For each submittal for review, allow 15 days excluding delivery time to and from the Contractor.
 9. Identify variations from Contract Documents and product or system limitations that may be detrimental to successful performance of the completed work.
 10. Provide space for Contractor and Architect review stamps.
 11. When revised for resubmission, identify all changes made since previous submission.
 12. Distribute reviewed submittals. Instruct parties to promptly report inability to comply with requirements.
- B. Product Data Procedures:
1. Submit only information required by individual specification sections.
 2. Collect required information into a single submittal.
 3. Submit concurrently with related shop drawing submittal.
 4. Do not submit (Material) Safety Data Sheets for materials or products.
- C. Shop Drawing Procedures:

1. Prepare accurate, drawn-to-scale, original shop drawing documentation by interpreting Contract Documents and coordinating related work.
2. Do not reproduce Contract Documents to create shop drawings.
3. Generic, non-project-specific information submitted as shop drawings do not meet the requirements for shop drawings.

3.10 SUBMITTAL REVIEW

- A. Submittals for Review: Architect will review each submittal, and approve, or take other appropriate action.
- B. Submittals for Information: Architect will acknowledge receipt and review. See below for actions to be taken.
- C. Architect's actions will be reflected by marking each returned submittal using virtual stamp on electronic submittals.
 1. Notations may be made directly on submitted items and/or listed on appended Submittal Review cover sheet.
- D. Architect's and consultants' actions on items submitted for review:
 1. Authorizing purchasing, fabrication, delivery, and installation:
 - a. "No Exceptions Taken", or language with same legal meaning.
 - b. "Exceptions Taken as Noted", or language with same legal meaning.
 - 1) Resubmission is not required.
 2. Not Authorizing fabrication, delivery, and installation:
 - a. "Revise and Resubmit".
 - 1) Resubmit revised item, with review notations acknowledged and incorporated.
 - b. "Rejected".
 - 1) Submit item complying with requirements of Contract Documents.
- E. Architect's and consultants' actions on items submitted for information:
 1. Items for which no action was taken:
 - a. "Received" - to notify the Contractor that the submittal has been received for record only.
 2. Items for which action was taken:
 - a. "Reviewed" - no further action is required from Contractor.

END OF SECTION

SECTION 01 3216 - CONSTRUCTION PROGRESS SCHEDULE

PART 1 GENERAL

1.01 SECTION INCLUDES

- A. Preliminary schedule.
- B. Construction progress schedule, bar chart type.

1.02 RELATED SECTIONS

- A. Section 01 1000 - Summary: Work sequence.

1.03 REFERENCE STANDARDS

- A. AGC (CPSM) - Construction Planning and Scheduling Manual; 2004.
- B. M-H (CPM) - CPM in Construction Management - Project Management with CPM; 2015.

1.04 SUBMITTALS

- A. Within 10 days after date of Agreement, submit preliminary schedule.
- B. Within 20 days after review of preliminary schedule, submit draft of proposed complete schedule for review.
 - 1. Confirm that major contractors have reviewed and accepted proposed schedule.
- C. Submit updated schedule with each Application for Payment.
- D. Submit in PDF format.

1.05 SCHEDULE FORMAT

- A. Listings: In chronological order according to the start date for each activity. Identify each activity with the applicable specification section number.
- B. Multiples of legal (11x14 inches) or tabloid (11x17 inches).
- C. Scale and Spacing: To allow for notations and revisions.

PART 2 PRODUCTS - NOT USED

PART 3 EXECUTION

3.01 PRELIMINARY SCHEDULE

- A. Prepare preliminary schedule in the form of a horizontal bar chart.

3.02 CONTENT

- A. Show complete sequence of construction by activity, with dates for beginning and completion of each element of construction.
- B. Identify each item by specification section number.
- C. Provide sub-schedules to define critical portions of the entire schedule.
- D. Show accumulated percentage of completion of each item, and total percentage of Work completed, as of the first day of each month.
- E. Include milestone events such as testing, AHJ inspections, partial occupancy of phases etc.
- F. Provide legend for symbols and abbreviations used.

3.03 BAR CHARTS

- A. Include a separate bar for each major portion of Work or operation.
- B. Identify the first work day of each week.

3.04 REVIEW AND EVALUATION OF SCHEDULE

- A. Participate in joint review and evaluation of schedule with Architect at each submittal.
- B. Evaluate project status to determine work behind schedule and work ahead of schedule.
- C. After review, revise as necessary as result of review, and resubmit within 10 days.

3.05 UPDATING SCHEDULE

- A. Maintain schedules to record actual start and finish dates of completed activities.
- B. Indicate progress of each activity to date of revision, with projected completion date of each activity.
- C. Update diagrams to graphically depict current status of Work.
- D. Identify activities modified since previous submittal, major changes in Work, and other identifiable changes.
- E. Indicate changes required to maintain Date of Substantial Completion.
- F. Submit reports required to support recommended changes.

3.06 DISTRIBUTION OF SCHEDULE

- A. Distribute copies of updated schedules to Contractor's project site file, to subcontractors, suppliers, Architect, Owner, and other concerned parties.
- B. Instruct recipients to promptly report, in writing, problems anticipated by projections indicated in schedules.

END OF SECTION

SECTION 01 4000 - QUALITY REQUIREMENTS

PART 1 GENERAL

1.01 SECTION INCLUDES

- A. Submittals.
- B. Quality assurance.
- C. References and standards.
- D. Testing and inspection agencies and services.
- E. Control of installation.
- F. Mock-ups.
- G. Tolerances.
- H. Manufacturers' field services.
- I. Defect Assessment.

1.02 RELATED REQUIREMENTS

- A. Document 00 9000 - Available Project Information: Soil investigation data.
- B. Document 00 7200 - General Conditions: Inspections and approvals required by public authorities.
- C. Section 01 3000 - Administrative Requirements: Submittal procedures.
- D. Section 01 4216 - Definitions.
- E. Section 01 4533 - Code-Required Special Inspections: Inspections and approval required by IBC.
- F. Section 01 6000 - Product Requirements: Requirements for material and product quality.

1.03 REFERENCE STANDARDS

- A. ASTM C1077 - Standard Practice for Agencies Testing Concrete and Concrete Aggregates for Use in Construction and Criteria for Testing Agency Evaluation; 2017.
- B. ASTM D3740 - Standard Practice for Minimum Requirements for Agencies Engaged in the Testing and/or Inspection of Soil and Rock as Used in Engineering Design and Construction; 2012a.
- C. ASTM E329 - Standard Specification for Agencies Engaged in Construction Inspection, Testing, or Special Inspection; 2018.
- D. ASTM E543 - Standard Specification for Agencies Performing Nondestructive Testing; 2015.
- E. ASTM E699 - Standard Specification for Agencies Involved in Testing, Quality Assurance, and Evaluating of Manufactured Building Components; 2016.
- F. IAS AC89 - Accreditation Criteria for Testing Laboratories; 2017.

1.04 SUBMITTALS

- A. See Section 01 3000 - Administrative Requirements, for submittal procedures.
- B. Test Reports: After each test/inspection, promptly submit electronic copies of report to Architect and to Contractor using electronic document service.
 - 1. Include:
 - a. Date issued.
 - b. Project title and number.
 - c. Name of inspector.
 - d. Date and time of sampling or inspection.
 - e. Identification of product and specifications section.
 - f. Location in the Project.
 - g. Type of test/inspection.
 - h. Date of test/inspection.
 - i. Results of test/inspection.
 - j. Compliance with Contract Documents.
 - k. When requested by Architect, provide interpretation of results.

2. Test report submittals are for Architect's knowledge as contract administrator for the limited purpose of assessing compliance with information given and the design concept expressed in the Contract Documents, or for Owner's information.
 - C. Certificates: When specified in individual specification sections, submit certification by the manufacturer and Contractor or installation/application subcontractor to Architect, in quantities specified for Product Data.
 1. Indicate material or product complies with or exceeds specified requirements. Submit supporting reference data, affidavits, and certifications as appropriate.
 2. Certificates may be recent or previous test results on material or product, but must be acceptable to Architect.
 - D. Manufacturer's Instructions: When specified in individual specification sections, submit printed instructions for delivery, storage, assembly, installation, start-up, adjusting, and finishing, for the Owner's information. Indicate special procedures, perimeter conditions requiring special attention, and special environmental criteria required for application or installation.
 - E. Manufacturer's Field Reports: Submit reports for Architect's benefit as contract administrator or for Owner.
 1. Submit report within 7 days of observation to Architect for information.
 2. Submit for information for the limited purpose of assessing compliance with information given and the design concept expressed in the Contract Documents.
- 1.05 Quality Assurance
 - A. Designer Qualifications: Where professional engineering design services and design data submittals are specifically required of Contractor by Contract Documents, provide services of a Professional Engineer experienced in design of this type of work and licensed in Louisiana.
- 1.06 REFERENCES AND STANDARDS
 - A. For products and workmanship specified by reference to a document or documents not included in the Project Manual, also referred to as reference standards, comply with requirements of the standard, except when more rigid requirements are specified or are required by applicable codes.
 - B. Comply with reference standard of date of issue current on date of Contract Documents, except where a specific date is established by applicable code.
 - C. Obtain copies of standards where required by product specification sections.
 - D. Should specified reference standards conflict with Contract Documents, request clarification from Architect before proceeding.
 - E. Neither the contractual relationships, duties, or responsibilities of the parties in Contract nor those of Architect shall be altered from Contract Documents by mention or inference otherwise in any reference document.
- 1.07 Testing and Inspection Agencies and Services
 - A. Owner will employ and pay for services of an independent testing agency to perform specified testing.
 - B. Employment of agency in no way relieves Contractor of obligation to perform Work in accordance with requirements of Contract Documents.
 - C. Owner Employed Agency:
 1. Testing agency: Comply with requirements of ASTM E329, ASTM E543, ASTM C1077, and ASTM D3740.
 2. Inspection agency: Comply with requirements of ASTM D3740 and ASTM E329.
 3. Laboratory Qualifications: Accredited by IAS according to IAS AC89.
 4. Laboratory: Authorized to operate in Louisiana.
 5. Laboratory Staff: Maintain a full time registered Engineer on staff to review services.
 6. Testing Equipment: Calibrated at reasonable intervals either by NIST or using an NIST established Measurement Assurance Program, under a laboratory measurement quality assurance program.

PART 2 PRODUCTS - NOT USED

PART 3 EXECUTION

3.01 CONTROL OF INSTALLATION

- A. Monitor quality control over suppliers, manufacturers, products, services, site conditions, and workmanship, to produce work of specified quality.
- B. Comply with manufacturers' instructions, including each step in sequence.
- C. Should manufacturers' instructions conflict with Contract Documents, request clarification from Architect before proceeding.
- D. Comply with specified standards as minimum quality for the work except where more stringent tolerances, codes, or specified requirements indicate higher standards or more precise workmanship.
- E. Have work performed by persons qualified to produce required and specified quality.
- F. Verify that field measurements are as indicated on shop drawings or as instructed by the manufacturer.
- G. Secure products in place with positive anchorage devices designed and sized to withstand stresses, vibration, physical distortion, and disfigurement.

3.02 MOCK-UPS

- A. Before installing portions of the Work where mock-ups are required, for each form of construction and finish required to comply with the following requirements, using materials indicated for the completed Work. The purpose of mock-up is to demonstrate the proposed range of aesthetic effects and workmanship.
- B. Accepted mock-ups establish the standard of quality the Architect will use to judge the Work.
- C. Tests shall be performed under provisions identified in this section and identified in the respective product specification sections.
- D. Assemble and erect specified items with specified attachment and anchorage devices, flashings, seals, and finishes.
- E. Obtain Architect's approval of mock-ups before starting work, fabrication, or construction.
- F. Architect will use accepted mock-ups as a comparison standard for the remaining Work.

3.03 TOLERANCES

- A. Monitor fabrication and installation tolerance control of products to produce acceptable Work. Do not permit tolerances to accumulate.
- B. Comply with manufacturers' tolerances. Should manufacturers' tolerances conflict with Contract Documents, request clarification from Architect before proceeding.
- C. Adjust products to appropriate dimensions; position before securing products in place.

3.04 TESTING AND INSPECTION

- A. See individual specification sections for testing and inspection required.
- B. Testing Agency Duties:
 - 1. Provide qualified personnel at site. Cooperate with Architect and Contractor in performance of services.
 - 2. Perform specified sampling and testing of products in accordance with specified standards.
 - 3. Ascertain compliance of materials and mixes with requirements of Contract Documents.
 - 4. Promptly notify Architect and Contractor of observed irregularities or non-compliance of Work or products.
 - 5. Perform additional tests and inspections required by Architect.
 - 6. Submit reports of all tests/inspections specified.
- C. Limits on Testing/Inspection Agency Authority:
 - 1. Agency may not release, revoke, alter, or enlarge on requirements of Contract Documents.
 - 2. Agency may not approve or accept any portion of the Work.
 - 3. Agency may not assume any duties of Contractor.

4. Agency has no authority to stop the Work.
- D. Contractor Responsibilities:
 1. Deliver to agency at designated location, adequate samples of materials proposed to be used that require testing, along with proposed mix designs.
 2. Cooperate with laboratory personnel, and provide access to the Work and to manufacturers' facilities.
 3. Provide incidental labor and facilities:
 - a. To provide access to Work to be tested/inspected.
 - b. To obtain and handle samples at the site or at source of Products to be tested/inspected.
 - c. To facilitate tests/inspections.
 - d. To provide storage and curing of test samples.
 4. Notify Architect and laboratory 24 hours prior to expected time for operations requiring testing/inspection services.
 5. Employ services of an independent qualified testing laboratory and pay for additional samples, tests, and inspections required by Contractor beyond specified requirements.
 6. Arrange with Owner's agency and pay for additional samples, tests, and inspections required by Contractor beyond specified requirements.
- E. Re-testing required because of non-compliance with specified requirements shall be performed by the same agency on instructions by Architect.
- F. Re-testing required because of non-compliance with specified requirements shall be paid for by Contractor.

3.05 MANUFACTURERS' FIELD SERVICES

- A. When specified in individual specification sections, require material or product suppliers or manufacturers to provide qualified staff personnel to observe site conditions, conditions of surfaces and installation, quality of workmanship, start-up of equipment, test, adjust, and balance equipment as applicable, and to initiate instructions when necessary.
- B. Report observations and site decisions or instructions given to applicators or installers that are supplemental or contrary to manufacturers' written instructions.

3.06 DEFECT ASSESSMENT

- A. Replace Work or portions of the Work not complying with specified requirements.
- B. If, in the opinion of Architect, it is not practical to remove and replace the work, Architect will direct an appropriate remedy or adjust payment.

END OF SECTION

SECTION 01 4216 - DEFINITIONS

PART 1 GENERAL

1.01 SUMMARY

- A. This section supplements the definitions contained in the General Conditions.
- B. Other definitions are included in individual specification sections.

1.02 DEFINITIONS

- A. Furnish: To supply, deliver, unload, and inspect for damage.
- B. Install: To unpack, assemble, erect, apply, place, finish, cure, protect, clean, start up, and make ready for use.
- C. Product: Material, machinery, components, equipment, fixtures, and systems forming the work result. Not materials or equipment used for preparation, fabrication, conveying, or erection and not incorporated into the work result. Products may be new, never before used, or re-used materials or equipment.
- D. Project Manual: The book-sized volume that includes the procurement requirements (if any), the contracting requirements, and the specifications.
- E. Provide: To furnish and install.
- F. Supply: Same as Furnish.

PART 2 PRODUCTS - NOT USED

PART 3 EXECUTION - NOT USED

END OF SECTION

SECTION 01 4533 - CODE-REQUIRED SPECIAL INSPECTIONS AND PROCEDURES

PART 1 GENERAL

1.01 Section Includes

- A. Code-required special inspections.
- B. Testing services incidental to special inspections.
- C. Submittals.

1.02 RELATED REQUIREMENTS

- A. Section 01 3000 - Administrative Requirements: Submittal procedures.
- B. Section 01 4000 - Quality Requirements.
- C. Section 01 6000 - Product Requirements: Requirements for material and product quality.

1.03 ABBREVIATIONS AND ACRONYMS

- A. AHJ: Authority having jurisdiction.
- B. IAS: International Accreditation Service, Inc.
- C. NIST: National Institute of Standards and Technology.

1.04 Definitions

- A. Code or Building Code: ICC (IBC), International Building Code, most recent edition adopted by authority having jurisdiction, including all applicable amendments and supplements without limitation, and specifically Chapter 17 - Special Inspections and Tests.
- B. Authority Having Jurisdiction (AHJ): Agency or individual officially empowered to enforce the building, fire and life safety code requirements of the permitting jurisdiction in which the Project is located.
- C. Special Inspections and Tests: Inspections and testing of materials, installation, fabrication, erection, or placement of components and connections mandated by Building Code to safeguard public welfare.
 - 1. Special inspections are inspections and testing of materials, installation, fabrication, erection or placement of components and connections mandated by the AHJ that also require special expertise to ensure compliance with the approved Contract Documents and the referenced standards.
 - 2. Special inspections and tests are separate from and independent of tests and inspections conducted by Owner or Contractor for purposes of quality assurance and contract administration.

1.05 Reference Standards

- A. ACI 318 - Building Code Requirements for Structural Concrete and Commentary; 2014 (Errata 2018).
- B. ASCE 7 - Minimum Design Loads and Associated Criteria for Buildings and Other Structures; Most Recent Edition Cited by Referring Code or Reference Standard.
- C. ASTM C31/C31M - Standard Practice for Making and Curing Concrete Test Specimens in the Field; 2019.
- D. ASTM C172/C172M - Standard Practice for Sampling Freshly Mixed Concrete; 2017.
- E. ASTM D3740 - Standard Practice for Minimum Requirements for Agencies Engaged in the Testing and/or Inspection of Soil and Rock as Used in Engineering Design and Construction; 2012a.
- F. ASTM E329 - Standard Specification for Agencies Engaged in Construction Inspection, Testing, or Special Inspection; 2018.
- G. AWS D1.1/D1.1M - Structural Welding Code - Steel; 2015, with Errata (2016).
- H. AWS D1.3/D1.3M - Structural Welding Code - Sheet Steel; 2018.
- I. IAS AC89 - Accreditation Criteria for Testing Laboratories; 2017.
- J. IAS AC291 - Accreditation Criteria for Special Inspection Agencies; 2017.
- K. ICC (IBC) - International Building Code; Most Recent Edition Adopted by Authority Having Jurisdiction, Including All Applicable Amendments and Supplements.

- L. ICC (IBC)-2018 - International Building Code; 2018.
- M. SDI QA/QC - Standard for Quality Control and Quality Assurance for Installation of Steel Deck; 2022.
- N. SJI 100 - Catalog of Standard Specifications Load Tables and Weight Tables for Steel Joists and Joist Girders; 2011.
- O. TMS 402/602 - Building Code Requirements and Specification for Masonry Structures; 2016.

1.06 Submittals

- A. See Section 01 3000 - Administrative Requirements for submittal procedures.
- B. Special Inspection Agency Qualifications: Prior to start of work, Special Inspection Agency is required to:
 - 1. Submit agency name, address, and telephone number, names of full time registered Engineer and responsible officer.
 - 2. Submit certification that Special Inspection Agency is acceptable to AHJ.
 - 3. Submit documentation that Special Inspection Agency is accredited by IAS according to IAS AC291.
- C. Special Inspection Reports: After each special inspection, Special Inspector is required to promptly submit at least one digital copy of report; one to Architect and one to the Structural Engineer.
 - 1. Include:
 - a. Date issued.
 - b. Project title and number.
 - c. Name of Special Inspector.
 - d. Date and time of special inspection.
 - e. Identification of product and specifications section.
 - f. Location in the Project.
 - g. Type of special inspection.
 - h. Date of special inspection.
 - i. Results of special inspection.
 - j. Compliance with contract documents.
 - 2. Report shall be uploaded to the electronic document submittal service (Newforma) with notice to the Architect and Structural Engineer that the report is available for review.

1.07 Quality Assurance

- A. Special Inspection Agency Qualifications:
 - 1. Independent firm specializing in performing testing and inspections of the type specified in this section.
 - 2. Accredited by IAS according to IAS AC291.
- B. Testing Agency Qualifications:
 - 1. Independent firm specializing in performing testing and inspections of the type specified in this section.
 - 2. Accredited by IAS according to IAS AC89.

PART 2 PRODUCTS - NOT USED

PART 3 EXECUTION

3.01 Special Inspections and Testing

- A. The Code requires special inspections and testing of certain materials, components, assemblies, and connections used in constructing the project. Special inspections and testing will be performed in accordance with the Code.
- B. Special inspections and testing will be performed in accordance with the Code for the following materials and project components:
 - 1. Steel.
 - 2. Concrete.

3. Masonry.
4. Soils.
5. Fire-resistant penetrations and joints.
6. Structural observations required by ICC (IBC) section 1704.6.

3.02 SCHEDULE OF SPECIAL INSPECTIONS, GENERAL

- A. Frequency of Special Inspections: Special Inspections are indicated as continuous or periodic.
 1. Continuous Special Inspection: Special Inspection Agency is required to be present in the area where the work is being performed and observe the work at all times the work is in progress.
 2. Periodic Special Inspection: Special Inspection Agency is required to be present in the area where work is being performed and observe the work part-time or intermittently and at the completion of the work.
 3. Reference structural drawings for additional inspection requirements and frequency.

3.03 SPECIAL INSPECTIONS FOR STEEL CONSTRUCTION

- A. Cold-Formed Steel Deck: Comply with quality assurance inspection requirements of SDI QA/QC.
- B. Open-Web Joists and Joist Girders: Comply with requirements of SJI 100, Table 1705.2.3.
 1. End Connections - Welding or Bolted: Comply with requirements of SJI 100; periodic.
 2. Bridging - Horizontal or Diagonal:
 - a. Standard Bridging: Comply with requirements of SJI 100; periodic.
- C. Welding:
 1. Structural Steel and Cold Formed Steel Deck:
 - a. Complete and Partial Joint Penetration Groove Welds: Verify compliance with AWS D1.1/D1.1M; continuous.
 - b. Multipass Fillet Welds: Verify compliance with AWS D1.1/D1.1M; continuous.
 - c. Single Pass Fillet Welds Less than 5/16 inch Wide: Verify compliance with AWS D1.1/D1.1M; periodic.
 - d. Plug and Slot Welds: Verify compliance with AWS D1.1/D1.1M; continuous.
 - e. Single Pass Fillet Welds 5/16 inch or Greater: Verify compliance with AWS D1.1/D1.1M; continuous.
 - f. Floor and Roof Deck Welds: Verify compliance with AWS D1.3/D1.3M; continuous.

3.04 SPECIAL INSPECTIONS FOR CONCRETE CONSTRUCTION

- A. Reinforcement, Including Prestressing Tendons, and Verification of Placement: Verify compliance with ACI 318, Chapters 20, 25.2, 25.3, 26.6.1-26.6.3; periodic.
- B. Anchors Cast in Concrete: Verify compliance with ACI 318; periodic.
- C. Anchors Post-Installed in Hardened Concrete: Verify compliance with ACI 318.
 1. Adhesive Anchors: Verify horizontally or upwardly-inclined orientation installations resisting sustained tension loads - Section 17.8.2.4; continuous.
 2. Other Mechanical and Adhesive Anchors: Verify as per Chapter 17.8.2; periodic.
- D. Design Mix: Verify plastic concrete complies with the design mix in approved Contract Documents and with ACI 318, Chapter 4 and 5.2; periodic.
- E. Concrete Sampling Concurrent with Strength Test Sampling: Each time fresh concrete is sampled for strength tests, verify compliance with ASTM C172/C172M, ASTM C31/C31M and ACI 318, Chapter 26.5, 26.12, and record the following, continuous:
 1. Slump.
 2. Air content.
 3. Temperature of concrete.
- F. Specified Curing Temperature and Techniques: Verify compliance with approved Contract Documents and ACI 318, Section 26.5.3; periodic.
- G. Formwork Shape, Location and Dimensions: Verify compliance with approved Contract Documents and ACI 318, Section 11.1.2(b); periodic.

3.05 SPECIAL INSPECTIONS FOR MASONRY CONSTRUCTION

- A. Masonry Structures Subject to Special Inspection:
 - 1. Masonry construction when required by the quality assurance program of TMS 402/602.
- B. Verify each item below complies with approved Contract Documents and the applicable articles of TMS 402/602.
 - 1. Inspections and Approvals:
 - a. Verify compliance with the required inspection provisions of the approved Contract Documents; periodic.
 - b. Verify approval of submittals required by Contract Documents; periodic.
 - 2. Compressive Strength of Masonry: Verify compressive strength of masonry units prior to start of construction unless specifically exempted by code; periodic.
 - 3. Slump Flow and Visual Stability Index (VSI): Verify compliance as self consolidating grout arrives on site; continuous.
 - 4. Joints and Accessories: When masonry construction begins, verify:
 - a. Proportions of site prepared mortar; periodic.
 - b. Construction of mortar joints; periodic.
 - c. Location of reinforcement, connectors, prestressing tendons, anchorages, etc; periodic.
 - 5. Structural Elements, Joints, Anchors, Protection: During masonry construction, verify:
 - a. Size and location of structural elements; periodic.
 - b. Type, size and location of anchors, including anchorage of masonry to structural members, frames or other construction; periodic.
 - c. Size, grade and type of reinforcement, anchor bolts and prestressing tendons and anchorages; periodic.
 - d. Preparation, construction and protection of masonry against hot weather above 90 degrees F and cold weather below 40 degrees F; periodic.
 - 6. Grouting Preparation: Prior to grouting, verify:
 - a. Grout space is clean; periodic.
 - b. Correct placement of reinforcing, connectors, prestressing tendons and anchorages; periodic.
 - c. Correctly proportioned site prepared grouts and prestressing grout for bonded tendons; periodic.
 - d. Correctly constructed mortar joints; periodic.
 - 7. Preparation of Grout Specimens, Mortar Specimens and Prisms: Observe preparation of specimens; periodic.

3.06 SPECIAL INSPECTIONS FOR SOILS

- A. Materials and Placement: Verify each item below complies with approved construction documents and approved geotechnical report.
 - 1. Design bearing capacity of material below shallow foundations; periodic.
 - 2. Design depth of excavations and suitability of material at bottom of excavations; periodic.
 - 3. Materials, densities, lift thicknesses; placement and compaction of backfill: continuous.
 - 4. Subgrade, prior to placement of compacted fill verify proper preparation; periodic.
- B. Testing: Classify and test excavated material; periodic.

3.07 Testing Agency Duties and Responsibilities

- A. Testing Agency Duties:
 - 1. Test samples submitted by Contractor.
 - 2. Provide qualified personnel at site. Cooperate with Architect and Contractor in performance of services.
 - 3. Perform specified sampling and testing of products in accordance with specified standards.
 - 4. Ascertain compliance of materials and mixes with requirements of Contract Documents.
 - 5. Promptly notify Architect and Contractor of observed irregularities or non-compliance of work or products.
 - 6. Perform additional tests and inspections required by Architect.

7. Submit reports of all tests or inspections specified.
- B. Limits on Testing or Inspection Agency Authority:
 1. Agency may not release, revoke, alter, or enlarge on requirements of Contract Documents.
 2. Agency may not approve or accept any portion of the work.
 3. Agency may not assume any duties of Contractor.
 4. Agency has no authority to stop the work.
- C. On instructions by Architect, perform re-testing required because of non-compliance with specified requirements, using the same agency.
- D. Contractor will pay for re-testing required because of non-compliance with specified requirements.

3.08 Contractor Duties and Responsibilities

- A. Contractor Responsibilities, General:
 1. Deliver to agency at designated location, adequate samples of materials for special inspections that require material verification.
 2. Cooperate with agency and laboratory personnel; provide access to approved documents at project site, to the work, to manufacturers' facilities, and to fabricators' facilities.
 3. Provide incidental labor and facilities:
 - a. To provide access to work to be tested or inspected.
 - b. To obtain and handle samples at the site or at source of Products to be tested or inspected.
 - c. To facilitate tests or inspections.
 - d. To provide storage and curing of test samples.
 4. Notify Architect and laboratory 24 hours prior to expected time for operations requiring testing or inspection services.
 5. Arrange with Owner's agency and pay for additional samples, tests, and inspections required by Contractor beyond specified requirements.
 6. Retain special inspection records.

END OF SECTION

SECTION 01 5000 - TEMPORARY FACILITIES AND CONTROLS

PART 1 GENERAL

1.01 SECTION INCLUDES

- A. Temporary utilities.
- B. Temporary telecommunications services.
- C. Temporary sanitary facilities.
- D. Temporary Controls: Barriers, enclosures, and fencing.
- E. Security requirements.
- F. Vehicular access and parking.
- G. Waste removal facilities and services.
- H. Field offices.

1.02 RELATED REQUIREMENTS

- A. Section 01 5813 - Temporary Project Signage.

1.03 TEMPORARY UTILITIES

- A. Owner will provide the following:
 - 1. Electrical power, consisting of connection to existing facilities.
 - 2. Water supply, consisting of connection to existing facilities.
- B. Provide and pay for all lighting, heating and cooling, and ventilation required for construction purposes.
- C. Use trigger-operated nozzles for water hoses, to avoid waste of water.

1.04 TELECOMMUNICATIONS SERVICES

- A. Provide, maintain, and pay for telecommunications services to field office at time of project mobilization.
- B. Telecommunications services shall include:
 - 1. Windows-based personal computer dedicated to project telecommunications, with necessary software and laser printer.
 - 2. Cell Phone: minimum of one for Superintendent use.
 - 3. Internet Connections: Minimum of one; wireless cell connection, DSL or faster.

1.05 TEMPORARY SANITARY FACILITIES

- A. Provide and maintain required facilities and enclosures. Provide at time of project mobilization.
- B. Maintain daily in clean and sanitary condition.
- C. Locate away from existing school building.

1.06 BARRIERS

- A. Provide barriers to prevent unauthorized entry to construction areas, to prevent access to areas that could be hazardous to workers or the public and to protect existing facilities and adjacent properties from damage from construction operations.
- B. Protect non-owned vehicular traffic, stored materials, site, and structures from damage.

1.07 FENCING

- A. Construction: Contractor's option.
- B. Provide 6 foot high fence around construction site; equip with vehicular and pedestrian gates with locks.

1.08 EXTERIOR ENCLOSURES

- A. Provide temporary weather tight closure of exterior openings to accommodate acceptable working conditions and protection for Products, to allow for temporary heating and maintenance of required

ambient temperatures identified in individual specification sections, and to prevent entry of unauthorized persons. Provide access doors with self-closing hardware and locks.

1.09 INTERIOR ENCLOSURES

- A. Provide temporary partitions and ceilings as indicated to separate work areas from Owner-occupied areas, to prevent penetration of dust and moisture into Owner-occupied areas, and to prevent damage to existing materials and equipment.
- B. Construction: Framing and gypsum board sheet materials with taped joints and sealed edges at intersections with existing surfaces:

1.10 SECURITY

- A. Provide security and facilities to protect Work, existing facilities, and Owner's operations from unauthorized entry, vandalism, or theft.
- B. Coordinate with Owner's security program.

1.11 VEHICULAR ACCESS AND PARKING

- A. Comply with regulations relating to use of streets and sidewalks, access to emergency facilities, and access for emergency vehicles.
- B. Coordinate access and haul routes with governing authorities and Owner.
- C. Provide and maintain access to fire hydrants, free of obstructions.
- D. Provide means of removing mud from vehicle wheels before entering streets.
- E. Provide temporary parking areas to accommodate construction personnel. When site space is not adequate, provide additional off-site parking.
- F. Existing school parking areas may not be used for construction parking.

1.12 WASTE REMOVAL

- A. Provide waste removal facilities and services as required to maintain the site in clean and orderly condition.
- B. Provide containers with lids. Remove trash from site periodically.

1.13 PROJECT SIGNS - See Section 01 5813

1.14 FIELD OFFICES

- A. Office: Weathertight, with lighting, electrical outlets, heating, cooling equipment, and equipped with sturdy furniture, drawing rack, and drawing display table.
- B. Provide space for Project meetings, with table and chairs to accommodate 16 persons minimum.
- C. Locate offices a minimum distance of 30 feet from existing and new structures.

1.15 REMOVAL OF UTILITIES, FACILITIES, AND CONTROLS

- A. Remove temporary utilities, equipment, facilities, materials, prior to Date of Substantial Completion inspection.
- B. Remove underground installations to a minimum depth of 2 feet. Grade site as indicated.
- C. Clean and repair damage caused by installation or use of temporary work.

PART 2 PRODUCTS - NOT USED

PART 3 EXECUTION - NOT USED

END OF SECTION

SECTION 01 5713 - TEMPORARY EROSION AND SEDIMENT CONTROL

PART 1 GENERAL

1.01 SECTION INCLUDES

- A. Prevention of erosion due to construction activities.
- B. Prevention of sedimentation of waterways, open drainage ways, and storm and sanitary sewers due to construction activities.
- C. Restoration of areas eroded due to insufficient preventive measures.

1.02 RELATED REQUIREMENTS

- A. Section 31 2200 - Grading: Temporary and permanent grade changes for erosion control.
- B. Section 32 9223 - Sodding: Permanent turf for erosion control.

1.03 REFERENCE STANDARDS

- A. ASTM D4355/D4355M - Standard Test Method for Deterioration of Geotextiles by Exposure to Light, Moisture and Heat in a Xenon Arc Type Apparatus; 2014.
- B. ASTM D4491/D4491M - Standard Test Methods for Water Permeability of Geotextiles by Permittivity; 2017.
- C. ASTM D4491 - Standard Test Methods for Water Permeability of Geotextiles by Permittivity.; 1999a (Reapproved 2014).
- D. ASTM D4533/D4533M - Standard Test Method for Trapezoid Tearing Strength of Geotextiles; 2015.
- E. ASTM D4632/D4632M - Standard Test Method for Grab Breaking Load and Elongation of Geotextiles; 2015a.
- F. ASTM D4751 - Standard Test Method for Determining Apparent Opening Size of a Geotextile; 2016.
- G. ASTM D4873/D4873M - Standard Guide for Identification, Storage, and Handling of Geosynthetic Rolls and Samples; 2017.
- H. FHWA FLP-94-005 - Best Management Practices for Erosion and Sediment Control; 1995.

1.04 PERFORMANCE REQUIREMENTS

- A. Comply with all requirements of Bossier Parish for erosion and sedimentation control.
- B. Develop and follow an Erosion and Sedimentation Prevention Plan and submit periodic inspection reports.
- C. Do not begin clearing, grading, or other work involving disturbance of ground surface cover until applicable permits have been obtained; furnish all documentation required to obtain applicable permits.
- D. Timing: Put preventive measures in place as soon as possible after disturbance of surface cover and before precipitation occurs.
- E. Storm Water Runoff: Control increased storm water runoff due to disturbance of surface cover due to construction activities for this project.
 - 1. Prevent runoff into storm and sanitary sewer systems, including open drainage channels, in excess of actual capacity or amount allowed by authorities having jurisdiction, whichever is less.
- F. Erosion On Site: Minimize wind, water, and vehicular erosion of soil on project site due to construction activities for this project.
 - 1. Control movement of sediment and soil from temporary stockpiles of soil.
 - 2. Prevent development of ruts due to equipment and vehicular traffic.
 - 3. If erosion occurs due to non-compliance with these requirements, restore eroded areas at no cost to Owner.
- G. Erosion Off Site: Prevent erosion of soil and deposition of sediment on other properties caused by water leaving the project site due to construction activities for this project.
 - 1. Prevent windblown soil from leaving the project site.
 - 2. Prevent tracking of mud onto public roads outside site.
 - 3. Prevent mud and sediment from flowing onto sidewalks and pavements.

4. If erosion occurs due to non-compliance with these requirements, restore eroded areas at no cost to Owner.
- H. Sedimentation of Waterways Off Site: Prevent sedimentation of waterways off the project site, including rivers, streams, lakes, ponds, open drainage ways, storm sewers, and sanitary sewers.
 1. If sedimentation occurs, install or correct preventive measures immediately at no cost to Owner; remove deposited sediments; comply with requirements of authorities having jurisdiction.
- I. Open Water: Prevent standing water that could become stagnant.
- J. Maintenance: Maintain temporary preventive measures until permanent measures have been established.

PART 2 PRODUCTS

2.01 MATERIALS

- A. Mulch: Use one of the following:
 1. Straw or hay.
 2. Erosion control matting or netting.
 3. Cutback asphalt.
- B. Grass Seed For Temporary Cover: Select a species appropriate to climate, planting season, and intended purpose. If same area will later be planted with permanent vegetation, do not use species known to be excessively competitive or prone to volunteer in subsequent seasons.
- C. Bales: Air dry, rectangular straw bales.
 1. Cross Section: 14 by 18 inches, minimum.
 2. Bindings: Wire or string, around long dimension.
- D. Bale Stakes: One of the following, minimum 3 feet long:
 1. Steel U- or T-section, with minimum mass of 1.33 pound per linear foot.
 2. Wood, 2 by 2 inches in cross section.
- E. Silt Fence Fabric: Polypropylene geotextile resistant to common soil chemicals, mildew, and insects; non-biodegradable; in longest lengths possible; fabric including seams with the following minimum average roll lengths:
 1. Average Opening Size: 30 U.S. Std. Sieve, maximum, when tested in accordance with ASTM D4751.
 2. Permittivity: 0.05 sec^{-1} , minimum, when tested in accordance with ASTM D4491/D4491M.
 3. Ultraviolet Resistance: Retaining at least 70 percent of tensile strength, when tested in accordance with ASTM D4355/D4355M after 500 hours exposure.
 4. Tensile Strength: 100 pounds-force, minimum, in cross-machine direction; 124 pounds-force, minimum, in machine direction; when tested in accordance with ASTM D4632/D4632M.
 5. Elongation: 15 to 30 percent, when tested in accordance with ASTM D4632/D4632M.
 6. Tear Strength: 55 pounds-force, minimum, when tested in accordance with ASTM D4533/D4533M.
 7. Color: Manufacturer's standard, with embedment and fastener lines preprinted.
- F. Silt Fence Posts: One of the following, minimum 5 feet long:
 1. Steel U- or T-section, with minimum mass of 1.33 pound per linear foot.

PART 3 EXECUTION

3.01 EXAMINATION

- A. Examine site and identify existing features that contribute to erosion resistance; maintain such existing features to greatest extent possible.

3.02 PREPARATION

- A. Schedule work so that soil surfaces are left exposed for the minimum amount of time.

3.03 SCOPE OF PREVENTIVE MEASURES

- A. In all cases, if permanent erosion resistant measures have been installed temporary preventive measures are not required.
- B. Construction Entrances: Traffic-bearing aggregate surface.
 - 1. Width: As required; 20 feet, minimum.
 - 2. Length: 50 feet, minimum.
 - 3. Provide at each construction entrance from public right-of-way.
 - 4. Where necessary to prevent tracking of mud onto right-of-way, provide wheel washing area out of direct traffic lane, with drain into sediment trap or basin.
- C. Linear Sediment Barriers: Made of silt fences.
 - 1. Provide linear sediment barriers:
 - a. Along downhill perimeter edge of disturbed areas, including soil stockpiles.
 - b. Across the entrances to culverts that receive runoff from disturbed areas.
 - 2. Space sediment barriers with the following maximum slope length upslope from barrier:
 - a. Slope of Less Than 2 Percent: 100 feet..
 - b. Slope Between 2 and 5 Percent: 75 feet.
 - c. Slope Between 5 and 10 Percent: 50 feet.
 - d. Slope Between 10 and 20 Percent: 25 feet.
 - e. Slope Over 20 Percent: 15 feet.
- D. Storm Drain Curb Inlet Sediment Trap: Protect each curb inlet using one of the following measures:
 - 1. Filter fabric wrapped around hollow concrete blocks blocking entire inlet face area; use one piece of fabric wrapped at least 1-1/2 times around concrete blocks and secured to prevent dislodging; orient cores of blocks so runoff passes into inlet.
 - 2. Straw bale row blocking entire inlet face area; anchor into pavement.
- E. Temporary Splash Pads: Stone aggregate over filter fabric; size to suit application; provide at downspout outlets and storm water outlets.
- F. Mulching: Use only for areas that may be subjected to erosion for less than 6 months.
 - 1. Asphalt: Use only where no traffic, either vehicular or pedestrian, is anticipated.
- G. Temporary Seeding: Use where temporary vegetated cover is required.

3.04 INSTALLATION

- A. Traffic-Bearing Aggregate Surface:
 - 1. Excavate minimum of 6 inches.
 - 2. Place geotextile fabric full width and length, with minimum 12 inch overlap at joints.
 - 3. Place and compact at least 6 inches of 1 1/2 to 3 1/2 inch diameter stone.
- B. Silt Fences:
 - 1. Store and handle fabric in accordance with ASTM D4873/D4873M.
 - 2. Where slope gradient is less than 3:1 or barriers will be in place less than 6 months, use nominal 16 inch high barriers with minimum 36 inch long posts spaced at 6 feet maximum, with fabric embedded at least 4 inches in ground.
 - 3. Where slope gradient is steeper than 3:1 or barriers will be in place over 6 months, use nominal 28 inch high barriers, minimum 48 inch long posts spaced at 6 feet maximum, with fabric embedded at least 6 inches in ground.
 - 4. Where slope gradient is steeper than 3:1 and vertical height of slope between barriers is more than 20 feet, use nominal 32 inch high barriers with woven wire reinforcement and steel posts spaced at 4 feet maximum, with fabric embedded at least 6 inches in ground.
 - 5. Install with top of fabric at nominal height and embedment as specified.
 - 6. Do not splice fabric width; minimize splices in fabric length; splice at post only, overlapping at least 18 inches, with extra post.
 - 7. Fasten fabric to steel posts using wire, nylon cord, or integral pockets.
 - 8. Wherever runoff will flow around end of barrier or over the top, provide temporary splash pad or other outlet protection; at such outlets in the run of the barrier, make barrier not more than 12 inches high with post spacing not more than 4 feet.
- C. Straw Bale Rows:

1. Install bales in continuous rows with ends butting tightly, with one bale at each end of row turned uphill.
 2. Install bales so that bindings are not in contact with the ground.
 3. Embed bales at least 4 inches in the ground.
 4. Anchor bales with at least two stakes per bale, driven at least 18 inches into the ground; drive first stake in each bale toward the previously placed bale to force bales together.
 5. Fill gaps between ends of bales with loose straw wedged tightly.
 6. Place soil excavated for trench against bales on the upslope side of the row, compacted.
- D. Mulching Over Small and Medium Areas:
1. Dry Straw and Hay: Apply 4 to 6 inches depth.
 2. Asphalt: Apply 1/4 gallon per square yard.
 3. Erosion Control Matting: Comply with manufacturer's instructions.

3.05 MAINTENANCE

- A. Inspect preventive measures weekly, within 24 hours after the end of any storm that produces 0.5 inches or more rainfall at the project site, and daily during prolonged rainfall.
- B. Repair deficiencies immediately.
- C. Silt Fences:
1. Promptly replace fabric that deteriorates unless need for fence has passed.
 2. Remove silt deposits that exceed one-third of the height of the fence.
 3. Repair fences that are undercut by runoff or otherwise damaged, whether by runoff or other causes.
- D. Straw Bale Rows:
1. Promptly replace bales that fall apart or otherwise deteriorate unless need has passed.
 2. Remove silt deposits that exceed one-half of the height of the bales.
 3. Repair bale rows that are undercut by runoff or otherwise damaged, whether by runoff or other causes.
- E. Clean out temporary sediment control structures weekly and relocate soil on site.
- F. Place sediment in appropriate locations on site; do not remove from site.

3.06 CLEAN UP

- A. Remove temporary measures after permanent measures have been installed, unless permitted to remain by Architect.
- B. Clean out temporary sediment control structures that are to remain as permanent measures.
- C. Where removal of temporary measures would leave exposed soil, shape surface to an acceptable grade and finish to match adjacent ground surfaces.

END OF SECTION

SECTION 01 5813 - TEMPORARY PROJECT SIGNAGE

PART 1 GENERAL

1.01 SECTION INCLUDES

- A. Project identification sign.

1.02 QUALITY ASSURANCE

- A. Design sign and structure to withstand 50 miles/hr wind velocity.
- B. Finishes, Painting: Adequate to withstand weathering, fading, and chipping for duration of construction.

1.03 SUBMITTALS

- A. See Section 01 3000 - Administrative Requirements for submittal procedures.
- B. Shop Drawing: Show content, layout, lettering, color, structure, sizes.

PART 2 PRODUCTS

2.01 SIGN MATERIALS

- A. Structure and Framing: New, wood, structurally adequate.
- B. Sign Substrate: Exterior grade plywood, minimum 3/4 inch thick, standard large sizes to minimize joints.
- C. Rough Hardware: Galvanized.
- D. Paint and Primers: Exterior quality, two coats; sign background of white color.
- E. Sign Surface: Printed graphics on coated sign fabric.

2.02 PROJECT IDENTIFICATION SIGN

- A. One printed sign, 60 sq ft area, approximately 60 inches high x 12' wide, bottom minimum 5 feet above ground.
- B. Content:
 - 1. Project title, logo and name of Owner as indicated on Contract Documents.
 - 2. Names and logo of Architect.
 - 3. Name and logo of Prime Contractor.
 - 4. Project rendering as provided by the Architect.
- C. Graphic Design, Colors, Style of Lettering: Designated by Architect.

PART 3 EXECUTION

3.01 INSTALLATION

- A. Install project identification sign within 20 days after date fixed by Notice to Proceed.
- B. Erect at designated location.
- C. Erect supports and framing on secure foundation, rigidly braced and framed to resist wind loadings.
- D. Install sign surface plumb and level, with butt joints. Anchor securely.
- E. Paint exposed surfaces of sign, supports, and framing.

3.02 MAINTENANCE

- A. Maintain signs and supports clean, repair deterioration and damage.

3.03 REMOVAL

- A. Remove signs, framing, supports, and foundations at completion of Project and restore the area.

END OF SECTION

SECTION 01 6000 - PRODUCT REQUIREMENTS

PART 1 GENERAL

1.01 SECTION INCLUDES

- A. General product requirements.
- B. Transportation, handling, storage and protection.
- C. Product option requirements.
- D. Substitution limitations.
- E. Procedures for Owner-supplied products.
- F. Maintenance materials, including extra materials, spare parts, tools, and software.

1.02 RELATED REQUIREMENTS

- A. Section 01 2500 - Substitution Procedures: Substitutions made during procurement phases.
- B. Section 01 4000 - Quality Requirements: Product quality monitoring.

1.03 SUBMITTALS

- A. Product Data Submittals: Submit manufacturer's standard published data. Mark each copy to identify applicable products, models, options, and other data. Supplement manufacturers' standard data to provide information specific to this Project.
- B. Shop Drawing Submittals: Prepared specifically for this Project; indicate utility and electrical characteristics, utility connection requirements, and location of utility outlets for service for functional equipment and appliances.
- C. Sample Submittals: Illustrate functional and aesthetic characteristics of the product, with integral parts and attachment devices. Coordinate sample submittals for interfacing work.
 - 1. For selection from standard finishes, submit samples of the full range of the manufacturer's standard colors, textures, and patterns.

PART 2 PRODUCTS

2.01 EXISTING PRODUCTS

- A. Do not use materials and equipment removed from existing premises unless specifically required or permitted by Contract Documents.
- B. Existing materials and equipment indicated to be removed, but not to be re-used, relocated, reinstalled, delivered to the Owner, or otherwise indicated as to remain the property of the Owner, become the property of the Contractor; remove from site.

2.02 NEW PRODUCTS

- A. Provide new products unless specifically required or permitted by Contract Documents.
- B. Use of products having any of the following characteristics is not permitted:
 - 1. Made using or containing CFC's or HCFC's.
 - 2. Containing lead, cadmium, or asbestos.

2.03 PRODUCT OPTIONS

- A. Products Specified by Reference Standards or by Description Only: Use any product meeting those standards or description.
- B. Products Specified by Naming One or More Manufacturers: Use a product of one of the manufacturers named and meeting specifications, no options or substitutions allowed.
- C. Products Specified by Naming One or More Manufacturers with a Provision for Substitutions: Submit a request for substitution for any manufacturer not named.

2.04 MAINTENANCE MATERIALS

- A. Furnish extra materials, spare parts, tools, and software of types and in quantities specified in individual specification sections.
- B. Deliver and place in location as directed; obtain receipt prior to final payment.

PART 3 EXECUTION

3.01 SUBSTITUTION LIMITATIONS

- A. See Section 01 2500 - Substitution Procedures.

3.02 TRANSPORTATION AND HANDLING

- A. Package products for shipment in manner to prevent damage; for equipment, package to avoid loss of factory calibration.
- B. If special precautions are required, attach instructions prominently and legibly on outside of packaging.
- C. Coordinate schedule of product delivery to designated prepared areas in order to minimize site storage time and potential damage to stored materials.
- D. Transport and handle products in accordance with manufacturer's instructions.
- E. Transport materials in covered trucks to prevent contamination of product and littering of surrounding areas.
- F. Promptly inspect shipments to ensure that products comply with requirements, quantities are correct, and products are undamaged.
- G. Provide equipment and personnel to handle products by methods to prevent soiling, disfigurement, or damage, and to minimize handling.
- H. Arrange for the return of packing materials, such as wood pallets, where economically feasible.

3.03 STORAGE AND PROTECTION

- A. Provide protection of stored materials and products against theft, casualty, or deterioration.
- B. Store and protect products in accordance with manufacturers' instructions.
- C. Store with seals and labels intact and legible.
- D. Arrange storage of materials and products to allow for visual inspection for the purpose of determination of quantities, amounts, and unit counts.
- E. Store sensitive products in weathertight, climate-controlled enclosures in an environment favorable to product.
- F. For exterior storage of fabricated products, place on sloped supports above ground.
- G. Provide off-site storage and protection when site does not permit on-site storage or protection.
- H. Protect products from damage or deterioration due to construction operations, weather, precipitation, humidity, temperature, sunlight and ultraviolet light, dirt, dust, and other contaminants.
- I. Comply with manufacturer's warranty conditions, if any.
- J. Cover products subject to deterioration with impervious sheet covering. Provide ventilation to prevent condensation and degradation of products.
- K. Prevent contact with material that may cause corrosion, discoloration, or staining.
- L. Provide equipment and personnel to store products by methods to prevent soiling, disfigurement, or damage.
- M. Arrange storage of products to permit access for inspection. Periodically inspect to verify products are undamaged and are maintained in acceptable condition.

END OF SECTION

SECTION 01 7000 - EXECUTION AND CLOSEOUT REQUIREMENTS

PART 1 GENERAL

1.01 SECTION INCLUDES

- A. Examination, preparation, and general installation procedures.
- B. Requirements for alterations work, including selective demolition.
- C. Pre-installation meetings.
- D. Cutting and patching.
- E. Surveying for laying out the work.
- F. Cleaning and protection.
- G. Starting of systems and equipment.
- H. Demonstration and instruction of Owner personnel.
- I. Closeout procedures, including Contractor's Correction Punch List, except payment procedures.
- J. General requirements for maintenance service.

1.02 RELATED REQUIREMENTS

- A. Section 01 1000 - Summary: Limitations on working in existing building; continued occupancy; work sequence; identification of salvaged and relocated materials.
- B. Section 01 3000 - Administrative Requirements: Submittals procedures, Electronic document submittal service.
- C. Section 01 4000 - Quality Requirements: Testing and inspection procedures.
- D. Section 01 5000 - Temporary Facilities and Controls: Temporary interior partitions.
- E. Section 01 7900 - Demonstration and Training: Demonstration of products and systems to be commissioned and where indicated in specific specification sections
- F. Section 01 9113 - General Commissioning Requirements: Contractor's responsibilities in regard to commissioning.
- G. Individual Product Specification Sections:
 - 1. Advance notification to other sections of openings required in work of those sections.
 - 2. Limitations on cutting structural members.

1.03 REFERENCE STANDARDS

- A. NFPA 241 - Standard for Safeguarding Construction, Alteration, and Demolition Operations; 2013.

1.04 SUBMITTALS

- A. See Section 01 3000 - Administrative Requirements, for submittal procedures.
- B. Cutting and Patching: Submit written request in advance of cutting or alteration that affects:
 - 1. Structural integrity of any element of Project.
 - 2. Integrity of weather exposed or moisture resistant element.
 - 3. Efficiency, maintenance, or safety of any operational element.
 - 4. Visual qualities of sight exposed elements.
 - 5. Work of Owner or separate Contractor.
 - 6. Include in request:
 - a. Identification of Project.
 - b. Location and description of affected work.
 - c. Necessity for cutting or alteration.
 - d. Description of proposed work and products to be used.
 - e. Alternatives to cutting and patching.
- C. Project Record Documents: Accurately record actual locations of capped and active utilities.

1.05 PROJECT CONDITIONS

- A. Grade site to drain. Maintain excavations free of water. Provide, operate, and maintain pumping equipment.
- B. Protect site from puddling or running water. Provide water barriers as required to protect site from soil erosion.
- C. Perform dewatering activities, as required, for the duration of the project.
- D. Ventilate enclosed areas to assist cure of materials, to dissipate humidity, and to prevent accumulation of dust, fumes, vapors, or gases.
- E. Dust Control: Execute work by methods to minimize raising dust from construction operations. Provide positive means to prevent air-borne dust from dispersing into atmosphere and over adjacent property.
- F. Noise Control: Provide methods, means, and facilities to minimize noise produced by construction operations.
- G. Pest and Rodent Control: Provide methods, means, and facilities to prevent pests and insects from damaging the work.
- H. Rodent Control: Provide methods, means, and facilities to prevent rodents from accessing or invading premises.
- I. Pollution Control: Provide methods, means, and facilities to prevent contamination of soil, water, and atmosphere from discharge of noxious, toxic substances, and pollutants produced by construction operations. Comply with federal, state, and local regulations.

1.06 COORDINATION

- A. Coordinate scheduling, submittals, and work of the various sections of the Project Manual to ensure efficient and orderly sequence of installation of interdependent construction elements.
- B. Verify that utility requirements and characteristics of new operating equipment are compatible with building utilities. Coordinate work of various sections having interdependent responsibilities for installing, connecting to, and placing in service, such equipment.
- C. Coordinate space requirements, supports, and installation of mechanical and electrical work that are indicated diagrammatically on drawings. Follow routing indicated for pipes, ducts, and conduit, as closely as practicable; place runs parallel with lines of building. Utilize spaces efficiently to maximize accessibility for other installations, for maintenance, and for repairs.
- D. In finished areas except as otherwise indicated, conceal pipes, ducts, and wiring within the construction. Coordinate locations of fixtures and outlets with finish elements.
- E. Coordinate completion and clean-up of work of separate sections.
- F. After Owner occupancy of premises, coordinate access to site for correction of defective work and work not in accordance with Contract Documents, to minimize disruption of Owner's activities.

PART 2 PRODUCTS

2.01 PATCHING MATERIALS

- A. New Materials: As specified in product sections; match existing products and work for patching and extending work.
- B. Type and Quality of Existing Products: Determine by inspecting and testing products where necessary, referring to existing work as a standard.

PART 3 EXECUTION

3.01 EXAMINATION

- A. Verify that existing site conditions and substrate surfaces are acceptable for subsequent work. Start of work means acceptance of existing conditions.
- B. Verify that existing substrate is capable of structural support or attachment of new work being applied or attached.
- C. Examine and verify specific conditions described in individual specification sections.

- D. Take field measurements before confirming product orders or beginning fabrication, to minimize waste due to over-ordering or misfabrication.
- E. Verify that utility services are available, of the correct characteristics, and in the correct locations.
- F. Prior to Cutting: Examine existing conditions prior to commencing work, including elements subject to damage or movement during cutting and patching. After uncovering existing work, assess conditions affecting performance of work. Beginning of cutting or patching means acceptance of existing conditions.

3.02 PREPARATION

- A. Clean substrate surfaces prior to applying next material or substance.
- B. Seal cracks or openings of substrate prior to applying next material or substance.
- C. Apply manufacturer required or recommended substrate primer, sealer, or conditioner prior to applying any new material or substance in contact or bond.

3.03 PREINSTALLATION MEETINGS

- A. Require attendance of parties directly affecting, or affected by, work of the specific section.
- B. Notify Architect seven days in advance of meeting date.
- C. Prepare agenda and preside at meeting:
 - 1. Review conditions of examination, preparation and installation procedures.
 - 2. Review coordination with related work.

3.04 LAYING OUT THE WORK

- A. Verify locations of survey control points prior to starting work.
- B. Promptly notify Architect of any discrepancies discovered.
- C. Protect survey control points prior to starting site work; preserve permanent reference points during construction.
- D. Promptly report to Architect the loss or destruction of any reference point or relocation required because of changes in grades or other reasons.
- E. Replace dislocated survey control points based on original survey control. Make no changes without prior written notice to Architect.
- F. Utilize recognized engineering survey practices.
- G. Establish elevations, lines and levels. Locate and lay out by instrumentation and similar appropriate means:
 - 1. Site improvements including pavements; stakes for grading, fill and topsoil placement; utility locations, slopes, and invert elevations.
 - 2. Grid or axis for structures.
 - 3. Building foundation, column locations, ground floor elevations.
- H. Periodically verify layouts by same means.

3.05 GENERAL INSTALLATION REQUIREMENTS

- A. Install products as specified in individual sections, in accordance with manufacturer's instructions and recommendations, and so as to avoid waste due to necessity for replacement.
- B. Make vertical elements plumb and horizontal elements level, unless otherwise indicated.
- C. Install equipment and fittings plumb and level, neatly aligned with adjacent vertical and horizontal lines, unless otherwise indicated.
- D. Make consistent texture on surfaces, with seamless transitions, unless otherwise indicated.
- E. Make neat transitions between different surfaces, maintaining texture and appearance.

3.06 CUTTING AND PATCHING

- A. Whenever possible, execute the work by methods that avoid cutting or patching.
- B. Perform whatever cutting and patching is necessary to:
 - 1. Complete the work.

2. Fit products together to integrate with other work.
3. Provide openings for penetration of mechanical, electrical, and other services.
4. Match work that has been cut to adjacent work.
5. Repair areas adjacent to cuts to required condition.
6. Repair new work damaged by subsequent work.
7. Remove samples of installed work for testing when requested.
8. Remove and replace defective and non-complying work.
- C. Execute work by methods that avoid damage to other work and that will provide appropriate surfaces to receive patching and finishing. In existing work, minimize damage and restore to original condition.
- D. Cut rigid materials using masonry saw or core drill. Pneumatic tools not allowed without prior approval.
- E. Restore work with new products in accordance with requirements of Contract Documents.
- F. Fit work air tight to pipes, sleeves, ducts, conduit, and other penetrations through surfaces.
- G. At penetrations of fire rated walls, partitions, ceiling, or floor construction, completely seal voids with fire rated material in accordance with Section 07 8400, to full thickness of the penetrated element.
- H. Patching:
 1. Finish patched surfaces to match finish that existed prior to patching. On continuous surfaces, refinish to nearest intersection or natural break. For an assembly, refinish entire unit.
 2. Match color, texture, and appearance.
 3. Repair patched surfaces that are damaged, lifted, discolored, or showing other imperfections due to patching work. If defects are due to condition of substrate, repair substrate prior to repairing finish.

3.07 PROGRESS CLEANING

- A. Maintain areas free of waste materials, debris, and rubbish. Maintain site in a clean and orderly condition.
- B. Remove debris and rubbish from pipe chases, plenums, attics, crawl spaces, and other closed or remote spaces, prior to enclosing the space.
- C. Broom and vacuum clean interior areas prior to start of surface finishing, and continue cleaning to eliminate dust.
- D. Collect and remove waste materials, debris, and trash/rubbish from site periodically and dispose off-site; do not burn or bury.

3.08 PROTECTION OF INSTALLED WORK

- A. Protect installed work from damage by construction operations.
- B. Provide special protection where specified in individual specification sections.
- C. Provide temporary and removable protection for installed products. Control activity in immediate work area to prevent damage.
- D. Protect finished floors, stairs, and other surfaces from traffic, dirt, wear, damage, or movement of heavy objects, by protecting with durable sheet materials.
- E. Protect work from spilled liquids. If work is exposed to spilled liquids, immediately remove protective coverings, dry out work, and replace protective coverings.
- F. Prohibit traffic or storage upon waterproofed or roofed surfaces. If traffic or activity is necessary, obtain recommendations for protection from waterproofing or roofing material manufacturer.
- G. Remove protective coverings when no longer needed; reuse or recycle coverings if possible.

3.09 SYSTEM STARTUP

- A. Coordinate with requirements of Section 01 9113 - General Commissioning Requirements.
- B. Coordinate schedule for start-up of various equipment and systems.
- C. Verify that each piece of equipment or system has been checked for proper lubrication, drive rotation, belt tension, control sequence, and for conditions that may cause damage.
- D. Verify tests, meter readings, and specified electrical characteristics agree with those required by the equipment or system manufacturer.

- E. Verify that wiring and support components for equipment are complete and tested.
- F. Execute start-up under supervision of applicable Contractor personnel in accordance with manufacturers' instructions.
- G. When specified in individual specification Sections, require manufacturer to provide authorized representative to be present at site to inspect, check, and approve equipment or system installation prior to start-up, and to supervise placing equipment or system in operation.
- H. Submit a written report that equipment or system has been properly installed and is functioning correctly.

3.10 DEMONSTRATION AND INSTRUCTION

- A. See Section 01 7900 - Demonstration and Training.

3.11 ADJUSTING

- A. Adjust operating products and equipment to ensure smooth and unhindered operation.

3.12 FINAL CLEANING

- A. Execute final cleaning prior to Substantial Completion.
- B. Use cleaning materials that are nonhazardous.
- C. Clean interior and exterior glass, surfaces exposed to view; remove temporary labels, stains and foreign substances, polish transparent and glossy surfaces, vacuum carpeted and soft surfaces.
- D. Remove all labels that are not permanent. Do not paint or otherwise cover fire test labels or nameplates on mechanical and electrical equipment.
- E. Clean equipment and fixtures to a sanitary condition with cleaning materials appropriate to the surface and material being cleaned.
- F. Replace filters of operating equipment.
- G. Clean debris from roofs, downspouts, scuppers, overflow drains, and area drains.
- H. Clean site; sweep paved areas, rake clean landscaped surfaces.
- I. Remove waste, surplus materials, trash/rubbish, and construction facilities from the site; dispose of in legal manner; do not burn or bury.

3.13 CLOSEOUT PROCEDURES

- A. Make submittals that are required by governing or other authorities.
- B. Notify Architect when work is considered ready for Architect's Substantial Completion inspection.
- C. Submit written certification containing Contractor's Correction Punch List, that Contract Documents have been reviewed, work has been inspected, and that work is complete in accordance with Contract Documents and ready for Architect's Substantial Completion inspection.
- D. Conduct Substantial Completion inspection and create Final Correction Punch List containing Architect's and Contractor's comprehensive list of items identified to be completed or corrected and submit to Architect.
- E. Correct items of work listed in Final Correction Punch List and comply with requirements for access to Owner-occupied areas.
- F. Complete items of work determined by Architect listed in executed Certificate of Substantial Completion.

3.14 MAINTENANCE

- A. Provide service and maintenance of components indicated in specification sections.
- B. Maintenance Period: As indicated in specification sections or, if not indicated, not less than one year from the Date of Substantial Completion or the length of the specified warranty, whichever is longer.
- C. Examine system components at a frequency consistent with reliable operation. Clean, adjust, and lubricate as required.
- D. Include systematic examination, adjustment, and lubrication of components. Repair or replace parts whenever required. Use parts produced by the manufacturer of the original component.

- E. Maintenance service shall not be assigned or transferred to any agent or subcontractor without prior written consent of the Owner.

END OF SECTION

SECTION 01 7800 - CLOSEOUT SUBMITTALS

PART 1 GENERAL

1.01 SECTION INCLUDES

- A. Project record documents.
- B. Operation and maintenance data.
- C. Warranties and bonds.

1.02 RELATED REQUIREMENTS

- A. Section 00 700 - General Conditions: Performance bond and labor and material payment bonds, warranty, and correction of work.
- B. Section 01 3000 - Administrative Requirements: Submittals procedures, shop drawings, product data, and samples.
- C. Section 01 7000 - Execution and Closeout Requirements: Contract closeout procedures.
- D. Individual Product Sections: Specific requirements for operation and maintenance data.
- E. Individual Product Sections: Warranties required for specific products or Work.

1.03 SUBMITTALS

- A. Project Record Documents: Submit documents to Architect in electronic format for review prior to inclusion in closeout submittals.
- B. Operation and Maintenance Data:
 - 1. Submit a preliminary draft of proposed formats and outlines of contents before start of Work. Architect will review and return with comments.
 - 2. For equipment, or component parts of equipment put into service during construction and operated by Owner, submit completed documents within ten days after acceptance.
 - 3. Submit two sets of revised final documents in electronic format within 30 days after final inspection.
- C. Warranties and Bonds:
 - 1. For equipment or component parts of equipment put into service during construction with Owner's permission, submit documents within 10 days after acceptance.
 - 2. Make other submittals within 30 days after Date of Substantial Completion, prior to final Application for Payment.
 - 3. For items of Work for which acceptance is delayed beyond Date of Substantial Completion, submit within 10 days after acceptance, listing the date of acceptance as the beginning of the warranty period.

PART 2 PRODUCTS - NOT USED

PART 3 EXECUTION

3.01 PROJECT RECORD DOCUMENTS

- A. Maintain on site one set of the following record documents; record actual revisions to the Work:
 - 1. Drawings.
 - 2. Specifications.
 - 3. Addenda.
 - 4. Change Orders and other modifications to the Contract.
 - 5. Reviewed shop drawings, product data, and samples.
- B. Ensure entries are complete and accurate, enabling future reference by Owner.
- C. Store record documents separate from documents used for construction.
- D. Record information concurrent with construction progress.
- E. Record Drawings and Shop Drawings: Legibly mark each item to record actual construction including:

1. Measured depths of foundations in relation to finish first floor datum.
 2. Measured horizontal and vertical locations of underground utilities and appurtenances, referenced to permanent surface improvements.
 3. Measured locations of internal utilities and appurtenances concealed in construction, referenced to visible and accessible features of the Work.
 4. Field changes of dimension and detail.
 5. Details not on original Contract drawings.
- F. Upon completion of the project, have the record drawings scanned into electronic PDF format and provide a separate folder labeled as "AS-BUILT DRAWNGS".

3.02 OPERATION AND MAINTENANCE DATA

- A. Source Data: For each product or system, list names, addresses and telephone numbers of Subcontractors and suppliers, including local source of supplies and replacement parts.
- B. Product Data: Mark each sheet to clearly identify specific products and component parts, and data applicable to installation. Delete inapplicable information.
- C. Drawings: Supplement product data to illustrate relations of component parts of equipment and systems, to show control and flow diagrams. Do not use Project Record Documents as maintenance drawings.
- D. Typed Text: As required to supplement product data. Provide logical sequence of instructions for each procedure, incorporating manufacturer's instructions.

3.03 OPERATION AND MAINTENANCE DATA FOR MATERIALS AND FINISHES

- A. For Each Product, Applied Material, and Finish:
 1. Product data, with catalog number, size, composition, and color and texture designations.
- B. Instructions for Care and Maintenance: Manufacturer's recommendations for cleaning agents and methods, precautions against detrimental cleaning agents and methods, and recommended schedule for cleaning and maintenance.
- C. Moisture protection and weather-exposed products: Include product data listing applicable reference standards, chemical composition, and details of installation. Provide recommendations for inspections, maintenance, and repair.
- D. Where additional instructions are required, beyond the manufacturer's standard printed instructions, have instructions prepared by personnel experienced in the operation and maintenance of the specific products.

3.04 OPERATION AND MAINTENANCE DATA FOR EQUIPMENT AND SYSTEMS

- A. For Each Item of Equipment and Each System:
 1. Description of unit or system, and component parts.
 2. Identify function, normal operating characteristics, and limiting conditions.
 3. Include performance curves, with engineering data and tests.
 4. Complete nomenclature and model number of replaceable parts.
- B. Where additional instructions are required, beyond the manufacturer's standard printed instructions, have instructions prepared by personnel experienced in the operation and maintenance of the specific products.
- C. Panelboard Circuit Directories: Provide electrical service characteristics, controls, and communications; typed.
- D. Include color coded wiring diagrams as installed.
- E. Operating Procedures: Include start-up, break-in, and routine normal operating instructions and sequences. Include regulation, control, stopping, shut-down, and emergency instructions. Include summer, winter, and any special operating instructions.
- F. Maintenance Requirements: Include routine procedures and guide for preventative maintenance and trouble shooting; disassembly, repair, and reassembly instructions; and alignment, adjusting, balancing, and checking instructions.
- G. Provide servicing and lubrication schedule, and list of lubricants required.
- H. Include manufacturer's printed operation and maintenance instructions.
- I. Include sequence of operation by controls manufacturer.

- J. Provide original manufacturer's parts list, illustrations, assembly drawings, and diagrams required for maintenance.
- K. Provide control diagrams by controls manufacturer as installed.
- L. Provide charts of valve tag numbers, with location and function of each valve, keyed to flow and control diagrams.
- M. Provide list of original manufacturer's spare parts, current prices, and recommended quantities to be maintained in storage.
- N. Include test and balancing reports.
- O. Additional Requirements: As specified in individual product specification sections.

3.05 ASSEMBLY OF ELECTRONIC OPERATION AND MAINTENANCE MANUALS

- A. Assemble operation and maintenance data into electronic manuals for Owner's personnel use, with data arranged in the same sequence as, and identified by, the specification sections as outlined below. Deliver on USB thumbdrive- 2 required.
- B. Where systems involve more than one specification section, provide separate folder for each system. Label systems to coincide with construction drawings (ie: RTU-1, AHU-2 etc)
- C. Project Directory: Title and address of Project; names, addresses, and telephone numbers of Architect, Consultants, Contractor and subcontractors, with names of responsible parties.
- D. Tables of Contents: List every item separated into folders, using the same identification as on the folder tab.
- E. Text: Manufacturer's printed data in PDF format.
- F. Drawings: Provide full size drawings in PDF format.
- G. Arrangement of Contents: Organize electronic data in folders as follows:
 - 1. Project Directory.
 - 2. Index of Contents, of all volumes, and of this volume.
 - 3. Separate folders for each specification division, then separate folders within that for each item:
 - ie. DIVISION 8 -OPENINGS (folder)
 - 08 1113 - Hollow Metal Doors & Frames (folder)
 - 08 1416 - Flush Wood Doors (folder)
 - etc...
 - 4. Within each individual section provide the following information (as applicable):
 - a. Electronic copy of warranties
 - b. Copy of the approved submittal and shop drawing
 - c. Installation instructions
 - d. Operation and Maintenance data
 - e. Cleaning information
 - f. Parts Lists
 - 5. For mechanical and electrical equipment, label equipment sections within each category to coincide with the construction drawings (ie. RTU-1, AHU-2 etc).
 - a. In addition to the information required above, also provide:
 - b. Manufacturer's instructions and/or installation Manual
 - c. Manufacturer's service manual
 - d. Required filter sizes.
 - e. Manufacturer's lubrication chart listing types of lubricant to be used on each item of equipment and recommended frequency of lubrication.
 - f. Electrical diagrams of each equipment "packaged" control system.
 - g. Parts lists and identifying part numbers with prices of each part. The name and address of the nearest distributor from which parts can be obtained.
- H. Bookmark each individual section to allow immediate access to desired information.
- I. Submittals that are incomplete, or not properly subdivided into folders and appropriately bookmarked will be rejected.

3.06 WARRANTIES AND BONDS

- A. Obtain warranties and bonds, executed in duplicate by responsible Subcontractors, suppliers, and manufacturers, within 10 days after completion of the applicable item of work. Except for items put into use with Owner's permission, leave date of beginning of time of warranty until Date of Substantial completion is determined.
- B. Verify that documents are in proper form, contain full information, and are notarized (when required).
- C. Co-execute submittals when required.
- D. Retain warranties and bonds until time specified for submittal.
- E. Hardcopy Manual: In addition to the electronic copy included in the individual sections, bind the original in a commercial quality 8-1/2 by 11 inch three D side ring binder with durable plastic covers.
- F. Cover: Identify the binder with typed or printed title WARRANTIES AND BONDS, with title of Project; name, address and telephone number of Contractor; and name of responsible company principal.
- G. Table of Contents: Neatly typed, in the sequence of the Table of Contents of the Project Manual, with each item identified with the number and title of the specification section in which specified, and the name of product or work item.
- H. Separate each warranty or bond indexed to the Table of Contents listing. List Subcontractor, supplier, and manufacturer, with name, address, and telephone number of responsible principal.

END OF SECTION

SECTION 01 7900 - DEMONSTRATION AND TRAINING

PART 1 GENERAL

1.01 SUMMARY

- A. Demonstration of products and systems where indicated in specific specification sections.
- B. Training of Owner personnel in operation and maintenance is required for:
 - 1. All software-operated systems.
 - 2. HVAC systems and equipment.
 - 3. Plumbing equipment.
 - 4. Electrical systems and equipment.
 - 5. Items specified in individual product Sections.
- C. Training of Owner personnel in care, cleaning, maintenance, and repair is required for:
 - 1. Finishes, including flooring, wall finishes, ceiling finishes.

1.02 RELATED REQUIREMENTS

- A. Section 01 7800 - Closeout Submittals: Operation and maintenance manuals.
- B. Other Specification Sections: Additional requirements for demonstration and training.

1.03 SUBMITTALS

- A. See Section 01 3000 - Administrative Requirements, for submittal procedures.
- B. Training Manuals: Provide training manual for each attendee; allow for minimum of two attendees per training session.
 - 1. Include applicable portion of O&M manuals.
 - 2. Include copies of all hand-outs, slides, overheads, video presentations, etc., that are not included in O&M manuals.
 - 3. Provide one extra copy of each training manual to be included with operation and maintenance data.
- C. Training Reports:
 - 1. Identification of each training session, date, time, and duration.
 - 2. Sign-in sheet showing names and job titles of attendees.
 - 3. List of attendee questions and written answers given, including copies of and references to supporting documentation required for clarification; include answers to questions that could not be answered in original training session.
- D. Video Recordings: Submit digital video recording of each demonstration and training session for Owner's subsequent use.
 - 1. Format: DVD Disc or USB thumbdrive.
 - 2. Label each disc and container with session identification and date.

1.04 QUALITY ASSURANCE

- A. Instructor Qualifications: Familiar with design, operation, maintenance and troubleshooting of the relevant products and systems.
 - 1. Provide as instructors the most qualified trainer of those contractors and/or installers who actually supplied and installed the systems and equipment.
 - 2. Where a single person is not familiar with all aspects, provide specialists with necessary qualifications.

PART 2 PRODUCTS - NOT USED

PART 3 EXECUTION

3.01 DEMONSTRATION - GENERAL

- A. Demonstrations conducted during system start-up do not qualify as demonstrations for the purposes of this section, unless approved in advance by Owner.
- B. Demonstration may be combined with Owner personnel training if applicable.
- C. Operating Equipment and Systems: Demonstrate operation in all modes, including start-up, shut-down, seasonal changeover, emergency conditions, and troubleshooting, and maintenance procedures, including scheduled and preventive maintenance.
 - 1. For equipment or systems requiring seasonal operation, perform demonstration for other season within six months.
- D. Non-Operating Products: Demonstrate cleaning, scheduled and preventive maintenance, and repair procedures.

3.02 TRAINING - GENERAL

- A. Conduct training on-site unless otherwise indicated.
- B. Owner will provide classroom and seating at no cost to Contractor.
- C. Provide training in minimum two hour segments.
- D. Training schedule will be subject to availability of Owner's personnel to be trained; re-schedule training sessions as required by Owner; once schedule has been approved by Owner failure to conduct sessions according to schedule will be cause for Owner to charge Contractor for personnel "show-up" time.
- E. Review of Facility Policy on Operation and Maintenance Data: During training discuss:
 - 1. The location of the O&M manuals and procedures for use and preservation; backup copies.
 - 2. Typical contents and organization of all manuals, including explanatory information, system narratives, and product specific information.
- F. Product- and System-Specific Training:
 - 1. Review the applicable O&M manuals.
 - 2. For systems, provide an overview of system operation, design parameters and constraints, and operational strategies.
 - 3. Review instructions for proper operation in all modes, including start-up, shut-down, seasonal changeover and emergency procedures, and for maintenance, including preventative maintenance.
 - 4. Provide hands-on training on all operational modes possible and preventive maintenance.
 - 5. Emphasize safe and proper operating requirements; discuss relevant health and safety issues and emergency procedures.
 - 6. Discuss common troubleshooting problems and solutions.
 - 7. Discuss any peculiarities of equipment installation or operation.
 - 8. Discuss warranties and guarantees, including procedures necessary to avoid voiding coverage.
 - 9. Review recommended tools and spare parts inventory suggestions of manufacturers.
 - 10. Review spare parts and tools required to be furnished by Contractor.
 - 11. Review spare parts suppliers and sources and procurement procedures.
- G. Be prepared to answer questions raised by training attendees; if unable to answer during training session, provide written response within three days.

END OF SECTION

SECTION 01 9113 - GENERAL COMMISSIONING REQUIREMENTS

PART 1 GENERAL

1.01 SUMMARY

- A. Commissioning is intended to achieve the following specific objectives; this section specifies the Contractor's responsibilities for commissioning:
 - 1. Verify that the work is installed in accordance with Contract Documents and the manufacturer's recommendations and instructions, and that it receives adequate operational checkout prior to startup: Startup reports and Prefunctional Checklists executed by Contractor are utilized to achieve this.
 - 2. Verify and document that functional performance is in accordance with Contract Documents: Functional Tests executed by Contractor and witnessed by the Commissioning Authority are utilized to achieve this.
 - 3. Verify that operation and maintenance manuals submitted to Owner are complete: Detailed operation and maintenance (O&M) data submittals by Contractor are utilized to achieve this.
 - 4. Verify that the Owner's operating personnel are adequately trained: Formal training conducted by Contractor is utilized to achieve this.
- B. The Commissioning Authority directs and coordinates all commissioning activities; this section describes some but not all of the Commissioning Authority's responsibilities.
- C. The Commissioning Authority is employed by Contractor.

1.02 RELATED REQUIREMENTS

- A. Section 01 7800 - Closeout Submittals: Scope and procedures for operation and maintenance manuals and project record documents.
- B. Section 23 0800 - Commissioning of HVAC and Mechanical Systems: HVAC control system testing; other requirements.
- C. Section 26 0800 - Commissioning of Electrical Systems.

1.03 REFERENCE STANDARDS

- A. ASHRAE Std 202 - Commissioning Process for Buildings and Systems; 2018.
- B. NEBB S110 - Whole Building Technical Commissioning Of New Construction; 2018.
- C. PECO (Samples) - Sample Forms for Prefunctional Checklists and Functional Performance Tests; Current Edition.

1.04 SUBMITTALS

- A. See Section 01 3000 - Administrative Requirements, for submittal procedures; except:
- B. Product Data: If submittals to Architect do not include the following, submit copies as soon as possible:
 - 1. Manufacturer's product data, cut sheets, and shop drawings.
 - 2. Manufacturer's installation instructions.
 - 3. Startup, operating, and troubleshooting procedures.
 - 4. Fan and pump curves.
 - 5. Factory test reports.
 - 6. Warranty information, including details of Owner's responsibilities in regard to keeping warranties in force.
- C. Manufacturers' Instructions: Submit copies of all manufacturer-provided instructions that are shipped with the equipment as soon as the equipment is delivered.
- D. Startup Plans and Reports.
- E. Completed Prefunctional Checklists.
- F. Commissioning Issues Log:
 - 1. Construction observations.
 - 2. Supporting photographs.

1.05 QUALITY ASSURANCE

- A. Testing Agency Qualifications: Independent firm specializing in performing testing and inspections of the type specified in this section.

PART 2 PRODUCTS

2.01 TEST EQUIPMENT

- A. Provide all standard testing equipment required to perform startup and initial checkout and required Functional Testing; unless otherwise noted such testing equipment will NOT become the property of Owner.
- B. Calibration Tolerances: Provide testing equipment of sufficient quality and accuracy to test and/or measure system performance with the tolerances specified. If not otherwise noted, the following minimum requirements apply:
 - 1. Temperature Sensors and Digital Thermometers: Certified calibration within past year to accuracy of 0.5 degree F and resolution of plus/minus 0.1 degree F.
 - 2. Pressure Sensors: Accuracy of plus/minus 2.0 percent of the value range being measured (not full range of meter), calibrated within the last year.
 - 3. Calibration: According to the manufacturer's recommended intervals and when dropped or damaged; affix calibration tags or keep certificates readily available for inspection.
- C. Equipment-Specific Tools: Where special testing equipment, tools and instruments are specific to a piece of equipment, are only available from the vendor, and are required in order to accomplish startup or Functional Testing, provide such equipment, tools, and instruments as part of the work at no extra cost to Owner; such equipment, tools, and instruments are to become the property of Owner.

PART 3 EXECUTION

3.01 COMMISSIONING PLAN

- A. Contractor is responsible for compliance with the Commissioning Plan.
- B. Commissioning Plan: The commissioning schedule, procedures, and coordination requirements for all parties in the commissioning process.
- C. Commissioning Schedule:
 - 1. Re-submit anticipated startup dates monthly, but not less than 4 weeks prior to startup.
 - 2. Prefunctional Checklists and Functional Tests are to be performed in sequence from components, to subsystems, to systems.
 - 3. Provide sufficient notice to Commissioning Authority for delivery of relevant Checklists and Functional Test procedures, to avoid delay.

3.02 STARTUP PLANS AND REPORTS

- A. Startup Plans: For each item of equipment and system for which the manufacturer provides a startup plan, submit the plan not less than 8 weeks prior to startup.
- B. Startup Reports: For each item of equipment and system for which the manufacturer provides a startup checklist (or startup plan or field checkout sheet), document compliance by submitting the completed startup checklist prior to startup, signed and dated by responsible entity.
- C. Submit directly to the Commissioning Authority with a copy to the Architect.

3.03 PREFUNCTIONAL CHECKLISTS

- A. A Prefunctional Checklist is required to be filled out for each item of equipment or other assembly specified to be commissioned.
 - 1. No sampling of identical or near-identical items is allowed.
 - 2. These checklists do not replace manufacturers' recommended startup checklists, regardless of apparent redundancy.

3. Prefunctional Checklist forms will not be complete until after award of the contract; the following types of information will be gathered via the completed Checklist forms:
 - a. Certification by installing contractor that the unit is properly installed, started up, and operating and ready for Functional Testing.
 - b. Confirmation of receipt of each shop drawing and commissioning submittal specified, itemized by unit.
 - c. Manufacturer, model number, and relevant capacity information; list information "as specified," "as submitted," and "as installed."
 - d. Serial number of installed unit.
 - e. List of inspections to be conducted to document proper installation prior to startup and Functional Testing; these will be primarily static inspections and procedures; for equipment and systems may include normal manufacturer's start-up checklist items and minor testing.
 - f. Sensor and actuator calibration information.
- B. Deficiencies: Correct deficiencies and re-inspect or re-test, as applicable, at no extra cost to Owner.

3.04 FUNCTIONAL TESTS

- A. A Functional Test is required for each item of equipment, system, or other assembly specified to be commissioned, unless sampling of multiple identical or near-identical units is allowed by the final test procedures.
- B. Contractor is responsible for execution of required Functional Tests, after completion of Prefunctional Checklist and before closeout.
- C. Functional Test Procedures:
 1. Examples of Functional Testing:
 - a. Test the dynamic function and operation of equipment and systems (rather than just components) using manual (direct observation) or monitoring methods under full operation (e.g., the chiller pump is tested interactively with the chiller functions to see if the pump ramps up and down to maintain the differential pressure setpoint).
 - b. Systems are tested under various modes, such as during low cooling or heating loads, high loads, component failures, unoccupied, varying outside air temperatures, fire alarm, power failure, etc.
 - c. Systems are run through all the HVAC control system's sequences of operation and components are verified to be responding as the sequence's state.
- D. Deferred Functional Tests: Some tests may need to be performed later, after substantial completion, due to partial occupancy, equipment, seasonal requirements, design or other site conditions; performance of these tests remains the Contractor's responsibility regardless of timing.

3.05 SENSOR AND ACTUATOR CALIBRATION

- A. Calibrate all field-installed temperature, relative humidity, carbon monoxide, carbon dioxide, and pressure sensors and gauges, and all actuators (dampers and valves) on this piece of equipment shall be calibrated. Sensors installed in the unit at the factory with calibration certification provided need not be field calibrated.
- B. All Sensors:
 1. Verify that sensor location is appropriate and away from potential causes of erratic operation.
 2. Verify that sensors with shielded cable are grounded only at one end.
 3. For sensor pairs that are used to determine a temperature or pressure difference, for temperature make sure they are reading within 0.2 degree F of each other, and for pressure, within tolerance equal to 2 percent of the reading, of each other.
 4. Tolerances for critical applications may be tighter.
- C. Sensors Without Transmitters - Standard Application:
 1. Make a reading with a calibrated test instrument within 6 inches of the site sensor.
 2. Verify that the sensor reading, via the permanent thermostat, gauge or building automation system, is within the tolerances in the table below of the instrument-measured value.
 3. If not, install offset, calibrate or replace sensor.
- D. Sensors With Transmitters - Standard Application.

1. Disconnect sensor.
 2. Connect a signal generator in place of sensor.
 3. Connect ammeter in series between transmitter and building automation system control panel.
 4. Using manufacturer's resistance-temperature data, simulate minimum desired temperature.
 5. Adjust transmitter potentiometer zero until 4 mA is read by the ammeter.
 6. Repeat for the maximum temperature matching 20 mA to the potentiometer span or maximum and verify at the building automation system.
 7. Record all values and recalibrate controller as necessary to comply with specified control ramps, reset schedules, proportional relationship, reset relationship and P/I reaction.
 8. Reconnect sensor.
 9. Make a reading with a calibrated test instrument within 6 inches of the site sensor.
 10. Verify that the sensor reading, via the permanent thermostat, gauge or building automation system, is within the tolerances in the table below of the instrument-measured value.
 11. If not, replace sensor and repeat.
 12. For pressure sensors, perform a similar process with a suitable signal generator.
 - E. Sensor Tolerances for Standard Applications: Plus/minus the following maximums:
 1. Watthour, Voltage, Amperage: 1 percent of design.
 2. Pressure, Air, Water, Gas: 3 percent of design.
 3. Air Temperatures (Outside Air, Space Air, Duct Air): 0.4 degrees F.
 4. Relative Humidity: 4 percent of design.
 5. Barometric Pressure: 0.1 inch of Hg.
 6. Flow Rate, Air: 10 percent of design.
 7. Flow Rate, Water: 4 percent of design.
 8. AHU Wet Bulb and Dew Point: 2.0 degrees F.
 - F. Critical Applications: For some applications more rigorous calibration techniques may be required for selected sensors. Describe any such methods used on an attached sheet.
 - G. Valve/Damper Stroke Setup and Check:
 1. For all valve/damper actuator positions checked, verify the actual position against the control system readout.
 2. Set pump/fan to normal operating mode.
 3. Command valve/damper closed; visually verify that valve/damper is closed and adjust output zero signal as required.
 4. Command valve/damper to open; verify position is full open and adjust output signal as required.
 5. Command valve/damper to a few intermediate positions.
 6. If actual valve/damper position does not reasonably correspond, replace actuator or add pilot positioner (for pneumatics).
 - H. Isolation Valve or System Valve Leak Check: For valves not associated with coils.
 1. With full pressure in the system, command valve closed.
 2. Use an ultra-sonic flow meter to detect flow or leakage.
- 3.06 TEST PROCEDURES - GENERAL
- A. Provide skilled technicians to execute starting of equipment and to execute the Functional Tests. Ensure that they are available and present during the agreed upon schedules and for sufficient duration to complete the necessary tests, adjustments and problem-solving.
 - B. Provide all necessary materials and system modifications required to produce the flows, pressures, temperatures, and conditions necessary to execute the test according to the specified conditions. At completion of the test, return all affected equipment and systems to their pre-test condition.
 - C. Sampling: Where Functional Testing of fewer than the total number of multiple identical or near-identical items is explicitly permitted, perform sampling as follows:
 1. Identical Units: Defined as units with same application and sequence of operation; only minor size or capacity difference.
 2. Sampling is not allowed for:
 - a. Major equipment.
 - b. Life-safety-critical equipment.

- c. Prefunctional Checklist execution.
 - 3. XX = the percent of the group of identical equipment to be included in each sample; defined for specific type of equipment.
 - 4. YY = the percent of the sample that if failed will require another sample to be tested; defined for specific type of equipment.
 - 5. Randomly test at least XX percent of each group of identical equipment, but not less than three units. This constitutes the "first sample."
 - 6. If YY percent of the units in the first sample fail, test another XX percent of the remaining identical units.
 - 7. If YY percent of the units in the second sample fail, test all remaining identical units.
 - D. Manual Testing: Use hand-held instruments, immediate control system readouts, or direct observation to verify performance (contrasted to analyzing monitored data taken over time to make the "observation").
 - E. Simulating Conditions: Artificially create the necessary condition for the purpose of testing the response of a system; for example apply hot air to a space sensor using a hair dryer to see the response in a VAV box.
 - F. Simulating Signals: Disconnect the sensor and use a signal generator to send an amperage, resistance or pressure to the transducer and control system to simulate the sensor value.
 - G. Over-Writing Values: Change the sensor value known to the control system in the control system to see the response of the system; for example, change the outside air temperature value from 50 degrees F to 75 degrees F to verify economizer operation.
 - H. Indirect Indicators: Remote indicators of a response or condition, such as a reading from a control system screen reporting a damper to be 100 percent closed, are considered indirect indicators.
 - I. Monitoring: Record parameters (flow, current, status, pressure, etc.) of equipment operation using dataloggers or the trending capabilities of the relevant control systems; where monitoring of specific points is called for in Functional Test Procedures:
 - 1. Provide hard copies of monitored data in columnar format with time down left column and at least 5 columns of point values on same page.
 - 2. Graphical output is desirable and is required for all output if the system can produce it.
 - 3. Monitoring may be used to augment manual testing.
- 3.07 OPERATION AND MAINTENANCE MANUALS
- A. See Section 01 7800 - Closeout Submittals for additional requirements.
 - B. Prior to assembling closeout documents, submit manuals related to items that were commissioned to Commissioning Authority for review; make changes recommended by Commissioning Authority.
 - C. Commissioning Authority will add commissioning records to manuals after submission to Owner and Architect.

END OF SECTION

SECTION 02 4100 - DEMOLITION

PART 1 GENERAL

1.01 SECTION INCLUDES

- A. Selective demolition of built site elements.
- B. Selective demolition of building elements for alteration purposes.

1.02 RELATED REQUIREMENTS

- A. Section 01 1000 - Summary: Limitations on Contractor's use of site and premises.
- B. Section 01 5000 - Temporary Facilities and Controls: Security, protective barriers, and waste removal.
- C. Section 01 5713 - Temporary Erosion and Sediment Control.
- D. Section 01 7000 - Execution and Closeout Requirements: Project conditions; protection of bench marks, survey control points, and existing construction to remain; reinstallation of removed products; temporary bracing and shoring.
- E. Section 31 2323 - Fill: Filling holes, pits, and excavations generated as a result of removal operations.

1.03 DEFINITIONS

- A. Remove: Detach or dismantle items from existing construction and dispose of them off site, unless items are indicated to be salvaged or reinstalled.
- B. Remove and Salvage: Detach or dismantle items from existing construction in a manner to prevent damage. Clean, package, label and deliver salvaged items to Owner in ready-for-reuse condition.
- C. Remove and Reinstall: Detach or dismantle items from existing construction in a manner to prevent damage. Clean and prepare for reuse and reinstall where indicated.
- D. Existing to Remain: Designation for existing items that are not to be removed and that are not otherwise indicated to be salvaged or reinstalled.

1.04 REFERENCE STANDARDS

- A. NFPA 241 - Standard for Safeguarding Construction, Alteration, and Demolition Operations; 2013.

PART 2 PRODUCTS - NOT USED

PART 3 EXECUTION

3.01 DEMOLITION

- A. Remove paving and curbs required to accomplish new work.
- B. Remove other items indicated, for disposal, unless specifically noted to return to Owner.

3.02 GENERAL PROCEDURES AND PROJECT CONDITIONS

- A. Comply with requirements in Section 01 7000.
- B. Comply with applicable codes and regulations for demolition operations and safety of adjacent structures and the public.
 - 1. Obtain required permits.
 - 2. Comply with applicable requirements of NFPA 241.
 - 3. Take precautions to prevent catastrophic or uncontrolled collapse of structures to be removed; do not allow worker or public access within range of potential collapse of unstable structures.
 - 4. Provide, erect, and maintain temporary barriers and security devices.
 - 5. Use physical barriers to prevent access to areas that could be hazardous to workers or the public.
 - 6. Conduct operations to minimize effects on and interference with adjacent structures and occupants.

7. Do not close or obstruct roadways or sidewalks without permits from authority having jurisdiction.
8. Conduct operations to minimize obstruction of public and private entrances and exits. Do not obstruct required exits at any time. Protect persons using entrances and exits from removal operations.
- C. Protect existing structures and other elements to remain in place and not removed.
 1. Provide bracing and shoring.
 2. Prevent movement or settlement of adjacent structures.
 3. Stop work immediately if adjacent structures appear to be in danger.
- D. Minimize production of dust due to demolition operations.
- E. Partial Removal of Paving and Curbs: Neatly saw cut at right angle to surface.

3.03 EXISTING UTILITIES

- A. Coordinate work with utility companies. Notify utilities before starting work, comply with their requirements, and obtain required permits.
- B. Protect existing utilities to remain from damage.
- C. Locate and mark utilities to remain; mark using highly visible tags or flags, with identification of utility type; protect from damage due to subsequent construction, using substantial barricades if necessary.
- D. Remove exposed piping, valves, meters, equipment, supports, and foundations of disconnected and abandoned utilities.
- E. Prepare building demolition areas by disconnecting and capping utilities outside the demolition zone. Identify and mark, in same manner as other utilities to remain, utilities to be reconnected.

3.04 SELECTIVE DEMOLITION FOR ALTERATIONS

- A. Existing construction and utilities indicated on drawings are based on casual field observation and existing record documents only.
 1. Verify construction and utility arrangements are as indicated.
 2. Report discrepancies to Architect before disturbing existing installation.
 3. Beginning of demolition work constitutes acceptance of existing conditions that would be apparent upon examination prior to starting demolition.
- B. Separate areas in which demolition is being conducted from areas that remain occupied.
 1. Provide, erect, and maintain temporary dustproof partitions of construction specified in Section 01 5000 in locations indicated on drawings.
- C. Maintain weatherproof exterior building enclosure, except for interruptions required for replacement or modifications; prevent water and humidity damage.
- D. Remove existing work as indicated and required to accomplish new work.
- E. Protect existing work to remain.
 1. Prevent movement of structure. Provide shoring and bracing as required.
 2. Perform cutting to accomplish removal work neatly and as specified for cutting new work.
 3. Repair adjacent construction and finishes damaged during removal work.
 4. Patch to match new work.

3.05 DEBRIS AND WASTE REMOVAL

- A. Remove debris, junk, and trash from site.
- B. Leave site in clean condition, ready for subsequent work.

END OF SECTION

SECTION 03 0516 - UNDERSLAB VAPOR BARRIER

PART 1 GENERAL

1.01 SECTION INCLUDES

- A. Sheet vapor barrier under concrete slabs on grade.

1.02 RELATED REQUIREMENTS

- A. Section 03 3000 - Cast-in-Place Concrete: Preparation of subgrade, granular fill, placement of concrete.

1.03 REFERENCE STANDARDS

- A. ASTM E1643 - Standard Practice for Selection, Design, Installation and Inspection of Water Vapor Retarders Used in Contact with Earth or Granular Fill Under Concrete Slabs; 2011 (Reapproved 2017).
- B. ASTM E1745 - Standard Specification for Plastic Water Vapor Retarders Used in Contact with Soil or Granular Fill under Concrete Slabs; 2017.

1.04 SUBMITTALS

- A. See Section 01 3000 - Administrative Requirements, for submittal procedures.
- B. Product Data: Submit manufacturers' data on manufactured products.
- C. Manufacturer's Installation Instructions: Indicate installation procedures and interface required with adjacent construction.

PART 2 PRODUCTS

2.01 MATERIALS

- A. Underslab Vapor Barrier:
 - 1. Water Vapor Permeance: Not more than 0.010 perms, maximum.
 - 2. Complying with ASTM E1745 Class A.
 - 3. Thickness: 15 mils.
 - 4. Basis of Design:
 - a. Stego Industries LLC; Stego Wrap Vapor Barrier (15-mil): www.stegoindustries.com/#sle.
 - b. Epro Services, Inc.; Ecoshield-E (15 mil): www.eproserv.com.
 - c. Monarflex Geomembrances; Monarflex Reflex Super: www.monarflex.com.
 - d. Substitutions: Not permitted.
- B. Accessory Products: Vapor barrier manufacturer's recommended tape, adhesive, mastic, etc., for sealing seams and penetrations in vapor barrier.

PART 3 EXECUTION

3.01 EXAMINATION

- A. Verify that surface over which vapor barrier is to be installed is complete and ready before proceeding with installation of vapor barrier.

3.02 INSTALLATION

- A. Install vapor barrier in accordance with manufacturer's instructions and ASTM E1643.
- B. Install vapor barrier under interior slabs on grade; lap sheet over footings and seal to foundation walls.
- C. Lap joints minimum 6 inches.
- D. Seal joints, seams and penetrations watertight with manufacturer's recommended products and follow manufacturer's written instructions.
- E. No penetration of vapor barrier is allowed except for reinforcing steel and permanent utilities.

- F. Repair damaged vapor retarder before covering with other materials.

END OF SECTION

SECTION 03 2000 - CONCRETE REINFORCING

PART 1 GENERAL

1.01 SECTION INCLUDES

- A. Reinforcing steel for cast-in-place concrete.
- B. Supports and accessories for steel reinforcement.

1.02 RELATED REQUIREMENTS

- A. Section 03 3000 - Cast-in-Place Concrete.
- B. Section 04 2731 - Reinforced Unit Masonry: Reinforcement for load-bearing masonry.

1.03 REFERENCE STANDARDS

- A. ACI 301 - Specifications for Structural Concrete; 2016.
- B. ACI 318 - Building Code Requirements for Structural Concrete and Commentary; 2014 (Errata 2018).
- C. ACI SP-66 - ACI Detailing Manual; 2004.
- D. ASTM A615/A615M - Standard Specification for Deformed and Plain Carbon-Steel Bars for Concrete Reinforcement; 2018.
- E. ASTM A1064/A1064M - Standard Specification for Carbon-Steel Wire and Welded Wire Reinforcement, Plain and Deformed, for Concrete; 2018a.
- F. CRSI (DA4) - Manual of Standard Practice; 2009.
- G. CRSI (P1) - Placing Reinforcing Bars; 2011.

1.04 SUBMITTALS

- A. See Section 01 3000 - Administrative Requirements, for submittal procedures.
- B. Shop Drawings: Comply with requirements of ACI SP-66. Include bar schedules, shapes of bent bars, spacing of bars, and location of splices.
 - 1. Prepare shop drawings under seal of a Professional Structural Engineer experienced in design of work of this type and licensed in Louisiana.
- C. Reports: Submit certified copies of mill test report of reinforcement materials analysis.

1.05 QUALITY ASSURANCE

- A. Perform work of this section in accordance with ACI 301.

PART 2 PRODUCTS

2.01 REINFORCEMENT

- A. Reinforcing Steel: ASTM A615/A615M, Grade 60 (60,000 psi).
 - 1. Deformed billet-steel bars.
 - 2. Unfinished.
- B. Steel Welded Wire Reinforcement (WWR): Deformed type; ASTM A1064/A1064M.
 - 1. Form: Flat Sheets.
- C. Reinforcement Accessories:
 - 1. Tie Wire: Annealed, minimum 16 gauge, 0.0508 inch.
 - 2. Chairs, Bolsters, Bar Supports, Spacers: Sized and shaped for adequate support of reinforcement during concrete placement.

2.02 FABRICATION

- A. Fabricate concrete reinforcing in accordance with CRSI (DA4) - Manual of Standard Practice.
- B. Welding of reinforcement is not permitted.
- C. Locate reinforcing splices not indicated on drawings at point of minimum stress.

PART 3 EXECUTION

3.01 PLACEMENT

- A. Place, support and secure reinforcement against displacement. Do not deviate from required position.
- B. Do not displace or damage vapor barrier.
- C. Accommodate placement of formed openings.
- D. Comply with applicable code for concrete cover over reinforcement.

3.02 FIELD QUALITY CONTROL

- A. The Contractor shall not pour any foundation concrete without inspection and approval of all reinforcing steel placement by the Structural Engineer or Architect.

END OF SECTION

SECTION 03 3000 - CAST-IN-PLACE CONCRETE

PART 1 GENERAL

- 1.01 Section Includes
- A. Concrete formwork.
 - B. Concrete for composite roof construction.
 - C. Floors and slabs on grade.
 - D. Concrete reinforcement.
 - E. Joint devices associated with concrete work.
 - F. Miscellaneous concrete elements, including equipment pads, light pole bases, and thrust blocks.
 - G. Concrete curing.
- 1.02 Related Requirements
- A. Section 03 0516 - Underslab Vapor Barrier.
 - B. Section 03 2000 - Concrete Reinforcing.
 - C. Section 07 9200 - Joint Sealants: Products and installation for sealants and joint fillers for saw cut joints and isolation joints in slabs.
 - D. Section 07 9513 - Expansion Joint Cover Assemblies.
 - E. Section 31 3116 - Termite Control: Field-applied termiticide for subgrade below concrete surfaces.
- 1.03 Reference Standards
- A. ACI 117 - Specifications for Tolerances for Concrete Construction and Materials; 2010 (Reapproved 2015).
 - B. ACI 211.1 - Standard Practice for Selecting Proportions for Normal, Heavyweight, and Mass Concrete; 1991 (Reapproved 2009).
 - C. ACI CODE-318 - Building Code Requirements for Structural Concrete and Commentary; 2019 (Reapproved 2022).
 - D. ACI PRC-211.1 - Selecting Proportions for Normal-Density and High Density-Concrete - Guide; 2022.
 - E. ACI 301 - Specifications for Structural Concrete; 2016.
 - F. ACI 302.1R - Guide to Concrete Floor and Slab Construction; 2015.
 - G. ACI 304R - Guide for Measuring, Mixing, Transporting, and Placing Concrete; 2000 (Reapproved 2009).
 - H. ACI 305R - Guide to Hot Weather Concreting; 2010.
 - I. ACI 306R - Guide to Cold Weather Concreting; 2016.
 - J. ACI 308R - Guide to External Curing of Concrete; 2016.
 - K. ACI 318 - Building Code Requirements for Structural Concrete and Commentary; 2014 (Errata 2018).
 - L. ACI 347R - Guide to Formwork for Concrete; 2014, with Errata (2017).
 - M. ACI PRC-302.1 - Guide to Concrete Floor and Slab Construction; 2015.
 - N. ACI PRC-304 - Guide for Measuring, Mixing, Transporting, and Placing Concrete; 2000 (Reapproved 2009).
 - O. ACI PRC-305 - Guide to Hot Weather Concreting; 2020.
 - P. ACI PRC-306 - Guide to Cold Weather Concreting; 2016.
 - Q. ACI PRC-308 - Guide to External Curing of Concrete; 2016.
 - R. ACI PRC-347 - Guide to Formwork for Concrete; 2014 (Reapproved 2021).
 - S. ACI SPEC-117 - Specification for Tolerances for Concrete Construction and Materials; 2010 (Reapproved 2015).
 - T. ACI SPEC-301 - Specifications for Concrete Construction; 2020.
 - U. ASTM A615/A615M - Standard Specification for Deformed and Plain Carbon-Steel Bars for Concrete Reinforcement; 2018.
 - V. ASTM A1064/A1064M - Standard Specification for Carbon-Steel Wire and Welded Wire Reinforcement, Plain and Deformed, for Concrete; 2018a.
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- W. ASTM C33/C33M - Standard Specification for Concrete Aggregates; 2018.
- X. ASTM C39/C39M - Standard Test Method for Compressive Strength of Cylindrical Concrete Specimens; 2018.
- Y. ASTM C94/C94M - Standard Specification for Ready-Mixed Concrete; 2018.
- Z. ASTM C143/C143M - Standard Test Method for Slump of Hydraulic-Cement Concrete; 2015a.
- AA. ASTM C150/C150M - Standard Specification for Portland Cement; 2018.
- BB. ASTM C171 - Standard Specification for Sheet Materials for Curing Concrete; 2016.
- CC. ASTM C173/C173M - Standard Test Method for Air Content of Freshly Mixed Concrete by the Volumetric Method; 2016.
- DD. ASTM C260/C260M - Standard Specification for Air-Entraining Admixtures for Concrete; 2010a (Reapproved 2016).
- EE. ASTM C494/C494M - Standard Specification for Chemical Admixtures for Concrete; 2017.
- FF. ASTM C827/C827M - Standard Test Method for Change in Height at Early Ages of Cylindrical Specimens of Cementitious Mixtures; 2016.
- GG. ASTM D695 - Standard Test Method for Compressive Properties of Rigid Plastics; 2015.
- HH. ASTM D1751 - Standard Specification for Preformed Expansion Joint Filler for Concrete Paving and Structural Construction (Nonextruding and Resilient Bituminous Types); 2018.
- II. ASTM D1752 - Standard Specification for Preformed Sponge Rubber Cork and Recycled PVC Expansion Joint Fillers for Concrete Paving and Structural Construction; 2018.
- JJ. ASTM E1155/E1155M - Standard Test Method for Determining FF Floor Flatness and FL Floor Levelness Numbers; 2023.
- KK. ASTM E1745 - Standard Specification for Plastic Water Vapor Retarders Used in Contact with Soil or Granular Fill under Concrete Slabs; 2017.
- LL. ASTM E96/E96M - Standard Test Methods for Water Vapor Transmission of Materials; 2016.

1.04 Submittals

- A. See Section 01 3000 - Administrative Requirements for submittal procedures.
- B. Product Data: Submit manufacturers' data on manufactured products showing compliance with specified requirements and installation instructions.
- C. Mix Design: Submit proposed concrete mix design.
 - 1. Indicate proposed mix design complies with requirements of ACI SPEC-301, Section 4 - Concrete Mixtures.
 - 2. All mix designs shall state their indicated use on the design submittal.
 - 3. Mix designs that will be pumped shall be so noted on the submittal and shall have mix proportions compatible with the pumping process.
- D. Test Reports: Submit report for each test or series of tests specified.
- E. Project Record Documents: Accurately record actual locations of embedded utilities and components that will be concealed from view upon completion of concrete work.

1.05 Quality Assurance

- A. Perform work of this section in accordance with ACI SPEC-301 and ACI CODE-318.
- B. Follow recommendations of ACI PRC-305 when concreting during hot weather.
- C. Follow recommendations of ACI PRC-306 when concreting during cold weather.

1.06 Warranty

- A. See Section 01 7800 - Closeout Submittals for additional warranty requirements.
- B. Slabs with Moisture Vapor Reducing Admixture (MVRA): Provide warranty to cover the cost of flooring failures due to moisture migration from slabs for life of the concrete.
 - 1. Include cost of repair or removal of failed flooring, placement of topical moisture remediation system, and replacement of flooring with comparable flooring system.
 - 2. Provide warranty by admixture manufacturer matching terms of flooring adhesive or primer manufacturer's material defect warranty.

PART 2 PRODUCTS

2.01 Formwork

- A. Formwork Design and Construction: Comply with guidelines of ACI PRC-347 to provide formwork that will produce concrete complying with tolerances of ACI SPEC-117.
- B. Form Materials: Contractor's choice of standard products with sufficient strength to withstand hydrostatic head without distortion in excess of permitted tolerances.
 - 1. Form Facing for Exposed Finish Concrete: MDO plywood or steel.
 - 2. Form Coating: Release agent that will not adversely affect concrete or interfere with application of coatings.
 - 3. Form Ties: Cone snap type that will leave no metal within 1-1/2 inches of concrete surface.

2.02 Reinforcement Materials

- A. Comply with requirements of Section 03 2000.

2.03 Concrete Materials

- A. Cement: ASTM C150/C150M, Type I - Normal Portland type.
- B. Fine and Coarse Aggregates: ASTM C33/C33M.
- C. Fly Ash: ASTM C618, Class C or F, up to 25% of the total cementitious content by weight.
- D. Water: ASTM C1602/C1602M; clean, potable, and not detrimental to concrete.

2.04 Admixtures

- A. Do not use chemicals that will result in soluble chloride ions in excess of 0.1 percent by weight of cement.
- B. Air Entrainment Admixture: ASTM C260/C260M.
 - 1. Do not use air entrainment admixtures in floor slabs.
- C. High Range Water Reducing Admixture: ASTM C494/C494M Type F.
- D. Moisture Vapor Reducing Admixture (MVRA): Liquid, inorganic admixture free of volatile organic compounds (VOCs). Closes capillary systems formed during concrete curing to reduce moisture vapor emission and transmission. Reduces concrete shrinkage with no adverse effect on concrete properties or applied flooring.
 - 1. Provide admixture in all floor slabs.
 - 2. Products:
 - a. Barrier One Concrete Admixtures; MVRA-CPS: www.barrierone.com/#sle.
 - b. ISE Logik Industries, Inc; MVRA 900: www.iselogik.com/#sle.
 - c. Concrete Moisture Solutions, Inc.: CPS Moisture Vapor Reduction Admixture: www.CPSadmix.com.
 - d. Substitutions: Not permitted.

2.05 Accessory Materials

- A. Non-Shrink Cementitious Grout: Premixed compound consisting of nonmetallic aggregate, cement, water reducing and plasticizing agents.
 - 1. Minimum Compressive Strength at 28 Days: 7500 pounds per square inch.

2.06 Bonding and Jointing Products

- A. Slab Isolation Joint Filler: 1/2-inch thick, height equal to slab thickness, with removable top section forming 1/2-inch deep sealant pocket after removal.
 - 1. Products:
 - a. Nomaco, Inc; Nomaflex Expansion Joint Filler with Void Cap Option: www.nomaco.com/#sle.
 - b. W. R. Meadows, Inc; Deck-O-Foam Joint Filler with pre-scored top strip: www.wrmeadows.com/#sle.

- c. Substitutions: See Section 01 6000 - Product Requirements.
 - B. Dowel Sleeves: Plastic sleeve for smooth, round, steel load-transfer dowels.
- 2.07 Curing Materials
- A. Moisture-Retaining Sheet: ASTM C171.
 - 1. Polyethylene film, clear, minimum nominal thickness of 4 mil, 0.004 inch.
 - B. Water: Potable, not detrimental to concrete.
- 2.08 Concrete Mix Design
- A. Proportioning Normal Weight Concrete: Comply with ACI PRC-211.1 recommendations.
 - B. Concrete Strength: Establish required average strength for each type of concrete on the basis of field experience or trial mixtures, as specified in ACI SPEC-301.
 - C. Admixtures: Add acceptable admixtures as recommended in ACI PRC-211.1 and at rates recommended or required by manufacturer.
 - D. Normal Weight Concrete:
 - 1. Compressive Strength, when tested in accordance with ASTM C39/C39M at 28 days: As indicated on drawings.
 - 2. Water-Cement Ratio: Maximum 49 percent by weight in slabs, 52 percent for grade beams.
 - 3. Total Air Content: 3 percent, determined in accordance with ASTM C173/C173M.
 - a. Do not add air to interior slabs-on-grade.
 - 4. Maximum Slump, Grade Beams and Footings: 3 inches.
 - 5. Maximum Slump, Slabs-on-Grade and Shelter Deck: 4 inches, plus or minus 1 inch.
 - 6. Maximum Aggregate Size: 1.25 inch at slabs, 1.5 inches at grade beams and footings, 0.75 inch at shelter deck.
- 2.09 Mixing
- A. Transit Mixers: Comply with ASTM C94/C94M.

PART 3 EXECUTION

- 3.01 Examination
- A. Verify lines, levels, and dimensions before proceeding with work of this section.
- 3.02 Preparation
- A. Formwork: Comply with requirements of ACI SPEC-301. Design and fabricate forms to support all applied loads until concrete is cured and for easy removal without damage to concrete.
 - B. Verify that forms are clean and free of rust before applying release agent.
 - C. Coordinate placement of embedded items with erection of concrete formwork and placement of form accessories.
 - D. Where new concrete is to be bonded to previously placed concrete, prepare existing surface by cleaning and applying bonding agent in according to bonding agent manufacturer's instructions.
 - E. In locations where new concrete is doweled to existing work, drill holes in existing concrete, insert steel dowels and pack solid with non-shrink grout.
 - F. Interior Slabs on Grade: Install vapor retarder under interior slabs on grade. Comply with ASTM E1643. Lap joints minimum 6 inches. Seal joints, seams and penetrations watertight with manufacturer's recommended products and follow manufacturer's written instructions. Repair damaged vapor retarder before covering.
 - 1. Vapor Retarder Over Granular Fill: Install compactible granular fill before placing vapor retarder as indicated on drawings.

3.03 Installing Reinforcement and Other Embedded Items

- A. Comply with requirements of ACI SPEC-301. Clean reinforcement of loose rust and mill scale, and accurately position, support, and secure in place to achieve not less than minimum concrete coverage required for protection.
- B. Install welded wire reinforcement in maximum possible lengths, and offset end laps in both directions. Splice laps with tie wire.
- C. Verify that anchors, seats, plates, reinforcement and other items to be cast into concrete are accurately placed, positioned securely, and will not interfere with concrete placement.

3.04 Placing Concrete

- A. Place concrete in accordance with ACI PRC-304.
- B. Place concrete for floor slabs in accordance with ACI PRC-302.1.
- C. Notify Architect not less than 48 hours prior to commencement of placement operations.
- D. Maintain records of concrete placement. Record date, location, quantity, air temperature, and test samples taken.
- E. Ensure reinforcement, inserts, embedded parts, and formed construction joint devices will not be disturbed during concrete placement.
- F. Place concrete continuously without construction (cold) joints wherever possible; where construction joints are necessary, before next placement prepare joint surface by removing laitance and exposing the sand and sound surface mortar, by sandblasting or high-pressure water jetting.
- G. Finish floors level and flat, unless otherwise indicated, within the tolerances specified below.

3.05 Slab Jointing

- A. Locate joints as indicated on drawings.
- B. Anchor joint fillers and devices to prevent movement during concrete placement.
- C. Isolation Joints: Use preformed joint filler with removable top section for joint sealant, total height equal to thickness of slab, set flush with top of slab.
- D. Saw Cut Contraction Joints: Saw cut joints after initial set but before concrete begins to final set, within 2 to maximum 4 hours after placing; use Soff-Cut System with 3/16 inch thick blade and cut at least 1 inch deep but not less than one quarter (1/4) the depth of the slab.

3.06 Floor Flatness and Levelness Tolerances

- A. An independent testing agency, as specified in Section 01 4000, will inspect finished slabs for compliance with specified tolerances.
- B. Minimum F(F) Floor Flatness and F(L) Floor Levelness Values:
 - 1. Exposed to View and under Thin Resilient Flooring or Thinset Tile: F(F) of 25; F(L) of 18, on-grade only.
- C. Measure F(F) Floor Flatness and F(L) Floor Levelness in accordance with ASTM E1155/E1155M, within 48 hours after slab installation; report both composite overall values and local values for each measured section.
- D. Correct the slab surface if composite overall value is less than specified and if local value is less than two-thirds of specified value or less than F(F) 13/F(L) 10.
- E. Correct defects by grinding or by removal and replacement of the defective work. Areas requiring corrective work will be identified. Re-measure corrected areas by the same process.

3.07 Concrete Finishing

- A. Repair surface defects, including tie holes, immediately after removing formwork.
- B. Unexposed Form Finish: Rub down or chip off fins or other raised areas 1/4 inch or more in height.
- C. Exposed Form Finish: Rub down or chip off and smooth fins or other raised areas 1/4 inch or more in height. Provide finish as follows:
 - 1. Smooth Rubbed Finish: Wet concrete and rub with carborundum brick or other abrasive, not more than 24 hours after form removal.

- D. Concrete Slabs: Finish to requirements of ACI PRC-302.1 and as follows:
 - 1. Surfaces to Receive Thin Floor Coverings: "Steel trowel" as described in ACI 302.1R; thin floor coverings include resilient flooring, resinous matrix terrazzo, and thin set ceramic tile.
 - 2. Other Surfaces to Be Left Exposed: Trowel as described in ACI PRC-302.1, minimizing burnish marks and other appearance defects.
- E. In areas with floor drains, maintain floor elevation at walls; pitch surfaces uniformly to drains at 1:100 nominal.

3.08 Curing and Protection

- A. Comply with requirements of ACI PRC-308. Immediately after placement, protect concrete from premature drying, excessively hot or cold temperatures, and mechanical injury.
- B. Maintain concrete with minimal moisture loss at relatively constant temperature for period necessary for hydration of cement and hardening of concrete.
 - 1. Normal concrete: Not less than seven days.
- C. Formed Surfaces: Cure by moist curing with forms in place for full curing period.
- D. Surfaces Not in Contact with Forms:
 - 1. Initial Curing: Start as soon as free water has disappeared and before surface is dry. Keep continuously moist for not less than three days by water-fog spray.
 - a. Spraying: Spray water over floor slab areas and maintain wet.
 - 2. Final Curing: Begin after initial curing but before surface is dry.
 - a. Moisture-Retaining Sheet: Lap strips not less than 3 inches and seal with waterproof tape or adhesive; secure at edges.

3.09 Field Quality Control

- A. An independent testing agency will perform field quality control tests, as specified in Section 01 4000 - Quality Requirements.
- B. Provide free access to concrete operations at project site and cooperate with appointed firm.
- C. Submit proposed mix design of each class of concrete to inspection and testing firm for review prior to commencement of concrete operations.
- D. Tests of concrete and concrete materials may be performed at any time to ensure compliance with specified requirements.
- E. Compressive Strength Tests: ASTM C39/C39M, for each test, mold and cure three concrete test cylinders. Obtain test samples for every 100 cubic yards or less of each class of concrete placed.
- F. Perform one slump test for each set of test cylinders taken, following procedures of ASTM C143/C143M.

3.10 Defective Concrete

- A. Test Results: The testing agency shall report test results in writing to Architect and Contractor within 24 hours of test.
- B. Defective Concrete: Concrete not complying with required lines, details, dimensions, tolerances or specified requirements.
- C. Repair or replacement of defective concrete will be determined by the Architect. The cost of additional testing shall be borne by Contractor when defective concrete is identified.
- D. Do not patch, fill, touch-up, repair, or replace exposed concrete except upon express direction of Architect for each individual area.

3.11 Protection

- A. Do not permit traffic over unprotected concrete floor surface until fully cured.

END OF SECTION

SECTION 04 2000 - UNIT MASONRY

PART 1 GENERAL

1.01 SECTION INCLUDES

- A. Concrete block.
- B. Decorative concrete block.
- C. Clay facing brick.
- D. Mortar and grout.
- E. Reinforcement and anchorage.
- F. Flashings.
- G. Lintels.
- H. Accessories.

1.02 RELATED REQUIREMENTS

- A. Section 03 2000 - Concrete Reinforcing: Reinforcing steel for grouted masonry.
- B. Section 04 2731 - Reinforced Unit Masonry.
- C. Section 04 7200 - Cast Stone Masonry.
- D. Section 04 8150 - Through-Wall & Wall Substrate Flashing System: Through-wall masonry flashings.
- E. Section 05 5000 - Metal Fabrications: Loose steel lintels.
- F. Section 07 8400 - Firestopping: Firestopping at penetrations of fire-rated masonry and at top of fire-rated walls.
- G. Section 07 9200 - Joint Sealants: Sealing control and expansion joints.

1.03 REFERENCE STANDARDS

- A. ASTM A153/A153M - Standard Specification for Zinc Coating (Hot-Dip) on Iron and Steel Hardware; 2016a.
- B. ASTM A641/A641M - Standard Specification for Zinc-Coated (Galvanized) Carbon Steel Wire; 2009a (Reapproved 2014).
- C. ASTM A951/A951M - Standard Specification for Steel Wire for Masonry Joint Reinforcement; 2016.
- D. ASTM A1064/A1064M - Standard Specification for Carbon-Steel Wire and Welded Wire Reinforcement, Plain and Deformed, for Concrete; 2018a.
- E. ASTM C90 - Standard Specification for Loadbearing Concrete Masonry Units; 2016a.
- F. ASTM C144 - Standard Specification for Aggregate for Masonry Mortar; 2018.
- G. ASTM C150/C150M - Standard Specification for Portland Cement; 2018.
- H. ASTM C207 - Standard Specification for Hydrated Lime for Masonry Purposes; 2018.
- I. ASTM C216 - Standard Specification for Facing Brick (Solid Masonry Units Made From Clay or Shale); 2017a.
- J. ASTM C270 - Standard Specification for Mortar for Unit Masonry; 2019.
- K. ASTM C404 - Standard Specification for Aggregates for Masonry Grout; 2018.
- L. ASTM C979/C979M - Standard Specification for Pigments for Integrally Colored Concrete; 2016.
- M. BIA Technical Notes No. 7 - Water Penetration Resistance – Design and Detailing; 2017.
- N. BIA Technical Notes No. 13 - Ceramic Glazed Brick Exterior Walls; 2017.

1.04 SUBMITTALS

- A. See Section 01 3000 - Administrative Requirements for submittal procedures.
- B. Product Data: Provide data for fabricated wire reinforcement, mortar, and masonry accessories.
- C. Samples: Submit two samples of decorative block and facing brick units to illustrate color, texture, and extremes of color range.

1.05 QUALITY ASSURANCE

- A. Installer Qualifications: Company specializing in performing work of the type specified and with at least five years of documented experience of similar scope and size.

1.06 DELIVERY, STORAGE, AND HANDLING

- A. Deliver, handle, and store masonry units by means that will prevent mechanical damage and contamination by other materials.

1.07 ENVIRONMENTAL REQUIREMENTS

- A. Maintain materials and surrounding air temperature to minimum 40 degrees F prior to, during, and 48 hours after completion of masonry work.
- B. Maintain materials and surrounding air temperature to maximum 90 degrees F prior to, during, and 48 hours after completion of masonry work.

PART 2 PRODUCTS

2.01 CONCRETE MASONRY UNITS

- A. Concrete Block: Comply with referenced standards and as follows:
 - 1. Size: Standard units with nominal face dimensions of 16 by 8 inches and nominal depths as indicated on drawings for specific locations.
 - 2. Special Shapes: Provide nonstandard blocks configured for corners, lintels, headers, and control joint edges.
 - a. Provide bullnose units for outside corners.
 - 3. Load-Bearing Units: ASTM C90, normal weight.
 - 4. Exposed Faces: Special color and texture where indicated, as follows:
 - a. Ground-Face Units:
 - 1) Exterior Burnished Block Veneer: Featherlite Building Products, color: Texas Cream.
 - 2) Interior Burnished Block: Nettleton Concrete Inc., color: Dalmation.
 - 3) Substitutions: See Section 01 6000 - Product Requirements.
 - a) Substitutions must be prior approved by the Architect and must match existing units color and texture.
 - 4) Coordinate to provide reinforced unit masonry units from same source.

2.02 BRICK UNITS

- A. Facing Brick: ASTM C216, Type FBS Smooth, Grade SW.
 - 1. Brick Veneer: Acme Brick, color: Marble Gray #166.
 - 2. Brick Veneer Accent: Acme Brick, color: Westchester Blend #158.
 - 3. Substitutions: See Section 01 6000 - Product Requirements.
 - a. Substitutions must be prior approved by the Architect and must match existing units color and texture.
 - 4. Nominal size: 3-5/8 x 2-1/4 x 7-5/8 inches.
 - 5. Special shapes: Molded units as required by conditions indicated, unless standard units can be sawn to produce equivalent effect.

2.03 MORTAR AND GROUT MATERIALS

- A. Portland Cement: ASTM C150/C150M, Type I; color as required to produce approved color sample.
 - 1. Not more than 0.60 percent alkali.
- B. Hydrated Lime: ASTM C207, Type S.
- C. Mortar Aggregate: ASTM C144.
- D. Grout Aggregate: ASTM C404.

- E. Pigments for Colored Mortar: Pure, concentrated mineral pigments specifically intended for mixing into mortar and complying with ASTM C979/C979M.
 - 1. Color(s): Match existing.
 - 2. Manufacturers:
 - a. Ash Gove: www.ashgrovepkg.com.
 - b. Lafarge Building Materials, Inc.: www.lafarge-na.com.
 - c. Solomon Colors, Inc: www.solomoncolors.com/#sle.
 - d. Spec Mix, Inc.: www.specmix.com.
 - e. Substitutions: See Section 01 6000 - Product Requirements.
- F. Water: Clean and potable.

2.04 REINFORCEMENT AND ANCHORAGE

- A. Manufacturers:
 - 1. Hohmann & Barnard, Inc; including Dur-O-Wal brand: www.h-b.com/#sle.
 - 2. WIRE-BOND: www.wirebond.com/#sle.
 - 3. Substitutions: See Section 01 6000 - Product Requirements.
- B. Reinforcing Steel: Type specified in Section 03 2000; size as indicated on drawings; uncoated finish.
- C. Single Wythe Joint Reinforcement: ASTM A951/A951M.
 - 1. Type: Ladder.
 - 2. Material: ASTM A1064/A1064M steel wire, mill galvanized to ASTM A641/A641M Class 3.
 - 3. Size: 0.1483 inch side rods with 0.1483 inch cross rods; width as required to provide not less than 5/8 inch of mortar coverage on each exposure.
- D. Flexible Anchors: 2-piece anchors that permit differential movement between masonry and building frame, sized to provide not less than 1/2 inch of mortar coverage from masonry face.
- E. Two-Piece Wall Ties: Formed steel wire, 0.1875 inch thick, adjustable, eye and pintle type, hot dip galvanized to ASTM A 153/A 153M, Class B, sized to provide not less than 1/2 inch of mortar coverage from masonry face and to allow vertical adjustment of up to 1-1/4 in.
- F. Masonry Veneer Anchors: 2-piece anchors that permit differential movement between masonry veneer and structural backup, hot dip galvanized to ASTM A 153/A 153M, Class B.
 - 1. Anchor plates: Not less than 0.075 inch thick, designed for fastening to structural backup through sheathing by two fasteners; provide design with legs that penetrate sheathing and insulation to provide positive anchorage.
 - 2. Wire ties: Trapezoidal shape, 0.1875 inch thick.
 - 3. Vertical adjustment: Not less than 2 inches.

2.05 FLASHINGS - AS SPECIFIED IN SECTION 04 8150 - THROUGH-WALL & SUBSTRATE FLASHING SYSTEM

2.06 ACCESSORIES

- A. Cavity Mortar Control: Semi-rigid polyethylene or polyester mesh panels, sized to thickness of wall cavity, and designed to prevent mortar droppings from clogging weeps and cavity vents and allow proper cavity drainage.
 - 1. Mortar Diverter: Semi-rigid mesh designed for installation at flashing locations.
 - a. Manufacturers:
 - 1) Advanced Building Products Inc; Mortar Break: www.advancedbuildingproducts.com/#sle.
 - 2) Mortar Net Solutions; MortarNet: www.mortarnet.com/#sle.
 - 3) WIRE-BOND: www.wirebond.com/#sle.
 - 4) Substitutions: See Section 01 6000 - Product Requirements.
- B. Weeps:
 - 1. Type: Polyester mesh.
 - 2. Manufacturers:
 - a. Blok-Lok Limited: www.blok-lok.com/#sle.

- b. CavClear, a Division of Archovations Inc: www.cavclear.com/#sle.
 - c. Hohmann & Barnard, Inc: www.h-b.com/#sle.
 - d. Mortar Net Solutions: www.mortarnet.com/#sle.
 - e. WIRE-BOND: www.wirebond.com/#sle.
 - f. Substitutions: See Section 01 6000 - Product Requirements.
- C. Cleaning Solution: Non-acidic, not harmful to masonry work or adjacent materials.

2.07 MORTAR AND GROUT MIXING

- A. Mortar for Unit Masonry: ASTM C270, using the Proportion Specification.
 - 1. Interior, non-loadbearing masonry: Type N.
- B. Colored Mortar: Proportion selected pigments and other ingredients to match Architect's sample, without exceeding manufacturer's recommended pigment-to-cement ratio.
- C. Mixing: Use mechanical batch mixer and comply with referenced standards.

PART 3 EXECUTION

3.01 EXAMINATION

- A. Verify that field conditions are acceptable and are ready to receive masonry.
- B. Verify that related items provided under other sections are properly sized and located.
- C. Verify that built-in items are in proper location, and ready for roughing into masonry work.

3.02 PREPARATION

- A. Provide temporary bracing during installation of masonry work. Maintain in place until building structure provides permanent bracing.

3.03 COLD AND HOT WEATHER REQUIREMENTS

- A. Maintain materials and surrounding air temperature to minimum 40 degrees F prior to, during, and 48 hours after completion of masonry work.
- B. Maintain materials and surrounding air temperature to maximum 90 degrees F prior to, during, and 48 hours after completion of masonry work.

3.04 COURSING

- A. Establish lines, levels, and coursing indicated. Protect from displacement.
- B. Maintain masonry courses to uniform dimension. Form vertical and horizontal joints of uniform thickness.
- C. Concrete Masonry Units:
 - 1. Bond: Running.
 - 2. Coursing: One unit and one mortar joint to equal 8 inches.
 - 3. Mortar Joints: Concave.
- D. Brick Units:
 - 1. Bond: Running.
 - 2. Coursing: Three units and three mortar joints to equal 8 inches.
 - 3. Mortar Joints: Concave.

3.05 PLACING AND BONDING

- A. Lay hollow masonry units with face shell bedding on head and bed joints.
- B. Buttering corners of joints or excessive furrowing of mortar joints is not permitted.
- C. Remove excess mortar and mortar smears as work progresses.
- D. Interlock intersections and external corners, except for units laid in stack bond.
- E. Do not shift or tap masonry units after mortar has achieved initial set. Where adjustment must be made, remove mortar and replace.

- F. Perform job site cutting of masonry units with proper tools to provide straight, clean, unchipped edges. Prevent broken masonry unit corners or edges.
- G. Cut mortar joints flush where wall tile is scheduled or resilient base is scheduled.
- H. Isolate masonry partitions from vertical structural framing members with a control joint as indicated.
- I. Isolate top joint of masonry partitions from horizontal structural framing members and slabs or decks with compressible joint filler.

3.06 WEEPS/CAVITY VENTS

- A. Install weeps in veneer and cavity walls at 24 inches on center horizontally on top of through-wall flashing above shelf angles and lintels and at bottom of walls.

3.07 CAVITY MORTAR CONTROL

- A. Do not permit mortar to drop or accumulate into cavity air space or to plug weep/cavity vents.
- B. Install cavity mortar diverter at base of cavity and at other flashing locations as recommended by manufacturer to prevent mortar droppings from blocking weep/cavity vents.

3.08 REINFORCEMENT AND ANCHORAGE - GENERAL

- A. Unless otherwise indicated on drawings or specified under specific wall type, install horizontal joint reinforcement 16 inches on center.
- B. Place masonry joint reinforcement in first and second horizontal joints above and below openings. Extend minimum 16 inches each side of opening.
- C. Place continuous joint reinforcement in first and second joint below top of walls.
- D. Lap joint reinforcement ends minimum 6 inches.
- E. Fasten anchors to structural framing and embed in masonry joints as masonry is laid. Unless otherwise indicated on drawings or closer spacing is indicated under specific wall type, space anchors at maximum of 36 inches horizontally and 24 inches vertically.
- F. Embed ties and anchors in mortar joint and extend into masonry unit a minimum of 1-1/2 inches with at least 5/8 inch mortar cover to the outside face of the anchor.

3.09 REINFORCEMENT AND ANCHORAGE - MASONRY VENEER

- A. Masonry Back-Up: Embed anchors to bond veneer at maximum 16 inches on center vertically and 36 inches on center horizontally. Place additional anchors at perimeter of openings and ends of panels, so maximum spacing of anchors is 8 inches on center.
- B. Stud Back-Up: Secure veneer anchors to stud framed back-up and embed into masonry veneer at maximum 24 inches on center vertically and 16 inches on center horizontally. Place additional anchors at perimeter of openings and ends of panels, so maximum spacing of anchors is 8 inches on center.

3.10 MASONRY FLASHINGS

- A. Whether or not specifically indicated, install masonry flashing to divert water to exterior at all locations where downward flow of water will be interrupted.
 - 1. Extend flashings full width at such interruptions and at least 6 inches, minimum, into adjacent masonry or turn up flashing ends at least 8 inches, minimum, to form watertight pan at nonmasonry construction.
 - 2. Remove or cover protrusions or sharp edges that could puncture flashings.
 - 3. Seal lapped ends and penetrations of flashing before covering with mortar.
- B. Lap end joints of flashings at least 4 inches, minimum, and seal watertight with flashing sealant/adhesive.
- C. Form end dams at all lintel flashings and seal.

3.11 LINTELS

- A. Install loose steel lintels over openings.

3.12 CONTROL AND EXPANSION JOINTS

- A. Do not continue horizontal joint reinforcement through control or expansion joints.
- B. Install preformed control joint device in continuous lengths. Seal butt and corner joints in accordance with manufacturer's instructions.

3.13 BUILT-IN WORK

- A. As work progresses, install built-in metal door frames and glazed frames and other items to be built into the work and furnished under other sections.
- B. Install built-in items plumb, level, and true to line.
- C. Bed anchors of metal door and glazed frames in adjacent mortar joints. Fill frame voids solid with grout.

3.14 TOLERANCES

- A. Maximum Variation From Unit to Adjacent Unit: 1/16 inch.
- B. Maximum Variation from Plane of Wall: 1/4 inch in 10 ft and 1/2 inch in 20 ft or more.
- C. Maximum Variation from Plumb: 1/4 inch per story non-cumulative; 1/2 inch in two stories or more.
- D. Maximum Variation from Level Coursing: 1/8 inch in 3 ft and 1/4 inch in 10 ft; 1/2 inch in 30 ft.
- E. Maximum Variation of Mortar Joint Thickness: Head joint, minus 1/4 inch, plus 3/8 inch.
- F. Maximum Variation from Cross Sectional Thickness of Walls: 1/4 inch.

3.15 CUTTING AND FITTING

- A. Cut and fit for chases, pipes, conduit, and sleeves. Coordinate with other sections of work to provide correct size, shape, and location.
- B. Obtain approval prior to cutting or fitting masonry work not indicated or where appearance or strength of masonry work may be impaired.

3.16 CLEANING

- A. Remove excess mortar and mortar droppings.
- B. Clean soiled surfaces with cleaning solution.
- C. Use non-metallic tools in cleaning operations.

END OF SECTION

SECTION 04 2731 - REINFORCED UNIT MASONRY

PART 1 GENERAL

1.01 SECTION INCLUDES

- A. Concrete Block.
- B. Decorative Concrete Block.
- C. Mortar and Grout.
- D. Reinforcement and Anchorage.
- E. Flashings.
- F. Accessories.

1.02 RELATED REQUIREMENTS

- A. Section 03 2000 - Concrete Reinforcing: Reinforcing steel for grouted masonry.
- B. Section 04 2000 - Unit Masonry: Exterior brick and cmu veneer.
- C. Section 04 8150 - Through-Wall and Wall Substrate Flashing System
- D. Section 07 2100 - Thermal Insulation: Board Insulation applied to exterior concrete masonry surfaces.
- E. Section 07 2119 - Foamed-In-Place Insulation: Insulation in exterior concrete masonry surfaces.
- F. Section 07 2500 - Weather Barriers: Dampproofing and air barriers applied to exterior concrete masonry surfaces.
- G. Section 07 8400 - Firestopping: Firestopping at penetrations of masonry work.
- H. Section 07 9005 - Joint Sealers: Backing rod and sealant at control and expansion joints.

1.03 REFERENCE STANDARDS

- A. ACI 530/530.1/ERTA - Building Code Requirements and Specification for Masonry Structures and Related Commentaries; 2011.
- B. ASTM A82/A82M - Standard Specification for Steel Wire, Plain, for Concrete Reinforcement; 2007.
- C. ASTM A153/A153M - Standard Specification for Zinc Coating (Hot-Dip) on Iron and Steel Hardware; 2009.
- D. ASTM A615/A615M - Standard Specification for Deformed and Plain Carbon Steel Bars for Concrete Reinforcement; 2015.
- E. ASTM A641/A641M - Standard Specification for Zinc-Coated (Galvanized) Carbon Steel Wire; 2009a (Reapproved 2014).
- F. ASTM A1064/A1064M - Standard Specification for Carbon-Steel Wire and Welded Wire Reinforcement, Plain and Deformed, for Concrete; 2015.
- G. ASTM C90 - Standard Specification for Loadbearing Concrete Masonry Units; 2014.
- H. ASTM C91/C91M - Standard Specification for Masonry Cement; 2012.
- I. ASTM C94/C94M - Standard Specification for Ready-Mixed Concrete; 2015.
- J. ASTM C270 - Standard Specification for Mortar for Unit Masonry; 2014a.
- K. ASTM C476 - Standard Specification for Grout for Masonry; 2010.
- L. ASTM C1019 - Standard Test Method for Sampling and Testing Grout; 2013.
- M. ASTM C1072 - Standard Test Method for Measurement of Masonry Flexural Bond Strength; 2013.
- N. ASTM C1314 - Standard Test Method for Compressive Strength of Masonry Prisms; 2014.
- O. ASTM E518/E518M - Standard Test Methods for Flexural Bond Strength of Masonry; 2010.
- P. UL (FRD) - Fire Resistance Directory; current edition.

1.04 SUBMITTALS

- A. See Section 01 3000 - Administrative Requirements, for submittal procedures.
- B. Product Data: Provide data for masonry units, fabricated wire reinforcement, and mortar and grout.

1.05 QUALITY ASSURANCE

- A. Comply with provisions of ACI 530/530.1/ERTA, except where exceeded by requirements of the contract documents.
- B. Installer Qualifications: Company specializing in performing work of the type specified and with at least five years of documented experience on projects of similar scope and size.

1.06 REGULATORY REQUIREMENTS

- A. Conform to applicable code for UL requirements for fire rated masonry construction.

1.07 DELIVERY, STORAGE, AND HANDLING

- A. Deliver, handle, and store masonry units by means that will prevent mechanical damage and contamination by other materials.

1.08 FIELD CONDITIONS

- A. Maintain materials and surrounding air temperature to minimum 40 degrees F prior to, during, and 48 hours after completion of masonry work.
- B. Maintain materials and surrounding air temperature to maximum 90 degrees F prior to, during, and 48 hours after completion of masonry work.

PART 2 PRODUCTS

2.01 CONCRETE MASONRY UNITS

- A. Concrete Block: Comply with referenced standards and as follows:
 - 1. Size: Standard units with nominal face dimensions of 16 by 8 inches and nominal depths as indicated on the drawings for specific locations.
 - 2. Special Shapes: Provide non-standard blocks configured for bullnose corners, lintels, headers, control joint edges, and other detailed conditions.
 - 3. Load-Bearing Units: ASTM C90, fm=2500 psi.
 - a. Hollow block.
 - 4. Exposed Faces: Manufacturer's standard color and texture unless specifically noted.
 - 5. Exposed Faces: Special color and texture where indicated as ground face units.
 - a. Ground-Face Units:
 - 1) Exterior Burnished Block Veneer: Featherlite Building Products, color: Texas Cream.
 - 2) Interior Burnished Block: Nettleton Concrete Inc., color: Dalmation.
 - 3) Substitutions: See Section 01 6000 - Product Requirements.
 - a) Substitutions must be prior approved by the Architect and must match existing units color and texture.
 - b. Coordinate to provide load-bearing and non-load bearing units from same source.

2.02 MORTAR AND GROUT MATERIALS

- A. Masonry Cement: ASTM C91/C91M Type S.
 - 1. Minimum 28-day Strength: 2000 psi.
- B. Water: Clean and potable.

2.03 REINFORCEMENT AND ANCHORAGE

- A. Manufacturers:
 - 1. Hohmann & Barnard, Inc: www.h-b.com/sle.
 - 2. WIRE-BOND: www.wirebond.com.
 - 3. Substitutions: See Section 01 6000 - Product Requirements.
- B. Reinforcing Steel: ASTM A615/A615M, Grade 60 (60,000 psi) yield strength.
 - 1. Deformed billet-steel bars.

- C. Rebar Positioners: Wire formed accessories to position reinforcing steel into center of masonry cells for grouting.
 - 1. Hohmann & Barnard, Inc.; Product RB Rebar Positioner; www.h-b.com.
 - 2. WIRE-BOND: Product Core Lock Rebar Positioner; www.wirebond.com.
 - 3. Substitutions: See Section 01 6000 - Product Requirements.
 - D. Single Wythe Joint Reinforcement: Ladder type; ASTM A1064/A1064M steel wire, hot dip galvanized after fabrication to ASTM A153/A153M, Class B; 0.1483 inch side rods with 0.1483 inch cross rods; width as required to provide not more than 1 inch and not less than 1/2 inch of mortar coverage on each exposure.
 - E. Adjustable Multiple Wythe Joint Reinforcement: Ladder type with adjustable ties spaced at 16 in on center ASTM A1064/A1064M steel wire, mill galvanized to ASTM A641/A641M, Class 3; 0.1875 inch side rods with 0.1483 inch cross rods and adjustable components of 0.1875 inch wire; width of components as required to provide not more than 1 inch and not less than 1/2 inch of mortar coverage from each masonry face.
 - 1. Vertical adjustment: Not less than 2 inches.
 - 2. Products:
 - a. Hohmann & Barnard, Inc.; Product 270 Ladder; www.h-b.com.
 - b. WIRE-BOND: Product Series 800 Level-Eye Ladder; www.wirebond.com.
 - c. Substitutions: See Section 01 6000 - Product Requirements.
- 2.04 FLASHINGS - AS SPECIFIED IN 04 8150 - THROUGH-WALL AND WALL SUBSTRATE FLASHING SYSTEM.
- 2.05 ACCESSORIES
- A. Preformed Control Joints: Rubber material. Provide with corner and tee accessories, fused joints.
 - B. Joint Filler: Closed cell polyvinyl chloride; oversized 50 percent to joint width; self expanding; in maximum lengths available.
 - C. Cleaning Solution: Non-acidic, not harmful to masonry work or adjacent materials.
- 2.06 MORTAR MIXES
- A. Mortar for Unit Masonry: ASTM C270, using the Property Specification.
 - B. Exterior, loadbearing masonry; Type S.
 - C. Interior, loadbearing masonry; Type S.
 - D. Colored Mortar: Proportion selected pigments and other ingredients to match Architect's sample, without exceeding manufacturer's recommended pigment-to-cement ratio.
 - 1. Use only at exposed ground-face block units.
- 2.07 MORTAR MIXING
- A. Thoroughly mix mortar ingredients using mechanical batch mixer, in accordance with ASTM C270 and in quantities needed for immediate use.
 - B. Maintain sand uniformly damp immediately before the mixing process.
 - C. Add mortar color in accordance with manufacturer's instructions. Provide uniformity of mix and coloration.
 - D. Do not use anti-freeze compounds to lower the freezing point of mortar.
 - E. If water is lost by evaporation, re-temper only within two hours of mixing.
- 2.08 GROUT MIXES
- A. Bond Beams and Lintels: 3000 psi strength at 28 days; 8-10 inches slump; mix in accordance with ASTM C476.
 - 1. Fine grout for spaces with smallest horizontal dimension of 1/4 inch or less.
 - 2. Coarse grout for spaces with smallest horizontal dimension greater than 1/2 inch.

2.09 GROUT MIXING

- A. Mix grout in accordance with ASTM C94/C94M.
- B. Thoroughly mix grout ingredients in quantities needed for immediate use in accordance with ASTM C476 for fine and course grout.
- C. Do not use anti-freeze compounds to lower the freezing point of grout.

PART 3 EXECUTION

3.01 EXAMINATION

- A. Verify that field conditions are acceptable and are ready to receive masonry.
- B. Verify that related items provided under other sections are properly sized and located.
- C. Verify that built-in items are in proper location, and ready for roughing into masonry work.

3.02 PREPARATION

- A. Direct and coordinate placement of metal anchors supplied for installation under other sections.
- B. Provide temporary bracing during installation of masonry work. Maintain in place until building structure provides permanent bracing.
- C. For areas where high-lift grouting will be employed, provide cleanout openings as follows:
 - 1. Hollow Masonry: Not less than 8 inches high at the bottom of each cell to be grouted, formed by cutting out face shell of masonry unit.

3.03 COURSING

- A. Establish lines, levels, and coursing indicated. Protect from displacement.
- B. Maintain masonry courses to uniform dimension. Form vertical and horizontal joints of uniform thickness.
- C. Concrete Masonry Units:
 - 1. Bond: Running.
 - 2. Coursing: One unit and one mortar joint to equal 8 inches.
 - 3. Mortar Joints: Concave.

3.04 PLACING AND BONDING

- A. Lay hollow masonry units with face shell bedding on head and bed joints.
- B. Buttering corners of joints or excessive furrowing of mortar joints is not permitted.
- C. Remove excess mortar as work progresses.
- D. Interlock intersections and external corners.
- E. Do not shift or tap masonry units after mortar has achieved initial set. Where adjustment must be made, remove mortar and replace.
- F. Perform job site cutting of masonry units with proper tools to provide straight, clean, unchipped edges. Prevent broken masonry unit corners or edges. Replace any damaged units that will be exposed to view.
- G. Cut mortar joints flush where wall tile is scheduled or resilient base is scheduled.

3.05 REINFORCEMENT AND ANCHORAGE

- A. Reinforcement Bars: Secure at locations indicated and to avoid displacement during grouting use rebar positioners. Minimum spacing between bars or to masonry surfaces shall be one bar diameter.
 - 1. Welding of splices is not permitted.
- B. Joint Reinforcement: Install horizontal joint reinforcement 16 inches on center.
 - 1. Place masonry joint reinforcement in first and second horizontal joints above and below openings. Extend minimum 16 inches each side of opening.
 - 2. Place continuous joint reinforcement in first and second joint below top of walls.
 - 3. Lap joint reinforcement ends minimum 8 inches.

- C. Reinforced Hollow Unit Masonry: Keep vertical cores to be grouted clear of mortar, including bed area of first course.
 - 1. Bond Beams: At bond beams or other locations for horizontally reinforced masonry, provide special masonry units or saw to accommodate reinforcement.

3.06 MASONRY FLASHINGS

- A. Whether or not specifically indicated, install masonry flashing to divert water to exterior at all locations where downward flow of water will be interrupted.
- B. Water test all exterior masonry flashings prior to installation of veneer masonry.

3.07 GROUTING

- A. Install all grouting in compliance with ACI 530 and the following:
 - 1. Verify that horizontal and vertical reinforcement is in proper position and adequately secured before beginning pours.
 - 2. Clean out masonry cells and other cavities to be grouted by high pressure water spray or compressed air. Remove debris, allow to dry, and inspect before sealing cleanout openings.
 - 3. Where the following conditions are met, place grout in lifts no exceeding 12 feet 8 inches:
 - a. The masonry has cured for at least 4 hours.
 - b. The grout slump is maintained between 10 and 11 inches.
 - c. No intermediate reinforced bond beams are placed between the top and the bottom of the pour height.
 - d. When items (a) and (b) are met but there are intermediate bond beams within the grout pour, limit the grout height to the bottom of the lowest bond beam that is more than 5 feet 4 inches above the bottom of the lift, but do not exceed a grout lift height of 12 feet 8 inches.
 - 4. When the conditions listed above are not met, place grout in lifts not exceeding 5 feet 4 inches.
 - 5. Place grout for spanning elements in single, continuous pour.

3.08 CONTROL AND EXPANSION JOINTS

- A. Do not continue horizontal joint reinforcement through control or expansion joints.
- B. Install preformed control joint device in continuous lengths. Seal butt and corner joints in accordance with manufacturer's instructions.

3.09 BUILT-IN WORK

- A. As work progresses, install built-in metal door frames, glazed frames, fabricated metal frames, anchor bolts, and plates and other items to be built into the work and furnished under other sections.
- B. Install built-in items plumb, level, and true to line.
- C. Bed anchors of metal door and glazed frames in adjacent mortar joints. Fill frame voids solid with grout.
 - 1. Fill adjacent masonry cores with grout minimum 12 inches from framed openings.
- D. Do not build into masonry construction organic materials that are subject to deterioration.

3.10 TOLERANCES

- A. Maximum Variation from Alignment of Pilasters: 1/4 inch.
- B. Maximum Variation From Unit to Adjacent Unit: 1/16 inch.
- C. Maximum Variation from Plane of Wall: 1/4 inch in 10 ft and 1/2 inch in 20 ft or more.
- D. Maximum Variation from Plumb: 1/4 inch per story non-cumulative; 1/2 inch in two stories or more.
- E. Maximum Variation from Level Coursing: 1/8 inch in 3 ft and 1/4 inch in 10 ft; 1/2 inch in 30 ft.
- F. Maximum Variation of Joint Thickness: 1/8 inch in 3 ft.
- G. Maximum Variation from Cross Sectional Thickness of Walls: 1/4 inch.

3.11 CUTTING AND FITTING

- A. Cut and fit for chases. Coordinate with other sections of work to provide correct size, shape, and location.

- B. Obtain approval prior to cutting or fitting masonry work not indicated or where appearance or strength of masonry work may be impaired.

3.12 FIELD QUALITY CONTROL

- A. An independent testing agency will perform field quality control tests, as specified in Section 01 4000 - Quality Requirements.
- B. Test and evaluate grout in accordance with ASTM C1019 procedures.
 - 1. Test Frequency: 3 samples for every 50 yards of grout..
- C. Prism Tests: Test masonry and mortar panels for compressive strength in accordance with ASTM C1314 and for flexural bond strength in accordance with ASTM C1072 or ASTM E518; perform tests and evaluate results.
 - 1. Test Frequency: 3 prisms for every 5000 square feet of wall surface.

3.13 CLEANING

- A. Remove excess mortar and mortar smears as work progresses.
- B. Clean soiled surfaces with cleaning solution.
- C. Use non-metallic tools in cleaning operations.

3.14 PROTECTION

- A. Without damaging completed work, provide protective boards at exposed external corners that are subject to damage by construction activities.

END OF SECTION

SECTION 04 7200 - CAST STONE MASONRY

PART 1 GENERAL

1.01 SECTION INCLUDES

- A. Architectural cast stone.

1.02 RELATED REQUIREMENTS

- A. Section 04 2000 - Unit Masonry: Installatioyn of cast stone in conjunction with masonry.
- B. Section 07 9200 - Joint Sealants: Sealing joints indicated to be left open for sealant.

1.03 REFERENCE STANDARDS

- A. ASTM A615/A615M - Standard Specification for Deformed and Plain Carbon-Steel Bars for Concrete Reinforcement; 2018.
- B. ASTM A767/A767M - Standard Specification for Zinc-Coated (Galvanized) Steel Bars for Concrete Reinforcement; 2016.
- C. ASTM C1364 - Standard Specification for Architectural Cast Stone; 2018.

1.04 SUBMITTALS

- A. See Section 01 3000 - Administrative Requirements, for submittal procedures.
- B. Shop Drawings: Include elevations, dimensions, layouts, profiles, cross sections, reinforcement, exposed faces, arrangement of joints, anchoring methods, anchors, and piece numbers.
- C. Verification Samples: Pieces of actual cast stone components not less than 6 inches square, illustrating range of color and texture to be anticipated in components furnished for the project.

1.05 QUALITY ASSURANCE

- A. Manufacturer Qualifications:
 - 1. A firm with a minimum of 5 years experience producing cast stone of types required for project.
 - 2. Current producer member of the Cast Stone Institute or the Architectural Precast Association.
 - 3. Adequate plant capacity to furnish quality, sizes, and quantity of cast stone required without delaying progress of the work.

1.06 MOCK-UP

- A. Provide full size cast stone components for installation in mock-up of exterior wall.
- B. See Section 01 4000 - Quality Requirements for additional requirements.
- C. Approved mock-up will become standard for appearance and workmanship.
- D. Remove mock-up not incorporated into the work and dispose of debris.

1.07 DELIVERY, STORAGE, AND HANDLING

- A. Deliver cast stone components secured to shipping pallets and protected from damage and discoloration. Protect corners from damage.
- B. Store cast stone components and installation materials in accordance with manufacturer's instructions.
- C. Store cast stone components on pallets with nonstaining, waterproof covers. Ventilate under covers to prevent condensation. Prevent contact with dirt.
- D. Protect cast stone components during handling and installation to prevent chipping, cracking, or other damage.
- E. Store mortar materials where contamination can be avoided.
- F. Schedule and coordinate production and delivery of cast stone components with unit masonry work to optimize on-site inventory and to avoid delaying the work.

PART 2 PRODUCTS

2.01 MANUFACTURERS

- A. Architectural Cast Stone:
 - 1. Any current producer member of the Cast Stone Institute.

2.02 ARCHITECTURAL CAST STONE

- A. Cast Stone: Architectural concrete product manufactured to simulate appearance of natural limestone, complying with ASTM C1364.
 - 1. Compressive Strength: As specified in ASTM C1364; calculate strength of pieces to be field cut at 80 percent of uncut piece.
 - 2. Freeze-Thaw Resistance: Demonstrated by laboratory testing in accordance with ASTM C1364.
 - 3. Surface Texture: Fine grained texture, with no bugholes, air voids, or other surface blemishes visible from distance of 20 feet.
 - 4. Color: Match existing building.
 - a. Bassco Cast Stone, color: Light Buff.
 - b. Substitutions: See Section 01 6000 - Product Requirements.
 - 1) Substitutions must be prior approved by the Architect and must match existing cast stone color and texture.
 - 5. Remove cement film from exposed surfaces before packaging for shipment.
- B. Shapes: Provide shapes indicated on drawings.
 - 1. Variation from Any Dimension, Including Bow, Camber, and Twist: Maximum of plus/minus 1/8 inch or length divided by 360, whichever is greater, but not more than 1/4 inch.
 - 2. Unless otherwise indicated on drawings, provide:
 - a. Wash or slope of 1:12 on exterior horizontal surfaces.
 - b. Drips on projecting components, wherever possible.
 - c. Raised fillets at back of sills and at ends to be built in.
- C. Reinforcement: Provide reinforcement as required to withstand handling and structural stresses; comply with ACI 318.

2.03 MATERIALS

- A. Portland Cement: ASTM C150/C150M.
 - 1. For Units: Type I or II, white.
 - 2. For Mortar: Type I or II, except Type III may be used in cold weather.
- B. Coarse Aggregate: ASTM C33/C33M, except for gradation; granite, quartz, or limestone.
- C. Fine Aggregate: ASTM C33/C33M, except for gradation; natural or manufactured sands.
- D. Admixtures: ASTM C494/C494M.
- E. Water: Potable.
- F. Reinforcing Bars: ASTM A615/A615M, Grade 40 (40,000 psi), deformed bars, galvanized.
 - 1. Galvanized in accordance with ASTM A767/A767M, Class I.
- G. Embedded Anchors, Dowels, and Inserts: Type 304 stainless steel, of type and size as required for conditions.
- H. Mortar: Portland cement-lime, ASTM C270 Type N.
- I. Sealant: As specified in Section 07 9200.
- J. Cleaner: General-purpose cleaner designed for removing mortar and grout stains, efflorescence, and other construction stains from new masonry surfaces without discoloring or damaging masonry surfaces; approved for intended use by cast stone manufacturer and by cleaner manufacturer for use on cast stone and adjacent masonry materials.

PART 3 EXECUTION

3.01 EXAMINATION

- A. Examine construction to receive cast stone components. Notify Architect if construction is not acceptable.
- B. Do not begin installation until unacceptable conditions have been corrected.

3.02 INSTALLATION

- A. Install cast stone components in conjunction with masonry, complying with requirements of Section 04 2000.
- B. Setting:
 - 1. Drench cast stone components with clear, running water immediately before installation.
 - 2. Set units in a full bed of mortar unless otherwise indicated.
 - 3. Fill vertical joints with mortar.
 - 4. Fill dowel holes and anchor slots completely with mortar or non-shrink grout.

3.03 TOLERANCES

- A. Joints: Make all joints 3/8 inch, except as otherwise detailed.
 - 1. Rake mortar joints 3/4 inch for pointing.
 - 2. Remove excess mortar from face of stone before pointing joints.
 - 3. Point joints with color matching mortar in layers 3/8 inch thick and tool to a slight concave profile.
 - 4. Leave the following joints open for sealant:
 - a. Head joints in top courses, including copings, parapets, cornices, sills, and steps.
 - b. Joints labeled "control joint" or "expansion joint".
- B. Sealant Joints: Install sealants as specified in Section 07 9200.
- C. Installation Tolerances:
 - 1. Variation from Plumb: Not more than 1/8 inch in 10 feet or 1/4 inch in 20 feet or more.
 - 2. Variation from Level: Not more than 1/8 inch in 10 feet or 1/4 inch in 20 feet, or 3/8 inch maximum.
 - 3. Variation in Joint Width: Not more than 1/8 inch in 36 inches or 1/4 of nominal joint width, whichever is less.
 - 4. Variation in Plane Between Adjacent Surfaces (Lipping): Not more than 1/16 inch difference between planes of adjacent units or adjacent surfaces indicated to be flush with units.

3.04 REPAIR

- A. Repair chips and other surface damage noticeable when viewed in direct daylight at 10 feet.
- B. Repair with matching touch-up material provided by the manufacturer and in accordance with manufacturer's instructions.
- C. Repair methods and results subject to Architect 's approval.

3.05 CLEANING

- A. Clean completed exposed cast stone after mortar is thoroughly set and cured.
 - 1. Wet surfaces with water before applying cleaner.
 - 2. Apply cleaner to cast stone in accordance with manufacturer's instructions.
 - 3. Remove cleaner promptly by rinsing thoroughly with clear water.
 - 4. Do not use acidic cleaners.

3.06 PROTECTION

- A. Protect completed work from damage.

- B. Clean, repair, or restore damaged or mortar-splashed work to condition of new work.

END OF SECTION

SECTION 04 8150 - THROUGH-WALL AND WALL SUBSTRATE FLASHING SYSTEM

PART 1 - GENERAL

1.01 GENERAL

- A. Contractor shall review American Concrete Institute 530.1 mandatory specification checklist for additional requirements necessary for specific project.
- B. It is the intent of this specification that the work will provide a watertight facility. The attached specifications describe the minimum acceptable standards of construction and finish.
- C. The design intent is to have windows installed, flashed and water tested prior to veneer installation.

1.02 RELATED REQUIREMENTS

- A. Section 01 4000 - Quality Requirements: Water testing of flashing assemblies.
- B. Section 04 200 - Unit Masonry.
- C. Section 04 2731 - Reinforced Unit Masonry.
- D. Section 07 2500 - Weather Barriers: Coordination of installation and compatibility of flashings and weather barrier materials.
- E. Section 07 6200 - Sheet Metal Flashing and Trim
- F. Section 08 4413 - Glazed Aluminum Curtain Walls

1.03 QUALITY ASSURANCE

- A. Flashing system shall be provided and installed by a qualified waterproofing contractor.
- B. At a scheduled pre-construction meeting with all trades, contractor shall review flashing for the project and how the flashing shall be sequenced with the following: below grade waterproofing, air and vapor system, window installation, sealant installation, relief angles and roofing.
- C. Contractor shall water test all through-wall flashings once veneer is twelve inches (12") above installed flashing. Coordinate test with Architect.
- D. Contractor shall provide a photo manifest of through-wall installation, including all starts, stops, and transitions in plane.

1.04 SUBMITTALS

- A. See Section 01 3000 - Administrative Requirements, for submittal procedures.
- B. Product Data: Manufacturer's data sheets on each product to be used, including:
 - 1. Physical characteristics of components.
 - 2. Storage and handling requirements and recommendations.
 - 3. Installation instructions and recommendations.

1.05 DELIVERY, STORAGE, AND HANDLING

- A. Deliver materials in manufacturer's original, unopened containers and rolls with all labels intact and legible including labels indicating appropriate warnings, storage conditions, lot numbers, and usage instructions. Materials damaged in shipping or storage shall not be used.
- B. Manufacturer's packaging and/or roll plastic is not acceptable for exterior storage. Tarpaulin with grommets shall be minimum acceptable for exterior coverings. All materials stored as above shall be a minimum of four inches (4") off the substrate, and the tarpaulin tied off with rope.
- C. Deliver materials in sufficient quantity to allow continuity of work.
- D. Handle and store material in such a manner as to avoid damage.
- E. Protect materials against damage by construction traffic.
- F. Storage: All materials should be stored under cover to avoid site damage. During cool weather construction, store materials inside at 50° F or higher.
- G. The proper storage of materials is the sole responsibility of the contractor and damaged materials shall be discarded, removed from the project site, and replaced prior to application.

1.06 SITE CONDITIONS

- A. Measurements: It will be the contractor's responsibility to obtain and/or verify any necessary dimensions by visiting the job site, and the contractor shall be responsible for the correctness of same. Any drawings supplied are for reference only.
- B. Coordinate installation of materials of this section with sheathing and weather barriers to ensure compatibility and completeness of the building envelope system.

1.07 WARRANTY

- A. See Section 01 7800 - Closeout Submittals, for additional warranty requirements.
- B. Flashing Manufacturer: Project shall be installed in such a manner that the flashing material manufacturer will furnish a written ten (10) year materials warranty from the date of substantial completion of the completed project.

PART 2 - PRODUCTS

2.01 BUILT-IN FLASHING MEMBRANE (ELVALOY® SHEET)

- A. For all horizontal and vertical applications the built-in flashing membrane shall be 40 mil flexible sheet material, consisting of a blend of elastomeric and thermal plastic polymers, incorporating DuPont Elvaloy®. The membrane shall be reinforced with synthetic fibers, calendered into sheet form, rolled and cut to width. Provide 25 mil material around all drainage plane penetrations.
- B. Cloaks shall be pre-formed, three dimensional flexible units used for detail corners, level changes, stop ends, and special applications.
 - 1. Physical Properties
 - 2. Elongation: 175% ASTM D412
 - 3. Tensile Strength: 650 psi ASTM D412
 - 4. Tear Strength: 280 psi ASTM D624
 - 5. Low Temperature Flexibility: -25° F Pass ASTM D146
 - 6. Water Absorption: Less than 0.1% ASTM D471
- C. Cloak color shall be as selected by Architect and/or shall match mortar color. Reference manufacturer's full list of colors for selection.
- D. Basis of Design Product:
 - 1. Hohmann & Barnard, Inc.; Product: Flex-Flash Flashing; www.h-b.com.
 - 2. Hyload Inc.; Product: Hyload Flashing Membrane; www.hyload.com.
 - 3. Substitutions: See Section 01 6000 - Product Requirements.

2.02 RELATED MATERIALS FOR BUILT-IN FLASHING MEMBRANE

- A. Flashing Membrane Adhesive: Flashing adhesive exceeds the requirements of TTS00230C Type II, Class B, ASTM C 92094. The product shall be terra cotta (dull red) in color.
 - 1. Physical Properties
 - a. Hardness Shore A: 24 ± 3 ASTM C 661
 - b. Shear Strength: 75 psi ASTM D 1002
 - c. Tack Free Time: 25 minutes ASTM C 679
 - d. Slump (sag): Zero slump ASTM C 697
 - e. Shrinkage: No measurable shrinkage after 14 days
 - f. Low Temperature Flexibility: -20° F pass 1/4 inch mandrel
 - g. Service Temperature: -40° F to 200° F continuous service
 - h. Shelf Life: One year
 - 2. Termination Bar: Manufacturer's standard stainless steel, aluminum, or plastic, as recommended by the manufacturer for the specific substrate application.

2.03 RELATED MATERIALS FOR SURFACE ADHERED FLASHING MEMBRANE

- A. Asphalt Primer: Shall be a two-sided, self-adhering tape used to seal the top of cloaks against the back-up wythe. Adhesive may be used as an alternative.

- B. Substrate Primer:
 - 1. Physical Properties
 - a. Solids by Weight: 68%
 - b. Viscosity: 758 cps
 - c. Weight per Gallon: 9.3 lbs.
 - d. Elongation: >656% no Breakage, Exceeded Travel of Instron ASTM D 2370
 - e. Tensile Strength: 85.1 psi ASTM D 2370
 - f. pH: 10
 - g. Hardness Shore A: 59
 - h. Peel Strength: Aluminum No Fail at 4.60 pli Concrete No Fail at 3.86 pli
- C. Mastic: Shall be used at all laps and joints, and top terminations.
- D. Termination Bar: Manufacturer's standard stainless steel, aluminum, or plastic, as recommended by the manufacturer for the specific substrate application.

PART 3 - EXECUTION

3.01 EXAMINATION

- A. Examine conditions for compliance with requirements for installation tolerances and other specific conditions.

3.02 GENERAL

- A. Preparation: All sharp protrusions and mortar droppings must be removed from the substrate, and the surface must be clean and dry.
- B. Flashing shall be fully adhered around all wall penetrations prior to veneer installation.

3.03 INSTALLATION OF BUILT-IN FLASHING MEMBRANE

- A. Weep holes shall be provided immediately above all flashing at maximum 32-inch centers. A minimum of two weeps shall be installed above any wall opening.
- B. All joints in the flashing membrane shall be lapped a minimum of four inches (4") using flashing membrane adhesive.
- C. Flashing membrane shall be installed six inches (6") above finished grade level.
- D. Cloaks and end dams shall be installed at all window and door heads and sills.
- E. Vertical flashing at wall openings shall extend into the wall opening four inches (4"). The door/window frame shall be installed with the flashing extending onto the back of the frame.
- F. Cleaning: Flashing membrane shall not be damaged by cavity cleaning after installation. Precautions to be taken during subsequent work include but not limited to:
 - 1. Use of cavity battens to prevent mortar droppings;
 - 2. Removal of droppings before they harden;
 - 3. Never use implements such as steel rods for cleaning the cavity; and
 - 4. Inspection of cavity flashing for damage as the work proceeds.

3.04 INSTALLATION OF WALL DRAINAGE SYSTEM

- A. Collection device shall be placed vertically on top of the flashing inside the wall cavity where it shall catch and permanently suspend mortar droppings above the level of the weep holes and flashing. The dovetail shape shall prevent mortar droppings from forming a continuous dam and shall allow water and air to rapidly and easily move through the material to the weeps.

3.05 FLASHING MEMBRANE ADHESIVE

- A. Application:
 - 1. Flashing adhesive shall be applied to clean, dry and relatively smooth surfaces.
 - 2. When joint two (2) pieces of flashing membrane, or joining flashing membrane to Cloaks:

3. Apply two (2) one-fourth inch (1/4") beads of adhesive approximately one-half inch (1/2") and one and one-half inch (1-1/2"), respectively, from the edge of the bottom membrane along the entire width of the bottom membrane. Overlap the top membrane over the bottom membrane two inches (2") and roll lap with steel hand roller, causing excess to extrude the entire length of the overlap.
4. Do not remove excess adhesive.
- B. Safety, Storage and Handling: Keep container tightly closed when not in use. Store at room temperature. Clean up tools and hands with waterless hand cleaner.

3.06 SUBSTRATE PRIMER

- A. Surface Preparation: Areas to be primed should be dry.
- B. Application: Substrate primer may be applied using a soft roller or brush. It can be removed from masonry with soapy water while wet and a solvent-based cleaner if dry (mineral spirits or citrus cleaner).
- C. Coverage: Depending on the condition of the surface, coverage may vary from as little as 150 square feet to 200 square feet per gallon. Install in strict accordance with primer manufacturer's documented recommendations.
- D. Caution:
 1. Substrate primer should not be applied when temperatures are below 40° F or when rain is imminent.
 2. Keep substrate primer from freezing.
 3. During hot weather, the product should be stored in a cool shaded area.
 4. Do not thin product.
 5. Curing rates will vary depending on the ambient temperature relative humidity, wind speed, sky condition and the proper rate of application. Generally speaking, Substrate primer will dry within 15 to 30 minutes when applied at 70° F or above. At 50° F, on a cloudy day, cure time may be extended to as much as one hour.
 6. Check several places on primed area for dryness prior to proceeding with the flashing application.

3.07 TESTING

- A. Prior to installation of veneer materials, water test all installed flashing per AAMA 501.2-09 (Water Hose Test).
- B. Notify Architect of testing schedule a minimum of 72 hours in advance.
- C. Photograph and document test locations and test results.
- D. Repair any deficient flashing revealed by the testing. Replace any materials unable to be satisfactorily repaired and retest.
- E. Only upon approval of acceptable test performance results may flashings be concealed by veneer materials.

END OF SECTION

SECTION 05 1200 - STRUCTURAL STEEL FRAMING

PART 1 GENERAL

1.01 SECTION INCLUDES

- A. Structural steel framing members.
- B. Base plates, shear stud connectors and anchor bolts.
- C. Grouting under base plates.

1.02 RELATED REQUIREMENTS

- A. Section 01 4533 - Code-Required Special Inspections: Connection inspections.
- B. Section 05 2100 - Steel Joist Framing.
- C. Section 05 3100 - Steel Decking: Support framing for small openings in deck.
- D. Section 05 5000 - Metal Fabrications: Steel fabrications affecting structural steel work.

1.03 REFERENCE STANDARDS

- A. AISC (MAN) - Steel Construction Manual; 2017.
- B. AISC 303 - Code of Standard Practice for Steel Buildings and Bridges; 2016.
- C. ASTM A36/A36M - Standard Specification for Carbon Structural Steel; 2014.
- D. ASTM A108 - Standard Specification for Steel Bar, Carbon and Alloy, Cold Finished; 2018.
- E. ASTM A123/A123M - Standard Specification for Zinc (Hot-Dip Galvanized) Coatings on Iron and Steel Products; 2017.
- F. ASTM A500/A500M - Standard Specification for Cold-Formed Welded and Seamless Carbon Steel Structural Tubing in Rounds and Shapes; 2018.
- G. ASTM A563/A563M - Standard Specification for Carbon and Alloy Steel Nuts (Inch and Metric); 2021a.
- H. ASTM A563 - Standard Specification for Carbon and Alloy Steel Nuts; 2015.
- I. ASTM A992/A992M - Standard Specification for Structural Steel Shapes; 2011 (Reapproved 2015).
- J. ASTM F1554 - Standard Specification for Anchor Bolts, Steel, 36, 55, and 105-ksi Yield Strength; 2018.
- K. ASTM F3125/F3125M - Standard Specification for High Strength Structural Bolts and Assemblies, Steel and Alloy Steel, Heat Treated, Inch Dimensions 120 ksi and 150 ksi Minimum Tensile Strength, and Metric Dimensions 830 MPa and 1040 MPa Minimum Tensile Strength; 2018.
- L. AWS A2.4 - Standard Symbols for Welding, Brazing, and Nondestructive Examination; 2012.
- M. AWS D1.1/D1.1M - Structural Welding Code - Steel; 2015, with Errata (2016).
- N. SSPC-Paint 20 - Zinc-Rich Primers (Type I, "Inorganic," and Type II, "Organic"); 2002 (Ed. 2004).
- O. SSPC-SP 3 - Power Tool Cleaning; 1982, with Editorial Revision (2004).
- P. UL (FRD) - Fire Resistance Directory; Current Edition.

1.04 SUBMITTALS

- A. See Section 01 3000 - Administrative Requirements, for submittal procedures.
- B. Shop Drawings:
 - 1. Indicate profiles, sizes, spacing, locations of structural members, openings, attachments, and fasteners.
 - 2. Connections.
 - 3. Indicate loads.
 - 4. Indicate welded connections with AWS A2.4 welding symbols. Indicate net weld lengths.
- C. Welders Certificates: Certify welders employed on the Work, verifying AWS qualification within the previous 12 months.

1.05 QUALITY ASSURANCE

- A. Fabricate structural steel members in accordance with AISC (MAN) "Steel Construction Manual."

- B. Fabricator: Company specializing in performing the work of this section with minimum ten years of documented experience.
- C. Erector: Company specializing in performing the work of this section with minimum ten years of documented experience and an AISC Certified Steel Erector (CSE).
- D. Design connections not detailed on drawings under direct supervision of a Professional Structural Engineer experienced in design of this work and licensed in Louisiana.

PART 2 PRODUCTS

2.01 MATERIALS

- A. Steel Angles and Plates: ASTM A36/A36M.
- B. Steel W Shapes and Tees: ASTM A572/A572M or ASTM A992/A992M.
- C. Cold-Formed Structural Tubing: ASTM A500/A500M, Grade B.
- D. Shear Stud Connectors: Made from ASTM A108 Grade 1015 bars.
- E. Tension Control Bolts: Twist-off type; ASTM F3125/F3125M.
- F. Unheaded Anchor Rods: ASTM F1554, Grade 36, plain, with matching ASTM A563/A563M nuts and ASTM F436/F436M Type 1 washers.
- G. Welding Materials: AWS D1.1/D1.1M; type required for materials being welded.
- H. Grout: ASTM C1107/C1107M; Non-shrink; premixed compound consisting of non-metallic aggregate, cement, water reducing and plasticizing agents.
 - 1. Minimum Compressive Strength at 28 Days: 7500 pounds per square inch.
- I. Shop and Touch-Up Primer: Fabricator's standard, complying with VOC limitations of authorities having jurisdiction.

2.02 FABRICATION

- A. Shop fabricate to greatest extent possible.
- B. Continuously seal joined members by continuous welds. Grind exposed welds smooth.
- C. Develop required camber for members where indicated.

2.03 FINISH

- A. Prepare structural component surfaces in accordance with SSPC-SP 3.
- B. Shop prime structural steel members. Do not prime surfaces that will be field welded.
- C. Where indicated, galvanize structural steel members to comply with ASTM A123/A123M. Provide minimum 1.7 oz/sq ft galvanized coating.

PART 3 EXECUTION

3.01 EXAMINATION

- A. Verify that conditions are appropriate for erection of structural steel and that the work may properly proceed.

3.02 ERECTION

- A. Erect structural steel in compliance with AISC 303.
- B. Allow for erection loads and provide sufficient temporary bracing to maintain structure in safe condition, plumb, and in true alignment until completion of erection and installation of permanent bracing.
- C. Field weld components indicated on shop drawings.
- D. Do not field cut or alter structural members without approval of Architect.
- E. After erection, prime welds, abrasions, and surfaces not shop primed, except surfaces to be in contact with concrete.
- F. Grout solidly between column plates and bearing surfaces, complying with manufacturer's instructions for nonshrink grout. Trowel grouted surfaces smooth, splaying neatly to 45 degrees.

3.03 TOLERANCES

- A. Maximum Variation From Plumb: 1/4 inch per story, non-cumulative.
- B. Maximum Offset From True Alignment: 1/4 inch.

END OF SECTION

SECTION 05 2100 - STEEL JOIST FRAMING

PART 1 GENERAL

1.01 SECTION INCLUDES

- A. Open web steel joists and shear stud connectors, with bridging, attached seats and anchors.
- B. Loose bearing members, such as plates or angles, and anchor bolts for site placement.
- C. Supplementary framing for roof openings greater than 12 inches.

1.02 RELATED REQUIREMENTS

- A. Section 04 2731 - Reinforced Unit Masonry: Placement of anchors for embedding into masonry.
- B. Section 05 1200 - Structural Steel Framing: Superstructure framing.
- C. Section 05 3100 - Steel Decking: Support framing for openings less than 12 inches in decking.
- D. Section 05 5000 - Metal Fabrications: Non-framing steel fabrications attached to joists.

1.03 REFERENCE STANDARDS

- A. ASTM A36/A36M - Standard Specification for Carbon Structural Steel; 2014.
- B. ASTM A108 - Standard Specification for Steel Bar, Carbon and Alloy, Cold Finished; 2018.
- C. AWS D1.1/D1.1M - Structural Welding Code - Steel; 2015, with Errata (2016).
- D. SJI 100 - Catalog of Standard Specifications Load Tables and Weight Tables for Steel Joists and Joist Girders; 2011.
- E. SJI Technical Digest No. 9 - Handling and Erection of Steel Joists and Joist Girders; 2008.
- F. SSPC-Paint 15 - Steel Joist Shop Primer/Metal Building Primer; 1999 (Ed. 2004).
- G. SSPC-SP 2 - Hand Tool Cleaning; 2018.
- H. SSPC-SP 3 - Power Tool Cleaning; 1982, with Editorial Revision (2004).

1.04 SUBMITTALS

- A. See Section 01 3000 - Administrative Requirements, for submittal procedures.
- B. Shop Drawings: Indicate standard designations, joist coding, configurations, sizes, spacings, cambers, locations of joists, joist leg extensions, bridging, connections, and attachments.

1.05 QUALITY ASSURANCE

- A. Design connections not detailed on drawings under direct supervision of a Professional Structural Engineer experienced in design of this work and licensed in Louisiana.
- B. Perform Work, including that for headers and other supplementary framing, in accordance with SJI 100 Standard Specifications Load Tables and SJI Technical Digest No. 9.
- C. Manufacturer Qualifications: Company specializing in performing the work of this section with minimum ten years documented experience.

1.06 DELIVERY, STORAGE, AND HANDLING

- A. Transport, handle, store, and protect products to SJI requirements.

PART 2 PRODUCTS

2.01 MANUFACTURERS

- A. Steel Joists:
 - 1. Canam Group Inc: www.canam-steeljoists.ws
 - 2. New Millennium Building Systems: www.newmill.com/#sle.
 - 3. Nucor-Vulcraft Group: www.vulcraft.com/#sle.
 - 4. Substitutions: See Section 01 6000 - Product Requirements.

2.02 MATERIALS

- A. Open Web Joists: SJI Type K Joists:
 - 1. Provide top chord extensions as indicated.
 - 2. Minimum End Bearing on Steel Supports: Comply with referenced SJI standard.
 - 3. Finish: Shop primed.
- B. Open Web Composite Joists: SJI 100 Type CJ Joists:
 - 1. Minimum End Bearing on Steel Supports: Comply with referenced SJI standards.
 - 2. Minimum End Bearing on Masonry or Concrete Supports: Comply with referenced SJI standards.
 - 3. Finish: Shop primed.
- C. Shear Stud Connectors: Made from ASTM A108 Grade 1015 bars.
- D. Structural Steel For Supplementary Framing and Joist Leg Extensions: ASTM A36/A36M.
- E. Welding Materials: AWS D1.1/D1.1M; type required for materials being welded.
- F. Shop and Touch-Up Primer: SSPC-Paint 15, complying with VOC limitations of authorities having jurisdiction.

2.03 FINISH

- A. Shop prime joists as specified.
- B. Prepare surfaces to be finished in accordance with SSPC-SP 2.

PART 3 EXECUTION

3.01 EXAMINATION

- A. Verify existing conditions prior to beginning work.

3.02 ERECTION

- A. Erect joists with correct bearing on supports.
- B. Allow for erection loads. Provide sufficient temporary bracing to maintain framing safe, plumb, and in true alignment.
- C. Coordinate the placement of anchors for securing loose bearing members furnished as part of the work of this section.
- D. After joist alignment and installation of framing, field weld joist seats to steel bearing surfaces.
- E. Position and field weld joist chord extensions and wall attachments as detailed.
- F. Install supplementary framing for roof openings greater than 12 inches.
- G. Do not permit erection of decking until joists are braced, bridged, and secured or until completion of erection and installation of permanent bridging and bracing. Coordinate bridging with other trades to allow for ductwork, piping, etc.
- H. Do not field cut or alter structural members without approval of joist manufacturer.
- I. After erection, prime welds, damaged shop primer, and surfaces not shop primed, except surfaces specified not to be primed.

3.03 TOLERANCES

- A. Maximum Variation From Plumb: 1/4 inch.
- B. Maximum Offset From True Alignment: 1/4 inch.

3.04 FIELD QUALITY CONTROL

- A. An independent testing agency will perform field quality control tests, as specified in Section 01 4000 - Quality Requirements.

END OF SECTION

SECTION 05 3100 - STEEL DECKING

PART 1 GENERAL

1.01 SECTION INCLUDES

- A. Roof deck.
- B. Composite roof deck.
- C. Supplementary framing for openings up to and including 12 inches.
- D. Bearing plates and angles.
- E. Stud shear connectors.

1.02 RELATED REQUIREMENTS

- A. Section 04 2731 - Reinforced Unit Masonry: Placement of anchors for bearing plates embedded in unit masonry assemblies.
- B. Section 05 1200 - Structural Steel Framing: Support framing for openings larger than 18 inches.
- C. Section 05 2100 - Steel Joist Framing: Support framing for openings larger than 18 inches.
- D. Section 05 5000 - Metal Fabrications: Steel angle concrete stops at deck edges.

1.03 REFERENCE STANDARDS

- A. ASTM A36/A36M - Standard Specification for Carbon Structural Steel; 2014.
- B. ASTM A108 - Standard Specification for Steel Bar, Carbon and Alloy, Cold Finished; 2018.
- C. ASTM A123/A123M - Standard Specification for Zinc (Hot-Dip Galvanized) Coatings on Iron and Steel Products; 2017.
- D. ASTM A510/A510M - Standard Specification for General Requirements for Wire Rods and Coarse Round Wire, Carbon Steel, and Alloy Steel; 2018.
- E. ASTM A653/A653M - Standard Specification for Steel Sheet, Zinc-Coated (Galvanized) or Zinc-Iron Alloy-Coated (Galvannealed) by the Hot-Dip Process; 2018.
- F. ASTM B633 - Standard Specification for Electrodeposited Coatings of Zinc on Iron and Steel; 2015.
- G. AWS B2.1/B2.1M - Specification for Welding Procedure and Performance Qualification; 2014 (Amended 2015).
- H. AWS D1.1/D1.1M - Structural Welding Code - Steel; 2015, with Errata (2016).
- I. AWS D1.3/D1.3M - Structural Welding Code - Sheet Steel; 2018.
- J. FM DS 1-28 - Wind Design; 2016.
- K. FM DS 1-29 - Roof Deck Securement and Above-Deck Roof Components; Factory Mutual System; 2016.
- L. IAS AC172 - Accreditation Criteria for Fabricator Inspection Programs for Structural Steel; 2017.
- M. ICC-ES AC70 - Acceptance Criteria for Fasteners Power Driven into Concrete, Steel and Masonry Elements; 2016.
- N. SDI (DM) - Publication No.30, Design Manual for Composite Decks, Form Decks, and Roof Decks; 2007.
- O. SSPC-Paint 20 - Zinc-Rich Primers (Type I, "Inorganic," and Type II, "Organic"); 2002 (Ed. 2004).

1.04 SUBMITTALS

- A. See Section 01 3000 - Administrative Requirements, for submittals procedures.
- B. Product Data: Provide deck profile characteristics, dimensions, structural properties, and finishes.
- C. Shop Drawings: Indicate deck plan, support locations, openings, pertinent details, and accessories.
- D. Welders' Qualification Statement: Welders' certificates in accordance with AWS B2.1/B2.1M and dated no more than 12 months before start of scheduled welding work.

1.05 QUALITY ASSURANCE

- A. Design deck layout, spans, fastening, and joints under direct supervision of a Professional Structural Engineer experienced in design of this work and licensed in Louisiana.
- B. Fabricator Qualifications: A qualified steel fabricator that is accredited by the International Accreditation Service (IAS) Fabricator Inspection Program for Structural Steel in accordance with IAS AC172.

1.06 DELIVERY, STORAGE, AND HANDLING

- A. Cut plastic wrap to encourage ventilation.
- B. Store deck on dry wood sleepers; slope for positive drainage.

PART 2 PRODUCTS

2.01 MANUFACTURERS

- A. Steel Deck:
 - 1. Canam Steel Corporation: www.canam-steeljoists.ws.
 - 2. New Millennium Building Systems; ____: www.newmill.com/#sle.
 - 3. Nucor-Vulcraft Group: www.vulcraft.com/#sle.
 - 4. Wheeling Corrugating Co.: www.wheelingcorrugating.com.
 - 5. Substitutions: See Section 01 6000 - Product Requirements.

2.02 STEEL DECK

- A. Roof Deck: Non-composite type, fluted steel sheet:
 - 1. Galvanized Steel Sheet: ASTM A653/A653M, Structural Steel (SS) Grade 33/230, with G90/Z275 galvanized coating.
 - 2. Minimum Base Metal Thickness: 22 gauge, 0.0299 inch.
 - 3. Nominal Height: 1-1/2 inch.
 - 4. Profile: Fluted.
 - 5. Formed Sheet Width: 36 inch.
 - 6. Side Joints: Lapped, mechanically fastened.
- B. Composite Roof Deck: Fluted steel sheet embossed to interlock with concrete:
 - 1. Galvanized Steel Sheet: ASTM A653/A653M, Structural Steel (SS) Grade 33/230, with G90/Z275 galvanized coating.
 - 2. Minimum Base Metal Thickness: 20 gauge, 0.0359 inch.
 - 3. Nominal Height: 2 inches.
 - 4. Profile: Fluted.
 - 5. Formed Sheet Width: 36 inch.
 - 6. Side Joints: Lapped, mechanically fastened.

2.03 ACCESSORY MATERIALS

- A. Bearing Plates and Angles: ASTM A36/A36M steel.
- B. Stud Shear Connectors: Made from ASTM A108 Grade 1015 bars.
- C. Welding Materials: AWS D1.1/D1.1M.
- D. Fasteners: Galvanized hardened steel, self tapping.
- E. Powder Actuated Mechanical Fasteners: Steel; with knurled shank and forged ballistic point. Comply with applicable requirements of ICC-ES AC70.
 - 1. Design Requirements: Provide number and type of fasteners that comply with the applicable requirements of SDI (DM) design method for roof deck and floor deck applications and {rs\#1}/{rs\#2} wind uplift resistance.
 - 2. Material: Steel; ASTM A510/A510M.
 - a. Washers:
 - 1) Steel Bar Joist Framing Applications: 0.472 inch diameter, minimum.
 - b. Corrosion Resistance:

- 1) Steel Bar Joist Framing Applications: ASTM B633, SC1, Type III zinc electroplate..
3. Products:
 - a. Hilti; X-ENP-19: www.hilti.com.
 - b. Substitutions: See Section 01 6000 - Product Requirements.
- F. Mechanical Sidelap Connectors: Steel; hex washer head undercut with reverse serrations and self-piercing or stitch point at center.
 1. Design Requirements: Provide number and type of fasteners that comply with the applicable requirements of SDI design method for roof deck applications.
 2. Material: #10 Tek screws at 1.5 inch deck.
- G. Touch-Up Primer for Galvanized Surfaces: SSPC-Paint 20, complying with VOC limitations of authorities having jurisdiction.

PART 3 EXECUTION

3.01 EXAMINATION

- A. Verify existing conditions prior to beginning work.

3.02 INSTALLATION

- A. Erect metal deck in accordance with SDI Design Manual and manufacturer's instructions. Align and level.
- B. On steel supports provide minimum 1-1/2 inch bearing.
- C. At mechanically fastened male/female side laps fasten at 24 inches on center maximum.
- D. Drive mechanical sidelap connectors completely through adjacent lapped sheets; positively engage adjacent sheets with minimum three-thread penetration.
- E. Weld composite deck in accordance with AWS D1.3/D1.3M.
- F. At deck openings from 6 inches to 12 inches in size, provide 3 x 3 x 1/4 inch (minimum U.N.O.) steel angle reinforcement. Place angles perpendicular to flutes; extend minimum two flutes beyond each side of opening and fusion weld to deck at each flute.
- G. At deck openings greater than 18 inches in size, provide steel angle reinforcement. as specified in Section 05 1200.
- H. Weld stud shear connectors through steel deck to structural members below.
- I. Immediately after welding deck and other metal components in position, coat welds, burned areas, and damaged surface coating, with touch-up primer.

END OF SECTION

SECTION 05 4000 - COLD-FORMED METAL FRAMING

PART 1 GENERAL

1.01 SECTION INCLUDES

- A. Formed steel stud exterior wall and interior wall framing.

1.02 RELATED REQUIREMENTS

- A. Section 05 2100 - Structural Steel Framing: Structural building framing.
- B. Section 07 2100 - Thermal Insulation: Insulation within framing members.
- C. Section 09 2116 - Gypsum Board Assemblies: Lightweight, non-load bearing metal stud framing.
- D. Section 09 2116 - Gypsum Board Assemblies: Gypsum-based sheathing.

1.03 REFERENCE STANDARDS

- A. AISI S100 - North American Specification for the Design of Cold-Formed Steel Structural Members; 2016.
- B. AISI S240 - North American Standard for Cold-Formed Steel Structural Framing; 2015.
- C. ASCE 7 - Minimum Design Loads and Associated Criteria for Buildings and Other Structures; Most Recent Edition Cited by Referring Code or Reference Standard.
- D. ASTM A153/A153M - Standard Specification for Zinc Coating (Hot-Dip) on Iron and Steel Hardware; 2016a.
- E. ASTM A780/A780M - Standard Practice for Repair of Damaged and Uncoated Areas of Hot-Dip Galvanized Coatings; 2009 (Reapproved 2015).
- F. ASTM A653/A653M - Standard Specification for Steel Sheet, Zinc-Coated (Galvanized) or Zinc-Iron Alloy-Coated (Galvannealed) by the Hot-Dip Process; 2018.
- G. ASTM C955 - Standard Specification for Cold-Formed Steel Structural Framing Members; 2018.
- H. ASTM C1007 - Standard Specification for Installation of Load Bearing (Transverse and Axial) Steel Studs and Related Accessories; 2011a (Reapproved 2015).
- I. AWS D1.1/D1.1M - Structural Welding Code - Steel; 2015, with Errata (2016).
- J. ICC (IBC) - International Building Code; Most Recent Edition Adopted by Authority Having Jurisdiction, Including All Applicable Amendments and Supplements.
- K. SSPC-Paint 20 - Zinc-Rich Primers (Type I, "Inorganic," and Type II, "Organic"); 2002 (Ed. 2004).

1.04 ADMINISTRATIVE REQUIREMENTS

- A. Coordinate with work of other sections that is to be installed in or adjacent to the metal framing system, including but not limited to structural anchors, cladding anchors, utilities, insulation, and firestopping.

1.05 SUBMITTALS

- A. See Section 01 3000 - Administrative Requirements for submittal procedures.
- B. Product Data: Provide data on standard framing members; describe materials and finish, product criteria, limitations.
- C. Product Data: Provide manufacturer's data on factory-made connectors and mechanical fasteners, showing compliance with requirements.
- D. Shop Drawings: Indicate component details, framed openings, bearing, anchorage, and type and location of fasteners, and accessories or items required of related work.

1.06 QUALITY ASSURANCE

- A. Designer Qualifications: Design framing system under direct supervision of a Professional Structural Engineer experienced in design of this work and licensed in Louisiana.
- B. Manufacturer Qualifications: Company specializing in manufacturing the types of products specified in this section, and with minimum ten years of documented experience.

- C. Manufacturer Qualifications: Member of Steel Stud Manufacturers Association (SSMA):
www.ssma.com/#sle.
- D. Installer Qualifications: Company specializing in performing the work of this section with minimum five years documented experience.

PART 2 PRODUCTS

2.01 MANUFACTURERS

- A. Metal Framing:
 - 1. ClarkDietrich: www.clarkdietrich.com/#sle.
 - 2. MarinoWARE: www.marinoware.com/#sle.
 - 3. Telling Industries: www.tellingindustries.com/#sle.
 - 4. The Steel Network, Inc: www.SteelNetwork.com/#sle.
 - 5. Substitutions: See Section 01 6000 - Product Requirements.
- B. Framing Connectors and Accessories:
 - 1. Same manufacturer as metal framing.
 - 2. Simpson Strong-Tie: www.strongtie.com/#sle.
 - 3. Substitutions: See Section 01 6000 - Product Requirements.

2.02 FRAMING SYSTEM

- A. Provide primary and secondary framing members, bridging, bracing, plates, gussets, clips, fittings, reinforcement, and fastenings as required to provide a complete framing system.
- B. Design Requirements: Design cold-formed framing systems, components and connectors to withstand specified design loads in compliance with ICC (IBC) and ASCE 7.

2.03 FRAMING MATERIALS

- A. Wall Studs and Track Sections: AISI S240; c-shaped studs and u-shaped track sections in stud-matching nominal width and compatible height.
- B. Studs and Track: ASTM C955; track in matching nominal width and compatible height.
 - 1. Gauge and Depth: As indicated on drawings.
 - 2. Galvanized in accordance with ASTM A653/A653M, G60/Z180 coating.

2.04 FASTENERS

- A. Self-Drilling, Self-Tapping Screws, Bolts, Nuts and Washers: Hot dip galvanized per ASTM A153/A153M.
- B. Anchorage Devices: Powder actuated and Drilled expansion bolts as indicated on the drawings.
- C. Welding: Comply with AWS D1.1/D1.1M.

2.05 ACCESSORIES

- A. Bracing, Furring, Bridging: Formed sheet steel, thickness determined for conditions encountered; finish to match framing components.
- B. Galvanizing Repair: Touch up bare steel with zinc-rich paint in compliance with ASTM A780/A780M.
- C. Touch-Up Primer for Galvanized Surfaces: SSPC-Paint 20 Type I - Inorganic, complying with VOC limitations of authorities having jurisdiction.

PART 3 EXECUTION

3.01 EXAMINATION

- A. Verify that substrate surfaces are ready to receive work.
- B. Verify field measurements and adjust installation as required.

3.02 Installation - General

- A. Install structural members and connections in compliance with ASTM C1007.

3.03 INSTALLATION OF STUDS

- A. Install components in accordance with manufacturers' instructions and ASTM C1007 requirements.
- B. Align floor and ceiling tracks; locate to wall layout. Secure in place with fasteners at maximum 24 inches on center. Coordinate installation of sealant with floor and ceiling tracks.
- C. Place studs at 16 inches on center; not more than 2 inches from abutting walls and at each side of openings. Connect studs to tracks using fastener method.
- D. Construct corners using minimum of three studs. Install double studs at wall openings, door and window jambs.
- E. Install load-bearing studs full length in one piece. Splicing of studs is not permitted.
- F. Install load-bearing studs, brace, and reinforce to develop full strength and achieve design requirements.
- G. Install intermediate studs above and below openings to align with wall stud spacing.
- H. Install framing between studs for attachment of mechanical and electrical items, and to prevent stud rotation.
- I. Touch-up field welds and damaged galvanized surfaces with primer.

3.04 TOLERANCES

- A. Maximum Variation from True Position: 1/4 inch.
- B. Maximum Variation of any Member from Plane: 1/8 inch.

END OF SECTION

SECTION 05 5000 - METAL FABRICATIONS

PART 1 GENERAL

1.01 SECTION INCLUDES

- A. Shop fabricated steel items.
- B. Roof access ladders.
- C. Steel gates.

1.02 RELATED REQUIREMENTS

- A. Section 03 3000 - Cast-in-Place Concrete: Placement of metal fabrications in concrete.
- B. Section 04 2000 - Unit Masonry: Placement of metal fabrications in masonry.
- C. Section 04 2731 - Reinforced Unit Masonry: Placement of metal fabrications in masonry.
- D. Section 05 1200 - Structural Steel Framing: Structural steel anchor bolts.
- E. Section 05 2100 - Steel Joist Framing: Structural joist bearing plates, including anchorage.
- F. Section 05 3100 - Steel Decking: Bearing plates for metal deck bearing, including anchorage.
- G. Section 09 9113 - Exterior Painting: Paint finish.
- H. Section 09 9123 - Interior Painting: Paint finish.

1.03 REFERENCE STANDARDS

- A. ASTM A36/A36M - Standard Specification for Carbon Structural Steel; 2014.
- B. ASTM A500/A500M - Standard Specification for Cold-Formed Welded and Seamless Carbon Steel Structural Tubing in Rounds and Shapes; 2018.
- C. AWS A2.4 - Standard Symbols for Welding, Brazing, and Nondestructive Examination; 2012.
- D. AWS D1.1/D1.1M - Structural Welding Code - Steel; 2015, with Errata (2016).
- E. SSPC-Paint 20 - Zinc-Rich Primers (Type I, "Inorganic," and Type II, "Organic"); 2002 (Ed. 2004).
- F. SSPC-SP 2 - Hand Tool Cleaning; 2018.

1.04 SUBMITTALS

- A. See Section 01 3000 - Administrative Requirements, for submittal procedures.
- B. Shop Drawings: Indicate profiles, sizes, connection attachments, reinforcing, anchorage, size and type of fasteners, and accessories. Include erection drawings, elevations, and details where applicable.
 - 1. Indicate welded connections using standard AWS A2.4 welding symbols. Indicate net weld lengths.

PART 2 PRODUCTS

2.01 MATERIALS - STEEL

- A. Steel Sections: ASTM A36/A36M.
- B. Steel Tubing: ASTM A500/A500M Grade B cold-formed structural tubing.
- C. Plates: ASTM A283/A283M.
- D. Bolts, Nuts, and Washers: ASTM A307, Grade A, plain.
- E. Welding Materials: AWS D1.1/D1.1M; type required for materials being welded.
- F. Shop and Touch-Up Primer: SSPC-20, complying with VOC limitations of authorities having jurisdiction.
- G. Touch-Up Primer for Galvanized Surfaces: SSPC-Paint 20, Type I - Inorganic, complying with VOC limitations of authorities having jurisdiction.

2.02 FABRICATION

- A. Fit and shop assemble items in largest practical sections, for delivery to site.

- B. Fabricate items with joints tightly fitted and secured.
- C. Continuously seal joined members by continuous welds.
- D. Grind exposed joints flush and smooth with adjacent finish surface. Make exposed joints butt tight, flush, and hairline. Ease exposed edges to small uniform radius.
- E. Furnish components required for anchorage of fabrications. Fabricate anchors and related components of same material and finish as fabrication, except where specifically noted otherwise.

2.03 FABRICATED ITEMS

- A. Ladders: Steel; in compliance with ANSI A14.3; with mounting brackets and attachments; prime paint finish.
 - 1. Sizes as indicated on drawings.
- B. Ledge Angles, Shelf Angles, and Channels Not Attached to Structural Framing: For support of metal decking; prime paint finish.
- C. Lintels: As detailed; galvanized finish.

2.04 FINISHES - STEEL

- A. Prime paint steel items.
- B. Prepare surfaces to be primed in accordance with SSPC-SP2.
- C. Clean surfaces of rust, scale, grease, and foreign matter prior to finishing.
- D. Prime Painting: One coat.

2.05 FABRICATION TOLERANCES

- A. Squareness: 1/8 inch maximum difference in diagonal measurements.
- B. Maximum Offset Between Faces: 1/16 inch.
- C. Maximum Misalignment of Adjacent Members: 1/16 inch.
- D. Maximum Bow: 1/8 inch in 48 inches.
- E. Maximum Deviation From Plane: 1/16 inch in 48 inches.

PART 3 EXECUTION

3.01 EXAMINATION

- A. Verify that field conditions are acceptable and are ready to receive work.

3.02 INSTALLATION

- A. Install items plumb and level, accurately fitted, free from distortion or defects.
- B. Provide for erection loads, and for sufficient temporary bracing to maintain true alignment until completion of erection and installation of permanent attachments.
- C. Obtain approval prior to site cutting or making adjustments not scheduled.
- D. After erection, prime welds, abrasions, and surfaces not shop primed or galvanized.

3.03 TOLERANCES

- A. Maximum Variation From Plumb: 1/4 inch per story, non-cumulative.
- B. Maximum Offset From True Alignment: 1/4 inch.
- C. Maximum Out-of-Position: 1/4 inch.

END OF SECTION

SECTION 06 1000 - ROUGH CARPENTRY

PART 1 GENERAL

1.01 Section Includes

- A. Roof-mounted curbs.
- B. Roofing nailers.
- C. Miscellaneous framing and sheathing.
- D. Concealed wood blocking, nailers, and supports.

1.02 Related Requirements

- A. Section 07 2500 - Weather Barriers: Water-resistive barrier over sheathing.
- B. Section 09 2116 - Gypsum Board Assemblies: Gypsum-based sheathing.

1.03 Reference Standards

- A. ASTM A153/A153M - Standard Specification for Zinc Coating (Hot-Dip) on Iron and Steel Hardware; 2016a.
- B. ASTM C557 - Standard Specification for Adhesives for Fastening Gypsum Wallboard to Wood Framing; 2003 (Reapproved 2017).
- C. ASTM D2898 - Standard Test Methods for Accelerated Weathering of Fire-Retardant-Treated Wood for Fire Testing; 2010 (Reapproved 2017).
- D. ASTM E84 - Standard Test Method for Surface Burning Characteristics of Building Materials; 2018b.
- E. AWPA U1 - Use Category System: User Specification for Treated Wood; 2017.
- F. PS 1 - Structural Plywood; 2009.
- G. PS 2 - Performance Standard for Wood-Based Structural-Use Panels; 2010.
- H. PS 20 - American Softwood Lumber Standard; 2015.
- I. SPIB (GR) - Grading Rules; 2014.

1.04 Delivery, Storage, and Handling

- A. General: Cover wood products to protect against moisture. Support stacked products to prevent deformation and to allow air circulation.

PART 2 PRODUCTS

2.01 DIMENSION LUMBER

- A. Moisture Content: S-dry or MC19.
- B. Miscellaneous Framing, Blocking, Nailers, Grounds, and Furring:
 - 1. Lumber: S4S, No. 3 or Utility Grade.
 - 2. Boards: Standard or No. 3.

2.02 Construction Panels

- A. Roof Sheathing: PS 2 type type CDX, rated Structural I Sheathing.
 - 1. Bond Classification: Exterior.
 - 2. Span Rating: 32.
 - 3. Thickness: As indicated.
- B. Wall Sheathing: Any PS 1 type.
 - 1. Bond Classification: Exterior.
 - 2. Grade: Structural I Sheathing.
 - 3. Span Rating: 24.
 - 4. Performance Category: 1/2 PERF CAT.
 - 5. Edge Profile: Square edge

6. Location: Roof side of exterior wall parapets where indicated.

2.03 Accessories

- A. Metal and Finish of Fasteners:
 1. Untreated Wood: Hot-dip galvanized steel complying with ASTM A153/A153M Class D.
- B. Fasteners and Anchors:
 1. Drywall Screws: Bugle head, hardened steel, power driven type, length three times thickness of sheathing.
 2. Anchors: Toggle bolt type for anchorage to hollow masonry.
- C. General Purpose Construction Adhesives: Comply with ASTM C557.
- D. Water-Resistive Barrier: See Section 07 2500.

PART 3 EXECUTION

3.01 Installation - General

- A. Select material sizes to minimize waste.
- B. Reuse scrap to the greatest extent possible; clearly separate scrap for use on site as accessory components, including: shims, bracing, and blocking.

3.02 Blocking, Nailers, and Supports

- A. Provide framing and blocking members as indicated or as required to support finishes, fixtures, specialty items, and trim.
- B. In gypsum board walls, provide blocking attached to studs as backing and support for wall-mounted items, unless item can be securely fastened to two or more studs or other method of support is explicitly indicated.
- C. Where ceiling-mounting is indicated, provide blocking and supplementary supports above ceiling, unless other method of support is explicitly indicated.
- D. Provide nonstructural framing and blocking to support the following:
 1. Cabinets and shelf supports.
 2. Wall brackets.
 3. Grab bars.
 4. Toilet accessories.
 5. Wall-mounted door stops.
 6. Tackboards and marker boards.
 7. Running trim.
 8. Other wall- or ceiling-mounted items indicated on drawings.

3.03 Roof-Related Carpentry

- A. Coordinate installation of roofing carpentry with deck construction, framing of roof openings, and roofing assembly installation.
- B. Provide wood curb at all roof openings except where specifically indicated otherwise. Form corners by alternating lapping side members.

3.04 Installation of Construction Panels

- A. Roof Sheathing: Secure panels with long dimension perpendicular to framing members, with ends staggered and over firm bearing.
 1. At long edges provide solid edge blocking where joints occur between roof framing members.
 2. Screw panels to framing; staples are not permitted.

3.05 Tolerances

- A. Framing Members: 1/4 inch from true position, maximum.

B. Variation from Plane, Other than Floors: 1/4 inch in 10 feet maximum, and 1/4 inch in 30 feet maximum.

END OF SECTION

SECTION 06 4100 - ARCHITECTURAL WOOD CASEWORK

PART 1 GENERAL

1.01 SECTION INCLUDES

- A. Wood casework with laminate cladding.
- B. Cabinet and drawer hardware.

1.02 RELATED REQUIREMENTS

- A. Section 06 1000 - Rough Carpentry.
- B. Section 08 7100 - Door Hardware: Door locks provided by hardware supplier for installation in specified casework.

1.03 REFERENCE STANDARDS

- A. ANSI A135.4 - American National Standard for Basic Hardboard; 2012.
- B. ANSI A208.2 - American National Standard for Medium Density Fiberboard for Interior Use; 2009.
- C. AWI/AWMAC/WI (AWS) - Architectural Woodwork Standards; 2014, with Errata (2016).
- D. BHMA A156.9 - American National Standard for Cabinet Hardware; 2015.
- E. HPVA HP-1 - American National Standard for Hardwood and Decorative Plywood; 2016.
- F. NEMA LD 3 - High-Pressure Decorative Laminates; 2005.

1.04 SUBMITTALS

- A. See Section 01 3000 - Administrative Requirements for submittal procedures.
- B. Shop Drawings: Indicate materials, component profiles, fastening methods, jointing details, and accessories.
 - 1. Provide the information required by AWI/AWMAC/WI (AWS).

1.05 QUALITY ASSURANCE

- A. Fabricator/Installer Qualifications: Firm specializing in fabricating and installing products specified in this section with minimum five years of documented experience; with qualifications indicating ability to comply with requirements of this section.
 - 1. Woodworking company with at least one project in past five years with value of casework within 20 percent of casework cost for this project.

1.06 DELIVERY, STORAGE AND HANDLING

- A. Store products prior to installation on flat, level, clean surfaces; elevate products above floors and protect from sunlight.
- B. Store products in interior rooms with completed wet work and overhead work.
- C. Handle materials and products to prevent damage to edges, ends, or surfaces.

1.07 FIELD CONDITIONS

- A. Ambient Conditions for Acclimation, Installation, and Post-Installation of Wood-Based Products:
 - 1. Acclimation Period inside Installation Environments: 72 hours, minimum prior to installation.
 - 2. Maintain temperature between 60 degrees F and 90 degrees F.
 - 3. Relative Humidity Conditions During Installation and Post-Installation: Maintain relative humidity between 25 and 55 percent.
 - 4. Maximum Sustained Time outside Specified Temperature Range: 24 hours.

PART 2 PRODUCTS

2.01 ARCHITECTURAL WOOD CASEWORK

- A. Casework Finish: Wood casework with laminate cladding.
- B. Provide casework and casework components in sizes and profiles as indicated on drawings.

2.02 CABINETS

- A. Quality Standard: Custom Grade, in accordance with AWI/AWMAC/WI (AWS), unless noted otherwise.
- B. Cabinets:
 - 1. Finish - Exposed Exterior Surfaces: Decorative laminate.
 - 2. Finish - Exposed Interior Surfaces: Decorative laminate.
 - 3. Finish - Concealed Surfaces: Melamine.
 - 4. Door and Drawer Front Edge Profiles: Square edge with thin applied band.
 - 5. Interface Style for Cabinet and Door: Style 1 - Overlay; flush overlay.
 - 6. Grained Face Layout for Cabinet and Door Fronts: Flush panel.
 - a. Custom Grade: Doors, drawer fronts and false fronts wood grain to run and match vertically within each cabinet unit.
 - 7. Adjustable Shelf Loading: 50 psf.
 - a. Deflection: L/144.

2.03 PANEL CORE MATERIALS

- A. Medium Density Fiberboard (MDF): Composite panel composed of cellulosic fibers, additives, and bonding system; cured under heat and pressure; comply with ANSI A208.2.
 - 1. Panel Thickness: 3/4 inch unless noted otherwise.
- B. Basic Hardboard: Panel manufactured from inter-felted lignocellulosic fibers consolidated under heat and pressure; comply with ANSI A135.4.
 - 1. Surface: Smooth two sides (S2S).
 - 2. Nominal Thickness: 1/4 inch.
 - 3. Use for drawer bottoms, dust panels, and other components indicated on drawings.

2.04 LAMINATE MATERIALS

- A. Manufacturers:
 - 1. Wilsonart LLC: www.wilsonart.com/#sle.
 - 2. Substitutions: See Section 01 6000 - Product Requirements.
 - a. Substitutions must be prior approved by the Architect and must match existing laminates color and texture.
 - 3. Colors and Textures:
 - a. Cabinets: Wilsonart 7909-60 Fusion Maple.
 - b. Countertops: Wilsonart 4820-60 Carbon EV.
- B. High Pressure Decorative Laminate (HPDL): NEMA LD 3, types as recommended for specific applications.
- C. Provide specific types as indicated.
 - 1. Horizontal Surfaces: HGS, 0.048 inch nominal thickness, finish as selected.
 - 2. Vertical Surfaces: VGS, 0.028 inch nominal thickness, finish as selected.
 - 3. Laminate Backer: BKL, 0.020 inch nominal thickness, undecorated; for application to concealed backside of panels faced with high pressure decorative laminate.
 - a. Color: Greystone.

2.05 COUNTERTOPS

- A. Plastic Laminate Countertops: Medium density fiberboard substrate covered with HDPL, conventionally fabricated and self-edge banded as shown on the drawings. Provide plywood substrates at wet conditions.

2.06 ACCESSORIES

- A. Adhesive: Type recommended by fabricator to suit application.
- B. Plastic Edge Banding: 3 mm extruded PVC, convex shaped; smooth finish; self-locking serrated tongue; of width to match component thickness.
 - 1. Color: D96 Wilsonart Shadow.
 - 2. Use at all exposed shelf edges.
 - 3. Use at doors and drawers.
- C. Fasteners: Size and type to suit application.
- D. Bolts, Nuts, Washers, Lags, Pins, and Screws: Of size and type to suit application; chrome-plated finish in concealed locations and stainless steel finish in exposed locations.
- E. Concealed Joint Fasteners: Threaded steel.
- F. Grommets: Standard plastic grommets for cut-outs, in color to blend with adjacent surface.

2.07 HARDWARE

- A. Hardware: BHMA A156.9, types as recommended by fabricator for quality grade specified.
- B. Adjustable Shelf Supports: Standard side-mounted system using multiple holes for pin supports and coordinated self rests, satin chrome finish, for nominal 1 inch spacing adjustments.
- C. Drawer and Door Pulls: "U" shaped wire pull, steel with satin finish, 4 inch centers., ADAAG compliant.
- D. Cabinet Locks: Keyed cylinder, one key per lock (all keyed under master key), steel with satin finish.
 - 1. At teacher's lockers where indicated on the drawings (reference cabinet elevations), install Schlage CL-100 (or equal) lock to match classroom key. Locks furnished by Section 08 7100 - Door Hardware supplier, installed by casework manufacturer.
- E. Cabinet Catches:
 - 1. Type: Magnetic catch and Push latch.
- F. Drawer Slides:
 - 1. Type: Full extension.
 - a. Box Drawer Slides: 100 lbf.
 - b. File Drawer Slides: 150 lbf.
 - c. Pencil Drawer Slides: 45 lbf.
 - 2. Mounting: Side mounted.
 - 3. Stops: Integral type.
 - 4. Features: Provide self closing/stay closed type.
 - 5. Manufacturers:
 - a. Accuride International, Inc: www accuride.com/#sle.
 - b. Grass America Inc: www.grassusa.com/#sle.
 - c. Knap & Vogt Manufacturing Company: www.knapandvogt.com/#sle.
 - d. Substitutions: See Section 01 6000 - Product Requirements.
- G. Hinges: European style concealed self-closing type, 135 degree opening , steel with satin finish.
 - 1. Manufacturers:
 - a. Grass America Inc; TEC Soft-Close: www.grassusa.com/#sle.
 - b. Hettich America, LP: www.hettich.com/#sle.
 - c. Blum, Inc: www.blum.com/#sle.
 - d. Substitutions: See Section 01 6000 - Product Requirements.
- H. Door Bolts: Locking door catch for use on locking pairs of doors without the necessity of an additional catch or bolt.
 - 1. Manufacturers:
 - a. Hafele America Company; Product 245.58.754.
 - 2. Location: Use at all pairs of locking cabinet doors.

2.08 FABRICATION

- A. Fabricate to maximum extents plausible, including doors, drawers, and hardware; fabricate units in sizes transportable through building openings.
- B. When necessary to cut and fit on site, provide materials with sufficient allowance for cutting.

- C. Plastic Laminate: Apply plastic laminate finish in full uninterrupted sheets consistent with manufactured sizes. Fit corners and joints hairline; secure with concealed fasteners. Locate counter butt joints minimum 2 feet from sink cut-outs.
- D. Provide cutouts for plumbing fixtures. Verify locations of cutouts from on-site dimensions. Seal cut edges.

PART 3 EXECUTION

3.01 EXAMINATION

- A. Verify casework and materials required for installation have been delivered, handled and stored as specified.
- B. Verify wood blocking that provides casework backing is installed as indicated on drawings.
- C. Verify location and sizes of rough-in plumbing and rough-in electrical associated with work of this section.

3.02 INSTALLATION

- A. Install work in accordance with AWI/AWMAC/WI (AWS) requirements for grade indicated.

3.03 ADJUSTING

- A. Adjust hardware for smooth operation in accordance with hardware manufacturer's documented instructions.

3.04 CLEANING

- A. See Section 01 7000 - Execution and Closeout Requirements for additional requirements.
- B. Clean exposed surfaces of casework, shelving, and hardware.

END OF SECTION

SECTION 07 0553 - FIRE AND SMOKE ASSEMBLY IDENTIFICATION

PART 1 GENERAL

1.01 SECTION INCLUDES

- A. Identification markings for fire and smoke rated partitions, and fire rated walls.

1.02 RELATED REQUIREMENTS

- A. Section 09 9123 - Interior Painting: Paint finish.

1.03 REFERENCE STANDARDS

- A. ICC (IBC) - International Building Code; Most Recent Edition Adopted by Authority Having Jurisdiction, Including All Applicable Amendments and Supplements.

1.04 FIELD CONDITIONS

- A. Do not install painted markings when ambient temperature is lower than recommended by coating manufacturer.

PART 2 PRODUCTS

2.01 FIRE AND SMOKE ASSEMBLY IDENTIFICATION

- A. Regulatory Requirements: Comply with "Marking and Identification" requirements of "Fire-Resistance Ratings and Fire Tests" chapter of ICC (IBC).
- B. Applied Fire and Smoke Assembly Identification: Identification markings applied to partition with paint and a code compliant stencil. See Section 09 9123 for products.
- C. Languages: Provide sign markings in English.

PART 3 EXECUTION

3.01 EXAMINATION

- A. Verify that substrate surfaces are ready to receive work.

3.02 PREPARATION

- A. See Section 09 9123 for substrate preparation for painted markings.

3.03 INSTALLATION

- A. Locate markings as required by ICC (IBC).
- B. Install applied markings in accordance with Section 09 9123.
- C. Install neatly, with horizontal edges level.
- D. Protect from damage until Date of Substantial Completion; repair or replace damaged markings.

END OF SECTION

SECTION 07 2100 - THERMAL INSULATION

PART 1 GENERAL

1.01 SECTION INCLUDES

- A. Board insulation at cavity wall construction.
- B. Batt insulation in exterior wall construction.

1.02 RELATED REQUIREMENTS

- A. Section 06 1000 - Rough Carpentry: Installation requirements for board insulation over steep slope roof sheathing or roof structure.
- B. Section 07 2200 - Roof and Deck Insulation: Insulation specified as part of roofing system.
- C. Section 07 2500 - Weather Barriers: Separate air barrier and vapor retarder materials.
- D. Section 09 2116 - Gypsum Board Assemblies: Acoustic insulation inside walls and partitions.

1.03 REFERENCE STANDARDS

- A. ASTM C552 - Standard Specification for Cellular Glass Thermal Insulation; 2017, with Editorial Revision (2018).
- B. ASTM C553 - Standard Specification for Mineral Fiber Blanket Thermal Insulation for Commercial and Industrial Applications; 2013.
- C. ASTM C578 - Standard Specification for Rigid, Cellular Polystyrene Thermal Insulation; 2018.
- D. ASTM C665 - Standard Specification for Mineral-Fiber Blanket Thermal Insulation for Light Frame Construction and Manufactured Housing; 2017.
- E. ASTM E84 - Standard Test Method for Surface Burning Characteristics of Building Materials; 2018b.
- F. ASTM E136 - Standard Test Method for Behavior of Materials in a Vertical Tube Furnace At 750 Degrees C; 2016a.

1.04 SUBMITTALS

- A. See Section 01 3000 - Administrative Requirements for submittal procedures.
- B. Product Data: Provide data on product characteristics and performance criteria.

PART 2 PRODUCTS

2.01 APPLICATIONS

- A. Insulation Inside Masonry Cavity Walls: Extruded polystyrene (XPS) board.
- B. Insulation in Metal Framed Walls: Batt insulation with no vapor retarder.

2.02 FOAM BOARD INSULATION MATERIALS

- A. Extruded Polystyrene (XPS) Board Insulation: Comply with ASTM C578 with either natural skin or cut cell surfaces.
 - 1. Flame Spread Index (FSI): Class A - 0 to 25, when tested in accordance with ASTM E84.
 - 2. Smoke Developed Index (SDI): 450 or less, when tested in accordance with ASTM E84.
 - 3. Type and Thermal Resistance, R-value: Type IV, 5.0 (0.88), minimum, per 1 inch thickness at 75 degrees F mean temperature.
 - 4. Board Edges: Square.
 - 5. Type and Water Absorption: Type XII, 0.3 percent by volume, maximum, by total immersion.
 - 6. Products:
 - a. DuPont de Nemours, Inc; Styrofoam Brand Cavitymate: building.dupont.com/#sle.
 - b. Owens Corning Corporation; FOAMULAR Type 150 Extruded Polystyrene (XPS) Insulation: www.ocbuildingspec.com/#sle.
 - c. Substitutions: See Section 01 6000 - Product Requirements.

2.03 MINERAL FIBER BLANKET INSULATION MATERIALS

- A. Where batt insulation is indicated, either glass fiber or mineral fiber batt insulation may be used, at Contractor's option.
- B. Flexible Glass Fiber Blanket Thermal Insulation: Preformed insulation, complying with ASTM C665; friction fit.
 - 1. Flame Spread Index: 25 or less, when tested in accordance with ASTM E84.
 - 2. Smoke Developed Index: 50 or less, when tested in accordance with ASTM E84.
 - 3. Combustibility: Non-combustible, when tested in accordance with ASTM E136.
 - 4. Thermal Resistance: R-value of 19.
 - 5. Thickness: 6 inches unless noted otherwise on drawings.
 - 6. Facing: Unfaced.
 - 7. Products:
 - a. CertainTeed Corporation: www.certainteed.com/#sle.
 - b. Johns Manville: www.jm.com/#sle.
 - c. Owens Corning Corporation: www.ocbuildingspec.com/#sle.
 - d. Knauf Insulation: www.icsinsulation.com.
 - e. Substitutions: See Section 01 6000 - Product Requirements.

2.04 ACCESSORIES

- A. Tape: Bright aluminum self-adhering type, 2 inch wide.
- B. Tape joints of rigid insulation in accordance with insulation manufacturers' instructions.
- C. Adhesive: Type recommended by insulation manufacturer for application.

PART 3 EXECUTION

3.01 EXAMINATION

- A. Verify that substrate, adjacent materials, and insulation materials are dry and that substrates are ready to receive insulation.
- B. Verify substrate surfaces are flat, free of honeycomb, fins, irregularities, or materials or substances that may impede adhesive bond.

3.02 BOARD INSTALLATION AT CAVITY WALLS

- A. Install boards to fit snugly between wall ties.
 - 1. Place membrane surface facing out, and tape seal board joints.
- B. Install boards horizontally on walls.
 - 1. Place boards to maximize adhesive contact.
 - 2. Install in running bond pattern.
 - 3. Butt edges and ends tightly to adjacent boards and protrusions.
- C. Cut and fit insulation tightly to protrusions or interruptions to the insulation plane.

3.03 BATT INSTALLATION

- A. Install insulation in accordance with manufacturer's instructions.
- B. Install in exterior wall spaces without gaps or voids. Do not compress insulation.
- C. Trim insulation neatly to fit spaces. Insulate miscellaneous gaps and voids.
- D. Fit insulation tightly in cavities and tightly to exterior side of mechanical and electrical services within the plane of the insulation.
- E. If any insulation becomes wet, remove and replace wet insulation.

3.04 PROTECTION

- A. Do not permit installed insulation to be damaged prior to its concealment.

END OF SECTION

SECTION 07 2216 - ROOF AND DECK INSULATION

PART 1 - GENERAL

1.01 SECTION INCLUDES

- A. Insulation furnished and installed as part of a complete roof system.

1.02 RELATED REQUIREMENTS

- A. Section 01 6000 - Rough Carpentry: Wood blocking.
- B. Section 07 5303 - Fully Adhered Elvaloy Multi-Ply Roof System: Roofing Membrane.

1.03 REFERENCES

- A. C 177-85 Test Method for Steady-State Heat Flux Measurements and Thermal Transmission Properties by Means of the Guarded-Hot-Plate Apparatus.
- B. C 209-84 Methods of Testing Insulating Board (Cellulosic Fiber), Structural and Decorative.
- C. D 41-85 Asphalt Primer Used in Roofing and Waterproofing.
- D. D 312-89 Asphalt Used in Roofing.
- E. D 1621-73 (1979) Test Method for Compressive Properties of Rigid Cellular Plastics.
- F. D 4601-86 Asphalt Coated Glass Fiber Base Sheet Used in Roofing.
- G. National Roofing Contractors Association (NRCA)
- H. ANSI/SPRI (CURRENT YEAR)
- I. ASCE 7 wind uplift criteria, (CURRENT YEAR)

1.04 QUALITY ASSURANCE

- A. Regulatory Requirements
 - 1. Classified by Underwriter's Laboratories (UL) as Class A roof covering.
 - 2. Follow local, state, and federal regulations, safety standards, and codes.
- B. Installation
 - 1. Installation shall be in accordance with manufacturer's current published application procedures, NRCA general recommendations, and ASCE 7 wind uplift criteria.
 - 2. Roof system manufacturer's technical specifications shall be considered part of this specification and shall be used as reference for specific application procedures.

1.05 SUBMITTALS

- A. See Section 01 3000 - Administrative Requirements, for submittal procedures.
- B. Product Data: Submit Manufacturer's product data sheets for each product.
- C. Shop Drawings: Layout of roof plan showing tapered design, tapered insulation pattern, direction of slope, amount of slope, spot elevations indicating thicknesses at high and low points.
- D. Certification: Submit roof manufacturer's certification in writing that insulation is acceptable as substrate for application of specified roof system.

1.06 DELIVERY, STORAGE, AND HANDLING

- A. Store materials in accordance with manufacturer's recommendations.
- B. When stored outdoors:
 - 1. Tarp and shield insulation from moisture and ultraviolet rays.
 - 2. Elevate insulation above substrate four inches minimum.
 - 3. Secure insulation to resist high winds.
 - 4. Distribute insulation stored on roof deck to prevent concentrated loads that would impose excessive stress or stain on deck or structural members. Verify that structure can accommodate additional loading.

5. Wet insulation, or insulation that has been wet but which has dried, may not be used and shall be removed completely and immediately from the job site.
6. Do not double stack bundles of insulation on the roof top.

1.07 SEQUENCING AND SCHEDULING

- A. Substrate Acceptance: Roof system manufacturer's representative shall inspect roof deck and associated substrates and provide written acceptance of conditions.
- B. Manufacturer's approved roofing contractor shall inspect and approve deck and substrates.
- C. Plan roof layout with respect to roof deck slope to prevent rainwater drainage into completed roofing.
- D. Do not install more insulation than can be covered with complete roof system in same day.

1.08 PRODUCT CONDITIONS

- A. Environmental Requirements:
 1. Apply roofing and insulation in dry weather.
 2. Do not proceed with roof construction during inclement weather or when precipitation is predicted 40% or more possibility.
 3. Do not apply insulation over wet or moist deck or in foggy conditions.
 4. Days with wind speeds of 30 mph or greater shall be considered "Bad Weather" days.
- B. Emergency Equipment: Maintain on-site equipment and material necessary to apply emergency temporary seals in the event of sudden storms or inclement weather.
- C. Costs for emergency roofing shall be borne by Contractor.

PART 2 - PRODUCTS

2.01 INSULATION

- A. All insulation shall be supplied by the membrane manufacturer. All insulation must be approved for the specific application; Underwriters Laboratory approved, and be listed in the FM Global Approval Guide.
- B. Polyisocyanurate Roof Insulation: Insulation shall be rigid polyisocyanurate foam board; thickness and LTTR-value shall be a minimum of R-30; meeting Federal Specification No. HH-I-1972/1 or 2 with 20 psi minimum compressive strength and 2.0 pcf minimum density. Board shall be surfaced on two (2) sides with non-asphaltic facer material. Two layer application is required to prevent cupping of the insulation board.
- C. Tapered Polyisocyanurate Roof Insulation: Tapered polyisocyanurate board per Federal Specification No. HH-I-1972/1 or 2 with 20 psi minimum compressive strength and 2.0 pcf minimum density. Insulation shall be of thickness required for on-fourth inch (1/4") slope per foot to roof drains as shown on the drawings. Starting edge thickness of tapered insulation shall be equal to R-30. Insulation shall be surfaced on two (2) sides with non-asphaltic facer material.
- D. Coverboard: Non-structural glass mat faced, non-combustible, moisture resistant, silicone treated gypsum core panel, manufactured to conform to ASTM C-1177. Thickness shall be 1/2" = R of 0.56 with a nominal board size of 48" x 96".
- E. Crickets and Saddles: Tapered polyisocyanurate board.
 1. Minimum Slope: 1/2" inch per linear foot.
 2. Widths of crickets and saddles are not to exceed 1/3 their lengths, unless otherwise shown on Drawings.
 3. Starting Thickness: Zero (0) inches.
- F. Cant Strips:
 1. Tapered cants at all locations where detailed or where applicable.
 2. Size: 4 inches high x 4 inches wide x 5-3/4 inches across diagonal face.

2.02 BITUMEN FOR THE COVER BOARD

- A. Shall be ASTM D 312 Type IV extra steep asphalt.

Interply Top PourBacknail Strap

0 - ½" per 12"	Type IV	Type IV	No	No
½" - 2" per 12"	Type IV	Type IV	Yes	Strap if possible
2" - 3" per 12"	Type IV	Type IV	Yes	Yes

2.03 ASPHALT ROOF PRIMER

- A. Quick-dry asphalt-based primer for priming of asphalt roof surfaces, or approved equal.
- Federal Specification SS-A-701B
ASTM D 41
Flash Point 105° F
Viscosity at 80° F (ASTM D 217) 50-60 K.U.
Weight per gallon 7.4 pounds
Drying time (to touch) Min. 4 hours

2.04 FASTENERS

- A. Fasteners and fastening plates and/or termination bars shall be FM Approved and shall be listed in the FM Global Approval Guide, and as recommended by the insulation/fastener manufacturer for the specific application to meet the minimal requirements for wind uplift FM I-90 as required by FM Global.
- B. Standard Fastener for Steel Applications for 18-24 gauge Steel and Wood Substrates: Shall be a #14 fastener with a minimum of .220 thread diameter and .12.5 buttress threads and a 30 degree spade point. Fasteners shall be fluorocarbon coated with CR-10 corrosion resistant coating when subjected to 30 Kesternich cycles (DIN 50018) shows less than 15% red rust which surpasses FM Global Approval Standard 4470, or approved equal. All fasteners shall be used in conjunction with the manufacturer's approved round pressure plate. Fasteners, plates, and/or bars shall be FM approved and listed in the FM Global Approval Guide and rated for I-90 minimum.

PART 3 - EXECUTION

3.01 PROTECTION

- A. Provide special protection from traffic on completed work.

3.02 EXAMINATION AND PREPARATION

- A. Do not install until defects are corrected and deck substrate meets roof system manufacturer's requirements.
- B. Do not apply insulation adhesives below 45 degrees. Weather conditions shall be 45 degrees and rising.
- C. Do not apply insulation unless asphalt application temperature, EVT of approximately 375 degrees F to 425 degrees F, can be maintained or when water or moisture is present on substrate. Do not heat asphalt above flashing point, or 525 degrees F.
- D. Examine substrate and related surfaces, and verify that there are no conditions such as inadequate anchorage, foreign materials, moisture, ridges, depressions, or other conditions which would prevent satisfactory installation of roof system.
- E. Start of work constitutes acceptance of deck substrate and site conditions.
- F. Sweep deck substrate clean of dust and debris immediately prior to installation Insulation.

3.03 INSULATION

- A. Manufacturer's Instructions: In regard to adhesive attachment, the manufacturer's instructions or specifications shall determine the suitability for an application. Installation must meet ASCE 7 criteria and meet local governing building codes.
- B. Precautions: The surface of the insulation must not be ruptured due to overdriving of fasteners.
- C. Thermal insulation boards shall be laid on the substrate in parallel rows with end joints staggered and butted as close as possible. All joints shall be tight and at the roof perimeter and roof penetrations, insulation shall be cut neatly and fitted to reduce openings to a minimum. All openings one-fourth inch (1/4") or larger shall be filled with insulation.
- D. Insulation shall be tapered or feathered at drains and scuppers to provide proper drainage.

- E. No more insulation shall be installed than can be covered by the completed roof system by the end of the day or the onset of inclement weather.
- F. Tapered insulation and crickets shall be placed in accordance with the drawings and/or as required to minimum of NRCA standards.

3.04 INSULATION INSTALLATION

- A. Insulation shall be mechanically fastened to the metal deck. Fastening shall conform to the current ASCE 7 criteria for wind uplift as dictated by wind zone applicable to location of project. Pattern shall be determined by building height, location and geographical area of the United States. It is the contractor's responsibility to consult current publications, literature, and bulletins of IBC and the manufacturer that are in effect at the time of this project. Insulation shall be laid with edges parallel to flutes and bearing on deck surface/flats. The long dimension of base insulation layer must be fully supported by the top flange of the metal deck. The edges of insulation boards must not cantilever over the flutes of the metal deck.
- B. Attachment of Insulation to Concrete Deck: Embed insulation in adhesive in full contact, in accordance with roofing and insulation manufacturers' instructions.
- C. Second layer and cover board specified shall be Boards shall be staggered and butted as close as possible with voids over one-fourth inch (1/4") to be filled.
- D. Place tapered insulation to the required slope pattern in accordance with manufacturer's instructions.
- E. Cut insulation to fit neatly to perimeter blocking and around penetrations through roof.
- F. Tape joints of insulation in accordance with roofing and insulation manufacturers' instructions.
- G. The top surface of the insulation shall be coated with hot asphalt using twenty-five pounds (25#) per one hundred (100) square feet of surface, and the cover board shall be applied using offset joints, so that each layer breaks joints to a minimum of six inches (6") both ways with the preceding layer, and immediately walked in place.

3.05 ADJUSTING

- A. Remove insulation which has been damaged (broken, cracked, punctured, wet, etc.) and install acceptable new units before installation of roof system.

3.06 CLEANING

- A. Remove debris and material wrappers from jobsite. Leave insulation clean and dry, ready to receive roofing membrane.

3.07 PROTECTION

- A. Provide special protection from traffic on completed work.

END OF SECTION

SECTION 07 2500 - WEATHER BARRIERS

PART 1 GENERAL

1.01 SECTION INCLUDES

- A. Air Barriers: Materials that form a system to stop passage of air through exterior walls, joints between exterior walls and roof, and joints around frames of openings in exterior walls.

1.02 RELATED REQUIREMENTS

- A. Section 06 1000 - Rough Carpentry: Water-resistive barrier under exterior plywood sheathing.
- B. Section 07 9200 - Joint Sealants: Sealing building joints.
- C. Section 09 2116 - Gypsum Board Assemblies: Water-resistive barrier over gypsum sheathing.

1.03 REFERENCE STANDARDS

- A. ASTM D412 - Standard Test Methods for Vulcanized Rubber and Thermoplastic Elastomers--Tension; 2016.
- B. ASTM E84 - Standard Test Method for Surface Burning Characteristics of Building Materials; 2018b.
- C. ASTM E96/E96M - Standard Test Methods for Water Vapor Transmission of Materials; 2016.
- D. ASTM E2178 - Standard Test Method for Air Permeance of Building Materials; 2013.
- E. ICC-ES AC308 - Acceptance Criteria for Water-Resistive Barriers; 2016.
- F. ICC-ES AC148 - Acceptance Criteria for Flexible Flashing Materials; 2017.
- G. NFPA 285 - Standard Fire Test Method for Evaluation of Fire Propagation Characteristics of Exterior Non-Load-Bearing Wall Assemblies Containing Combustible Components; 2012.

1.04 SUBMITTALS

- A. See Section 01 3000 - Administrative Requirements for submittal procedures.
- B. Product Data: Provide data on material characteristics and performance criteria.
- C. Manufacturer's Installation Instructions: Indicate preparation and installation methods.

1.05 FIELD CONDITIONS

- A. Maintain temperature and humidity recommended by materials manufacturers before, during, and after installation.

PART 2 PRODUCTS

2.01 WEATHER BARRIER ASSEMBLIES

- A. Air Barrier:
 - 1. On outside surface of sheathing of exterior walls use air barrier coating, fluid applied type.

2.02 AIR BARRIER MATERIALS (WATER VAPOR PERMEABLE AND WATER-RESISTIVE)

- A. Air Barrier, Fluid Applied: Vapor permeable, elastomeric waterproofing.
 - 1. Air Barrier Coating:
 - a. Material: Acrylic.
 - b. Dry Film Thickness (DFT): 10 mil, 0.010 inch, minimum.
 - c. Air Permeance: 0.004 cfm/sq ft, maximum, when tested in accordance with ASTM E2178.
 - d. Water Vapor Permeance: 18 perms, minimum, when tested in accordance with ASTM E96/E96M Procedure B (Water Method) at 73.4 degrees F.
 - e. Ultraviolet (UV) and Weathering Resistance: Approved in writing by manufacturer for up to six months of weather exposure after application.
 - f. Elongation: 300 percent, minimum, when tested in accordance with ASTM D412.

- g. Surface Burning Characteristics: Flame spread index of 25 or less, smoke developed index of 450 or less, when tested in accordance with ASTM E84.
- h. Complies with NFPA 285 wall assembly requirements.
- i. Sealants, Tapes and Accessories: As recommended by coating manufacturer.
- j. Manufacturers:
 - 1) DuPont de Nemours, Inc; Tyvek Fluid Applied WB+ with Tyvek Fluid Applied Flashing and Joint Compound, Sealant for Tyvek Fluid Applied System and StraightFlash: www.dupont.com/#sle.
 - 2) PROSOCO, Inc; R-GUARD Spray Wrap MVP with Joint & Seam Filler, FastFlash, SureSpan EX: www.prosoco.com/r-guard/#sle.
 - 3) Sto Corp; StoGuard Assembly with Sto Gold Fill and Sto Gold-Coat, StoGuard Transition Membrane: www.stocorp.com/#sle.
 - 4) Dryvit; Backstop NT with AquaFlash: www.dryvit.com.
 - 5) Substitutions: Not permitted.

2.03 Accessories

- A. Sealants, Tapes, and Accessories for Sealing Weather Barrier and Sealing Weather Barrier to Adjacent Substrates: As specified or as recommended by weather barrier manufacturer to create a complete system.
- B. Flexible Flashing: Peel and stick flexible flashing membrane to seal sheathing rough openings to adjacent envelope materials (storefronts, door frames etc).
 - 1. Sto Corporation; StoGuard Transition Membrane.
 - 2. Prosoco, Inc.; SureSpan EX.
 - 3. DuPont Building Innovations; StraightFlash..
 - 4. Dryvit; AquaFlash.
- C. Thinners and Cleaners: As recommended by water-resistive barrier manufacturer.
- D. Other Sealants, Joint Treatments, Primers:
 - 1. Manufacturer's standard accessory items as required to provide a complete, warranted fluid applied weather barrier system.

PART 3 EXECUTION

3.01 EXAMINATION

- A. Verify that surfaces and conditions comply with requirements of this section.

3.02 PREPARATION

- A. Remove projections, protruding fasteners, and loose or foreign matter that might interfere with proper installation.
- B. Complete all required joint fill and flashings prior to weather barrier installation. Spot fasteners or other voids in substrate with manufacturer's recommended fill material.

3.03 INSTALLATION

- A. Install materials in strict accordance with manufacturer's instructions. Wrap door, window, louver and other openings in exterior walls to achieve continuity of air barrier when combined with other building systems and flashings.
- B. Air Barriers: Install continuous air tight barrier over surfaces indicated, with sealed seams and with sealed joints to adjacent surfaces.
- C. Apply sealants within recommended temperature range in accordance with manufacturer's installation instructions.
- D. Fluid-Applied Membranes:
 - 1. Prepare substrate in accordance with coating manufacturer's installation instructions; treat joints in substrate and between dissimilar materials as indicated.

2. Where exterior masonry veneer is being applied, install masonry anchors prior to placement of water-resistive barrier over masonry substrate; seal airtight around anchors.
 3. Apply flashing to seal with adjacent construction and to bridge joints in coating substrate.
 4. Spray apply coating in strict accordance with manufacturer's published instructions and back-roll to achieve a void and pinhole free surface. Apply additional coats as required to achieve manufacturer's recommended minimum dry film thickness.
- E. Openings and Penetrations in Exterior Water-Resistive Barriers:
1. Install flashing over sills, covering entire sill framing member, and extend at least 5 inches onto water-resistive barrier and at least 6 inches up jambs; mechanically fasten stretched edges.
 2. At openings filled with nonflanged frames, seal water-resistive barrier to each side of framing at opening using flashing at least 9 inches wide, and covering entire depth of framing.
 3. At head of openings, install flashing under water-resistive barrier extending at least 2 inches beyond face of jambs; seal water-resistive barrier to flashing.
 4. At interior face of openings, seal gap between window/door frame and rough framing, using self-adhering flexible flashing membrane.
 5. Service and Other Penetrations: Form flashing around penetrating items and seal to surface of water-resistive barrier.

3.04 FIELD QUALITY CONTROL

- A. Do not cover installed water-resistive barriers until required inspections have been completed.
- B. Obtain approval of installation procedures from water-resistive barrier manufacturer based on a mock-up installed in place, prior to proceeding with remainder of installation.
- C. Take digital photographs of each portion of installation prior to covering up weather barriers.

3.05 PROTECTION

- A. Do not leave materials exposed to weather longer than recommended by manufacturer.

END OF SECTION

SECTION 07 4264 - ALUMINUM COMPOSITE MATERIAL WALL PANELS

PART 1 GENERAL

1.01 SECTION INCLUDES

- A. Exterior cladding consisting of formed aluminum composite material (ACM) sheet and anchors to structure, attached to solid backup.
 - 1. Panel systems include:
 - a. Flat sheet Clip-and-Caulk type system.
- B. Matching flashing and trim.

1.02 RELATED REQUIREMENTS

- A. Section 07 2500 - Weather Barriers: Installation of spray-applied weather barrier behind rainscreen wall system.
- B. Section 07 6200 - Sheet Metal Flashing and Trim: Metal flashing components integrated with this wall system.
- C. Section 07 9200 - Joint Sealants: Sealing joints between siding and adjacent construction and fixtures.

1.03 REFERENCE STANDARDS

- A. ASTM A36/A36M - Standard Specification for Carbon Structural Steel; 2014.
- B. ASTM A153/A153M - Standard Specification for Zinc Coating (Hot-Dip) on Iron and Steel Hardware; 2016a.
- C. ASTM A276/A276M - Standard Specification for Stainless Steel Bars and Shapes; 2017.
- D. ASTM A480/A480M - Standard Specification for General Requirements for Flat-Rolled Stainless and Heat-Resisting Steel Plate, Sheet, and Strip; 2018a.
- E. ASTM A653/A653M - Standard Specification for Steel Sheet, Zinc-Coated (Galvanized) or Zinc-Iron Alloy-Coated (Galvannealed) by the Hot-Dip Process; 2018.
- F. ASTM A792/A792M - Standard Specification for Steel Sheet, 55% Aluminum-Zinc Alloy-Coated by the Hot-Dip Process; 2010 (Reapproved 2015).
- G. ASTM B221 - Standard Specification for Aluminum and Aluminum-Alloy Extruded Bars, Rods, Wire, Profiles, and Tubes; 2014.
- H. ASTM D523 - Standard Test Method for Specular Gloss; 2014.
- I. ASTM D1781 - Standard Test Method for Climbing Drum Peel for Adhesives; 1998 (Reapproved 2012).
- J. ASTM D1929 - Standard Test Method for Determining Ignition Temperature of Plastics; 2016.
- K. ASTM D2244 - Standard Practice for Calculation of Color Tolerances and Color Differences from Instrumentally Measured Color Coordinates; 2016.
- L. ASTM D4145 - Standard Test Method for Coating Flexibility of Prepainted Sheet; 2010 (Reapproved 2018).
- M. ASTM D4214 - Standard Test Methods for Evaluating the Degree of Chalking of Exterior Paint Films; 2007 (Reapproved 2015).
- N. ASTM E84 - Standard Test Method for Surface Burning Characteristics of Building Materials; 2018b.
- O. ASTM E331 - Standard Test Method for Water Penetration of Exterior Windows, Skylights, Doors, and Curtain Walls by Uniform Static Air Pressure Difference; 2000 (Reapproved 2016).
- P. ASTM A666 - Standard Specification for Annealed or Cold-Worked Austenitic Stainless Steel Sheet, Strip, Plate, and Flat Bar; 2015.
- Q. ASTM B209 - Standard Specification for Aluminum and Aluminum-Alloy Sheet and Plate; 2014.

1.04 SUBMITTALS

- A. See Section 01 3000 - Administrative Requirements, for submittal procedures.
- B. Product Data - Wall System: Manufacturer's data sheets on each product to be used, including:
 - 1. Physical characteristics of components shown on shop drawings.

2. Storage and handling requirements and recommendations.
3. Installation instructions and recommendations.
4. Specimen warranty for wall system, as specified herein.
- C. Shop Drawings: Show layout and elevations, dimensions and thickness of panels, connections, details and location of joints, sealants and gaskets, method of anchorage, number of anchors, supports, reinforcement, trim, flashings, and accessories.
 1. Differentiate between shop and field fabrication.
 2. Indicate substrates and adjacent work with which the wall system must be coordinated.
 3. Include large-scale details of anchorages and connecting elements.
 4. Include large-scale details or schematic, exploded or isometric diagrams to fully explain flashing at a scale of not less than 1-1/2 inches per 12 inches.
 5. Include design engineer's stamp or seal on shop drawings for attachments and anchors.
- D. Verification Samples: For each finish product specified, minimum size 6 inches square, representing actual product in color and texture.
- E. Installer's Qualification Statement.
- F. Maintenance Data: Care of finishes and warranty requirements.
- G. Executed Warranty: Submit warranty and ensure that forms have been completed in Owner's name and registered with manufacturer.

1.05 QUALITY ASSURANCE

- A. Field Measurements: Verify actual dimensions by field measurement before fabrication; show recorded measurements on shop drawings.
- B. Design Engineer's Qualifications: Design structural supports and anchorages under direct supervision of a Structural Engineer experienced in design of this type of Work and licensed in Louisiana.
- C. Perform work in accordance with International Building Code.
- D. Manufacturer Qualifications: Company specializing in manufacturing products specified in this section.
 1. With not less than five years of documented experience.
- E. Installer Qualifications: Company specializing in performing work of the type specified in this section.
 1. With minimum five years of documented experience.
 2. Approved by wall system manufacturer.

1.06 DELIVERY, STORAGE, AND HANDLING

- A. Deliver products in manufacturer's original, unopened, undamaged containers with identification labels intact.
 1. Protect finishes by applying heavy duty removable plastic film during production.
 2. Package for protection against transportation damage.
 3. Provide markings to identify components consistently with drawings.
 4. Exercise care in unloading, storing and installing panels to prevent bending, warping, twisting and surface damage.
- B. Store products protected from exposure to harmful weather conditions and at temperature conditions recommended by manufacturer.
 1. Store in well ventilated space out of direct sunlight.
 2. Protect from moisture and condensation with tarpaulins or other suitable weather tight covering installed to provide ventilation.
 3. Store at a slope to ensure positive drainage of any accumulated water.
 4. Do not store in any enclosed space where ambient temperature can exceed 120 degrees Fahrenheit.
 5. Avoid contact with any other materials that might cause staining, denting, or other surface damage.

1.07 PROJECT CONDITIONS

- A. Field Measurements: Verify actual dimensions by field measurement before fabrication; show recorded measurements on shop drawings. Coordinate field measurements and fabrication schedule with construction progress to avoid delays.

1.08 WARRANTY

- A. See Section 01 7800 - Closeout Submittals, for additional warranty requirements.
- B. Wall System Warranty: Provide joint written warranty by manufacturer and installer, agreeing to correct defects in manufacturing or installation within a two year period after Date of Substantial Completion.
- C. ACM Sheet Manufacturer's Finish Warranty: Provide manufacturer's written warranty stating that the finish will perform as follows for minimum of 20 years:
 - 1. Chalking: No more than that represented by a No. 8 rating based on ASTM D4214.
 - 2. Color Retention: No fading or color change in excess of 5 Hunter color difference units, calculated in accordance with ASTM D2244.
 - 3. Gloss Retention: Minimum of 30 percent gloss retention, when tested in accordance with ASTM D523.

PART 2 PRODUCTS

2.01 MANUFACTURERS

- A. Aluminum Composite Material Sheet Manufacturers:
 - 1. Basis of Design Product: Laminators Inc.; Omega-Lite: www.laminatorsinc.com.
 - 2. Alternate Manufacturers:
 - a. 3A Composites USA; Alucobond: www.alucobondusa.com/sle.
 - b. Alcoa, Inc; Reynobond: www.alcoa.com.
 - c. ALPOLIC Materials; ALPOLIC (PE core): www.alpolic-usa.com/sle.
 - 3. Substitutions: See Section 01 6000 - Product Requirements.
 - a. Substitutions must be prior approved by Architect and must match the existing ACM system color and finish.

2.02 FLAT SHEET PANEL SYSTEM

- A. Wall Panel System: Metal panels, fasteners, and anchors designed to be supported by framing or other substrate provided by others; provide installed panel system capable of maintaining specified performance without defects, damage or failure.
 - 1. Provide panel jointing and weatherseal using manufacturer's standard "clip and caulk" system.
 - 2. Anchor panels to supporting framing without exposed fasteners.
- B. Performance Requirements:
 - 1. Thermal Movement: Provide for free and noiseless vertical and horizontal thermal movement due to expansion and contraction under material temperature range of minus 20 degrees Fahrenheit to 180 degrees F without buckling, opening of joints, undue stress on fasteners, or other detrimental effects; allow for ambient temperature at time of fabrication, assembly, and erection procedures.
 - 2. Air Infiltration: 0.06 cfm/sq ft of wall area, maximum, when tested at 1.57 psf in accordance with ASTM E283.
 - 3. Water Penetration: No water penetration under static pressure when tested in accordance with ASTM E331 at a differential of 10 percent of inward acting design load, 6.24 psf minimum, after 15 minutes.
 - a. Water penetration is defined as the appearance of uncontrolled water on the interior face of the wall.
 - b. Design to drain leakage and condensation to the exterior face of the wall.

2.03 MATERIALS

- A. Aluminum Composite Material (ACM) Sheet: Two sheets of aluminum sandwiching a solid core of extruded thermoplastic material formed in a continuous process with no glues or adhesives between dissimilar materials; core material free of voids and spaces; no foamed insulation material content.
 - 1. Overall Sheet Thickness: 0.12 inch, minimum.
 - 2. Face Sheet Thickness: .024 inches, minimum.
 - 3. Alloy: Manufacturer's standard, selected for best appearance and finish durability.

4. Bond and Peel Strength: No adhesive failure of the bond between the core and the skin nor cohesive failure of the core itself below 22.4 inch-pound/inch with no degradation in bond performance, when tested in accordance with ASTM D1781, simulating resistance to panel delamination, after 8 hours of submersion in boiling water and after 21 days of immersion in water at 70 degrees Fahrenheit.
5. Surface Burning Characteristics: Flame spread index of 25, maximum; smoke developed index of 450, maximum; when tested in accordance with ASTM E84.
6. Flammability: Self-ignition temperature of 650 degrees Fahrenheit or greater, when tested in accordance with ASTM D1929.
7. Factory Finish: Three coat fluoropolymer resin coating, approved by the coating manufacturer for the length of warranty specified for the project, and applied by coil manufacturing facility that specializes in coil applied finishes.
 - a. Coating: Kynar 500 PVDF fluoropolymer resin coating.
 - b. Coating Flexibility: Pass ASTM D4145 minimum 1T-bend, at time of manufacturing.
 - c. Long-Term Performance: Not less than that specified under WARRANTY in PART 1.
8. Color: Laminators Bright Silver.
- B. Flashing: Sheet aluminum; 0.040 inch thick, minimum; finish and color to match ACM sheet.
- C. Anchors, Clips and Accessories: Use one of the following:
 1. Stainless steel complying with ASTM A276/A276M, ASTM A480/A480M, or ASTM A666.
 2. Steel complying with ASTM A36/A36M and hot-dipped galvanized to ASTM A153/A153M.
- D. Fasteners:
 1. Exposed Fasteners: Stainless steel; permitted only where absolutely unavoidable and subject to prior approval of the Architect.
 2. Screws: Self-drilling or self-tapping Type 410 stainless steel or zinc-alloy steel hex washer head, with EPDM or PVC washer under heads of fasteners bearing on weather side of metal wall panels.
 3. Fasteners for Flashing and Trim: Blind fasteners of high-strength aluminum or stainless steel.
- E. Joint Sealer: Silicone sealant approved by ACM sheet manufacturer.
- F. Provide panel system manufacturer's and installer's standard corrosion resistant accessories, including fasteners, clips, anchorage devices and attachments.

PART 3 EXECUTION

3.01 EXAMINATION

- A. Verify dimensions, tolerances, and interfaces with other work.
- B. Verify substrate on-site to determine that conditions are acceptable for product installation in accordance with manufacturers written instructions.
- C. If substrate preparation is the responsibility of another installer, notify Architect of unsatisfactory preparation before proceeding.
- D. Notify Architect in writing of conditions detrimental to proper and timely completion of work. Do not proceed with erection until unsatisfactory conditions have been corrected.
- E. Proceeding with installation of product indicates acceptance of substrate conditions.

3.02 PREPARATION

- A. Protect adjacent work areas and finish surfaces from damage during installation.

3.03 FABRICATION

- A. Fabricate panels into sizes and profiles as indicated on the shop drawings, with all exterior corners brakeformed at right angles, with smooth corners and sealed to provide a completely weathertight condition.

3.04 INSTALLATION

- A. Do not install products that are defective, including warped, bowed, dented, and broken members, and members with damaged finishes.

- B. Comply with instructions and recommendations of ACM sheet manufacturer and wall system manufacturer, as well as with approved shop drawings.
- C. Install wall system securely allowing for necessary thermal and structural movement; comply with wall system manufacturer's instructions for installation of concealed fasteners.
- D. Do not handle or tool products during erection in manner that damages finish, decreases strength, or results in visual imperfection or failure in performance. Return component parts that require alteration to shop for refabrication, if possible, or for replacement with new parts.
- E. Separate dissimilar metals; use gasket fasteners, isolation shims, or isolation tape where needed to eliminate possibility of electrolytic action between metals.
- F. Where joints are designed for field applied sealant, seal joints completely with specified sealant.
- G. Install flashings as indicated on shop drawings At flashing butt joints, provide a lap strap under flashing and seal lapped surfaces with a full bed of non-hardening sealant.
- H. Install square, plumb, straight, and true, accurately fitted, with tight joints and intersections maintaining the following installation tolerances:
 - 1. Variation From Plane or Location: 1/2 inch in 30 feet of length and up to 3/4 inch in 300 feet, maximum.
 - 2. Deviation of Vertical Member From True Line: 0.1 inch in 25 feet run, maximum.
 - 3. Deviation of Horizontal Member From True Line: 0.1 inch in 25 feet run, maximum.
 - 4. Offset From True Alignment Between Two Adjacent Members Abutting End To End, In Line: 0.03 inch, maximum.
- I. Replace damaged products.
 - 1. Exception: Field repairs of minor damage to finishes are permitted only when approved in writing by Architect, panel manufacturer, and fabricator.
 - 2. Field Repairs to Finishes: Using materials and methods sufficient that repairs are not discernible when viewed at distance of 10 feet under all typical light conditions experienced at the project.

3.05 CLEANING

- A. Ensure weep holes and drainage channels are unobstructed and free of dirt and sealants.
- B. Remove protective film after installation of joint sealers, after cleaning of adjacent materials, and immediately prior to completion of work.
- C. Remove temporary coverings and protection of adjacent work areas.
- D. Clean installed products in accordance with manufacturer's instructions.

3.06 PROTECTION

- A. Protect installed panel system from damage until Date of Substantial Completion.

END OF SECTION

SECTION 07 5303 - FULLY ADHERED ELVALOY MULTI-PLY ROOF SYSTEM

PART 1 - GENERAL

1.01 SECTION INCLUDES

- A. Installation of roof insulation.
- B. Adhered membrane roofing system.
- C. Traffic pads.

1.02 RELATED REQUIREMENTS

- A. Section 06 1000 - Rough Carpentry: Wood blocking.
- B. Section 07 2216 - Roof and Deck Insulation.
- C. Section 07 6200 - Sheet Metal Flashing and Trim.

1.03 PERFORMANCE REQUIREMENTS

- A. General Performance: Installed membrane roofing and base flashings shall withstand specified uplift pressures, thermally induced movement, and exposure to weather without failure due to defective manufacture, fabrication, installation, or other defects in construction. Membrane roofing and base flashings shall remain watertight.
- B. Material Compatibility: Provide roofing materials that are compatible with one another under conditions of service and application required, as demonstrated by membrane roofing manufacturer based on testing and field experience.
- C. Roofing System Design: Provide membrane roofing system that is identical to systems that have been successfully tested by a qualified testing and inspecting agency to resist uplift pressure calculated according to ASCE/SEI 7.

1.04 QUALITY ASSURANCE

- A. Manufacturer Qualifications: A qualified manufacturer that is UL listed for membrane roofing system identical to that used for this Project.
- B. Installer Qualifications: Roofing Installer must be:
 - 1. Currently prequalified with the Owner in accordance with Owner's prequalification requirements.
 - 2. Currently in good standing with the manufacturer for manufacturers warranty requirements.
 - 3. Installer must be an experienced single firm specializing in the type of roofing repair and/or removal and replacement work required, employing only experienced workers for the class of work in which they are employed, having at least five (5) years successful experience on projects similar in size and scope and acceptable as applicators by the Architect.
 - 4. Installer must have successfully completed previous projects warranted by the manufacturer.
 - 5. It shall remain the General Contractor's responsibility to determine the current status of a roofing subcontractor with the manufacturer's certification plan prior to receiving a bid from them.
- C. Source Limitations: Obtain components including roof insulation fasteners for membrane roofing system from same manufacturer as membrane roofing or approved by membrane roofing manufacturer.
- D. System requirements
 - 1. All products from deck up to sky shall be listed in the roofing manufacturer's "Proposed Assembly Letter".
- E. Exterior Fire-Test Exposure: ASTM E 108, Class A; for application and roof slopes indicated, as determined by testing identical membrane roofing materials by a qualified testing agency. Materials shall be identified with appropriate markings of applicable testing agency.
- F. Fire-Resistance Ratings: Where indicated, provide fire-resistance-rated roof assemblies identical to those of assemblies tested for fire resistance per ASTM E 119 by a qualified testing agency. Identify products with appropriate markings of applicable testing agency.
- G. Manufacturer's Observation Reports: Beginning with the commencement of the roofing system installation for the project and continuing through the completion of the roofing system installation and

all its associated components, the Roofing System Manufacturer or their appointed representative will provide written quality assurance observation reports as follows and this shall be confirmed in writing by the manufacturer and made part of the roofing submittals.

1. Keep the Architect /Owner informed as to the progress, status, and quality of work as observed.
 2. Provide jobsite observations no less than once per week throughout the installation of the roofing system and its associated components. Reports shall include detailed weekly reports to the Architect, Contractor, and Subcontractor along with digital photographs of work in progress. These reports and photographs shall be descriptive of actual work in progress, status, and condition, and be presented in a written format with digital color photographs.
 3. Report to the Architect /Owner in writing any refusal or failure of the Contractor to correct unacceptable practices or conditions called to the Contractor's attention.
 4. Confirm, after completion of the project and based on manufacturer's observations and tests (if necessary), that manufacturer has observed no deviations from application procedures in conflict with the plans and specifications or the manufacturer's installation requirements for warranty other than those that may have been previously reported or approved.
 5. The roof system manufacturer shall, perform annual observations of the roof system at no additional cost to the Owner. These inspections shall include a written report with photographs for presentation to the Architect/Owner. Observations are to be scheduled and coordinated with the Architect and performed by the manufacturer's representative. Nothing shall be required of the Architect/Owner other than providing access to the roof system.
 6. It will be the sole responsibility of each bidder to ensure these conditions are to be met by the roofing system manufacturer or their appointed representative prior to bidding.
- H. Preinstallation Roofing Conference: Conduct conference at Project site.
1. Meet with Owner, Architect, Owner's insurer if applicable, testing and inspecting agency representative, roofing Installer, roofing system manufacturer's representative, deck Installer, and installers whose work interfaces with or affects roofing, including installers of roof accessories and roof-mounted equipment.
 2. Review methods and procedures related to roofing installation, including manufacturer's written instructions.
 3. Review and finalize construction schedule and verify availability of materials, Installer's personnel, equipment, and facilities needed to make progress and avoid delays.
 4. Examine deck substrate conditions and finishes for compliance with requirements, including flatness and fastening.
 5. Review structural loading limitations of roof deck during and after roofing.
 6. Review base flashings, special roofing details, roof drainage, roof penetrations, equipment curbs, and condition of other construction that will affect roofing system.
 7. Review governing regulations and requirements for insurance and certificates if applicable.
 8. Review temporary protection requirements for roofing system during and after installation.
 9. Review roof observation and repair procedures after roofing installation.
- I. Testing Laboratory Services: Test results shall meet or exceed established standards.
- J. Underwriters Laboratories, Inc.; Roofing Covering: Class A fire hazard classification.
- K. Comply with governing local, state, and federal regulations, safety standards, and codes.
- 1.05 REFERENCE STANDARDS (INCLUDING LATEST REVISIONS)
- A. The manufacturer's Technical Specifications and current NRCA, Underwriters Laboratory, and IBC guidelines shall be considered a part of this specification and shall be referred for general application procedures and recommendations.
 - B. ASTM B 209 - Specification for Aluminum and Aluminum Alloy Sheet and Plate
 - C. ASTM C 719 - Test Method for Adhesion and Cohesion of Elastomeric Joint Sealants Under Cycle Movement (Hockman Cycle)
 - D. ASTM C 794 - Test Method for Adhesion-in-Peel of Elastomeric Joint Sealants
 - E. ASTM C 920 - Specification for Elastomeric Joint Sealants
 - F. ASTM D 312 - Specification for Asphalt Used in Roofing
 - G. ASTM D 4586 -Specification for Asphalt Roof Cement, Asbestos Free

- H. ASTM A 361 - Sheet Steel, Zinc-Coated (Galv.) by the Hot-Dip Process for Roofing and Siding.
- I. ASTM C 177 - Test for Thermal Laboratory Services
- J. The National Roofing Contractors Association (NRCA) - Roofing and Waterproofing Manual
- K. Single-ply Roofing Institute (SPRI) - A Professional Guide to Specifications Manual
- L. Sheet Metal and Air Conditioning Contractors National Association (SMACNA) - Architectural Sheet Metal Manual
- M. American Society of Civil Engineers - ASCE 7

1.06 SUBMITTALS

- A. See Section 01 3000 - Administrative Requirements, for submittal procedures.
- B. Submit manufacturer's "Proposed Assembly Letter" for approval PRIOR to submittal of product data and shop drawings.
- C. Product Data: For each type of product indicated.
- D. Shop Drawings: For roofing system. Include plans, elevations, sections, details, and attachments to other work.
 - 1. Base flashings and membrane terminations.
 - 2. Tapered insulation, including slopes.
 - 3. Crickets, saddles, and tapered edge strips, including slopes.
 - 4. Insulation fastening patterns for corner, perimeter, and field-of-roof locations.
 - 5. Base-ply fastening patterns for corner, perimeter, and field-of-roof locations.

1.07 INFORMATIONAL SUBMITTALS

- A. Qualification Data: For qualified Installer and manufacturer.
- B. Manufacturer Certificates: Signed by roofing manufacturer certifying that roofing system complies with requirements specified in "Performance Requirements" Article.
 - 1. Submit evidence of complying with performance requirements.
 - 2. Product Test Reports: Based on evaluation of comprehensive tests performed by manufacturer and witnessed by a qualified testing agency, for components of membrane roofing system.
 - 3. Research/Evaluation Reports: For components of membrane roofing system, from the ICC-ES.
 - 4. Warranties: Sample of special warranties.

1.08 DELIVERY, STORAGE, AND HANDLING

- A. Deliver materials in manufacturer's original, unopened containers and rolls with all labels intact and legible Including labels indicating appropriate warnings, storage conditions, lot numbers, and usage instructions. Materials damaged in shipping or storage shall not be used.
- B. Deliver materials requiring fire resistance classification to the job with labels attached and packaged as required by labeling service.
- C. Deliver materials in sufficient quantity to allow continuity of work.
- D. Handle and store material and equipment in such a manner as to avoid damage. Liquid products shall be delivered sealed, in original containers.
- E. Handle rolled goods so as to prevent damage to edge or ends.
- F. Select and operate material handling equipment so as not to damage existing construction or applied roofing.
- G. Moisture-sensitive products shall be maintained in dry storage areas and properly covered. Provide continuous protection of materials against wetting and moisture absorption. Store roofing and flashing materials on clean raised platforms with weather protective covering when stored outdoors.
- H. Manufacturer's packaging and/or roll plastic is not acceptable for exterior storage. Tarpaulin with grommets shall be minimum acceptable for exterior coverings. All materials stored as above shall be four inches (4") minimum off the substrate, and the tarpaulin tied off with rope.
- I. Store rolled goods on end.
- J. Protect materials against damage by construction traffic.

- K. The proper storage of materials is the sole responsibility of the contractor and any wet or damaged roofing materials shall be discarded, removed from the project site, and replaced prior to application.
- L. Comply with fire and safety regulations, especially with materials which are extremely flammable and/or toxic. Use safety precautions indicated on labels.
- M. Products liable, such as emulsions, to degrade as a result of being frozen shall be maintained above 40° F in heated storage.
- N. No storage of materials shall be permitted on roof areas other than those materials that are to be installed the same day.

1.09 SITE CONDITIONS

- A. Job Condition Requirements:
 - 1. Apply roofing in dry weather.
 - 2. Do not apply roofing when ambient temperature is below 40° F (4° C).
 - 3. Proceed with roofing work only when weather conditions are in compliance with manufacturer's recommended limitations, and when conditions will permit the work to proceed in accordance with specifications.
 - 4. Schedule the work so the building will be left watertight at the end of each day. Do not remove more roofing material than can be reinstalled in any working day.
 - 5. All surfaces to receive new roofing shall be smooth, dry, and free from dirt, debris, and foreign material before any of this work is installed. Competent operators shall be in attendance at all times equipment is in use. Materials shall be stored neatly in areas designated by the Owner. Load placed on the roof at any point shall not exceed the safe load for which the roof is designed.
 - 6. The contractor shall take all necessary precautions to protect the roof mat and deck from damage. The contractor shall be responsible for repairing all new areas of damage caused by the negligence of the contractor, at the contractor's expense. The Owner's on-site representative shall determine damage caused by contractor negligence.
 - 7. Follow insurance underwriter's requirements acceptable for use with specified products or systems.
 - 8. Due caution should be exercised so as not to alter the structural integrity of the deck. When cutting through any deck, care should be taken so as not to damage the deck or any part of the deck.
 - 9. The contractor is to verify the location of all ducts, electrical lines, piping, conduit, and/or similar obstructions. The contractor is to perform all work in such a manner as to avoid contact with the above mentioned items.
 - 10. Surface and air temperatures should be a minimum 45° F during applications of cleaner and waterproof coating and remain above 45° F for a minimum of four (4) hours following applications. Verify compatibility of cleaner with coatings, paints, primers and joint sealers specified. Advise Owner's representative of any problems in this regard prior to commencing cleaning operations.
 - 11. Damage to Work of Others: The contractor shall repair, refinish, and make good any damage to the building or landscaping resulting from any of his operation. This shall include, but is not limited to, any damage to plaster, tile work, wall covering, paint, ceilings, floors, or any other finished work. Damage done to the building, equipment, or grounds must be repaired at the successful contractor's expense holding the Owner harmless from any other claims for property damage and/or personal injury.
 - 12. Measurements: It will be the contractor's responsibility to obtain and/or verify any necessary dimensions by visiting the job site, and the contractor shall be responsible for the correctness of same. Any drawings supplied are for reference only.
 - 13. Cleaning and Disposal of Materials:
 - a. Contractor shall keep the job clean and free from all loose materials and foreign matter. Contractor shall take necessary precautions to keep outside walls clean and shall allow no roofing materials to remain on the outside walls.
 - b. All waste materials, rubbish, etc., shall be removed from the Owner's premises as accumulated. Rubbish shall be carefully handled to reduce the spread of dust. A suitable scrap chute or hoist must be used to lower any debris. At completion, all work areas shall be left broom clean and all contractor's equipment and materials removed from the site.

- c. Debris shall be removed from the site and disposed at an approved disposal site.

1.10 WARRANTY

- A. See Section 01 7800 - Closeout Submittals, for additional warranty requirements.
- B. Roofing Manufacturer: Project shall be installed in such a manner that the roofing material manufacturer will furnish a written twenty (20) year NDL type warranty from the date of substantial completion of the completed project.
- C. Roofing Contractor: The contractor, jointly with any subcontractors employed by him, shall guarantee the work required and performed under this contract will be free from defects in workmanship and materials, and that the building will be and remain waterproof for a two (2) year warranty period, after the Owner accepts the work as substantially complete. The warranty shall be in approved notarized written form, to obligate the contractor and his subcontractors, if any, to make good the requirements of the warranty.
- D. Warranty repairs shall be performed by a certified installer. The repairs shall be performed in accordance with the manufacturer's written instructions and recommended procedures so as to not void the warranty. Repair of the system, including materials and labor, shall be done at no cost to the Owner.
- E. Wind warranty rider up to and including 120 MPH wind gust for the roofing system.
- F. Impact rider up to and including 2-inch diameter hail.
- G. Membrane manufacturer shall provide the written warranty as specified and may not use their standard warranty unless meeting or exceeding the requirements specified herein.

PART 2 - PRODUCTS

2.01 GENERAL

- A. All materials shall be furnished, specified, or approved in writing by the manufacturer issuing the warranty.
- B. The roofing membrane manufacturer is defined as a company which makes the primary roofing membrane and flashing membrane in its own factories from raw materials. No "Private Label" material, in which one company's name goes on a product manufactured by others, is acceptable for this project.
- C. Samples of all materials used on the project, which are not supplied by the membrane manufacturer, shall be submitted to the membrane manufacturer for written approval prior to work starting.
- D. The specified roofing system shall only be applied by manufacturer-approved and trained roofing contractors.
- E. Compatibility: Provide materials that are recommended by manufacturers to be fully compatible with indicated substrates, or provide separation materials as required to eliminate contact between incompatible materials.
- F. All roofing and roof accessories shall be installed in compliance with manufacturer's current specifications and details.
- G. All materials used on the project shall be asbestos free.
- H. Liquid-type auxiliary materials shall meet VOC limits of authorities having jurisdiction.

2.02 MANUFACTURERS

- A. Basis-of-Design Manufacturer: Johns-Manville, JM PVC 60 FB System: www.jm.com3.
- B. Alternate Manufacturers:
 - 1. Fibertite Roofing System as manufactured by Seaman Corporation: www.fibertite.com.
 - 2. Flex Membrane International Corporation: www.flexroo.com
- C. Substitutions: Not Permitted.

2.03 FINISH MEMBRANE

- A. The white thermoplastic membrane shall be nominal sixty (60) mil in overall thickness consisting of a white thermoplastic membrane with a backing of 5.5 ounce polyester fleece with a minimum one and

- one-half inch (1-1/2") dry selvage edge for welding. The high performance thermoplastic membrane shall be comprised of a minimum 50% of total polymer content of KEE (ketone ethylene ester).
- B. The thermoplastic membrane shall meet the following physical properties: Elongation 105%, ASTM D 412; Tensile Strength 1300 lbs/in², ASTM D 412; Tear Strength 380 ppi, ASTM D 624; Density @ 70° F, 80 lbs/ft³; Low Temperature Flexibility, Pass, 37 GP 56M; and Water Absorption less than 0.1%, 37 GP 56M.
- C. Membrane manufacturer must submit a letter of certification stating that the membrane has a minimum of 50% KEE content in the field sheet.
- 2.04 BASE FLASHING AND VERTICAL WALL MEMBRANE
- A. Base flashing membrane shall be non-fleece-backed material white thermoplastic membrane specified for the installation on all roof penetrations, rise walls and parapets, or pre-approved equal.
- B. For other warranties, base flashing membrane can be non-fleeced thermoplastic membrane, or pre approved equal.
- C. Flashing Membrane (Non-fleeced): Flashing membrane shall be utilized for multi-angled intersections, stripping ply, trim strips, and other conditions where molding/forming of the membrane is required.
- 2.05 UNDERLAYMENT PLIES
- A. Shall be Underwriters Laboratory approved and listed in the FM Global Approval Guide.
- B. Shall be Type IV fiberglass ply sheet, Underwriters Laboratory Type G 1, meeting Federal Specification No. SS R 620B, ASTM D 2178, Type III, or approved equal.
- 2.06 INSULATION AND SUBSTRATE BOARDS
- A. All insulation and substrate shall be in compliance with Section 07 2200 - Roof and Deck Insulation.
- 2.07 BITUMEN
- A. Shall be ASTM D 312 Type IV extra steep asphalt.
- 2.08 WOOD
- A. Nailers, cants, blocking and wooden curbs are specified in Section 061000 - Rough Carpentry.
- 2.09 CANT STRIP
- A. Provide 45 degree cant strips (no partials) at all vertical and horizontal surfaces, such as walls, parapet walls, curbs, expansion joints, etc., and as recommended by membrane manufacturer.
- B. Cants shall provide a four inch (4") rise above the roof's surface and extend a minimum of four inches (4") horizontally.
- C. Structural: Shall be wood where used for structural purposes meeting NRCA, FM Global and Underwriters Laboratory guidelines.
- D. Non-structural: Shall be wood fiber where used for non-structural purposes, conforming to ASTM C208 and C209.
- 2.10 FASTENERS
- A. Fasteners and fastening plates or bars shall be listed in the FM Global Approval Guide, and be as recommended by the fastener manufacturer for the specific application.
- B. Fastener for Steel Deck: Shall be a #14 fastener, fluorocarbon coated, with CR-10 coating. A minimum .200 diameter shank and .250 diameter thread. To be used with round pressure plates or bar, and having a fluorocarbon CR-10 coating, when subjected to thirty (30) Kesternich cycles (DIN 50018) shows less than ten percent (10%) red rust which surpasses FM Global Approval Standard 4470, as supplied by the membrane manufacturer to achieve the warranted wind uplift. Fasteners, plates, and/or bars shall be listed in the FM Global Approval Guide.

2.11 ADHESIVE

- A. Manufacturer's recommended single component cold applied asphalt emulsion adhesive designed specifically to adhere fleece backed membranes to compatible substrates.

2.12 ROOFING INSULATION ADHESIVE

- A. Shall be a dual component, reaction cure polyurethane adhesive, meeting the following physical properties, as manufactured by Hyload Inc., or approved equal.
- B. Density ASTM D-1622 Free Rise 3.2 lb/cf
- C. Compressive Strength ASTM D-1621 Parallel 38 psi @ 6% deflection
- D. Tensile Strength ASTM D 1623 35 psi
- E. Water Absorption ASTM D 2843 5.1%
- F. Closed Cell Content ASTM D 2856 90% min.; R-value=.8 new
- G. Weight/Gallon (Liquid Components)
- Part 1" Component = 10.32 lbs
- Part 2" Component = 8.54 lbs.
- Part 1" Component = 225 cps
- Part 2" Component = 275 cps

2.13 BONDING ADHESIVE FOR FLASHING

- A. Description: Adhesive is a bonding cement of synthetic rubber for fully adhering membranes to various substrates, Produced by Ashland Chemical, or approved equal.
- B. Handling: Contains ingredients which could be harmful if mishandled. Contact with skin and eyes should be avoided and necessary protective equipment and clothing should be worn.

2.14 PITCH PAN SEALANT

- A. Shall be one-part, self-leveling polyurethane sealant meeting ASTM C 920, Type S, Grade P, Class 25, for use in new pitch pans, or approved equal.

2.15 ASPHALT ROOF PRIMER

- A. Quick-dry asphalt-based primer for priming of asphalt roof surfaces, or approved equal.
1. ASTM D 41
 2. Flash Point 105° F
 3. Viscosity at 80° F (ASTM D 217) 50-60 K.U.
 4. Weight per gallon 7.4 pounds
 5. Drying time (to touch) Min. 4 hours

2.16 SEALANTS

- A. One-part Urethane Sealant: Sealant for use at coping joints, reglet joints, etc., shall be a one-component, high performance, non-priming, non sag, gun grade elastomeric polyurethane sealant designed for use in active exterior joints, ASTM C 920, shall meet the following physical and performance properties, or approved equal.

<u>Properties</u>	<u>Results</u>	<u>Test Methods</u>
Movement capability, %	+/- 35	ASTM C719
Tensile strength, psi (MPa)	350 (2.4)	ASTM D412
Tear strength, pli	50	ASTM D1004
Ultimate elongation at break, %	800	ASTM D412
Rheological, at 120° F (49° C) (sag in vertical displacement)	No sag	ASTM C639
Extrudability, 3 seconds	Passes	ASTM C603
Hardness, Shore A		ASTM C661
At standard conditions	25-30	

<u>Properties</u>		<u>Results</u>	<u>Test Methods</u>
After heat aging (max Shore A: 50)		25	
Weight loss, after heat aging		3%	ASTM C792
Cracking and Chalking, after heat aging		None	ASTM C792
Tack-free time, hrs, (maximum 72 hours)		Passes	ASTM C679
Stain and color change		Passes (no visible stain)	ASTM C510
Bond durability,* on glass, aluminum, and concrete		±35% movement	ASTM C719
Adhesion* in peel, pli (min. 5 pli)		30	ASTM C794
Adhesion* in peel after UV radiation through glass (min. 5 pli)		Passes	ASTM C794
Artificial weathering, Xenon arc, 250 hours		Passes	ASTM C793
Artificial weathering, Xenon arc, 3,000 hrs		No surface cracking	ASTM G26
Water immersion, 122° F (50° C)		Passes 10 weeks with	ASTM C1247
*Primed for water immersion dictated by ASTM C920.		movement cycling	
1. BASF Sonneborn Sonolastic NP1, One-component moisture curing polyurethane, or approved equal acceptable to the roofing manufacturer.			
B. Elastomeric Sealant			
1. Multi Component Polysulfide Sealant: Except as otherwise indicated, provide manufacturer's standard, non modified, 2 or more part, polyurethane based, elastomeric sealant; complying with either ASTM C 920, Type M, Class 25, or FS TT S 00227E, Class A; self leveling grade/type where used in joints of surfaces subject to traffic, otherwise non sag grade/type, or approved equal.			
2. Durability: Less than 0.5 square inch adhesion/cohesion loss for three (3) samples of both mortar and aluminum; ASTM C 719 test procedure.			
3. Adhesion in Peel: Fifteen pound (15#) peel strength and 10% maximum loss of bond to substrate; ASTM C 794.			
4. Bituminous Modification: Where joint surfaces contain or are contaminated with bituminous materials, provide manufacturer's modified type sealant which is compatible with joint surfaces (modified with coal tar or asphalt as required).			
C. Seam Sealer			
1. Special caulk compatible with Elvaloy® and thermoplastic membrane to seal exposed cut edges.			
2.17 WALKWAY PAD			
A. The walkway pad shall have the following minimum physical properties, and be applied with edges heat or solvent welded, or approved equal.			
	Property	Test Procedure	Physical Properties
1.	Color		Gray or Yellow
2.	Size		30" wide x 60' long
3.	Thickness	ASTM D 638	125" nominal
4.	Specific Gravity	ASTM D 792	1.32g/cm ³
5.	Tensile Strength	ASTM D 638	>2500 psi
6.	Elongation	ASTM D 638	>300%
7.	Cold Resistance	ASTM D 1043	-40 degrees F
8.	Water Vapor Permeability	ASTM E 96	2.8g/m ² /day
9.	Dimensional Stability	ASTM D 1240	0.5% or less
10.	Ultraviolet Stability	12,000 hrs.	Excellent

2.18 ROOF DRAINS

- A. Reference Section 22 400 - Plumbing Fixtures for additional information on roof drains and accessories.

2.19 TERMINATION/PRESSURE BARS

- A. Aluminum strip shall be extruded channel bar with a mill finish, width one inch (1"), thickness 0.100" +/- .008", leg height one-fourth inch (1/4") top and bottom, leg angle ninety degrees (90°), for perimeter and curb anchorage, having predrilled holes six inches (6") on center, as manufactured by Olympic Fasteners, or approved equal.

2.20 PIPE BANDS

- A. Pipe bands shall be stainless steel bands with self-locking heads and shall be tightened with hand tool for tension control and flush cut off.

2.21 PIPE SUPPORTS

- A. Reference Plumbing drawings and specifications for additional information and requirements for pipe supports.

2.22 PRE-MOLDED BOOTS

- A. Non-reinforced thermoplastic tapered molds for various pipes, heat welded to field membrane and sealed at top with stainless steel pipe bands and seam sealer.

2.23 TRIM STRIPS

- A. The trim strip shall have the following minimum properties, or approved equal.
1. Six inch (6") wide non-fleeced 45 mil thermoplastic used for capping end laps of rolls.
 2. The trim strip is seamed with the use of hot-air welding.

2.24 VERTICAL WALL SHIMMING MATERIAL

- A. Exterior grade plywood or concrete core board. Proper selection and installation as required to meet FM Global and UL guidelines.

2.25 SELF-ADHERING UNDERLAYMENT FOR TEMPORARY WATERPROOFING

- A. A premium heavyweight, minimum 60 mil, self-adhering underlayment, to use as a temporary waterproofing barrier.

2.26 OVERNIGHT SEAL

- A. Hot applied asphalt bitumen shall be provided for the purpose of night sealing the roof system.

2.27 MISCELLANEOUS MATERIALS

- A. Approved and recommended by the manufacturer for the proposed use.

PART 3 - EXECUTION

3.01 REFERENCE

- A. The manufacturer's Technical Specifications shall be considered a part of this specification and should be referred to for more specific application procedures and recommendations.
- B. Application of materials shall be in strict accordance with the manufacturer's recommendations and current NRCA, Underwriters Laboratory and IBC guidelines, except where more stringent requirements are shown or specified. In the instance of a conflict between these specifications and those of the manufacturer, the more stringent specifications shall take precedence.

3.02 GENERAL INSTALLATION:

- A. Comply with governing local, state, and federal regulations, safety standards, and codes.
- B. Protect adjacent areas with tarpaulin or other durable materials.
- C. Contractor shall prevent overspray, and be responsible for parking lot areas and/or adjoining areas not part of this contract.
- D. Contractor shall be responsible for sealing, as required, all openings that may allow bitumen migration or drippage, i.e. pitch dams, envelopes, and filler strips.
- E. Prepare surfaces according to manufacturer's or applicator's published instructions. All metal that is to receive bitumen, or come in contact with bitumen or adhesive, shall be first primed with appropriate primer. Any prefabricated sheet steel that is to receive bitumen, or come in contact with bitumen or adhesive, shall be scored, scuffed or abraded prior to receiving primer.
- F. Use cleaning materials or primers necessary to render an acceptable surface/substrate.
- G. All surfaces/substrates shall be clean and dry prior to application of materials.
- H. Prior to application of felts and membrane, all foreign matter, gravel, etc., shall be removed from the insulation and/or substrate. Gravel or debris between the insulation/substrate and plies is not acceptable.
- I. Bitumen kettle shall have a fume recovery system, and visible thermometer and thermostatic control or some other means to provide positive monitoring of the bitumen temperature when it is heated in accordance with manufacturer's instructions.
- J. Ambient temperature shall be 45° F and rising.
- K. The underlayment plies and field membrane are to be laid in the direction of maximum roof slope, working from bottom of slope toward ridge.
- L. All roof areas will be picture framed with the 45 mil Thermoplastic membrane as the system is being applied. The outer edge of the picture frame sheet shall extend approximately two inches (2") above the top of the cant. All end laps of the field sheets of the 60 mil coal-tar elastomeric membrane shall lap the picture frame sheet a minimum of eight inches (8") or the picture frame sheet side laps shall lap the field sheet a minimum of eight inches (8").
- M. Wrinkles, buckles, kinks, and fishmouths are not acceptable when laying membrane.
- N. Dry voids on membrane are not acceptable.

3.03 SUBSTRATE PREPARATION

- A. Substrate shall be smooth and free of debris, sharp edges, and other surface irregularities prior to work starting. Substrate repair shall be performed as required to minimum of NRCA standards.

3.04 NAILERS

- A. Wooden nailers shall be installed at gravel stops, drip edges, and expansion joints on outside perimeter of building in accordance with NRCA, Underwriters Laboratory and IBC guidelines.
- B. Locate and install as shown on details; along gravel stops and drip edges and other areas as required by membrane manufacturer.
- C. Anchor nailer to structural deck with manufacturer's approved fasteners, spaced appropriately for the specified installation; minimum withdrawal resistance: one hundred (100) pounds.
- D. Height and Taper: Match top of adjacent construction within one-fourth inch (1/4"). Taper as required to provide continuous contact surface without creating ponding.

3.05 WOOD CANTS

- A. Toe of cant shall be level with the surface to receive new roof membrane and in all cases anchored according to NRCA, Underwriters Laboratory and IBC guidelines.

3.06 INSULATION

- A. Installation of roof insulation shall be in accordance with Section 07 2216 - Roof and Deck Insulation and the manufacturer's approved assembly letter.

3.07 ASPHALT HEATING

- A. Use low burner flames during initial melt downs. Circulate asphalt after initial melt down. Maximum asphalt temperature shall be 25°F below the flash point.
- B. Avoid prolonged heating of asphalt at high temperatures. Reduce the asphalt temperature to below 500°F if asphalt is not being used for periods of four (4) hours or more.
- C. Kettle shall be free of contaminants.
- D. Application rates: Bitumen quantities for waterstop/tie offs, flashings, miscellaneous detail applications, and minimum kettle capacity are not included in application rates. To account for these factors, add approximately 25 percent additional bitumen on a total job average basis.

3.08 HOT APPLIED APPLICATION OF PLY SHEET

- A. Substrate Board shall be covered with two (2) layers of fiberglass ply sheet Type IV fully adhered as follows:
 - 1. All layers shall be solid mopped at the nominal rate of thirty pounds (30#) ± 20 percent per one hundred (100) square feet using asphalt Type III as required by slope, properly heated. Specified layers shall be applied in accordance with the manufacturer's recommendations and in accordance with general practices as set forth by the NRCA Roofing Manual.

3.09 APPLICATION OF FLEECE BACKED MEMBRANE

- A. Fully Adhered Application: Fully adhere membrane to acceptable substrate with adhesive applied at the rate specified by the manufacturer.
 - 1. The roof surface must be clean, dry and free of foreign material.
 - 2. Position sheets as indicated on approved shop drawings.
 - 3. Fold one end of the Elvaloy® sheet on top of itself until both ends meet. Apply adhesive to the prepared roof surface. The sheet can then be pulled and laid into the bonding material using care not to create any wrinkles.
 - 4. Carefully push into place from fold line to overlap, avoiding wrinkles and air pockets. Roll or broom membrane flat. Using a minimum 200 lb water filled roller, roll membrane into the adhesive.
 - 5. Repeat procedure for other sheet half.
 - 6. Lap seams shall be done by lapping the two inch (2") selvedge edge over the non selvedge edge of the previous roll. The selvedge edge seam shall be made with the heat gun method.
 - 7. Roll ends are butted and capped with a six inch (6") wide trim strip. The trim strip is then seamed with the heat gun.
 - a. Lap Seaming Procedure: Overlap membrane for attachment method specified and hot air welded with manufacturer's approved equipment.
 - b. ALL SEAMS SHALL BE WELDED DAILY. NO EXCEPTIONS.
 - 1) All surfaces to be welded shall be clean, dry and free of foreign material.
 - 2) All seams must then be checked with a needle probe and any voids repaired with the heat gun.
 - 3) Caulk all exposed cut edges with seam sealer.

3.10 BACKNAILING/STRAPPING

- A. On slopes greater than one inch (1") in twelve inches (12"), refer to NRCA and/or manufacturer's guidelines for backnailing procedures and follow the more stringent guidelines for all specified materials.

Slope	Interply& Top Pour	BacknailStrap	
0 - ½" per 12"	Type IV	No	No
½" - 2" per 12"	Type IV	Yes	Strap if possible
2" - 3" per 12"	Type IV	Yes	Yes

3.11 PERIMETER FASTENING

- A. Wood nailers are required for perimeter gravel stops or drip edges. Field membrane and all plies shall be mechanically fastened to nailer on twelve inch (12") centers maximum.

3.12 FLASHING

- A. Flash all penetrations, metal edge systems, walls, curbs, expansion joints, drains as shown on details and approved shop drawings with white Elvaloy® flashing membrane.
 - 1. Field fabricate flashings for vent pipes, vent stacks or other multi-angled roof projections/penetrations.
 - 2. Mechanically fasten flashing at terminations according to approved details.
 - 3. Fastening membrane flashing through metal counterflashing without the use of a termination bar is not acceptable.
 - a. Any lumber or shimming required for attachment or to make material flashing flush or level with offsets and/or transitions shall be incorporated in the flashing specifications.

3.13 BASE FLASHING (APPROXIMATELY 8" IN HEIGHT MINIMUM)

- A. Base flashings shall be installed using the flashing membrane, with length of run not to exceed twenty linear feet (20').
- B. Wooden nailers or curbs shall be installed at all edges and openings in the roof, mechanically fastened to the deck.
- C. Cant strips shall be installed at the intersection of the deck and all vertical surfaces.
- D. The roofing field membrane shall extend up over and a minimum two inches (2") above the top of cant strips at all vertical intersections or out to the roof's edge.
- E. All existing substrates receiving flashing membrane shall be clean and primed with primer, prior to application as required.
- F. All flashings shall be mechanically fastened with a termination bar a maximum of six inches (6") on center, be a maximum of forty inches (40") above finished roof height, extend a minimum of eight inches (8") onto the field of horizontal roof membrane, and not exceed eight linear feet (8') of run in length.
- G. All vertical flashing butted seams of the flashing membrane shall be covered with a six inch (6") trim strip and hot air welded.
- H. All flashing membrane shall be adhered with flashing bonding adhesive to the vertical substrate and hot-air welded to the field of roof membrane; hot air weld six inch (6") trim strip over the butted vertical seams/laps.
- I. Flashing welds shall be a minimum two inch (2") width, no maximum.
- J. Hot Air Welding of Flashing:
 - 1. When using a hand held hot-air welder, the seams should be pressed together using a hand held roller. The speed and temperature settings of the welding equipment can be affected by the weather conditions at the site of application, therefore, these parameters should be set by trial and error using two (2) pieces of the flashing membrane. Minimum width of hot air weld two inches (2"), no maximum.
 - 2. Lay the membranes together and apply pressure to the welded seam to ensure full adhesion.
 - 3. Allow the seams to set fully, and probe the entire length for voids. Reseal voids immediately with a hot-air gun and roller.
 - a. All hot air welded seams/laps shall be tested daily with a probe for integrity, no variance.

3.14 VERTICAL WALL FLASHING (FOR USE APPROXIMATELY 8-18" ABOVE THE FINISHED ROOF LINE AND EXTENDING UPWARD)

- A. Flashing membrane shall be installed on the vertical beginning a minimum of eight inches (8") above the finished roof line (where the base flashing is terminated), with length of run not to exceed twenty feet (20'). Flashing shall be installed in strict accordance with the manufacturer's recommendations.
- B. The termination bar used to terminate the minimum eight inch (8") high base flashing shall be covered with the lower edge of the upper vertical flashing. This will cause the termination bar to be buried at the termination point. The selvedge edge of the upper flashing shall be hot-air welded to the base flashing membrane. Care should be taken to ensure the top edge of the base flashing and bottom edge of the vertical flashing are both secured.
- C. All existing substrates receiving flashing membrane shall be clean and primed with asphalt primer, prior to application.

- D. All substrates receiving welded-seam flashing membrane shall be clean and primed with primer, prior to application when applicable.
- E. The vertical wall flashing membrane shall be set in flashing bonding adhesive according to manufacturer's guidelines.
- F. All vertical flashing joints shall be butted together and covered with 6" trim strip and hot-air welded to the flashing membrane.
- G. Flashing welds shall be minimum two inch (2") width, no maximum.
- H. Immediately following the laying of the flashing membrane, it shall be pressed or rolled in the width direction of the membrane. This will prevent excessive entrapment of air beneath the membrane. The pressing or rolling shall be in the width direction and with the laps so as not to buck the laps.
- I. Any flashing extending further than eighteen inches (18") up onto a vertical surface shall be installed using a hidden termination bar. The termination bar used to terminate the first flashing shall be covered by the lower edge of the upper vertical flashing and the selvedge edge shall be hot air welded to the lower flashing. This will cause the termination bar to be hidden at the termination point. Care should be taken to ensure the top edge of the bottom flashing and bottom edge of the upper vertical flashing are both secured. The upper flashing shall be installed and extended up and over the parapet wall and fastened to the nailer on the outside of the wall.
- J. The flashing membrane shall be run up the wall in lengths not to exceed twenty (20') linear feet, run under the coping cap and be terminated on the outside of the wall six inches (6") on center; then the coping cap shall be reset. All vertical butt joints are to be stripped in with the 6" trim strip and hot air welded.
- K. Hot-air Welding Laps/Joints/Seams:
 - 1. When using a hand-held hot-air welder, the seams should be pressed together using a hand held roller. The speed and temperature settings of the welding equipment can be affected by the weather conditions at the site of application, therefore, these parameters should be set by the contractor by using two (2) pieces of flashing membrane. Minimum width of hot-air weld shall be two inches (2").
 - 2. Lay the laps together and apply pressure to the welded seam to ensure full adhesion.
 - 3. Allow the seams to set fully, and probe the entire length for voids. Reseal voids immediately with a hot-air gun and roller.
 - a. All hot air welded seams/joints/laps shall be tested daily with a probe for integrity, no variance.
 - b. Any lumber or shimming required for attachment or to make material flashing flush or level with offsets and/or transitions shall be incorporated in the flashing specifications.

3.15 PROJECTION FLASHINGS

- A. Plumbing Vents: Soil vent stack pipes shall receive new lead flashings installed in strict accordance with practices set forth in the NRCA Roofing Manual. The lead shall be carried up and over the top of the stack, and crimped down into the pipe to form a watertight seal. Projections that cannot be sealed thus should be boxed in and flashed as recommended by the roof membrane manufacturer.
- B. Square Projections: Lay the field membrane up to the projection, and cut membrane so that it will extend twelve inches (12") beyond the projection. Cut a slit in the membrane to correspond with the position of the projection, and lay the membrane in hot asphalt. Apply another layer of membrane in exactly the same fashion, but from the opposite direction. For metal flange type projections, after doing above, strip in with six inch (6") strips of membrane.
- C. Round Projections: Cut membrane square and eighteen inches (18") from perimeter of projection. Slit square membrane with an "X" of proper size to ensure a close fit and positive seal. Place over projection, and adhere to clean membrane already on the roof. Cut a six inch (6") piece of membrane to apply as a collar, and secure with an all stainless steel clamp.

3.16 CURB FLASHINGS

- A. The flashing substrate shall be free of any dirt and loose material.
- B. The underlayment ply or plies and the field membrane shall be brought to two inches (2") past the top of the cant strip and adhered.

- C. Starting on the roof at least six inches (6") from the roofside edge of the cant strip, adhere two (2) plies of Type IV ply sheet extending over the cant and up the vertical a minimum of eight inches (8"). Each lap of the ply sheet shall be a minimum of three inches (3").
- D. Over the Type IV ply sheet starting on the roof at least eight inches (8") from the roofside edge of the cant strip, adhere the field membrane extending over the cant and up the vertical a minimum of eight inches (8"). Each lap of the field membrane shall be a minimum of three inches (3"), hot air welded, and shall not coincide with the laps of the underlayment sheet.
- E. Fasten the top edge of the flashings on six inch (6") centers using approved termination bar and fasteners.
- F. An NRCA approved metal counterflashing shall extend down over the flashing a minimum of four inches (4").

3.17 EDGING FLASHINGS

- A. An NRCA approved gravel stop/fascia system shall be installed in strict accordance with published instructions to meet ES-1.

3.18 FLASHING

- A. Flash all penetrations, metal edge systems, walls, curbs, expansion joints, drains as shown on details and approved shop drawings with white reinforced "Elvaloy" flashing membrane.
 - 1. Use prefabricated flashing accessories or components such as sealant pockets, premolded vent/pipe flashing.
 - 2. Mechanically fasten flashing at terminations according to approved details.
 - 3. Fastening membrane flashing through metal counterflashing is not acceptable.
 - 4. Any lumber or shimming required for attachment or to make material flashing flush or level with offsets and/or transitions shall be incorporated in the flashing specifications.

3.19 DRAIN FLASHINGS

- A. Build a sump to the drain and create a smooth transition by installing tapered insulation around the drain. The slope of the drain sump shall not exceed one inch (1") per horizontal foot (8%). The drain sump should be eight foot by eight foot (8' x 8') sump minimum per roof plans.
- B. All drains shall receive lead flashings. Flashings shall be installed in strict accordance with manufacturer's recommendations and with practices as set forth in the NRCA Roofing Manual.
- C. Drain shall be covered with the 60 mil coal tar elastomeric roofing membrane (CTEM) and underlayment plies as specified, slitting the membranes over the drain hole with an "X".
- D. Lead flashings as specified shall be installed and primed with asphalt base primer and allowed to dry prior to application of flashing layers.
- E. Lead flashing shall be covered with flashing membranes consisting of one layer of fiberglass ply sheet and one layer of 60 mil coal tar elastomeric roofing membrane (CTEM). Each layer shall be installed in a solid bed of asphalt bitumen as specified and shall extend a minimum of twelve inches (12") past the outer edges of the three by three foot (3' x 3') lead flashing. Flashing membranes and lead flashing shall be slit over the drain hole with an "X", cutting excess material from the interior of the drain bowl.

3.20 DRAIN ACCESSORIES

- A. Drain guards shall be installed at all drains, per manufacturer's recommendations.

3.21 ROOF DRAINS

- A. Install drain inserts with permanent gaskets between insert and drain wall to prevent backflow of water and leakage.
- B. Install clamping rings and strainers.

3.22 WALKWAY PADS

- A. Fully adhere and heat weld walkway pads where required to provide protected pathways from rooftop access points to mechanical or other equipment requiring rooftop maintenance.

3.23 PROTECTION

- A. Protect all building surfaces against damage from roofing work.
- B. Where traffic must continue over finished, installed roofing system, protect membrane, underlayment accessories and finishes from damage.

3.24 MEMBRANE PROTECTION

- A. Where equipment pads, wood sleepers, or walkway slabs are to be installed over the roofing membrane, an additional layer of the roofing membrane shall be installed between the roofing membrane and the pad, sleeper, or slab. Due caution shall be exercised to prevent roofing membrane damage during placement. Where required, membrane shall be welded to field membrane to prevent slippage.

3.25 PIPING/CONDUIT

- A. Piping/conduit shall be installed at NRCA recommended heights, and supports furnished. Permanent supports shall be installed upon pads approved by membrane manufacturer. Coordinate work with mechanical and electrical contractors.

3.26 OVERNIGHT SEAL

- A. Shall be performed according to accepted roofing practice as outlined in the NRCA Roofing Manual, SPRI and membrane manufacturer's recommended procedure.

3.27 CLEANING

- A. Clean exposed surfaces of excess cement, adhesive, sealants, mortar and paint associated with the new work.
- B. Clean work area of excess roofing materials and installation debris daily.
- C. Repair or replace defaced or disfigured finishes caused by the work.
- D. Upon completion of the project the entire roof shall be cleaned using a cleaning agent compatible with the membrane to remove all dirt, debris, asphalt, adhesives. The roof shall be uniform in cleanliness and be returned to a like new appearance.

END OF SECTION

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SECTION 07 6200 - SHEET METAL FLASHING AND TRIM

PART 1 - GENERAL

1.01 SECTION INCLUDES

- A. Flashing and sheet metal components for moisture protection.
- B. Related accessories.

1.02 RELATED REQUIREMENTS

- A. Section 04 8150 - Through-Wall and Wall Substrate Flashing System: Non-metallic flashing.
- B. Section 06 1000 - Rough Carpentry: Wood nailers.
- C. Section 07 5303 - Fully Adhered Elvaloy Multi-Ply Roof System.

1.03 SUBMITTALS

- A. See Section 01 3000 - Administrative Requirements, for submittal procedures.
- B. Shop Drawings: Submit shop drawings, product data and mockups of all sheet metal.
- C. Product Data: Provide product data containing data that confirm all materials proposed for use in the system meet the standards indicated in this Section.

1.04 QUALITY ASSURANCE

- A. Comply with governing local, state, and federal regulations, safety standards, and codes. Provide products of acceptable manufacturers in satisfactory use in similar service for five (5) years. Use experienced installers. Deliver, handle and store materials in accordance with manufacturer's instructions.

1.05 REFERENCE STANDARDS

- A. Applicable portions of ASCE, SMACNA and ASTM publications.

1.06 WARRANTIES

- A. Roof System Manufacturer's Product Warranty: Submit manufacturer's standard product warranty signed by the manufacturer's authorized official, guaranteeing to correct failures in product which may occur during the warranty period, without reducing or otherwise limiting any other rights to correction which the Owner/Project Consultant may have under the contract documents. Failure is defined to include product failure which leads to interruption of a watertight installation. Correction may include repair or replacement of failed product.
- B. Contractor's Warranty Period: For roofing flashing and sheet metal, provide a written warranty which shall warrant work to be free of leaks and defects in materials and workmanship for two (2) years, starting from date of substantial completion.
- C. Defects of the sheet metal occurring during the warranty period shall be promptly corrected by the contractor, and defects of the roofing shall be promptly corrected by the manufacturer at no additional cost to the Owner. Upon notification from the Owner or the Owner's representative that evidence of a defect exists, the responsible party shall immediately inform the Owner's representative of the date on which corrective work will be scheduled, and shall notify the Owner's representative when the corrective work has been completed.

PART 2 - PRODUCTS

2.01 SHEET METAL MATERIAL

- A. Hot-dipped Galvanized Steel for use as counterflashings (where not visible from the ground), pitch pans and expansion joints: Minimum 24-gauge, G-90, hot-dipped galvanized metal, commercial quality, ASTM A 525.

- B. Hot-dipped Galvanized Steel for use as continuous clips: Minimum 22-gauge, G-90, hot-dipped galvanized metal, commercial quality, ASTM A 525.
- C. Prefinished Galvanized Sheet Steel (where visible from the ground): Shall be 22-gauge flat stock, prefinished with Kynar finish meeting ASTM A 446, forty-five and one-half inches to forty-eight inches width by one hundred twenty inches in length (45-1/2" - 48" x 120") for use as new metal edge gravel guard, cover plates, downspouts, gutters, coping and miscellaneous metal.
 - 1. Colors: As selected from full range of manufacturer options, match to adjacent materials.
- D. Elvaloy® Cladded Metal: Shall be G-90 galvanized steel with 25 mil Elvaloy® membrane lamination; width shall be up to four feet, length shall be eight or ten feet.

2.02 FASTENERS

- A. Fasteners shall be same metal as flashing/sheet metal, or other non-corrosive metal as recommended by sheet manufacturer for the specific application. Match finish of exposed heads with material being fastened.
- B. Fasteners and fastening plates or bars shall be listed in the FM Global Approval Guide.
- C. Screws: Self-taping sheet metal type with neoprene washer, as appropriate.
- D. Pop Rivets: Full stainless steel Series 42 or 44, as appropriate.
- E. Continuous Clip: Concealed hold-down clip type; of same materials as coping, gravel guard, sized to suit application. Use a continuous clip, minimum 20-gauge G-90 galvanized.

2.03 ACCESSORIES

- A. Bituminous Paint: Acid and alkali resistant, black color.
- B. Sealant (for Sheet Metal): One-component polyurethane, conforming to requirements of FS TT-S-230C, non-staining and non-bleeding.
- C. Metal Accessories: Provide sheet metal clips, straps, anchoring devices, and similar accessory units as required for installation of work, matching or compatible with material being installed, non-corrosive, size, and gauge required for performance.
 - 1. Hook Strips/Cleats: Minimum 20-gauge. Nail at 8 inches on centers with roofing nails.
 - 2. Termination Bars: 12-gauge x 1 inch hot-dipped galvanized bar stock fastened with specified drive pins spaced at 12 inches on center.

PART 3 - EXECUTION

3.01 INSPECTION

- A. Verify roof openings, curbs, pipes, sleeves, ducts or vents through roof are solidly set, cant strips and reglets in place, substrates are smooth and clean and nailing strips located.
- B. Verify membrane termination and base flashings are in place, sealed and secure.
- C. Beginning of installation means acceptance of conditions.

3.02 PREPARATION

- A. Field measure site conditions prior to fabricating work. Provide all shop drawings and mock-ups one month prior to installation to the Owner/Project Consultant for approval.
- B. Install starter and edge strips and cleats before starting installation.

3.03 FABRICATION - GENERAL

- A. Shop-fabricate work to greatest extent possible. Comply with details shown, and with applicable requirements of SMACNA "Architectural Sheet Metal Manual" and other recognized industry practices. Fabricate for waterproof and weather-resistant performance; with expansion provisions for running work, sufficient to permanently prevent leakage, damage or deterioration of the work. Form work to fit substrates. Comply with material manufacturer's instructions and recommendations. Form exposed sheet metal work without excessive oil-canning, buckling, and tool marks, true to line and levels as indicated, with exposed edges folded back to form hems.

- B. Fabricate gravel stops/fascia, counterflashings, pitch pans, expansion joints, and copings with new galvanized sheet metal as specified. Fabricate gravel guard and fascia to size and dimensions as indicated on the drawings. Fabricate metal copings as indicated.
- C. Form sheet metal on bending brake.
- D. Shape, trim and hand seam metal on bench insofar as practicable.
- E. Form materials with straight lines, sharp angles and smooth curves.
- F. Fold back edges on concealed side of exposed edge to form hem (1/2" minimum).
- G. Weld or solder joints on parts that are to be permanently and rigidly assembled.
- H. Limit single-piece lengths to ten feet (10').
- I. Fabricate corner pieces with eighteen inch (18") extensions, metered and sealed by forming as one piece.
- J. Backpaint flashing in contact with masonry or dissimilar materials with bituminous paint.
- K. Install new metal rooftop projections. New rooftop projection details shall be as recommended in NRCA or SMACNA handbooks. All rooftop projections shall be cleaned, all joints sealed, and painted with a rust inhibitive paint. Standard color to be selected by the Architect.
- L. All sheet metal shall be sealed and watertight.
- M. Metal work should be secured so as to prevent damage from buckling or wind. Where clips are shown, these are to be continuous.
- N. All prefinished metal shall be sanded and/or abraded prior to receiving primer.
- O. Seams: Fabricate non-moving seams in sheet metal with flat-lock seams. For metal other than aluminum, tin edges are to be seamed, form seams, and soldered.
- P. Expansion Provisions: Form expansion joints of intermeshing hooked flanges, not less than one inch (1") deep, filled with mastic sealant (concealed within joints).
- Q. Sealant Joints: Where movable, non-expansion type joints are indicated or required for proper performance of work, form metal to provide for proper installation of elastomeric sealant, in compliance with industry standards.
- R. Separations: Provide for separation of metal from non-compatible metal or corrosive substrates by coating concealed surfaces at locations of contact, with bituminous coating or other permanent separation as recommended by manufacturer/fabricator.
- S. Bed flanges of work shall be set on two ribbons of elastomeric sealant or water block where required for waterproof performance.

3.04 INSTALLATION

- A. General: All sheet metal termination to vertical wall shall have a through-wall with receiver installed on masonry walls or prefabricated "Z" bar flashing pre-installed to fluid applied wall finished prior to installation of sheet metal termination. This applies to edge metal, base flashing closures and all vertical surface intersections. Refer to NRCA, SMACNA, and metal manufacturer's guidelines.
- B. Gravel Guard/Fascia:
 - 1. Shall be installed with expansion joints, ten feet (10') on center, one-fourth inch (1/4") expansion leeway, with a cover plate.
 - 2. Secure metal flashings per specifications.
 - 3. Lock seams and end joints.
 - 4. Form sections identical to profiles as shown or approved similar, to match existing building.
 - 5. Fabricate corner pieces with minimum eighteen inch (18"), maximum forty-eight inch (48") extensions, formed and sealed with rivets and sealant, as one piece.
 - 6. Hem exposed edges three-fourths inch (3/4") minimum.
 - 7. Backpaint flashing in contact with masonry or dissimilar materials with bituminous paint. Surface sand before applying primers.
 - 8. Integrate flashing in a manner consistent with detailing.
 - 9. Provide and install continuous clip around perimeter.
 - 10. Apply sealant at horizontal juncture of gravel guard metal to exterior vertical wall.
 - 11. Shall be fabricated in accordance with all SMACNA provisions.
- C. Coping:
 - 1. Install new metal coping as required for a permanent watertight installation.

2. All coping shall be pre-manufactured with low profile standing seam metal.
3. Shall be minimum 24-gauge prefinished Kynar installed in ten foot (10') sections maximum.
4. Vertical fascia shall extend minimum two and one-half inches (2-1/2") or be minimum one and one-half inches (1-1/2") below bottom of nailer, whichever is greater.
5. Secure metal flashings per specifications and to meet ES-1.
6. Lock seams and end joints.
7. Form sections identical to profiles as shown or approved similar, to match existing building.
8. Fabricate corner pieces with minimum eighteen inch (18"), maximum forty-eight inch (48") extensions, formed and sealed with rivets and sealant, as one piece.
9. Hem exposed edges three-fourths inch (3/4") minimum.
10. Backpaint flashing in contact with masonry or dissimilar materials with bituminous paint. Surface sand before applying primers.
11. Integrate flashing in a manner consistent with detailing.
12. Provide and install continuous clip, minimum 22-gauge.
13. Apply sealant at horizontal juncture of coping metal to exterior vertical wall.
14. Shall be fabricated in accordance with all SMACNA provisions.

D. Pitch Pans:

1. Install pitch pans of specified cladded metal according to NRCA standards, minimum of six inches by six inches (6" x 6").
2. Pitch pans shall be fabricated to minimum of four inches (4") above the finished roof membrane. Seams of pitch pans shall be soldered on each side.
3. Sealant or water block shall be applied under pitch pan flange a minimum of one-half pound (1/2#) per linear foot.
4. All projections enclosed in pitch pans shall be cleaned in any manner suitable and coated with a rust inhibitive coating as approved by the Owner/Project Consultant. Coating shall be allowed to dry prior to pitch pan fill.
5. Base of pitch pans shall be filled with nonferrous, non-shrink grout to proper height and allowed to cure.
6. Top finish fill shall be self-leveling, one-part urethane, with maximum fill to within three-eighths inch (3/8") of top of pitch pan sides.
7. Strip in flange of the pitch pan with reinforced specified membrane. Strip in is to be hot air welded as required in 075432

E. Bonnets/Hoods:

1. Fabricate and install above all pitch pans, where necessary, or reinstall as applicable, metal bonnets over all pitch pans, NO EXCEPTIONS.
2. Bonnets/Hoods shall be manufactured with metal compatible with metal to which bonnet is to be attached.
3. On beams and other steel, weld in place bonnets fabricated from one-fourth inch (1/4") steel plate.
4. Draw band bonnets fabricated from 14-gauge stainless steel shall be used on circular projections.

3.05 FIELD FINISH

- A. Backpaint concealed metal surfaces with bituminous paint where expected to be in contact with cementitious materials or dissimilar metals. Exposed surfaces to be provided with a factory applied fluorocarbon Kynar finish meeting ASTM A 446 and AAMA specification 605.2 for high performance coating.
- B. New 22-gauge hot-dipped galvanized metal shall be painted on all locations visible from the ground with an industrial grade paint to match adjacent materials, or standard color selected by Architect. Galvanized metal surface must be properly prepared by removing all oil, grease, and/or protective mill coatings by solvent cleaning surface in accordance with SSPC-SP1, and according to paint manufacturer's recommendation, to ensure proper adhesion of paint to metal.

END OF SECTION

SECTION 07 7200 - ROOF ACCESSORIES

PART 1 GENERAL

1.01 SECTION INCLUDES

- A. ICC-500 rated roof hatch.
- B. Ladder safety post.
- C. Safety railing system.

1.02 RELATED REQUIREMENTS

- A. Section 05 5000 - Metal Fabrications: Access ladder.
- B. Section 05 5303 - Fully Adhered Elvaloy Multi-Ply Roofing System.
- C. Section 07 6200 - Sheet Metal Flashing and Trim: Roof accessory items fabricated from sheet metal.

1.03 REFERENCE STANDARDS

- A. 29 CFR 1910.23 - Ladders; current edition.
- B. ASTM A653/A653M - Standard Specification for Steel Sheet, Zinc-Coated (Galvanized) or Zinc-Iron Alloy-Coated (Galvannealed) by the Hot-Dip Process; 2018.
- C. ASTM B221 - Standard Specification for Aluminum and Aluminum-Alloy Extruded Bars, Rods, Wire, Profiles, and Tubes; 2014.
- D. ASTM B221M - Standard Specification for Aluminum and Aluminum-Alloy Extruded Bars, Rods, Wire, Profiles, and Tubes (Metric); 2013.
- E. FM (AG) - FM Approval Guide; current edition.
- F. UL (DIR) - Online Certifications Directory; Current Edition.

1.04 SUBMITTALS

- A. See Section 01 3000 - Administrative Requirements for submittal procedures.
- B. Product Data: Manufacturer's data sheets on each product to be used.
 - 1. Preparation instructions and recommendations.
 - 2. Storage and handling requirements and recommendations.
 - 3. Installation methods.
 - 4. Maintenance requirements.
- C. Warranty Documentation:
 - 1. Submit manufacturer warranty.
 - 2. Ensure that forms have been completed in Owner's name and registered with manufacturer.

1.05 DELIVERY, STORAGE, AND HANDLING

- A. Store products in manufacturer's unopened packaging until ready for installation.
- B. Store products under cover and elevated above grade.

1.06 WARRANTY

- A. See Section 01 7800 - Closeout Submittals for additional warranty requirements.
- B. Extended Correction Period: Correct defective work within 5-year period commencing on Date of Substantial Completion.

PART 2 PRODUCTS

2.01 ROOF HATCHES

- A. Basis of Design Product:
 - 1. RPH LLC, Advanced Building Products; Cyclone Roof Hatch Model #CRH:
www.RPHProducts.com.

- B. Alternate Roof Hatch Manufacturers:
 - 1. Bilco Company: www.bilco.com/#sle.
 - 2. Dur-Red Products: www.dur-red.com/#sle.
 - 3. Milcor, Inc: www.milcorinc.com/#sle.
 - 4. Substitutions: See Section 01 6000 - Product Requirements.
- C. Roof Hatches: Factory-assembled 3/16 inch carbon steel or schedule 40 steel frame and cover, complete with operating and release hardware.
 - 1. Style: Provide flat metal covers unless otherwise indicated.
 - 2. Mounting Substrate: Provide frames and curbs suitable for mounting on concrete deck with applied insulation.
 - 3. Thermally Broken Hatches: Provide R-40 insulated lid.
 - 4. For Ladder Access: Single leaf; 30 by 36 inches.
 - 5. Approvals:
 - a. ICC-500 and FEMA P-361 rated to 250+ mph wind, including missile impact and labeling.
 - b. Pressure rated per ASTM E330.
- D. Safety Railing System: Roof hatch safety rail system mounted directly to curb without penetration of roofing system.
 - 1. Railing Size: As indicated on drawings.
 - 2. Railing: Comply with 29 CFR 1910.23 for ladder safety, with a safety factor of two.
 - 3. Posts and Rails: Galvanized steel tubing.
 - 4. Gate: Same material as railing; automatic closing with latch.
 - 5. Finish: Manufacturer's standard, factory applied finish.
 - 6. Gate Hinges and Post Guides: ASTM B221 (ASTM B221M), 6063 alloy, T5 temper aluminum.
 - 7. Mounting Brackets: Hot dipped galvanized steel, 1/4 inch thick, minimum.
 - 8. Fasteners: Stainless steel, Type 316.
 - 9. Products:
 - a. Activar Construction Products Group, Inc. - JL Industries; RTA Safety Railing: www.activarcpg.com/#sle.
 - b. BILCO Company; Bil-Guard 2.0: www.bilco.com/#sle.
 - c. Safety Rail Company; Roof HatchGuard, Non-Penetrating Fall Protection: www.safetyrailcompany.com/#sle.
 - d. Substitutions: See Section 01 6000 - Product Requirements.
- E. Hardware: Steel, zinc coated and chromate sealed, unless otherwise indicated or required by manufacturer.
 - 1. Lifting Mechanisms: Compression or torsion spring operator with shock absorbers that automatically opens upon release of latch; capable of lifting covers despite 10 psf load.
 - 2. Hinges: Heavy duty pintle type.
 - 3. Hold open arm with vinyl-coated handle for manual release.
 - 4. Latch: Upon closing, engage latch automatically and reset manual release.
 - 5. Manual Release: Pull handle on interior.
 - 6. Locking: Padlock hasp on interior.
- F. Ladder Safety Post
 - 1. Provide Bilco (or equal) ladder safety post Model LU-1. The ladder safety post shall be pre-assembled from the manufacturer.
 - 2. Performance characteristics:
 - a. Tubular post shall lock automatically when fully extended.
 - b. Safety post shall have controlled upward and downward movement.
 - c. Release lever shall disengage the post to allow it to be returned to its lowered position.
 - d. Post shall have adjustable mounting brackets to fit ladder rung spacing up to 14" (356mm) on center and clamp brackets to accommodate ladder rungs up to 1-3/4" (44mm) in diameter.
 - 3. Post: Shall be manufactured of high strength square tubing. A pull up loop shall be provided at the upper end of the post to facilitate raising the post.
 - 4. Balancing spring: A stainless steel spring balancing mechanism shall be provided to provide smooth, easy, controlled operation when raising and lowering the safety post.

5. Hardware: All mounting hardware shall be Type 316 stainless steel.
6. Finishes: Factory finish shall be yellow powder coat steel.

PART 3 EXECUTION

3.01 EXAMINATION

- A. Do not begin installation until substrates have been properly prepared.
- B. If substrate preparation is the responsibility of another installer, notify Architect of unsatisfactory preparation before proceeding.

3.02 PREPARATION

- A. Clean surfaces thoroughly prior to installation.
- B. Prepare surfaces using methods recommended by manufacturer for achieving acceptable results for applicable substrate under project conditions.

3.03 INSTALLATION

- A. Install in accordance with manufacturer's instructions, in manner that maintains roofing system weather-tight integrity.

3.04 PROTECTION

- A. Protect installed products until completion of project.
- B. Touch-up, repair or replace damaged products before Date of Substantial Completion.

END OF SECTION

SECTION 07 8400 - FIRESTOPPING

PART 1 GENERAL

1.01 SECTION INCLUDES

- A. Firestopping systems.
- B. Firestopping of joints and penetrations in fire-resistance-rated and smoke-resistant assemblies, whether indicated on drawings or not, and other openings indicated.

1.02 RELATED REQUIREMENTS

- A. Section 01 7000 - Execution and Closeout Requirements: Cutting and patching.
- B. Section 07 0553 - Fire and Smoke Assembly Identification.
- C. Section 09 2116 - Gypsum Board Assemblies: Gypsum wallboard fireproofing.

1.03 REFERENCE STANDARDS

- A. ASTM E119 - Standard Test Methods for Fire Tests of Building Construction and Materials; 2018c.
- B. ASTM E814 - Standard Test Method for Fire Tests of Penetration Firestop Systems; 2013a (Reapproved 2017).
- C. ASTM E1966 - Standard Test Method for Fire-Resistive Joint Systems; 2015.
- D. ASTM E2837 - Standard Test Method for Determining the Fire Resistance of Continuity Head-of-Wall Joint Systems Installed Between Rated Wall Assemblies and Nonrated Horizontal Assemblies; 2013 (Reapproved 2017).
- E. ASTM G21 - Standard Practice for Determining Resistance of Synthetic Polymeric Materials to Fungi; 2015.
- F. ITS (DIR) - Directory of Listed Products; current edition.
- G. FM (AG) - FM Approval Guide; current edition.
- H. UL 2079 - Standard for Tests for Fire Resistance of Building Joint Systems; Current Edition, Including All Revisions.
- I. UL (DIR) - Online Certifications Directory; Current Edition.
- J. UL (FRD) - Fire Resistance Directory; Current Edition.

1.04 SUBMITTALS

- A. See Section 01 3000 - Administrative Requirements for submittal procedures.
- B. Schedule of Firestopping: List each type of penetration, fire rating of the penetrated assembly, and firestopping test or design number.
- C. Product Data: Provide data on product characteristics and performance ratings.
- D. Manufacturer's Installation Instructions: Indicate preparation and installation instructions.
- E. Installer's qualification statement.

1.05 QUALITY ASSURANCE

- A. Fire Testing: Provide firestopping assemblies of designs that provide the specified fire ratings when tested in accordance with ASTM E119 and ASTM E814.
 - 1. Listing in UL (FRD), FM (AG), or ITS (DIR) will be considered as constituting an acceptable test report.
- B. Installer Qualifications: Company specializing in performing the work of this section and:
 - 1. Trained by manufacturer.

1.06 FIELD CONDITIONS

- A. Comply with firestopping manufacturer's recommendations for temperature and conditions during and after installation; maintain minimum temperature before, during, and for three days after installation of materials.

- B. Provide ventilation in areas where solvent-cured materials are being installed.

PART 2 PRODUCTS

2.01 MANUFACTURERS

- A. Firestopping Manufacturers:
1. 3M Fire Protection Products: www.3m.com/firestop/#sle.
 2. A/D Fire Protection Systems Inc: www.adfire.com/#sle.
 3. Hilti, Inc: www.us.hilti.com/#sle.
 4. Nelson FireStop Products: www.nelsonfirestop.com/#sle.
 5. Specified Technologies Inc: www.stifirestop.com/#sle.
 6. Substitutions: See Section 01 6000 - Product Requirements.

2.02 MATERIALS

- A. Firestopping Materials: Any materials meeting requirements.
- B. Mold and Mildew Resistance: Provide firestopping materials with mold and mildew resistance rating of zero(0) in accordance with ASTM G21.
- C. Primers, Sleeves, Forms, Insulation, Packing, Stuffing, and Accessories: Provide type of materials as required for tested firestopping assembly.

2.03 FIRESTOPPING ASSEMBLY REQUIREMENTS

- A. Head-of-Wall (HW) Joint System Firestopping at Joints Between Fire-Rated Wall Assemblies and Non-Rated Horizontal Assemblies: Use system that has been tested according to ASTM E2837 to have fire resistance F Rating equal to required fire rating of wall assembly.
- B. Floor-to-Floor (FF), Floor-to-Wall (FW), Head-of-Wall (HW), and Wall-to-Wall (WW) Joints, Except Perimeter, Where Both Are Fire-Rated: Use system that has been tested according to ASTM E1966 or UL 2079 to have fire resistance F Rating equal to required fire rating of the assembly in which the joint occurs.
1. Listing by FM (AG), ITS (DIR), UL (DIR), or UL (FRD) in their certification directories will be considered evidence of successful testing.
- C. Through Penetration Firestopping: Use system that has been tested according to ASTM E814 to have fire resistance F Rating equal to required fire rating of penetrated assembly.
1. Listing by FM (AG), ITS (DIR), UL (DIR), or UL (FRD) in their certification directories will be considered evidence of successful testing.

2.04 FIRESTOPPING SYSTEMS

- A. Firestopping at Uninsulated Metallic Pipe and Conduit Penetrations, of diameter 4 inches or less: Caulk or putty.
1. Area Separation Walls: UL Design No. W-L-1054, F Rating 2 hour.
 2. Corridor Walls: UL Design No. W-L-1054, F Rating 1 hour.
 3. Other Interior Partitions: UL Design No. W-L-1054, F Rating 1 hour.
- B. Firestopping at Combustible Pipe and Conduit Penetrations, of diameter 4 inches or less: Manufactured device.
1. Floors: UL Design No. CAJ-2109, F Rating 2 hour.
 2. Area Separation Walls: UL Design No. W-L-5028, F Rating 2 hour.
 3. Other Interior Partitions: UL Design No. W-L-5028, F Rating 1 hour.
- C. Firestopping at Cable Penetrations, not in Conduit or Cable Tray: Caulk or putty with steel sleeve.
1. Area Separation Walls: UL Design No. W-L 3079, F Rating 2 hour.
 2. Other Interior Partitions: UL Design No. W-L-3079, F Rating 1 hour.
- D. Firestopping Between Top of Partition Wall and Roof deck: Fiber firestopping with smoke seal coating; UL Design No. HW-D-0081, F Rating 1 or 2 hour, as required.

2.05 PRODUCTS

- A. Elastomeric Silicone Firestopping: Single component silicone elastomeric compound and compatible silicone sealant:
 - 1. Color: Dark grey or red.
 - 2. Manufacturers:
 - a. Grace Construction Products; Product Flamesafe FS1900: www.na.graceconstruction.com.
 - b. 3M Fire Protection Products; Product Fire Barrier Caulk CP25WB+: www.3m.com/firestop.
 - c. Hilti, Inc; Product CP601S: www.us.hilti.com.
 - d. Specified Technologies, Inc; Product PEN300: www.stifirestop.com.
 - e. Substitutions: See Section 01 6000 - Product Requirements.
- B. Trowelable Compound Firestopping: Formulated cement based mortar compound:
 - 1. Color: Dark grey or red.
 - 2. Manufacturers:
 - a. Grace Construction Products; Product Flamesafe Mortar Seal FSM22: www.na.graceconstruction.com.
 - b. 3M Fire Protection Products; Product Fire Barrier Mortar: www.3m.com/firestop.
 - c. Specified Technologies, Inc; Product SSM106: www.stifirestop.com.
 - d. Hilti, Corp.; Product FS635: www.hilti.com.
 - e. Substitutions: See Section 01 6000 - Product Requirements.
- C. Forming Material: Nominal 4 pcf density mineral wood batt insulation.
- D. Firestop Devices: Mechanical device with incombustible filler and sheet stainless steel jacket and collar:
 - 1. Manufacturers:
 - a. Grace Construction Products; Product Flamesafe FSD: www.na.graceconstruction.com.
 - b. Specified Technologies, Inc; Product LCC100-400: www.stifirestop.com.
 - c. Hilti, Corp.; Product CP642/643: www.hilti.com.
 - d. Substitutions: See Section 01 6000 - Product Requirements.
- E. Intumescent Putty: Compound which expands on exposure to surface heat gain:
 - 1. Color: Dark grey or red.
 - 2. Manufacturers:
 - a. Grace Construction Products; Product Flamesafe FSP1000: www.na.graceconstruction.com.
 - b. 3M Fire Protection Products; Product Fire Barrier Moldable Putty+: www.3m.com/firestop.
 - c. Specified Technologies, Inc; Product SSP100: www.stifirestop.com.
 - d. Hilti, Corp.; Product FS-ONE: www.hilti.com.
 - e. Substitutions: See Section 01 6000 - Product Requirements.
- F. Primers, Sleeves, Forms, Insulation, Packing, Stuffing, and Accessories: Type required for tested assembly design.

PART 3 EXECUTION

3.01 EXAMINATION

- A. Verify openings are ready to receive the work of this section.

3.02 PREPARATION

- A. Clean substrate surfaces of dirt, dust, grease, oil, loose material, or other materials that could adversely affect bond of firestopping material.
- B. Remove incompatible materials that could adversely affect bond.
- C. Install backing materials to prevent liquid material from leakage.

3.03 INSTALLATION

- A. Install materials in manner described in fire test report and in accordance with manufacturer's instructions, completely closing openings.
- B. Do not cover installed firestopping until inspected by authorities having jurisdiction.
- C. Install labeling required by code.

3.04 FIELD QUALITY CONTROL

- A. Repair or replace penetration firestopping and joints at locations where inspection results indicate firestopping or joints do not meet specified requirements.

3.05 CLEANING

- A. Clean adjacent surfaces of firestopping materials.

3.06 PROTECTION

- A. Protect adjacent surfaces from damage by material installation.

END OF SECTION

SECTION 07 9200 - JOINT SEALANTS

PART 1 GENERAL

1.01 SECTION INCLUDES

- A. Nonsag gunnable joint sealants.
- B. Self-leveling pourable joint sealants.
- C. Joint backings and accessories.

1.02 RELATED REQUIREMENTS

- A. Section 07 2500 - Weather Barriers: Sealants required in conjunction with water-resistive barriers.
- B. Section 07 8400 - Firestopping: Firestopping sealants.
- C. Section 08 4313 - Aluminum-Framed Storefronts: Installing continuous interior flashing behind sill mullion.
- D. Section 08 7100 - Door Hardware: Setting exterior door thresholds in sealant.
- E. Section 08 8000 - Glazing: Glazing sealants and accessories.
- F. Section 09 3000 - Tiling: Sealant between tile and plumbing fixtures and at junctions with other materials and changes in plane.

1.03 REFERENCE STANDARDS

- A. ASTM C661 - Standard Test Method for Indentation Hardness of Elastomeric-Type Sealants by Means of a Durometer; 2015.
- B. ASTM C834 - Standard Specification for Latex Sealants; 2017.
- C. ASTM C920 - Standard Specification for Elastomeric Joint Sealants; 2018.
- D. ASTM C1193 - Standard Guide for Use of Joint Sealants; 2016.
- E. ASTM C1330 - Standard Specification for Cylindrical Sealant Backing for Use with Cold Liquid-Applied Sealants; 2018.

1.04 SUBMITTALS

- A. See Section 01 3000 - Administrative Requirements for submittal procedures.
- B. Product Data: Submit manufacturer's technical datasheets for each product to be used; include the following:
 - 1. Physical characteristics, including movement capability, VOC content, hardness, cure time, and color availability.
 - 2. List of backing materials approved for use with the specific product.
 - 3. Substrates that product is known to satisfactorily adhere to and with which it is compatible.
 - 4. Substrates the product should not be used on.
 - 5. Substrates for which use of primer is required.
 - 6. Installation instructions, including precautions, limitations, and recommended backing materials and tools.
- C. Color Cards for Selection: Where sealant color is not specified, submit manufacturer's color cards showing standard colors available for selection.

1.05 WARRANTY

- A. See Section 01 7800 - Closeout Submittals for additional warranty requirements.
- B. Correct defective work within a five year period after Date of Substantial Completion.
- C. Warranty: Include coverage for installed sealants and accessories that fail to achieve watertight seal, exhibit loss of adhesion or cohesion, or do not cure.

PART 2 PRODUCTS

2.01 JOINT SEALANT APPLICATIONS

- A. Scope:
1. Exterior Joints: Seal open joints, whether or not the joint is indicated on drawings, unless specifically indicated not to be sealed. Exterior joints to be sealed include, but are not limited to:
 - a. Wall expansion and control joints.
 - b. Joints between door, window, and other frames and adjacent construction.
 - c. Joints between different exposed materials.
 - d. Other joints indicated below.
 2. Interior Joints: Do not seal interior joints unless specifically indicated to be sealed. Interior joints to be sealed include, but are not limited to, the following items.
 - a. Joints between door, window, and other frames and adjacent construction.
 - b. Other joints indicated below.
 3. Do not seal the following types of joints:
 - a. Intentional weep holes in masonry.
 - b. Joints indicated to be treated with manufactured expansion joint cover, or some other type of sealing device.
 - c. Joints where sealant is specified to be provided by manufacturer of product to be sealed.
 - d. Joints where installation of sealant is specified in another section.
 - e. Joints between suspended panel ceilings/grid and walls.

2.02 NONSAG JOINT SEALANTS

- A. Non-Staining Silicone Sealant: ASTM C920, Grade NS, Uses M and A; not expected to withstand continuous water immersion or traffic.
1. Movement Capability: Plus and minus 25 percent, minimum.
 2. Nonstaining to Porous Stone: Nonstaining to light-colored natural stone when tested in accordance with ASTM C1248.
 3. Dirt Pick-Up: Reduced dirt pick-up compared to other silicone sealants.
 4. Color: Match adjacent finished surfaces.
 5. Products:
 - a. Dow; DOWSIL 790 Silicone Building Sealant: www.dow.com/#sle.
 - b. Pecora Corporation; Pecora 890 NST (Non-Staining Technology): www.pecora.com/#sle.
 - c. Tremco Commercial Sealants & Waterproofing; Spectrem 1: www.tremcosealants.com/#sle.
 - d. Degussa Building Systems Sonneborn; Omniseal: www.chemrex.com.
 - e. Substitutions: See Section 01 6000 - Product Requirements.
 6. Applications: Use for:
 - a. Control, expansion, and soft joints in masonry.
 - b. Joints between concrete and other materials.
 - c. Joints between metal frames and other materials.
 - d. Other exterior joints for which no other sealant is indicated.
- B. Mildew-Resistant Silicone Sealant: ASTM C920, Grade NS, Uses M and A; single component, mildew resistant; not expected to withstand continuous water immersion or traffic.
1. Color: White.
 2. Products:
 - a. Everkem Diversified Products, Inc; TruSil 100: www.everkemproducts.com/#sle.
 - b. Pecora Corporation; Pecora 898 NST (Non-Staining Technology): www.pecora.com/#sle.
 - c. Sika Corporation; Sikasil GP: www.usa.sika.com/#sle.
 - d. Substitutions: See Section 01 6000 - Product Requirements.
 3. Applications: Use for:
 - a. Joints between plumbing fixtures and floor and wall surfaces.
- C. Acrylic Emulsion Latex: Water-based; ASTM C834, single component, non-staining, non-bleeding, non-sagging; not intended for exterior use.

1. Color: Standard colors matching finished surfaces, Type OP (opaque).
2. Products:
 - a. Pecora Corporation; AC-20 +Silicone: www.pecora.com/#sle.
 - b. Sherwin-Williams Company; 950A Siliconized Acrylic Latex Caulk: www.sherwin-williams.com/#sle.
 - c. Tremco Commercial Sealants & Waterproofing; Tremflex 834: www.tremcosealants.com/#sle.
 - d. Degussa Building Systems Sonneborn; Sonolac: www.chemrex.com.
 - e. Substitutions: See Section 01 6000 - Product Requirements.
3. Applications: Use for:
 - a. Interior wall and ceiling control joints.
 - b. Joints between door and window frames and wall surfaces.
 - c. Other interior joints for which no other type of sealant is indicated.
- D. Acrylic latex: ASTM C 834, single component, non-staining, non-bleeding, non-sagging.
 1. Color: Standard colors matching finished surfaces, Type OP (opaque).
 2. Manufacturers:
 - a. Color Rite, Inc.; Color Rite.
 3. Applications: Use for:
 - a. Sealing between wood or laminate casework and walls.

2.03 SELF-LEVELING JOINT SEALANTS

- A. Self-Leveling Polyurethane Sealant: ASTM C920, Grade P, Uses M and A; single component; explicitly approved by manufacturer for traffic exposure; not expected to withstand continuous water immersion .
 1. Movement Capability: Plus and minus 25 percent, minimum.
 2. Hardness Range: 35 to 55, Shore A, when tested in accordance with ASTM C661.
 3. Color: Gray.
 4. Products:
 - a. Pecora Corporation; Dynatrol: www.pecora.com/#sle.
 - b. Dow Chemical Company; DOWSIL SL Parking Structure Sealant: consumer.dow.com/en-us/industry/ind-building-construction.html/#sle.
 - c. Tremco, Inc.; Vulkem 245: www.tremcosealants.com/#sle.
 - d. Degussa Building Systems Sonneborn; SL1: www.chemrex.com.
 - e. Substitutions: See Section 01 6000 - Product Requirements.
 5. Applications: Use for:
 - a. Joints in sidewalks and vehicular paving.

2.04 ACCESSORIES

- A. Backer Rod: Cylindrical cellular foam rod with surface that sealant will not adhere to, compatible with specific sealant used, and recommended by backing and sealant manufacturers for specific application.
 1. Type for Joints Not Subject to Pedestrian or Vehicular Traffic: ASTM C1330; Type C - Closed Cell Polyethylene.
 2. Type for Joints Subject to Pedestrian or Vehicular Traffic: ASTM C1330; Type C - Closed Cell Polyethylene.
 3. Closed Cell: 30 to 50 percent larger in diameter than joint width.
- B. Backing Tape: Self-adhesive polyethylene tape with surface that sealant will not adhere to and recommended by tape and sealant manufacturers for specific application.
- C. Masking Tape: Self-adhesive, nonabsorbent, nonstaining, removable without adhesive residue, and compatible with surfaces adjacent to joints and sealants.
- D. Joint Cleaner: Noncorrosive and nonstaining type, type recommended by sealant manufacturer; compatible with joint forming materials.
- E. Primers: Type recommended by sealant manufacturer to suit application; nonstaining.

PART 3 EXECUTION

3.01 EXAMINATION

- A. Verify that joints are ready to receive work.
- B. Verify that backing materials are compatible with sealants.
- C. Verify that backer rods are of the correct size.

3.02 PREPARATION

- A. Remove loose materials and foreign matter that could impair adhesion of sealant.
- B. Clean joints, and prime as necessary, in accordance with manufacturer's instructions.
- C. Perform preparation in accordance with manufacturer's instructions and ASTM C1193.
- D. Mask elements and surfaces adjacent to joints from damage and disfigurement due to sealant work; be aware that sealant drips and smears may not be completely removable.
- E. Concrete Floor Joints That Will Be Exposed in Completed Work: Test joint filler in an inconspicuous area to verify that it does not stain or discolor slab.

3.03 INSTALLATION

- A. Install this work in accordance with sealant manufacturer's requirements for preparation of surfaces and material installation instructions.
- B. Provide joint sealant installations complying with ASTM C1193.
- C. Measure joint dimensions and size joint backers to achieve the following:
 - 1. Width/depth ratio of 2:1.
 - 2. Neck dimension no greater than 1/3 of the joint width.
 - 3. Surface bond area on each side not less than 75 percent of joint width.
- D. Install bond breaker backing tape where backer rod cannot be used.
- E. Install sealant free of air pockets, foreign embedded matter, ridges, and sags, and without getting sealant on adjacent surfaces.
- F. Do not install sealant when ambient temperature is outside manufacturer's recommended temperature range, or will be outside that range during the entire curing period, unless manufacturer's approval is obtained and instructions are followed.
- G. Nonsag Sealants: Tool surface concave, unless otherwise indicated; remove masking tape immediately after tooling sealant surface.
- H. Concrete Floor Joint Filler: After full cure, shave joint filler flush with top of concrete slab.

END OF SECTION

SECTION 07 9513 - EXPANSION JOINT COVER ASSEMBLIES

PART 1 GENERAL

1.01 SECTION INCLUDES

- A. Expansion joint cover assemblies for floor, wall, ceiling, and exterior surfaces.

1.02 RELATED REQUIREMENTS

- A. Section 03 1000 - Concrete Forming and Accessories: Placement of joint cover assembly frames in formwork.
- B. Section 04 2000 - Unit Masonry: Placement of joint cover assembly frames in masonry.
- C. Section 07 6200 - Sheet Metal Flashing and Trim: Roof expansion and control joint covers.
- D. Section 07 9200 - Joint Sealants: Sealing expansion and control joints using gunnable and pourable sealants.
- E. Section 09 2116 - Gypsum Board Assemblies: Gypsum board control joint trim.
- F. Section 09 2116 - Gypsum Board Assemblies: Placement of expansion joint assemblies in gypsum board walls and ceilings.

1.03 REFERENCE STANDARDS

- A. ASTM B221 - Standard Specification for Aluminum and Aluminum-Alloy Extruded Bars, Rods, Wire, Profiles, and Tubes; 2014.
- B. ASTM B221M - Standard Specification for Aluminum and Aluminum-Alloy Extruded Bars, Rods, Wire, Profiles, and Tubes (Metric); 2013.
- C. ASTM B308/B308M - Standard Specification for Aluminum-Alloy 6061-T6 Standard Structural Profiles; 2010.
- D. ITS (DIR) - Directory of Listed Products; current edition.
- E. UL (DIR) - Online Certifications Directory; Current Edition.

1.04 ADMINISTRATIVE REQUIREMENTS

- A. Installation Templates: For frames and anchors to be embedded in concrete or masonry, furnish templates to relevant installers; include installation instructions and tolerances.

1.05 SUBMITTALS

- A. See Section 01 3000 - Administrative Requirements for submittal procedures.
- B. Product Data: Provide joint assembly profiles, profile dimensions, anchorage devices and available colors and finish.
- C. Manufacturer's Installation Instructions: Indicate rough-in sizes and required tolerances for item placement.

PART 2 PRODUCTS

2.01 MANUFACTURERS

- A. Expansion Joint Cover Assemblies:
 - 1. Architectural Art Mfg, Inc: www.archart.com/#sle.
 - 2. Balco, Inc: www.balcousa.com/#sle.
 - 3. Construction Specialties, Inc: www.c-sgroup.com/#sle.
 - 4. Inpro: www.inprocorp.com/#sle.
 - 5. MM Systems Corp: www.mmsystemscorp.com/#sle.
 - 6. Substitutions: See Section 01 6000 - Product Requirements.

2.02 EXPANSION JOINT COVER ASSEMBLY APPLICATIONS

- A. Interior Floor Joints:
 - 1. Basis of Design Products:
 - a. Existing slab to new slab: Construction Specialties, Inc; GFS-100: www.c-sgroup.com/#sle.
 - b. New slab to new slab: Construction Specialties, Inc; ALS-100: www.c-sgroup.com/#sle.
 - c. Slab to wall: Construction Specialties, Inc.; GFSW-100: www.c-sgroup.com/#sle.
 - d. Substitutions: See Section 01 6000 - Product Requirements.
- B. Interior Wall/Ceiling Joints:
 - 1. Basis of Design Products:
 - a. Ceiling to Ceiling: Construction Specialties, Inc; FCF-100: www.c-sgroup.com/#sle.
 - b. Ceiling to Wall: Construction Specialties, Inc.; FCFC-100: www.c-sgroup.com/#sle.
 - c. Wall to Wall: Construction Specialties, Inc.; ASM-100: www.c-sgroup.com/#sle.
 - d. Substitutions: See Section 01 6000 - Product Requirements.
- C. Exterior Wall Joints:
 - 1. Basis of Design Products:
 - a. Wall to Wall: Inpro Corporation; 615-A07-050: www.inpro.com/#sle.
 - b. Wall to Corner: Inpro Corporation; 651-A09-0: www.inprocorp.com/#sle.
 - c. Substitutions: See Section 01 6000 - Product Requirements.

2.03 EXPANSION JOINT COVER ASSEMBLIES

- A. Expansion Joint Cover Assemblies - General: Factory-fabricated and assembled; designed to completely fill joint openings, sealed to prevent passage of air, dust, water, smoke; suitable for traffic expected.
 - 1. Joint Dimensions and Configurations: As indicated on drawings.
 - 2. Joint Cover Sizes: Selected to suit joint width and configuration, based on manufacturer's published recommendations and limitations.
 - 3. Lengths: Provide covers in full lengths required; avoid splicing wherever possible.
 - 4. Anchors, Fasteners, and Fittings: Provided by cover manufacturer.
- B. Floor Joint Covers: Coordinate with indicated floor coverings.
- C. Resilient Seal Type Covers: Having flat exposed surface without crevices that could collect dirt; designed to withstand expected movement without extrusion of seal from joint assembly; for floors, provide style that is flush with top of floor covering; for exterior joints, weathertight.
- D. Sliding Cover Plate Type Covers: Provide plate with beveled edges and neat fit that does not collect dirt.
- E. Covers in Gypsum Board Assemblies: Provide style with anchoring wings that can be completely covered by joint compound.
- F. Covers in Fire Rated Assemblies: Provide cover assembly having fire rating equivalent to that of assembly into which it is installed.
 - 1. Acceptable Evaluation Agencies: UL (DIR) and ITS (DIR).

2.04 MATERIALS

- A. Extruded Aluminum: ASTM B221 (ASTM B221M), 6063 alloy, T6 temper; or ASTM B308/B308M, 6061 alloy, T6 temper.
 - 1. Exposed Finish Outdoors: Natural anodized.
 - 2. Exposed Finish at Floors: Mill finish or natural anodized.
 - 3. Exposed Finish at Walls and Ceilings: Natural anodized.
- B. Resilient Seals:
 - 1. For Ceilings: Any resilient material, flush, pleated, or hollow gasket.
 - 2. For Pedestrian Traffic Applications: EPDM rubber, Neoprene, or Santoprene; no PVC; Shore A hardness of 40 to 50 Durometer.
 - 3. Color: Gray.
- C. Anchors and Fasteners: As recommended by cover manufacturer.
- D. Ferrous Metal Anchors: Galvanized where embedded in concrete or in contact with cementitious materials.

- E. Backing Paint for Aluminum Components in Contact with Cementitious Materials: Asphaltic type.

PART 3 EXECUTION

3.01 EXAMINATION

- A. Verify that joint preparation and dimensions are acceptable and in accordance with manufacturer's requirements.
- B. Verify that frames and anchors installed by others are in correct locations and suitable for installation of remainder of assembly.

3.02 INSTALLATION

- A. Install components and accessories in accordance with manufacturer's instructions.
- B. Align work plumb and level, flush with adjacent surfaces.
- C. Rigidly anchor to substrate to prevent misalignment.

3.03 PROTECTION

- A. Do not permit traffic over unprotected floor joint surfaces.
- B. Provide strippable coating to protect finish surface.

END OF SECTION

SECTION 08 1113 - HOLLOW METAL DOORS AND FRAMES

PART 1 GENERAL

1.01 SECTION INCLUDES

- A. Non-fire-rated hollow metal doors and frames.
- B. Hollow metal frames for wood doors.
- C. Fire-rated hollow metal frames.
- D. Thermally insulated hollow metal doors with frames.
- E. Tornado-resistant hollow metal doors and frames.
- F. Accessories, including glazing.

1.02 RELATED REQUIREMENTS

- A. Section 08 1416 - Flush Wood Doors.
- B. Section 08 7100 - Door Hardware.
- C. Section 08 8000 - Glazing: Glass for doors and borrowed lites.
- D. Section 09 9113 - Exterior Painting: Field painting.
- E. Section 09 9123 - Interior Painting: Field painting.

1.03 ABBREVIATIONS AND ACRONYMS

- A. ANSI: American National Standards Institute.
- B. HMMA: Hollow Metal Manufacturers Association.
- C. NAAMM: National Association of Architectural Metal Manufacturers.
- D. NFPA: National Fire Protection Association.
- E. SDI: Steel Door Institute.
- F. UL: Underwriters Laboratories.

1.04 REFERENCE STANDARDS

- A. ADA Standards - Americans with Disabilities Act (ADA) Standards for Accessible Design; 2010.
- B. ANSI/SDI A250.4 - Test Procedure and Acceptance Criteria for Physical Endurance for Steel Doors, Frames and Frame Anchors; 2011.
- C. ANSI/SDI A250.6 - Recommended Practice for Hardware Reinforcing on Standard Steel Doors and Frames; 2003 (R2009).
- D. ANSI/SDI A250.8 - Specifications for Standard Steel Doors and Frames (SDI-100); 2017.
- E. ANSI/SDI A250.10 - Test Procedure and Acceptance Criteria for Prime Painted Steel Surfaces for Steel Doors and Frames; 2011.
- F. ASTM A653/A653M - Standard Specification for Steel Sheet, Zinc-Coated (Galvanized) or Zinc-Iron Alloy-Coated (Galvannealed) by the Hot-Dip Process; 2018.
- G. ASTM A1008/A1008M - Standard Specification for Steel, Sheet, Cold-Rolled, Carbon, Structural, High-Strength Low-Alloy, High-Strength Low-Alloy with Improved Formability, Solution Hardened, and Bake Hardenable; 2018.
- H. ASTM A1011/A1011M - Standard Specification for Steel, Sheet and Strip, Hot-Rolled, Carbon, Structural, High-Strength Low-Alloy, High-Strength Low-Alloy with Improved Formability, and Ultra-High Strength; 2018a.
- I. ASTM C143/C143M - Standard Test Method for Slump of Hydraulic-Cement Concrete; 2015a.
- J. ASTM C476 - Standard Specification for Grout for Masonry; 2018.
- K. ASTM E84 - Standard Test Method for Surface Burning Characteristics of Building Materials; 2018b.
- L. ASTM E330/E330M - Standard Test Method for Structural Performance of Exterior Windows, Doors, Skylights and Curtain Walls by Uniform Static Air Pressure Difference; 2014.
- M. BHMA A156.115 - American National Standard for Hardware Preparation in Steel Doors and Steel Frames; 2016.

- N. ICC 500 - ICC/NSSA Standard for the Design and Construction of Storm Shelters; National Storm Shelter Association; 2014.
- O. ITS (DIR) - Directory of Listed Products; current edition.
- P. NAAMM HMMA 805 - Recommended Selection and Usage Guide for Hollow Metal Doors and Frames; 2012.
- Q. NAAMM HMMA 830 - Hardware Selection for Hollow Metal Doors and Frames; 2002.
- R. NAAMM HMMA 831 - Hardware Locations for Hollow Metal Doors and Frames; 2011.
- S. NAAMM HMMA 840 - Guide Specifications for Installation and Storage of Hollow Metal Doors and Frames; 2007.
- T. NAAMM HMMA 861 - Guide Specifications for Commercial Hollow Metal Doors and Frames; 2014.
- U. NFPA 80 - Standard for Fire Doors and Other Opening Protectives; 2019.
- V. NFPA 252 - Standard Methods of Fire Tests of Door Assemblies; 2017.
- W. SDI 117 - Manufacturing Tolerances for Standard Steel Doors and Frames; 2013.
- X. UL (DIR) - Online Certifications Directory; Current Edition.
- Y. UL 10C - Standard for Positive Pressure Fire Tests of Door Assemblies; Current Edition, Including All Revisions.

1.05 SUBMITTALS

- A. See Section 01 3000 - Administrative Requirements for submittal procedures.
- B. Product Data: Materials and details of design and construction, hardware locations, reinforcement type and locations, anchorage and fastening methods, and finishes.
- C. Shop Drawings: Details of each opening, showing elevations, glazing, frame profiles, and any indicated finish requirements.

1.06 QUALITY ASSURANCE

- A. Manufacturer Qualifications: Provide hollow metal doors and frames from SDI Certified manufacturer: www.steeldoor.org/sdicertified.php.

1.07 DELIVERY, STORAGE, AND HANDLING

- A. Comply with NAAMM HMMA 840 or ANSI/SDI A250.8 (SDI-100) in accordance with specified requirements.
- B. Protect with resilient packaging; avoid humidity build-up under coverings; prevent corrosion and adverse effects on factory applied painted finish.

PART 2 PRODUCTS

2.01 MANUFACTURERS

- A. Hollow Metal Doors and Frames:
 - 1. Ceco Door, an Assa Abloy Group company: www.assaabloydss.com/#sle.
 - 2. Republic Doors, an Allegion brand: www.republicdoor.com/#sle.
 - 3. Steelcraft, an Allegion brand: www.allegion.com/#sle.
 - 4. Metal Products Inc.: www.metalproducts.com..
 - 5. Substitutions: Not permitted.
- B. Tornado-Resistant Hollow Metal Doors and Frames:
 - 1. Ceco Door, an Assa Abloy Group Company: www.assaabloydss.com/#sle.
 - 2. Republic Doors, an Allegion brand: www.republicdoor.com/#sle.
 - 3. Steelcraft, an Allegion brand: www.allegion.com/#sle.
 - 4. Substitutions: Not permitted.

2.02 PERFORMANCE REQUIREMENTS

- A. Requirements for Hollow Metal Frames:

1. Steel Sheet: Comply with one or more of the following requirements; galvanized steel complying with ASTM A653/A653M, cold-rolled steel complying with ASTM A1008/A1008M, or hot-rolled pickled and oiled (HRPO) steel complying with ASTM A1011/A1011M, commercial steel (CS) Type B, for each.
2. Accessibility: Comply with ICC A117.1 and ADA Standards.
3. Exterior Door Top Closures: Flush end closure channel, with top and door faces aligned.
4. Door Edge Profile: Manufacturers standard for application indicated.
5. Typical Door Face Sheets: Flush.
6. Glazed Lights: Non-removable stops on non-secure side; sizes and configurations as indicated on drawings. Style: Flush.
7. Hardware Preparations, Selections and Locations: Comply with NAAMM HMMA 830 and NAAMM HMMA 831 or BHMA A156.115 and ANSI/SDI A250.8 (SDI-100) in accordance with specified requirements.
8. Zinc Coating for Typical Interior and/or Exterior Locations: Provide metal components zinc-coated (galvanized) and/or zinc-iron alloy-coated (galvanized) by the hot-dip process in accordance with ASTM A653/A653M, with manufacturer's standard coating thickness, unless noted otherwise for specific hollow metal doors and frames.
 - a. Based on SDI Standards: Provide at least A40/ZF120 (galvanized) when necessary, coating not required for typical interior door applications, and at least A60/ZF180 (galvanized) for corrosive locations.

2.03 HOLLOW METAL DOORS

- A. Door Finish: Factory primed and field finished.
- B. Exterior Doors: Thermally insulated.
 1. Based on SDI Standards: ANSI/SDI A250.8 (SDI-100).
 - a. Level 1 - Standard-duty.
 - b. Physical Performance Level C, 250,000 cycles; in accordance with ANSI/SDI A250.4.
 - c. Model 1 - Full Flush.
 - d. Door Face Metal Thickness: 20 gage, 0.032 inch, minimum.
 - e. Zinc Coating: A60/ZF180 galvanized coating; ASTM A653/A653M.
 2. Door Core Material: Polystyrene 1 lbs/cu ft minimum density.
 - a. Foam Plastic Insulation: Manufacturer's standard board insulation with maximum flame spread index (FSI) of 75, and maximum smoke developed index (SDI) of 450 in accordance with ASTM E84, and completely enclosed within interior of door.
 3. Door Thermal Resistance: R-Value of 6.0 minimum, for installed thickness of polystyrene.
 4. Door Thickness: 1-3/4 inches, nominal.
 5. Weatherstripping: Refer to Section 08 7100.
- C. Fire-Rated Doors:
 1. Based on SDI Standards: ANSI/SDI A250.8 (SDI-100).
 - a. Level 1 - Standard-duty.
 - b. Physical Performance Level C, 250,000 cycles; in accordance with ANSI/SDI A250.4.
 - c. Model 1 - Full Flush.
 - d. Door Face Metal Thickness: 20 gauge, 0.032 inch, minimum.
 2. Fire Rating: As indicated on Door Schedule, tested in accordance with UL 10C and NFPA 252 ("positive pressure fire tests").
 3. Provide units listed and labeled by UL (DIR) or ITS (DIR).
 - a. Attach fire rating label to each fire rated unit.
 4. Door Core Material: Manufacturers standard core material/construction in compliance with requirements.
 5. Door Thickness: 1-3/4 inches, nominal.
- D. Tornado-Resistant Doors:
 1. Design and size door and frame components to withstand the specified load requirements without damage or permanent set, when tested in accordance with ASTM E330/E330M.
 - a. Design Wind Loads: Comply with requirements of applicable code.

- b. Wind-Borne Debris Resistance: Door and frame components shall have UL (DIR) approval for Large and Small Missile impact and pressure cycling at design wind loads.
- 2. Tornado Shelter Application: Comply with ICC 500 standard.
- 3. Based on SDI Standards: ANSI/SDI A250.8 (SDI-100).
 - a. Level 4 - Maximum-duty.
 - b. Physical Performance Level A, 1,000,000 cycles; in accordance with ANSI/SDI A250.4.
 - c. Model 2 - Seamless.
 - d. Door Face Metal Thickness: 14 gauge, 0.067 inch, minimum.
 - e. Zinc Coating: A60/ZF180 galvanized coating; ASTM A653/A653M.
- 4. Door Core Material: Manufacturers standard core material/construction and in compliance with requirements.
- 5. Door Thickness: 1-3/4 inches, nominal.
- 6. Door Face Sheets: Flush.
- 7. Door Finish: Factory primed and field finished.
- 8. Hardware: Coordinate with hardware to provide an ICC 500 and FEMA 361 approved opening assembly.

2.04 HOLLOW METAL FRAMES

- A. Comply with standards and/or custom guidelines as indicated for corresponding door in accordance with applicable door frame requirements.
- B. Frame Finish: Factory primed and field finished.
- C. Exterior Door Frames: Full profile/continuously welded type.
 - 1. Galvanizing: Components hot-dipped zinc-iron alloy-coated (galvanized) in accordance with ASTM A653/A653M, with A60/ZF180 coating.
 - 2. Frame Metal Thickness: 16 gage, 0.053 inch, minimum.
 - 3. Weatherstripping: Separate, see Section 08 7100.
- D. Interior Door Frames, Non-Fire Rated: Full profile/continuously welded type.
 - 1. Frame Metal Thickness: 16 gage, 0.053 inch, minimum.
- E. Door Frames, Fire-Rated: Full profile/continuously welded type.
 - 1. Fire Rating: Same as door, labeled.
 - 2. Frame Metal Thickness: 16 gage, 0.053 inch, minimum.
- F. Tornado-Resistant Door Frames: With same tornado resistance as door; full profile/continuously welded construction, ground smooth, fully prepared and reinforced for hardware installation.
 - 1. Frame Metal Thickness: 14 gauge, 0.067 inch, minimum.
 - 2. Frame Finish: Factory primed and field finished.
- G. Frames for Wood Doors: Comply with frame requirements in accordance with corresponding door.
- H. Provide mortar guard boxes for hardware cut-outs in frames to be installed in masonry or to be grouted.
- I. Frames in Masonry Walls: Size to suit masonry coursing with head member 4 inches high to fill opening without cutting masonry units.
- J. Frames Wider than 48 inches: Reinforce with steel channel fitted tightly into frame head, flush with top.

2.05 FINISHES

- A. Primer: Rust-inhibiting, complying with ANSI/SDI A250.10, door manufacturer's standard.
- B. Bituminous Coating: Cold-applied asphalt mastic, compounded for 15 mil, 0.015 inch dry film thickness (DFT) per coat; provide inert-type noncorrosive compound free of asbestos fibers, sulfur components, and other deleterious impurities.

2.06 ACCESSORIES

- A. Door Window Frames: Door window frames with glazing securely fastened within door opening.
 - 1. Size: As indicated on drawings.
 - 2. Frame Material: 18 gauge, 0.0478 inch, galvanized steel.
 - 3. Metal Finish: Gray polyester powder coating.

- 4. Glazing: 1/4 inch thick, tempered glass, in compliance with requirements of authorities having jurisdiction.
- B. Glazing: As specified in Section 08 8000.
- C. Astragals for Double Doors:
 - 1. Exterior Doors: Steel, T-shaped.
 - 2. Fire-Rated Doors: Steel, shape as required for fire rating.
- D. Grout for Frames: Mortar grout complying with ASTM C476 with maximum slump of 4 inches as measured in accordance with ASTM C143/C143M for hand troweling in place; plaster grout and thinner pumpable grout are prohibited.
- E. Silencers: Resilient rubber, fitted into drilled hole; provide three on strike side of single door, three on center mullion of pairs, and two on head of pairs without center mullions.
- F. Temporary Frame Spreaders: Provide for factory- or shop-assembled frames.

PART 3 EXECUTION

3.01 EXAMINATION

- A. Verify existing conditions before starting work.
- B. Verify that opening sizes and tolerances are acceptable.
- C. Verify that finished walls are in plane to ensure proper door alignment.

3.02 PREPARATION

- A. Coat inside of frames to be installed in masonry or to be grouted, with bituminous coating, prior to installation.

3.03 INSTALLATION

- A. Install doors and frames in accordance with manufacturer's instructions and related requirements of specified door and frame standards or custom guidelines indicated.
- B. Install fire rated units in accordance with NFPA 80.
- C. Coordinate frame anchor placement with wall construction.
- D. Grout frames in masonry construction, using hand trowel methods; brace frames so that pressure of grout before setting will not deform frames.
- E. Install door hardware as specified in Section 08 7100.
 - 1. Comply with recommended practice for hardware placement of doors and frames in accordance with ANSI/SDI A250.6 or NAAMM HMMA 861.
- F. Comply with glazing installation requirements of Section 08 8000.

3.04 TOLERANCES

- A. Clearances Between Door and Frame: Comply with related requirements of specified frame standards or custom guidelines indicated in accordance with SDI 117 or NAAMM HMMA 861.
- B. Maximum Diagonal Distortion: 1/16 inch measured with straight edge, corner to corner.

3.05 ADJUSTING

- A. Adjust for smooth and balanced door movement.

END OF SECTION

SECTION 08 1416 - FLUSH WOOD DOORS

PART 1 GENERAL

1.01 SECTION INCLUDES

- A. Flush wood doors; flush configuration; fire-rated and non-rated.

1.02 RELATED REQUIREMENTS

- A. Section 08 1113 - Hollow Metal Doors and Frames.
- B. Section 08 7100 - Door Hardware.
- C. Section 08 8000 - Glazing.

1.03 REFERENCE STANDARDS

- A. AWI/AWMAC/WI (AWS) - Architectural Woodwork Standards; 2014, with Errata (2016).
- B. FM (AG) - FM Approval Guide; current edition.
- C. ICC (IBC) - International Building Code; Most Recent Edition Adopted by Authority Having Jurisdiction, Including All Applicable Amendments and Supplements.
- D. NFPA 80 - Standard for Fire Doors and Other Opening Protectives; 2019.
- E. UL (DIR) - Online Certifications Directory; Current Edition.
- F. UL 10B - Standard for Fire Tests of Door Assemblies; Current Edition, Including All Revisions.
- G. WDMA I.S. 1A - Interior Architectural Wood Flush Doors; 2013.

1.04 SUBMITTALS

- A. See Section 01 3000 - Administrative Requirements for submittal procedures.
- B. Product Data: Indicate door core materials and construction; veneer species, type and characteristics.
- C. Shop Drawings: Show doors and frames, elevations, sizes, types, swings, undercuts, beveling, blocking for hardware, factory machining, factory finishing, cutouts for glazing and other details.
 - 1. Provide information as required by AWI/AWMAC/WI (AWS).
- D. Warranty, executed in Owner's name.

1.05 QUALITY ASSURANCE

- A. Manufacturer Qualifications: Company specializing in manufacturing the products specified in this section, with not less than five years of documented experience.

1.06 DELIVERY, STORAGE, AND HANDLING

- A. Package, deliver and store doors in accordance with specified quality standard.
- B. Accept doors on site in manufacturer's packaging, and inspect for damage.
- C. Protect doors with resilient packaging sealed with heat shrunk plastic. Do not store in damp or wet areas; or in areas where sunlight might bleach veneer. Seal top and bottom edges if stored more than one week. Break seal on site to permit ventilation.

1.07 WARRANTY

- A. See Section 01 7800 - Closeout Submittals for additional warranty requirements.
- B. Interior Doors: Provide manufacturer's warranty for the life of the installation.
- C. Include coverage for delamination of veneer, warping beyond specified installation tolerances, defective materials, and telegraphing core construction.

PART 2 PRODUCTS

2.01 MANUFACTURERS

- A. High Pressure Decorative Laminate (HPDL) Faced Doors:
 - 1. Ampco Products, Inc: www.ampco.com/#sle.
 - 2. Masonite Architectural: www.architectural.masonite.com/#sle.
 - 3. Graham-Maiman Wood Doors: www.architectural.masonite.com
 - 4. Poncraft Door Co: www.poncraft.com/#sle.
 - 5. VT Industries, Inc: www.vtindustries.com/#sle.
 - 6. Substitutions: See Section 01 6000 - Product Requirements.

2.02 DOORS

- A. Doors: See drawings for locations and additional requirements.
 - 1. Quality Standard: Custom Grade, Heavy Duty performance, in accordance with AWI/AWMAC/WI (AWS), unless noted otherwise.
 - 2. High Pressure Decorative Laminate (HPDL) Faced Doors: 5-ply unless otherwise indicated.
- B. Interior Doors: 1-3/4 inches thick unless otherwise indicated; flush construction.
 - 1. Provide solid core doors at each location.
 - 2. Fire Rated Doors: Tested to ratings indicated on drawings in accordance with ICC (IBC) - Positive Pressure; Underwriters Laboratories Inc (UL) labeled.
 - 3. High pressure decorative laminate (HPDL) finish.

2.03 DOOR AND PANEL CORES

- A. Non-Rated Solid Core and 20 Minute Rated Doors: Type particleboard core (PC), plies and faces as indicated.
- B. Fire-Rated Doors: Mineral core type, with fire resistant composite core (FD), plies and faces as indicated above; with core blocking as required to provide adequate anchorage of hardware without through-bolting.

2.04 DOOR FACINGS

- A. High Pressure Decorative Laminate (HPDL) Facing for Fire-Rated and Non-Fire-Rated Doors: NEMA LD 3, HGS; color(s) as indicated; satin finish.
 - 1. Laminate: Wilsonart 7909-60 Fusion Maple.
 - a. Substitutions: Not permitted.

2.05 DOOR CONSTRUCTION

- A. Fabricate doors in accordance with door quality standard specified.
- B. Cores Constructed with stiles and rails:
 - 1. Provide solid blocks at lock edge for hardware reinforcement.
 - 2. Provide solid blocking for other throughbolted hardware.
- C. Where supplementary protective edge trim is required, install trim after veneer facing has been applied full-width.
- D. Glazed Openings: Non-removable stops on non-secure side; sizes and configurations as indicated on drawings.
- E. Factory machine doors for hardware other than surface-mounted hardware, in accordance with hardware requirements and dimensions.
- F. Factory fit doors for frame opening dimensions identified on shop drawings, with edge clearances in accordance with specified quality standard.
- G. Provide edge clearances in accordance with the quality standard specified.

2.06 ACCESSORIES

- A. Hollow Metal Door Frames: See Section 08 1113.

- B. Glazing: See Section 08 8000.
- C. Glazing Stops: Wood with metal clips for rated doors, mitered corners; prepared for countersink style screws.
- D. Astragals for Non-Rated Double Doors: Wood, T shaped, overlapping and recessed at face edge.
- E. Astragals for Fire-Rated Double Doors: Steel, T shaped, overlapping and recessed at face edge, specifically for double doors.
- F. Door Hardware: See Section 08 7100.

PART 3 EXECUTION

3.01 EXAMINATION

- A. Verify existing conditions before starting work.
- B. Verify that opening sizes and tolerances are acceptable.
- C. Do not install doors in frame openings that are not plumb or are out-of-tolerance for size or alignment.

3.02 INSTALLATION

- A. Install doors in accordance with manufacturer's instructions and specified quality standard.
 - 1. Install fire-rated doors in accordance with NFPA 80 requirements.
- B. Factory-Finished Doors: Do not field cut or trim; if fit or clearance is not correct, replace door.
- C. Use machine tools to cut or drill for hardware.
- D. Coordinate installation of doors with installation of frames and hardware.
- E. Coordinate installation of glazing.

3.03 TOLERANCES

- A. Comply with specified quality standard for fit and clearance tolerances.
- B. Comply with specified quality standard for telegraphing, warp, and squareness.

3.04 ADJUSTING

- A. Adjust doors for smooth and balanced door movement.
- B. Adjust closers for full closure.

END OF SECTION

SECTION 08 3100 - ACCESS DOORS AND PANELS

PART 1 GENERAL

1.01 SECTION INCLUDES

- A. Wall-mounted access units.
- B. Ceiling-mounted access units.

1.02 RELATED REQUIREMENTS

- A. Section 09 9123 - Interior Painting: Field paint finish.

1.03 REFERENCE STANDARDS

- A. ITS (DIR) - Directory of Listed Products; current edition.
- B. UL (FRD) - Fire Resistance Directory; Current Edition.

1.04 SUBMITTALS

- A. See Section 01 3000 - Administrative Requirements for submittal procedures.
- B. Product Data: Provide sizes, types, finishes, hardware, scheduled locations, and details of adjoining work.
- C. Project Record Documents: Record actual locations of each access unit.

1.05 QUALITY ASSURANCE

- A. Manufacturer Qualifications: Company specializing in manufacturing the products specified in this section with minimum five years documented experience.

1.06 REGULATORY REQUIREMENTS

- A. Conform to IBC Code of fire rated access doors.
 - 1. Provide products listed and labeled by UL or ITS (Warnock Hersey) as suitable for the purpose specified and indicated.

1.07 PROJECT CONDITIONS

- A. Coordinate the work with other work (mechanical, electrical, and plumbing) requiring access doors whether indicated on drawings or not.
- B. Minimize requirement for access panels by attempting to locate valves, maintenance items, etc above accessible ceilings whenever possible.

PART 2 PRODUCTS

2.01 ACCESS DOORS AND PANELS ASSEMBLIES

- A. Wall and Ceiling Mounted Units:
 - 1. Panel Material: Steel, hot-dipped zinc or zinc-aluminum-alloy coated.
 - 2. Size: 12 inch by 12 inch unless otherwise noted.
 - 3. Door/Panel: Hinged, standard duty, with tool-operated spring or cam lock and no handle.
 - 4. Gypsum Board Mounting Criteria: Provide drywall bead frame with door surface recessed for infill with wall finish.
 - 5. Masonry Mounting Criteria: Provide surface-mounted frame with door surface flush with frame surface.
- B. Fire-Rated Wall-Mounted Units:
 - 1. Wall Fire-Rating: As indicated on drawings.
 - 2. Panel Material: Steel.
 - 3. Size: 12 by 12 inches.

- 4. Door/Panel: Insulated double-surface panel, with tool-operated spring or cam lock and no handle.
- C. Ceiling-Mounted Units:
 - 1. Panel Material: Aluminum extrusion with gypsum board inlay.
 - 2. Size - Ceilings: 24 inch by 24 inch.
 - 3. Door/Panel: Hinged, standard duty, with tool-operated spring or cam lock and no handle.

2.02 WALL AND CEILING MOUNTED ACCESS UNITS

- A. Manufacturers:
 - 1. ACUDOR Products Inc: www.acudor.com/#sle.
 - 2. Babcock-Davis: www.babcockdavis.com/#sle.
 - 3. Best Access Doors: www.bestaccessdoors.com/#sle.
 - 4. Karp Associates, Inc: www.karpinc.com/#sle.
 - 5. Milcor, Inc: www.milcorinc.com/#sle.
 - 6. Substitutions: See Section 01 6000 - Product Requirements.
- B. Interior Wall and Ceiling Mounted Units: Factory fabricated door and frame, fully assembled units with corner joints welded, filled and ground flush; square and without rack or warp; coordinate requirements with type of installation assembly being used for each unit.
 - 1. Material: Steel, hot-dipped zinc or zinc-aluminum-alloy coated.
 - 2. Style: Recessed door panel for infill with wall/ceiling finish.
 - a. Gypsum Board Mounting Criteria: Use drywall bead type frame.
 - 3. Door Style: Single thickness with rolled or turned in edges.
 - 4. Frames: 16-gauge, 0.0598-inch minimum thickness.
 - 5. Single Steel Sheet Door Panels: 16-gauge, 0.0625-inch minimum thickness.
 - 6. Door Panels to Receive Wall/Ceiling Finish: Surface recessed 5/8 inch back from wall face.
 - 7. Units in Fire-Rated Assemblies: Fire rating as required by applicable code for fire-rated assembly that access doors are being installed.
 - a. Provide products listed by ITS (DIR) or UL (FRD) as suitable for purpose indicated.
 - 8. Steel Finish: Primed.
 - 9. Hardware:
 - a. Hardware for Fire-Rated Units: As required for listing.
 - b. Hinges for Non-Fire-Rated Units: Continuous piano hinge.
 - c. Latch/Lock: Screw driver slot for quarter turn cam latch.
 - d. Number of Locks/Latches Required: As recommended by manufacturer for size of unit.
 - e. Gasketing: Extruded neoprene, around perimeter of door panel.

PART 3 EXECUTION

3.01 EXAMINATION

- A. Verify that rough openings are correctly sized and located.
- B. Begin installation only after substrates have been properly prepared, and if the responsibility of another installer, notify Architect of unsatisfactory preparation before proceeding.

3.02 PREPARATION

- A. Clean surfaces thoroughly prior to proceeding with this work.
- B. Prepare surfaces using methods recommended by manufacturer for applicable substrates in accordance with project conditions.

3.03 INSTALLATION

- A. Install units in accordance with manufacturer's instructions.
- B. Install frames plumb and level in openings, and secure units rigidly in place.
- C. Position units to provide convenient access to concealed equipment when necessary.

END OF SECTION

SECTION 08 3300 - TORNADO RESISTANT COILING DOORS

PART 1 GENERAL

1.01 SECTION INCLUDES

- A. Tornado Resistant Coiling Doors – Everything required for a complete code compliant system.

1.02 RELATED REQUIREMENTS

- A. Section 05 5000 – Metal Fabrications.
- B. Section 06 1000 – Rough Carpentry.
- C. Section 08 3100 – Access Doors and Panels.
- D. Section 09 9123 – Interior Painting.

1.03 REFERENCE STANDARDS

- A. Listed, labeled and certified by an IAS accredited nationally recognized testing laboratory for product compliance with FEMA 361 Safe Rooms for Tornadoes and Hurricanes.
- B. Listed, labeled and certified by an IAS accredited nationally recognized testing laboratory to ICC 500-2014 Standard for Design and Construction of Storm Shelters.
- C. Listed, labeled and certified by an IAS accredited nationally recognized testing laboratory for a wind pressure rating of 302psf (1.2 times the design wind pressure of 252psf) in accordance with ASTM E330.
- D. Listed, labeled and certified by an IAS accredited nationally recognized testing laboratory for Large Missile Impact rating in accordance with the requirements of ASTM E1886 for FEMA 361 Safe Rooms for Tornadoes and Hurricanes.

1.04 SUBMITTALS

- A. See Section 01 3000 – Administrative Requirements for submittal procedures.
- B. Product Data: Manufacturer's technical literature describing the products to be used under this section.
- C. Shop Drawings: Furnish shop drawings for architect's approval. Include elevations, sections, and details indicating dimensions, materials, finishes, conditions for anchorage and support of each coiling door.
- D. Maintenance and Operating Manuals: Furnish complete manuals describing the materials, devices and procedures to be followed in operating and maintaining all tornado resistant coiling doors under this section. Include manufacturer's brochures and parts lists describing the actual materials used in the product.

1.05 QUALITY ASSURANCE

- A. Regulatory Requirements: Comply with applicable FEMA requirements as well as laws, codes, ordinances and regulations of federal, state and municipal authorities having jurisdiction.
- B. Manufacturer Requirements: Manufacturer shall have been in the business of and have experience in manufacturing wide span opening protective door assemblies as well as providing dependable credible service for a minimum of ten (10) years.
- C. Operational Cycle Life: Tornado resistant coiling doors shall be designed and constructed for a minimum 10,000 operating cycles for the life of the door assembly. Cycles shall be verifiable by a non-resettable cycle counter located within the door's motor operator control panel.

1.06 DELIVERY, STORAGE AND HANDLING

- A. Deliver and store materials in manufacturer's original packaging, labeled to show name, brand and type. Store materials in a protected dry location off the ground in accordance with manufacturer's instructions.

1.07 WARRANTY

- A. See Section 01 7800 – Closeout Submittals for additional warranty requirements.

- B. Tornado Resistant Coiling Door Warranty: Provide Two (2) Year, 10,000 Cycle Warranty signed by the manufacturer and installer agreeing to repair or replace work which has failed as a result of defects in materials or workmanship. Upon notification within the warranty period, such defects shall be repaired at no cost to the owner.

PART 2 PRODUCTS

2.01 TORNADO RESISTANT COILING DOORS

- A. Basis of Design: McKeon Rolling Steel Door Company, Inc.; Model SafeSpace SS500-G:
www.mckeondoor.com.
- B. Substitutions: See Section 01 6000 – Product Requirements.
 - 1. Assembly shall be tested, listed and labeled by an IAS accredited nationally recognized testing laboratory, approved for use in FEMA 361 and ICC 500-2014 safe rooms and storm shelters.

2.02 COMPONENTS

- A. Curtain: Shall be assembled of G90 galvanized steel interlocking slats. Curtain shall be formed of slat profile sections of gauge as required to sustain the minimum required design wind pressure.
 - 1. Slat cross section shall not be less than 3" wide by 1-1/2" deep.
- B. Bottom Bar: Shall consist of a double 2" x 3" structural steel angle assembly formed to fit and engage the curtain assembly.
- C. Guides: Each guide assembly shall be fabricated of structural steel support angles no greater than 4" x 4" and guide retaining angles of a minimum 6" depth to retain curtain in the guides under the design wind pressure and impact forces specified.
- D. Mounting Brackets: Fabricated of hot rolled 3/16" minimum steel plates, brackets shall be provided to house ends of the counterbalance barrel assembly.
- E. Hood: Shall be provided to entirely enclose coiled curtain and counterbalance barrel assembly. Hood shall be fabricated of a minimum 22 gauge G90 galvanized steel, designed and formed to match brackets. Top and bottom shall be bent and reinforced to provide for proper stiffness.
- F. Counterbalance Assembly: Coiling door shall be counterbalanced by means of adjustable steel helical torsion springs attached to shaft enclosed in pipe with required mounting blocks or rings for attachment of curtain. Grease sealed bearings or self-lubricating graphite bearings shall be attached to the spring barrel which shall be fabricated of hot formed structural quality carbon steel seamless pipe.
- G. Electric Motor Operator: Door shall be provided with a compact power unit designed and laboratory listed by the door manufacturer. Operator shall be equipped with an adjustable screw-type limit switch to break the circuit at termination of travel. High efficiency planetary gearing running in an oil bath, shall be furnished together with a centrifugal governor, magnetic operated brake and a fail-safe magnetic release device, completely housed to protect against damage, dust and moisture. An efficient overload protection device, which will break the power circuit and protect against damage to the motor windings shall be integral with the unit. Operator is to be housed in a NEMA type 1 enclosure.
 - 1. Motor: Shall be intermediate duty, thermally protected, ball bearing type with a class A or better insulation. Horsepower of motor is to be 1/2hp minimum or of manufacturer's recommended size, whichever is greater.
 - 2. Starter: Shall be size "0" magnetic reversing starter, across the line type with mechanical and electrical interlocks, with 10 amp continuous rating and 24 volt control circuit.
 - 3. Reducer: Planetary gear type, 80% efficiency minimum.
 - 4. Cycle Counter: Non-resettable operational cycle counter.
- H. NFS Operation: The operating system shall prevent the tornado storm door from closing during building power interruption to the motor operator for a period of up to six hours. Once the NFS cycle lapses, the door shall self-close at a controlled governed rate of closure not greater than 6" per second.
- I. Control Stations: Each tornado storm door shall be provided with flush mount three position push button control station marked open, close and stop that is active during normal and alarm conditions. The control station shall remain operable as long as there is no main power failure to the motor operator.

- J. Master Control Station: Provide a single master control station that can simultaneously activate all of the tornado storm doors in the facility to the emergency closed or open positions. The master control station shall remain operable as long as there is no main power failure to the door's motor operators.
- K. Emergency Alarm Activation: With or without main power to the motor operator, upon activation by the facility's alarm system tornado storm door shall immediately self-close to the fully closed position. Once the emergency alarm condition has been cleared and main power has been restored, the door shall automatically power itself back to the fully open position.
- L. Emergency Manual Operation: The door shall be equipped with an auxiliary hand chain that shall remain operable during emergency alarm condition as well as during main power failure lasting up to six hours, after the six hours have lapsed the door shall self-close and remain in the closed position until main power has been restored. The hold open sequence of the emergency manual operation mode shall be programmable so that during emergency alarm condition or main power failure not exceeding six hours, the door shall remain open for a period of five to thirty minutes after the hand chain has opened the door before the door begins to self-close again.
- M. Obstruction Sensing Safety Edge: The obstruction sensing safety edge shall be programmable to either stop or reverse upon coming in contact with an obstruction during the close cycle of the door. The obstruction sensing safety edge shall remain active and operable as long as there is no main power failure to the motor operator. During main power failure, if the obstruction sensing safety edge comes in contact with an obstruction during the self-closing mode, the door shall stop and remain in contact with the obstruction until it is removed and the door can continue to the fully closed position.
- N. True Test Panel: Tornado storm doors shall be provided with a True Test panel. The test panel shall be designed so that it simulates an actual emergency alarm condition and activates all of the doors to self-close to the fully closed position. Once all of the doors have satisfactorily closed and the test panel has been reset, all of the doors shall automatically power themselves back to the fully open and alarm ready reset condition. Only one test panel shall be required to test all the tornado storm doors on this project simultaneously.
- O. Finish: After completion of fabrication, clean all metal surfaces to remove dirt and chemically treat to provide for paint adhesion. Curtain assembly is to receive a prime coat finish of .2 mils of epoxy primer and .8 mils of polyester paint.
 - 1. Color: Sterling Gray.

PART 3 EXECUTION

3.01 EXAMINATION

- A. Examine surfaces and field conditions to which this work is to be performed and notify architect if conditions of surfaces exist which are detrimental to proper installation and timely completion of work.
- B. Verify all dimensions taken at job site affecting the work. Notify the architect in any instance where dimensions vary.
- C. Coordinate and schedule work under this section with work of other sections so as not to delay job progress.

3.02 INSTALLATION

- A. Perform installation using only factory approved and certified representatives of the coiling door manufacturer.
- B. Install coiling door assemblies at locations shown in perfect alignment and elevation, plumb, level, straight and true.
- C. Adjust coiling door installation to provide uniform clearances and smooth non-binding operation.
- D. Install wiring in accordance with applicable local codes and the National Electrical Code Standard. Materials shall be UL listed.

3.03 PROTECTION AND CLEANING

- A. Protect installed work using adequate and suitable means during and after installation until accepted by owner.

- B. Remove, repair or replace materials which have been damaged in any way.
- C. Clean surfaces of grime and dirt using acceptable and recommended means and methods.

END OF SECTION

SECTION 08 4313 - ALUMINUM-FRAMED STOREFRONTS

PART 1 GENERAL

1.01 SECTION INCLUDES

- A. Aluminum doors and frames.
- B. Weatherstripping.
- C. Door hardware.

1.02 RELATED REQUIREMENTS

- A. Section 07 2500 - Weather Barriers: Sealing framing to water-resistive barrier installed on adjacent construction.
- B. Section 07 9200 - Joint Sealants: Sealing joints between frames and adjacent construction.
- C. Section 08 4413 - Glazed Aluminum Curtain Walls.
- D. Section 08 7100 - Door Hardware: Frame prep for hardware items other than specified in this section.
- E. Section 08 8000 - Glazing: Glass and glazing accessories.

1.03 REFERENCE STANDARDS

- A. AAMA CW-10 - Care and Handling of Architectural Aluminum From Shop to Site; 2015.
- B. AAMA 501.2 - Quality Assurance and Diagnostic Water Leakage Field Check of Installed Storefronts, Curtain Walls, and Sloped Glazing Systems; 2015.
- C. AAMA 609 & 610 - Cleaning and Maintenance Guide for Architecturally Finished Aluminum (Combined Document); 2015.
- D. AAMA 611 - Voluntary Specification for Anodized Architectural Aluminum; 2014 (2015 Errata).
- E. ASCE 7 - Minimum Design Loads and Associated Criteria for Buildings and Other Structures; Most Recent Edition Cited by Referring Code or Reference Standard.
- F. ASTM B221 - Standard Specification for Aluminum and Aluminum-Alloy Extruded Bars, Rods, Wire, Profiles, and Tubes; 2014.
- G. ASTM E283 - Standard Test Method for Determining the Rate of Air Leakage Through Exterior Windows, Curtain Walls, and Doors Under Specified Pressure Differences Across the Specimen; 2004 (Reapproved 2012).
- H. ASTM E330/E330M - Standard Test Method for Structural Performance of Exterior Windows, Doors, Skylights and Curtain Walls by Uniform Static Air Pressure Difference; 2014.
- I. ASTM E331 - Standard Test Method for Water Penetration of Exterior Windows, Skylights, Doors, and Curtain Walls by Uniform Static Air Pressure Difference; 2000 (Reapproved 2016).

1.04 ADMINISTRATIVE REQUIREMENTS

- A. Coordinate with installation of other components that comprise the exterior enclosure.

1.05 SUBMITTALS

- A. See Section 01 3000 - Administrative Requirements for submittal procedures.
- B. Product Data: Provide component dimensions, describe components within assembly, anchorage and fasteners, glass and infill, and internal drainage details.
- C. Shop Drawings: Indicate system dimensions, framed opening requirements and tolerances, affected related work, expansion and contraction joint location and details, and field welding required.
- D. Hardware Schedule: Complete itemization of each item of hardware to be provided for each door, cross-referenced to door identification numbers in Contract Documents.
- E. Warranty: Submit manufacturer warranty and ensure forms have been completed in Owner's name and registered with manufacturer.

1.06 QUALITY ASSURANCE

- A. Designer Qualifications: Design structural support framing components under direct supervision of a Professional Structural Engineer experienced in design of this Work and licensed in Louisiana.
- B. Installer Qualifications: Company specializing in performing work of type specified and with at least ten years of documented experience.

1.07 DELIVERY, STORAGE, AND HANDLING

- A. Handle products of this section in accordance with AAMA CW-10.
- B. Protect finished aluminum surfaces with wrapping. Do not use adhesive papers or sprayed coatings that bond to aluminum when exposed to sunlight or weather.

1.08 FIELD CONDITIONS

- A. Do not install sealants when ambient temperature is less than 40 degrees F. Maintain this minimum temperature during and 48 hours after installation.

1.09 WARRANTY

- A. See Section 01 7800 - Closeout Submittals for additional warranty requirements.
- B. Correct defective Work within a five year period after Date of Substantial Completion.
- C. Provide ten year manufacturer warranty against failure of glass seal on insulating glass units, including interpane dusting or misting. Include provision for replacement of failed units.
- D. Provide ten year manufacturer warranty against excessive degradation of finish. Include provision for replacement of units with excessive fading, chalking, or flaking.

PART 2 PRODUCTS

2.01 MANUFACTURERS

- A. Storefront Manufacturers:
 - 1. C.R. Laurence Company, Inc; U.S. Aluminum: www.crl-arch.com/#sle.
 - 2. Kawneer North America: www.kawneer.com/#sle.
 - 3. Manko Window Systems, Inc: www.mankowindows.com/#sle.
 - 4. Oldcastle BuildingEnvelope: www.oldcastlebe.com/#sle.
 - 5. Tubelite, Inc: www.tubeliteinc.com/#sle.
 - 6. YKK AP America, Inc: www.ykkap.com/commercial/#sle.
- B. Substitutions: See Section 01 6000 - Product Requirements.

2.02 COMPONENTS

- A. Aluminum Framing Members: Tubular aluminum sections, drainage holes and internal weep drainage system.
 - 1. Glazing Stops: Flush.
- B. Glazing: See Section 08 8000.
- C. Swing Doors: Glazed aluminum, wide stile.
 - 1. Thickness: 1-3/4 inches.
 - 2. Top Rail: 5 inches wide.
 - 3. Vertical Stiles: 5 inches wide.
 - 4. Bottom Rail: 10 inches wide.
 - 5. Glazing Stops: Beveled.

2.03 MATERIALS

- A. Extruded Aluminum: ASTM B221 (ASTM B221M).
- B. Structural Steel Sections: ASTM A36/A36M; shop primed.
- C. Fasteners: Stainless steel.
- D. Sill Flashing Sealant: Elastomeric, silicone or polyurethane, compatible with flashing material.

- E. Sealant for Setting Thresholds: Non-curing butyl type.
- F. Glazing Gaskets: Type to suit application to achieve weather, moisture, and air infiltration requirements.
- G. Glazing Accessories: See Section 08 8000.

2.04 FINISHES

- A. Class I Natural Anodized Finish: AAMA 611 AA-M12C22A41 Clear anodic coating not less than 0.7 mils thick.
- B. Touch-Up Materials: As recommended by coating manufacturer for field application.

2.05 HARDWARE

- A. For each door, include weatherstripping and and concealed closers.
- B. Other Door Hardware: As specified in Section 08 7100.
- C. Weatherstripping: Wool pile, continuous and replaceable; provide on all exterior doors.

PART 3 EXECUTION

3.01 EXAMINATION

- A. Verify dimensions, tolerances, and method of attachment with other work.
- B. Verify that storefront wall openings and adjoining water-resistive and/or air barrier seal materials are ready to receive work of this section.

3.02 INSTALLATION

- A. Install wall system in accordance with manufacturer's instructions.
- B. Attach to structure to permit sufficient adjustment to accommodate construction tolerances and other irregularities.
- C. Provide alignment attachments and shims to permanently fasten system to building structure.
- D. Align assembly plumb and level, free of warp or twist. Maintain assembly dimensional tolerances, aligning with adjacent work.
- E. Provide thermal isolation where components penetrate or disrupt building insulation.
- F. Install sill flashings. Turn up ends and edges; seal to adjacent work to form water tight dam.
- G. Where fasteners penetrate sill flashings, make watertight by seating and sealing fastener heads to sill flashing.
- H. Pack fibrous insulation in shim spaces at perimeter of assembly to maintain continuity of thermal barrier.
- I. Install glass in accordance with Section 08 8000, using exterior dry glazing method.
- J. Touch-up minor damage to factory applied finish; replace components that cannot be satisfactorily repaired.

3.03 TOLERANCES

- A. Maximum Variation from Plumb: 0.06 inch per 3 feet non-cumulative or 0.06 inch per 10 feet, whichever is less.
- B. Maximum Misalignment of Two Adjoining Members Abutting in Plane: 1/32 inch.

3.04 ADJUSTING

- A. Adjust operating hardware for smooth operation.

3.05 CLEANING

- A. Remove protective material from pre-finished aluminum surfaces.
- B. Wash down surfaces with a solution of mild detergent in warm water, applied with soft, clean wiping cloths, and take care to remove dirt from corners and to wipe surfaces clean.
- C. Upon completion of installation, thoroughly clean aluminum surfaces in accordance with AAMA 609 & 610.

- 3.06 PROTECTION
- A. Protect installed products from damage until Date of Substantial Completion.

END OF SECTION

SECTION 08 4413 - GLAZED ALUMINUM CURTAIN WALLS

PART 1 GENERAL

1.01 Section Includes

- A. Aluminum-framed curtain wall, with vision glazing and glass and metal infill panels.

1.02 Related Requirements

- A. Section 07 2500 - Weather Barriers: Sealing framing to water-resistive barrier installed on adjacent construction.
- B. Section 07 9200 - Joint Sealants: Sealing joints between frames and adjacent construction.
- C. Section 08 4313 - Aluminum-Framed Storefronts: Doors.
- D. Section 08 8000 - Glazing.

1.03 Reference Standards

- A. AAMA CW-10 - Care and Handling of Architectural Aluminum From Shop to Site; 2015.
- B. AAMA 501.2 - Quality Assurance and Diagnostic Water Leakage Field Check of Installed Storefronts, Curtain Walls, and Sloped Glazing Systems; 2015.
- C. AAMA 609 & 610 - Cleaning and Maintenance Guide for Architecturally Finished Aluminum (Combined Document); 2015.
- D. AAMA 611 - Voluntary Specification for Anodized Architectural Aluminum; 2014 (2015 Errata).
- E. AAMA 612 - Voluntary Specification, Performance Requirements, and Test Procedures for Combined Coatings of Anodic Oxide and Transparent Organic Coatings on Architectural Aluminum; 2017a.
- F. AAMA 2605 - Voluntary Specification, Performance Requirements and Test Procedures for Superior Performing Organic Coatings on Aluminum Extrusions and Panels (with Coil Coating Appendix); 2017a.
- G. ASCE 7 - Minimum Design Loads and Associated Criteria for Buildings and Other Structures; Most Recent Edition Cited by Referring Code or Reference Standard.
- H. ASTM A36/A36M - Standard Specification for Carbon Structural Steel; 2014.
- I. ASTM B209/B209M - Standard Specification for Aluminum and Aluminum-Alloy Sheet and Plate; 2021.
- J. ASTM B209 - Standard Specification for Aluminum and Aluminum-Alloy Sheet and Plate; 2014.
- K. ASTM B221 - Standard Specification for Aluminum and Aluminum-Alloy Extruded Bars, Rods, Wire, Profiles, and Tubes; 2014.
- L. ASTM C1249 - Standard Guide for Secondary Seal for Sealed Insulating Glass Units for Structural Sealant Glazing Applications; 2018.
- M. ASTM C794 - Standard Test Method for Adhesion-In-Peel of Elastomeric Joint Sealants; 2018.
- N. ASTM E283/E283M - Standard Test Method for Determining Rate of Air Leakage Through Exterior Windows, Skylights, Curtain Walls, and Doors Under Specified Pressure Differences Across the Specimen; 2019.
- O. ASTM E330/E330M - Standard Test Method for Structural Performance of Exterior Windows, Doors, Skylights and Curtain Walls by Uniform Static Air Pressure Difference; 2014.
- P. ASTM E331 - Standard Test Method for Water Penetration of Exterior Windows, Skylights, Doors, and Curtain Walls by Uniform Static Air Pressure Difference; 2000 (Reapproved 2016).

1.04 Administrative Requirements

- A. Coordinate with installation of other components that comprise the exterior enclosure.

1.05 Submittals

- A. See Section 01 3000 - Administrative Requirements for submittal procedures.
- B. Product Data: Provide component dimensions, describe components within assembly, anchorage and fasteners, internal drainage details, glazing, and infill.

- C. Shop Drawings: Indicate system dimensions, framed opening requirements and tolerances, affected related Work, expansion and contraction joint location and details, and field welding required.
- D. Samples: Submit two samples 12 by 12 inches in size illustrating finished infill panels.
- E. Field Quality Control Submittals: Report of field testing for water penetration.
- F. Warranty: Submit manufacturer warranty and ensure forms have been completed in Owner's name and registered with manufacturer.

1.06 Quality Assurance

- A. Designer Qualifications: Design curtain wall and its structural support framing components under direct supervision of a Professional Structural Engineer experienced in design of this work and licensed in Louisiana.
- B. Installer Qualifications: Company specializing in performing work of type specified and with at least ten years of documented experience.

1.07 Delivery, Storage, and Handling

- A. Handle products of this section in accordance with AAMA CW-10.
- B. Protect finished aluminum surfaces with wrapping. Do not use adhesive papers or sprayed coatings that bond to aluminum when exposed to sunlight or weather.

1.08 Field Conditions

- A. Do not install sealants when ambient temperature is less than 40 degrees F. Maintain this minimum temperature during and 48 hours after installation.

1.09 Warranty

- A. See Section 01 7800 - Closeout Submittals for additional warranty requirements.
- B. Correct defective Work within a five year period after Date of Substantial Completion.
- C. Provide ten year manufacturer warranty against failure of glass seal on insulating glass units, including interpane dusting or misting. Include provision for replacement of failed units.
- D. Provide ten year manufacturer warranty against excessive degradation of exterior finish. Include provision for replacement of units with excessive fading, chalking, or flaking.

PART 2 PRODUCTS

2.01 Manufacturers

- A. Basis of Design: Kawneer North America; 1600 LR Wall System: www.kawneer.com.
- B. Alternate Glazed Aluminum Curtain Walls Manufacturers:
 - 1. C.R. Laurence Company, Inc; U.S. Aluminum: www.crl-arch.com/#sle.
 - 2. Manko Window Systems, Inc: www.mankowindows.com/#sle.
 - 3. Oldcastle Building Envelope: www.oldcastlebe.com/#sle.
 - 4. Tubelite, Inc: www.tubeliteinc.com/#sle.
 - 5. YKK AP America, Inc: www.ykkap.com/commercial/#sle.
- C. Substitutions: See Section 01 6000 - Product Requirements.

2.02 CURTAIN WALL

- A. Aluminum-Framed Curtain Wall: Factory fabricated, factory finished aluminum framing members with infill, and related flashings, anchorage and attachment devices.
 - 1. Outside glazed, with pressure plate and mullion cover.
 - 2. Glazing Method: Field glazed system.
 - 3. Vertical Mullion Face Width: 2-1/2 inches.
 - 4. Vertical Mullion Depth From Face of Cap to Back of Frame: 7-1/2 inches.
 - 5. Glazing Thickness: 1 inch.

6. Provide flush joints and corners, weathersealed, accurately fitted and secured; prepared to receive anchors; fasteners and attachments concealed from view; reinforced as required for imposed loads.
 7. Construction: Eliminate noises caused by wind and thermal movement, prevent vibration harmonics, and prevent "stack effect" in internal spaces.
 8. System Internal Drainage: Drain to the exterior by means of a weep drainage network any water entering joints, condensation occurring in glazing channel, and migrating moisture occurring within system.
 9. Maintain continuous air barrier and/or vapor retarder seal throughout assembly, primarily in line with inside pane of glazing and inner sheet of infill panel and heel bead of glazing compound.
 10. Perimeter Clearance: Minimize space between framing members and adjacent construction while allowing expected movement.
- B. Structural Performance Requirements: Design and size components to withstand the following load requirements without damage or permanent set.
1. Design Wind Loads: Comply with the requirements of ASCE 7
 - a. Measure performance by testing in accordance with ASTM E330/E330M, using test loads equal to 1.5 times the design wind loads and 10 second duration of maximum pressure.
 - b. Member Deflection: For spans less than 13 feet 6 inches, limit member deflection to flexure limit of glass in any direction, and maximum of 1/175 of span or 3/4 inch, whichever is less and with full recovery of glazing materials.
 - c. Member Deflection: For spans over 13 feet 6 inches and less than 40 feet, limit member deflection to flexure limit of glass in any direction, and maximum of 1/240 of span plus 1/4 inch, with full recovery of glazing materials.
 2. Movement: Accommodate the following movement without damage to components or deterioration of seals:
 - a. Expansion and contraction caused by cycling temperature range of 170 degrees F over a 12 hour period.
 - b. Movement of curtain wall relative to perimeter framing.
- C. Water Penetration Resistance on Manufactured Assembly: No uncontrolled water on indoor face when tested as follows:
1. Test Pressure Differential: 10 psf.
 2. Test Method: ASTM E331.
- D. Air Leakage: 0.06 cfm/sq ft maximum leakage of wall area when tested in accordance with ASTM E283/E283M at 6.24 psf pressure difference across assembly.

2.03 COMPONENTS

- A. Aluminum Framing Members: Tubular aluminum sections, thermally broken with interior section insulated from exterior, drainage holes and internal weep drainage system.
1. Structurally Reinforced Members: Extruded aluminum with internal reinforcement of structural steel member.
 2. Install snap-in flat filler at head and jambs of perimeter framing system to permit sealing of building envelope system, and to prevent intrusion of water from building into curtainwall system. Provide sealed aluminum cap at top of all vertical mullions.
- B. Subsill: Manufacturer's solid aluminum high performance subsill for use at all sill locations, with sealed end dams.
- C. Sill Flashing: Provide aluminum waterstop flashing behind all exterior sill members as detailed. Finish to match curtainwall when exposed.
- D. Glazing: See Section 08 8000.
- E. Opaque Infill Panels: Insulated, steel sheet face and back, with edges formed to fit glazing channel and sealed and sealed.
1. Face Sheet: 032 inch thick Kynar finish steel sheet.
 2. Core: Rigid polystyrene insulation core with cement board substrate.
 3. Back Sheet: ____ inch thick.
 4. Thickness: 1 inch.
 5. Texture: Smooth.

6. Interior and Exterior Finish: Class I natural anodized Class I natural anodized.
7. Finish Warranty: 20 years.
8. Product:
 - a. Mapes-R panels as manufactured by Mapes Architectural Panels: www.mapespanels.com.
 - b. Substitutions: See Section 01 6000 - Product Requirements.

2.04 MATERIALS

- A. Extruded Aluminum: ASTM B221 (ASTM B221M).
- B. Sheet Aluminum: ASTM B209/B209M.
- C. Structural Steel Sections: ASTM A36/A36M; shop primed.
- D. Fasteners: Stainless steel; type as required or recommended by curtain wall manufacturer.
- E. Exposed Flashings: Aluminum sheet, 20-gauge, 0.032-inch minimum thickness; finish to match framing members.
- F. Concealed Flashings: Sheet aluminum, 26-gauge, 0.017-inch minimum thickness.
- G. Waterstop Sill Flashings: Sheet aluminum, 26 gage, 0.017 inch minimum thickness.
- H. Weatherseal Sealant: Silicone, with adhesion in compliance with ASTM C794; compatible with glazing accessories.
- I. Glazing Gaskets: Type to suit application to achieve weather, moisture, and air infiltration requirements.
- J. Glazing Accessories: See Section 08 8000.

2.05 FINISHES

- A. Class I Natural Anodized Finish: AAMA 611 AA-M12C22A41 Clear anodic coating not less than 0.7 mils thick.
- B. Superior Performing Organic Coatings System: Polyvinylidene fluoride (PVDF) multi-coat superior performing organic coatings system complying with AAMA 2605, including at least 70 percent PVDF resin, and at least 80 percent of aluminum extrusion and panels surfaces having minimum total dry film thickness (DFT) of 1.2 mils, 0.0012 inch.
 1. Manufacturers:
 - a. Arkema; Kynar 500: www.arkema.com/#sle.
 - b. PPG; Duranar: www.ppgmetalcoatings.com/#sle.
 - c. Sherwin-Williams Company; Fluropon: www.coil.sherwin.com/#sle.
 - d. Substitutions: See Section 01 6000 - Product Requirements.
- C. Touch-Up Materials: As recommended by coating manufacturer for field application.

PART 3 EXECUTION

3.01 EXAMINATION

- A. Verify dimensions, tolerances, and method of attachment with other related work.
- B. Verify that curtain wall openings and adjoining water-resistive and air barrier seal materials are ready to receive work of this section.
- C. Verify that anchorage devices have been properly installed and located.

3.02 INSTALLATION

- A. Install curtain wall system in accordance with manufacturer's instructions.
- B. Attach to structure to permit sufficient adjustment to accommodate construction tolerances and other irregularities.
- C. Provide alignment attachments and shims to permanently fasten system to building structure.
- D. Align assembly plumb and level, free of warp or twist. Maintain assembly dimensional tolerances, aligning with adjacent work.
- E. Provide thermal isolation where components penetrate or disrupt building insulation.
- F. Install sill flashings. Turn up ends and edges; seal to adjacent work to form water tight dam.
- G. Pack fibrous insulation in shim spaces at perimeter of assembly to maintain continuity of thermal barrier.

- H. Pressure Plate Framing: Install glazing in accordance with Section 08 8000, using exterior dry glazing method.
- I. Install perimeter sealant in accordance with Section 07 9005.
- J. Touch-up minor damage to factory applied finish; replace components that cannot be satisfactorily repaired.

3.03 TOLER

- A. Maximum Variation from Plumb: 0.06 inch per 3 feet noncumulative or 0.5 inches per 100 feet, whichever is less.
- B. Maximum Misalignment of Two Adjoining Members Abutting in Plane: 1/32 inch.
- C. Sealant Space Between Curtain Wall Mullions and Adjacent Construction: Maximum of 3/4 inch and minimum of 1/4 inch.

3.04 FIELD QUALITY CONTROL

- A. See Section 01 4000 - Quality Requirements for general testing and inspection requirements.
- B. Water-Spray Test: Provide water spray quality test of installed curtain wall components in accordance with AAMA 501.2 during construction process and before installation of interior finishes.
 - 1. Perform a minimum of two tests in each designated area as directed by Architect.
- C. Repair or replace curtain wall components that have failed designated field testing, and retest to verify performance complies with specified requirements.

3.05 CLEANING

- A. Remove protective material from pre-finished aluminum surfaces.
- B. Wash down surfaces with a solution of mild detergent in warm water, applied with soft, clean wiping cloths, take care to remove dirt from corners, and wipe surfaces clean.
- C. Upon completion of installation, thoroughly clean aluminum surfaces in accordance with AAMA 609 & 610.

3.06 PROTECTION

- A. Protect installed products from damage until Date of Substantial Completion.

END OF SECTION

SECTION 08 7100 - DOOR HARDWARE

PART 1 GENERAL

1.01 SECTION INCLUDES

- A. Hardware for wood, aluminum, and hollow metal doors.
- B. Hardware for fire-rated doors.
- C. Electrically operated and controlled hardware.
- D. Thresholds.
- E. Weatherstripping and gasketing.

1.02 RELATED REQUIREMENTS

- A. Section 06 4100 - Architectural Wood Casework: Cabinet hardware.
- B. Section 07 9200 - Joint Sealants: Sealants for setting exterior door thresholds.
- C. Section 08 1113 - Hollow Metal Doors and Frames.
- D. Section 08 1416 - Flush Wood Doors.
- E. Section 08 4313 - Aluminum-Framed Storefronts: Prep for hardware provided in this section.

1.03 REFERENCE STANDARDS

- A. ADA Standards - Americans with Disabilities Act (ADA) Standards for Accessible Design; 2010.
- B. BHMA (CPD) - Certified Products Directory; 2017.
- C. BHMA A156.1 - American National Standard for Butts and Hinges; 2016.
- D. BHMA A156.2 - American National Standard for Bored and Preamsembled Locks & Latches; 2017.
- E. BHMA A156.3 - American National Standard for Exit Devices; 2014.
- F. BHMA A156.4 - American National Standard for Door Controls - Closers; 2013.
- G. BHMA A156.6 - American National Standard for Architectural Door Trim; 2015.
- H. BHMA A156.7 - American National Standard for Template Hinge Dimensions; 2016.
- I. BHMA A156.15 - American National Standard for Release Devices - Closer Holder, Electromagnetic and Electromechanical; 2015.
- J. BHMA A156.16 - American National Standard for Auxiliary Hardware; 2013.
- K. BHMA A156.21 - American National Standard for Thresholds; 2014.
- L. BHMA A156.22 - American National Standard for Door Gasketing and Edge Seal Systems, Builders Hardware Manufacturers Association; 2017.
- M. BHMA A156.26 - American National Standard for Continuous Hinges; 2012.
- N. BHMA A156.115 - American National Standard for Hardware Preparation in Steel Doors and Steel Frames; 2016.
- O. BHMA A156.115W - Hardware Preparation in Wood Doors with Wood or Steel Frames; 2006.
- P. DHI (H&S) - Sequence and Format for the Hardware Schedule; 1996.
- Q. DHI (LOCS) - Recommended Locations for Architectural Hardware for Standard Steel Doors and Frames; 2004.
- R. DHI WDHS.3 - Recommended Locations for Architectural Hardware for Flush Wood Doors; 1993; also in WDHS-1/WDHS-5 Series, 1996.
- S. ICC A117.1 - Accessible and Usable Buildings and Facilities; 2017.
- T. ITS (DIR) - Directory of Listed Products; current edition.
- U. NFPA 70 - National Electrical Code; Most Recent Edition Adopted by Authority Having Jurisdiction, Including All Applicable Amendments and Supplements.
- V. NFPA 80 - Standard for Fire Doors and Other Opening Protectives; 2019.
- W. NFPA 101 - Life Safety Code; Most Recent Edition Adopted by Authority Having Jurisdiction, Including All Applicable Amendments and Supplements.
- X. NFPA 105 - Standard for Smoke Door Assemblies and Other Opening Protectives; 2016.
- Y. NFPA 252 - Standard Methods of Fire Tests of Door Assemblies; 2017.

- Z. UL (DIR) - Online Certifications Directory; Current Edition.
- AA. UL 10C - Standard for Positive Pressure Fire Tests of Door Assemblies; Current Edition, Including All Revisions.

1.04 ADMINISTRATIVE REQUIREMENTS

- A. Coordinate the manufacture, fabrication, and installation of products that door hardware is installed on.
- B. Sequence installation to ensure utility connections are achieved in an orderly and expeditious manner.
- C. Furnish templates for door and frame preparation to manufacturers and fabricators of products requiring internal reinforcement for door hardware.
- D. Keying Requirements Meeting:
 - 1. Attendance Required:
 - a. Contractor.
 - b. Owner.
 - c. Architect.
 - d. Installer's Architectural Hardware Consultant (AHC).
 - 2. Agenda:
 - a. Establish keying requirements.
 - b. Establish keying submittal schedule and update requirements.
 - 3. Incorporate "Keying Requirements Meeting" decisions into keying submittal upon review of door hardware keying system including, but not limited to, the following:
 - 4. Record minutes and distribute copies within two days after meeting to participants, with two copies to Architect, Owner, participants, and those affected by decisions made.
 - 5. Deliver established keying requirements to manufacturers.
- E. Coordinate with tornado shelter door manufacturer to provide acceptable hardware to ensure opening assemblies are compliant with both ICC-500 and FEMA P-361 standards.

1.05 SUBMITTALS

- A. See Section 01 3000 - Administrative Requirements for submittal procedures.
- B. Product Data: Manufacturer's catalog literature for each type of hardware, marked to clearly show products to be furnished for this project, and includes construction details, material descriptions, finishes, and dimensions and profiles of individual components.
- C. Shop Drawings - Door Hardware Schedule: Submit detailed listing that includes each item of hardware to be installed on each door. Use door numbering scheme as included in Contract Documents.
 - 1. Prepared by or under supervision of Architectural Hardware Consultant (AHC).
 - 2. Comply with DHI (H&S) using door numbers and hardware set numbers as indicated in construction documents.
 - 3. List groups and suffixes in proper sequence.
 - 4. Provide complete description for each door listed.
 - 5. Provide manufacturer name, product names, and catalog numbers; include functions, types, styles, sizes and finishes of each item.
 - 6. Include account of abbreviations and symbols used in schedule.
- D. Manufacturer's Installation Instructions: Indicate special procedures and perimeter conditions requiring special attention.
- E. Maintenance Data: Include data on operating hardware, lubrication requirements, and inspection procedures related to preventative maintenance.
 - 1. Submit manufacturer's parts lists and templates.
- F. Keying Schedule:
 - 1. Submit PDF copies of Keying Schedule in compliance with requirements established during Keying Requirements Meeting unless otherwise indicated.
- G. Warranty: Submit manufacturer's warranty and ensure that forms have been completed in Owner's name and registered with manufacturer.
- H. Maintenance Materials and Tools: Furnish the following for Owner's use in maintenance of project.
 - 1. See Section 01 6000 - Product Requirements, for additional provisions.

2. Tools: One set of each special wrench or tool applicable for each different or special hardware component, whether supplied by hardware component manufacturer or not.

1.06 QUALITY ASSURANCE

- A. Manufacturer Qualifications: Company specializing in manufacturing products specified in this section with minimum five years of documented experience.
- B. Hardware Supplier Qualifications: Company specializing in supplying commercial door hardware with minimum 5 years of experience, and is a Factory Authorized distributor of the products which are supplied.
- C. Hardware Supplier Qualifications: Company with certified Architectural Hardware Consultant (AHC) to assist in work of this section.

1.07 DELIVERY, STORAGE, AND HANDLING

- A. Package hardware items individually; label and identify each package with door opening code to match door hardware schedule.

1.08 WARRANTY

- A. See Section 01 7800 - Closeout Submittals for additional warranty requirements.
- B. Manufacturer's Warranty: Provide warranty against defects in material and workmanship for period indicated. Complete forms in Owner's name and register with manufacturer.
 1. Closers: Five years, minimum.
 2. Exit Devices: five years, minimum.
 3. Heavy Duty Cylindrical Locksets and Latches: seven years, minimum.
 4. Other Hardware: Two years, minimum.

PART 2 PRODUCTS

2.01 DESIGN AND PERFORMANCE CRITERIA

- A. Provide specified door hardware as required to make doors fully functional, compliant with applicable codes, and secure to extent indicated.
- B. Provide individual items of single type, of same model, and by same manufacturer.
- C. Provide door hardware products that comply with the following requirements:
 1. Applicable provisions of federal, state, and local codes.
 2. Accessibility: ADA Standards and ICC A117.1.
 3. Applicable provisions of NFPA 101.
 4. Fire-Rated Doors: NFPA 80, listed and labeled by qualified testing agency for fire protection ratings indicated, based on testing at positive pressure in accordance with NFPA 252 or UL 10C.
 5. Hardware on Fire-Rated Doors: Listed and classified by UL (DIR) or ITS (DIR) as suitable for application indicated.
 6. Listed and certified compliant with specified standards by BHMA (CPD).
 7. Auxiliary Hardware: BHMA A156.16.
 8. Hardware Preparation for Steel Doors and Steel Frames: BHMA A156.115.
 9. Hardware Preparation for Wood Doors with Wood or Steel Frames: BHMA A156.115W.
 10. Products Requiring Electrical Connection: Listed and classified by UL (DIR) as suitable for the purpose specified.
- D. Electrically Operated and/or Controlled Hardware: Provide all necessary power supplies, power transfer hinges, relays, and interfaces as required for proper operation whether scheduled or not; provide wiring between hardware and control components and to building power connection in compliance with NFPA 70.
- E. Fasteners:
 1. Provide fasteners of proper type, size, quantity, and finish that comply with commercially recognized standards for proposed applications.
 - a. Aluminum fasteners are not permitted.

- b. Provide phillips flat-head screws with heads finished to match door surface hardware unless otherwise indicated.
- 2. Provide machine screws for attachment to reinforced hollow metal and aluminum frames.
 - a. Self-drilling (Tek) type screws are not permitted.
- 3. Mineral Core Wood Doors: Sex bolts.
- 4. Provide stainless steel machine screws and lead expansion shields for concrete and masonry substrates.
- 5. Provide wall grip inserts for hollow wall construction.
- 6. Provide spacers or sex bolts with sleeves for through bolting of hollow metal doors and frames.
- 7. Fire-Rated Applications: Comply with NFPA 80.
 - a. Provide wood or machine screws for hinges mortised to doors or frames, strike plates to frames, and closers to doors and frames.
 - b. Provide steel through bolts for attachment of surface mounted closers, hinges, or exit devices to door panels unless proper door blocking is provided.

2.02 HINGES

- A. Manufacturers:
 - 1. Basis of Design: Ives Manufacturing.
 - 2. Substitutions: Not permitted.
- B. Hinges: Comply with BHMA A156.1, Grade 1.
 - 1. Butt Hinges: Comply with BHMA A156.1 and BHMA A156.7 for templated hinges.
 - a. Provide hinge width required to clear surrounding trim.
 - 2. Continuous Hinges: Comply with BHMA A156.26.
 - 3. Provide hinges on every swinging door.
 - 4. Provide five-knuckle full mortise butt hinges unless otherwise indicated.
 - 5. Provide ball-bearing hinges at each door.
 - 6. Provide non-removable pins on exterior outswinging doors.

2.03 EXIT DEVICES

- A. Manufacturers:
 - 1. Basis of Design: Von Duprin, an Allegion brand: www.allegion.com/us..
 - 2. Corbin Russwin; an Assa Abloy Group company; ED5200 Series: www.assaabloydss.com/#sle.
 - 3. Precision, dormakaba Group; 2100 Series: www.precisionhardware.com/#sle.
 - 4. Substitutions: Not permitted.
- B. Exit Devices: Comply with BHMA A156.3, Grade 1.
 - 1. Lever design to match lockset trim.
 - 2. Provide cylinder with cylinder dogging or locking trim.
 - 3. Provide exit devices properly sized for door width and height.
 - 4. Provide strike as recommended by manufacturer for application indicated.
 - 5. Provide less bottom rod (LBR) at scheduled locations to eliminate use of floor mounted strikes.
 - 6. Provide UL (DIR) listed exit device assemblies for fire-rated doors and panic device assemblies for non-fire-rated doors.
 - 7. For electrical options, provide quick connect plug-in pre-wired connectors.

2.04 LOCK CYLINDERS

- A. Locks: Provide key access on outside of each lock, unless otherwise indicated.
- B. Lock Cylinders:
 - 1. Provide cylinder types and styles as required by the hardware they are operating.
 - 2. Exterior doors are to be Schlage Large Format Cylinder.
 - 3. Interior doors are to be Schlage Key in Lever Cylinders.
- C. Keying: Master Keyed.
 - 1. Exterior doors are to be supplied with keyed construction cores. Provide a minimum of 10 Construction keys and 2 Construction Control keys.
 - 2. Key to Owner's existing keying system.

- a. Schlage Primus XP key system.
3. Supplier is to allow for a minimum of 12 cut Grand Master, Master, Control or Change keys as required by the Owner.
4. When providing keying information, comply with DHI Handbook "Keying Systems and Nom

2.05 CYLINDRICAL LOCKS

- A. Manufacturers:
 1. Basis of Design: Schlage, an Allegion brand.
 2. Corbin Russwin; an Assa Abloy Group company; CL3300: www.assaabloydss.com/#sle.
 3. Substitutions: See Section 01 6000 - Product Requirements.
- B. Cylindrical Locks (Bored): Comply with BHMA A156.2, Grade 1.
 1. Bored Hole: 2-1/8 inch diameter.
 2. Latchbolt Throw: 1/2 inch, minimum.
 3. Backset: 2-3/4 inch unless otherwise indicated.
 4. Strikes: Provide manufacturer's standard strike for each latchset or lockset with strike box and curved lip extending to protect frame in compliance with indicated requirements.
 - a. Finish: To match lock or latch.

2.06 DOOR PULLS AND PUSH PLATES

- A. Manufacturers:
 1. Basis of Design: H.B. Ives Company.
 2. Rockwood; an Assa Abloy Group company: www.assaabloydss.com/#sle.
 3. Substitutions: Not permitted.
- B. Door Pulls and Push Plates: Comply with BHMA A156.6.
 1. Pull Type: Offset at exterior doors, straight at interior doors, unless otherwise indicated.
 2. Push Plate Type: Flat, with square corners, unless otherwise indicated.
 - a. Edges: Beveled, unless otherwise indicated.
 3. Material: Stainless steel, unless otherwise indicated.
 4. Provide door pulls and push plates on doors without a lockset, latchset, exit device, or auxiliary lock unless otherwise indicated.
 5. On solid doors, provide matching door pull and push plate on opposite faces.

2.07 CLOSERS

- A. Manufacturers; Surface Mounted:
 1. Basis of Design: LCN, An Allegion brand.
 2. Corbin Russwin; an Assa Abloy Group company; DC8000: www.assaabloydss.com/#sle.
 3. Substitutions: See Section 01 6000 - Product Requirements.
- B. Closers: Comply with BHMA A156.4, Grade 1.
 1. Type: Surface mounted to door.
 2. Provide door closer on each fire-rated and smoke-rated door.
 3. At corridor entry doors, mount closer on room side of door.
 4. At outswinging exterior doors, mount closer on interior side of door.

2.08 PROTECTION PLATES

- A. Manufacturers:
 1. Basis of Design: Ives, an Allegion brand.
 2. Rockwood; an Assa Abloy Group company: www.assaabloydss.com/#sle.
 3. Substitutions: See Section 01 6000 - Product Requirements.
- B. Protection Plates: Comply with BHMA A156.6.
- C. Metal Properties: Stainless steel.
 1. Metal, Standard Duty: Thickness 0.050 inch, minimum.
- D. Edges: Beveled, on four sides unless otherwise indicated.
- E. Fasteners: Countersunk screw fasteners.

2.09 ELECTROMAGNETIC DOOR HOLDERS

- A. Manufacturers:
 - 1. Basis of Design: LCN, an Allegion brand.
 - 2. Rixson or Sargent; an Assa Abloy Group company: www.assaabloydss.com/#sle.
 - 3. Substitutions: See Section 01 6000 - Product Requirements.
- B. Electromagnetic Door Holders: Comply with BHMA A156.15.
 - 1. Type: Wall mounted, single unit, standard duty, with strike plate attached to door.
 - 2. Holding Force, Standard Duty: 40 lbs-force, minimum.
 - 3. Voltage: 12 VDC, and provide power supplies by same manufacturer as holders.
 - 4. Provide interface with fire-alarm system for fire-rated door assemblies.
 - 5. Provide interface with storm shelter systems

2.10 THRESHOLDS

- A. Manufacturers:
 - 1. Pemko; an Assa Abloy Group company: www.assaabloydss.com/#sle.
 - 2. Zero International, Inc: www.zerointernational.com/#sle.
 - 3. Substitutions: See Section 01 6000 - Product Requirements.
- B. Thresholds: Comply with BHMA A156.21.
 - 1. Provide threshold at each exterior door, unless otherwise indicated.
 - 2. Material: Aluminum.
 - 3. Threshold Surface: Fluted horizontal grooves across full width.
 - 4. Field cut threshold to profile of frame and width of door sill for tight fit.
 - 5. Provide non-corroding fasteners at exterior locations.

2.11 WEATHERSTRIPPING AND GASKETING

- A. Manufacturers:
 - 1. Basis of Design: Zero International, Inc.: www.zerointernational.com..
 - 2. Pemko; an Assa Abloy Group company: www.assaabloydss.com/#sle.
 - 3. National Guard Products, Inc: www.ngpinc.com/#sle.
 - 4. Substitutions: See Section 01 6000 - Product Requirements.
- B. Weatherstripping and Gasketing: Comply with BHMA A156.22.
 - 1. Head and Jamb Type: Self-adhesive.
 - 2. Provide gasketing for smoke and draft control doors that complies with local codes, requirements of assemblies tested in accordance with UL 1784.
 - 3. Surface mounted gasketing and astragals are to be installed with factory supplied self-drilling TEK screws at metal doors and door frames.

2.12 SILENCERS

- A. Manufacturers:
 - 1. Ives, an Allegion brand: www.allegion.com/us/#sle.
 - 2. Substitutions: See Section 01 6000 - Product Requirements.
- B. Silencers: Provide at equal locations on door frame to mute sound of door's impact upon closing.
 - 1. Single Door: Provide three on strike jamb of frame.
 - 2. Pair of Doors: Provide two on head of frame, one for each door at latch side.
 - 3. Material: Rubber, gray color.

PART 3 EXECUTION

3.01 EXAMINATION

- A. Verify that doors and frames are ready to receive this work; labeled, fire-rated doors and frames are properly installed, and dimensions are as indicated on shop drawings.
- B. Verify that electric power is available to power operated devices and of correct characteristics.

3.02 INSTALLATION

- A. Install hardware in accordance with manufacturer's instructions and applicable codes.
- B. Install hardware on fire-rated doors and frames in accordance with applicable codes and NFPA 80.
- C. Install hardware for smoke and draft control doors in accordance with NFPA 105.
- D. Use templates provided by hardware item manufacturer.
- E. Do not install surface mounted items until application of finishes to substrate are fully completed.
- F. Door Hardware Mounting Heights: Distance from finished floor to center line of hardware item.
 - 1. For Steel Doors and Frames: Install in compliance with DHI (LOCS) recommendations.
 - 2. For Wood Doors: Install in compliance with DHI WDHS.3 recommendations.
 - 3. Mounting heights in compliance with ADA Standards:
 - a. Locksets: 40-5/16 inch.
 - b. Push Plates/Pull Bars: 42 inch.
 - c. Deadlocks (Deadbolts): 48 inch.
 - d. Exit Devices: 40-5/16 inch.
- G. Set exterior door thresholds with full-width bead of elastomeric sealant at each point of contact with floor providing a continuous weather seal; anchor thresholds with stainless steel countersunk screws.

3.03 FIELD QUALITY CONTROL

- A. Perform field inspection and testing under provisions of Section 01 4000 - Quality Requirements.
- B. Provide an Architectural Hardware Consultant (AHC) to inspect installation and certify that hardware and installation has been furnished and installed in accordance with manufacturer's instructions and as specified.

3.04 ADJUSTING

- A. Adjust work under provisions of Section 01 7000 - Execution and Closeout Requirements.
- B. Adjust hardware for smooth operation.
- C. Adjust gasketing for complete, continuous seal; replace if unable to make complete seal.

3.05 CLEANING

- A. Clean finished hardware in accordance with manufacturer's written instructions after final adjustments have been made.
- B. Clean adjacent surfaces soiled by hardware installation.
- C. Replace items that cannot be cleaned to manufacturer's level of finish quality at no additional cost.

3.06 PROTECTION

- A. Protect finished Work under provisions of Section 01 7000 - Execution and Closeout Requirements.
- B. Do not permit adjacent work to damage hardware or finish.

3.07 HARDWARE SCHEDULE

- A. The schedule below is intended to indicate the general function and usage of the door. The indicated manufacturers below form the basis-of-design sets, and only those manufacturers indicated in the above paragraphs may be used as approved alternates where permitted. The hardware vendor shall provide all necessary brackets, accessories, etc as required for a complete assembly. If any inconsistencies are found that could affect pricing, obtain clarification prior to bidding.

HARDWARE SCHEDULE

HW-1

DOOR NUMBERS: H100 H101L

2	EA	Continuous Hinge	112HD 83" MFXMF	628	IVE
1	EA	Mullion	KR4954	689	VON
1	EA	Panic Hardware	HDSI 98EO	626	VON
1	EA	Panic Hardware	HDSI 98NL-OP	626	VON
2	EA	Primus Core Only	20-740	626	SCH
2	EA	Cylinder	as required	626	SCH
2	EA	Offset Door Pull	8190HD-2-O	630	IVE
2	EA	Surface Closer	4040XP CUSH TBSRT	689	LCN
2	EA	Mounting Plate	4040XP-18PA	689	LCN
2	EA	Door Sweep	8197AA-SEC 36"	626	ZER
1	EA	Threshold	65A	MILL	ZER

Perimeter seals by storefront door and frame supplier.

HW-2

DOOR NUMBER: H122

2	EA	Continuous Hinge	112HD 83" MFXMF	628	IVE
1	EA	Lockset	LMV9380-SPA	626	SCH
1	EA	Primus Core Only		626	SCH
1	PR	Surface Bolts	SB360-WS	626	IVE
2	EA	Surface Closer	4040XP EDA TBSRT	689	LCN
1	EA	Astragal	8195AA-SEC	626	ZER
2	EA	Door Sweep	8197AA-SEC 36"	626	ZER
1	EA	Threshold	65A 72"	MILL	ZER
1	EA	Drip Cap	142AA 76"	626	ZER
1	SET	Weatherstrip	8878AA 1/72" 2/84"	626	ZER

Note: Coordinate with storm door/frame supplier to ensure assembly is in full compliance with ICC 500 and FEMA 361.

HW-3

DOOR NUMBERS: H101A H101C H101J H101K

2	EA	Continuous Hinge	112HD 83" MFXMF	628	IVE
2	EA	Surface Panic Hardware	WS-T-9827L-F 996L 3'	626	VON
2	EA	Bottom Strike	WS-T-304L		VON
2	EA	Primus Core Only	20-740	626	SCH
2	EA	Cylinder	as required	626	SCH
2	EA	Surface Closer	4040XP EDA TBSRT	689	LCN
2	EA	Magnetic Hold Open	SEM 7850	689	LCN
1	EA	Astragal	8195AA-SEC	626	ZER
2	EA	Door Sweep	8197AA-SEC 36"	626	ZER
1	EA	Kickplate	8400 10" x 2" LDW-CS-B4E	630	IVE
1	SET	Gasketing	188S	GRY	ZER

Note: Coordinate with storm door/frame supplier to ensure assembly is in full compliance with ICC 500 and FEMA 361.

HW-4

DOOR NUMBERS: H101B H101D

2 EA	Continuous Hinge	112HD 83" MFXMF	628	IVE
2 EA	Panic Hardware	9827L-F-LBR 996L	626	VON
2 EA	Primus Core Only	20-740	626	SCH
2 EA	Rim or Mortise Cylinder as required		626	SCH
2 EA	Surface Closer	1261 EDA	689	LCN
2 EA	Mounting Plate	4040XP-18PA	689	LCN
2 EA	Magnetic Hold Open	SEM 7850	689	LCN
2 EA	Astragal	8192AA-SEC	626	ZER
2 EA	Kickplate	8400 10" x 1" LDW-CS-B4E	630	IVE
1 SET	Gasketing	188S	GRY	ZER

HW-5

DOOR NUMBERS: H102 H103 H104 H105 H106 H107
H108 H109 H110 H111 H112 H113 H114
H115A

3 EA	Ball Bearing Hinge	5BB1 4-1/2" x 4-1/2"	652	IVE
1 EA	Classroom Lockset	ND75PD-SPA	626	SCH
1 EA	Surface Closer	1261 EDA	689	LCN
1 EA	Kickplate	8400 10" x 2" LDW-CS-B4E	630	IVE
1 EA	Dome Stop	FS438	626	IVE
1 SET	Gasketing	188S	GRY	ZER

HW-6

DOOR NUMBER: H117A

3 EA	Ball Bearing Hinge	5BB1 4-1/2" x 4-1/2"	652	IVE
1 EA	Rim Panic	98L-996L	626	VON
1 EA	Primus Core Only	20-740	626	SCH
1 EA	Cylinder	as required	626	SCH
1 EA	Surface Closer	1261 HwPA	689	LCN
1 SET	Gasketing	188S	GRY	ZER

HW-7

DOOR NUMBER: H116

3 EA	Ball Bearing Hinge	5BB1 4-1/2" x 4-1/2"	652	IVE
1 EA	Lockset	ND80PD-SPA	626	SCH
1 EA	Surface Closer	1261 HwPA	689	LCN
1 SET	Gasketing	188S	GRY	ZER

HW-8

DOOR NUMBER: H119

3 EA	Ball Bearing Hinge	5BB1 4-1/2" x 4-1/2"	652	IVE
1 EA	Faculty Restroom Lock	ND85PD-SPA	626	SCH
1 EA	Surface Closer	1261 RwPA	689	LCN
1 EA	Kickplate	8400 10" x 2" LDW-CS-B4E	630	IVE
1 EA	Dome Stop	FS438	626	IVE
1 SET	Gasketing	188S	GRY	ZER

HW-9

DOOR NUMBER: H118

3 EA	Ball Bearing Hinge	5BB1 4-1/2" x 4-1/2"	652	IVE
1 EA	Lockset	ND80PD-SPA	626	SCH
1 EA	Kickplate	8400 10" x 2" LDW-CS-B4E	630	IVE
1 EA	Dome Stop	FS438	626	IVE
1 SET	Gasketing	188S	GRY	ZER

HW-10

DOOR NUMBERS: H115B

3 EA	Ball Bearing Hinge	5BB1 4-1/2" x 4-1/2"	652	IVE
1 EA	Lockset	ND66PD-SPA	626	SCH
1 EA	Kickplate	8400 10" x 2" LDW-CS-B4E	630	IVE
1 EA	Dome Stop	FS438	626	IVE
3 EA	Silencers	SR64	GRY	IVE

HW-11

DOOR NUMBERS: H101E H101F H101G H101H H101M H101N
H101O H101P H117B

1 EA	Ball Bearing Hinge	5BB1 4-1/2" x 4-1/2"	652	IVE
2 EA	Spring Hinges	3SP1 4-1/2" x 4-1/2"	652	IVE
1 EA	Deadbolt	B661	626	SCH
1 EA	Auto Door Bottom	351AA	626	ZER
1 SET	Gasketing	188S	GRY	ZER

HW-12

ROOM NUMBERS: H102 H103 H104 H105 H106 H107
H108 H109 H110 H111 H112 H115

1 EA	Cabinet Lock	CL100PB	626	SCH

At Teachers lockers where indicated on the drawings, provide locks keyed to match classroom key.
Locks furnished by hardware supplier and installed by casework manufacturer.

END OF SECTION

SECTION 08 8000 - GLAZING

PART 1 GENERAL

1.01 SECTION INCLUDES

- A. Insulating glass units.
- B. Glazing units.
- C. Glazing compounds and accessories.

1.02 RELATED REQUIREMENTS

- A. Section 07 2500 - Weather Barriers.
- B. Section 07 9200 - Joint Sealants: Sealants for other than glazing purposes.
- C. Section 08 1113 - Hollow Metal Doors and Frames: Glazed lites in doors.
- D. Section 08 1416 - Flush Wood Doors: Glazed lites in doors.
- E. Section 08 4313 - Aluminum-Framed Storefronts: Glazing provided as part of storefront door assembly.
- F. Section 08 4413 - Glazed Aluminum Curtain Walls: Glazing provided as part of wall assembly.
- G. Section 10 2800 - Toilet, Bath, and Laundry Accessories: Mirrors.

1.03 REFERENCE STANDARDS

- A. 16 CFR 1201 - Safety Standard for Architectural Glazing Materials; current edition.
- B. ANSI Z97.1 - American National Standard for Safety Glazing Materials Used in Buildings - Safety Performance Specifications and Methods of Test; 2015.
- C. ASCE 7 - Minimum Design Loads and Associated Criteria for Buildings and Other Structures; Most Recent Edition Cited by Referring Code or Reference Standard.
- D. ASTM C864 - Standard Specification for Dense Elastomeric Compression Seal Gaskets, Setting Blocks, and Spacers; 2005 (Reapproved 2015).
- E. ASTM C920 - Standard Specification for Elastomeric Joint Sealants; 2018.
- F. ASTM C1036 - Standard Specification for Flat Glass; 2016.
- G. ASTM C1048 - Standard Specification for Heat-Strengthened and Fully Tempered Flat Glass; 2018.
- H. ASTM C1193 - Standard Guide for Use of Joint Sealants; 2016.
- I. ASTM C1376 - Standard Specification for Pyrolytic and Vacuum Deposition Coatings on Flat Glass; 2015.
- J. ASTM E1300 - Standard Practice for Determining Load Resistance of Glass in Buildings; 2016.
- K. ASTM E2190 - Standard Specification for Insulating Glass Unit Performance and Evaluation; 2010.
- L. GANA (GM) - GANA Glazing Manual; 2008.
- M. GANA (SM) - GANA Sealant Manual; 2008.
- N. IGMA TM-3000 - North American Glazing Guidelines for Sealed Insulating Glass Units for Commercial & Residential Use; 1990 (2016).
- O. NFRC 300 - Test Method for Determining the Solar Optical Properties of Glazing Materials and Systems; 2017.

1.04 SUBMITTALS

- A. See Section 01 3000 - Administrative Requirements for submittal procedures.
- B. Product Data on Insulating Glass Unit Glazing Types: Provide structural, physical and environmental characteristics, size limitations, special handling and installation requirements.
- C. Samples: DO NOT submit actual glass samples.
- D. Warranty Documentation: Submit manufacturer warranty and ensure that forms have been completed in Owner's name and registered with manufacturer.

1.05 QUALITY ASSURANCE

- A. Perform Work in accordance with GANA (GM) and GANA (SM) for glazing installation methods.

Glazing		08 8000-1

- B. Manufacturer Qualifications: Company specializing in manufacturing the products specified in this section with minimum ten years of documented experience.
- C. Installer Qualifications: Company specializing in performing work of the type specified and with at least five years documented experience.

1.06 FIELD CONDITIONS

- A. Do not install glazing when ambient temperature is less than 40 degrees F.
- B. Maintain minimum ambient temperature before, during and 24 hours after installation of glazing compounds.

1.07 WARRANTY

- A. See Section 01 7800 - Closeout Submittals for additional warranty requirements.
- B. Insulating Glass Units: Provide a ten (10) year manufacturer warranty to include coverage for seal failure, interpane dusting or misting, including providing products to replace failed units.

PART 2 PRODUCTS

2.01 MANUFACTURERS

- A. Float Glass Manufacturers:
 - 1. AGC Glass North America, Inc: www.agcglass.com/#sle.
 - 2. Cardinal Glass Industries: www.cardinalcorp.com/#sle.
 - 3. Guardian Glass, LLC: www.guardianglass.com/#sle.
 - 4. Pilkington North America Inc: www.pilkington.com/na/#sle.
 - 5. Vitro Architectural Glass (formerly PPG Glass): www.vitroglazings.com/#sle.
 - 6. Substitutions: See Section 01 6000 - Product Requirements.

2.02 PERFORMANCE REQUIREMENTS - EXTERIOR GLAZING ASSEMBLIES

- A. Provide type and thickness of exterior glazing assemblies to support assembly dead loads, and to withstand live loads caused by positive and negative wind pressure acting normal to plane of glass.
 - 1. Design Pressure: Calculated in accordance with ASCE 7.
 - 2. Comply with ASTM E1300 for design load resistance of glass type, thickness, dimensions, and maximum lateral deflection of supported glass.
 - 3. Provide glass edge support system sufficiently stiff to limit the lateral deflection of supported glass edges to less than 1/175 of their lengths under specified design load.
 - 4. Glass thicknesses listed are minimum.
- B. Weather-Resistive Barrier Seals: Provide completed assemblies that maintain continuity of building enclosure water-resistive barrier, vapor retarder, and/or air barrier.
 - 1. In conjunction with weather barrier related materials described in other sections, as follows:
 - a. Water Barriers: See Section 07 2500.
 - 2. To utilize inner pane of multiple pane insulating glass units for continuity of vapor retarder and/or air barrier seal.
- C. Thermal and Optical Performance: Provide exterior glazing products with performance properties as indicated. Performance properties are in accordance with manufacturer's published data as determined with the following procedures and/or test methods:
 - 1. Center of Glass U-Value: Comply with NFRC 100 using Lawrence Berkeley National Laboratory (LBNL) WINDOW 7 computer program.
 - 2. Center of Glass Solar Heat Gain Coefficient (SHGC): Comply with NFRC 200 using Lawrence Berkeley National Laboratory (LBNL) WINDOW 7 computer program.
 - 3. Solar Optical Properties: Comply with NFRC 300 test method.

2.03 GLASS MATERIALS

- A. Float Glass: Provide float glass based glazing unless otherwise indicated.
 - 1. Annealed Type: ASTM C1036, Type I - Transparent Flat, Class 1 - Clear, Quality - Q3.

2. Kind HS - Heat-Strengthened Type: Complies with ASTM C1048.
3. Kind FT - Fully Tempered Type: Complies with ASTM C1048.
4. Fully Tempered Safety Glass: Complies with ANSI Z97.1 or 16 CFR 1201 criteria for safety glazing used in hazardous locations.
5. Thicknesses: As indicated.

2.04 INSULATING GLASS UNITS

- A. Manufacturers:
 1. Glass: Any of the manufacturers specified for float glass.
- B. Insulating Glass Units: Types as indicated.
 1. Durability: Certified by an independent testing agency to comply with ASTM E2190.
 2. Coated Glass: Comply with requirements of ASTM C1376 for pyrolytic (hard-coat) or magnetic sputter vapor deposition (soft-coat) type coatings on flat glass; coated vision glass, Kind CV; or coated spandrel glass, Kind CS.
 3. Metal-Edge Spacers: Aluminum, bent and soldered corners.
 4. Spacer Color: Black.
 5. Edge Seal:
 - a. Dual-Sealed System: Provide polyisobutylene sealant as primary seal applied between spacer and glass panes, and silicone sealant as secondary seal applied around perimeter.
 - b. Color: Black.
 6. Purge interpane space with dry air, hermetically sealed.
- C. Insulating Glass Units: Vision glass, double glazed.
 1. Applications: Exterior glazing unless otherwise indicated.
 2. Space between lites filled with air.
 3. Outboard Lite: Annealed float, 1/4 inch thick, minimum.
 - a. Tint: Solargray Tinted Float Glass.
 - b. Coating: Solarban 60, on #2 surface.
 4. Inboard Lite: Annealed float glass, 1/4 inch thick, minimum.
 - a. Tint: Clear.
 5. Total Thickness: 1 inch.
 6. Thermal Transmittance (U-Value), Summer - Center of Glass: 1.6, nominal.
 7. Visible Light Transmittance (VLT): 35 percent, nominal.
 8. Shading Coefficient: 0.29, maximum.
 9. Solar Heat Gain Coefficient (SHGC): 0.25, maximum.
 10. Visible Light Reflectance, Outside: 6 percent, maximum.
 11. Glazing Method: Dry glazing method, gasket glazing.
- D. Insulating Glass Units: Spandrel glazing.
 1. Applications: Exterior spandrel glazing unless otherwise indicated.
 2. Space between lites filled with air.
 3. Outboard Lite: Annealed float glass, 1/4 inch thick, minimum.
 - a. Tint: Solargray Tinted Float Glass.
 - b. Coating: Same as on vision units, on #2 surface.
 4. Inboard Lite: Heat-strengthened float glass, 1/4 inch thick.
 - a. Tint: Clear.
 - b. Opacifier: Ceramic frit, on #4 surface.
 - c. Opacifier Color: Westlake Opacicoat 3-1371.
 5. Total Thickness: 1 inch.

2.05 GLAZING UNITS

- A. Monolithic Interior Vision Glazing:
 1. Applications: Interior glazing unless otherwise indicated.
 2. Glass Type: Annealed float glass.
 3. Tint: Clear.
 4. Thickness: 1/4 inch, nominal as required by pane size.

5. Glazing Method: Dry glazed using preformed tape at door lites.
- B. Monolithic Safety Glazing: Non-fire-rated.
 1. Applications:
 - a. Glazed lites in doors, except fire doors.
 - b. Other locations required by applicable federal, state, and local codes and regulations.
 - c. Other locations indicated on drawings.
 2. Glass Type: Fully tempered safety glass as specified.
 3. Tint: Clear.
 4. Thickness: 1/4 inch, nominal.

2.06 GLAZING COMPOUNDS

- A. Butyl Sealant: Single component; ASTM C920 Grade NS, Class 12-1/2, Uses M and A, Shore A hardness of 10 to 20; black color.
- B. Silicone Sealant: Single component; neutral curing; capable of water immersion without loss of properties; non-bleeding, non-staining with cured Shore A hardness range of 15 to 25; black color.

2.07 ACCESSORIES

- A. Setting Blocks: Silicone, with 80 to 90 Shore A durometer hardness; ASTM C864 Option II. Length of 0.1 inch for each square foot of glazing or minimum 4 inch by width of glazing rabbet space minus 1/16 inch by height to suit glazing method and pane weight and area.
- B. Spacer Shims: Neoprene, 50 to 60 Shore A durometer hardness; ASTM C864 Option II. Continuous by one half the height of the glazing stop by thickness to suit application.
- C. Glazing Tape, Back Bedding Mastic Type: Preformed, butyl-based, 100 percent solids compound with integral resilient spacer rod applicable to application indicated; 5 to 30 cured Shore A durometer hardness; coiled on release paper; black color.
 1. Width: As required for application.
- D. Glazing Gaskets: Resilient silicone extruded shape to suit glazing channel retaining slot; ASTM C864 Option II; color black.
- E. Glazing Clips: Manufacturer's standard type.

PART 3 EXECUTION

3.01 VERIFICATION OF CONDITIONS

- A. Verify that openings for glazing are correctly sized and within tolerances, including those for size, squareness, and offsets at corners.
- B. Verify that the minimum required face and edge clearances are being provided.
- C. Verify that surfaces of glazing channels or recesses are clean, free of obstructions that may impede moisture movement, weeps are clear, and support framing is ready to receive glazing system.
- D. Verify that sealing between joints of glass framing members has been completed effectively.
- E. Proceed with glazing system installation only after unsatisfactory conditions have been corrected.

3.02 PREPARATION

- A. Clean contact surfaces with appropriate solvent and wipe dry immediately before glazing. Remove coatings that are not tightly bonded to substrates.
- B. Seal porous glazing channels or recesses with substrate compatible primer or sealer.
- C. Prime surfaces scheduled to receive sealant where required for proper sealant adhesion.

3.03 INSTALLATION, GENERAL

- A. Install glazing sealants in accordance with ASTM C1193, GANA (SM), and manufacturer's instructions.
- B. Do not exceed edge pressures around perimeter of glass lites as stipulated by glass manufacturer.
- C. Set glass lites of system with uniform pattern, draw, bow, and similar characteristics.

- D. Prevent glass from contact with any contaminating substances that may be the result of construction operations such as, and not limited to the following; weld splatter, fire-safing, plastering, mortar droppings, and paint.

3.04 INSTALLATION - DRY GLAZING METHOD (GASKET GLAZING)

- A. Application - Exterior and/or Interior Glazed: Set glazing infills from either the exterior or the interior of the building.
- B. Place setting blocks at 1/4 points with edge block no more than 6 inch from corners.
- C. Rest glazing on setting blocks and push against fixed stop with sufficient pressure on gasket to attain full contact.
- D. Install removable stops without displacing glazing gasket; exert pressure for full continuous contact.

3.05 INSTALLATION - DRY GLAZING METHOD (TAPE AND TAPE)

- A. Application - Interior Glazed Doors: Set glazing infills from the interior of the room.
- B. Cut glazing tape to length and set against permanent stops, projecting 1/16 inch above sight line.
- C. Place setting blocks at 1/4 points with edge block no more than 6 inch from corners.
- D. Rest glazing on setting blocks and push against tape for full contact at perimeter of pane or unit.
- E. Place glazing tape on free perimeter of glazing in same manner described above.
- F. Install removable stop without displacement of tape. Exert pressure on tape for full continuous contact.
- G. Carefully trim protruding tape with knife.

3.06 CLEANING

- A. Remove excess glazing materials from finish surfaces immediately after application using solvents or cleaners recommended by manufacturers.
- B. Remove nonpermanent labels immediately after glazing installation is complete.
- C. Clean glass and adjacent surfaces after sealants are fully cured.
- D. Clean glass on both exposed surfaces not more than 4 days prior to Date of Substantial Completion in accordance with glass manufacturer's written recommendations.

3.07 PROTECTION

- A. Remove and replace glass that is damaged during construction period prior to Date of Substantial Completion.

END OF SECTION

SECTION 08 9100 - LOUVERS

PART 1 GENERAL

1.01 SECTION INCLUDES

- A. Louvers, frames, and accessories.

1.02 RELATED REQUIREMENTS

- A. Section 07 2500 - Weather Barriers: Sealing frames to water-resistive barrier installed on adjacent construction.
- B. Section 07 6200 - Sheet Metal Flashing and Trim.
- C. Section 07 9200 - Joint Sealants: Sealing joints between frames and adjacent construction.
- D. Division 23 - Actuators and operable louvers.

1.03 REFERENCE STANDARDS

- A. AAMA 2605 - Voluntary Specification, Performance Requirements and Test Procedures for Superior Performing Organic Coatings on Aluminum Extrusions and Panels (with Coil Coating Appendix); 2017a.
- B. AMCA 500-L - Laboratory Methods of Testing Louvers for Rating; 2015.
- C. AMCA 511 - Certified Ratings Program for Air Control Devices; 2010.
- D. FEMA P-361 - Safe Rooms for Tornadoes and Hurricanes: Guidance for Community and Residential Safe Rooms; 2015.
- E. ICC 500 - ICC/NSSA Standard for the Design and Construction of Storm Shelters; National Storm Shelter Association; 2014.

1.04 SUBMITTALS

- A. See Section 01 3000 - Administrative Requirements for submittal procedures.
- B. Product Data: Provide data describing design characteristics, maximum recommended air velocity, design free area, materials and finishes.
- C. Shop Drawings: Indicate louver layout plan and elevations, opening and clearance dimensions, and tolerances; head, jamb and sill details; blade configuration, screens, blank-off areas required, and frames.
- D. Test Reports: Independent agency reports showing compliance with specified performance criteria.

1.05 QUALITY ASSURANCE

- A. Manufacturer Qualifications: Company specializing in manufacturing products of the type specified in this section, with minimum ten years of documented experience.

1.06 WARRANTY

- A. See Section 01 7800 - Closeout Submittals for additional warranty requirements.
- B. Provide five year manufacturer's warranty against distortion, metal degradation, and connection failures of louver components.
 - 1. Finish: Include twenty year coverage against degradation of exterior finish.

PART 2 PRODUCTS

2.01 MANUFACTURERS

- A. Basis of Design Louver Manufacturer:
 - 1. Greenheck Fan Corporation: www.greenheck.com.
- B. Alternate Manufacturers:
 - 1. Airline Louvers: www.airlinelouvers.com/#sle.
 - 2. Airolite Company, LLC: www.airolite.com/#sle.
 - 3. Construction Specialties, Inc: www.c-sgroup.com/#sle.

4. Ruskin Company: www.ruskin.com/#sle.
5. Substitutions: See Section 01 6000 - Product Requirements.

2.02 LOUVERS

- A. Louvers: Factory fabricated and assembled, complete with frame, mullions, and accessories; AMCA Certified in accordance with AMCA 511.
 1. Wind Load Resistance: Design to resist positive and negative wind load of 25 psf without damage or permanent deformation.
 2. High-Velocity Wind Load Resistance: Design to comply with applicable requirements of ICC 500 and FEMA P-361, including resistance to horizontal debris impact.
 3. Intake Louvers: Design to allow maximum of 0.01 oz/sq ft water penetration at calculated intake design velocity based on design air flow and actual free area, when tested in accordance with AMCA 500-L.
 4. Drainable Blades: Continuous rain stop at front or rear of blade aligned with vertical gutter recessed into both jambs of frame.
 5. Screens: Provide insect screens at intake louvers.
- B. Stationary Storm Louvers: Inverted "V" blade, extruded aluminum construction.
 1. Free Area: 50 percent, minimum.
 2. Pressure Drop: 0.157 inches of water gauge maximum per square foot of free area at velocity of 552.5 fpm, when tested in accordance with AMCA 500-L, test unit size 48 inch by 48 inch.
 3. Blades: V-shaped, on 2 inch centers, sight-proof.
 4. Frame: 5-1/2 inches deep, channel profile; corner joints.
 - a. Mounting Type: Flange frame.
 5. Aluminum Thickness: Frame heavy gauge extruded 5052-H32 aluminum, 0.25 inch nominal wall and blade thickness.
 6. Aluminum Finish: Superior performing organic coatings.
 - a. Color: Custom color as selected by Architect to coordinate with exterior face brick.
 7. Certifications: UL Classified Wind-Storm Rated Assembly in accordance with FEMA Guidelines P-320 and P-361, and ICC 500.
 8. Products:
 - a. GreenheckFan Corporation; Model AFL-501: www.greenheck.com.
 - b. Substitutions: See Section 01 6000 - Product Requirements.

2.03 FINISHES

- A. Superior Performing Organic Coatings System: Manufacturer's standard multi-coat superior performing organic coatings system complying with AAMA 2605, including at least 70 percent polyvinylidene fluoride (PVDF) resin, and at least 80 percent of aluminum extrusion and panels surfaces having minimum total dry film thickness (DFT) of 1.2 mils, 0.0012 inch.

2.04 ACCESSORIES

- A. Screens: Frame of same material as louver, with reinforced corners; removable, screw attached; installed on inside face of louver frame.
- B. Insect Screen: 18 x 16 size aluminum mesh.
- C. Fasteners and Anchors: Galvanized steel.
- D. Sealant for Setting Sills and Sill Flashing: Non-curing butyl type.

PART 3 EXECUTION

3.01 EXAMINATION

- A. Verify that prepared openings and flashings are ready to receive this work and opening dimensions are as indicated on shop drawings.
- B. Verify that field measurements are as indicated.

3.02 INSTALLATION

- A. Install louver assembly in accordance with manufacturer's instructions.
- B. Coordinate with installation of flashings by others.
- C. Install louvers level and plumb.
- D. Set sill members and sill flashing in continuous bead of sealant.
- E. Align louver assembly to ensure moisture shed from flashings and diversion of moisture to exterior.
- F. Secure louver frames in openings with concealed fasteners.
- G. Coordinate with installation of mechanical louvers and actuators.

3.03 CLEANING

- A. Strip protective finish coverings.
- B. Clean surfaces and components.

END OF SECTION

SECTION 09 2116 - GYPSUM BOARD ASSEMBLIES

PART 1 GENERAL

1.01 SECTION INCLUDES

- A. Metal stud wall framing.
- B. Metal channel ceiling framing.
- C. Acoustic insulation.
- D. Gypsum sheathing.
- E. Gypsum wallboard.
- F. Joint treatment and accessories.
- G. Textured finish system.
- H. Acoustic (sound-dampening) wall board.

1.02 RELATED REQUIREMENTS

- A. Section 06 1000 - Rough Carpentry: Wood blocking product and execution requirements.
- B. Section 07 2500 - Weather Barriers: Water-resistive barrier over sheathing.
- C. Section 07 8400 - Firestopping: Top-of-wall assemblies at fire-resistance-rated walls.

1.03 REFERENCE STANDARDS

- A. AISI S220 - North American Standard for Cold-Formed Steel Framing - Nonstructural Members; 2015.
- B. AISI S240 - North American Standard for Cold-Formed Steel Structural Framing; 2015.
- C. ANSI A108.11 - American National Standard Specifications for Interior Installation of Cementitious Backer Units; 2010 (Reaffirmed 2016).
- D. ANSI A118.9 - American National Standard Specifications for Test Methods and Specifications for Cementitious Backer Units; 1999 (Reaffirmed 2016).
- E. ASTM A653/A653M - Standard Specification for Steel Sheet, Zinc-Coated (Galvanized) or Zinc-Iron Alloy-Coated (Galvannealed) by the Hot-Dip Process; 2018.
- F. ASTM A1003/A1003M - Standard Specification for Steel Sheet, Carbon, Metallic- and Nonmetallic-Coated for Cold-Formed Framing Members; 2015.
- G. ASTM C1007 - Standard Specification for Installation of Load Bearing (Transverse and Axial) Steel Studs and Related Accessories; 2011a (Reapproved 2015).
- H. ASTM C475/C475M - Standard Specification for Joint Compound and Joint Tape for Finishing Gypsum Board; 2015.
- I. ASTM C645 - Standard Specification for Nonstructural Steel Framing Members; 2014, with Editorial Revision (2015).
- J. ASTM C665 - Standard Specification for Mineral-Fiber Blanket Thermal Insulation for Light Frame Construction and Manufactured Housing; 2017.
- K. ASTM C754 - Standard Specification for Installation of Steel Framing Members to Receive Screw-Attached Gypsum Panel Products; 2017.
- L. ASTM C840 - Standard Specification for Application and Finishing of Gypsum Board; 2018b.
- M. ASTM C1002 - Standard Specification for Steel Self-Piercing Tapping Screws for Application of Gypsum Panel Products or Metal Plaster Bases to Wood Studs or Steel Studs; 2016.
- N. ASTM C1047 - Standard Specification for Accessories For Gypsum Wallboard and Gypsum Veneer Base; 2014a.
- O. ASTM C1177/C1177M - Standard Specification for Glass Mat Gypsum Substrate for Use as Sheathing; 2013.
- P. ASTM C1280 - Standard Specification for Application of Exterior Gypsum Panel Products for Use as Sheathing; 2018.
- Q. ASTM C1396/C1396M - Standard Specification for Gypsum Board; 2017.

- R. ASTM D3273 - Standard Test Method for Resistance to Growth of Mold on the Surface of Interior Coatings in an Environmental Chamber; 2016.
- S. ASTM E90 - Standard Test Method for Laboratory Measurement of Airborne Sound Transmission Loss of Building Partitions and Elements; 2009 (Reapproved 2016).
- T. ASTM E413 - Classification for Rating Sound Insulation; 2016.
- U. ASTM G21 - Standard Practice for Determining Resistance of Synthetic Polymeric Materials to Fungi; 2015.
- V. GA-216 - Application and Finishing of Gypsum Panel Products; 2016.
- W. GA-226 - Application of Gypsum Board to Form Curved Surfaces; Gypsum Association; 2016.
- X. GA-600 - Fire Resistance Design Manual; 2015.
- Y. UL (FRD) - Fire Resistance Directory; Current Edition.

1.04 SUBMITTALS

- A. See Section 01 3000 - Administrative Requirements for submittal procedures.
- B. Product Data: Provide data on metal framing, gypsum board, glass mat faced gypsum board, accessories, and joint finishing system.
 - 1. Provide manufacturer's data on partition head to structure connectors, showing compliance with requirements.

PART 2 PRODUCTS

2.01 GYPSUM BOARD ASSEMBLIES

- A. Provide completed assemblies complying with ASTM C840 and GA-216.
- B. Fire Rated Assemblies: Provide completed assemblies complying with applicable code.
 - 1. UL Assembly Numbers: Provide construction equivalent to that listed for the particular assembly in the current UL (FRD).

2.02 METAL FRAMING MATERIALS

- A. Steel Sheet: ASTM A1003/A1003M, subject to the ductility limitations indicated in AISI S220 or equivalent.
- B. Manufacturers - Metal Framing, Connectors, and Accessories:
 - 1. ClarkDietrich: www.clarkdietrich.com/#sle.
 - 2. Marino: www.marinoware.com/#sle.
 - 3. Telling Industries: www.tellingindustries.com/#sle.
 - 4. JN Linrose Manufacturing: www.jnlinrose.com.
 - 5. Substitutions: See Section 01 6000 - Product Requirements.
- C. Nonstructural Framing System Components: AISI S220; galvanized sheet steel, of size and properties necessary to comply with ASTM C754 for the spacing indicated, with maximum deflection of wall framing of L/120 at 5 psf.
 - 1. Studs: C-shaped with knurled or embossed faces.
 - 2. Runners: U shaped, sized to match studs.
 - 3. Ceiling Channels: C-shaped.
 - 4. Furring Members: Hat-shaped sections, minimum depth of 7/8 inch or 1-1/2 inch as indicated.
- D. Partition Head to Structure Connections: Provide mechanical anchorage devices that accommodate deflection and prevent rotation of studs while maintaining structural performance of partition.
 - 1. Material: ASTM A653/A653M steel sheet, SS Grade 50/340, with G60/Z180 hot-dipped galvanized coating.
- E. Grid Suspension Systems: Steel grid system of main tees and support bars connected to structure using hanging wire.
 - 1. Products:
 - a. USG Corporation; Drywall Suspension System: www.usg.com/#sle.
 - b. Substitutions: See Section 01 6000 - Product Requirements.

2.03 BOARD MATERIALS

- A. Manufacturers - Gypsum-Based Board:
1. CertainTeed Corporation: www.certainteed.com/#sle.
 2. Georgia-Pacific Gypsum: www.gpgypsum.com/#sle.
 3. National Gypsum Company: www.nationalgypsum.com/#sle.
 4. PABCO Gypsum: www.pabco gypsum.com/#sle.
 5. USG Corporation: www.usg.com/#sle.
 6. Substitutions: See Section 01 6000 - Product Requirements.
- B. Gypsum Wallboard: Paper-faced gypsum panels as defined in ASTM C1396/C1396M; sizes to minimize joints in place; ends square cut.
1. Application: Use for vertical surfaces and ceilings, unless otherwise indicated.
 2. Thickness:
 - a. Vertical Surfaces: 5/8 inch.
 - b. Ceilings: 5/8 inch.
 - c. Multi-Layer Assemblies: Thicknesses as indicated on drawings.
 3. Paper-Faced Products:
 - a. CertainTeed Corporation; Type X Drywall: www.certainteed.com/#sle.
 - b. Georgia-Pacific Gypsum; ToughRock Fireguard X: www.gpgypsum.com/#sle.
 - c. Gold Bond Building Products, LLC provided by National Gypsum Company; Gold Bond Fire-Shield Gypsum Board: www.goldbondbuilding.com/#sle.
 - d. USG Corporation; Sheetrock Brand Firecode X Panels 5/8 in. (15.9 mm): www.usg.com/#sle.
 - e. Substitutions: See Section 01 6000 - Product Requirements.
- C. Acoustical Sound Dampening Wall Board: Two layers of heavy paper-faced, high-density gypsum board separated by a viscoelastic polymer layer and capable of achieving STC rating of 50 or more in typical stud wall assemblies as calculated in accordance with ASTM E413 and when tested in accordance with ASTM E90.
1. Thickness: 5/8 inch.
 2. Long Edges: Tapered.
 3. Mold Resistance: Score of 10, when tested in accordance with ASTM D3273.
 4. At Assemblies Indicated with Fire-Rating: Use type required by indicated test assembly.
 5. Products:
 - a. CertainTeed Corporation; SilentFX Quick Cut Type X Gypsum Board: www.certainteed.com/#sle.
 - b. Gold Bond Building Products, LLC provided by National Gypsum Company; Gold Bond SoundBreak XP Wall Board: www.goldbondbuilding.com/#sle.
 - c. Substitutions: See Section 01 6000 - Product Requirements.
- D. Exterior Sheathing Board: Sizes to minimize joints in place; ends square cut.
1. Application: Exterior sheathing, unless otherwise indicated.
 2. Mold Resistance: Score of 10, when tested in accordance with ASTM D3273.
 3. Fungal Resistance: No fungal growth when tested in accordance with ASTM G21.
 4. Glass Mat Faced Sheathing: Glass mat faced gypsum substrate as defined in ASTM C1177/C1177M.
 5. Edges: Square.
 6. Glass Mat Faced Products:
 - a. American Gypsum Company; M-Glass 1/2" Exterior Sheathing: www.americangypsum.com/#sle.
 - b. CertainTeed Corporation; GlasRoc 1/2" Exterior Sheathing: www.certainteed.com/#sle.
 - c. Georgia-Pacific Gypsum; DensGlass Sheathing: www.gpgypsum.com/#sle.
 - d. Gold Bond Building Products, LLC provided by National Gypsum Company; Gold Bond eXP Fire-Shield Sheathing: www.goldbondbuilding.com/#sle.
 - e. Substitutions: See Section 01 6000 - Product Requirements.

2.04 GYPSUM BOARD ACCESSORIES

- A. Acoustic Insulation: ASTM C665; preformed glass fiber, friction fit type, unfaced. Thickness: As indicated on drawings.
- B. Water-Resistive Barrier: See Section 07 2500.
- C. Beads, Joint Accessories, and Other Trim: ASTM C1047, galvanized steel or rolled zinc, unless noted otherwise.
 - 1. Corner Beads: Low profile, for 90 degree outside corners.
 - a. Products:
 - 1) CertainTeed Corporation; No-Coat Drywall Corner: www.certainteed.com/#sle.
 - 2) ClarkDietrich; Strait-Flex Big-Stick: www.clarkdietrich.com/#sle.
 - 3) Phillips Manufacturing Co; Everlast Corner Bead: www.phillipsmfg.com/#sle.
 - 4) Trim-Tex, Inc; Rigid Corner Bead: www.trim-tex.com/#sle.
 - 5) Substitutions: See Section 01 6000 - Product Requirements.
 - 2. L-Trim with Tear-Away Strip: Sized to fit 5/8 inch thick gypsum wallboard.
 - a. Products:
 - 1) Phillips Manufacturing Co; gripSTIK L-Tear: www.phillipsmfg.com/#sle.
 - 2) Substitutions: See Section 01 6000 - Product Requirements.
 - 3. Expansion Joints:
 - a. Type: V-shaped metal with factory-installed protective tape.
 - b. Products:
 - 1) Phillips Manufacturing Co; 093 Expansion Control Joint: www.phillipsmfg.com/#sle.
 - 2) Substitutions: See Section 01 6000 - Product Requirements.
- D. Joint Materials: ASTM C475/C475M and as recommended by gypsum board manufacturer for project conditions.
 - 1. Paper Tape: 2 inch wide, creased paper tape for joints and corners.
 - 2. Joint Compound: Drying type, vinyl-based, ready-mixed.
- E. Textured Finish Materials: Latex-based compound; plain.
- F. Screws for Fastening of Gypsum Panel Products to Cold-Formed Steel Studs Less than 0.033 inches in Thickness and Wood Members: ASTM C1002; self-piercing tapping screws, corrosion-resistant.

PART 3 EXECUTION

3.01 EXAMINATION

- A. Verify that project conditions are appropriate for work of this section to commence.

3.02 FRAMING INSTALLATION

- A. Metal Framing: Install in accordance with ASTM C1007/AISI S220 and manufacturer's instructions.
- B. Suspended Ceilings and Soffits: Space framing and furring members as indicated.
 - 1. Level ceiling system to a tolerance of 1/1200.
 - 2. Laterally brace entire suspension system.
- C. Studs: Space studs at 16 inches on center.
 - 1. Partitions Terminating at Structure: Attach top runner to structure, maintain clearance between top of studs and structure, and connect studs to track using specified mechanical devices in accordance with manufacturer's instructions; verify free movement of top of stud connections; do not leave studs unattached to track.
- D. Openings: Reinforce openings as required for weight of doors or operable panels, using not less than double studs at jambs.
- E. Furring for Fire-Resistance Ratings: Install as required for fire-resistance ratings indicated and to GA-600 requirements.
- F. Blocking: Install wood blocking for support of:
 - 1. Framed glass openings.
 - 2. Wall-mounted cabinets.

3. Plumbing fixtures.
4. Wall-mounted door hardware.
5. O.F.O.I. Monitors and screens.

3.03 ACOUSTIC ACCESSORIES INSTALLATION

- A. Acoustic Insulation: Place tightly within spaces, around cut openings, behind and around electrical and mechanical items within partitions, and tight to items passing through partitions.

3.04 BOARD INSTALLATION

- A. Comply with ASTM C840, GA-216, and manufacturer's instructions. Install to minimize butt end joints, especially in highly visible locations.
- B. Single-Layer Non-Rated: Install gypsum board parallel to framing, with ends and edges occurring over firm bearing.
- C. Fire-Resistance-Rated Construction: Install gypsum board in strict compliance with requirements of assembly listing.
- D. Exterior Sheathing: Comply with ASTM C1280. Install sheathing vertically, with edges butted tight and ends occurring over firm bearing.
- E. Installation on Metal Framing: Use screws for attachment of gypsum board.

3.05 INSTALLATION OF TRIM AND ACCESSORIES

- A. Control Joints: Place control joints consistent with lines of building spaces and as follows:
 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.

3.06 JOINT TREATMENT

- A. Finish gypsum board in accordance with levels defined in ASTM C840, as follows:
 1. Level 4: Walls and ceilings to receive paint finish or wall coverings, unless otherwise indicated.
 2. Level 2: In utility areas, behind cabinetry, and on backing board to receive tile finish.
 3. Level 1: Fire-resistance-rated wall areas above finished ceilings, whether or not accessible in the completed construction.
- 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. Taping, filling, and sanding are not required at base layer of double-layer applications.
- C. Fill and finish joints and corners of cementitious backing board as recommended by manufacturer.

3.07 TEXTURE FINISH

- A. Apply finish texture coating by means of spraying apparatus in accordance with manufacturer's instructions.
- B. Texture Required: Light orange peel to match existing.

3.08 TOLERANCES

- A. Maximum Variation of Finished Gypsum Board Surface from True Flatness: 1/8 inch in 10 feet in any direction.

END OF SECTION

SECTION 09 3000 - TILING

PART 1 GENERAL

1.01 SECTION INCLUDES

- A. Tile for wall applications.
- B. Non-ceramic trim.

1.02 RELATED REQUIREMENTS

- A. Section 07 9200 - Joint Sealants: Sealing joints between tile work and adjacent construction and fixtures.

1.03 REFERENCE STANDARDS

- A. ANSI A108/A118/A136 - American National Standard Specifications for the Installation of Ceramic Tile (Compendium).; 2017.
- B. ANSI A108.10 - American National Standard Specifications for Installation of Grout in Tilework; 1999 (Reaffirmed 2010).
- C. ANSI A108.11 - American National Standard Specifications for Interior Installation of Cementitious Backer Units; 2010 (Reaffirmed 2016).
- D. ANSI A118.4 - American National Standard Specifications for Modified Dry-Set Cement Mortar; 2012 (Revised).
- E. ANSI A118.7 - American National Standard Specifications for High Performance Cement Grouts for Tile Installation; 2010 (Reaffirmed 2016).
- F. ANSI A118.12 - American National Standard Specifications for Crack Isolation Membranes for Thin-Set Ceramic Tile and Dimension Stone Installation; 2014.
- G. ANSI A137.1 - American National Standard Specifications for Ceramic Tile; 2012.
- H. TCNA (HB) - Handbook for Ceramic, Glass, and Stone Tile Installation; 2017.

1.04 SUBMITTALS

- A. See Section 01 3000 - Administrative Requirements for submittal procedures.
- B. Product Data: Provide manufacturers' data sheets on tile, mortar, grout, and accessories. Include instructions for using grouts and adhesives.
- C. Installer's Qualification Statement:
- D. Maintenance Data: Include recommended cleaning methods, cleaning materials, and stain removal methods.

1.05 QUALITY ASSURANCE

- A. Installer Qualifications:
 - 1. Company specializing in performing tile installation, with minimum of five years of documented experience.

1.06 DELIVERY, STORAGE, AND HANDLING

- A. Protect adhesives from freezing or overheating in accordance with manufacturer's instructions.

1.07 FIELD CONDITIONS

- A. Do not install solvent-based products in an unventilated environment.
- B. Maintain ambient and substrate temperature above 50 degrees F and below 100 degrees F during installation and curing of setting materials.

PART 2 PRODUCTS

2.01 TILE

- A. Tile Products:
- B. Wall Tile, Type CT-1: ANSI A137.1 standard grade.
 - 1. Size: 12 x 24 inch, nominal.
 - 2. Product: American Olean; Theoretical Evolved: Balanced Beige TE82.
 - 3. Layout Pattern: Stacked Bond.
 - 4. Substitutions: See Section 01 6000 - Product Requirements.
 - a. Substitutions must be prior approved by the Architect and must match existing tile size, color and texture.

2.02 TRIM AND ACCESSORIES

- A. Non-Ceramic Trim: Satin natural anodized extruded aluminum, style and dimensions to suit application, for setting using tile mortar or adhesive.
 - 1. Applications:
 - a. Wall corners, outside corners of wall tile: Schluter Rondec.
 - 2. Manufacturers:
 - a. Schluter-Systems: www.schluter.com/#sle.
 - b. Genesis APS International: www.genesis-aps.com/#sle.
 - c. Substitutions: See Section 01 6000 - Product Requirements.

2.03 SETTING MATERIALS

- A. Provide setting and grout materials from same manufacturer.
- B. Latex-Portland Cement Mortar Bond Coat: ANSI A118.4.
 - 1. Products:
 - a. ARDEX Engineered Cements; ARDEX X 77 MICROTEC: www.ardexamericas.com/#sle.
 - b. Custom Building Products; ProLite Premium Rapid Setting Large Format Tile Mortar, with Multi-Surface Bonding Primer: www.custombuildingproducts.com/#sle.
 - c. LATICRETE International, Inc.; LATICRETE SureSet: www.laticrete.com/#sle.
 - d. Mapei Corporation; Large Tile & Stone Mortar: [ww.mapei.com](http://www.mapei.com).
 - e. Substitutions: See Section 01 6000 - Product Requirements.

2.04 GROUTS

- A. High Performance Polymer Modified Grout: ANSI A118.7 polymer modified cement grout.
 - 1. Applications: Use this type of grout where indicated .
 - 2. Use sanded grout for joints 1/8 inch wide and larger; use unsanded grout for joints less than 1/8 inch wide.
 - 3. Color(s): Match existing.
 - 4. Products:
 - a. ARDEX Engineered Cements; ARDEX FG-C MICROTEC: www.ardexamericas.com/#sle.
 - b. Custom Building Products; VersaBond LFT Tile Mortar: www.custombuildingproducts.com/#sle.
 - c. LATICRETE International, Inc; LATICRETE PERMACOLOR Grout: www.laticrete.com/#sle.
 - d. Mapei Corporation; Ultracolor Plus.
 - e. Substitutions: See Section 01 6000 - Product Requirements.

PART 3 EXECUTION

3.01 EXAMINATION

- A. Verify that wall surfaces are smooth and flat within the tolerances specified for that type of work, are dust-free, and are ready to receive tile.

3.02 PREPARATION

- A. Protect surrounding work from damage.
- B. Vacuum clean surfaces and damp clean.
- C. Seal substrate surface cracks with filler. Level existing substrate surfaces to acceptable flatness tolerances.
- D. Prepare substrate surfaces for adhesive installation in accordance with adhesive manufacturer's instructions.

3.03 INSTALLATION - GENERAL

- A. Install tile and grout in accordance with applicable requirements of ANSI A108.1a through ANSI A108.19, manufacturer's instructions, and TCNA (HB) recommendations.
- B. Lay to tile pattern specified. Do not interrupt tile pattern through openings.
- C. Cut and fit tile to penetrations through tile, leaving sealant joint space. Form corners neatly.
- D. 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.
- E. Form internal angles square and external angles bullnosed.
- F. Install non-ceramic trim in accordance with manufacturer's instructions.
- G. Sound tile after setting. Replace hollow sounding units.
- H. Keep control and expansion joints free of mortar, grout, and adhesive.
- I. Prior to grouting, allow installation to completely cure; minimum of 48 hours.
- J. Grout tile joints unless otherwise indicated.
- K. At changes in plane and tile-to-tile control joints, use tile sealant instead of grout, with either bond breaker tape or backer rod as appropriate to prevent three-sided bonding.

3.04 INSTALLATION - WALL TILE

- A. Over interior concrete and masonry, install in accordance with TCNA (HB) Method W202I, thin-set with dry-set or latex-Portland cement bond coat.

3.05 CLEANING

- A. Clean tile and grout surfaces.

END OF SECTION

SECTION 09 5100 - ACOUSTICAL CEILINGS

PART 1 GENERAL

1.01 SECTION INCLUDES

- A. Suspended metal grid ceiling system.
- B. Acoustical units.

1.02 REFERENCE STANDARDS

- A. ASTM A653/A653M - Standard Specification for Steel Sheet, Zinc-Coated (Galvanized) or Zinc-Iron Alloy-Coated (Galvannealed) by the Hot-Dip Process; 2018.
- B. ASTM C635/C635M - Standard Specification for the Manufacture, Performance, and Testing of Metal Suspension Systems for Acoustical Tile and Lay-in Panel Ceilings; 2017.
- C. ASTM C636/C636M - Standard Practice for Installation of Metal Ceiling Suspension Systems for Acoustical Tile and Lay-In Panels; 2013.
- D. ASTM E84 - Standard Test Method for Surface Burning Characteristics of Building Materials; 2018b.
- E. ASTM E1264 - Standard Classification for Acoustical Ceiling Products; 2014.
- F. NFPA 286 - Standard Methods of Fire Tests for Evaluating Contribution of Wall and Ceiling Interior Finish to Room Fire Growth; 2015.

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. See Section 01 3000 - Administrative Requirements for submittal procedures.
- B. Product Data: Provide data on suspension system components and acoustical units.
- C. Manufacturer's Installation Instructions: Indicate special procedures and perimeter conditions requiring special attention.

1.05 FIELD CONDITIONS

- A. Maintain uniform temperature of minimum 60 degrees F, and maximum humidity of 40 percent prior to, during, and after acoustical unit installation.

PART 2 PRODUCTS

2.01 ACOUSTICAL UNITS

- A. Manufacturers:
 - 1. Armstrong World Industries, Inc: www.armstrong.com/#sle.
 - 2. Substitutions: See Section 01 6000 - Product Requirements. Ceiling systems have been selected to match existing.
 - a. Products of other manufacturers will be considered provided the overall performance is within the specified range(s) and the overall appearance is not significantly different from that of the specified product. Architect's decision on aesthetics and substitutions is final. Obtain product approval prior to bidding.
- B. Suspension Systems:
 - 1. Same as for acoustical units.

2.02 ACOUSTICAL UNITS

- A. Acoustical Panels, Type ACT-1: Painted mineral fiber, with the following characteristics:
 - 1. Classification: ASTM E1264 Type III.
 - a. Form: 2, water felted.
 - 2. Size: 24 by 24 inches.
 - 3. Thickness: 5/8 inches.
 - 4. Ceiling Attenuation Class (CAC): 30, determined in accordance with ASTM E1264.
 - 5. Panel Edge: Square.
 - 6. Color: White.
 - 7. Surface Pattern: Non-perforated, fine.
 - 8. Suspension System: Exposed grid.
 - 9. Products:
 - a. Armstrong World Industries, Inc.; Dune #1772: www.armstrongceilings.com
 - b. Substitutions: See Section 01 6000 - Product Requirements.
- B. Acoustical Panels, Type ACT-2: Painted mineral fiber, with the following characteristics:
 - 1. Classification: ASTM E1264 Type IX.
 - a. Form: 2, water felted.
 - b. Pattern: "G" - smooth.
 - 2. Size: 24 by 24 inches.
 - 3. Thickness: 5/8 inches.
 - 4. Ceiling Attenuation Class (CAC): 33, determined in accordance with ASTM E1264.
 - 5. Panel Edge: Square.
 - 6. Color: White.
 - 7. Suspension System: Exposed grid.
 - 8. Products:
 - a. Armstrong World Industries, Inc; Kitchen Zone #673: www.armstrongceilings.com/#sle.
 - b. Substitutions: See Section 01 6000 - Product Requirements.

2.03 SUSPENSION SYSTEM(S)

- A. Metal Suspension Systems - General: Complying with ASTM C635/C635M; die cut and interlocking components, with perimeter moldings, hold down clips, stabilizer bars, clips, and splices as required for a complete ceiling system.
 - 1. Materials:
 - a. Steel Grid: ASTM A653/A653M, G60 coating, unless otherwise indicated.
- B. Exposed Suspension System: Hot-dipped galvanized steel grid with prefinished cap.
 - 1. Structural Classification: Intermediate-duty, when tested in accordance with ASTM C635/C635M.
 - 2. Profile: Tee; 15/16 inch face width.
 - 3. Finish: Baked enamel.
 - 4. Color: White.
 - 5. Products:
 - a. Armstrong World Industries, Inc.; Prelude XL: www.armstrongceilings.com.
 - b. Substitutions: See Section 01 6000 - Product Requirements.

2.04 ACCESSORIES

- A. Support Channels and Hangers: Galvanized steel; size and type to suit application and ceiling system flatness requirement specified.
- B. Hanger Wire: 12 gauge, 0.08 inch galvanized steel wire.
- C. Hold-Down Clips: Manufacturer's standard clips to suit application.
- D. Perimeter Moldings: Same metal and finish as grid.
 - 1. Size: As required for installation conditions.
 - 2. At Exposed Grid: Provide L-shaped molding for mounting at same elevation as face of grid.
- E. Touch-up Paint: Type and color to match acoustical and grid units.

PART 3 EXECUTION

3.01 EXAMINATION

- A. Verify existing conditions before starting work.
- B. Verify that layout of hangers will not interfere with other work.

3.02 Preparation

- A. Install after major above-ceiling work is complete.
- B. Coordinate the location of hangers with other work.

3.03 INSTALLATION - SUSPENSION SYSTEM

- A. Install suspension system in accordance with ASTM C636/C636M and manufacturer's instructions and as supplemented in this section.
- B. Rigidly secure system, including integral mechanical and electrical components, for maximum deflection of 1:360.
- C. Locate system on room axis according to reflected plan.
- D. Perimeter Molding: Install at intersection of ceiling and vertical surfaces and at junctions with other interruptions.
 - 1. Use longest practical lengths.
 - 2. Overlap corners.
- E. Install after major above-ceiling work is complete. Coordinate the location of hangers with other work.
- F. Suspension System, Non-Seismic: 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.
- G. 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.
- H. Do not support components on main runners or cross runners if weight causes total dead load to exceed deflection capability.
- I. Support fixture loads using supplementary hangers located within 6 inches of each corner, or support components independently.
- J. Do not eccentrically load system or induce rotation of runners.

3.04 INSTALLATION - ACOUSTICAL UNITS

- A. Install acoustical units in accordance with manufacturer's instructions.
- B. Fit acoustical units in place, free from damaged edges or other defects detrimental to appearance and function.
- C. Fit border trim neatly against abutting surfaces.
- D. Install units after above-ceiling work is complete.
- E. Install acoustical units level, in uniform plane, and free from twist, warp, and dents.
- F. Cutting Acoustical Units:
 - 1. Make field cut edges of same profile as factory edges.
 - 2. Double cut and field paint exposed reveal edges.
- G. Install hold-down clips on panels within 20 ft of an exterior door.

3.05 TOLERANCES

- 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 6500 - RESILIENT FLOORING

PART 1 GENERAL

1.01 SECTION INCLUDES

- A. Resilient tile flooring.
- B. Resilient base.
- C. Installation accessories.
- D. Prepping and waxing of installed floors.

1.02 REFERENCE STANDARDS

- A. ASTM F710 - Standard Practice for Preparing Concrete Floors to Receive Resilient Flooring; 2017.
- B. ASTM F1861 - Standard Specification for Resilient Wall Base; 2016.
- C. ASTM F2034 - Standard Specification for Sheet Linoleum Floor Covering; 2018.

1.03 SUBMITTALS

- A. See Section 01 3000 - Administrative Requirements for submittal procedures.
- B. Product Data: Provide data on specified products, describing physical and performance characteristics; including sizes, patterns and colors available; and installation instructions.
- C. Verification Samples: Submit two samples, 12 by 12 inch in size illustrating color and pattern for each resilient flooring product specified.
- D. Maintenance Data: Include maintenance procedures, recommended maintenance materials and schedules.
 - 1. Submit sealers and was for approval and compatibility with Owner's maintenance procedures.
- E. Maintenance Materials: Furnish the following for Owner's use in maintenance of project.
 - 1. See Section 01 6000 - Product Requirements, for additional provisions.
 - 2. Extra Flooring Material: 45 square feet of each type and color.
 - 3. Extra Wall Base: 120 linear feet of each type and color.

1.04 QUALITY ASSURANCE

- A. Installer Qualifications: Company specializing in installing specified flooring with minimum five years documented experience.

1.05 DELIVERY, STORAGE, AND HANDLING

- A. Upon receipt, immediately remove any shrink-wrap and check materials for damage and the correct style, color, quantity and run numbers.
- B. Store all materials off of the floor in an acclimatized, weather-tight space.
- C. Maintain temperature in storage area between 55 degrees F and 90 degrees F.
- D. Protect roll materials from damage by storing on end.

1.06 FIELD CONDITIONS

- A. 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 TILE FLOORING

- A. Vinyl Composition Tile - Type VCT: Homogeneous, with color extending throughout thickness.
 - 1. Manufacturers:
 - a. Tarkett Flooring: www.tarkett.com/#sle.
 - b. Substitutions: See Section 01 6000 - Product Requirements.

2. Size: 12 by 12 inch.
3. Thickness: 0.125 inch.
4. Color: To match existing; TBD.
5. .
 - a.
 - b.
- B. Vinyl Tile - Type LVT-1: Printed film type, with transparent or translucent wear layer.
 1. Manufacturer:
 - a. Mannington Commercial; Color Anchor: www.manningtoncommercial.com/#sle.
 - b. Substitutions: See Section 01 6000 - Product Requirements.
 - 1) Substitutions must be prior approved by the Architect and must match existing flooring size, color and texture.
 2. Edge: Micro bevel.
 3. Tile Size: 12 by 24 inch.
 4. Wear Layer Thickness: 0.020 inch.
 5. Total Thickness: 0.098 inch (2.5 mm)
 6. Warranty: 10 year limited warranty.
 7. Products:
 - a. Mannington: Color Anchor
 - 1) LVT-1: C139 Stride London Fog.

2.02 RESILIENT BASE

- A. Resilient Base: ASTM F1861, Type TP, rubber, thermoplastic; top set Style B, Cove.
 1. Manufacturers:
 - a. Johnsonite, a Tarkett Company: www.johnsonite.com/#sle.
 - b. Substitutions: See Section 01 6000 - Product Requirements.
 2. Height: 4 inch.
 3. Thickness: 0.125 inch.
 4. Finish: Satin.
 5. Length: Roll.
 6. Color: To match existing, Johnsonite #63 Burnt Umber.

2.03 ACCESSORIES

- A. Subfloor Filler: White premix latex; type recommended by adhesive material manufacturer.
- B. Primers and Adhesives: Waterproof; types recommended by flooring manufacturer.
- C. Moldings, Transition and Edge Strips: Rubber.
 1. Product: #45 Reducer strip as manufactured by Roppe Corporation: www.roppe.com.
 - a. Use at transition from VCT to sealed concrete floors.
 2. Substitutions: See Section 01 6000 - Product Requirements.
- D. Sealer and Wax: Types recommended by flooring manufacturer and approved by Owner for compatibility with building maintenance.
 1. Finish Wax: Spartan Chemical Company, INC.; iShine: www.spartanchemical.com.
 - a. Substitutions: Not permitted.
 2. Verify wax specification with Owner's Maintenance Supervisor PRIOR to ordering for this project to verify compatibility with Owner's current maintenance standards.

PART 3 EXECUTION

3.01 EXAMINATION

- A. Verify that surfaces are flat to tolerances acceptable to flooring manufacturer, free of cracks that might telegraph through flooring, clean, dry, and free of curing compounds, surface hardeners, and other chemicals that might interfere with bonding of flooring to substrate.

- B. Verify that wall surfaces are smooth and flat within the tolerances specified for that type of work, are dust-free, and are ready to receive resilient base.
- C. Cementitious Subfloor Surfaces: Verify that substrates are ready for resilient flooring installation by testing for moisture and alkalinity (pH).
 - 1. If test results are not within limits recommended by flooring manufacturer, install manufacturer approved sealer.
- D. Verify that required floor-mounted utilities are in correct location.

3.02 PREPARATION

- A. Prepare floor substrates as recommended by flooring and adhesive manufacturers.
- B. Remove subfloor ridges and bumps. Fill minor low spots, cracks, joints, holes, and other defects with subfloor filler to achieve smooth, flat, hard surface.
- C. Prohibit traffic until filler is fully cured.
- D. Clean substrate.

3.03 INSTALLATION - GENERAL

- A. Starting installation constitutes acceptance of subfloor conditions.
- B. Install in accordance with manufacturer's written instructions.
- C. Adhesive-Applied Installation:
 - 1. Spread only enough adhesive to permit installation of materials before initial set.
 - 2. Fit joints and butt seams tightly.
 - 3. Set flooring in place, press with heavy roller to attain full adhesion.
- D. Where type of floor finish, pattern, or color are different on opposite sides of door, terminate flooring under centerline of door.
- E. Install edge strips at unprotected or exposed edges, where flooring terminates, and where indicated.
 - 1. Resilient Strips: Attach to substrate using adhesive.
- F. Scribe flooring to walls, columns, cabinets, floor outlets, and other appurtenances to produce tight joints.

3.04 INSTALLATION - TILE FLOORING

- A. Mix tile from container to ensure shade variations are consistent when tile is placed, unless otherwise indicated in manufacturer's installation instructions.
- B. Lay flooring with joints and seams parallel to building lines to produce symmetrical pattern.

3.05 INSTALLATION - RESILIENT BASE

- A. Fit joints tightly and make vertical. Maintain minimum dimension of 144 inches between joints. Do not piece cut materials, use full length sections to minimize joints.
- B. Miter internal corners. At external corners, use premolded units.
- C. Install base on solid backing. Bond tightly to wall and floor surfaces.
- D. Scribe and fit to door frames and other interruptions.

3.06 CLEANING

- A. Remove excess adhesive from floor, base, and wall surfaces without damage.
- B. Clean in accordance with manufacturer's written instructions.

3.07 PREPARATION OF RESILIENT TILE FLOORING (FLOOR FINISH)

- A. Five or more days after installation, scrub the floor using a neutral detergent as approved by the floor manufacturer and a scrubbing pad or brush as recommended for the type of floor being maintained. Note: Do not use black or brown pads or their equivalent brushes on any floors. Strip off all non-approved maintenance polish prior to applying specified finish.

- B. Once the floor is thoroughly cleaned, rinsed, and dried, apply 3 coats of a high-quality commercial floor polish (minimum 25% solids) using lint free, synthetic mops. Certain situations may require the application of one or two coats of sealer as approved by the floor manufacturer. Allow ample drying time between coats of sealer and/or finish. Do not allow traffic on the floor for several hours (overnight if possible).

END OF SECTION

SECTION 09 6623 - RESINOUS MATRIX TERRAZZO FLOORING

PART 1 GENERAL

1.01 SECTION INCLUDES

- A. Epoxy matrix rubberized terrazzo with ground and polished finish.
- B. Divider strips.
- C. Epoxy matrix floor and cove base.

1.02 RELATED REQUIREMENTS

- A. Section 03 3000 - Cast-in-Place Concrete: Concrete subfloor with steel trowel finish.

1.03 REFERENCE STANDARDS

- A. NTMA (EPOXY) - Epoxy Terrazzo Specifications; Current Edition.

1.04 SUBMITTALS

- A. See Section 01 3000 - Administrative Requirements, for submittal procedures.
- B. Product Data: Provide data for divider strips and sealer; include printed copy of current NTMA recommendations for type of terrazzo specified.
- C. Shop Drawings: Indicate divider strip layout, and details of adjacent components.
- D. Samples: Submit two samples, 6 inch by 6 inch in size illustrating color, chip size and variation, chip gradation, matrix color, and typical divider strip.
- E. Installer's Qualification Statement.
- F. Cleaning and Maintenance Data: Include procedures for stain removal, stripping, and sealing.

1.05 QUALITY ASSURANCE

- A. Perform work in accordance with NTMA recommendations as posted at their web site at www.ntma.com.
- B. Manufacturer Qualifications: Company specializing in manufacturing products specified in this section.
 - 1. Minimum five years of documented experience.
 - 2. Associate member firm of the National Terrazzo and Mosaic Association, Inc.
- C. Installer Qualifications: Company specializing in performing the type of work specified in this section.
 - 1. Minimum five years of documented experience.
 - 2. Approved by matrix manufacturer.

1.06 DELIVERY, STORAGE, AND HANDLING

- A. Store terrazzo materials in a dry, secure area.
- B. Maintain minimum temperature of 60 degrees F.
- C. Keep products away from fire or open flame.

1.07 FIELD CONDITIONS

- A. Do not install terrazzo when temperature is below 50 degrees F or above 90 degrees F.
- B. Maintain temperature within specified range 24 hours before, during, and 72 hours after installation of flooring.
- C. Provide ambient lighting level of 50 ft candles, measured at floor surface.

PART 2 PRODUCTS

2.01 SYSTEM DESCRIPTION

- A. A nominal 1/4 inch seamless flooring system composed of high solids flexible epoxy resin with colored rubber chips in a troweled mortar system.

2.02 MANUFACTURERS

- A. Basis of Design - Resinous Matrix Terrazzo Flooring: Key Resin; Keylastic SQT: www.keyresin.com/#sle.
- B. Other Acceptable Manufacturers - Resinous Matrix Terrazzo Flooring:
 - 1. Sherwin-Williams High Performance Flooring; Softtop Decorative Flooring System: www.sherwin-williams.com/resin-flooring/#sle.
 - 2. Substitutions: See Section 01 6000 - Product Requirements.

2.03 EPOXY MATRIX TERRAZZO APPLICATIONS

- A. Floors:
 - 1. Thickness: 1/4 inch, nominal.
 - 2. Color(s): Custom formulation as selected by Architect.
 - 3. Aggregate Type: EPDM colored rubber particles.
- B. Wall Base:
 - 1. Thickness: Same as floors.
 - 2. Style: Coved.
 - 3. Color(s): Same as adjacent floor.
 - 4. Aggregate Type and Size: Same as floors.

2.04 ACCESSORIES

- A. Divider Strips: 1/8 inch thick plastic exposed top strip, zinc coated steel concealed bottom strip, with anchoring features.
- B. Control Joint Strips: 1/8 inch nominal width zinc exposed top strips, zinc coated steel concealed bottom strips, 1/8 inch wide neoprene filler strip between vertical strips, with anchoring features.
- C. Divider and Control Joint Strip Height: To suit thickness of terrazzo topping, with allowance for grinding.
- D. Base Cap, Base Divider Strip, and Separator Strip: Match divider strips.
- E. Slip Resistive Admixture: Gneral Polymers #5191 Non-Skid Additive or equal.
- F. Floor transition from epoxy flooring to VCT: Anodized aluminum.
 - 1. Product: Reno-U manufactured by Schluter Systems: www.schluter.com.
- G. Cleaner: Neutralizing liquid type, pH of 7.
- H. Sealer: Colorless, non-yellowing, penetrating liquid type to completely seal matrix surface; not detrimental to system components.
- I. Subfloor Filler: Latex type.
- J. Primer: Type as recommended by terrazzo manufacturer..

PART 3 EXECUTION

3.01 EXAMINATION

- A. Verify that subfloor surfaces are smooth and flat within the tolerances specified for that type of work and are ready to receive terrazzo.
- B. Verify that wall surfaces are smooth and flat within the tolerances specified for that type of work, are dust-free, and are ready to receive terrazzo.
- C. Verify that subfloor surfaces are dust-free and free of substances that could impair bonding of materials to subfloor surfaces.
- D. Cementitious Subfloor Surfaces: Verify that substrates are ready for terrazzo flooring installation by testing for moisture and alkalinity (pH).
 - 1. Obtain instructions if test results are not within limits recommended by terrazzo flooring manufacturer.
- E. Verify that required floor-mounted utilities are in correct location.

3.02 PREPARATION

- A. Clean substrate of foreign matter.
- B. Apply primer in accordance with manufacturer's instructions.

3.03 INSTALLATION

- A. Saw cut substrate to install divider and control joint strips.
- B. Install divider strips according to pattern approved on shop drawings.
- C. Install base and border divider and control joint strips to match floor pattern.
- D. Install terminating cap strip at top of base; attach securely to wall substrate.
- E. Form 12 inch wide border with divider strips.
- F. Place terrazzo mix over substrate to thickness indicated.

3.04 FINISHING

- A. Finish terrazzo to NTMA requirements.
- B. Grind terrazzo surfaces with power disc machine; sequence with coarse to fine grit abrasive, using a wet method.
- C. Apply grout to fill voids exposed from grinding.
- D. Remove grout coat by grinding, using a fine grit abrasive.
- E. Hand grind vertical and curved surfaces similarly.

3.05 TOLERANCES

- A. Maximum Variation from Flat Surface: 1/4 inch in 10 feet.
- B. Maximum Variation from Level (Except Surfaces Sloping to Drain): 1/8 inch.

3.06 CLEANING

- A. Scrub and clean terrazzo surfaces with neutral pH cleaner in accordance with manufacturer's instructions. Let dry.
- B. Immediately after terrazzo has dried, apply sealer in accordance with manufacturer's instructions.
- C. Polish surfaces in accordance with manufacturer's instructions.

3.07 PROTECTION

- A. Protect finished terrazzo from damage due to subsequent construction until Date of Substantial Completion.
- B. Do not permit construction traffic over finished terrazzo surfaces.

END OF SECTION

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SECTION 09 7700 - DECORATIVE LAMINATE PANEL SYSTEM

PART L GENERAL

1.01 SECTION INCLUDES

- A. Pre-manufactured decorative laminate panel system including mounting hardware and specified accessories.

1.02 RELATED SECTIONS

- A. Section 06 1000 - Rough Carpentry; furring, blocking, and other carpentry work that is not exposed to view.
- B. Section 09 2116 - Gypsum Board Assemblies; for metal support systems not included in this section.

1.03 REFERENCES

- A. American Society for Testing and Materials (ASTM) E84 - Standard Test Method for Surface Burning Characteristics of Building Materials.
- B. Architectural Woodwork Institute (AWI) Quality Standards.

1.04 SUBMITTALS

- A. See Section 01 3000 - Administrative Requirements, for submittal procedures.
- B. Product Data: Manufacturer's data sheets on each product to be used, including:
 - 1. Preparation instructions and recommendations.
 - 2. Storage and handling requirements and recommendations.
 - 3. Installation methods.
- C. Shop Drawings: Shop drawings in sufficient detail to show fabrication, installation, anchorage, and interface of the work of this Section with adjacent work.
- D. Selection Samples: For each finish product specified, one complete set of color chips representing manufacturer's standard range of available colors and patterns.

1.05 QUALITY ASSURANCE

- A. Manufacturer Qualifications:
 - 1. Firm experienced in successful production of wall system similar to that indicated for the Project, with sufficient production capacity to produce required units without causing delay in the work.
 - 2. Provide certificate signed by panel manufacturer certifying that products comply with specified requirements.
- B. Installer Qualifications: Demonstrate successful experience in installing architectural woodwork similar in type and quality to those required for this project and approved by manufacturer.

1.06 DELIVERY, STORAGE, AND HANDLING

- A. Do not deliver wall system until painting, wet work, grinding, and similar operations that could damage, soil, or deteriorate wall system have been completed in installation areas as specified by AWI 1700-G-3.
- B. If panels are stored prior to installation, store them flat in completely enclosed areas, out of the weather. If panels must be stored in other than installation areas, store only in areas where environmental conditions comply with manufacturers recommendations. Do not expose panels to continuous direct sunlight, nor to extremes in temperature and humidity. Store products in manufacturer's packaging until ready for installation.
- C. Store and dispose of solvent-based materials, and materials used with solvent-based materials, in accordance with requirements of local authorities having jurisdiction.

1.07 PROJECT CONDITIONS

- A. Do not deliver or install wall system until building is enclosed, wet work is complete and HVAC system is operating and will maintain temperature and relative humidity at occupancy levels during the remainder of the construction period as specified by AWI 1700-G-3.
- B. Do not install wall system until normal lighting conditions exist. Normal lighting conditions are described as those in place when the project is finished. This includes, but not limited to, design lighting (wall washers, spot lights and flood lights, and similar fixtures) and natural lighting.
- C. Wall, ceilings, floors, and openings must be level, plumb, straight, in-line and square as specified by AWI 1700-G-3.
- D. Maintain environmental conditions (temperature, humidity, and ventilation) within limits recommended by manufacturer for optimum results. Do not install products under environmental conditions outside manufacturer's absolute limits. Panels shall be conditioned in the environment in which they will be installed for a minimum of 72 hours prior to installation. The recommended environment is 75 degrees Fahrenheit and 45 percent relative humidity.
- E. Environmental Conditions: Comply with Woodwork Manufacturer's recommendations for optimum temperature and humidity conditions for woodwork during its storage and installation. Do not install woodwork until these conditions have been attained and stabilized so that woodwork is within plus or minus 1.0 percent of optimum moisture content from date of installation through remainder of construction period.

1.08 WARRANTY

- A. See Section 01 7800 - Closeout Submittals, for additional warranty requirements.
- B. Manufacturer warrants any product it has manufactured and sold against defects in materials or workmanship for a period of five years from the date of original purchase and acceptance for use. This warranty extends to products assembled / installed and used in the manner intended and does not cover damage or failure caused by: misuse, abuse or accidents, exposure to extreme temperature, improper installation, improper maintenance and exposure to water or excessive humidity or excessive moisture.

PART 2 PRODUCTS

2.01 MANUFACTURERS

- A. Basis-of-Design Manufacturer: Panel Specialists, Inc.; 3115 Range Rd., Temple, TX 76504; www.panelspec.com.
- B. Alternate Manufacturer: Marlite, 202 Harger St., Dover, OH 44622; www.marlite.com.
- C. Substitutions: Not permitted.

2.02 PANEL SYSTEMS

- A. Provide high-pressure decorative laminate surfacing panels where shown on the drawings, as specified herein, and as needed for a complete and proper installation.
- B. Comply with applicable requirements of "Architectural Woodwork Quality Standards" published by the Architectural Woodwork Institute (AWI) unless otherwise indicated.
 - 1. Quality Standards: Comply with AWI Section 500 and its division 500B for panels with 3/8 inch core material for 7/16 inch laminated HPDL Panels.
- C. Panel system shall be fire retardant complying with the following fire classification:
 - 1. Class I/A - Flame Spread 0-25, Smoke Developed 450 or less.
- D. Panel System: #610 as manufactured by Panel Specialists, Inc. A progressive panel system with a hidden divider for a continuous decorative face with a consistent minimal reveal.
 - 1. Panel Thickness: 7/16 inches with laminate edgeband.
 - 2. Reveal: System to provide a reveal of 1/4 inch at horizontal joints, and vertical joints where indicated.
 - a. Provide vertical butt joints unless noted otherwise.
 - 3. Laminate: Wilsonart 7909-60 Fusion Maple.
 - 4. Panel Dimensions: Refer to drawings.
 - 5. Molding: Provide manufacturer's standard accessories.

- a. #631H and #631V Dividers.
- b. #103L-90 degree and 103L-135 degree Outside Corner Molding.
- c. #610 Edge Molding.
- d. #304A Trim Molding.
- e. #630 Butt Joint Molding.
- 6. Moldings shall be finished in clear anodized finish.

2.03 MATERIALS

- A. Decorative laminates (VGS,VGP,VGF & HGS) and non-decorative backers (BKV) used to surface wall panels systems shall be manufactured to meet or exceed the National Electrical Manufacturing Association (((NEMA LD 3))-2005) for thickness, performance properties and appearance.
- B. Particleboard: 45# density shall be used in Class III panel composition. Fire-rated particle board shall be used for Class I and Class II panel compositions (refer to AWI Section 200)

PART 3 EXECUTION

3.01 EXAMINATION

- A. Do not begin installation until substrates have been properly prepared according to AWI 1700-G-3.
- B. If substrate preparation is the responsibility of another installer, notify Architect of unsatisfactory preparation before proceeding.

3.02 FIELD DIMENSIONS

- A. Where wall system is indicated to be fitted to other construction, check actual dimensions of other constructions by accurate field measurements before manufacturing wall system; show recorded measurements on final shop drawings. Coordinate manufacturing schedule with construction progress to avoid delay of work.
- B. Where field measurements cannot be made without delaying the work, guarantee dimensions and proceed with manufacture of wall system without field measurements coordinate other construction to ensure that actual dimensions correspond to guaranteed dimensions.

3.03 PREPARATION

- A. Clean surfaces thoroughly prior to installation.
- B. Prepare surfaces using the methods recommended by the manufacturer for achieving the best result for the substrate under the project conditions.

3.04 INSTALLATION

- A. Install in accordance with manufacturer's instructions.
- B. When interior paneling is on an exterior wall or in a wet area, provide a barrier sheet of plastic film between the outside wall and the panels in order to prevent condensation affecting the stability of the panels.
- C. Field cutting of all wall systems should be accomplished using carbide tools. All face penetrations should have a minimal 1/8 inch radius according to NEMA Standards Publication LD 3-2005.
- D. All wall systems should receive an "S" bead of panel mastic on the back of the panel during installation.
- E. For vertical applications, wall systems shall be mechanically fastened to horizontal furring strapping spaced 24 inches O.C. Furring straps shall be no less than 18 gauge 3-1/2 inches wide, continuously. For horizontal applications, wall systems shall be mechanically fastened to horizontal furring strapping spaced 24 inches o.c.and/or mechanically fastened to studs. Furring straps shall be no less than 18 gauge 3-1/2 inches wide, continuously.

3.05 PROTECTION

- A. Protect installed products until completion of project.

B. Touch-up, repair or replace damaged products before Substantial Completion.

END OF SECTION

SECTION 09 9113 - EXTERIOR PAINTING

PART 1 GENERAL

1.01 SECTION INCLUDES

- A. Surface preparation.
- B. Field application of paints.
- C. Scope: Finish exterior surfaces exposed to view, unless fully factory-finished and unless otherwise indicated, including the following:
 - 1. Exposed surfaces of steel lintels and ledge angles.
 - 2. Mechanical and Electrical:
 - a. On the roof and outdoors, paint equipment exposed to weather or to view, including factory-finished materials.
- D. Do Not Paint or Finish the Following Items:
 - 1. Items factory-finished unless otherwise indicated; materials and products having factory-applied primers are not considered factory finished.
 - 2. Items indicated to receive other finishes.
 - 3. Items indicated to remain unfinished.
 - 4. Fire rating labels, equipment serial number and capacity labels, and operating parts of equipment.
 - 5. Non-metallic roofing and flashing.
 - 6. Stainless steel, anodized aluminum, bronze, terne-coated stainless steel, zinc, and lead.
 - 7. Floors, unless specifically indicated.
 - 8. Brick, glass unit masonry, architectural concrete, cast stone, integrally colored plaster and stucco.
 - 9. Glass.
 - 10. Concealed pipes, ducts, and conduits.

1.02 RELATED REQUIREMENTS

- A. Section 05 5000 - Metal Fabrications: Shop-primed items.
- B. Section 09 9123 - Interior Painting.

1.03 DEFINITIONS

- A. Comply with ASTM D16 for interpretation of terms used in this section.

1.04 REFERENCE STANDARDS

- A. 40 CFR 59, Subpart D - National Volatile Organic Compound Emission Standards for Architectural Coatings; U.S. Environmental Protection Agency; current edition.
- B. ASTM D16 - Standard Terminology for Paint, Related Coatings, Materials, and Applications; 2016.
- C. MPI (APSM) - Master Painters Institute Architectural Painting Specification Manual; Current Edition.
- D. SSPC-SP 1 - Solvent Cleaning; 2015, with Editorial Revision (2016).
- E. SSPC-SP 2 - Hand Tool Cleaning; 2018.
- F. SSPC-SP 3 - Power Tool Cleaning; 1982, with Editorial Revision (2004).
- G. SSPC-SP 6 - Commercial Blast Cleaning; 2007.

1.05 SUBMITTALS

- A. See Section 01 3000 - Administrative Requirements, for submittal procedures.
- B. Product Data: Provide complete list of products to be used, with the following information for each:
 - 1. Manufacturer's name, product name and/or catalog number, and general product category (e.g. "alkyd enamel").
 - 2. MPI product number (e.g. MPI #47).
 - 3. Cross-reference to specified paint system(s) product is to be used in; include description of each system.

1.06 QUALITY ASSURANCE

- A. Applicator Qualifications: Company specializing in performing the type of work specified with minimum five years documented experience.

1.07 DELIVERY, STORAGE, AND HANDLING

- A. Deliver products to site in sealed and labeled containers; inspect to verify acceptability.
- B. Container Label: Include manufacturer's name, type of paint, brand name, lot number, brand code, coverage, surface preparation, drying time, cleanup requirements, color designation, and instructions for mixing and reducing.
- C. Paint Materials: Store at minimum ambient temperature of 45 degrees F and a maximum of 90 degrees F, in ventilated area, and as required by manufacturer's instructions.

1.08 FIELD CONDITIONS

- A. Do not apply materials when surface and ambient temperatures are outside the paint product manufacturer's temperature ranges.
- B. Follow manufacturer's recommended procedures for producing best results, including testing of substrates, moisture in substrates, and humidity and temperature limitations.
- C. Do not apply exterior paint and finishes during rain or snow, or when relative humidity is outside the humidity ranges required by the paint product manufacturer.
- D. Provide lighting level of 80 ft candles measured mid-height at substrate surface.

PART 2 PRODUCTS

2.01 MANUFACTURERS

- A. Paints:
 - 1. Glidden Professional, a product of PPG Architectural Coatings: www.gliddenprofessional.com.
 - 2. Benjamin Moore & Co: www.benjaminmoore.com.
 - 3. Pratt & Lambert Paints: www.prattandlambert.com.
 - 4. Sherwin-Williams Company: www.sherwin-williams.com.
- B. Primer Sealers: Same manufacturer as top coats.
- C. Substitutions: See Section 01 6000 - Product Requirements.

2.02 PAINTS AND FINISHES - GENERAL

- A. Paints and Finishes: Ready-mixed, unless required to be a field-catalyzed paint.
 - 1. Provide paints and finishes of a soft paste consistency, capable of being readily and uniformly dispersed to a homogeneous coating, with good flow and brushing properties, and capable of drying or curing free of streaks or sags.
 - 2. Provide materials that are compatible with one another and the substrates indicated under conditions of service and application, as demonstrated by manufacturer based on testing and field experience.
 - 3. For opaque finishes, tint each coat including primer coat and intermediate coats, one-half shade lighter than succeeding coat, with final finish coat as base color.
 - 4. Supply each paint material in quantity required to complete entire project's work from a single production run.
 - 5. Do not reduce, thin, or dilute paint or finishes or add materials unless such procedure is described explicitly in manufacturer's product instructions.
- B. Volatile Organic Compound (VOC) Content:
 - 1. Provide paints and finishes that comply with the most stringent requirements specified in the following:
 - a. 40 CFR 59, Subpart D--National Volatile Organic Compound Emission Standards for Architectural Coatings.
 - b. Architectural coatings VOC limits of Louisiana.

2. Determination of VOC Content: Testing and calculation in accordance with 40 CFR 59, Subpart D (EPA Method 24), exclusive of colorants added to a tint base and water added at project site; or other method acceptable to authorities having jurisdiction.
 - C. Sheens: Provide the sheens specified; where sheen is not specified, sheen will be selected later by Architect from the manufacturer's full line.
 - D. Colors: To be selected from manufacturer's full range of available colors.
 1. Selection to be made by Architect after award of contract.
 2. Extend colors to surface edges; colors may change at any edge as directed by Architect.
- 2.03 PAINT SYSTEMS - EXTERIOR
- A. Paint ME-OP-2A - Ferrous Metals, Primed, Alkyd, 2 Coat:
 1. Touch-up with rust-inhibitive primer recommended by top coat manufacturer.
 2. Gloss: Two coats of alkyd enamel.
 - B. Paint MgE-OP-3A - Galvanized Metals, Alkyd, 3 Coat:
 1. One coat galvanize primer.
 2. Gloss: Two coats of alkyd enamel.
- 2.04 ACCESSORY MATERIALS
- A. Accessory Materials: Provide primers, sealers, cleaning agents, cleaning cloths, sanding materials, and clean-up materials as required for final completion of painted surfaces.
 - B. Patching Material: Latex filler.

PART 3 EXECUTION

3.01 EXAMINATION

- A. Do not begin application of paints and finishes until substrates have been properly prepared.
- B. Verify that surfaces are ready to receive work as instructed by the product manufacturer.
- C. Examine surfaces scheduled to be finished prior to commencement of work. Report any condition that may potentially effect proper application.
- D. If substrate preparation is the responsibility of another installer, notify Architect of unsatisfactory preparation before proceeding.
- E. Test shop-applied primer for compatibility with subsequent cover materials.
- F. Measure moisture content of surfaces using an electronic moisture meter. Do not apply finishes unless moisture content of surfaces are below the following maximums:
 1. Exterior Plaster and Stucco: 12 percent.
 2. Masonry, Concrete, and Concrete Masonry Units: 12 percent.
 3. Concrete Floors and Traffic Surfaces: 8 percent.

3.02 PREPARATION

- A. Clean surfaces thoroughly and correct defects prior to application.
- B. Prepare surfaces using the methods recommended by the manufacturer for achieving the best result for the substrate under the project conditions.
- C. Remove or repair existing paints or finishes that exhibit surface defects.
- D. Remove surface appurtenances, including electrical plates, hardware, light fixture trim, escutcheons, and fittings, prior to preparing surfaces for finishing.
- E. Seal surfaces that might cause bleed through or staining of topcoat.
- F. Remove mildew from impervious surfaces by scrubbing with solution of tetra-sodium phosphate and bleach. Rinse with clean water and allow surface to dry.
- G. Exterior Plaster: Fill hairline cracks, small holes, and imperfections with exterior patching plaster. Make smooth and flush with adjacent surfaces. Wash and neutralize high alkali surfaces.
- H. Galvanized Surfaces:
 1. Remove surface contamination and oils and wash with solvent according to SSPC-SP 1.

2. Prepare surface according to SSPC-SP 2.
- I. Ferrous Metal:
 1. Solvent clean according to SSPC-SP 1.
 2. Shop-Primed Surfaces: Sand and scrape to remove loose primer and rust. Feather edges to make touch-up patches inconspicuous. Clean surfaces with solvent. Prime bare steel surfaces.
 3. Remove rust, loose mill scale, and other foreign substances using methods recommended in writing by paint manufacturer and blast cleaning according to SSPC-SP 6 "Commercial Blast Cleaning". Protect from corrosion until coated.
- J. Metal Doors to be Painted: Prime metal door top and bottom edge surfaces.

3.03 APPLICATION

- A. Remove unfinished louvers, grilles, covers, and access panels on mechanical and electrical components and paint separately.
- B. Apply products in accordance with manufacturer's written instructions and recommendations in "MPI Architectural Painting Specification Manual".
- C. Where adjacent sealant is to be painted, do not apply finish coats until sealant is applied.
- D. Do not apply finishes to surfaces that are not dry. Allow applied coats to dry before next coat is applied.
- E. Apply each coat to uniform appearance.
- F. Dark Colors and Deep Clear Colors: Regardless of number of coats specified, apply additional coats until complete hide is achieved.
- G. Sand metal surfaces lightly between coats to achieve required finish.
- H. Vacuum clean surfaces of loose particles. Use tack cloth to remove dust and particles just prior to applying next coat.
- I. Reinstall electrical cover plates, hardware, light fixture trim, escutcheons, and fittings removed prior to finishing.

3.04 CLEANING

- A. Collect waste material that could constitute a fire hazard, place in closed metal containers, and remove daily from site.

3.05 PROTECTION

- A. Protect finishes until completion of project.
- B. Touch-up damaged finishes after Substantial Completion.

3.06 Schedule - Paint Systems

- A. Galvanized Steel: Finish surfaces exposed to view.
 1. Exterior: MgE-OP-3A, gloss.
- B. Shop-Primed Metal Items: Finish surfaces exposed to view.
 1. Finish the following items:
 - a. Exposed surfaces of lintels.
 - b. Roof access ladders.
 - c. Metal doors and frames.
 2. Exterior: ME-OP-2A, semi-gloss.

END OF SECTION

SECTION 09 9123 - INTERIOR PAINTING

PART 1 GENERAL

1.01 SECTION INCLUDES

- A. Surface preparation.
- B. Field application of paints.
- C. Scope: Finish interior surfaces exposed to view, unless fully factory-finished and unless otherwise indicated, including the following:
 - 1. Both sides and edges of plywood backboards for electrical and telecom equipment before installing equipment.
 - 2. Mechanical and Electrical:
 - a. In finished areas, paint insulated and exposed pipes, conduit, boxes, insulated and exposed ducts, hangers, brackets, collars and supports, mechanical equipment, and electrical equipment, unless otherwise indicated.
 - b. In finished areas, paint shop-primed items.
 - c. Paint interior surfaces of air ducts that are visible through grilles and louvers with one coat of flat black paint to visible surfaces.
- D. Do Not Paint or Finish the Following Items:
 - 1. Items factory-finished unless otherwise indicated; materials and products having factory-applied primers are not considered factory finished.
 - 2. Items indicated to receive other finishes.
 - 3. Items indicated to remain unfinished.
 - 4. Fire rating labels, equipment serial number and capacity labels, bar code labels, and operating parts of equipment.
 - 5. Stainless steel, anodized aluminum, bronze, terne-coated stainless steel, and lead items.
 - 6. Marble, granite, slate, and other natural stones.
 - 7. Floors, unless specifically indicated.
 - 8. Glass.
 - 9. Acoustical materials, unless specifically indicated.
 - 10. Concealed pipes, ducts, and conduits.

1.02 RELATED REQUIREMENTS

- A. Section 09 9113 - Exterior Painting.

1.03 DEFINITIONS

- A. Comply with ASTM D16 for interpretation of terms used in this section.

1.04 REFERENCE STANDARDS

- A. 40 CFR 59, Subpart D - National Volatile Organic Compound Emission Standards for Architectural Coatings; U.S. Environmental Protection Agency; current edition.
- B. ASTM D16 - Standard Terminology for Paint, Related Coatings, Materials, and Applications; 2016.
- C. ASTM D4442 - Standard Test Methods for Direct Moisture Content Measurement of Wood and Wood-Based Materials; 2016.
- D. MPI (APL) - Master Painters Institute Approved Products List; Master Painters and Decorators Association; Current Edition.
- E. MPI (APSM) - Master Painters Institute Architectural Painting Specification Manual; Current Edition.
- F. SSPC V1 (PM1) - Good Painting Practice: Painting Manual, Volume 1; 2016.
- G. SSPC-SP 1 - Solvent Cleaning; 2015, with Editorial Revision (2016).
- H. SSPC-SP 2 - Hand Tool Cleaning; 2018.

1.05 SUBMITTALS

- A. See Section 01 3000 - Administrative Requirements, for submittal procedures.
- B. Product Data: Provide complete list of products to be used, with the following information for each:
 - 1. Manufacturer's name, product name and/or catalog number, and general product category (e.g., "alkyd enamel").
 - 2. MPI product number (e.g., MPI #47).
 - 3. Cross-reference to specified paint system(s) product is to be used in; include description of each system.
- C. Manufacturer's Instructions: Indicate special surface preparation procedures.
- D. Maintenance Data: Submit data including product technical data sheets, material safety data sheets (MSDS), care and cleaning instructions, touch-up procedures, and repair of painted and finished surfaces.

1.06 QUALITY ASSURANCE

- A. Applicator Qualifications: Company specializing in performing the type of work specified with minimum five years documented experience.

1.07 DELIVERY, STORAGE, AND HANDLING

- A. Deliver products to site in sealed and labeled containers; inspect to verify acceptability.
- B. Container Label: Include manufacturer's name, type of paint, brand name, lot number, brand code, coverage, surface preparation, drying time, cleanup requirements, color designation, and instructions for mixing and reducing.
- C. Paint Materials: Store at minimum ambient temperature of 45 degrees F and a maximum of 90 degrees F, in ventilated area, and as required by manufacturer's instructions.

1.08 FIELD CONDITIONS

- A. Do not apply materials when surface and ambient temperatures are outside the temperature ranges required by the paint product manufacturer.
- B. Follow manufacturer's recommended procedures for producing best results, including testing of substrates, moisture in substrates, and humidity and temperature limitations.
- C. Do not apply materials when relative humidity exceeds 85 percent, at temperatures less than 5 degrees F above the dew point, or to damp or wet surfaces.
- D. Minimum Application Temperatures for Paints: 50 degrees F for interiors unless required otherwise by manufacturer's instructions.
- E. Provide lighting level of 80 ft candles measured mid-height at substrate surface.

PART 2 PRODUCTS

2.01 MANUFACTURERS

- A. Provide paints and finishes used in any individual system from the same manufacturer; no exceptions.
- B. Paints:
 - 1. Pittsburgh Paints: www.ppgpaints.com/#sle.
 - 2. Sherwin-Williams Company: www.sherwin-williams.com/#sle.
 - 3. Benjamin Moore & Co.: www.benjaminmoore.com.
 - 4. Pratt & Lambert Paints: www.prattandlambert.com.
- C. Primer Sealers: Same manufacturer as top coats.
- D. Substitutions: See Section 01 6000 - Product Requirements.

2.02 PAINTS AND FINISHES - GENERAL

- A. Paints and Finishes: Ready-mixed, unless intended to be a field-catalyzed paint.
 - 1. Provide paints and finishes of a soft paste consistency, capable of being readily and uniformly dispersed to a homogeneous coating, with good flow and brushing properties, and capable of drying or curing free of streaks or sags.

2. Provide materials that are compatible with one another and the substrates indicated under conditions of service and application, as demonstrated by manufacturer based on testing and field experience.
3. For opaque finishes, tint each coat including primer coat and intermediate coats, one-half shade lighter than succeeding coat, with final finish coat as base color.
4. Supply each paint material in quantity required to complete entire project's work from a single production run.
5. Do not reduce, thin, or dilute paint or finishes or add materials unless such procedure is specifically described in manufacturer's product instructions.
- B. Primers: Unless other primer is required or recommended by manufacturer of top coats; where the manufacturer offers options on primers for a particular substrate, use primer categorized as "best" by the manufacturer.
- C. Volatile Organic Compound (VOC) Content:
 1. Provide paints and finishes that comply with the most stringent requirements specified in the following:
 - a. 40 CFR 59, Subpart D--National Volatile Organic Compound Emission Standards for Architectural Coatings.
 - b. Architectural coatings VOC limits of Louisiana.
 2. Determination of VOC Content: Testing and calculation in accordance with 40 CFR 59, Subpart D (EPA Method 24), exclusive of colorants added to a tint base and water added at project site; or other method acceptable to authorities having jurisdiction.
- D. Sheens: Provide the sheens specified; where sheen is not specified, sheen will be selected later by Architect from the manufacturer's full line.
- E. Colors: To be selected from manufacturer's full range of available colors.
 1. Selection to be made by Architect after award of contract.
 2. Extend colors to surface edges; colors may change at any edge as directed by Architect.
 3. In finished areas, finish pipes, ducts, conduit, and equipment the same color as the wall/ceiling under which they are mounted.

2.03 PAINT SYSTEMS - INTERIOR

- A. Paint CI-OP-3L - Concrete/Masonry, Opaque, Latex, 3 Coat:
 1. One coat of block filler.
 2. Semi-gloss: Two coats of latex enamel.
- B. Paint MI-OP-2A - Ferrous Metals, Primed, Alkyd, 2 Coat:
 1. Touch-up with alkyd primer.
 2. Semi-gloss: Two coats of alkyd enamel.
- C. Paint MgI-OP-3A - Galvanized Metals, Alkyd, 3 Coat:
 1. One coat galvanize primer.
 2. Semi-gloss: Two coats of alkyd enamel.
- D. Paint GI-OP-3LA - Gypsum Board/Plaster, Latex-Acrylic, 3 Coat:
 1. One coat of alkyd primer sealer.
 2. Eggshell: Two coats of latex-acrylic enamel.
 3. Flat: Two coats of latex enamel-acrylic.
- E. Paint GI-P-1A - Gypsum Board/Plaster, Alkyd Primer, 1 Coat:
 1. One coat of alkyd primer sealer.

2.04 ACCESSORY MATERIALS

- A. Accessory Materials: Provide primers, sealers, cleaning agents, cleaning cloths, sanding materials, and clean-up materials as required for final completion of painted surfaces.
- B. Patching Material: Latex filler.

PART 3 EXECUTION

3.01 EXAMINATION

- A. Verify that surfaces are ready to receive work as instructed by the product manufacturer.
- B. Examine surfaces scheduled to be finished prior to commencement of work. Report any condition that may potentially affect proper application.
- C. Test shop-applied primer for compatibility with subsequent cover materials.
- D. Measure moisture content of surfaces using an electronic moisture meter. Do not apply finishes unless moisture content of surfaces is below the following maximums:
 - 1. Gypsum Wallboard: 12 percent.
 - 2. Masonry, Concrete, and Concrete Masonry Units: 12 percent.
 - 3. Interior Wood: 15 percent, measured in accordance with ASTM D4442.

3.02 PREPARATION

- A. Clean surfaces thoroughly and correct defects prior to application.
- B. Prepare surfaces using the methods recommended by the manufacturer for achieving the best result for the substrate under the project conditions.
- C. Remove surface appurtenances, including electrical plates, hardware, light fixture trim, escutcheons, and fittings, prior to preparing surfaces or finishing.
- D. Seal surfaces that might cause bleed through or staining of topcoat.
- E. Remove mildew from impervious surfaces by scrubbing with solution of tetra-sodium phosphate and bleach. Rinse with clean water and allow surface to dry.
- F. Masonry:
 - 1. Remove efflorescence and chalk. Do not coat surfaces if moisture content, alkalinity of surfaces, or if alkalinity of mortar joints exceed that permitted in manufacturer's written instructions. Allow to dry.
 - 2. Prepare surface as recommended by top coat manufacturer.
- G. Gypsum Board: Fill minor defects with filler compound. Spot prime defects after repair.
- H. Galvanized Surfaces:
 - 1. Remove surface contamination and oils and wash with solvent according to SSPC-SP 1.
 - 2. Prepare surface according to SSPC-SP 2.
- I. Ferrous Metal:
 - 1. Solvent clean according to SSPC-SP 1.
 - 2. Shop-Primed Surfaces: Sand and scrape to remove loose primer and rust. Feather edges to make touch-up patches inconspicuous. Clean surfaces with solvent. Prime bare steel surfaces.
- J. Metal Doors to be Painted: Prime metal door top and bottom edge surfaces.

3.03 APPLICATION

- A. Remove unfinished louvers, grilles, covers, and access panels on mechanical and electrical components and paint separately.
- B. Apply products in accordance with manufacturer's written instructions.
- C. Where adjacent sealant is to be painted, do not apply finish coats until sealant is applied.
- D. Do not apply finishes to surfaces that are not dry. Allow applied coats to dry before next coat is applied.
- E. Apply each coat to uniform appearance in thicknesses specified by manufacturer.
- F. Dark Colors and Deep Clear Colors: Regardless of number of coats specified, apply as many coats as necessary for complete hide.
- G. Sand wood and metal surfaces lightly between coats to achieve required finish.
- H. Vacuum clean surfaces of loose particles. Use tack cloth to remove dust and particles just prior to applying next coat.
- I. Reinstall electrical cover plates, hardware, light fixture trim, escutcheons, and fittings removed prior to finishing.

3.04 CLEANING

- A. Collect waste material that could constitute a fire hazard, place in closed metal containers, and remove daily from site.

3.05 PROTECTION

- A. Protect finishes until completion of project.
- B. Touch-up damaged finishes after Substantial Completion.

3.06 SCHEDULE - PAINT SYSTEMS

- A. Concrete, Concrete Masonry Units (CMU), Concrete Block, Brick Masonry: Finish surfaces exposed to view.
 - 1. Interior: CI-OP-3L, semi-gloss.
- B. Gypsum Board: Finish surfaces exposed to view.
 - 1. Interior Ceilings and Bulkheads: GI-OP-3E, flat.
 - 2. Interior Walls: GI-OP-3LKA, eggshell UNO.
 - 3. Interior Bathroom Walls: GI-OP-3E, semi-gloss.
- C. Steel Fabrications: Finish surfaces exposed to view.
 - 1. Interior: MI-OP-2A, semi-gloss.
- D. Galvanized Steel: Finish surfaces exposed to view.
 - 1. Interior: Mgl-OP-3A.
- E. Shop-Primed Metal Items: Finish surfaces exposed to view.
 - 1. Interior: MI-OP-2A.

END OF SECTION

SECTION 10 1100 - VISUAL DISPLAY UNITS

PART 1 GENERAL

1.01 SECTION INCLUDES

- A. Porcelain enamel steel markerboards.
- B. Tackboards.
- C. Bulletin board cabinets.

1.02 RELATED REQUIREMENTS

- A. Section 06 1000 - Rough Carpentry: Blocking and supports.
- B. Section 09 2116 - Gypsum Board Assemblies: Concealed supports in metal stud walls.

1.03 REFERENCE STANDARDS

- A. ANSI A135.4 - American National Standard for Basic Hardboard; 2012.
- B. ANSI A208.1 - American National Standard for Particleboard; 2009.
- C. ASTM A424/A424M - Standard Specification for Steel, Sheet, for Porcelain Enameling; 2018.
- D. ASTM E84 - Standard Test Method for Surface Burning Characteristics of Building Materials; 2018b.

1.04 SUBMITTALS

- A. See Section 01 3000 - Administrative Requirements, for submittal procedures.
- B. Product Data: Provide manufacturer's data on porcelain enamel steel markerboard, tackboard, and accessories.
- C. Shop Drawings: Indicate wall elevations, dimensions, joint locations.
- D. Samples: Color charts for selection of color and texture of tackboard surface covering.

1.05 QUALITY ASSURANCE

- A. Manufacturer Qualifications: Company specializing in manufacturing the products specified in this section with minimum five years documented experience.

1.06 WARRANTY

- A. See Section 01 7800 - Closeout Submittals, for additional warranty requirements.
- B. Provide five year warranty for markerboard to include warranty against discoloration due to cleaning, crazing or cracking, and staining.

PART 2 PRODUCTS

2.01 VISUAL DISPLAY UNITS

- A. Magnetic Porcelain Enamel Steel Markerboards [Type A4]:
 - 1. Manufacturers:
 - a. Claridge Products and Equipment, Inc: www.claridgeproducts.com/#sle.
 - b. Nelson Adams NACO: www.nelsonadamsnaco.com/#sle.
 - c. MooreCo, Inc.: www.moorecoinc.com.
 - d. Substitutions: See Section 01 6000 - Product Requirements.
 - 2. Color: White.
 - 3. Steel Face Sheet Thickness: 24 gauge, 0.0239 inch .
 - 4. Core: Particleboard, 1/2 inch thick, laminated to face sheet.
 - 5. Backing: Galvanized steel sheet, laminated to core.
 - 6. Size: As indicated on drawings.
 - 7. Frame: Extruded aluminum , with concealed fasteners.
 - 8. Frame Finish: Anodized, natural.

9. Accessories: Provide marker tray and map rail.
10. Products:
 - a. Claridge Series 5 Factory Built Markerboards or equal.
 - b. Substitutions: See Section 01 6000 - Product Requirements.
- B. Tackboards [Type B1]: Composition cork.
 1. Cork Thickness: 1/4 inch.
 2. Color: As selected from manufacturer's full range.
 3. Backing: Hardboard, 1/4 inch thick, laminated to tack surface.
 4. Surface Burning Characteristics: Flame spread index of 25, maximum, and smoke developed index of 450, maximum, when tested in accordance with ASTM E84.
 5. Size: As indicated on drawings.
 6. Frame: Extruded aluminum, with concealed fasteners.
 7. Frame Profile: Manufacturer's standard.
 8. Frame Finish: Anodized, natural.
 9. Products:
 - a. Claridge Series 5 with Claridge Cork or equal.
- C. Bulletin Board Cabinets [Type S]: Factory-fabricated aluminum-framed unit with tackable panel on back inside surface and glazed door at front.
 1. Width: 3 feet.
 2. Height: 3 feet.
 3. Depth: 2 inches.
 4. Aluminum Frames: Extruded aluminum, with concealed fasteners. Anodized, natural finish.
 5. Frame Profile: Square frame section with square cabinet corners.
 6. Components:
 - a. Glazed Door: Hinged, clear acrylic sheet.
 - b. Tackable Back Panel: Composition cork.
 7. Products:
 - a. Claridge Series 2300 Economy Bulletin Board Cabinet or equal.
 - b. Substitutions: See Section 01 6000 - Product Requirements.

2.02 MATERIALS

- A. Porcelain Enameled Steel Sheet: ASTM A424/A424M, Type I, Commercial Steel, with fired-on vitreous finish.
- B. Hardboard for Cores: ANSI A135.4, Class 1 - Tempered, S2S (smooth two sides).
- C. Particleboard: ANSI A208.1; wood chips, set with waterproof resin binder, sanded faces.
- D. Steel Sheet Backing: 28 gauge, 0.0149 inch, galvanized.
- E. Adhesives: Type used by manufacturer.

2.03 ACCESSORIES

- A. Map Rail: Extruded aluminum, manufacturer's standard profile, with cork insert and runners for accessories; 1 inch wide overall, full width of frame.
- B. Marker Tray: Aluminum, manufacturer's standard profile, one piece full length of markerboard, molded ends, concealed fasteners, same finish as frame.
- C. Mounting Brackets: Concealed.

PART 3 EXECUTION

3.01 EXAMINATION

- A. Verify that field measurements are as indicated.
- B. Verify that internal wall blocking is ready to receive work and positioning dimensions are as indicated on shop drawings.

3.02 PREPARATION

- A. Acclimatize tackable wall panels by removing from packaging in installation area not less than 24 hours before application.
- B. Prepare surfaces using the methods recommended by the manufacturer for achieving the best result for the substrate under the project conditions.

3.03 INSTALLATION

- A. Install boards in accordance with manufacturer's instructions.
- B. Install with bottom of perimeter frame at 36 inches above finished floor.
- C. Secure units level and plumb.

3.04 CLEANING

- A. Clean board surfaces in accordance with manufacturer's instructions.

END OF SECTION

SECTION 10 1400 - SIGNAGE

PART 1 GENERAL

1.01 SECTION INCLUDES

- A. Room and door signs.
- B. Interior informational signs.

1.02 REFERENCE STANDARDS

- A. 36 CFR 1191 - Americans with Disabilities Act (ADA) Accessibility Guidelines for Buildings and Facilities; Architectural Barriers Act (ABA) Accessibility Guidelines; current edition.
- B. ADA Standards - Americans with Disabilities Act (ADA) Standards for Accessible Design; 2010.
- C. ICC A117.1 - Accessible and Usable Buildings and Facilities; 2017.

1.03 SUBMITTALS

- A. See Section , for submittal procedures.
- B. Product Data: Manufacturer's printed product literature for each type of sign, indicating sign styles, font, foreground and background colors, locations, overall dimensions of each sign.
- C. Signage Schedule: Provide information sufficient to completely define each sign for fabrication, including room number, room name, other text to be applied, sign and letter sizes, fonts, and colors.
- D. Selection Samples: Where colors are not specified, submit two sets of color selection charts or chips.
- E. Manufacturer's Qualification Statement.

1.04 QUALITY ASSURANCE

- A. Manufacturer Qualifications: Company specializing in manufacturing the products specified in this section with minimum years of experience.

1.05 DELIVERY, STORAGE, AND HANDLING

- A. Package signs as required to prevent damage before installation.
- B. Store tape adhesive at normal room temperature.

1.06 FIELD CONDITIONS

- A. Do not install tape adhesive when ambient temperature is lower than recommended by manufacturer.
- B. Maintain this minimum temperature during and after installation of signs.

PART 2 PRODUCTS

2.01 MANUFACTURERS

- A. Flat Signs:
 - 1. Basis of Design: ASI Sign Systems, Inc.: www.asisignage.com.
 - a. Contract: Lacy Jorden, (318)706-9212 lacy.jorden@asisignage.com.
- B. Alternate Manufacturers:
 - 1. Best Sign Systems, Inc: www.bestsigns.com/#sle.
 - 2. Inpro: www.inprocorp.com/#sle.
 - 3. Mohawk Sign Systems, Inc: www.mohawksign.com/#sle.
 - 4. Substitutions: See Section 01 6000 - Product Requirements.

2.02 SIGNAGE APPLICATIONS

- A. Accessibility Compliance: Signs are required to comply with ADA Standards and ICC A117.1 and applicable building codes, unless otherwise indicated; in the event of conflicting requirements, comply with the most comprehensive and specific requirements.

- B. Room Signs: [Types A, B, C, E and F]:
 - 1. Sign Type: Flat signs with thermoformed panel media as specified with contrasting color backplate and screen printed logo.
 - 2. Provide "tactile" signage, with letters raised minimum and Grade II braille.
 - 3. Sizes: As indicated on the drawings.
 - 4. Office/Classroom Doors: Identify with the room numbers indicated on drawings; in addition, provide "window" section for replaceable occupant name.
 - 5. Service Rooms: Identify with the room names and numbers indicated on drawings.
 - 6. Rest Rooms: Identify with pictograms, the names "MEN" and "WOMEN", and braille.
- C. Interior Informational Sign [Type D]:
 - 1. Sign Type: signs media as specified.
 - 2. Sizes: As indicated on drawings.
 - 3. Wording of signs is scheduled on drawings.

2.03 SIGN TYPES

- A. Flat Signs: Signage media without frame. Refer to drawings for sizes and arrangement.
 - 1. Edges:
 - 2. Corners:
 - 3. Clear Cover: For customer produced sign media, provide clear cover of polycarbonate plastic, glossy on back, non-glare on front.
 - 4. Wall Mounting of One-Sided Signs: Mount back panel using concealed screws with tape mounted front panels..
- B. Color and Font: Unless otherwise indicated:
 - 1. Character Font: Helvetica.
 - 2. Character Case:
 - 3. Background Color: As selected from manufacturer's full range of color options.
 - 4. Character Color: Contrasting color as selected.

2.04 TACTILE SIGNAGE MEDIA

- A. Engraved Panels: Laminated colored plastic; engraved through face to expose core as background color:
 - 1. Total Thickness:

2.05 ACCESSORIES

- A. Concealed Screws: Stainless steel, galvanized steel, chrome plated, or other non-corroding metal.
- B. Exposed Screws:
- C. Tape Adhesive: Double sided tape, permanent adhesive.
- D. Silicone Adhesive: As recommended by manufacturer for subsurface application.

PART 3 EXECUTION

3.01 EXAMINATION

- A. Verify that substrate surfaces are ready to receive work.

3.02 INSTALLATION

- A. Install in accordance with manufacturer's instructions.
- B. Install neatly, with horizontal edges level.
- C. Locate signs and mount at locations indicated on drawings and in accordance with ADA Standards and ICC A117.1.
 - 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 Architect's instructions.
- D. Protect from damage until Date of Substantial Completion; repair or replace damaged items.

END OF SECTION

SECTION 10 2113.17 - PHENOLIC TOILET COMPARTMENTS

PART 1 GENERAL

1.01 SECTION INCLUDES

- A. Phenolic toilet compartments.
- B. Urinal screens.

1.02 RELATED REQUIREMENTS

- A. Section 10 2800 - Toilet, Bath, and Laundry Accessories.

1.03 REFERENCE STANDARDS

- A. ASTM A666/A666M - Standard Specification for Annealed or Cold-Worked Austenitic Stainless Steel Sheet, Strip, Plate, and Flat Bar; 2024.

1.04 SUBMITTALS

- A. See Section 01 3000 - Administrative Requirements, for submittal procedures.
- B. Product Data: Provide data on panel construction, hardware, and accessories.
- C. Shop Drawings: Indicate partition plan, elevation views, dimensions, details of wall and floor supports, door swings.
- D. Samples for Selection: Submit samples of manufacturer's full color range for selection of colors.
- E. Manufacturer's Installation Instructions: Indicate special procedures.

PART 2 PRODUCTS

2.01 MANUFACTURERS

- A. Phenolic Toilet Compartments:
 - 1. Basis of Design: ASI Accurate Partitions: www.asi-accuratepartitions.com/#sle.
 - 2. Substitutions: Section 01 6000 - Product Requirements.
 - a. Substitutions must be prior approved by the Architect and must match existing partitions color, design, and hardware.

2.02 PHENOLIC TOILET COMPARTMENTS

- A. Toilet Compartments: Factory fabricated doors, pilasters, and divider panels made of solid phenolic core panels with integral melamine finish, floor-mounted headrail-braced.
 - 1. Color: Dove Gray #3010.
- B. Doors:
 - 1. Thickness: 3/4 inch.
 - 2. Width: 24 inch.
 - 3. Width for Handicapped Use: 36 inch, out-swinging.
 - 4. Height: 58 inch.
- C. Panels:
 - 1. Thickness: 1/2 inch.
 - 2. Height: 58 inch.
 - 3. Depth: As indicated on drawings.
- D. Pilasters:
 - 1. Thickness: 3/4 inch.
 - 2. Width: As required to fit space; minimum 3 inch.
- E. Screens: Without doors; to match compartments; mounted to wall with continuous panel brackets, and floor-to-ceiling vertical upright consisting of pilaster anchored to floor and ceiling.

2.03 ACCESSORIES

- A. Pilaster Shoes: Formed ASTM A666 Type 304 stainless steel with No. 4 finish, 3 inch high, concealing floor fastenings.
 - 1. Provide adjustment for floor variations with screw jack through steel saddles integral with pilaster.
- B. Head Rails: Hollow stainless steel, 1 inch by 1-1/2 inch size, with anti-grip profile and cast socket wall brackets.
- C. Wall and Pilaster Brackets: Satin stainless steel; continuous type.
- D. Attachments, Screws, and Bolts: Stainless steel , tamper proof type Trox pin-in.
 - 1. For attaching panels and pilasters to brackets: Through-bolts and nuts ; tamper proof Trox pin-in.
- E. Hardware: Satin stainless steel:
 - 1. Pivot hinges, gravity type, adjustable for door close positioning; two per door.
 - 2. Nylon bearings.
 - 3. Door Latch: Slide type with exterior emergency access feature.
 - 4. Door strike and keeper with rubber bumper; mounted on pilaster in alignment with door latch.
 - 5. Coat hook with rubber bumper; one per compartment, mounted on door.
 - 6. Provide door pull for outswinging doors.

PART 3 EXECUTION

3.01 EXAMINATION

- A. Verify that field measurements are as indicated.
- B. Verify correct spacing of and between plumbing fixtures.
- C. Verify correct location of built-in framing, anchorage, and bracing.

3.02 INSTALLATION

- A. Install partitions secure, rigid, plumb, and level in accordance with manufacturer's instructions.
- B. Maintain 3/8 inch to 1/2 inch space between wall and panels and between wall and end pilasters.
- C. Attach panel brackets securely to walls using anchor devices.
- D. Attach panels and pilasters to brackets. Locate head rail joints at pilaster center lines.
- E. Field touch-up of scratches or damaged finish will not be permitted. Replace damaged or scratched materials with new materials.

3.03 TOLERANCES

- A. Maximum Variation From True Position: 1/4 inch.
- B. Maximum Variation From Plumb: 1/8 inch.

3.04 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.
- C. Adjust adjacent components for consistency of line or plane.

END OF SECTION

SECTION 10 2601 - WALL AND CORNER GUARDS

PART 1 GENERAL

1.01 SECTION INCLUDES

- A. Corner guards.

1.02 RELATED REQUIREMENTS

- A. Section 06 1000 - Rough Carpentry: Blocking for wall and corner guard anchors.
- B. Section 09 2116 - Gypsum Board Assemblies: Placement of supports in stud wall construction.
- C. Section 09 9123 - Interior Painting: Painted finish on aluminum retainer prior to installation of vinyl guard.

1.03 REFERENCE STANDARDS

- A. ASTM E84 - Standard Test Method for Surface Burning Characteristics of Building Materials; 2018b.

1.04 SUBMITTALS

- A. See Section 01 3000 - Administrative Requirements for submittal procedures.
- B. Product Data: Indicate physical dimensions, features, and anchorage details.
- C. Samples: Submit full range of manufacturer's color options for selection.
- D. Warranty Documentation: Submit manufacturer warranty and ensure that forms have been completed in Owner's name and registered with manufacturer.
- E. Maintenance Data: Manufacturer's instructions for care and cleaning of each type of product. Include information about both recommended and potentially detrimental cleaning materials and methods.

1.05 DELIVERY, STORAGE, AND HANDLING

- A. Deliver wall and door protection items in original, undamaged protective packaging. Label items to designate installation locations.
- B. Protect work from moisture damage.
- C. Protect work from UV light damage.
- D. Do not deliver products to project site until areas for storage and installation are fully enclosed, and interior temperature and humidity are in compliance with manufacturer's recommendations for each type of item.
- E. Store products in either horizontal or vertical position, in compliance with manufacturer's instructions.

1.06 WARRANTY

- A. See Section 01 7800 - Closeout Submittals for additional warranty requirements.
- B. Correct defective Work within a one year period after Date of Substantial Completion.

PART 2 PRODUCTS

2.01 MANUFACTURERS

- A. Corner Guards:
 - 1. Construction Specialties, Inc; SFS-20N: www.c-sgroup.com/#sle.
 - 2. Inpro; 160F: www.inprocorp.com/#sle.
 - 3. Substitutions: See Section 01 6000 - Product Requirements.

2.02 PERFORMANCE CRITERIA

- A. Impact Strength: Unless otherwise noted, provide protection products and assemblies that have been successfully tested for compliance with applicable provisions of ASTM D256 and/or ASTM F476.

- B. Chemical and Stain Resistance: Unless otherwise noted, provide protection products and assemblies with chemical and stain resistance complying with applicable provisions of ASTM D543.
- C. Fungal Resistance: Unless otherwise noted, provide protection products and assemblies which pass ASTM G21 testing.

2.03 PRODUCT TYPES

- A. Corner Guards - Flush Mounted:
 - 1. Material: High impact vinyl with full height extruded aluminum retainer.
 - 2. Performance: Resist lateral impact force of 100 lbs at any point without damage or permanent set.
 - 3. Fire Resistance: Where fire rating is specified for the wall in which the guard is mounted, provide assemblies that have been tested in accordance with ASTM E119 for the same rating as the wall.
 - 4. Surface Burning Characteristics: Provide assemblies with flame spread index of 25 or less and smoke developed index of 450 or less, when tested in accordance with ASTM E84.
 - 5. Width of Wings: 2 inches.
 - 6. Corner: Square.
 - 7. Color: As selected from manufacturer's full line of color options.
 - 8. Length: One piece, top of base to ceiling (up to 12').
 - 9. Base: Provide 4 inch aluminum base attached to aluminum retainer.
 - 10. End Caps: Provide at lengths over 12', otherwise butt corner guard to ceiling.
- B. Mounting Brackets and Attachment Hardware: Appropriate to component and substrate.

2.04 FABRICATION

- A. Fabricate components with tight joints, corners and seams.
- B. Pre-drill holes for attachment.

PART 3 EXECUTION

3.01 EXAMINATION

- A. Verify that rough openings, concealed blocking, and anchors are correctly sized and located.
- B. Start of installation constitutes acceptance of project conditions.

3.02 INSTALLATION

- A. Install components in accordance with manufacturer's instructions, level and plumb, secured rigidly in position to supporting construction.
- B. Position corner guard at top of wall base.
- C.

3.03 TOLERANCES

- A. Maximum Variation From Required Height: 1/4 inch.
- B. Maximum Variation From Level or Plane For Visible Length: 1/4 inch.

3.04 CLEANING

- A. Clean wall protection items of excess adhesive, dust, dirt, and other contaminants.

END OF SECTION

SECTION 10 2800 - TOILET, BATH, AND LAUNDRY ACCESSORIES

PART 1 GENERAL

1.01 SECTION INCLUDES

- A. Commercial toilet accessories.
- B. Utility room accessories.

1.02 RELATED REQUIREMENTS

- A. Section 06 1000 - Rough Carpentry: Concealed supports for accessories, including in wall framing and plates.
- B. Section 10 2113.17 Phenolic Toilet Compartments.

1.03 REFERENCE STANDARDS

- A. ADA Standards - Americans with Disabilities Act (ADA) Standards for Accessible Design; 2010.
- B. ASTM A123/A123M - Standard Specification for Zinc (Hot-Dip Galvanized) Coatings on Iron and Steel Products; 2017.
- C. ASTM A653/A653M - Standard Specification for Steel Sheet, Zinc-Coated (Galvanized) or Zinc-Iron Alloy-Coated (Galvannealed) by the Hot-Dip Process; 2018.
- D. ASTM A666/A666M - Standard Specification for Annealed or Cold-Worked Austenitic Stainless Steel Sheet, Strip, Plate, and Flat Bar; 2024.
- E. ASTM C1036 - Standard Specification for Flat Glass; 2016.
- F. ASTM C1503 - Standard Specification for Silvered Flat Glass Mirror; 2018.
- G. ICC A117.1 - Accessible and Usable Buildings and Facilities; 2017.

1.04 ADMINISTRATIVE REQUIREMENTS

- A. Coordinate the work with the placement of internal wall reinforcement and reinforcement of toilet partitions to receive anchor attachments.

1.05 SUBMITTALS

- A. See Section 01 3000 - Administrative Requirements, for submittal procedures.
- B. Product Data: Submit data on accessories describing size, finish, details of function, and attachment methods.

PART 2 PRODUCTS

2.01 MANUFACTURERS

- A. Products listed are made by Bobrick Washroom Equipment, Inc.: www.bobrick.com. Provide the named product or a comparable product by one of the following:
- B. Commercial Toilet, Shower, and Bath Accessories:
 - 1. American Specialties, Inc: www.americanspecialties.com/#sle.
 - 2. Bradley Corporation: www.bradleycorp.com/#sle.
 - 3. Georgia-Pacific Professional: www.gppro.com/#sle.
 - 4. Substitutions: Section 01 6000 - Product Requirements.
- C. Provide products of each category type by single manufacturer.

2.02 MATERIALS

- A. Accessories - General: Shop assembled, free of dents and scratches and packaged complete with anchors and fittings, steel anchor plates, adapters, and anchor components for installation.
 - 1. Grind welded joints smooth.
 - 2. Fabricate units made of metal sheet of seamless sheets with flat surfaces.

- B. Keys: Provide 2 keys for each accessory to Owner; all items keyed alike.
- C. Stainless Steel Sheet: ASTM A666/A666M, Type 304.
- D. Galvanized Sheet Steel: Hot-dipped galvanized steel sheet, ASTM A653/A653M, with G90/Z275 coating.
- E. Mirror Glass: Annealed float glass, ASTM C1036 Type I, Class 1, Quality Q2, with silvering, protective and physical characteristics complying with ASTM C1503.
- F. Adhesive: Two component epoxy type, waterproof.
- G. Fasteners, Screws, and Bolts: Hot dip galvanized; tamper-proof; security type.
- H. Expansion Shields: Fiber, lead, or rubber as recommended by accessory manufacturer for component and substrate.

2.03 FINISHES

- A. Stainless Steel: Satin finish, unless otherwise noted.
- B. Baked Enamel: Pretreat to clean condition, apply one coat primer and minimum two coats epoxy baked enamel.
- C. Galvanizing for Items Other than Sheet: Comply with ASTM A123/A123M; galvanize ferrous metal and fastening devices.

2.04 Commercial Toilet Accessories

- A. Corner Grab Bars: Stainless steel, nonslip grasping surface finish.
 - 1. Standard Duty Grab Bars:
 - a. Push/Pull Point Load: 250 pound-force, minimum.
 - b. Dimensions: 1-1/4 inch outside diameter, minimum 0.05 inch wall thickness, concealed flange mounting, 1-1/2 inch clearance between wall and inside of grab bar.
 - c. Length and Configuration: As indicated on drawings.
 - d. Product: B-68137 as manufactured by Bobrick Washroom Equipment Inc.
- B. Toilet Paper Dispenser: Double roll, surface mounted, for cored type rolls.
 - 1. Products:
 - a. Product: 59206 as manufactured by Georgia-Pacific.
 - b. Substitutions: Section 01 6000 - Product Requirements.
- C. Large Mirror:
 - 1. Size: 72 x 48 inches.
 - 2. Annealed Float Glass: Silvering, protective and physical characteristics in compliance with ASTM C1503.
 - 3. Frame: 0.05 inch channel shapes, with mitered and welded and ground corners, and tamperproof hanging system; satin finish.
 - 4. Backing: Full-mirror sized, minimum 0.03 inch galvanized steel sheet and nonabsorptive filler material.
 - 5. Product: B-165 as manufactured by Bobrick Washroom Equipment, Inc.
- D. Combination Paper Towel Dispenser and Waste: Manual, roll paper type.
 - 1. Cover: Stainless steel.
 - 2. Paper Discharge: manual dispense by touch-free pull.
 - 3. Capacity: 8-inch diameter roll.
 - 4. Mounting: Semi recessed.
 - 5. Waste Receptacle: 12 gallon.
 - 6. Product: B-3961 as manufactured by Bobrick Washroom Equipment, Inc.
- E. Small Mirror:
 - 1. Size: 30 x 48 inches.
 - 2. Annealed Float Glass: Silvering, protective and physical characteristics in compliance with ASTM C1503.
 - 3. Frame: 0.05 inch channel shapes, with mitered and welded and ground corners, and tamperproof hanging system; satin finish.

4. Backing: Full-mirror sized, minimum 0.03 inch galvanized steel sheet and nonabsorptive filler material.
5. Product: B-165 as manufactured by Bobrick Washroom Equipment, Inc.
- F. Coat Hook: Heavy-duty stainless steel, double-prong, rectangular-shaped bracket and backplate for concealed attachment, satin finish.
 1. Product: B-672 as manufactured by Bobrick Washroom Equipment Inc.
- G. Mop and Broom Holder: 0.05 inch thick stainless steel, Type 304, hat-shaped channel.
 1. Holders: Three spring-loaded rubber cam holders.
 2. Length: 24 inches.
 3. Product: B-223 x 24 as manufactured by Bobrick Washroom Equipment Inc.
- H. Towel Dispenser: Folded paper type, stainless steel; surface mounted, with viewing slots on sides as refill indicator and knob-latch.
 1. Capacity: 200 C-fold minimum.
 2. Product: B-26210 as manufactured by Bobrick Washroom Equipment Inc.

PART 3 EXECUTION

3.01 EXAMINATION

- A. Verify existing conditions before starting work.
- B. Verify exact location of accessories for installation.
- C. Verify that field measurements are as indicated on drawings.
- D. See Section 06 1000 for installation of blocking and concealed anchors in walls.

3.02 PREPARATION

- A. Provide templates and rough-in measurements as required.

3.03 INSTALLATION

- A. Install accessories in accordance with manufacturers' instructions in locations indicated on drawings.
- B. Install plumb and level, securely and rigidly anchored to substrate.
- C. Mounting Heights: As required by accessibility regulations, unless otherwise indicated.

3.04 PROTECTION

- A. Protect installed accessories from damage due to subsequent construction operations.

END OF SECTION

SECTION 10 4400 - FIRE PROTECTION SPECIALTIES

PART 1 GENERAL

1.01 SECTION INCLUDES

- A. Fire extinguishers.
- B. Fire blankets.
- C. Fire extinguisher cabinets.
- D. Accessories.

1.02 RELATED REQUIREMENTS

- A. Section 04 2731 - Reinforced Unit Masonry: Roughed-in wall openings.

1.03 REFERENCE STANDARDS

- A. FM (AG) - FM Approval Guide; current edition.
- B. NFPA 10 - Standard for Portable Fire Extinguishers; 2017.
- C. UL (DIR) - Online Certifications Directory; Current Edition.

1.04 SUBMITTALS

- A. See Section 01 3000 - Administrative Requirements, for submittal procedures.
- B. Product Data: Provide extinguisher ratings and classifications and color and finish.
- C. Shop Drawings: Indicate cabinet physical dimensions and rough-in measurements for recessed cabinets.

PART 2 PRODUCTS

2.01 MANUFACTURERS

- A. Fire Extinguishers, Cabinets and Accessories:
 - 1. Ansul, a Tyco Business: www.ansul.com/#sle.
 - 2. JL Industries, Inc.: www.jlindustries.com.
 - 3. Larsen's Manufacturing Co: www.larsensmfg.com.
 - 4. Potter-Roemer: www.potterroemer.com/#sle.
 - 5. Substitutions: See Section 01 6000 - Product Requirements.

2.02 FIRE EXTINGUISHERS

- A. Fire Extinguishers - General: Comply with product requirements of NFPA 10 and applicable codes, whichever is more stringent.
 - 1. Provide extinguishers labeled by UL (DIR) or FM (AG) for purpose specified and as indicated.
- B. Multipurpose Dry Chemical Type Fire Extinguishers: Carbon steel tank, with pressure gauge.
 - 1. Class: A:B:C type.
 - 2. Size: 5 pound.
 - 3. Finish: Baked polyester powder coat, red color.
 - 4. Location: All locations unless noted otherwise.

2.03 FIRE EXTINGUISHER CABINETS

- A. Basis of Design Product: Academy Series 1826V manufactured by JL Industries Inc. Provide the named product or a comparable product by one of the approved manufacturer's listed above.
- B. Cabinet Configuration: Semi-recessed type.
 - 1. Trim: Flat square edge, with 1-1/2 inch wide face.
 - 2. Provide cabinet enclosure with right angle inside corners and seams, and with formed perimeter trim.
 - 3. Provide fire rated cabinets when located in rated wall assemblies.

- C. Door: 0.036 inch metal thickness, reinforced for flatness and rigidity with roller type catch. Hinge doors for 180 degree opening with continuous piano hinge.
- D. Door Glazing: Acrylic plastic, clear, 1/8 inch thick, flat shape and set in resilient channel glazing gasket.
- E. Pull: Recessed type ADA Flush Pull.
- F. Cabinet Mounting Hardware: Appropriate to cabinet, with pre-drilled holes for placement of anchors.
- G. Fabrication: Weld, fill, and grind components smooth.
- H. Finish of Cabinet Exterior Trim and Door: Clear Anodized.
- I. Finish of Cabinet Interior: White colored enamel.

PART 3 EXECUTION

3.01 EXAMINATION

- A. Verify existing conditions before starting work.
- B. Verify rough openings for cabinet are correctly sized and located.

3.02 INSTALLATION

- A. Install in accordance with manufacturer's instructions.
- B. Install cabinets plumb and level in wall openings, 54 inches from finished floor to top of cabinet, nominal per cmu coursing.
- C. Secure rigidly in place.
- D. Maintain fire ratings where cabinets are recessed into fire-rated wall systems.
- E. Place extinguishers in cabinets.

END OF SECTION

SECTION 10 7113.43 - FIXED SUN SCREENS

PART 1 GENERAL

1.01 SECTION INCLUDES

- A. Modular, shop fabricated, extruded aluminum sun screens to be mounted on structure provided by others.

1.02 RELATED REQUIREMENTS

- A. Section 04 2000 - Unit Masonry: Mounting substrates.

1.03 REFERENCE STANDARDS

- A. AAMA 611 - Voluntary Specification for Anodized Architectural Aluminum; 2014 (2015 Errata).
- B. ASTM A307 - Standard Specification for Carbon Steel Bolts, Studs, and Threaded Rod 60 000 PSI Tensile Strength; 2014 (Editorial 2017).
- C. ASTM A792/A792M - Standard Specification for Steel Sheet, 55% Aluminum-Zinc Alloy-Coated by the Hot-Dip Process; 2010 (Reapproved 2015).
- D. ASTM B209 - Standard Specification for Aluminum and Aluminum-Alloy Sheet and Plate; 2014.
- E. ASTM B209M - Standard Specification for Aluminum and Aluminum-Alloy Sheet and Plate (Metric); 2014.
- F. ASTM B221 - Standard Specification for Aluminum and Aluminum-Alloy Extruded Bars, Rods, Wire, Profiles, and Tubes; 2014.
- G. ASTM B221M - Standard Specification for Aluminum and Aluminum-Alloy Extruded Bars, Rods, Wire, Profiles, and Tubes (Metric); 2013.
- H. ASTM F593 - Standard Specification for Stainless Steel Bolts, Hex Cap Screws, and Studs; 2017.

1.04 SUBMITTALS

- A. See Section 01 3000 - Administrative Requirements, for submittal procedures.
- B. Shop Drawings: Prior to commencement of fabrication, submit detailed shop drawings, showing all profiles, sections of all components, finishes, fastening details, and manufacturer's technical and descriptive data. Include field dimensions of openings and elevations on shop drawings.
- C. Design Data: Submit comprehensive structural analysis of design for the specified loads. Stamp and sign calculations by professional engineer.

1.05 QUALITY ASSURANCE

- A. Designer Qualifications: Perform structural design under direct supervision of a Professional Engineer experienced in design of this type of work licensed in Louisiana.
- B. Manufacturer Qualifications: Company specializing in manufacturing products specified in this section, with no less than five years of documented experience.

1.06 DELIVERY, STORAGE, AND HANDLING

- A. Deliver materials to project site ready for erection.
- B. Package using methods that prevent damage during shipping and storage on site.
- C. Store materials under cover and elevated above grade.

1.07 WARRANTY

- A. See Section 01 7800 - Closeout Submittals, for additional warranty requirements.
- B. Sun Screens: Correct defective work within a one year period after Date of Substantial Completion.
- C. Finish Warranty: Provide manufacturer's ten year warranty on factory finish against cracking, peeling, and blistering.

PART 2 PRODUCTS

2.01 MANUFACTURERS

2.02 SUN SHADES

- A. Aluminum Sun Screens: Shop fabricated, shop finished, extruded aluminum outriggers, louvers, and fascia, free of defects impairing strength, durability or appearance.
- B. Basis of Design: The Airolite Company LLC; ZSC4 Sun Controls: www.airolite.com.
 - 1. Substitutions: See Section 01 6000 - Product Requirements.
 - 2. Substitutions must be prior approved by the Architect and must match the existing units dimensions, design, and finish.
- C. Design
 - 1. Configuration: As indicated on drawings.
 - 2. Louver Type: Bar.
 - 3. Outrigger Shape: Straight.
 - 4. Mounting: Wall bracket.
 - 5. Design Criteria: Design and fabricate to resist loads without failure, damage, or permanent deflection:
 - a. As per ASCE 7.
 - 6. Sizes: As indicated on drawings.
 - 7. Exposed Aluminum Finish: Class I natural anodized.
 - 8. Provide a complete system ready for erection at project site.
 - 9. Shop fabricate to the greatest extent possible; disassemble if necessary for shipping.

2.03 MATERIALS

- A. Aluminum Extrusions: ASTM B209 (ASTM B209M) or ASTM B221 (ASTM B221M).
- B. Aluminum Coated Steel Sheet: ASTM A792/A792M.
- C. Concealed Structural Supports: Aluminum, or steel coated for corrosion resistance and dissimilar metal isolation.
- D. Fasteners: ASTM F593 stainless steel.

2.04 FINISHES

- A. Class I Natural Anodized Finish: AAMA 611 AA-M12C22A41 Clear anodic coating not less than 0.7 mils thick.

PART 3 EXECUTION

3.01 EXAMINATION

- A. Examine substrates and site area for conditions that might prevent satisfactory installation.
- B. Verify that dimensions of supporting structure are within plus/minus 1/8 inch of dimensions indicated on shop drawings.
- C. Verify that all adjacent painting, roofing, masonry work, and other work that might damage sun screen finish has been completed prior to installation of sun screens.
- D. Do not install until after all adjacent painting, roofing and masonry work have been completed.
- E. Do not proceed with installation until all conditions are satisfactory.

3.02 INSTALLATION

- A. Install in accordance with manufacturer's installation instructions.
- B. Set units level, plumb, with uniform joints, and aligned with building elements.
- C. Separate dissimilar metals using concealed bituminous paint or non-absorbent gasket.
- D. Anchor units to structure as indicated on drawings.

- E. Do not cut or trim aluminum members without approval of manufacturer; do not install damaged members.
- F. Touch-up damaged finish coating using material provided by manufacturer to match original coating.

3.03 TOLERANCES

- A. Maximum Variation from Level: Plus/Minus 1/8 inch.

3.04 CLEANING

- A. Clean exterior surfaces units of dust and debris; follow manufacturer's cleaning instructions for the finish used.

3.05 PROTECTION

- A. Protect units after installation to prevent damage due to other work until Date of Substantial Completion.

END OF SECTION

SECTION 10 7313 - CANOPIES

PART 1 GENERAL

1.01 SECTION INCLUDES

- A. Aluminum overhead hanger rod style canopies.

1.02 REFERENCE STANDARDS

- A. AAMA 611 - Voluntary Specification for Anodized Architectural Aluminum; 2014 (2015 Errata).
- B. ASCE 7 - Minimum Design Loads and Associated Criteria for Buildings and Other Structures; Most Recent Edition Cited by Referring Code or Reference Standard.
- C. ASTM B210 - Standard Specification for Aluminum and Aluminum-Alloy Drawn Seamless Tubes; 2012.
- D. ASTM B221 - Standard Specification for Aluminum and Aluminum-Alloy Extruded Bars, Rods, Wire, Profiles, and Tubes; 2014.
- E. ASTM B241/B241M - Standard Specification for Aluminum and Aluminum-Alloy Seamless Pipe and Seamless Extruded Tube; 2016.

1.03 DESIGN REQUIREMENTS

- A. Awnings materials, assembly and attached to resist snow loads, positive and negative wind design loads per the requirements of ASCE 7.

1.04 SUBMITTALS

- A. See Section 01 3000 - Administrative Requirements, for submittal procedures.
- B. Shop Drawings: Indicate canopy profiles, sizes, connection attachments, anchorage, size and type of fasteners, accessories.
- C. Designer's qualification statement.
- D. Installer's qualification statement.
- E. Executed warranty.
- F. Specimen warranty.

1.05 QUALITY ASSURANCE

- A. Designer Qualifications: Perform design under direct supervision of Professional Engineer experienced in design of this type of work and licensed in Louisiana.
- B. Installer Qualifications: Company specializing in performing work of the type specified and with at least five years of documented experience.

1.06 WARRANTY

- A. See Section 01 7800 - Closeout Submittals for additional warranty requirements.
- B. Finish Warranty: Provide 20-year manufacturer warranty against excessive degradation of factory-applied finishes. Include provision for replacement of units with excessive fading, chalking, or flaking. Complete forms in Owner's name and register with warrantor.

PART 2 PRODUCTS

2.01 MANUFACTURERS

- A. Canopies:
 - 1. Mapes Canopies; Super Lumideck: www.mapes.com.
 - 2. Substitutions: See Section 01 6000 - Product Requirements.

2.02 COMPONENTS

- A. Material: Extruded 6063-T6 aluminum.

- B. Decking: 3 inch extruded aluminum flat soffit decking, minimum 0.078 thick.
- C. Fascia: 8 inch deep J-style, minimum 0.125 inch thick.
- D. Hanger Rods and Attachment Hardware: Powder coated to match canopy.
- E. Finish Exposed Components: Clear Anodized.

2.03 FINISHES

- A. Class I Natural Anodized Finish: AAMA 611 AA-M12C22A41 Clear anodic coating not less than 0.7 mils thick.

2.04 FABRICATION

- A. All connections shall be mechanically assembled utilizing 3/16 inch fasteners with a minimum shear stress of 350 lb. Pre-welded or factory-welded connections are not acceptable.
- B. Decking shall be designed with interlocking extruded aluminum members with mechanical fasteners field applied to provide structural integrity for the completed assembly.
- C. Concealed Drainage: Water shall drain from covered surfaces into integral fascia gutter and directed to the front for front drainage.

PART 3 EXECUTION

3.01 EXAMINATION

- A. Verify that wall substrate anchors are acceptable and are ready to receive work.
- B. Verify dimensions and elevations to be as shown on shop drawings.
- C. Erection shall be performed by an approved installer.

3.02 INSTALLATION

- A. Install in accordance with manufacturer's instructions and approved shop drawings.
- B. Install components plumb and level, accurately fitted, free from distortion or defects.
- C. Conceal bolts and screws whenever possible. Where not concealed, use flush countersunk fastenings.
- D. Protect finishes during handling and installation. Remove protective material from pre-finished aluminum surfaces.

3.03 TOLERANCES

- A. Maximum Variation From Plumb: 1/4 inch per story, non-cumulative.
- B. Maximum Misalignment From True Position: 1/4 inch.

END OF SECTION

SECTION 12 2113 - HORIZONTAL LOUVER BLINDS

PART 1 GENERAL

1.01 SECTION INCLUDES

- A. Horizontal slat louver blinds.
- B. Operating hardware.

1.02 REFERENCE STANDARDS

- A. WCMA A100.1 - Safety of Window Covering Products; 2018.

1.03 SUBMITTALS

- A. See Section 01 3000 - Administrative Requirements, for submittal procedures.
- B. Product Data: Provide data indicating physical and dimensional characteristics.
- C. Shop Drawings: Indicate opening sizes, tolerances required, method of attachment, clearances, and operation.

1.04 QUALITY ASSURANCE

- A. Manufacturer Qualifications: Company specializing in manufacturing the products specified in this section with minimum ten years documented experience.

PART 2 PRODUCTS

2.01 MANUFACTURERS

- A. Horizontal Louver Blinds:
 - 1. Hunter Douglas Architectural: www.hunterdouglasarchitectural.com/#sle.
 - 2. Levolor: www.commercial.levolor.com/#sle.
 - 3. Bali, division of Springs Industries, Inc.: www.baliblinds.com.
 - 4. Substitutions: See Section 01 6000 - Product Requirements.

2.02 BLINDS

- A. Description: Horizontal slat louvers hung from full-width headrail with full-width bottom rail.
- B. Manual Operation: Control of raising and lowering by cord with full range locking; blade angle adjustable by control wand.
- C. Metal Slats: Spring tempered pre-finished aluminum; radiused slat corners, with manufacturing burrs removed.
 - 1. Width: 2 inch.
 - 2. Thickness: 0.008 inch.
 - 3. Color: As selected by Architect.
- D. Slat Support: Woven polypropylene cord, ladder configuration.
- E. Head Rail: Pre-finished, formed aluminum box, with end caps; internally fitted with hardware, pulleys, and bearings for operation; same depth as width of slats.
 - 1. Color: Same as slats.
- F. Bottom Rail: Pre-finished, formed aluminum with top side shaped to match slat curvature; with end caps.
 - 1. Color: Same as headrail.
- G. Lift Cord: Braided nylon, continuous loop with restraining device; comply with WCMA A100.1.
- H. Control Wand: Extruded hollow plastic; hexagonal shape.
 - 1. Non-removable type.
 - 2. Length of window opening height less 3 inch.
 - 3. Color: Clear.
- I. Headrail Attachment: Wall brackets.

- J. Accessory Hardware: Type recommended by blind manufacturer.

2.03 FABRICATION

- A. Determine sizes by field measurement.
- B. Fabricate blinds to fit within openings with uniform edge clearance of 1/2 inch.

PART 3 EXECUTION

3.01 EXAMINATION

- A. Verify that openings are ready to receive the work.
- B. Ensure structural blocking and supports are correctly placed. See Section 06 1000.

3.02 INSTALLATION

- A. Install blinds in accordance with manufacturer's instructions.
- B. Secure in place with concealed fasteners.

3.03 TOLERANCES

- A. Maximum Variation of Gap at Window Opening Perimeter: 1/4 inch.
- B. Maximum Offset From Level: 1/8 inch.

3.04 ADJUSTING

- A. Adjust blinds for smooth operation.

3.05 CLEANING

- A. Clean blind surfaces just prior to occupancy.

END OF SECTION

SECTION 21 05 00 - COMMON WORK RESULTS FOR FIRE SUPPRESSION

PART 1 GENERAL

1.1 GENERAL

The General Conditions, Supplementary Plumbing, Mechanical and Electrical Conditions, and Special Conditions are hereby made a part of this Division to the same extent as if written in full, and this Contractor shall observe all of the requirements thereof insofar as they pertain and apply to his work.

1.2 SCOPE

The scope of the plumbing phase of this project shall include all labor, materials, equipment, etc., required to fulfill the intent of the Contract Documents and shall include the work specified under the subsequent sections of Division 21 of these specifications.

1.3 SUMMARY

Section includes pipe, fittings, valves, and connections for sprinkler and/or combination sprinkler and standpipe systems.

1.4 CODES AND REFERENCES:

- A. All work shall be performed in full accord with the latest editions of the applicable state, and national building codes and local ordinances.
- B. Refer to each section for applicable codes and reference standards.

1.5 FEES, PERMITS AND TAXES:

This Contractor shall make arrangements for and pay for all inspection fees, connection fees and permits required by local authorities. The Contractor shall also pay all taxes levied for labor and materials associated with work under this Division.

1.6 REFERENCES

- A. American Society of Mechanical Engineers:
 - 1. ASME B16.1 through B16.25 – Various Piping types and fittings
 - 2. ASME B36.10M - Welded and Seamless Wrought Steel Pipe.
- B. ASTM International:
 - 1. ASTM A53/A53M - Standard Specification for Pipe, Steel, Black and Hot-Dipped, Zinc-Coated, Welded and Seamless.
 - 2. ASTM A135 - Standard Specification for Electric-Resistance-Welded Steel Pipe.
 - 3. ASTM A234/A234M - Standard Specification for Piping Fittings of Wrought Carbon Steel and Alloy Steel for Moderate and High Temperature Service.
 - 4. ASTM A795 - Standard Specification for Black and Hot-Dipped Zinc-Coated (Galvanized) Welded and Seamless Steel Pipe for Fire Protection Use.
- C. American Welding Society:
 - 1. AWS A5.8 - Specification for Filler Metals for Brazing and Braze Welding.
 - 2. AWS D1.1 - Structural Welding Code - Steel.

- D. American Water Works Association:
 - 1. AWWA C110 - American National Standard for Ductile-Iron and Grey-Iron Fittings, for Water and Other Liquids.
 - 2. AWWA C111 - American National Standard for Rubber-Gasket Joints for Ductile-Iron Pressure Pipe and Fittings.
 - 3. AWWA C151 - American National Standard for Ductile-Iron Pipe, Centrifugally Cast, for Water.
- E. National Fire Protection Association:
 - 1. NFPA 13 - Installation of Sprinkler Systems.
 - 2. NFPA 24 - Private Fire Service Mains.
 - 3. NFPA 45 – Standard on Fire Protection for Laboratories Using Chemicals
 - 4. NFPA 101 - Life Safety Code

1.7 CODE REQUIREMENTS

All aspects of design, installation and equipment shall conform in all respects to the rules, regulations and requirements of the State Fire Marshal, Property Insurance Association of Louisiana, City of Bossier City and Local Fire Prevention Bureau. All piping, valves, fittings, etc. shall be U.L. listed and F.M. approved for fire protection service.

1.8 QUALITY ASSURANCE

- A. Perform Work in accordance with NFPA 13 and the requirements of the Louisiana State Fire Marshal.
- B. Maintain one copy of each document on site.

1.9 WARRANTY:

This contractor shall warrant all workmanship, material, equipment systems, etc., provided by him for a period of one year after substantial completion of each phase of the project. This warranty means that this contractor shall make good to the Owner, at no cost, any defects that become apparent during the year following substantial completion of each phase. This warranty is in addition to any other guarantees or warranties and is not intended to limit such other guarantees or warranties.

1.10 DEFINITIONS: The following words and phrases as used herein are hereby defined:

- A. "provide": Furnish and install all material and labor required for a complete installation ready for operation in accordance with the intent of the Contract Documents.
- B. "as required": Indicates that the Contractor shall perform the work or provide the material as indicated in accordance with manufacturer's installation instructions; and in accordance with applicable codes or regulations; and in a workmanlike manner as defined by good local practice.
- C. "or equal": Indicates that the Contractor may substitute equipment by another manufacturer if the salient features of the equipment indicated by manufacturer's name and/or described are, in the judgment of the Architect, adequate. Submittals for approval are required where indicated.
- D. "contractor": Where the word(s) "Contractor" or "this Contractor" is/are used, they refer to the Contractor engaged to execute the work under this division of the specifications only, even though he may be technically described as a sub-contractor.
- E. "intent of the Contract Documents": The specific intent of these documents is to provide to the Owner, in a thoroughly functional condition, all the various systems, equipment, etc., indicated herein. Final authority over interpretation of the "intent" shall rest with the Architect.

- F. "shall": Indicates a mandatory requirement.

1.11 INSPECTION OF THE SITE:

- A. The drawings are prepared from the best information available and reflect all conditions commensurate with this information. However, the contractor should visit the site prior to submitting a proposal and shall verify the locations, sizes, depths, pressures, etc., of all existing utilities and familiarize himself with working conditions, hazards, existing grades, soil conditions, obstructions, etc. If it becomes evident that existing site conditions will impair the proper operation of the utilities, the Architect should be notified in writing.
- B. All proposals shall take these existing conditions and any revisions required into consideration.

1.12 CONSTRUCTION REQUIREMENTS:

- A. The Contractor shall be responsible for fitting his material and apparatus into the building and shall carefully lay out his work at the site to conform to the structural conditions, to provide proper grading of lines, to avoid all obstructions and to conform to the details of the installation supplied by the manufacturer of the equipment to be installed. Furnish all necessary pilot lines and control lines whether indicated on the drawings or not. The drawings do not give exact details as to elevations of pipe lines nor do they show exact locations of pipe to scale. Piping elevations shall be handled by giving precedence to pipes which require a stated grade for proper operation. Devices necessary for installation and support of pipes, and equipment (such as sleeves, inserts, etc.) shall be located and installed as the construction progresses in order to allow completion of each phase of the work in the proper sequence.
- B. Drawings showing the extent and arrangement of the work of a particular trade shall be used together with drawings showing extent and arrangement of work of other trades to insure that the Contractor in laying out and installing his work shall do so in a manner such that the work of the several trades may progress in the most direct, workmanlike and harmonious manner.
- C. The Contractor shall be responsible for the proper location and size of slots, holes or openings in the building structure pertaining to his work, and for the correct location of pipe sleeves. The drawings indicate the extent and general arrangement of the various systems, but if any departures from these drawings are deemed necessary by the contractor, detailed drawings and descriptions of these departures and a statement of the reasons therefore shall be submitted to the Architect as soon as practicable. No departures from the arrangements shown on the drawings shall be made without prior written approval of Architect.
- D. In general, piping in finished areas of the building shall be run concealed unless noted and directed otherwise. Should any conditions arise which would cause any piping to be exposed in finished areas, it shall be immediately called to the Architect's attention. In unfinished spaces such as equipment rooms, all piping shall be run as high as possible, shall be run to a continuous grade and shall be grouped wherever it is feasible to do so.
- E. All pipe shall be cut accurately to measurements established at the building and shall be worked into place without springing or forcing. All pipes run exposed in equipment rooms shall be installed parallel to the building planes except that the lines shall be sloped to obtain the proper pitch. Piping run above furred ceilings, etc., shall be similarly installed, except as otherwise shown. All pipe openings shall be kept closed during construction until the systems are closed with final connections.
- F. The construction details of the building are illustrated on the Architectural and Structural Drawings. The trades shall thoroughly acquaint themselves with the details before submitting their bid as no allowance will be made because of unfamiliarity with these details. For new construction, place all inserts to accommodate the ultimate installation of pipe hangers in the

forms before concrete is poured and set sleeves in forms before construction. For existing construction, all required inserts shall be "drilled-in" and all openings required through concrete or masonry shall be "saw-cut" or "core drilled" with tools specifically designed for this purpose. All concealed lines shall be installed as required by the pace of the job to precede the general construction.

- G. All oiling devices and all parts of equipment requiring adjustment shall be easily accessible. Equipment shall be so located and installed as to permit convenient and safe maintenance and future replacement. The trade furnishing the equipment shall be responsible prior to ordering same in the event that equipment specified and/or approved is incompatible with this requirement.

1.13 SLEEVES AND PENETRATIONS:

- A. Refer to AIA General Conditions.
- B. Each and every pipe regardless of material, which passes through a concrete slab, (except slab on grade), masonry wall, roof or other portion of the building structure shall be free from the structure and shall pass through a sleeve furnished and installed by the Subcontractor responsible for the work involved.
- C. Above grade and dry location sleeves shall be constructed from 20 gauge galvanized steel and shall be flush on both sides of wall surface penetrated. The sleeves shall be sized to allow free passage of the pipe to be inserted, and when this pipe is to be insulated, the sleeves shall be large enough to pass the insulation. Floor sleeves located in pipe chases shall extend up two inches (2") above the floor slab.
- D. Sleeves passing through walls or floors on or below grade and/or in moist areas shall be constructed of galvanized steel, schedule 40 pipe and shall be designed with suitable flange in the center of the floor or wall to form a waterproof passage. After the pipes have been installed in the sleeves, void space around the pipe shall be caulked to insure a waterproof penetration. Fire ratings of rated walls and floors shall be maintained by the use of approved materials.
- E. All penetrations through fire rated ceilings, walls or floors shall be fire stopped using approved materials to maintain the fire rating of the ceiling, wall or floor structure. Fire stop shall be equal to BIO Fireshield, Inc., BOTHERM 200 or BIO K-2 mortar as applicable. Penetrations shall meet or exceed the requirements set forth in the U.L. Fire Resistance Directory, Volumes I and II.
- F. After installation of pipe through sleeves, all sleeves shall be sealed with materials suitable for maintaining thermal resistance, acoustic properties, and weatherproofing of walls, roofs, etc. Refer to Architectural specifications.

1.14 CONSTRUCTION SAFETY:

This contractor assumes all responsibility regarding the safety of his personnel on the project during construction. The Contract Documents do not include materials, procedures, components, etc., required to insure construction safety. Refer to General Conditions and Supplementary General Conditions for additional information.

1.15 DAMAGE:

- A. This Contractor shall be responsible for damage to project caused by this Contractor's failure to recognize hazards associated with items such as leaks, scheduling of work, inexperienced workmen, excessive cutting, etc.
- B. This Contractor shall repair, at no expense to the Owner, any such damage.

- C. This contractor shall familiarize himself with working conditions to the extent that he shall be responsible for damage to concealed piping, wiring and other equipment to remain and shall repair any damage caused by his negligence at no cost to the Owner.

1.16 FLOOR, CEILING AND WALL PLATES:

- A. Refer to AIA General Conditions.
- B. In addition to the requirements of the above referenced portions of this specification, all Subcontractors shall furnish a chromium plated sectional set screw escutcheon in each finished space on each pipe or hanger rod penetrating a wall, floor or ceiling. Escutcheons shall be sized to fit snugly to all lines and where the lines are insulated, the escutcheons shall be fit snugly over the insulation. These plates shall be provided with set screws so that they fit snugly against the finished surface. All equipment rooms are classified as finished space.

1.17 STORAGE OF MATERIALS:

Each contractor shall provide space for storage of materials, equipment or tools at ground level. Any storage contemplated within the building will be allowed only upon specific approval of the Architect.

PART 2 PRODUCTS

2.1 MATERIALS:

All materials shall be new and free from defects at the time of installation. Materials or equipment damaged in shipment or otherwise damaged prior to installation shall not be repaired at the job site, but shall be replaced with new materials.

2.2 MANUFACTURER'S REQUIREMENTS:

When a manufacturer's name appears in these specifications, it is not to be construed that the manufacturer does not have to meet the full requirements of the specifications or that his standard cataloged item will be acceptable.

2.3 SERVICE AND REPAIR PARTS:

All equipment installed on this project shall have local representation, local factory authorized service, and a local stock of repair parts.

2.4 FLAME SPREAD PROPERTIES OF MATERIALS:

All materials and adhesives used for air conditioning filters, acoustical lining, and insulation shall conform to NFPA and UL life, safety and flame spread properties of materials. The composite classifications shall not exceed 25 for a flame spread rating and 50 for a smoke developed rating for these classifications as listed for the basic materials. The finishes, adhesives, etc., specified for each system and shall be such when completely assembled.

2.5 ACCESS PANELS:

Provide flush mounted metal access panels and frames with concealed hinges and key actuated locks for all concealed and otherwise inaccessible valves, parts, fittings, equipment, filters, etc. and as required for inspection or service.

2.6 VALVES

- A. Valves shall be U.L. listed and F.M. approved for fire protection piping systems and shall be installed as required by the NFPA.
- B. Gate Valves:
 - 1. Up to and including 2 inches: Bronze body and trim, rising stem, hand wheel, solid wedge or disc, threaded ends.
 - 2. Over 2 inches : Iron body, bronze trim, rising stem pre-grooved for mounting tamper switch, hand wheel, OS&Y, solid bronze or cast iron wedge, grooved ends.
 - 3. Over 4 inches: Iron body, bronze trim, non-rising stem with bolted bonnet, solid bronze wedge, flanged ends, iron body indicator post assembly.
- C. Globe or Angle Valves:
 - 1. Up to and including 2 inches : Bronze body, bronze trim, rising stem and hand wheel, inside screw, renewable rubber disc, threaded ends, with back seating capacity.
 - 2. Over 2 inches: Iron body, bronze trim, rising stem, hand wheel, OS&Y, plug-type disc, flanged ends, renewable seat and disc.
- D. Ball Valves:
 - 1. Up to and including 2 inches : Bronze two piece body, brass, chrome plated bronze, or stainless steel ball, teflon seats and stuffing box ring, lever handle and balancing stops, threaded ends.
 - 2. Over 2 inches: Manufacturers: Cast steel body, chrome plated steel ball, teflon seat and stuffing box seals, lever handle flanged.
- E. Check Valves:
 - 1. Up to and including 2 inches: Bronze body and swing disc, rubber seat, threaded ends.
 - 2. Over 2 inches: Iron body, bronze trim, swing check with rubber disc, renewable disc and seat, flanged ends.
 - 3. 4 inches and over: Iron body, bronze disc with stainless steel spring, resilient seal, threaded, wafer, or flanged ends.
- F. Drain Valves:
 - 1. Compression Stop: Bronze with hose thread nipple and cap.
 - 2. Ball Valve: Brass with cap and chain, 3/4 inch hose thread.

2.7 UNDERGROUND PIPING

Shall be Class 150 cast iron pipe, with mechanical joints, tar coated and UL approved. Fittings for this pipe shall be mechanical joint type, Class 250, tar coated. Underground piping shall be braced and clamped in an approved manner acceptable to the Rating Bureau. AWWA C-900 DR18 PVC as manufactured by North American Corp. may be used if permitted by local codes and authorities. Provide concrete thrust blocks at each change in direction and at all tees, plugs, caps, and bends in strict accordance with NFPA 24 and Appendix B.

2.8 ABOVE GROUND PIPING

General: Black steel pipe produced to the following: ASTM A-795, A-53 and A-135. Pipe, fittings and joints shall be UL listed and FM approved. Listed restrictions and installation procedures per NFPA-13, and state and local codes must be followed. Piping layout shall be such as to avoid, wherever possible, conflicts or interference with building lighting, multiple pipe runs and mechanical equipment, including piping and equipment not in this contract. Locations of these items will be shown or called for on the drawings.

Threaded Pipe: Schedule 40 pipe 1" through 6" NPS and Schedule 30 pipe 8" NPS and larger may be threaded as approved by UL, FM, and NFPA 13.

Roll-Grooved Pipe: Schedule 10 pipe 1 1/4" through 12" NPS may be roll-grooved and joined with UL listed rubber-gasketed couplings as approved by UL, FM, and NFPA 13.

Other Fittings/Joints: Schedule 10, 30 or 40 pipe with welded outlets and joints are acceptable in accordance with UL, FM, and NFPA 13.

Piping for anti-freeze loop systems and dry-type systems shall be schedule 40 galvanized steel.

2.9 PIPE HANGERS AND SUPPORTS

- A. Hangers and supports shall be installed as required and shall be ULO listed for use in a sprinkler system. Hangers and supports shall be spaced in accordance with requirements of the NFPA.
- B. Hangers for Pipe Sizes 1/2 to 1-1/2 inch: Carbon steel, adjustable swivel, split ring.
- C. Hangers for Pipe Sizes 2 inch and Over: Carbon steel, adjustable, clevis.
- D. Multiple or Trapeze Hangers: Steel channels with welded spacers and hanger rods.
- E. Wall Support for Pipe Sizes to 3 inches: Cast iron hook.
- F. Wall Support for Pipe Sizes 4 inches and Over: Welded steel bracket and wrought steel clamp.
- G. Vertical Support: Steel riser clamp.
- H. Floor Support: Cast iron adjustable pipe saddle, lock nut, nipple, floor flange, and concrete pier or steel support.
- I. Copper Pipe Support: Carbon steel ring, adjustable, copper plated.

PART 3 EXECUTION

3.1 PREPARATION

- A. Ream pipe and tube ends. Remove burrs.
- B. Remove scale and foreign material, from inside and outside, before assembly.
- C. Prepare piping connections to equipment with flanges or unions.

3.2 INSTALLATION

- A. Install piping in accordance with NFPA 13 for sprinkler systems.

- B. Install Work in accordance with the requirements of the Louisiana State Fire Marshal.
- C. Route piping in orderly manner, plumb and parallel to building structure. Maintain gradient. Install piping to conserve building space, to not interfere with use of space and other work. Group piping whenever practical at common elevations.
- D. Install pipe sleeve at piping penetrations through footings, partitions, walls, and floors. Seal pipe and sleeve penetrations to maintain fire resistance equivalent to fire separation.
- E. Install piping to allow for expansion and contraction without stressing pipe, joints, or connected equipment.
- F. Pipe Hangers and Supports:
 - 1. Install in accordance with NFPA 13 and NFPA 45.
 - 2. Install hangers to with minimum 1/2 inch space between finished covering and adjacent work.
 - 3. Place hangers within 12 inches of each horizontal elbow.
 - 4. Use hangers with 1-1/2 inch minimum vertical adjustment. Design hangers for pipe movement without disengagement of supported pipe.
 - 5. Support vertical piping at every floor. Support riser piping independently of connected horizontal piping.
 - 6. Where installing several pipes in parallel and at same elevation, provide multiple or trapeze hangers.
 - 7. Prime coat exposed steel hangers and supports. Hangers and supports located in crawl spaces, pipe shafts, and suspended ceiling spaces are not considered exposed.
- G. Slope piping and arrange systems to drain at low points. Install eccentric reducers to maintain top of pipe level.
- H. Prepare pipe, fittings, supports, and accessories for finish painting. Where pipe support members are welded to structural building framing, scrape, brush clean, and apply one coat of zinc rich primer to welding.
- I. Do not penetrate building structural members unless indicated.
- J. Where more than one piping system material is specified, install compatible system components and joints. Install flanges, union, and couplings at locations requiring servicing.
- K. Die cut threaded joints with full cut standard taper pipe threads with red lead and linseed oil or other non-toxic joint compound applied to male threads only.
- L. Install valves with stems upright or horizontal, not inverted. Remove protective coatings.
- M. Install gate valves for shut-off or isolating service. Install drain valves at main shut-off valves, low points of piping and apparatus.
- N. Where inserts are omitted, drill through concrete slab from below and install through-bolt with recessed square steel plate and nut recessed into and grouted flush with slab.
- O. Prime and paint all exposed sprinkler piping, hangers, etc; red unless directed otherwise by architect/owner. Exposed piping shall be approved in writing prior to installation.

3.3 CLEANING

- A. Clean entire system after other construction is complete.

3.4 WORKMANSHIP:

- A. All work shall be done by experienced craftsmen skilled in the applicable trade.
- B. Unprofessional and incomplete work shall be rejected and corrected at no additional expense.

3.5 PROTECTION OF EQUIPMENT:

The Contractor shall continuously maintain adequate protection of stored materials and installed equipment. Fixtures and equipment, whether located inside or outside, shall be tightly covered with sheet polyethylene or waterproof tarpaulin as protection against dirt, rust, moisture and abuse from other trades. Adequate air circulation shall be provided under any protective sheet to prevent condensate build up. Materials and equipment shall not be stored directly on the ground. Piping and equipment shall not be used by other trades as supports for scaffolds or personnel. At the completion of the work, equipment, fixtures, exposed supports and piping shall be cleaned of loose dirt, construction debris, overspray, etc., to the satisfaction of the Architect. Repairs made necessary by damage shall be paid for by the Contractor.

3.6 PROTECTION OF STRUCTURE:

Each Contractor in performing his work shall take particular care not to damage the structure. All finished floors and step treads shall be covered to prevent any damage by workmen or their tools and equipment during the construction of the building. In addition, each Contractor shall protect any materials on the job site whether a part of this contract or the property of another Contractor.

3.7 FOUNDATIONS:

- A. Concrete foundations required by mechanical equipment shall be constructed by this Contractor. See Concrete Work.
- B. Equipment shall be set in place on the bases, leveled and aligned by means of shims, piped, then grouted in, in that order. After grouting, the forms shall be removed and the surfaces of the foundation shall be hand-rubbed with carborundum. Concrete work shall conform to the requirements of General Specifications, Concrete Work, of this specification.

3.8 CONFLICTS, INTERFERENCES AND COORDINATION BETWEEN TRADES:

- A. The drawings are not to be construed as shop drawings, but indicate the extent, general location, arrangement, etc., of piping systems and equipment. This Contractor shall refer to other sections of the specifications and other drawings such as electrical, structural, architectural, etc., in order to eliminate conflicts and undue delays in the progress of the work. Where other Contractors furnish items requiring piping connections by this Contractor, they will be held responsible for providing roughing-in drawings and assistance upon request.
- B. Each trade shall so harmonize its work with that of the other trades so that the work may be done in the most direct and workmanlike manner without hindering the other trades. Piping interference shall be handled by giving precedence to pipe lines which require a stated grade for proper operation. Where space requirements conflict, the following order of precedence shall be observed:
 - 1. Building lines
 - 2. Structural members
 - 3. Soil and drain piping
 - 4. Vent piping

5. Refrigerant piping
 6. Condensate piping
 7. Supply ductwork
 8. Exhaust ductwork
 9. Domestic water
 10. Electrical conduit
 11. Natural gas piping
 12. Automatic fire sprinkler piping
- C. In the event of conflicts between specifications and drawings, drawings shall take precedence over specifications except in matters pertaining to quality, applications, and coordination between trades, which shall be governed by specifications.
- D. Plans, specifications and other documents have been prepared and developed with reasonable professional care and coordination. It is the intent that all documents are supportive and complimentary, one to the other; and as such what is required by one shall be considered as required and binding as if indicated by all. Work indicated shall include, regardless of whether or not specifically indicated, such supportive or required items or work is consistent with what is indicated, is reasonably inferable from what is indicated, and/or is common construction procedure or knowledge with regard to what is indicated.
- E. In the event of conflict between codes, as interpreted by the authority having jurisdiction and the contract documents, the codes shall govern.
- F. In the event of conflict between manufacturer's installation instructions and the drawings, the manufacturer's installation instructions shall govern.
- G. Should discrepancies be found between the documents and/or an interpretation is required, and a decision or interpretation to the contractor is not rendered by the Architect, it shall be assumed the contractor has reviewed all the documents to find the most costly method for items in question which then shall be required. One document does not take precedence over another when interpreting a discrepancy.
- 3.9 CUTTING AND PATCHING:
- A. All cutting required by the installation of sleeves, piping, equipment, etc., shall be coordinated with the General Contractor, but performed by this Contractor. Patching shall be by the General Contractor. This Contractor shall not cut any structural element or any finished work without permission from the Architect.
- B. This Contractor shall cut and patch all paving as required by the installation of buried piping, including utilities.

3.10 CONCRETE WORK:

This Contractor shall provide all forming, reinforcing and concrete as required for his scope of work. Work shall conform to applicable portion of Division 3 CONCRETE.

3.11 TRENCHING AND BACKFILL:

- A. All necessary excavation and backfill for the installation of plumbing work shall be accomplished by each trade Subcontractor under his phase of the work. All such work shall be included regardless of the type of materials encountered in the excavation.
- B. Trenches for all underground piping shall be excavated to the required depths. The banks of trenches shall be kept as nearly vertical as practicable and where required shall be properly formed and braced. Trenches shall be not less than 12" wider than the outside diameter of the pipe to be laid therein. The bottoms of the trenches shall be tamped hard and graded to secure proper fall. Bell holes shall be excavated to a depth 6" below the bottom of the pipe and shall be backfilled to the proper grade with pea gravel or sand thoroughly tamped. Pipe laid in trenches dug in fill shall be supported down to load bearing undisturbed soil. After the pipes have been tested, inspected and approved by inspecting authorities, the trenches shall be backfilled.
- C. The trenches beneath and within six feet of the building shall be carefully backfilled with pea gravel or approved river sand depth of six (6) inches above the top of the pipe. The next layer and subsequent layers of backfill may be excavated materials if of earth, loam, sand or gravel free of large clods and with rocks no larger than 1-1/2" in diameter. Backfill shall be installed in layers 12" deep, adequately tamped and wetted down before the next layer of earth is laid in place. This additional material required for backfilling shall be furnished and any excess materials and debris shall be removed from the site. Any special backfill material shall be provided as specified or shown on the drawings.
- D. All excavating and backfilling shall be done in a manner so as not to disturb adjacent structures and any shoring required shall be provided.

3.12 EXECUTION OF WORK:

The Contractor shall plan, schedule and execute his work and that of any of his Sub-contractors so as not to interfere with the work of other trades or Contractors in the building or on the premises.

3.13 FLASHING AND WATERPROOFING:

All building penetrations to outside shall be flashed and counter flashed as required to eliminate leaks.

3.14 TESTS:

All tests shall be made by this Contractor and repeated until approved by the Architect. Piping systems shall not be covered or otherwise concealed until tests have been made and approvals obtained. Notify the Architect four days prior to tests to allow for scheduling. Test the piping systems as indicated in applicable articles.

3.15 CLEAN-UP:

- A. It shall be the responsibility of each trade to cooperate fully with the other trades on the job to help keep the job site in a clean and safe condition. At the end of each day's work, each trade shall properly store all of his tools, equipment, any surplus materials and all debris caused by his portion of the work.
- B. When all work has been finally tested, the Contractor shall clean all work installed by him, including all fixtures, equipment, pipes, and all exposed work. All pipes shall be flushed out and left free of all obstructions. All plates and other finished products shall be thoroughly cleaned and polished.

3.16 FINAL OBSERVATIONS:

- A. It shall be the duty of the Contractor to make a careful inspection trip of the entire project, assuring himself that the work on the project is ready for final acceptance, before calling upon the Architect/Engineer to make a final observation.
- B. In order not to delay final acceptance of the work, the Contractor shall have all necessary bonds, guarantees, receipts, affidavits, etc., called for in the various articles of this specification, prepared and signed in advance, and together with a letter of transmittal listing each paper included, and shall deliver the same to the Architect/Engineer at or before the time of the final observations. The Contractor is cautioned to check over each bond, receipt, etc., before preparing same for submission to see that the items check with the requirements of the specification.

END OF SECTION

SECTION 21 13 13 - AUTOMATIC FIRE SPRINKLER SYSTEMS

PART 1 GENERAL

1.1 SUMMARY

- A. Section includes automatic fire sprinkler, system design, installation, and certification.
- B. Related Sections:
 - 1. Section 26 05 03 - Equipment Wiring Connections: Execution requirements for electric connections to equipment specified by this section.

1.2 CONDITIONS

The General Conditions, Supplementary Mechanical and Electrical Conditions, and Special Conditions are hereby made a part of this Division to the same extent as if written in full, and this Contractor shall observe all of the requirements thereof insofar as they pertain and apply to his work.

1.3 REFERENCES

- A. National Fire Protection Association:
 - 1. NFPA 13 - Installation of Sprinkler Systems.
 - 2. NFPA 101 – Life Safety Code

1.4 SCOPE

- A. The scope of these specifications includes: the engineering, design and complete installation of the automatic fire sprinkler systems extending from the existing riser, through the new connecting corridor, to and throughout the new wing addition. The Sprinkler Contractor shall furnish and install the entire sprinkler system, from the connection at the existing sprinkler riser to the final installation of each head. Where conditions arise such that the sprinkler system installation is exposed directly to the exterior or to unconditioned interior spaces which will not maintain a space temperature above forty degrees Fahrenheit (i.e. attics, shafts, etc.), and at all exterior canopies, and overhangs 48" or wider, provide a dry-type automatic sprinkler system in strict accordance with the requirements of NFPA. Any and all components as required for a complete installation of each system type shall be provided including, but not limited to, piping, fittings, air compressors with power supply (coordinate with electrical contractor), etc. These areas shall be clearly marked in the shop drawing submittal. Dry system riser and associated piping, components, etc. shall be located in the mechanical room nearest each canopy location with piping extended above ceiling.
- B. It shall be a specific requirement that insofar as possible, all sprinkler system mains and branches shall be installed as close as possible to the floor/roof deck and through/between roof/floor framing members. Duct systems shall take precedence where minimal space is available and this contractor shall relocate piping, heads, etc. where conflicts with ductwork occur.
- C. All piping for all systems shall be coordinated with lighting fixtures, air-conditioning ducts, piping and air handling units. Sprinkler heads shall be located in the center of the ceiling tiles each way. Final exact locations shall be verified with the Architect upon shop drawings submittal and immediately prior to installation.
- D. Painting of all exposed sprinkler system piping, controls, valves, etc., shall be accomplished under the work this section. All sprinkler system piping throughout areas without finished ceilings shall be primed and painted; field coordinate exact routing , elevation and finish with architect.

- E. Caulking and sealing of sleeves for piping through floors and walls shall be included under the scope of the work of this section. The installation of all sleeves regardless of location, and the insulation of sprinkler system lines passing through insulated walls and partitions shall be in this Section of the work as specified hereinafter.
- F. Escutcheons for semi-recessed sprinkler heads in rigid ceilings shall be painted to match ceiling finishes; coordinate with architect accordingly.

1.5 SHOP DRAWINGS AND APPROVALS: <S>

The Automatic Sprinkler Subcontractor shall prepare complete shop drawings and dimensional working drawings for the entire installation. First submit to the Architect for approval the basic arrangement and layout. Such submittal will be noted for corrections or changes if required. Submit in four (4) copies. The corrected drawings shall then be submitted by the Subcontractor with review fees, completed applications, etc. to the Louisiana State Fire Marshal and Property Insurance Association of Louisiana. Upon securing written approval of these two agencies, submit to the Architect seven (7) copies of all drawings, stamped as approved, by each of the agencies.

1.6 CODE REQUIREMENTS:

All aspects of design, installation and equipment shall conform to the requirements of the International Fire Code; NFPA 13 and 101 and shall comply with all rules, regulations and requirements of the State Fire Marshal, Property Insurance Association of Louisiana, City of Bossier City and Local Fire Prevention Bureau. All piping, valves, fittings, etc. shall be U.L. listed and F.M. approved for fire protection service.

1.7 CLOSEOUT SUBMITTALS

- A. Project Record Documents: Record actual locations of sprinklers and deviations of piping from drawings. Indicate drain and test locations.
- B. Operation and Maintenance Data: Submit components of system, servicing requirements, record drawings, inspection data, replacement part numbers and availability, and location and numbers of service depot.

PART 2 PRODUCTS

2.1 MATERIALS AND INSTALLATION:

2.1.1 The materials and installation shall be as follows:

- A. Automatic Sprinkler Heads - Recessed, upright or pendent, of proper temperature rating, shall be installed throughout the building. Where furred or finished ceilings occur, the piping shall be installed above the ceiling with the sprinkler heads nipped to the ceiling and set in white polyester coated metal escutcheon plates. Sprinkler heads shall be semi-recessed type with white polyester coated finish in all finished ceilings unless noted or specified otherwise. Escutcheons for semi-recessed sprinkler heads in rigid ceilings shall be painted to match ceiling finishes; coordinate with architect accordingly.
- B. Drains - Shall be piped to outside of building as part of this work, except in locations where a drain fixture is provided by the plumbing design specifically.
 - 1. Branch piping accessories:
 - Alarm Pressure Switch: System Sensor Model "EPS".
 - Waterflow Detectors: System Sensor Model "WFD".

C. Piping System Valves - Shall be U.L. listed and F.M. approved for fire protection piping systems and shall be installed as required by the NFPA.

D. Overhead Piping

General: Black steel pipe produced to the following: ASTM A-795, A-53 and A-135. Pipe, fittings and joints shall be UL listed and FM approved. Listed restrictions and installation procedures per NFPA-13, and state and local codes must be followed. Piping layout shall be such as to avoid, wherever possible, conflicts or interference with building lighting, multiple pipe runs and mechanical equipment, including piping and equipment not in this contract. Locations of these items will be shown or called for on the drawings.

Threaded Pipe: Schedule 40 pipe 1" through 6" NPS and Schedule 30 pipe 8" NPS and larger may be threaded as approved by UL, FM, and NFPA 13.

Roll-Grooved Pipe: Schedule 10 pipe 1 1/4" through 12" NPS may be roll-grooved and joined with UL listed rubber-gasketed couplings as approved by UL, FM, and NFPA 13.

Other Fittings/Joints: Schedule 10, 30 or 40 pipe with welded outlets and joints are acceptable in accordance with UL, FM, and NFPA 13. Piping for dry-type systems shall be schedule 40 galvanized steel.

In lieu of rigid pipe offsets or return bends for sprinkler drops, the Victaulic VicFlex Multiple-Use Flexible Stainless Steel Sprinkler Drop System with captured coupling Style 108 may be used to locate sprinklers as required by final finished ceiling tiles and walls. The drop system shall consist of a braided type 304 stainless steel flexible tube, zinc plated steel male threaded nipple or Victaulic FireLock IGS Groove Style 108 coupling for connection to branch-line piping, and a zinc plated steel reducer with a female thread for connection to the sprinkler head.

1. Captured Coupling IGS Groove Style 108: Single-bolt, consisting of two ductile iron housings, grade # "EPDM" gasket, and a zinc electroplated steel bolt and nut conforming to ASTM A449.

E. Hangers

Shall be installed as required and shall be UL listed for use in a sprinkler system. Hangers shall be spaced in accordance with the requirements of the NFPA. All inserts and supports shall be installed prior to fireproofing. Coordinate with other trades.

F. Sprinkler Cabinet

One cabinet with 12 sprinkler heads and a head wrench shall be installed in the project where directed. Sprinklers shall be representative of those installed.

G. Underground Piping

Shall be Class 150 cast iron pipe, with mechanical joints, tar coated and UL approved. Fittings for this pipe shall be mechanical joint type, Class 250, tar coated. Underground piping shall be braced and clamped in an approved manner acceptable to the Rating Bureau. AWWA C-909 DR18 PVC as manufactured by North American Corp. may be used if permitted by local codes and authorities. Provide concrete thrust blocks at each change in direction and at all tees, plugs, caps, and bends in strict accordance with NFPA 24 and Appendix B. At each location where fire line enters the building to the sprinkler riser, provide Ames IBR seamless stainless steel In Building Riser supply.

H. Trenching and Backfill

Sprinkler lines included under this section shall conform to applicable portions of the specifications for excavation and backfill for buildings, including compaction and soils engineer control.

PART 3 EXECUTION

3.1 INSTALLATION

- A. Install in accordance with NFPA 13, and in accordance with the requirements of the Louisiana State Fire Marshal.
- B. Place pipe runs to minimize obstruction to other work.
- C. Install piping in concealed spaces above finished ceilings.
- D. Center sprinklers in two directions in ceiling tile and install piping offsets.

3.2 TESTING:

- A. All piping shall be tested for two hours at 200 psi in the presence of the Owner's representative and the inspector for the Rating Bureau and the Fire Marshal's representative, and shall be proved tight. Unsatisfactory workmanship shall be corrected to the satisfaction of the above mentioned persons. Defective materials shall be replaced with new materials and the defective materials removed from the premises.
- B. After testing and inspection of the entire system, and prior to project occupancy, a completed "Contractor's Material and Test Certificate" per NFPA-13 shall be submitted by the contractor for review and approval by the State Fire Marshal.

3.3 GUARANTEE:

All materials and workmanship installed under this section of the specifications shall be guaranteed for a period of one year from the date of acceptance of the installation by the Owner. Any defects noted within this period shall be promptly repaired by the Contractor at no expense to the Owner. The Contractor shall also be responsible for any damage to other work caused by leaks or breaks in work installed under this Contract during the period of construction and the guarantee period.

END OF SECTION

SECTION 22 05 00 - COMMON WORK RESULTS FOR PLUMBING

PART 1 - GENERAL

1.1 SCOPE:

The scope of the plumbing phase of this project shall include all labor, materials, equipment, etc., required to fulfill the intent of the Contract Documents and shall include the work specified under the subsequent sections of Division 15 of these specifications.

1.2 RELATED DOCUMENTS:

All applicable provisions of Divisions 0 and 1 govern work under this Division. Refer to these articles in the specifications for additional information.

1.3 REFERENCED STANDARDS:

1.3.1 All work shall be performed in full accord with the latest editions of the applicable state, and national building codes and local ordinances.

1.3.2 Refer to each section for applicable codes and reference standards.

1.4 FEES, PERMITS AND TAXES:

This Contractor shall make arrangements for and pay for all inspection fees, connection fees and permits required by local authorities. The Contractor shall also pay all taxes levied for labor and materials associated with work under this Division.

1.5 SUBMITTALS:

1.5.1 The symbol "<S>" indicates a requirement for submittals.

1.5.2 Refer to Architectural specifications for additional information on submittals.

1.5.3 Refer to AIA General Conditions.

1.5.4 In addition to the requirements of the above referenced portions of this specification, all Subcontractors proposing to do work under this Division shall comply with the following additional requirements:

- A. These specifications and drawings are intended to indicate a standard of quality for materials and equipment which is established by the listing of manufacturer's names and catalog numbers and/or by referenced standards. Materials and equipment that do not comply with these standards of quality will not be considered for substitution.
- B. As soon as practicable and within thirty (30) days after the award of the contract and before beginning the fabrication of any material or the installation of any equipment, data shall be submitted for approval on equipment and materials where noted. Materials (pipe, fittings, etc.) may be listed with the name of the manufacturer and identifying catalogue numbers. Data for equipment shall include manufacturer's name, catalog data, diagrams, drawings and other descriptive data as required or requested by the Architect for evaluation.
- C. Notwithstanding any reference in the specifications to any article, device, product, material, fixture, form or type of construction by name, make or catalogue number, such references shall be interpreted as establishing a standard of quality and shall not be construed as limiting competition; and the Contractor, in such cases, may at his option use any article, device, product material, fixture, form or type of construction

- which in the judgment of the Architect expressed in writing, is equal to that specified.
- D. All data shall be carefully examined and shall be forwarded for approval with a signed certification to the effect that the data has been carefully checked and found to be correct with respect to dimensions and available space and that the equipment complies with all requirements of the specifications.
- E. Point out in writing all deviations between the plans and specifications and the materials submitted.
- F. It is understood that proof of equality is the responsibility of the Contractor and/or supplier and that it is not the responsibility of the Architect to prove the inequality of the proposed substitutions. Furthermore the decisions of the Architect are final.

1.5.5 While it is not the intention of the Architect to discriminate against any manufacturer of equipment which is equal to specified equipment, a strict interpretation of such equality will be exercised by the Architect in considering any equipment offered as a substitute for equipment named in the specification. It shall be the responsibility of the Contractor to submit with each request for approval of substitute material or equipment, sufficient data to show conclusively that it is equal to the material or equipment specified.

1.5.6 Each Contractor shall submit shop drawings and/or diagrams for approval and for job coordination in all cases where significant deviations from the contract drawings are contemplated because of job conditions, interferences, or substitutions of equipment, or when requested by the Architect for purposes of clarification of the Contractor's intent. He shall also submit detailed shop drawings, rough-in sheets, etc., for all special or custom built items of equipment.

1.5.7 Submittal of shop drawings shall be made in sufficient quantities to provide one (1) copy of all data to be retained by the Engineer; two (2) copies of all data to be accumulated for the Owner; one (1) copy of all data to be retained by the Contractor; one (1) copy of all data to be retained by the Architect.

1.5.8 Should any substitute items be submitted and disapproved, then those items must be furnished exactly as described herein.

1.5.9 The Architect's review of shop drawings and/or submittal data shall not relieve the Contractor of responsibility for deviations from the contract drawings or specifications.

1.5.10 The size of plumbing equipment shown on the drawings is based on the dimensions of a particular manufacturer. While other manufacturers may be acceptable, it is the responsibility of the Contractor to determine if the equipment he proposes to furnish will fit in the space. Shop drawings shall be prepared when required by the Architect/Engineer or Owner to indicate a suitable arrangement.

1.5.11 Prior to ordering any equipment, the contractor shall furnish to the electrical contractor an itemized list of all equipment, motors, actuators, etc. requiring electrical power. The list shall include the item and its location, voltage, phase, horsepower and amperage. A copy of the list shall be submitted to the architect.

1.6 PRIOR APPROVAL:

Where the contractor wishes to substitute equipment or materials under an "or equal" clause, he shall submit via U.S. Mail or hand delivery to the Architect in written hard copy form at least seven (7) work days prior to bid opening lists of proposed substitutions which, from published manufacturer's data, cover the salient features of the proposed substitution.

Contractor shall indicate in writing all differences between specified equipment or materials and proposed substitution. Approvals will be issued in writing by addendum.

1.7 OPERATING AND MAINTENANCE MANUALS AND INSTRUCTIONS:

1.7.1 The symbol "<OM>" indicates a requirement for operating and maintenance manuals to be furnished.

1.7.2 The Owner's operating personnel shall be instructed by the Contractor on how to start and operate each item of equipment. Safety features shall be pointed out, particularly the possible troubles which might cause the safety controls to operate and what might be done to remedy the trouble.

1.7.3 Provide (4) four copies of operating and maintenance manuals. Manuals shall be bound in large ring, loose-leaf binders and contain the following:

- A. Manufacturer's instructions and/or installation manual.
- B. Manufacturer's service manual.
- C. Manufacturer's lubrication chart listing types of lubricant to be used on each item of equipment and recommended frequency of lubrication.
- D. Electrical diagrams of each equipment "packaged" control system.
- E. Parts lists and identifying part numbers with prices of each part. The name and address of the nearest distributor from which parts can be obtained.

1.8 WARRANTY:

This contractor shall warrant all workmanship, material, equipment systems, etc., provided by him for a period of one year after substantial completion of the project. This warranty means that this contractor shall make good to the Owner, at no cost, any defects that become apparent during the year following substantial completion. This warranty is in addition to any other guarantees or warranties and is not intended to limit such other guarantees or warranties.

1.9 DEFINITIONS: The following words and phrases as used herein are hereby defined:

1.9.1 "provide": Furnish and install all material and labor required for a complete installation ready for operation in accordance with the intent of the Contract Documents.

1.9.2 "as required": Indicates that the Contractor shall perform the work or provide the material as indicated in accordance with manufacturer's installation instructions; and in accordance with applicable codes or regulations; and in a workmanlike manner as defined by good local practice.

1.9.3 "or equal": Indicates that the Contractor may substitute equipment by another manufacturer if the salient features of the equipment indicated by manufacturer's name and/or described are, in the judgment of the Architect, adequate. Submittals for approval are required where indicated.

1.9.4 "contractor": Where the word(s) "Contractor" or "this Contractor" is/are used, they refer to the Contractor engaged to execute the work under this division of the specifications only, even though he may be technically described as a sub-contractor.

1.9.5 "intent of the Contract Documents": The specific intent of these documents is to provide to the Owner, in a thoroughly functional condition, all the various systems, equipment, etc., indicated herein. Final authority over interpretation of the "intent" shall rest with the Architect.

1.9.6 "shall": Indicates a mandatory requirement.

1.10 INSPECTION OF THE SITE:

1.10.1 The drawings are prepared from the best information available and reflect all conditions commensurate with this information. However, the contractor shall visit the site prior to submitting a proposal and should verify the locations, sizes, depths, pressures, etc., of all existing utilities and familiarize himself with working conditions, hazards, existing

grades, soil conditions, obstructions, etc. If it becomes evident that existing site conditions will impair the proper operation of the utilities, the Architect should be notified in writing.

1.10.2 All proposals shall take these existing conditions and any revisions required into consideration.

1.11 CONSTRUCTION REQUIREMENTS:

1.11.1 The Contractor shall be responsible for fitting his material and apparatus into the building and shall carefully lay out his work at the site to conform to the structural conditions, to provide proper grading of lines, to avoid all obstructions and to conform to the details of the installation supplied by the manufacturer of the equipment to be installed. Furnish all necessary pilot lines and control lines whether indicated on the drawings or not. The drawings do not give exact details as to elevations of pipe lines nor do they show exact locations of pipe to scale. Piping elevations shall be handled by giving precedence to pipes which require a stated grade for proper operation. Devices necessary for installation and support of pipes, and equipment (such as sleeves, inserts, etc.) shall be located and installed as the construction progresses in order to allow completion of each phase of the work in the proper sequence.

1.11.2 Drawings showing the extent and arrangement of the work of a particular trade shall be used together with drawings showing extent and arrangement of work of other trades to insure that the Contractor in laying out and installing his work shall do so in a manner such that the work of the several trades may progress in the most direct, workmanlike and harmonious manner.

1.11.3 The Contractor shall be responsible for the proper location and size of slots, holes or openings in the building structure pertaining to his work, and for the correct location of pipe sleeves. The drawings indicate the extent and general arrangement of the various systems, but if any departures from these drawings are deemed necessary by the contractor, detailed drawings and descriptions of these departures and a statement of the reasons therefore shall be submitted to the Architect as soon as practicable. No departures from the arrangements shown on the drawings shall be made without prior written approval of Architect.

1.11.4 In general, piping in finished areas of the building shall be run concealed unless noted and directed otherwise. Should any conditions arise which would cause any piping to be exposed in finished areas, it shall be immediately called to the Architect's attention. In unfinished spaces such as equipment rooms, all pipe shall be run as high as possible, shall be run to a continuous grade and shall be grouped wherever it is feasible to do so.

1.11.5 All pipe etc., shall be cut accurately to measurements established at the building and shall be worked into place without springing or forcing. All pipes run exposed in equipment rooms shall be installed parallel to the building planes except that the lines shall be sloped to obtain the proper pitch. Piping run above furred ceilings, etc., shall be similarly installed, except as otherwise shown. All pipe openings shall be kept closed during construction until the systems are closed with final connections.

1.11.6 The construction details of the building are illustrated on the Architectural and Structural Drawings. The trades shall thoroughly acquaint themselves with the details before submitting their bid as no allowance will be made because of unfamiliarity with these details. All required inserts shall be "drilled-in" and all openings required through concrete or masonry shall be "saw-cut" or "core drilled" with tools specifically designed for this purpose. Explosive or compression driven inserts shall only be allowed for use as approved by SMACNA and the manufacturer of these devices. All concealed lines shall be installed as required by the pace of the job to precede the general construction.

1.11.7 The plumbing plans do not give exact locations of outlets, fixtures, equipment items, etc. The exact location of each item shall be determined by reference to the general plans and to all detail drawings, equipment drawings, roughing-in drawings, etc., by measurements at the building and in cooperation with other trades. Minor relocations necessitated by the conditions at the site or directed by the Owner shall be made without additional cost to the Owner.

1.11.8 All oiling devices and all parts of equipment requiring adjustment shall be easily accessible. Equipment shall be so located and installed as to permit convenient and safe maintenance and future replacement. The trade furnishing the equipment shall be responsible prior to ordering same in the event that equipment specified and/or approved is incompatible with this requirement.

1.12 SLEEVES AND PENETRATIONS:

1.12.1 Refer to AIA General Conditions.

1.12.2 Each and every pipe and duct, regardless of material, which passes through a concrete slab, (except slab on grade), masonry wall, roof or other portion of the building structure shall be free from the structure and shall pass through a sleeve furnished and installed by the Subcontractor responsible for the work involved.

1.12.3 Above grade and dry location sleeves shall be constructed from 20 to 22 gauge galvanized steel and shall be flush on both sides of wall surface penetrated. The sleeves shall be sized to allow free passage of the pipe to be inserted, and when this pipe is to be insulated, the sleeves shall be large enough to pass the insulation. Floor sleeves located in pipe chases shall extend up two inches (2") above the floor slab.

1.12.4 Sleeves passing through walls or floors on or below grade and/or in moist areas shall be constructed of galvanized steel, schedule 40 pipe and shall be designed with suitable flange in the center of the floor or wall to form a waterproof passage. After the pipes have been installed in the sleeves, void space around the pipe shall be caulked to insure a waterproof penetration. Fire ratings of rated walls and floors shall be maintained by the use of approved materials.

1.12.5 All penetrations through fire rated ceilings, walls or floors shall be fire stopped using approved materials to maintain the fire rating of the ceiling, wall or floor structure. Fire stop shall be equal to BIO Fireshield, Inc., BIOTHERM 200 or BIO K-2 mortar as applicable. Penetrations shall meet or exceed the requirements set forth in the U.L. Fire Resistance Directory, Volumes I and II.

1.12.6 After installation of pipe and duct through sleeves, all sleeves shall be sealed with materials suitable for maintaining thermal resistance, acoustic properties, and weatherproofing of walls, roofs, etc. Refer to Architectural specifications.

1.13 ISOLATION:

Transmission of perceptible vibration, structure-borne noise, or objectional air borne noise to occupied areas by equipment installed under this contract will not be permitted.

1.14 CONSTRUCTION SAFETY:

This contractor assumes all responsibility regarding the safety of his personnel on the project during construction. The Contract Documents do not include materials, procedures, components, etc., required to insure construction safety. Refer to General Conditions and Supplementary General Conditions for additional information.

1.15 DAMAGE:

1.15.1 This Contractor shall be responsible for damage to project caused by this Contractor's failure to recognize hazards associated with items such as leaks, scheduling of work, inexperienced workmen, excessive cutting, etc.

1.15.2 This Contractor shall repair, at no expense to the Owner, any such damage.

1.15.3 This contractor shall familiarize himself with working conditions to the extent that he shall be responsible for damage to concealed piping, wiring and other equipment to remain and shall repair any damage caused by his negligence at no cost to the Owner.

1.16 FLOOR, CEILING AND WALL PLATES:

1.16.1 Refer to AIA General Conditions.

1.16.2 In addition to the requirements of the above referenced portions of this specification, all Subcontractors shall furnish a chromium plated sectional escutcheon in each finished space on each pipe or hanger rod penetrating a wall, floor or ceiling. Escutcheons shall be sized to fit snugly to all lines and where the lines are insulated, the escutcheons shall be fit snugly over the insulation. These plates shall be provided with set screws so that they fit snugly against the finished surface. All equipment rooms are classified as finished space.

1.17 EQUIPMENT NAME PLATE:

Each piece of equipment shall have a metal nameplate engraved with the manufacturer's name, the equipment's model number, and the equipment's serial number. The metal nameplate shall also be engraved with the equipment's capacity, voltage, horsepower, manufactured date and the equipment designation (i.e. WH-1, HWC-1, etc.) corresponding with the plans. This metal nameplate shall be fastened to the equipment with pop rivets. Plastic or stick-on type labels will not be acceptable.

1.18 IDENTIFICATION:

1.18.1 Each piece of equipment; every valve whose service and/or duty is not readily apparent; every piping system except cast iron sewer lines, shall be permanently and clearly identified.

1.18.2 Equipment and valves shall be provided with laminated phenolic nameplates, appropriately engraved with proper identification correlated to the designation shown on the drawings. Punched plastic tape will not be acceptable. Insulated equipment may have identification taped on as for piping system.

1.18.3 Piping systems shall have designation on ten foot (10'-0") centers and closer where required to provide adequate identification, using Brady "all temperature permacode" pipe markers with direction of flow and service indication.

1.18.4 All these pipe markers shall conform to ANSI-A-13 "Scheme for the Identification of Piping Systems". Arrow markers must have the same ANSI background colors as their companion pipe markers. All marks shall be as manufactured by Brady or approved equal.

1.19 STORAGE OF MATERIALS:

Each contractor shall provide space for storage of materials, equipment or tools at ground level. Any storage contemplated within the building will be allowed only upon specific approval of the Architect.

1.20 LOCAL CUSTOMS:

Each Sub-contractor shall comply with local customs as to which particular trade shall install any part or parts of any work or equipment specified herein.

1.21 MANUFACTURER'S DIRECTIONS:

The manufacturers' published directions shall be followed in the delivery, storage, protection, installation, piping and wiring of all equipment and material. The Contractor shall promptly notify the Architect in writing of any conflict between the requirements of the contract documents and the manufacturers' directions and shall obtain the Architect's instructions before proceeding with the work. Any such work performed that does not comply with the manufacturers' directions shall have deficiencies corrected at no cost to the Owner.

PART 2 - PRODUCTS

2.1 MATERIALS:

All materials shall be new and free from defects at the time of installation. Materials or equipment damaged in shipment or otherwise damaged prior to installation shall not be repaired at the job site, but shall be replaced with new materials.

2.2 MANUFACTURER'S REQUIREMENTS:

When a manufacturer's name appears in these specifications, it is not to be construed that the manufacturer does not have to meet the full requirements of the specifications or that his standard cataloged item will be acceptable.

2.3 SERVICE AND REPAIR PARTS:

All equipment installed on this project shall have local representation, local factory authorized service, and a local stock of repair parts.

2.4 FLAME SPREAD PROPERTIES OF MATERIALS:

All materials and adhesives used for air conditioning filters, acoustical lining, and insulation shall conform to NFPA and UL life, safety and flame spread properties of materials. The composite classifications shall not exceed 25 for a flame spread rating and 50 for a smoke developed rating for these classifications as listed for the basic materials. The finishes, adhesives, etc., specified for each system and shall be such when completely assembled.

2.5 ACCESS PANELS:

Provide flush mounted metal access panels and frames with concealed hinges and key actuated locks for all concealed and otherwise inaccessible valves, parts, fittings, equipment, filters, etc. and as required for inspection or service.

PART 3 - EXECUTION

3.1 WORKMANSHIP:

3.1.1 All work shall be done by experienced craftsmen skilled in the applicable trade.

3.1.2 Unprofessional and incomplete work shall be rejected and corrected at no additional expense.

3.2 PROTECTION OF EQUIPMENT:

The Contractor shall continuously maintain adequate protection of both stored and installed materials and equipment. Fixtures and equipment, whether located inside or outside, shall be tightly covered with sheet polyethylene or waterproof tarpaulin as protection against dirt, rust, moisture and abuse from other trades. Adequate air circulation shall be provided under any protective sheet to prevent condensate build up. Materials and equipment shall not be stored directly on the ground, floor, or roof deck. Piping and equipment shall not be used by other trades as supports for scaffolds or personnel. At the completion of the work, equipment, fixtures, exposed supports and piping shall be cleaned of dirt, construction debris, overspray, etc., to the satisfaction of the Architect. Repairs made necessary by damage shall be paid for by the Contractor.

3.3 PROTECTION OF STRUCTURE:

Each Contractor in performing his work shall take particular care not to damage the structure. All finished floors and step treads shall be covered to prevent any damage by workmen or their tools and equipment during the construction of the building. In addition, each Contractor shall protect any materials on the job site whether a part of this contract or the property of another Contractor.

3.4 LARGE EQUIPMENT:

All large pieces of equipment which will be installed in the building, and which are too large to permit access through doorways, stairways or shafts, shall be brought to the job by the Contractor and placed in the spaces before the enclosing structure is closed in.

3.5 FOUNDATIONS:

3.5.1 Concrete foundations required by mechanical equipment shall be constructed by this Contractor. See Concrete Work.

3.5.2 Equipment shall be set in place on the bases, leveled and aligned by means of shims, piped, then grouted in, in that order. After grouting, the forms shall be removed and the surfaces of the foundation shall be hand-rubbed with carborundum. Concrete work shall conform to the requirements of General Specifications, Concrete Work, of this specification.

3.6 CONFLICTS, INTERFERENCES AND COORDINATION BETWEEN TRADES:

3.6.1 The drawings are not to be construed as shop drawings, but indicate the extent, general location, arrangement, etc., of piping systems and equipment. This Contractor shall refer to other sections of the specifications and other drawings such as electrical, structural, architectural, etc., in order to eliminate conflicts and undue delays in the progress of the work. Where other Contractors furnish items requiring piping connections by this Contractor, they will be held responsible for providing roughing-in drawings and assistance upon request.

3.6.2 Each trade shall so harmonize its work with that of the other trades so that the work may be done in the most direct and workmanlike manner without hindering the other trades. Piping interference shall be handled by giving precedence to pipe lines which require a stated grade for proper operation. Where space requirements conflict, the following order of precedence shall be observed:

- A. Building lines
- B. Structural members
- C. Soil and drain piping
- D. Vent piping
- E. Refrigerant Piping
- F. Condensate piping
- G. Supply ductwork
- H. Exhaust ductwork
- I. Return ductwork
- J. Domestic water
- K. Electrical conduit
- L. Natural gas piping
- M. Automatic fire sprinkler piping

3.6.3 In the event of conflicts between specifications and drawings, drawings shall take precedence over specifications except in matters pertaining to quality, applications, and coordination between trades, which shall be governed by specifications.

3.6.4 Plans, specifications and other documents have been prepared and developed with reasonable professional care and coordination. It is the intent that all documents are supportive and complimentary, one to the other; and as such what is

required by one shall be considered as required and binding as if indicated by all. Work indicated shall include, regardless of whether or not specifically indicated, such supportive or required items or work is consistent with what is indicated, is reasonably inferable from what is indicated, and/or is common construction procedure or knowledge with regard to what is indicated.

3.6.5 In the event of conflict between codes, as interpreted by the authority having jurisdiction and the contract documents, the codes shall govern.

3.6.6 In the event of conflict between manufacturer's installation instructions and the drawings, the manufacturer's installation instructions shall govern.

3.6.7 Should discrepancies be found between the documents and/or an interpretation is required, and a decision or interpretation to the contractor is not rendered by the Architect, it shall be assumed the contractor has reviewed all the documents to find the most costly method for items in question which then shall be required. One document does not take precedence over another when interpreting a discrepancy.

3.7 CUTTING AND PATCHING:

3.7.1 All cutting required by the installation of sleeves, piping, equipment, etc., shall be coordinated with the General Contractor, but performed by this Contractor. Patching shall be by the General Contractor. This Contractor shall not cut any structural element or any finished work without permission from the Architect.

3.7.2 This Contractor shall cut and patch all paving as required by the installation of buried piping, including utilities.

3.8 PAINTING:

3.8.1 All painting except "touch-up", exposed piping throughout service shop and car wash areas, gas piping and equipment/mechanical room piping shall be provided under the painting sections unless noted otherwise. All exposed piping, equipment, etc., shall be left clean and free from rust or grease and ready for the painter.

3.8.2 Where equipment finishes are damaged, this Contractor shall obtain matching color touch-up paint from the equipment's manufacturer and paint as required.

3.9 CONCRETE WORK:

This Contractor shall provide all forming, reinforcing and concrete as indicated such as equipment bases, plumbing stack support pads, valve and cleanout pads and headwalls. Work shall conform to applicable portion of Division 3 CONCRETE.

3.10 TRENCHING AND BACKFILL:

3.10.1 All necessary excavation and backfill for the installation of plumbing, heating, air conditioning and ventilating work shall be accomplished by each trade Subcontractor under his phase of the work. All such work shall be included regardless of the type of materials encountered in the excavation.

3.10.2 Trenches for all underground piping shall be excavated to the required depths. The banks of trenches shall be kept as nearly vertical as practicable and where required shall be properly formed and braced. Trenches shall be not less than 12" wider than the outside diameter of the pipe to be laid therein. The bottoms of the trenches shall be tamped hard and graded to secure proper fall. Bell holes shall be excavated to a depth 6" below the bottom of the pipe and shall be backfilled to the proper grade with pea gravel or sand thoroughly tamped. Pipe laid in trenches dug in fill shall be supported down to load bearing undisturbed soil. After the pipes have been tested, inspected and approved by inspecting authorities, the trenches shall be backfilled.

3.10.3 The trenches beneath and within six feet of the building shall be carefully backfilled with pea gravel or approved river sand depth of six (6) inches above the top of the pipe. The next layer and subsequent layers of backfill may be

excavated materials if of earth, loam, sand or gravel free of large clods and with rocks no larger than 1-1/2" in diameter. Backfill shall be installed in layers 6" deep, adequately tamped and wetted down before the next layer of earth is laid in place. This additional material required for backfilling shall be furnished and any excess materials and debris shall be removed from the site. Any special backfill material shall be provided as specified or shown on the drawings.

3.10.4 All excavating and backfilling shall be done in a manner so as not to disturb adjacent structures and any shoring required shall be provided.

3.11 LUBRICATION:

This Contractor shall provide all lubricants for the operation of all equipment until acceptance. The Contractor shall be required to protect all bearings during the installation and shall thoroughly grease steel shafts to prevent corrosion. All motors and other equipment shall be provided with covers as required for proper protection during construction. All equipment bearings requiring periodic lubrication shall be provided with proper fittings for this purpose. Where equipment requiring such lubrication is not readily accessible due to location, copper tubing extensions shall be provided in addition to lubrication fittings.

3.12 ELECTRICAL WORK:

3.12.1 Except for such items that are completely wired at their point of manufacture and so delivered and unless specifically noted to the contrary herein, the Electrical Contractor shall provide all electric wiring (50 VAC and above) for power supply and control. This includes mounting of all electrical devices furnished under this section of these specifications.

3.12.2 Conduit and wiring (below 50 VAC) for all automatic controls, and interlock shall be provided by this Contractor. The furnishing of all disconnect switches as required for proper operation as shown on the drawings and required by code will be under Electrical Work, except where specifically designated on the plans.

3.12.3 Furnishing of complete wiring diagrams showing power wiring and interlock wiring shall be work under the trade supplying the equipment. Diagrams shall be based on approved equipment and shall be complete integral drawings, not a series of manufacturer's individual diagrams. After these diagrams have been approved by the Architect/Engineer, copies shall be furnished to the trades involved and they shall be followed in detail.

3.12.4 The electrical design and drawings are based on the equipment scheduled and shown on the drawings and should any mechanical equipment requiring changes to the electrical design be approved, the required electrical changes shall be made at the expense of the trade furnishing the changed equipment and at no cost to the Owner.

3.13 EQUIPMENT CONNECTION:

This Contractor shall bring required services to equipment items furnished under other sections of this specification or by the Owner, make final connections, and leave equipment ready for operation. Where it is necessary for Contractors performing work covered by this section to make final connections to items of equipment being furnished by Contractors under other sections, all such work shall be performed in a neat and workmanlike manner and all materials shall be of quality and finish normally used for such installation.

3.14 OPERATION PRIOR TO COMPLETION:

When any piece of mechanical or electrical equipment is operable and it is to the advantage of the Contractor to operate the equipment, he may do so providing that he properly cleans the equipment, installs clean filter media, properly adjusts and completes all punch list items before final acceptance by the Owner. The date of acceptance and the start of the warranty may not be the same date.

3.15 EQUIPMENT AND AIR INTAKE ARRANGEMENTS:

3.15.1 All equipment shall be installed in a manner to permit access to all surfaces requiring access. All valves, motors, drives, lubrication devices, filters and other necessary items shall be installed in a position to allow removal for service without disassembly of another part.

3.15.2 Outside air, ventilation and combustion air intakes shall be separated from exhaust air outlets, flues, plumbing vent stacks, etc. to avoid infiltration of odors, fumes and other contaminants. Separation shall be 15 ft. minimum.

3.16 EXECUTION OF WORK:

The Contractor shall plan, schedule and execute his work and that of any of his Sub-contractors so as not to interfere with the work of other trades or Contractors in the building or on the premises.

3.17 FLASHING AND WATERPROOFING:

All building penetrations to outside shall be flashed and counter flashed as required to eliminate leaks.

3.18 TESTS:

All tests shall be made by this Contractor and repeated until approved by the Architect. Piping systems shall not be covered or otherwise concealed until tests have been made and approvals obtained. Notify the Architect four days prior to tests to allow for scheduling. Test the piping systems as indicated in applicable articles, and as required by applicable codes and standards as a minimum.

3.19 CLEAN-UP:

3.19.1 It shall be the responsibility of each trade to cooperate fully with the other trades on the job to help keep the job site in a clean and safe condition. At the end of each day's work, each trade shall properly store all of his tools, equipment, any surplus materials and remove all debris caused by his portion of the work.

3.19.2 When all work has been finally tested, the Contractor shall clean all work installed by him, including all fixtures, equipment, pipes, and all exposed work. All pipes shall be flushed out and left free of all obstructions. All plates, fixtures, and other finished products shall be thoroughly cleaned and polished.

3.20 FINAL OBSERVATIONS:

3.20.1 It shall be the duty of the Contractor to make a careful inspection trip of the entire project, assuring himself that the work on the project is ready for final acceptance, before calling upon the Architect/Engineer to make a final observation.

3.20.2 In order not to delay final acceptance of the work, the Contractor shall have all necessary bonds, guarantees, receipts, affidavits, etc., called for in the various articles of this specification, prepared and signed in advance, and together with a letter of transmittal listing each paper included, and shall deliver the same to the Architect/Engineer at or before the time of the final observations. The Contractor is cautioned to check over each bond, receipt, etc., before preparing same for submission to see that the items check with the requirements of the specification.

END OF SECTION

SECTION 22 05 03 - PLUMBING PIPING

PART 1 - GENERAL

1.1 SCOPE:

Work in this section shall include piping, fittings, accessories etc., to be used in piping systems in accordance with the intent of the Contract Documents and shall include the following principal items:

Piping
Valves
Piping Accessories

1.2 REFERENCED STANDARDS:

National Bureau of Standards (NBS).
Cast Iron Soil Pipe Institute (CISPI).
American Society of Testing & Materials (ASTM).
American Water Works Association (AWWA).
National Fire Protection Association (NFPA).
Factory Mutual Engineering Corporation (FM).
American Society of Mechanical Engineers (ASME).

1.3 SUBMITTALS:

Submittals are required as indicated only. Submittal of pipe and fittings is not required unless a deviation from the specification is proposed.

PART 2 - PRODUCTS

2.1 DOMESTIC WATER PIPING:

2.1.1 Domestic water piping exterior to the building shall be Type "L" copper, per ASTM B-88, or SCH 40 PVC per ASTM D-2466-78 if approved by local code officials.

2.1.2 Domestic water piping, 1-1/2" and smaller in size, and under the building slab shall be type "L" soft drawn commercially pure copper water pipe, per ASTM B-88. The use of joints in the piping beneath concrete slabs will be avoided and will be permitted only to the extent of long runs where a single roll of length of copper tubing is not of sufficient length to complete the piping run. Should a joint be required, the joint shall be made with silver-fos solder and wrought solder joint copper fittings. Pipe larger than 1 1/2" shall be Type-L hard copper per ASTM B-88 with silver-fos solder and wrought fittings.

2.1.3 Domestic water piping, within the building and above ground, shall be type "L" hard drawn commercially pure copper joint fittings per ASTM B-88 and hard solder. Flux shall be a non-corrosive paste type. Cored solder will not be allowed; all solder shall be a solid string or wire type. Where soldered copper piping must be connected to screwed brass pipe, a cast brass adaptor shall be used. Piping shall be assembled with 95-5 tin/antimony solder or 95-5 tin/silver solder. No solder containing lead shall be used. <S> At contractor's option Victaulic grooved or Nibco "PressFit" copper systems may be used per manufacturer's recommendations for sizes 2" and larger.

2.1.4 Water piping connections to fixtures or equipment shall be made by use of brass pipe or nipples, chrome plated where exposed to view in finished areas, screwed into copper to IPS adaptor fittings. Ferrous piping connections shall not be used in copper piping systems.

2.1.5 Dielectric insulating couplings shall be provided between ferrous and copper piping systems.

2.1.6 <S> Domestic water piping control valves shall be provided by this Contractor where required to adequately control and isolate the various domestic water piping systems. Provide stem extensions for insulated valves equal to Nibco's Nib-Seal extended handle. (Reference Section 22 07 00 for insulation thickness.) Valves shall be as manufactured by Nibco, Stockham, Milwaukee, Hammond or Grinnell and equal to Milwaukee or Nibco numbers as stated below. Bronze components shall contain not more than 12% zinc.

- A. Gate valves throughout the domestic water piping shall be equal to Nibco S-111 or Milwaukee Gate 149, solder joint, 125 lb., rising stem, solid wedge disc.
- B. Check valves shall be equal to Nibco S-413-Y or Milwaukee Check 1509-S, 125 lb., bronze check valve with "Buna-N" disc.
- C. Temperature and pressure relief valves shall be ASME rated Watts valve or approved equal.
- D. Ball valves throughout the domestic water system shall be equal to Nibco S-585-70-66, solder joint, 600 psi WOG, stainless steel ball and trim, reinforced TFE seats, full-port, quarter-turn, two-piece.

2.1.7 On each cold supply where serving water closets or urinals, provide a manufactured water hammer protective device. These shall be of the size recommended by the manufacturer for the particular application and installed in accordance with Plumbing and Drainage Institute Standard PDI-WH201. On all other hot and cold water supplies provide an air chamber the same size as the supply to the fixture and not less than 24" long. These air chambers shall be located directly behind the supply connection to the fixture and shall have a capped top, shall be constructed of the same material as the piping system in which they are installed, and shall be insulated in the same manner as the balance of the piping system in which they are installed.

2.2 SANITARY DRAINAGE:

2.2.1 All sanitary drainage line (soil, waste and vent) shall be cast iron soil pipe and fittings per ASTM A74, coated inside and out and shall be labeled with the C.I. mark of quality and permanence as illustrated in Commercial Standard CS-188-59, which indicates that it complies with this standard. Weight of pipe shall be Class "SV" service weight. Joints shall be fabricated by the use of compression type joints similar to Tyler Pipe and Foundry's "Ty-Seal". "No Hub" piping per ASTM A-888 will be acceptable if approved by Plumbing Inspector but shall be limited to above ground installation. Any drain line subject to contamination by oil, gasoline, or any other petroleum product shall have "BUNA-N" gaskets, approved for that service.

2.2.2 <S> At the Contractor's option, and where approved by local authority sanitary drainage and vent piping may be type DWV Schedule 40 PVC pipe and fittings per ASTM D-2665-78. It shall be the contractor's responsibility to obtain approval from local authorities. PVC piping shall not be permitted in return air plenums, or exposed interior and exterior to the building. All vents through roof (VTRs) shall be service weight cast iron with a cast iron to PVC adaptor or transition fitting as required.

2.2.3 Horizontal waste and soil pipe shall be given a grade of 1/4" per foot where possible and not less than 1/8" per foot. Waste and soil piping 2-1/2" and smaller shall be given a grade of 1/4" per foot minimum. Where practicable, two or more vents shall be connected together and extended as one vent through the roof. Vent and waste connections to stacks shall be made by the appropriate use of forty-five (45) degrees wyes, long sweep quarter bends, sixth, eighth, or sixteenth bends as approved by local codes except that sanitary tees and sanitary crosses shall be used on the connection to vertical stacks. Provide piping offsets in vertical vent stacks as required to maintain a minimum 15 ft. separation between plumbing vents through roof and air intakes.

2.2.4 Vents shall be extended at least 12" above roof and shall be flashed per roofing manufacturer requirements as follows:

1. Membrane Roof –

- a. Install fasteners and plates as required around vent penetrations, using reinforced membrane. Cut out flashings as required and apply bonding adhesive to both the underside of the flashing and to the vent piping and the field sheet up to the outside edge of the fastener line.
 - b. Allow the bonding adhesive to dry to finger touch until it does not string or stick to a dry finger. Roll the flashing into the dry adhesive to complete the bond. Be sure that the flashing does not bridge where there is any change of direction. All flashings must be mechanically fastened at the top (under appropriate counterflashing or using an appropriate retainer) with approved fasteners. Laps must extend a minimum of 2-1/2 inches beyond fasteners onto field sheet or half sheet, as appropriate.
 - c. After flashing is adhered in place, promote full contact adhesion by going back over entire area with roller, broom, or hand pressure.
2. Other Roof Types - Use 4 lb. lead with the base extending at least 10" in every direction from stack. The vertical portion of the flashing shall extend upward the entire length of the vent pipe and turn down inside the pipe at least 2" to provide a weather-tight joint.
 3. Metal Roof - Use a 1 piece flexible base recommended by the metal roofing manufacturer. The base shall be E.P.D.M. (Ethylene Propylene Diene Monomer) rubber with a ductile aluminum alloy reinforcing base ring bonded to a rubber flange on the base of the flashing unit. Assembly shall be manufactured by and installed in accordance with Butler Manufacturing Company or prior approved equal.

2.2.5 Cleanouts shall be provided at each change in direction of the soil lines, at the end of each continuous waste line, at the foot of each riser within the building and at 80'-0" intervals in horizontal lines 4" and larger, and at 50'-0" intervals in horizontal lines 3" and smaller except as noted. The sizes of cleanouts shall be identical with the size of soil or waste lines in which they are placed, except that cleanouts larger than four inches (4") in diameter will not be required. Cleanouts must be placed in accessible locations and where they occur in pipe chases, said cleanouts shall be placed above the floors in such a manner that they will be accessible through doors or they shall be brought through the wall and provided with flush covers. Exact locations of each shall be approved by the Architect before installation. All cleanouts shall be of the type specifically designed for installation in the type of wall in which they are installed. Wherever cleanouts shall occur in finished floors, they shall be specifically designed for the type of floor in which they are installed. All cleanouts located in exterior locations shall be encased in 14" x 14" x 6" concrete pads unless installed in a walk drive or other paved area. All cleanouts in walls or other painted surfaces shall be of type furnished in prime coat to be painted on the job to match the surface in which they are installed. All cover plates on cleanouts shall be attached with vandal-proof screws.

2.2.6 Each fixture and piece of equipment requiring connection to the sanitary drainage system, except fixtures with integral traps, shall be equipped with a deep seal trap. Each trap shall be placed as near to the fixture as possible and no fixture shall be double trapped unless permitted by governing codes.

2.2.7 Hub drains, open-site drains and floor drains connected to the sanitary drainage system shall be provided with deep seal P-traps. P-traps used for open-site condensate termination shall be deep seal type and shall be equipped with a trap primer valve with 1/2" cold water supply and ball shut-off valve where ProSet Trap Guard is not used. The Plumbing Subcontractor shall provide all hub drains, open-site drains, and floor drains required for condensate drain termination, whether indicated on plan or not. Coordinate with HVAC Subcontractor accordingly. Termination points shall be within 10 feet of HVAC equipment unless indicated otherwise.

2.3 STORM WATER PIPING:

2.3.1 All storm water piping within the building and above ground shall be cast iron pipe per ASTM A53, coated inside and out and shall be labeled with the C.I. mark of quality and permanence as illustrated in Commercial Standard CS-188-59, which indicates that it complies with this standard. Weight of pipe shall be Class "SV" service weight. Joints shall be fabricated by the use of compression type joints similar to Tyler Pipe and Foundry's "Ty-Seal" or approved lead and oakum joint. "No Hub" piping will be acceptable if approved by Plumbing Inspector.

2.3.2 <S> At contractor's option, and where approved by local authority, Schedule 40 PVC DWV pipe and fittings per ASTM D-2665-78 may be used for storm water piping installed below slab. PVC piping shall not be permitted above slab, in return/exhaust plenums or exposed interior or exterior to the building. It shall be the contractor's responsibility to obtain approval from local authorities.

2.3.3 Cleanouts shall be provided at each change in direction of the drain lines, at the end of each continuous line, and at 100'-0" intervals exterior to the building. The sizes of cleanouts shall be identical with the size of drain lines in which they are placed, except that cleanouts larger than four inches (4") in diameter will not be required. Cleanouts must be placed in accessible locations and where they occur in pipe chases, said cleanouts shall be placed above the floors in such a manner that they will be accessible through doors or they shall be brought through the wall and provided with flush covers. Exact locations of each shall be approved by the Architect before installation. All cleanouts shall be of the type specifically designed for installation in the type of wall in which they are installed. All cleanouts located in exterior locations shall be encased in 14" x 14" x 6" concrete pads unless installed in a walk drive or other paved area. All cleanouts in walls or other painted surfaces shall be of type furnished in prime coat to be painted on the job to match the surface in which they are installed. All cover plates on cleanouts shall be attached with vandal-proof screws.

2.4 DRAIN AND RELIEF PIPING:

2.4.1 Auxiliary drain piping, equipment drains, appliance drain piping and water heater relief piping shall be type "L" hard drawn copper piping with cast and/or wrought copper fittings per ASTM B-88, 95/5 solder. Provide pipe supports at specified intervals with only copper-plated, copper or brass in contact with copper piping.

2.4.2 All drain piping shall be installed with a minimum fall of 1/8" per foot unless noted otherwise on plan.

2.5 GAS PIPING:

2.5.1 Furnish and install a system of gas piping as shown on the plans. All gas piping within the building shall be run exposed unless specifically shown otherwise. Any gas piping concealed within the building shall be properly vented to the outside.

2.5.2 All gas piping shall be standard weight black steel pipe per ASTM A-53. All intermediate pressure pipe and all pipe larger than 1-1/2" shall be welded joints. Low Pressure fittings 1-1/2" and smaller shall be standard weight black malleable iron screwed per ASTM A-197-65. Intermediate pressure fittings and fittings larger than 1-1/2" shall be "Tube-Turn" forged welding type, or approved equal. Screw thread joints shall be made with an approved compound & shall comply with ANSI Standard for Pipe Threads, B2.1-1968.

2.5.3 All underground piping shall have factory applied covering conforming to Republic "X-Tru-Coat"; or General Paint Corporation Specification "TMA-2", and shall include the following layers (one coat Biturine Enamel, one wrapping of felt and a final wrapping of heavy kraft paper.) Fittings and joints shall be treated and wrapped as specified above, in field after lines have been tested.

2.5.4 Care shall be taken to keep the inside of piping dry and free of dirt, cutting burrs and other foreign substances. All threaded piping shall be reamed smooth after cutting and shall be threaded with true, sharp dies to insure a proper joint make-up.

2.5.5 All equipment connections shall be preceded by a manual stop cock or full-port ball valve, union and 12" drip leg.

2.5.6 Gas cocks 2" and smaller shall be Crane Company No. 324, all iron with brass square head plug; cocks larger than 2" shall be Walworth, or equal, lubricated plug cocks, 150 psi wog. Gas ball valves shall be U.L. listed equal to Nibco K-590 with Teflon seat, 150 psi wog.

2.5.7 Unions 2-1/2" and smaller shall be Grinnell 463, or equal, black malleable iron, ground joint, brass to iron seat unions. Unions 3" and larger shall be Crane Company Standard malleable iron gasket type flange unions with proper gasket.

2.5.8 All exposed gas piping whether interior or exterior to the building shall be painted with one coat of primer and two coats of black rust preventative paint. Primer and first coat of paint shall not be the same color. Piping exposed on the building exterior shall be painted with a coat to match the building finish.

2.5.9 Provide 17 pound magnesium anodes by Standard Magnesium Corporation, located as indicated in an augured hole five feet from the pipe. The electrode wire shall be brazed or thermite welded to the pipe and coated with mastic. Provide a dielectric union at each location where the piping enters the building to electrically isolate the gas utility distribution system.

2.5.10 A DC voltage reading shall be made to test the effectiveness of the isolating unions. A minimum reading of 0.2 volts (measured across the union) shall be required. Repair or replace unions until this voltage can be obtained.

2.5.11 <S> Underground gas piping, if approved by local code, may be yellow polyethylene plastic pipe per API 15LE ASTM D-2513 with fusion joints equal to PPI PE 2406 in lieu of the wrapping black steel pipe.

2.5.12 Provide anodeless riser at building service entrances and at meter set for transition from polyethylene plastic pipe to above ground piping. Metal pipe shall have factory conforming to Republic "X-TRU-COAT".

2.5.13 Provide a lubricated plug cock and union in the inlet and discharge piping of each gas pressure regulator. Extend schedule 40 threaded galvanized steel pipe vents from each interior regulator and terminate through the roof or through the exterior wall with watertight flashing, gooseneck and birdscreen. Vents shall be the full size of the regulator vent connection and shall extend through the roof/wall undiminished in size.

2.5.14 Provide epoxy-coated flexible stainless steel braided connectors at all radiant heaters and unit heaters. Provide all required adaptors, reducers, etc. for equipment connections.

2.6 PIPING ACCESSORIES GENERAL:

2.6.1 Flanges shall be slip-on or butt welding standard weight 1/16" raised face type with gaskets.

2.6.2 Unions shall be all bronze for copper systems and malleable iron with ground joint for steel piping systems. Provide dielectric unions for joining dissimilar metallic piping systems.

2.6.3 Weldolets and threadolets shall be steel per ANSI B16.9.

2.6.4 Escutcheons shall be single piece, set screw type, chrome plated and shall cover the opening and sleeve.

PART 3 - EXECUTION

3.1 PIPING INSTALLATION:

3.1.1 The piping systems required under the Plumbing division of these specifications shall be installed in a neat and workmanlike manner. All pipe hangers shall be of the type mentioned in this section and shall be so spaced and installed as to maintain a rigid piping system, adequately supported both laterally and vertically.

3.1.2 All domestic piping systems shall be installed level and the low points of all risers shall have gate valves 1/2" in size installed with hose ends in order to adequately drain the system.

3.1.3 At each group of plumbing fixtures and at each piece of equipment, full-port ball valves shall be furnished and installed by this Contractor so that these groups of fixtures or pieces of equipment may be isolated from accessible locations. Provide General Contractor with locations of all access doors. Access doors required for these valves shall be furnished by this Contractor.

3.1.4 Each of the piping systems shall be installed to provide for expansion and contraction and the joints shall be soldered at such time that the system is not under strain.

3.1.5 Necessary spring pieces and offsets shall be furnished by this Contractor as required.

3.1.6 Each of the piping systems shall be concealed in chases and above ceilings and in walls in all finished areas and shall be run exposed only as specifically specified or as shown on the drawings in machinery spaces or unfinished areas.

3.1.7 Exposed piping shall be held close to the walls and ceilings and necessary fittings shall be provided and installed to allow for offsets to hold the piping close to wall and ceilings. Where these lines run exposed a clearance shall be obtained from the Architect in writing before making the installation.

3.1.8 All valves shall be so located as to make the removal of their bonnets possible. All flanged valves shown in the horizontal positions shall be mounted with valve stem inclined one bolt hole above the horizontal lines shall be "made-up" with valve stem inclined at an angle of thirty (30) degrees above the horizontal position. All valve stems must be true and straight at the time the system is tested for final acceptance.

3.1.9 Pipe shall be cut accurately to measurements established at the site and worked into place without springing or forcing.

3.1.10 Provide clearance for installation of insulation and for access to valves, drains and unions.

3.1.11 Provide a 1/2" thick foam plastic insulating sleeve-protector on all copper and plastic piping penetrations of concrete slab-on-grade prior to pouring of concrete.

3.1.12 Locate and suspend piping in such a manner so as to minimize transmission of vibration and noise.

3.1.13 All piping penetrations through fire rated ceilings, walls or floors shall be fire stopped using approved materials to maintain the fire rating of the ceiling, wall or floor structure. Fire stop shall be equal to BIO Fireshield, Inc., BIOTHERM 200 or BIO K-2 mortar as applicable.

3.1.14 All piping connections to equipment and fixtures shall contain flanges or unions to allow easy removal whether or not shown on the plans.

3.1.15 Install a continuous length of tracer wire for the full length of each run of nonmetallic pipe installed underground. Attach wire to top of pipe in such manner that it will not be displaced during construction operations.

3.1.16 Air gaps for all indirect waste connections (open-site) shall be at least twice the effective drain piping diameter and in no case less than 2".

3.2 PIPING JOINTS:

3.2.1 Screwed joints shall have full cut pipe threads. Joints shall be assembled with an approved compound applied to only the male threads. A minimum of three pipe threads shall remain exposed when the joint is assembled.

3.2.2 Welded pipe joints shall be fusion welded by a metallic arc welding process. The welding operations shall conform to the current recommendations of the American Welding Society. This Contractor's welder, employed on this project, shall have passed qualification tests as prescribed by the National Pipe Welding Bureau or other reputable testing laboratory using qualification procedures as recommended by the ASME Boiler Construction Code or American Welding Standards.

3.2.3 PVC Plastic pipe joints shall be assembled by applying NSF approved Oatey all purpose purple primer and all purpose clear solvent or approved equal. PVC primer and solvent cement shall be applied to both the pipe and fittings in accordance with the manufacturer's recommendations. Join the pipe and fittings to completely set the pipe within the fitting and rotate the pipe within the fitting one-half revolution to evenly distribute the solvent cement.

3.2.4 Solder joints shall be assembled with square cut pipe using a pipe cutter. Hack saw cut pipe ends shall be reamed to full size. Both the pipe and fittings shall be furnished absolutely clean. Brazing flux shall be applied to both the pipe and the fittings. The use of corrosive acid flux will not be permitted. During the brazing, the pipe and fittings must be charged with nitrogen gas.

3.2.5 See Paragraph 2.2 for cast-iron piping joints.

3.3 SECURING AND SUPPORTING OF PIPE:

3.3.1 All pipe shall be supported from the building structure by means of approved hangers and supports. Piping shall be supported to maintain required grade and pitch, prevent vibration and provide for expansion/contraction.

3.3.2 All hangers shall be secured to approved inserts wherever possible and practicable. Hanger inserts shall be set in place before concrete is poured. Where hangers attach to the structural steel framing, approved beam clamps shall be employed. Where required, the Mechanical Subcontractor shall install channels to span between framing members. In no case shall spacing of hangers for horizontal piping be greater than indicated on the following schedule:

FERROUS (SCHEDULE 40) PIPING

NOMINAL PIPE SIZE (MAXIMUM)	HANGER SPACING
1/2"	5'-0"
3/4"	6'-0"
1"	7'-0"
1-1/2"	8'-0"
2" and larger	10'-0"

COPPER PIPING/TUBING

NOMINAL PIPE SIZE (MAXIMUM)	HANGER SPACING
Up to 1-1/2"	6'-0"
2" and larger	8'-0"

PLASTIC (PVC) PIPING

NOMINAL PIPE SIZE (MAXIMUM)	HANGER SPACING
All pipe sizes	4'-0"

CAST IRON PIPING

NOMINAL PIPE SIZE (MAXIMUM)	HANGER SPACING
All pipe sizes	one hanger per length of pipe and not exceeding 5'-0" intervals

3.3.3 Vertical lines shall be adequately supported at their bases, either by a suitable hanger placed in the horizontal line near the riser, or by a base fitting set on a pedestal or foundation and from each floor slab by means of approved clamp type support bearing on the slab or beam. In no case shall the spacing of supports for vertical piping be greater than indicated on the following schedule:

FERROUS (SCHEDULE 40) PIPING

NOMINAL PIPE SIZE
(MAXIMUM)
All pipe sizes

SUPPORT SPACING

At the base and at each story level, not exceeding 30'-0" intervals

COPPER PIPING/TUBING

NOMINAL PIPE SIZE
(MAXIMUM)
Up to 1-1/4"
1-1/2" and larger

SUPPORT SPACING

4'-0"
At the base and at each story level, not exceeding 15'-0" intervals

PLASTIC (PVC) PIPING

NOMINAL PIPE SIZE
(MAXIMUM)
Up to 1-1/2"
2" and larger

SUPPORT SPACING

4'-0"
At the base and at each story level, not exceeding 20'-0" levels

CAST IRON PIPING

NOMINAL PIPE SIZE
(MAXIMUM)
All pipe sizes

SUPPORT SPACING

At the base and at each story level, not exceeding 15'-0" intervals

3.3.4 Hangers for piping 2" and smaller shall be of the split cast ring type with fastening device. Hangers for piping larger than 2" shall be of the adjustable clevis hanger type. Hanger rods shall be minimum 3/8" diameter and shall have machine threads. Brackets of approved type may be used along walls. Hanger rods for individually suspended horizontal pipes shall be steel rods of size indicated on the following table:

NOMINAL PIPE SIZE
(MAXIMUM)
1/2" to 2"
2-1/2" to 3"
4"

ROD SIZE

3/8"
1/2"
5/8"

3.3.5 Hangers for use with copper piping shall be copper plated ferrous sizes for copper tubing.

3.3.6 Hangers shall be installed within 2'-0" of each change in direction, either vertical or horizontal, or pipe tee and on each side of valves, strainers, etc.

3.3.7 Multiple horizontal pipes may be supported on trapeze hangers. Trapeze spacing shall be in accordance with the schedule for pipe spacing based upon the smallest pipe. The trapeze members shall be properly sized for the piping load they are to support.

3.3.8 Where "cold" pipes are insulated with a vapor sealing jacket, the hanger shall be oversized accordingly to accommodate the outside diameter of the insulation, and half-round 16 gauge galvanized steel shields, not less than 14" long, rolled to fit the insulation diameter, shall be provided between the insulation and the hanger.

3.3.9 Pipe supports shall be as manufactured by Mapa, Miro, Fee and Mason, Grinnell, F&S Manufacturing, or prior-approved equal.

3.4 SCHEDULE OF PLUMBING BRANCHES:

The size of branches or runouts to each fixture shall be as indicated on the drawings. Where no size of connection is indicated, connection shall be not less than in accordance with the following schedule or local plumbing code:

Fixture	Waste	Vent	C.W.	H.W.
Water Closet	4"	2"	1"	—
Lavatories	1 1/2"	2"	1/2"	1/2"
Urinals (Wall Mtd)	2"	2"	3/4"	—
Sinks	1 1/2"	2"	1/2"	1/2"
Janitor/Service Sinks	3"	2"	1/2"	1/2"
Floor Drains	4"	2"	—	—
Wall Faucets/Hose Bibbs	—	—	3/4"	—
Water Coolers/Bottle Fillers	1 1/2"	1 1/2"	1/2"	—

3.5 EQUIPMENT PLUMBING CONNECTIONS:

3.5.1 The Plumbing Subcontractor shall rough-in for connections to all miscellaneous equipment noted on the drawings. Final connections to the equipment shall be a part of this contract.

3.5.2 The Plumbing Subcontractor shall make final connections to all pieces of equipment furnished under this (general) contract that require natural gas, water, drain, waste or vent connections, furnishing all required shutoff cocks, valves, drain valves and traps unless specified or noted otherwise on plan.

3.5.3 All HVAC equipment requiring connection to the domestic water system shall be provided with a reduced pressure backflow preventer as specified in section 22 40 00.

3.5.4 System shall be capable of passing all Local Plumbing Code tests for conventional pipe and fittings.

3.6 GAS PIPING TESTING:

Gas piping shall be tested in strict accordance with NFPA 54.

3.7 TESTING REQUIREMENTS:

Refer to sections 22 09 00 for further testing requirements.

END OF SECTION

SECTION 22 07 00 - PLUMBING INSULATION

PART 1 - GENERAL

1.1 GENERAL:

Refer to Section 22 05 00 for General Requirements for mechanical work.

1.2 SCOPE:

The Contractor shall cover all piping and apparatuses, as specified below, with insulation as manufactured by Manville, Owens-Corning or equal. All insulation, jacket, facing and adhesive shall have composite ratings not exceeding flame spread of 25 and smoke development of 50.

PART 2 - PRODUCTS

2.1 DOMESTIC WATER PIPING:

All cold water piping, hot water piping and hot water recirculating piping above grade shall be insulated with 1" thick, molded fiberglass mitered to fit the piping. This insulation material shall be furnished with a "Universal" white vapor barrier jacket with flap. All jacket materials shall be factory applied. Provide manufactured rigid fitting covers.

2.2 ROOF DRAIN and OVERFLOW DRAIN PIPING:

Roof drain and overflow drain piping from the bottom of the roof slab through all horizontal runs to the connection with the vertical leaders within the building shall be insulated with 1" thick Armstrong AP Armaflex or 1" "Snap-on" rigid fiberglass insulation with FRJ jacket. At points of insulation termination, the insulation shall be sealed vapor tight to prevent any moisture from leaking out from under the insulation. Ductwrap shall not be considered an acceptable alternate.

2.3 FINISHED JACKET:

2.3.1 All insulation outside, exposed to weather shall be covered with 0.024" aluminum metal jacket (including refrigerant piping).

2.3.2 All insulation exposed, including but not limited to Service Lanes, Service (Shop), Parts Dept. shall be covered with a white PVC rigid jacket with sealed seams. Prep, prime and paint to match adjacent structure and finishes; coordinate colors and finishes with Architect.

PART 3 - EXECUTION

3.1 PROCEDURES:

3.1.1 All insulation shall be the product of reputable manufacturers and shall be applied by mechanics skilled in the use of various materials and in the employ of a concern regularly engaged in the insulating business. The materials shall all be applied in accordance with the published standards of the manufacturer of the materials, using any special materials as required by these specifications and by those published standards. Unsightly work shall be just cause for rejection.

3.1.2 All sectional covering shall finish round and smooth, without lumps or depressions and all end and joints shall butt evenly and tightly together and to the covered surface. No broken or damaged section shall be used. When covering is formed from blocks, they shall be carefully and evenly applied, securely wired in place and joints shall be closed with cement insulation.

3.1.3 In instances where insulated lines pass into other areas, wherein the line will not be insulated as described herein, the insulation shall not terminate at the wall, but shall extend full size a minimum of 1" beyond the wall.

3.1.4 Engage the services of a qualified insulation applicator to furnish and install all the insulation required for the mechanical equipment, piping, etc., specified herein.

3.1.5 All surfaces to be insulated shall be clean and dry before applying insulation. All sections of molded pipe covering shall be firmly butted together. No insulation shall be applied until the pipe, duct, etc., have been pressure tested and found tight. Piping flexible connections, flanges and unions shall not be covered unless specifically noted. Flexible connections on ducts shall not be covered.

3.1.6 Prior to the installation of any insulating material to ferrous piping systems, the piping surfaces shall be thoroughly cleaned of all mill scale, grease and dirt and shall be given a coat of rust inhibiting primer.

3.1.7 Refer to Section 22 05 00, for flame spread properties of insulating materials.

3.1.8 At all valves, unions, flanges, etc. insulation shall be beveled or tapered to the surface being insulated. Insulation ends shall then be sealed vapor-tight with mastic.

3.1.9 Where vapor barriers are required, the vapor barrier shall be on the outside. Extreme care shall be taken that the vapor barrier is unbroken. Joints, etc., shall all be sealed. Where insulation with a vapor barrier terminates, it shall be sealed off with the vapor barrier being tapered continuous to the surface being insulated. Ends shall not be left raw.

3.1.10 Armaflex insulation shall be slid on unslit or shall be applied with contact cement. Duct tape, electrical tape, staples, etc., shall not be permitted.

3.1.11 Rigid PVC and metal jackets shall have side and end lap at least 2-inches wide with the cut edge of the side lap turned inside one inch to provide a smooth edge. Overlap the jacket not less than 2 inches at longitudinal and circumferential joints, seal water-tight with silicone sealant, and secure with metal bands at not more than 9-inch centers or with screws at not more than 5-inch centers. Overlap longitudinal joints down to shed water. Seal all seams and joints with a coating recommended by the insulation manufacturer for weatherproofing.

3.1.12 Where pipe installation constraints (i.e. equipment connections, complex fittings, valves, etc.) hamper the addition of the metal jacketing, the Armaflex insulation may be exposed to the weather. At such locations, all Armaflex insulation exposed to the weather shall be coated with a weatherproof finish recommended by the manufacturer.

3.1.13 All Armaflex insulation exterior to the building shall be coated with a weatherproof finish recommended by the manufacturer.

END OF SECTION

SECTION 22 09 00 - CLEANING AND TESTING FOR PLUMBING SYSTEMS

PART 1 - GENERAL

1.1 GENERAL:

Refer to Section 220500 for Common Work Results for Plumbing.

1.2 SCOPE:

1.2.1 This Contractor shall, at his own expense, during the progress of the work or upon its completion, make such tests of his work as are herein specified in accordance with all laws, governing authorities, or as are required by Architect or by state or municipal bureaus having jurisdiction and under their supervision. The Contractor shall provide all apparatus, temporary piping connections or any other requirements necessary for such tests. He shall take all due precautions to prevent damage to building or its contents incurred by such tests, as he will be required to repair and make good, at his own expense, any damage so caused. Any leaks, defects or deficiencies discovered as a result of the tests shall be immediately repaired or made good and test shall be repeated until the test requirements are fully complied with. No caulking of pipe joints to remedy leaks will be permitted.

1.2.2 No work of any nature shall be covered, enclosed or otherwise concealed until properly inspected, tested and approved. Any leaks which develop during any of the tests shall be corrected with new material and made as good as required; said tests shall be repeated until the work is satisfactory to Architect and the mechanical inspectors in every way.

1.2.3 Each separate system with its various components shall be operated by this Contractor for a reasonable length of time to demonstrate the performance of all equipment and piping in accordance with the true intent and purpose of the plans and specifications. All necessary adjustments shall be made to the satisfaction of the Architect.

PART 2 - PRODUCTS

2.1 STERILIZATION MATERIALS:

Domestic water sterilization solutions shall contain not less than 50 parts per million of available chlorine. The chlorinating materials shall be either liquid chlorine, conforming to U. S. Army Specification Number 4-1, or calcium hypochlorite or chlorinated lime conforming to the requirements of Federal Specification 0-C-114.

PART 3 - EXECUTION

3.1 TESTING AND ADJUSTING:

3.1.1 Water Piping System: Water piping systems shall be properly tested to a hydrostatic pressure of one hundred and fifty pounds per square inch gauge (150 psi) for a period of not less than eight hours. During this test period, all leaks in pipe, fittings and accessories, and in the particular piping system which is being tested, shall be stopped and the hydrostatic test shall again be applied. This procedure shall be repeated for an entire eight hour period and no leaks can be found while the system being tested is subject to the pressure mentioned above.

3.1.2 Sanitary Drains: Pipe shall have all outlets temporarily plugged. The pipes shall be filled with water testing the system in sections such that no section shall be tested with less than 10 foot (10') head of water. If after twenty-four (24) hours, the level of the water has been lowered by leakage, the leaks must be found and stopped by this Contractor, and the water level shall again be raised and the test repeated until after twenty-four hour retention period there shall be no perceptible lowering of the water level of the system being tested.

3.1.3 Storm/Roof Drains: Pipe shall have all outlets temporarily plugged. The pipes shall be filled with water testing the system in sections such that no section shall be tested with less than 10 foot (10') head of water. If after twenty-four (24) hours, the level of the water has been lowered by leakage, the leaks must be found and stopped by this Contractor, and

the water level shall again be raised and the test repeated until after twenty-four hour retention period there shall be no perceptible lowering of the water level of the system being tested.

3.2 STERILIZATION:

3.2.1 After completion of the testing, the entire domestic cold and hot water piping systems with attached equipment shall be thoroughly sterilized with a solution containing not less than 50 parts per million of available chlorine as described above. The chlorinating materials shall be pumped into the system through the connection described below. The sterilization solution shall be allowed to remain in the system for a period of eight (8) hours, during which time all valves and faucets shall be opened and closed several times. After sterilization, the solution shall be flushed from the system with clean water until the residual chlorine content is not greater than 0.2 parts per million. The exact procedure actually used shall meet or exceed local code requirements.

3.2.2 The sterilization solution shall be introduced into the water system through a 3/4" opening to be provided in the water main on the building side of the water meter.

3.2.3 The sterilization process shall be conducted under the direction of the local health department and upon completion of the process, the health department shall test and verify the cleanliness of the water piping system.

END OF SECTION

SECTION 22 40 00 - PLUMBING FIXTURES

PART 1 - GENERAL

1.1 GENERAL:

Refer to Section 22 05 00 for Common Work Results for Plumbing.

1.2 SCOPE:

1.2.1 Provide and install all labor, materials, equipment, tools and services and perform all operations required in connection with or properly incidental to the installation of complete plumbing fixtures and plumbing equipment, as indicated on the drawings, reasonably implied therefrom, or as specified herein, unless specifically excluded.

1.2.2 Plumbing fixtures shall be supplied, set and connected as listed herein and as shown on the drawings. Fixtures shall be protected from damage during construction and shall be thoroughly cleaned of all tape and adhesive prior to final acceptance.

1.2.3 Special mounting heights of plumbing fixtures shall be coordinated with architectural details of each toilet area.

1.3 SUBMITTALS:

Submittals are required as indicated.

1.4 REFERENCED STANDARDS:

City of Bossier City Code and Ordinances
ADA Part II 36 CFR Part 1191 & Part III 28 CFR Part 36
Energy Policy Act of 1992, HR776
International Plumbing Code
Louisiana Plumbing Code and Amendments

PART 2 - PRODUCTS

2.1 FITTINGS AND PIPES:

2.1.1 Fittings and piping in connection with plumbing fixtures shall be brass and, wherever exposed, shall be polished, chrome plated. Provide tight fitting wall or floor escutcheons of chrome-plated brass wherever pipes pass through walls, floors and ceilings.

2.1.2 Provide and install all required water, waste, soil and vent connections to all plumbing fixtures and equipment, together with all fittings, supports, fastening devices, cocks, valves, traps, etc., leaving all in complete working order.

2.2 FIXTURES:

2.2.1 All plumbing fixtures shall be new, first quality, free from marks or chips and shall be provided with sufficient support in order to adequately hang each and every unit. Insofar as is possible, all fixtures shall be by the same manufacturer (i.e., water closets, lavatories, etc.).

2.2.2 Each and every unit shall be complete with all required trim and all exposed piping and trim shall be polished chrome-plated, all brass. Each and every fixture shall be provided with keyed stop valves whether specifically shown and/or specified or not, and all such keyed stop valves shall have a metal-to-metal seat.

2.2.3 Each piece of trim, supply fittings, etc., shall be provided whether correctly specified or not in order to securely fit the fixture involved to the particular roughing-in available.

2.3 PLUMBING FIXTURES: <S>

REFERENCE PLUMBING FIXTURE SCHEDULE ON PLANS FOR FIXTURES NOT LISTED BELOW.

2.3.1 Roof Drain (RD) - Wade 3000-5-46-52-53-DF or Zurn ZA100-DP-EA with cast iron body, flashing ring, gravel stop, vandal-proof secured aluminum mushroom dome strainer, bearing pan/sump receiver, extension flange and under deck clamp. Provide minimum 4 lb lead flashing, 24" x 24".

2.3.2 Overflow Drain (OFD) - Wade 3000-SD-5-46-52-53-DF or Zurn ZA100-89-DP-EA with cast iron body, flashing ring, gravel stop, vandal-proof secured aluminum mushroom dome strainer, adjustable plastic standpipe, bearing pan/sump receiver, extension flange and under deck clamp. Provide minimum 4lb. lead flashing, 24" X 24".

2.3.3 Down Spout Nozzle (DSN) – Mifab R1960-F-6-BA 304 stainless steel recessed downspout nozzle with hinged perforated birdscreen cover made to receive cast-iron pipe downspout inside, finished flush with wall; vandal-proof and buy American Act compliant. Size as indicated on plan. Provide schedule 40 galvanized street elbow, coupling, nipple, and hub adaptor as required for downspout connection.

2.4 CLEANOUTS: <S>

2.4.1 CLEANOUTS SHALL BE AS FOLLOWS:

Floor Cleanouts	- in finished areas:	Wade #W-6000 or Josam 56000-96-Y with satin nickel bronze top with bronze plug.
	- in tile floors:	Wade #W-6000-T or Josam 5600012-96-Y with bronze plug.
	- in terrazzo floors:	Wade #W-6000-U or Josam 56040-1-96-Y with bronze plug.
	- in unfinished utility or storage areas:	Wade #W-8550-D or Josam 58500-22-96 with bronze plug.

Wall Cleanouts - Wade #W-8480R or Josam 58610 Stainless Steel coverplate with bronze plug.

Cleanouts in exposed piping - Wade #W-8550-R or Josam 58500-96 with bronze plug.

Exterior Cleanouts - Wade #W-6000-X-5 or Josam 56070-1-15 with heavy-duty nickel bronze top and bronze plug.

2.4.2 Cleanouts in waterproof floor shall have flashing flange and clamping device.

2.4.3 Cleanouts in carpeted areas shall be provided with carpet markers (Wade option No. 72).

2.5 FLOOR DRAINS: <S>

2.5.1 Provide floor drains where indicated on drawings. Drains shall be cast iron construction, with satin nickel bronze strainers and vandal proof hardware.

2.5.2 Strainer sizes shall be as follows: 8" X 8" square on 3" and 4" drains.

2.5.3 A deep seal, cast iron P-trap shall be installed on each drain connected to the sanitary sewer system.

2.5.4 Drains in waterproof floors shall have flashing flange and clamping device.

2.6 WATER HAMMER CONTROL: <S> <OM>

2.6.1 Arrestors shall be sized and applied in accordance with the Plumbing and Drainage Institute Standard PDI-WH-201. Equipment shall be Wade Shockstop, Sioux Chief Hydra-Rester or equal by Amtrol, Zurn, Josam, or Precision Plumbing Products.

2.6.2 Provide access panel in wall to service water hammer arrestors where not installed above accessible ceilings.

2.7 VACUUM BREAKERS: <S> <OM>

2.7.1 For hose bibbs and wall faucets: Woodford #34H or equal.

2.7.2 For water heaters without dip tubes: Watts #288A or equal.

2.8 DOMESTIC HOT WATER CIRCULATORS: <S><OM>

Hot water circulating pumps shall be manufactured by Belll and Gossett, Taco or Grundfos and shall have capacities as scheduled on the drawings. The pumps shall be all bronze construction and shall be provided complete with a manual motor starter equal to Square "D" Class 2510.

PART 3 - EXECUTION

3.1 INSTALLATION:

3.1.1 Plumbing fixtures and equipment shall be set in place, leveled and connected as indicated on the drawings. Fixtures shall be protected from damage during construction and shall be thoroughly cleaned of all tape and adhesive prior to final acceptance.

3.1.2 Verify exact location and mounting height of wall hung handicapped fixtures with architectural drawings before roughing-in.

3.1.3 Contractor shall set and connect all fixtures, including fixtures and equipment provided by others, in strict accordance with the manufacturer's printed instructions and applicable industry standards as indicated.

3.1.4 Caulk around all plumbing fixtures with fine continuous bead of white silicon sealant.

3.1.5 Supplies to each fixture or piece of equipment shall be valved for service.

3.1.6 All drains shall be trapped and vented.

3.1.7 Connection between china and soil pipe flanges shall be made gas and water-tight with one-piece molded gasket.

3.1.8 Do not install aerators on faucets until system has been flushed out and sterilized.

3.1.9 Provide white plastic snap-on bolt caps for all water closet and urinal mounting studs.

3.1.10 Reference architectural drawings and interior elevations for plumbing fixture mounting heights and installation arrangement prior to order, rough-in and installation.

3.2 PUMP INSTALLATION:

A. General: Comply with the manufacturer's written installation and alignment instructions.

B. Install pumps in locations and arrange to provide access for periodic maintenance, including removal of motors, impellers, couplings, and accessories.

C. Support pumps and piping separately so that the weight of the piping system does not rest on the pump.

3.3 PUMP CONNECTIONS:

A. General: Install valves that are same size as the piping connecting the pump.

- B. Install suction and discharge pipe sizes equal to or greater than the diameter of the pump nozzles.
- C. Install a nonslam check valve, shut off valve, butterfly manual balancing valve and glycerin-filled pressure gauge on the discharge side of pumps.
- D. Install a shut off valve, strainer, butterfly manual balancing valve and glycerin-filled pressure gauge on the suction side of inline pumps.
- E. Install flexible connectors on the suction and discharge side of each pump. Install flexible connectors between the pump casing and the discharge valves and upstream from the pump suction diffuser.
- F. Install T & P test ports in suction and discharge piping around pump.

END OF SECTION

SECTION 23 05 00 - COMMON WORK RESULTS FOR HVAC

PART 1 - GENERAL

1.1 SCOPE:

The scope of the mechanical phase of this project shall include all labor, materials, equipment, etc., required to fulfill the intent of the Contract Documents and shall include the work specified under the subsequent sections of Division 23 of these specifications.

1.2 RELATED DOCUMENTS:

All applicable provisions of Divisions 0 and 1 govern work under this Division. Refer to these articles in the specifications for additional information.

1.3 SUBMITTALS:

1.3.1 All work shall be performed in full accord with the latest editions of the applicable state, and national building codes and local ordinances.

1.3.2 Refer to each section for applicable codes and reference standards.

1.4 FEES, PERMITS AND TAXES:

This Contractor shall make arrangements for and pay for all inspection fees, connection fees and permits required by local authorities. The Contractor shall also pay all taxes levied for labor and materials associated with work under this Division.

1.5 SUBMITTALS:

1.5.1 The symbol "<S>" indicates a requirement for submittals.

1.5.2 Refer to Architectural specifications for additional information on submittals.

1.5.3 Refer to AIA General Conditions.

1.5.4 In addition to the requirements of the above referenced portions of this specification, all Subcontractors proposing to do work under this Division shall comply with the following additional requirements:

- A. These specifications and drawings are intended to indicate a standard of quality for materials and equipment which is established by the listing of manufacturer's names and catalog numbers and/or by referenced standards. Materials and equipment that do not comply with these standards of quality will not be considered for substitution.
- B. As soon as practicable and within thirty (30) days after the award of the contract and before beginning the fabrication of any material or the installation of any equipment, data shall be submitted for approval on equipment and materials where noted. Materials (pipe, fittings, etc.) may be listed with the name of the manufacturer and identifying catalogue numbers. Data for equipment shall include manufacturer's name, catalog data, diagrams, drawings and other descriptive data as required or requested by the Architect for evaluation.
- C. Notwithstanding any reference in the specifications to any article, device, product, material, fixture, form or type of construction by name, make or catalogue number, such references shall be interpreted as establishing a standard of quality and shall not be construed as limiting competition; and the Contractor, in

such cases, may at his option use any article, device, product material, fixture, form or type of construction which in the judgment of the Architect expressed in writing, is equal to that specified.

- D. All data shall be carefully examined and shall be forwarded for approval with a signed certification to the effect that the data has been carefully checked and found to be correct with respect to dimensions and available space and that the equipment complies with all requirements of the specifications.
- E. Point out in writing all deviations between the plans and specifications and the materials submitted.
- F. It is understood that proof of equality is the responsibility of the Contractor and/or supplier and that it is not the responsibility of the Architect to prove the inequality of the proposed substitutions. Furthermore the decisions of the Architect are final.

1.5.5 While it is not the intention of the Architect to discriminate against any manufacturer of equipment which is equal to specified equipment, a strict interpretation of such equality will be exercised by the Architect in considering any equipment offered as a substitute for equipment named in the specification. It shall be the responsibility of the Contractor to submit with each request for approval of substitute material or equipment, sufficient data to show conclusively that it is equal to the material or equipment specified.

1.5.6 Each Contractor shall submit shop drawings and/or diagrams for approval and for job coordination in all cases where significant deviations from the contract drawings are contemplated because of job conditions, interferences, or substitutions of equipment, or when requested by the Architect for purposes of clarification of the Contractor's intent. He shall also submit detailed shop drawings, rough-in sheets, etc., for all special or custom built items of equipment.

1.5.7 Submittal of shop drawings shall be made in sufficient quantities to provide one (1) copy of all data to be retained by the Engineer; two (2) copies of all data to be accumulated for the Owner; one (1) copy of all data to be retained by the Contractor; one (1) copy of all data to be retained by the Architect.

1.5.8 Should any substitute items be submitted and disapproved, then those items must be furnished exactly as described herein.

1.5.9 The Architect's review of shop drawings and/or submittal data shall not relieve the Contractor of responsibility for deviations from the contract drawings or specifications.

1.5.10 The size of mechanical equipment shown on the drawings is based on the dimensions of a particular manufacturer. While other manufacturers may be acceptable, it shall be the responsibility of the Contractor to determine if the equipment he proposes to furnish will fit in the space. Shop drawings shall be prepared to indicate a suitable arrangement.

1.5.11 Prior to ordering any equipment, the contractor shall furnish to the electrical contractor an itemized list of all equipment, motors, actuators, etc. requiring electrical power. The list shall include the item and its location, voltage, phase, horsepower and amperage. A copy of the list shall be submitted to the architect/engineer.

1.6 PRIOR APPROVAL:

Where the contractor wishes to substitute equipment or materials under an "or equal" clause, he shall submit via U.S. Mail or hand delivery to the Architect in written hard copy form seven (7) work days prior to bid opening lists of proposed substitutions which, from published manufacturer's data, cover the salient features of the proposed substitution.

Contractor shall indicate in writing all differences between specified equipment or materials and proposed substitution. Approvals will be issued in writing by addendum.

1.7 OPERATING AND MAINTENANCE MANUALS AND INSTRUCTIONS:

1.7.1 The symbol "<OM>" indicates a requirement for operating and maintenance manuals to be furnished.

1.7.2 The Owner's operating personnel shall be instructed by the Contractor on how to start and operate each item of equipment. Safety features shall be pointed out, particularly the possible troubles which might cause the safety controls to operate and what might be done to remedy the trouble.

1.7.3 The Owner's operating personnel shall be thoroughly instructed in the operation of the control system. Instructions should include an explanation of the control system or system sequence of operation, the proper set points of each thermostat, etc., and how to change the settings to accommodate overheating and overcooling, or incorrect humidity. Instructions shall include an explanation of components which should not be tampered with or control settings which should not be changed except by authorized personnel of the Control Manufacturer. Thermostat keys shall be turned over to the Owner.

1.7.4 Relative to the air conditioning system, instruct the Owner's operating personnel in the following:

- A. Removal of service access panels from equipment. If special tools are required, turn over to the Owner at least one set.
- B. Method of removing air filters.
- C. Location of concealed valves, traps, air splitters, automatic dampers, etc., requiring periodic maintenance and location of access to them.
- D. Method of cleaning/servicing Plasma air purification systems.

1.7.5 Provide (4) four copies of operating and maintenance manuals. Manuals shall be bound in large ring, loose-leaf binders and contain the following:

- A. Manufacturer's instructions and/or installation manual.
- B. Manufacturer's service manual.
- C. Manufacturer's lubrication chart listing types of lubricant to be used on each item of equipment and recommended frequency of lubrication.
- D. Electrical diagrams of each equipment "packaged" control system.
- E. Parts lists and identifying part numbers with prices of each part. The name and address of the nearest distributor from which parts can be obtained.

1.8 WARRANTY:

This contractor shall warrant all workmanship, material, equipment systems, etc., provided by him for a period of three years after substantial completion of the project. This warranty means that this contractor shall make good to the Owner, at no cost, any defects that become apparent during the year following substantial completion. This warranty is in addition to any other guarantees or warranties and is not intended to limit such other guarantees or warranties.

1.9 DEFINITIONS: The following words and phrases as used herein are hereby defined:

1.9.1 "provide": Furnish and install all material and labor required for a complete installation ready for operation in accordance with the intent of the Contract Documents.

1.9.2 "as required": Indicates that the Contractor shall perform the work or provide the material as indicated in accordance with manufacturer's installation instructions; and in accordance with applicable codes or regulations; and in a workmanlike manner as defined by good local practice.

1.9.3 "or equal": Indicates that the Contractor may substitute equipment by another manufacturer if the salient features of the equipment indicated by manufacturer's name and/or described are, in the judgment of the Architect, adequate. Submittals for approval are required where indicated.

1.9.4 "contractor": Where the word(s) "Contractor" or "this Contractor" is/are used, they refer to the Contractor engaged to execute the work under this division of the specifications only, even though he may be technically described as a sub-contractor.

1.9.5 "intent of the Contract Documents": The specific intent of these documents is to provide to the Owner, in a thoroughly functional condition, all the various systems, equipment, etc., indicated herein. Final authority over interpretation of the "intent" shall rest with the Architect.

1.9.6 "shall": Indicates a mandatory requirement.

1.10 INSPECTION OF THE SITE:

1.10.1 The drawings are prepared from the best information available and reflect all conditions commensurate with this information. However, the contractor should visit the site prior to submitting a proposal and should verify the locations, sizes, depths, pressures, etc., of all existing utilities and familiarize himself with working conditions, hazards, existing grades, soil conditions, obstructions, etc. If it becomes evident that existing site conditions will impair the proper operation of the utilities, the Architect should be notified in writing.

1.10.2 All proposals shall take these existing conditions and any revisions required into consideration.

1.11 CONSTRUCTION REQUIREMENTS:

1.11.1 The Contractor shall be responsible for fitting his material and apparatus into the building and shall carefully lay out his work at the site to conform to the structural conditions, to provide proper grading of lines, to avoid all obstructions and to conform to the details of the installation supplied by the manufacturer of the equipment to be installed. Furnish all necessary pilot lines and control lines whether indicated on the drawings or not. The drawings do not give exact details as to elevations of pipe lines nor do they show exact locations of pipe to scale. Piping elevations shall be handled by giving precedence to pipes which require a stated grade for proper operation. Devices necessary for installation and support of pipes, and equipment (such as sleeves, inserts, etc.) shall be located and installed as the construction progresses in order to allow completion of each phase of the work in the proper sequence.

1.11.2 Drawings showing the extent and arrangement of the work of a particular trade shall be used together with drawings showing extent and arrangement of work of other trades to insure that the Contractor in laying out and installing his work shall do so in a manner such that the work of the several trades may progress in the most direct, workmanlike and harmonious manner.

1.11.3 The Contractor shall be responsible for the proper location and size of slots, holes or openings in the building structure pertaining to his work, and for the correct location of pipe sleeves. The drawings indicate the extent and general arrangement of the various systems, but if any departures from these drawings are deemed necessary by the contractor, detailed drawings and descriptions of these departures and a statement of the reasons therefore shall be submitted to the Architect as soon as practicable. No departures from the arrangements shown on the drawings shall be made without prior written approval of Architect.

1.11.4 In general, piping and ductwork in finished areas of the building shall be run concealed unless noted and directed otherwise. Should any conditions arise which would cause any piping or ductwork to be exposed in finished areas, it shall be immediately called to the Architect's attention. In unfinished spaces such as equipment rooms, all pipe and duct shall be run as high as possible, shall be run to a continuous grade and shall be grouped wherever it is feasible to do so.

1.11.5 All pipe, duct, etc., shall be cut accurately to measurements established at the building and shall be worked into place without springing or forcing. All ducts and pipes run exposed in machinery and equipment rooms shall be installed

parallel to the building planes except that the lines shall be sloped to obtain the proper pitch. Piping and ducts run above furred ceilings, etc., shall be similarly installed, except as otherwise shown. All pipe and duct openings shall be kept closed during construction until the systems are closed with final connections.

1.11.6 The construction details of the building are illustrated on the Architectural and Structural Drawings. The trades shall thoroughly acquaint themselves with the details before submitting their bid as no allowance will be made because of unfamiliarity with these details. For new construction, place all inserts to accommodate the ultimate installation of pipe hangers in the forms before concrete is poured and set sleeves in forms before construction. For existing construction, all required inserts shall be "drilled-in" and all openings required through concrete or masonry shall be "saw-cut" or "core drilled" with tools specifically designed for this purpose. Explosive or compression driven inserts shall only be allowed for use as approved by SMACNA and the manufacturer of these devices. All concealed lines shall be installed as required by the pace of the job to precede the general construction.

1.11.7 The mechanical plans do not give exact locations of outlets, fixtures, equipment items, etc. The exact location of each item shall be determined by reference to the general plans and to all detail drawings, equipment drawings, roughing-in drawings, etc., by measurements at the building and in cooperation with other trades. Minor relocations necessitated by the conditions at the site or directed by the Owner shall be made without additional cost to the Owner.

1.11.8 All oiling devices and all parts of equipment requiring adjustment shall be easily accessible. Equipment shall be so located and installed as to permit convenient and safe maintenance and future replacement. The trade furnishing the equipment shall be responsible prior to ordering same in the event that equipment specified and/or approved is incompatible with this requirement.

1.12 ISOLATION:

1.12.1 Transmission of perceptible vibration, structure-borne noise, or objectional air borne noise to occupied areas by equipment installed under this contract will not be permitted.

1.12.2 The isolation supplier shall be a firm or individual capable of dealing effectively with vibration and noise characteristics, effects and criteria and have facilities and capabilities for measuring and evaluating such disturbances and the preparation of drawings and installation instructions.

1.13 CONSTRUCTION SAFETY:

This contractor assumes all responsibility regarding the safety of his personnel on the project during construction. The Contract Documents do not include materials, procedures, components, etc., required to insure construction safety. Refer to General Conditions and Supplementary General Conditions for additional information.

1.14 DAMAGE:

1.14.1 This Contractor shall be responsible for damage to project caused by this Contractor's failure to recognize hazards associated with items such as leaks, scheduling of work, inexperienced workmen, excessive cutting, etc.

1.14.2 This Contractor shall repair, at no expense to the Owner, any such damage.

1.14.3 This contractor shall familiarize himself with working conditions to the extent that he shall be responsible for damage to concealed piping, wiring and other equipment to remain and shall repair any damage caused by his negligence at no cost to the Owner.

1.15 SAFETY GUARDS:

Contractor shall furnish and install all safety guards required. All belt driven equipment, projecting shafts and other rotating parts shall be enclosed or adequately guarded.

1.16 STORAGE OF MATERIALS:

Each contractor shall provide space for storage of materials, equipment or tools at ground level. Any storage contemplated within the building will be allowed only upon specific approval of the Architect.

1.17 LOCAL CUSTOMS:

Each Sub-contractor shall comply with local customs as to which particular trade shall install any part or parts of any work or equipment specified herein.

1.18 MANUFACTURER'S DIRECTIONS:

The manufacturers' published directions shall be followed in the delivery, storage, protection, installation, piping and wiring of all equipment and material. The Contractor shall promptly notify the Architect in writing of any conflict between the requirements of the contract documents and the manufacturers' directions and shall obtain the Architect's instructions before proceeding with the work. Any such work performed that does not comply with the manufacturers' directions shall have deficiencies corrected at no cost to the Owner.

PART 2 - PRODUCTS

2.1 MATERIALS:

All materials shall be new and free from defects at the time of installation. Materials or equipment damaged in shipment or otherwise damaged prior to installation shall not be repaired at the job site, but shall be replaced with new materials.

2.2 MANUFACTURER'S REQUIREMENTS:

When a manufacturer's name appears in these specifications, it is not to be construed that the manufacturer does not have to meet the full requirements of the specifications or that his standard cataloged item will be acceptable.

2.3 SERVICE AND REPAIR PARTS:

All equipment installed on this project shall have local representation, local factory authorized service, and a local stock of repair parts.

2.4 FLAME SPREAD PROPERTIES OF MATERIALS:

All materials and adhesives used for air conditioning filters, acoustical lining, and insulation shall conform to NFPA and UL life, safety and flame spread properties of materials. The composite classifications shall not exceed 25 for a flame spread rating and 50 for a smoke developed rating for these classifications as listed for the basic materials. The finishes, adhesives, etc., specified for each system and shall be such when completely assembled.

2.5 ACCESS PANELS:

Provide flush mounted metal access panels and frames with concealed hinges and key actuated locks for all concealed and otherwise inaccessible valves, parts, fittings, equipment, filters, etc. and as required for inspection or service. Panels shall be paint grip galvanized steel, primed and ready for finished painting. Paint to match adjacent finishes.

2.6 FLOOR, CEILING AND WALL PLATES:

2.6.1 Refer to AIA General Conditions.

2.6.2 In addition to the requirements of the above referenced portions of this specification, all Subcontractors shall furnish a chromium plated sectional escutcheon in each finished space on each pipe or hanger rod penetrating a wall,

floor or ceiling. Escutcheons shall be sized to fit snugly to all lines and where the lines are insulated, the escutcheons shall be fit snugly over the insulation. These plates shall be provided with set screws so that they fit snugly against the finished surface. All equipment rooms are classified as finished space.

2.7 EQUIPMENT NAME PLATE:

Each piece of equipment shall have a metal nameplate engraved with the manufacturer's name, the equipment's model number, and the equipment's serial number. The metal nameplate shall also be engraved with the equipment's capacity, voltage, horsepower, manufactured date and the equipment designation (i.e. FCU-1, etc.) corresponding with the plans. This metal nameplate shall be fastened to the equipment with pop rivets. Plastic or stick-on type labels will not be acceptable.

2.8 IDENTIFICATION:

2.8.1 Each piece of equipment; every valve whose service and/or duty is not readily apparent; each zone duct, outside air duct and return air duct whose duty is not immediately apparent; every piping system except cast iron sewer lines, shall be permanently and clearly identified.

2.8.2 Equipment, valves and duct shall be provided with laminated phenolic nameplates, with engraved letters on light background, appropriately engraved with proper identification correlated to the designation shown on the drawings. Punched plastic tape will not be acceptable. Insulated equipment may have identification taped on as for piping system.

2.8.3 Piping systems shall have designation on ten foot (10'-0") centers and closer where required to provide adequate identification, using Brady "all temperature permacode" pipe markers with direction of flow and service indication.

2.8.4 All these pipe markers shall conform to ANSI-A-13 "Scheme for the Identification of Piping Systems". Arrow markers must have the same ANSI background colors as their companion pipe markers. All marks shall be as manufactured by Brady or approved equal.

2.8.5 Refrigerant piping shall be labeled with pipe service and flow direction at 10' maximum intervals and at least once in every room traversed.

2.9 SLEEVES AND PENETRATIONS:

2.9.1 Refer to AIA General Conditions.

2.9.2 Each and every pipe and duct, regardless of material, which passes through a concrete slab, (except slab on grade), masonry wall, roof or other portion of the building structure shall be free from the structure and shall pass through a sleeve furnished and installed by the Subcontractor responsible for the work involved.

2.9.3 Above grade and dry location sleeves shall be constructed from 18 gauge galvanized steel and shall be flush on both sides of wall surface penetrated. The sleeves shall be sized to allow free passage of the pipe to be inserted, and when this pipe is to be insulated, the sleeves shall be large enough to pass the insulation. Floor sleeves located in pipe chases shall extend up two inches (2") above the floor slab.

2.9.4 Sleeves passing through walls or floors on or below grade and/or in moist areas shall be constructed of galvanized steel, schedule 40 pipe and shall be designed with suitable flange in the center of the floor or wall to form a waterproof passage. After the pipes have been installed in the sleeves, void space around the pipe shall be caulked to insure a waterproof penetration. Fire ratings of rated walls and floors shall be maintained by the use of approved materials.

2.9.5 All penetrations through fire rated ceilings, walls or floors shall be fire stopped using approved materials to maintain the fire rating of the ceiling, wall or floor structure. Fire stop shall be equal to BIO Fireshield, Inc., BIOTHERM 200 or BIO K-2 mortar as applicable. Penetrations shall meet or exceed the requirements set forth in the U.L. Fire Resistance Directory, Volumes I and II.

2.9.6 After installation of pipe and duct through sleeves, all sleeves shall be sealed with materials suitable for maintaining thermal resistance, acoustic properties, and weatherproofing of walls, roofs, etc. Refer to Architectural specifications.

2.9.7 Mechanical sleeve seals shall be modular mechanical type, consisting of interlocking synthetic rubber links shaped to continuously fill annular space between object and sleeve, connected with bolts and pressure plates causing rubber sealing elements to expand when tightened, providing watertight seal and electrical insulation.

2.9.8 Formed steel channel shall be galvanized 12 gauge thick steel, with holes 1-1/2 inches on center.

2.9.9 All penetrations through exterior walls shall be provided with (2) Link-Seal Model L modular seal assemblies, one at each end of sleeve. Seals shall have blue EPDM seal elements.

PART 3 - EXECUTION

3.1 WORKMANSHIP:

3.1.1 All work shall be done by experienced craftsmen skilled in the applicable trade.

3.1.2 Unprofessional and incomplete work shall be rejected and corrected at no additional expense.

3.2 PROTECTION OF EQUIPMENT:

The Contractor shall continuously maintain adequate protection of both stored and installed materials and equipment. Fixtures and equipment, whether located inside or outside, shall be tightly covered with sheet polyethylene or waterproof tarpaulin as protection against dirt, rust, moisture and abuse from other trades. Adequate air circulation shall be provided under any protective sheet to prevent condensate build up. All equipment and piping shall have all openings sealed weathertight and waterproof until time of installation and connection. Materials and equipment shall not be stored directly on the ground, floor or roof deck. Ductwork, piping and equipment shall not be used by other trades as supports for scaffolds or personnel. At the completion of the work, equipment, fixtures, exposed supports and piping shall be cleaned of dirt, construction debris, overspray, etc., to the satisfaction of the Architect. Repairs made necessary by damage shall be paid for by the Contractor.

3.3 PROTECTION OF STRUCTURE:

Each Contractor in performing his work shall take particular care not to damage the structure. All finished floors and step treads shall be covered to prevent any damage by workmen or their tools and equipment during the construction of the building. In addition, each Contractor shall protect any materials on the job site whether a part of this contract or the property of another Contractor.

3.4 CONFLICTS, INTERFERENCES AND COORDINATION BETWEEN TRADES:

3.4.1 The drawings are not to be construed as shop drawings, but indicate the extent, general location, arrangement, etc., of piping systems and equipment. This Contractor shall refer to other sections of the specifications and other drawings such as electrical, structural, architectural, etc., in order to eliminate conflicts and undue delays in the progress of the work. Where other Contractors furnish items requiring piping connections by this Contractor, they will be held responsible for providing roughing-in drawings and assistance upon request.

3.4.2 Each trade shall so harmonize its work with that of the other trades so that the work may be done in the most direct and workmanlike manner without hindering the other trades. Piping interference shall be handled by giving precedence to pipe lines which require a stated grade for proper operation. Where space requirements conflict, the following order of precedence shall be observed:

A. Building lines

- B. Structural members
- C. Soil and drain piping
- D. Vent piping
- E. Condensate piping
- F. Supply ductwork
- G. Exhaust ductwork
- H. Return ductwork
- I. Domestic water
- J. Refrigerant piping
- K. Electrical conduit
- L. Automatic Sprinkler piping
- M. Natural gas piping

3.4.3 In the event of conflicts between specifications and drawings, drawings shall take precedence over specifications except in matters pertaining to quality, applications, and coordination between trades, which shall be governed by specifications.

3.4.4 Plans, specifications and other documents have been prepared and developed with reasonable professional care and coordination. It is the intent that all documents are supportive and complimentary, one to the other; and as such what is required by one shall be considered as required and binding as if indicated by all. Work indicated shall include, regardless of whether or not specifically indicated, such supportive or required items or work is consistent with what is indicated, is reasonably inferable from what is indicated, and/or is common construction procedure or knowledge with regard to what is indicated.

3.4.5 In the event of conflict between codes, as interpreted by the authority having jurisdiction and the contract documents, the codes shall govern.

3.4.6 In the event of conflict between manufacturer's installation instructions and the drawings, the manufacturer's installation instructions shall govern.

3.4.7 Should discrepancies be found between the documents and/or an interpretation is required, and a decision or interpretation to the contractor is not rendered by the Architect, it shall be assumed the contractor has reviewed all the documents to find the most costly method for items in question which then shall be required. One document does not take precedence over another when interpreting a discrepancy.

3.5 CUTTING AND PATCHING:

3.5.1 All cutting required by the installation of sleeves, piping, equipment, etc., shall be coordinated with the General Contractor, but performed by this Contractor. Patching shall be by the General Contractor. This Contractor shall not cut any structural element or any finished work without permission from the Architect.

3.5.2 This Contractor shall cut and patch all paving as required by the installation of buried piping, including utilities.

3.6 PAINTING:

3.6.1 All painting except "touch-up", natural gas piping, exposed sprinkler and fireline piping, and mechanical room piping shall be provided under the painting sections (Division 9) unless noted otherwise. All exposed piping, equipment, etc., shall be left clean and free from rust or grease and ready for the painter.

3.6.2 Where equipment finishes are damaged, this Contractor shall obtain matching color touch-up paint from the equipment's manufacturer and paint as required.

3.7 LUBRICATION:

This Contractor shall provide all lubricants for the operation of all equipment until acceptance. The Contractor shall be required to protect all bearings during the installation and shall thoroughly grease steel shafts to prevent corrosion. All motors and other equipment shall be provided with covers as required for proper protection during construction. All equipment bearings requiring periodic lubrication shall be provided with proper fittings for this purpose. Where equipment requiring such lubrication is not readily accessible due to location, copper tubing extensions shall be provided in addition to lubrication fittings.

3.8 ELECTRICAL WORK:

3.8.1 Except for such items that are completely wired at their point of manufacture and so delivered and unless specifically noted to the contrary herein, the Electrical Contractor shall provide all electric wiring (50 VAC and above) for power supply. This includes mounting of all electrical devices furnished under this section (Mechanical) of these specifications.

3.8.2 Conduit and wiring (below 50 VAC) for all automatic controls, temperature control, temperature indication, and interlock shall be provided by the Temperature Controls Contractor. The furnishing of all disconnect switches as required for proper operation as shown on the drawings and required by code will be under Electrical Work, except where specifically designated on the plans. The furnishing of all starters for mechanical equipment will be done under this section (Mechanical) of these specifications. The temperature controls contractor shall coordinate all 50 VAC and above requirements with the electrical contractor prior to bid.

3.8.3 Furnishing of complete wiring diagrams showing power wiring and interlock wiring shall be work under the trade supplying the equipment. Diagrams shall be based on approved equipment and shall be complete integral drawings, not a series of manufacturer's individual diagrams. After these diagrams have been approved by the Architect/Engineer, copies shall be furnished to the trades involved and they shall be followed in detail.

3.8.4 The electrical design and drawings are based on the equipment scheduled and shown on the drawings and should any mechanical equipment requiring changes to the electrical design be approved, the required electrical changes shall be made at the expense of the trade furnishing the changed equipment and at no cost to the Owner.

3.9 EQUIPMENT CONNECTION:

This Contractor shall bring required services to equipment items furnished under other sections of this specification or by the Owner, make final connections, and leave equipment ready for operation. Where it is necessary for Contractors performing work covered by this section to make final connections to items of equipment being furnished by Contractors under other sections, all such work shall be performed in a neat and workmanlike manner and all materials shall be of quality and finish normally used for such installation.

3.10 OPERATION PRIOR TO COMPLETION:

When any piece of mechanical or electrical equipment is operable and it is to the advantage of the Contractor to operate the equipment, he may do so providing that he properly cleans the equipment, installs clean filter media, properly adjusts

and completes all punch list items before final acceptance by the Owner. The date of acceptance and the start of the warranty may not be the same date.

3.11 EQUIPMENT ARRANGEMENTS:

All equipment shall be installed in a manner to permit access to all surfaces requiring access. All valves, motors, drives, lubrication devices, filters and other necessary items shall be installed in a position to allow removal for service without disassembly of another part.

3.12 EXECUTION OF WORK:

The Contractor shall plan, schedule and execute his work and that of any of his Sub-contractors so as not to interfere with the work of other trades or Contractors in the building or on the premises.

3.13 FLASHING AND WATERPROOFING:

All building penetrations to outside shall be flashed and counter flashed as required to eliminate leaks.

3.14 TESTS:

All tests shall be made by this Contractor and repeated until approved by the Architect. Piping systems shall not be covered or otherwise concealed until tests have been made and approvals obtained. Notify the Architect four days prior to tests to allow for scheduling. Test the piping systems as indicated in applicable articles.

3.15 CLEAN-UP:

3.15.1 It shall be the responsibility of each trade to cooperate fully with the other trades on the job to help keep the job site in a clean and safe condition. At the end of each day's work, each trade shall properly store all of his tools, equipment, any surplus materials and remove all debris caused by his portion of the work.

3.15.2 When all work has been finally tested, the Contractor shall clean all work installed by him, including all fixtures, equipment, pipes, ducts and all exposed work. All pipes shall be flushed out and left free of all obstructions. All plates, grilles, and other finished products shall be thoroughly cleaned and polished.

3.16 FINAL OBSERVATIONS:

3.16.1 It shall be the duty of the Contractor to make a careful inspection trip of the entire project, assuring himself that the work on the project is ready for final acceptance, before calling upon the Architect/Engineer to make a final observation.

3.16.2 In order not to delay final acceptance of the work, the Contractor shall have all necessary bonds, guarantees, receipts, affidavits, etc., called for in the various articles of this specification, prepared and signed in advance, and together with a letter of transmittal listing each paper included, and shall deliver the same to the Architect/Engineer at or before the time of the final observations. The Contractor is cautioned to check over each bond, receipt, etc., before preparing same for submission to see that the items check with the requirements of the specification.

END OF SECTION

SECTION 23 05 03 - HVAC PIPING

PART 1 - GENERAL

1.1 SCOPE:

Work in this section shall include piping, fittings, accessories etc., to be used in piping systems in accordance with the intent of the Contract Documents and shall include the following principal items:

Piping
Valves
Piping Accessories

1.2 REFERENCES

- A. American Society of Mechanical Engineers (ASME).
- B. American Society of Testing & Materials (ASTM).
- C. American Welding Society.
- D. American Water Works Association (AWWA).
- E. National Fire Protection Association (NFPA).
- F. National Bureau of Standards (NBS).

1.3 SUBMITTALS:

Submittals are required as indicated only. Submittal of pipe and fittings is not required unless a deviation from the specification is proposed.

1.4 QUALITY ASSURANCE

- A. Perform work in accordance with ASME code for installation of piping systems and ASME Section IX for welding materials and procedures.

PART 2 - PRODUCTS

2.1 EQUIPMENT DRAINS, OVERFLOWS AND RELIEF PIPING:

2.1.1 Condensate drain piping, auxiliary drain piping, and equipment drain piping shall be type "L" hard drawn copper piping with cast and/or wrought copper fittings per ASTM B-88, 95/5 solder. Provide pipe supports at specified intervals with only copper-plated, copper or brass in contact with copper piping.

2.1.2 All drain piping shall be installed with a minimum fall of 1/8" per foot unless noted otherwise on plan.

2.1.3 The HVAC Subcontractor shall provide all drain piping required for or related to HVAC equipment whether indicated on plan or not. Coordinate all termination points required with the Plumbing Subcontractor.

2.1.4 The size of condensate drain piping from HVAC equipment shall be indicated on the plans. Where no size is shown, piping shall not be less than 3/4" and in no case less than in accordance with the following schedule:

Coil Nominal Tonnage	Copper Pipe Size
Up to 2	3/4"
2 1/2 to 5	1"
6 to 14	1 1/2"

15 to 40

2"

2.1.5 The HVAC Subcontractor shall provide all drain piping required for or related to HVAC equipment whether indicated on plan or not. Coordinate all termination points required with the Plumbing Subcontractor.

2.2 REFRIGERATION PIPING:

2.2.1 All accessible refrigeration piping from the air cooled condensing units/heat pumps to each refrigerant coil shall be Type "L" hard drawn copper per ASTM B-88. All such piping concealed in walls and chases/furrings shall be Type "L" soft copper with long radius bends. Joints concealed in wall and chases/ furrings are not acceptable. All fittings and joints shall be made with silver-fos solder. Provide strainer-dryer combination and liquid solenoid valves at refrigerant coil and condensing unit/heat pump. Thermostatic expansion valves and all accessories shall be equal to Alco, Inc. or approved equal. Provide and install distributors for multistage units equal to Alco, Inc. suitable for modulating flow rates. Provide specialties such as solenoid valves, sight glasses, accumulators, and filter/dryers as required for proper system operation. Components shall be specifically designed for refrigeration service.

2.2.2 VRV and split system refrigerant piping specialties such as branch selector boxes, refrigerant Y-connector kits, headers, etc. shall be furnished by the system manufacturer and installed in strict accordance with the manufacturer's instructions and piping diagrams. Provide color coding identification of all refrigerant piping.

2.3 PIPE HANGERS AND SUPPORTS: <S>

- A. Conform to ASME, ASTM and MSS SP requirements.
- B. Hangers for pipe sizes ½ to 1-1/2 inches: carbon steel, adjustable swivel, split ring.
- C. Hangers for cold pipe sizes 2-1/2 inches and larger: carbon steel, adjustable, clevis.
- D. Multiple or trapeze hangers: steel channels with welded spacers and hanger rods.
- E. Wall support for pipe sizes 3 inches and smaller: cast iron hooks.
- F. Wall support for pipe sizes 4 inches and larger: welded steel bracket and wrought steel clamp.
- G. Vertical support: steel riser clamp.
- H. Floor support for cold pipe: cast iron adjustable pipe saddle, lock nut, nipple, floor flange, and concrete pier or steel support.
- I. Copper pipe support: carbon steel rings, adjustable, copper plated.
- J. Hanger rods: mild steel threaded both ends, threaded on end, or continuous threaded.
- K. Inserts: malleable iron case of galvanized steel shell and expander plug for threaded connection with lateral adjustment, top slot for reinforcing rods, lugs for attaching to forms; size inserts to suit threaded hanger rods.

2.4 PIPING ACCESSORIES GENERAL:

- A. Unions shall be all bronze for copper systems and malleable iron with ground joint for steel piping systems. Provide dielectric unions for joining dissimilar metallic piping systems.
- B. Escutcheons shall be single piece, set screw type, chrome plated and shall cover the opening and sleeve.

PART 3 - EXECUTION

3.1 PIPING INSTALLATION:

3.1.1 The piping systems required under the Mechanical division of these specifications shall be installed in a neat and workmanlike manner. All pipe hangers shall be of the type mentioned in this section or as indicated and shall be so spaced and installed as to maintain a rigid piping system, adequately supported both laterally and vertically.

3.1.2 Each of the piping systems shall be installed to provide for expansion and contraction and the joints shall be soldered at such time that the system is not under strain.

3.1.3 Necessary spring pieces and offsets shall be furnished by this Contractor as required.

3.1.4 Each of the piping systems shall be concealed in chases and above ceilings and in walls in all finished areas and shall be run exposed only as specifically specified or as shown on the drawings in machinery spaces or unfinished areas.

3.1.5 Exposed piping shall be held close to the walls and ceilings and necessary fittings shall be provided and installed to allow for offsets to hold the piping close to wall and ceilings. Where these lines run exposed a clearance shall be obtained from the Architect in writing before making the installation.

3.1.6 Pipe shall be cut accurately to measurements established at the site and worked into place without springing or forcing.

3.1.7 Provide clearance for installation of insulation and for access to valves, drain and unions.

3.1.8 Locate and suspend piping in such a manner so as to minimize transmission of vibration and noise.

3.1.9 All piping penetrations through fire rated ceilings, walls or floors shall be fire stopped using approved materials to maintain the fire rating of the ceiling, wall or floor structure. Fire stop shall be equal to BIO Fireshield, Inc., BIOTHERM 200 or BIO K-2 mortar as applicable.

3.1.10 All piping connections to equipment and fixtures shall contain flanges or unions to allow easy removal whether or not shown on the plans.

3.1.11 Air gaps for all indirect waste connections (open-sight) shall be at least twice the effective drain piping diameter and in no case less than 2".

3.2 PIPING JOINTS:

3.2.1 Solder joints shall be assembled with square cut pipe using a pipe cutter. Hack saw cut pipe ends shall be reamed to full size. Both the pipe and fittings shall be furnished absolutely clean. Brazing flux shall be applied to both the pipe and the fittings. The use of corrosive acid flux will not be permitted. During the brazing, the pipe and fittings must be charged with nitrogen gas.

3.2.2 Mechanical coupling joints shall be assembled in strict accordance with the recommendations of the coupling joint manufacturer. The bolts, fasteners, gaskets and lubricants shall be a product of, or shall adhere rigidly to, the specification requirements of the joint manufacturer.

3.3 SECURING AND SUPPORTING OF PIPE:

3.3.1 All pipe shall be supported from the building structure by means of approved hangers and supports. Piping shall be supported to maintain required grade and pitch, prevent vibration and provide for expansion/contraction.

3.3.2 All hangers shall be secured to approved inserts wherever possible and practicable. Hanger inserts shall be set in place before concrete is poured. Where hangers attach to the structural steel framing, approved beam clamps shall be

employed. Where required, the Mechanical Subcontractor shall install channels to span between framing members. In no case shall spacing of hangers for horizontal piping be greater than indicated on the following schedule:

COPPER PIPING/TUBING

NOMINAL PIPE SIZE (MAXIMUM)	HANGER SPACING
Up to 1-1/2"	6'-0"
2" and larger	8'-0"

3.3.3 Vertical lines shall be adequately supported at their bases, either by a suitable hanger placed in the horizontal line near the riser, or by a base fitting set on a pedestal or foundation and from each floor slab by means of approved clamp type support bearing on the slab or beam. In no case shall the spacing of supports for vertical piping be greater than indicated on the following schedule:

COPPER PIPING/TUBING

NOMINAL PIPE SIZE (MAXIMUM)	SUPPORT SPACING
Up to 1-1/4"	4'-0"
1-1/2" and larger	At the base and at each story level, not exceeding 15'-0" intervals

3.3.4 Hangers for piping 2" and smaller shall be of the split cast ring type with fastening device. Hangers for piping larger than 2" shall be of the adjustable clevis hanger type. Hanger rods shall be minimum 3/8" diameter and shall have machine threads. Brackets of approved type may be used along walls. Hanger rods for individually suspended horizontal pipes shall be steel rods of size indicated on the following table:

NOMINAL PIPE SIZE (MAXIMUM)	ROD SIZE
1/2" to 2"	3/8"
2-1/2" to 3"	1/2"
4"	5/8"

3.3.5 Hangers for use with copper piping shall be copper plated ferrous sizes for copper tubing.

3.3.6 Hangers shall be installed within 2'-0" of each change in direction, either vertical or horizontal, or pipe tee and on each side of valves, strainers, etc.

3.3.7 Where "cold" pipes are insulated with a vapor sealing jacket, the hanger shall be oversized accordingly to accommodate the outside diameter of the insulation, and half-round 16 gauge galvanized steel shields, not less than 14" long, rolled to fit the insulation diameter, shall be provided between the insulation and the hanger.

3.3.8 Pipe supports shall be as manufactured by Fee and Mason, Grinnell, F&S Manufacturing, or prior-approved equal.

3.4 INSTALLATION – INSERTS

- A. Provide inserts for placement in concrete forms.
- B. Provide inserts for suspending hangers from reinforced concrete slabs and sides of reinforced concrete beams.
- C. Provide hooked rod to concrete reinforcement section for inserts carrying pipe 4 inches (100 mm) and larger.

- D. Where concrete slabs form finished ceiling, locate inserts flush with slab surface.
- E. Where inserts are omitted, drill through concrete slab from below and provide through-bolt with recessed square steel plate and nut recessed into and grouted flush with slab.

3.5 INSTALLATION - PIPE HANGERS AND SUPPORTS

- A. Install in accordance with ASME, ASTM and MSS SP.
- B. Support horizontal piping as scheduled.
- C. Install hangers to provide minimum 1/2 inch space between finished covering and adjacent work.
- D. Place hangers within 12 inches of each horizontal elbow.
- E. Use hangers with 1-1/2 inch minimum vertical adjustment. Design hangers for pipe movement without disengagement of supported pipe.
- F. Support vertical piping at every floor. Support riser piping independently of connected horizontal piping.
- G. Where installing several pipes in parallel and at same elevation, provide multiple pipe hangers or trapeze hangers.
- H. Provide copper plated hangers and supports for copper piping.
- I. Prime coat exposed steel hangers and supports. Hangers and supports located in crawl spaces, pipe shafts, and suspended ceiling spaces are not considered exposed.
- J. Provide clearance in hangers and from structure and other equipment for installation of insulation and access to valves and fittings.

END OF SECTION

SECTION 23 05 53 - MECHANICAL IDENTIFICATION

PART 1 GENERAL

1.1 SUMMARY

- A. Section Includes:
 - 1. Nameplates.
 - 2. Tags.
 - 3. Stencils.
 - 4. Pipe markers.
 - 5. Ceiling tacks.
 - 6. Labels.

1.2 REFERENCES

- A. American Society of Mechanical Engineers:
 - 1. ASME A13.1 - Scheme for the Identification of Piping Systems.
- B. Section 23 05 00 – Common Work Results for HVAC

1.3 SUBMITTALS

- A. Division 1 - Submittal Procedures:
- B. Product Data: Submit manufacturers catalog literature for each product required.
- C. Shop Drawings: Submit list of wording, symbols, letter size, and color coding for mechanical identification and valve chart and schedule, including valve tag number, location, function, and valve manufacturer's name and model number.

1.4 QUALITY ASSURANCE

- A. Conform to ASME A13.1 for color scheme for identification of piping systems and accessories.

1.5 FIELD MEASUREMENTS

- A. Verify field measurements prior to fabrication.

PART 2 PRODUCTS

2.1 NAMEPLATES

- A. Equipment Nameplates: Metal nameplate with engraved or stamped data including manufacturer's name, equipment model and serial numbers, capacity, voltage, horsepower, manufactured date and equipment designation corresponding to the plans. Nameplate shall include the room number served as designated by the owner.
- B. Equipment Marker: Laminated three-layer plastic with engraved black letters data on light contrasting background color including equipment name and designation corresponding to the plans and the area the equipment serves, including both the owner's room name and number. Size shall be 4" x 6" minimum for equipment, 3/4" x 2" for switches, sensors, and control components.

2.2 TAGS

- A. Metal Tags:
 - 1. Brass with stamped letters; tag size minimum 1-1/2 inches diameter with finished edges and brass beaded chain or s-hook.
- B. Tag Chart: Typewritten letter size list of applied tags and location in anodized aluminum frame.

2.3 STENCILS

- A. Stencils: With clean cut symbols and letters of following size:
 - 1. Up to 2 inches Outside Diameter of Insulation or Pipe: 1/2 inch high letters.
 - 2. 2-1/2 to 6 inches Outside Diameter of Insulation or Pipe: 1-inch high letters.
 - 3. Over 6 inches Outside Diameter of Insulation or Pipe: 1-3/4 inches high letters.
 - 4. Ductwork and Equipment: 1-3/4 inches high letters.
- B. Stencil Paint: semi-gloss enamel, colors and lettering size conforming to ASME A13.1.

2.4 PIPE MARKERS

- A. Color and Lettering: Conform to ASME A13.1.
- B. Plastic Pipe Markers:
 - 1. Factory fabricated, flexible, semi-rigid plastic, preformed to fit around pipe or pipe covering. Larger sizes may have maximum sheet size with spring fastener.
- C. Plastic Tape Pipe Markers:
 - 1. Flexible, vinyl film tape with pressure sensitive adhesive backing and printed markings.
- D. Plastic Underground Pipe Markers:
 - 1. Bright colored continuously printed plastic ribbon tape, minimum 6 inches (150 mm) wide by 4 mil (0.10 mm) thick, manufactured for direct burial service.

2.5 CEILING TACKS

- A. Description: Steel with 3/4 inch (19 mm) diameter color-coded head.
- B. Color code as follows:
 - 1. HVAC equipment: Yellow.
 - 2. Fire dampers/smoke dampers: Red.
 - 3. Plumbing valves: Green.

2.6 LABELS

- A. Description: Aluminum, size 2.0 x 0.75 inches, adhesive backed with printed identification.

PART 3 EXECUTION

3.1 PREPARATION

- A. Degrease and clean surfaces to receive adhesive for identification materials.
- B. Prepare surfaces in accordance with Section 09 90 00 for stencil painting.

3.2 INSTALLATION

- A. Apply stencil painting in accordance with Section 09 90 00.
- B. Install identifying devices after completion of coverings and painting.
- C. Install labels with sufficient adhesive for permanent adhesion and seal with clear lacquer. For unfinished canvas covering, apply paint primer before applying labels.
- D. Install tags using corrosion resistant chain. Number tags consecutively by location.
- E. Install underground plastic pipe markers 6 to 8 inches below finished grade, directly above buried pipe.
- F. Identify water heaters, exhaust fans, duct dampers, heating units, fans, air handling units, and pumps with equipment markers. Identify condensing units/heat pumps with equipment name plates.
- G. Identify access panels, control panels, and major control components outside panels with equipment markers.
- H. Identify valves in main and branch piping with tags.
- I. Tag automatic controls, instruments, and relays. Key to control schematic. Provide equipment nameplates for all automatic control panels.
- J. Identify piping, concealed or exposed, with plastic pipe markers, plastic tape pipe markers, or stenciled painting. Identify service, and flow direction. Install in clear view and align with axis of piping. Locate identification not to exceed 20 feet (6 m) on straight runs including risers and drops, adjacent to each valve and tee, at each side of penetration of structure, wall, or enclosure, and at each obstruction.
- K. Provide ceiling tacks to locate valves, air handling units, fans, or dampers above T-bar type panel ceilings. Locate in corner of panel closest to equipment. Use different color approved by owner for each item type.
- L. Provide equipment markers for fan control switches.
- M. Contractor shall obtain written approval of proposed identification scheme from the Owner's maintenance supervisor prior to application of identification.

END OF SECTION

SECTION 23 05 90 - CLEANING AND TESTING FOR HVAC

PART 1 - GENERAL

1.1 GENERAL:

Refer to Section 230500 Common Work Results for HVAC.

1.2 SCOPE:

1.2.1 This Contractor shall, at his own expense, before beginning work, during the progress of the work, or upon its completion, make such tests of his work as are herein specified in accordance with all laws, governing authorities, or as are required by Architect or by state or municipal bureaus having jurisdiction and under their supervision. The Contractor shall provide all apparatus, temporary piping connections or any other requirements necessary for such tests. He shall take all due precautions to prevent damage to building or its contents incurred by such tests, as he will be required to repair and make good, at his own expense, any damage so caused. Any leaks, defects or deficiencies discovered as a result of the tests shall be immediately repaired or made good and test shall be repeated until the test requirements are fully complied with. No caulking of pipe joints to remedy leaks will be permitted.

1.2.2 No work of any nature shall be covered, enclosed or otherwise concealed until properly inspected, tested and approved. Any leaks which develop during any of the tests shall be corrected with new material and made as good as required; said tests shall be repeated until the work is satisfactory to Architect and the mechanical inspectors in every way.

1.2.3 Each separate system with its various components shall be operated by this Contractor for a reasonable length of time to demonstrate the performance of all equipment and piping in accordance with the true intent and purpose of the plans and specifications. All necessary adjustments shall be made to the satisfaction of the Architect.

1.2.4 All motor driven equipment shall be proved operable generally in accordance with the intent of these specifications.

1.2.5 All electrical power and water for testing of air conditioning and/or heating equipment systems shall be provided by the General Contractor.

PART 2 - PRODUCTS

Not used.

PART 3 - EXECUTION

3.1 TESTING AND ADJUSTING:

3.1.1 Heating, Ventilating and Air Conditioning Systems: Each and every phase of the new air conditioning, heating and ventilating systems shall be operated separately, or in conjunction with the others for a period of time to demonstrate to the satisfaction of the Architect the ability of the equipment to meet the capacity and performance requirements while maintaining design conditions in accordance with the true intent and purpose of these specifications. Heating and cooling capacities and performance for every system shall be checked in the winter and summer, respectively. Any adjustments and/or startup required shall be done at no additional cost to the owner. Any adjustments done during one season shall not affect capacities and performance during the other season. The volume of air at each outlet and inlet, air conditioning equipment performance data, etc., shall be tabulated and required balancing performed by engineering personnel skilled, trained and experienced in the performance of these functions. Previous to such performance tests, this Contractor shall have set all valves, dampers, motors, controllers, thermostats, etc., and shall have the system operating and maintaining design temperatures, humidity and air circulation throughout all areas of the building. This Contractor shall also at the proper time make such additional

adjustments as may be required to obtain consistent temperatures throughout the project. See Section 23 05 93 of these specifications.

3.2 NOISE LEVEL:

3.2.1 All items of equipment shown on the plans and specified herein have been selected so that the anticipated noise level in the building from the air conditioning and other systems will not be above 25NC level.

3.2.2 If the Contractor wishes to make substitution of equipment from that selected, he must satisfy himself and the Engineer that the noise level in the building will not exceed 25NC.

END OF SECTION

SECTION 23 05 93 - TESTING, ADJUSTING AND BALANCING FOR HVAC

PART 1 - GENERAL

1.1 RELATED DOCUMENTS:

All division 15 specification sections, drawings, and general provisions of the contract apply to work of this section, as do other documents referred to in this section.

1.2 SCOPE OF WORK:

1.2.1 The Contractor shall obtain the services of an independent Test and Balance (TAB) Company which specializes in the testing and balancing of heating, ventilating and air conditioning (HVAC) systems to test, adjust and balance all HVAC systems in the building(s).

1.2.2 The work included in this section consists of furnishing labor, instruments, and tools required in testing, adjusting and balancing the HVAC systems as described in these specifications or shown on accompanying drawings. Services shall include checking equipment performance, taking the specified measurements, and recording and reporting the results. The testing, adjusting and balancing agency shall act as a reporting agency; that is, list and report each piece of equipment as to identification number, manufacturer, model number, serial number, proper location, specified performance, and report actual performance of all equipment as found during testing. The report is intended to be used during the life of the building as a ready reference indicating original conditions, equipment components, etc.

1.2.3 Representatives of the Test and Balance Company shall visit the job site during installation of the HVAC equipment, piping and ductwork as required.

1.2.4 Upon completion of the HVAC system installation, the Test and Balance Company shall perform all required testing and balancing with the full cooperation of the Contractor and his Sub-contractors. The Contractor shall make changes and/or adjustments to the HVAC system components that are required by the Test and Balance Company to accomplish proper balancing. The TAB agency shall not supply or install any materials or balancing devices, such as pulleys, drives, belts, etc. All of this work is by the Contractor and shall be performed at no additional cost to the Owner.

1.2.6 The test and balance report complete with a summary page listing all deficiencies shall be submitted to the Architect for review. The test and balance report must be complete and must be accepted by the Architect prior to acceptance of the project. Any outstanding test and balance items shall be placed on the punch list and a monetary value shall be assigned to them.

1.2.7 After all deficiencies have been corrected the Test and Balance Company shall supply four (4) copies of the final and complete report to the Architect for inclusion in the Operation and Maintenance Manuals. Testing and balancing must be accepted by architect prior to acceptance of project.

1.2.8 The items requiring testing, adjusting, and balancing include (but are not restricted to) the following:

AIR SYSTEMS:

Supply Fans HPAHU

Diffusers, Registers, Grilles and Dampers

Coils (Air Temperatures)

Exhaust Fans

Packaged Dedicated Outside Air Units (DOAS)-supply duct systems, return/exhaust duct systems

Air Filters

Mini-Split Systems (MS/MSHP)

1.3 DEFINITIONS, REFERENCES, STANDARDS:

All work shall be in accordance with the latest edition of the Associated Air Balance Council (AABC) National Standards or the latest standards of the National Environmental Balancing Bureau (NEBB). If these contract documents set forth more stringent requirements than the AABC National Standards or the NEBB Standards, these contract documents shall prevail.

1.4 QUALIFICATIONS:

Agency Qualifications: The TAB Agency shall be a current member of the AABC or the NEBB. Falsification of a TAB report shall be grounds for reporting the firm's actions to the appropriate certifications agency.

1.5 SUBMITTALS:

1.5.1 Procedures and Agenda: The TAB agency shall submit the TAB procedures and agenda proposed to be used.

1.5.2 Sample Forms: The TAB agency shall submit sample forms, which shall include the minimum data required by the AABC National Standards or the NEBB Standards.

1.6 TAB PREPARATION AND COORDINATION:

1.6.1 Shop drawings, submittal data, up-to-date revisions, change orders, fan curves, pump curves and other data required for planning, preparation, and execution of the TAB work shall be provided when available and no later than 30 days after the Designer has returned the final approved submittal data to the Contractor.

1.6.2 System installation and equipment startup shall be complete prior to the TAB agency being notified to begin.

1.6.3 The building control system (BCS) contractor shall provide and install the control system, including all temperature, pressure and humidity sensors. These shall be calibrated for accurate control. If applicable, the BCS contractor shall install all necessary computers and computer programs, and make these operational. Assistance shall be provided as required for reprogramming, coordination, and problem resolution.

1.6.4 All test points, balancing devices, identification tags, etc., shall be accessible and clear of insulation and other obstructions that would impede TAB procedures.

1.6.5 Qualified installation or startup personnel shall be readily available for the operation and adjustment of the systems. Assistance shall be provided as required for coordination and problem resolution.

1.7 REPORTS:

1.7.1 Final TAB Report - The TAB agency shall submit the final TAB report for review by the Architect. On plans provided, all outlets, devices, HVAC equipment, etc., shall be identified (including manufacturer, model number, serial number, motor manufacturer, HP, drive type, fan and motor sheaves and belt number), along with a numbering system corresponding to report unit identification. The TAB agency shall submit an AABC "National Project Performance Guaranty" (or similar NEBB Guaranty) assuring that the project systems were tested, adjusted and balanced in accordance with the project specifications and AABC National Standards (or similar NEBB Standards).

1.7.2 Submit 4 copies of the Final TAB Report to the Architect for inclusion in the Operation and Maintenance Manuals.

PART 2 - INSTRUMENTATION

All instruments used for measurements shall be accurate and calibrated. Calibration and maintenance of all instruments shall be in accordance with the requirements of AABC National Standards (or similar NEBB Standards).

PART 3 - EXECUTION

3.1 GENERAL:

3.1.1 The specified systems shall be reviewed and inspected for conformance to design documents. Testing, adjusting and balancing on each identified system shall be performed. The accuracy of measurements shall be in accordance with AABC National Standards (or similar NEBB Standards). Adjustment tolerances shall be + or - 10% unless otherwise stated.

3.1.2 Equipment settings, including manual damper quadrant positions, valve indicators, fan speed control levers, and similar controls and devices shall be marked to show final settings.

3.1.3 All information necessary to complete a proper TAB project and report shall be per AABC or NEBB standards unless otherwise noted. The descriptions of work required, as listed in this section, are a guide to the minimum information needed.

3.1.4 TAB contractor shall cut insulation, ductwork and piping for installation of test probes to the minimum extent necessary to allow adequate performance of procedures. Upon completion, patch insulation, ductwork, and housings using materials identical to those removed. Seal insulation to reestablish integrity of the vapor barrier.

3.1.5 TAB work shall include additional inspection and adjustment of components during the season following the initial balance to include re-balance of any items influenced by seasonal changes or as directed by the Owner.

3.1.6 TAB contractor shall coordinate with the General Contractor and Mechanical Contractor as required to make adjustments, duct changes, install additional dampers, adjust or replace sheaves, etc. and make every effort to correct system performance deficiencies prior to submission of the final Test & Balance reports. Should deficiencies still exist, TAB contractor shall provide in report form, documentation explaining any and all deficiencies, with suggestions for their resolution to meet or exceed the intent of the contract documents.

3.2 AIR SYSTEMS:

3.2.1 The TAB agency shall verify that all ductwork, splitters, extractors, dampers, grilles, registers, and diffusers have been installed per design, are functional and set full open. Any leakage in the ductwork shall be repaired prior to the test. The TAB agency shall perform the following TAB procedures in accordance with the AABC National Standards or NEBB Standards:

For supply fans:

1. Fan Speeds - Test and adjust fan RPM to achieve design CFM requirements.
2. Current and Voltage - Test and record motor voltage and amperage, and compare data with the nameplate limits to ensure fan motor is not in or above the service factor.
3. Pitot-Tube Traverse - Perform a Pitot-tube traverse of main supply and return ducts, as applicable to obtain total CFM. If a Pitot-tube traverse is not practical, an explanation of why a traverse was not made must appear on the appropriate data sheet.
4. Outside Air - Test and adjust the outside air on applicable equipment using a Pitot-tube traverse. If a traverse is not practical, an explanation of why a traverse was not made must appear on the appropriate data sheet. If a traverse is not practical use the mixed-air temperature method if the inside and outside temperature difference is at least 20 degrees Fahrenheit or use the difference between Pitot-tube traverse of the supply and return air ducts.
5. Static Pressure - Test and record system static pressure, including the static pressure profile of each supply fan.

For diffusers, registers and grilles:

1. Tolerances - Test, adjust, and balance each diffuser, grille, and register to within 10% of design requirements. Minimize drafts. Include required CFM, initial test CFM and final CFM.
2. Identification - Identify the type, location, and size of each grille, diffuser, and register. This information shall be recorded on air outlet data sheets.

For exhaust fans:

1. Fan Speeds - Test and adjust fan RPM to achieve design CFM requirements.
2. Current and Voltage - Test and record motor voltage and amperage, and compare data with the nameplate limits to ensure motor is not in or above the service factor.
3. Pitot-Tube Traverse - Perform a Pitot-tube traverse of main exhaust ducts to obtain total CFM. If a Pitot-tube traverse is not practical, an explanation of why a traverse was not made must appear on the appropriate data sheet.
4. Static Pressure - Test and record system static pressure, including the static pressure profile of each exhaust fan.

For zone, branch and main ducts:

1. Adjust ducts to within design CFM requirements. As applicable, at least one zone balancing damper shall be completely open. Multi-diffuser branch ducts shall have at least one outlet or inlet volume damper completely open.
2. For outside air branch ducts, adjust to within design CFM requirements; tolerance shall be +10%/-0%.

For coils:

1. Air Temperature - Once air flows are set to acceptable limits, take wet bulb and dry bulb air temperatures on the entering and leaving side of each cooling coil. Dry-bulb temperature shall be taken on the entering and leaving side of each heating coil.

3.3 ADDITIONAL TAB SERVICES:

3.3.1 Tab Report Verification:

At the time of final inspection, the TAB agency may be required to recheck, in the presence of the owner's representative, specific and random selections of data, air quantities, and air motion recorded in the certified report. Points and areas for recheck shall be selected by the owner's representative. Measurements and test procedures shall be the same as approved for the initial work for the certified report. Selections for recheck, specific plus random, shall not exceed 10% of the total number tabulated in the report.

END OF SECTION

SECTION 23 07 00 - HVAC INSULATION

PART 1 - GENERAL

1.1 GENERAL:

Refer to Section 23 05 00 for Common Work Results for HVAC.

1.2 SCOPE:

The Contractor shall cover all piping and apparatuses, as specified below, with insulation as manufactured by Manville, Owens-Corning or equal. All insulation, jacket, facing and adhesive shall have composite ratings not exceeding flame spread of 25 and smoke development of 50.

PART 2 - PRODUCTS

2.1 DUCTWORK:

All supply, return and outside air ductwork excluding internally lined return and outside air ductwork shall be insulated with 2" thick, three quarter pound per cubic foot minimum density glassfiber blanket insulation and have type FRK foil reinforced kraft vapor barrier jacket. Internally lined supply air ductwork shall be wrapped in addition to lined. Insulation shall be wrapped tightly on the ductwork with all circumferential joints butted and longitudinal joints overlapped a minimum of 2". Adhere insulation to metal with 4" strips of insulation bonding adhesive at 8" on centers. On longitudinal joints, the overlap shall be secured using 9/16" flared door staples applied 6" on centers and taped with minimum 3" wide foil reinforced kraft tape. All pin penetrations or punctures in facing shall be taped. Tape all circumferential joints with 4" wide foil reinforced kraft tape. Refer to Section 23 30 00 for ductwork with internal lining.

2.2 AIR DISTRIBUTION DEVICES:

Each air distribution device shall be provided with a 2" thick, 3/4 lb density insulation blanket for condensation control. Insulation blanket shall be taped securely and sealed around perimeter of air device neck and backpan.

2.3 REFRIGERANT PIPING:

All refrigerant piping shall be insulated with 1" thick closed cell (expanded) elastomeric tubing equal to Armstrong AP Armaflex. All such materials shall not melt, drip or carry a progressive flame. All such piping and insulation exterior to the building shall be covered with a minimum 0.024" thick aluminum metal jacket. VRF system insulation specialties shall be furnished by manufacturer and installed by this contractor in strict accordance with manufacturers requirements.

2.4 ALUMINUM METAL JACKET:

All insulation outside, exposed to weather shall be covered with 0.019" aluminum metal jacket (including refrigerant piping).

2.5 CONDENSATE DRAIN PIPING:

2.5.1 Condensate drain piping from HVAC equipment that runs outside the fan housing shall be insulated with 1/2" thick molded fiberglass with a "Universal" white vapor barrier jacket with flap. Furnish manufactured rigid fitting covers.

2.5.2 All piping above slab from floor drains, deep-seal p-traps, hub drains or other devices used for condensate drain termination shall be insulated with 1" thick molded fiberglass with a "Universal" white vapor barrier jacket with flap and manufactured rigid fitting covers.

PART 3 - EXECUTION

3.1 PROCEDURES:

3.1.1 All insulation shall be the product of reputable manufacturers and shall be applied by mechanics skilled in the use of various materials and in the employ of a concern regularly engaged in the insulating business. The materials shall all be applied in accordance with the published standards of the manufacturer of the materials, using any special materials as required by these specifications and by those published standards. Unsightly work shall be just cause for rejection.

3.1.2 All sectional covering shall finish round and smooth, without lumps or depressions and all end and joints shall butt evenly and tightly together and to the covered surface. No broken or damaged section shall be used. When covering is formed from blocks, they shall be carefully and evenly applied, securely wired in place and joints shall be closed with cement insulation.

3.1.3 In instances where insulated lines pass into other areas, wherein the line will not be insulated as described herein, the insulation shall not terminate at the wall, but shall extend full size a minimum of 1" beyond the wall.

3.1.4 Engage the services of a qualified insulation applicator to furnish and install all the insulation required for the mechanical equipment, piping, etc., specified herein.

3.1.5 All surfaces to be insulated shall be clean and dry before applying insulation. All sections of molded pipe covering shall be firmly butted together. No insulation shall be applied until the pipe, duct, etc., have been pressure tested and found tight. Piping flexible connections, flanges and unions shall not be covered unless specifically noted. Flexible connections on ducts shall not be covered.

3.1.6 Refer to Section 23 05 00, for flame spread properties of insulating materials.

3.1.7 Where vapor barriers are required, the vapor barrier shall be on the outside. Extreme care shall be taken that the vapor barrier is unbroken. Joints, etc., shall all be sealed. Where insulation with a vapor barrier terminates, it shall be sealed off with the vapor barrier being tapered continuous to the surface being insulated. Ends shall not be left raw.

3.1.8 Armaflex insulation shall be slid on unslit or shall be applied with contact cement. Duct tape, electrical tape, staples, etc., shall not be permitted.

3.1.9 Metal jackets shall have side and end lap at least 2-inches wide with the cut edge of the side tap turned inside one inch to provide a smooth edge. Overlap the jacket not less than 2 inches at longitudinal and circumferential joints and secure with metal bands at not more than 9-inch centers or with screws at not more than 5-inch centers. Overlap longitudinal joints down to shed water. Seal circumferential joints with a coating recommended by the insulation manufacturer for weatherproofing.

3.1.10 All Armaflex insulation exterior to the building shall be coated with a weatherproof finish recommended by the manufacturer and covered with a metal jacket as described above.

3.1.11 Inserts and Shields:

1. Application: Piping or Equipment 1-1/2 inches diameter or larger.
2. Shields: Galvanized steel between pipe hangers or pipe hanger rolls and inserts.
3. Insert location: Between support shield and piping and under finish jacket.
4. Insert configuration: Minimum 6 inches long, of thickness and contour matching adjoining insulation; may be factory fabricated.
5. Insert material: Compression resistant insulating material suitable for planned temperature range and service.

3.1.12 Exterior Applications: Provide insulation with vapor retarder jacket. Cover with caulked aluminum jacket with seams located on bottom side of horizontal sections.

END OF SECTION

SECTION 23 08 00 - COMMISSIONING OF HVAC AND MECHANICAL SYSTEMS

PART 1 GENERAL

1.1 SUMMARY

- A. Section Includes:
 - 1. HVAC commissioning description.
 - 2. HVAC commissioning responsibilities.
- B. Related Sections:
 - 1. Section 23 05 93 - Testing, Adjusting, and Balancing for HVAC: For requirements and procedures concerning testing, adjusting, and balancing of mechanical systems.
 - 2. Section 23 09 00 – Temperature Controls: Submittal, training, and programming requirements.

1.2 REFERENCES

- A. Associated Air Balance Council:
 - 1. AABC - AABC Commissioning Guideline.
- B. American Society of Heating, Refrigerating and Air-Conditioning Engineers:
 - 1. ASHRAE Guideline 1 - The HVAC Commissioning Process.
- C. National Environmental Balancing Bureau:
 - 1. NEBB - Procedural Standards for Whole Building Systems Commissioning of New Construction.
- D. Section 23 05 00 – Common Work Results for HVAC.

1.3 COMMISSIONING DESCRIPTION

- A. The purpose of HVAC commissioning is to ensure the Owner that work has been completed as specified and that systems are functioning in the manner as described in Division 23 Sections 23 05 00 - "Common Results for HVAC" and 23 09 00 – "Temperature Controls" and specified system operating criteria. It will assist operating staff training and familiarization with new systems. It will serve as a tool to reduce post-occupancy critical systems operational difficulty or failure. It will, also, be used to develop test protocol and record the associated test data in an effort to advance the building systems from a state of substantial completion to a full dynamic operation.
- B. HVAC commissioning process includes the following tasks:
 - 1. Testing and startup of HVAC equipment and systems.
 - 2. Equipment and system verification checks.
 - 3. Assistance in functional performance testing to verify testing and balancing, and equipment and system performance.
 - 4. Provide qualified personnel to assist in commissioning tests, including seasonal testing.
 - 5. Complete and endorse functional performance test checklists provided by Commissioning Authority to assure equipment and systems are fully operational and ready for functional performance testing.
 - 6. Provide equipment, materials, and labor necessary to correct deficiencies found during commissioning process to fulfill contract and warranty requirements.

7. Provide operation and maintenance information and record drawings to Commissioning Authority for review verification and organization, prior to distribution.
 8. Provide assistance to Commissioning Authority to develop, edit, and document system operation descriptions.
- C. The steps associated with commissioning are outlined below:
1. Step One - Installation Verification
 2. Step Two - System Start-Up.
 3. Step Three – Functional Performance Testing.
- D. Operational staff training is essential to the commissioning process and will run concurrently with steps one through three.
- E. The Commissioning Team will include representatives of the Owner, Construction and Installing Subcontractors, Test and Balance Subcontractor, FMCS Subcontractor and Construction Subcontractor's Commissioning Agent. Equipment manufacturer's representatives will be present for start-up as specified in the equipment specification sections and for equipment training.
- F. Equipment and Systems to Be Commissioned:
1. Ductwork.
 2. Packaged DX DOAS Units.
 3. Air handling units and associated outdoor VRF heat-pump condensing units.
 4. Energy recovery devices.
 5. Computer and data room Mini-split systems.
 6. Smoke dampers
 7. Fire dampers.
 8. Indoor air quality.
 9. Thermostats/Temperature sensors
 10. Testing, adjusting and balancing work.
- G. Perform seasonal function performance tests for the following equipment and systems:
1. Packaged DX DOAS Units.
 2. Air Handling Units/VRF Heat-Pump Condensing Units.
 3. Energy Recovery Devices.

1.4 COMMISSIONING SUBMITTALS

- A. Draft Forms: Submit draft of system verification form and functional performance test checklist.
- B. Test Reports: Indicate data on system verification form for each piece of equipment and system as specified. Use NEBB forms as guidelines.
- C. Field Reports: Indicate deficiencies preventing completion of equipment or system verification checks equipment or system to achieve specified performance.

1.5 CLOSEOUT SUBMITTALS

- A. Section 01 70 00 - Execution and Closeout Requirements: Requirements for submittals.
- B. Project Record Documents: Record revisions to equipment and system documentation necessitated by commissioning.
- C. Operation and Maintenance Data: Submit revisions to operation and maintenance manuals when necessary revisions are discovered during commissioning.

1.6 QUALITY ASSURANCE

- A. Perform Work in accordance with AABC and NEBB standards.
- B. Maintain one copy of each document on site.

1.7 COMMISSIONING RESPONSIBILITIES

- A. Equipment or System Installer Commissioning Responsibilities:
 - 1. Attend commissioning meetings.
 - 2. Ensure temperature controls installer performs assigned commissioning responsibilities as specified below.
 - 3. Ensure testing, adjusting, and balancing agency performs assigned commissioning responsibilities as specified.
 - 4. Provide instructions and demonstrations for Owner's personnel.
 - 5. Ensure subcontractors perform assigned commissioning responsibilities.
 - 6. Ensure participation of equipment manufacturers in appropriate startup, testing, and training activities when required by individual equipment specifications.
 - 7. Develop startup and initial checkout plan using manufacturer's startup procedures and functional performance checklists for equipment and systems to be commissioned.
 - 8. During verification check and startup process, execute HVAC related portions of checklists for equipment and systems to be commissioned.
 - 9. Perform and document completed startup and system operational checkout procedures, providing copy to Commissioning Authority.
 - 10. Provide manufacturer's representatives to execute starting of equipment. Ensure representatives are available and present during agreed upon schedules and are in attendance for duration to complete tests, adjustments and problem-solving.
 - 11. Coordinate with equipment manufacturers to determine specific requirements to maintain validity of warranties.
 - 12. Provide personnel to assist Commissioning Authority during equipment or system verification checks and functional performance tests.
 - 13. Prior to functional performance tests, review test procedures to ensure feasibility, safety and equipment protection and provide necessary written alarm limits to be used during tests.
 - 14. Prior to startup, inspect, check, and verify correct and complete installation of equipment and system components for verification checks included in commissioning plan. When deficient or incomplete work is discovered, ensure corrective action is taken and re-check until equipment or system is ready for startup.
 - 15. Provide factory supervised startup services for equipment and systems specified elsewhere in these specifications. Coordinate work with manufacturer and Commissioning Authority.
 - 16. Perform verification checks and startup on equipment and systems as specified.
 - 17. Assist Commissioning Authority in performing functional performance tests on equipment and systems as specified.
 - 18. Perform operation and maintenance training sessions scheduled by Commissioning Authority.
 - 19. Conduct HVAC system orientation and inspection.
- B. Temperature Controls Installer Commissioning Responsibilities:
 - 1. Attend commissioning meetings.
 - 2. Review design for ability of systems to be controlled including the following:
 - a. Confirm proper hardware requirements exists to perform functional performance testing.
 - b. Confirm proper safeties and interlocks are included in design.
 - c. Confirm sensors selected are within device ranges.

- d. Indicate delineation of control between packaged controls and building automation system the owner's monitoring systems.
 - e. Provide written sequences of operation for packaged controlled equipment. Equipment manufacturers' stock sequences may be included, when accompanied by additional narrative to reflect Project conditions.
 - 3. Inspect, check, and confirm proper operation and performance of control hardware and software provided in other HVAC sections.
 - 4. Perform training sessions to instruct Owner's personnel in hardware operation, software operation, programming, and application.
 - 5. Demonstrate system performance and operation to Commissioning Authority during functional performance tests including each mode of operation.
 - 6. Provide control system technician to assist testing, adjusting, and balancing agency during performance of testing, adjusting, and balancing work.
 - 7. Assist in performing operation and maintenance training sessions.
- C. Testing, Adjusting, and Balancing Agency Commissioning Responsibilities:
- 1. Attend commissioning meetings.
 - 2. Participate in verification of testing, adjusting, and balancing report for verification or diagnostic purposes.
 - 3. Assist in performing operation and maintenance training sessions.

1.8 SCHEDULING

- A. Prepare schedule indicating anticipated start dates for the following:
- 1. Ductwork cleaning.
 - 2. Equipment and system startups.
 - 3. Automatic temperature control system checkout.
 - 4. Testing, adjusting, and balancing.
 - 5. HVAC system orientation and inspections.
 - 6. Operation and maintenance manual submittals.
 - 7. Training sessions.
- B. Schedule seasonal tests of equipment and systems during peak weather conditions to observe full-load performance.
- C. Schedule occupancy sensitive tests of equipment and systems during conditions of both minimum and maximum occupancy and/or use.

1.9 COORDINATION

- A. Section 01 30 00 - Administrative Requirements: Requirements for coordination.
- B. Notify Commissioning Authority minimum of two weeks in advance of the following:
- 1. Scheduled equipment and system startups.
 - 2. Scheduled automatic temperature control system checkout.
 - 3. Scheduled start of testing, adjusting, and balancing work.
- C. Coordinate programming of automatic temperature control system with construction and commissioning schedules.

PART 2 PRODUCTS

2.1 COMMISSIONING PLAN

A. The commissioning plan shall outline the organization, scheduling, team members, and documentation pertaining to the overall commissioning process.

2.2 NARRATIVE DESCRIPTIONS

A. A narrative description of the design intents of the systems and their intended modes of sequences of operation.

2.3 FUNCTIONAL PERFORMANCE TESTS (FPT) PROCEDURES

A. The FPT procedures at the minimum shall consist of the following sections:

1. Narrative Description:

a. This section provides a narrative description of the design intents of the systems and their intended modes of sequences of operation.

2. Testing Prerequisites:

a. This section contains verification that primary mechanical, electrical, and controls systems that support or interact with the system that the FPT is prepared against are completed, tested and operational.

3. Installation Verification:

a. This section contains verification that the system installation is completed and is ready for commissioning.

4. Commencement of Functional Performance Testing:

a. This section records the date and time of the start of system commissioning.

5. System Condition Prior to Starting Performance Testing:

a. This section records the current set points and parameters of the system at the start of commissioning.

6. Functional Performance Test:

a. This section shall provide the following:

1) Sequential steps required to set parameters and conditions required to test component and functions throughout intended ranges of operation.

2) Full range of checks and tests carried out to determine if electric and pneumatic connections, components, subsystems, systems and interfaces between systems function in accordance with the contract documents and design intents.

3) All modes and sequences of control operations, interlocks and conditional control responses and specified responses to abnormal emergency conditions.

7. End of Functional Performance Test:

a. This section records the date and time of the end of system commissioning.

8. Field Notes:

- a. This section records notes or remarks during system commissioning.
9. List systems modifications, not required by the Contract Documents, but provided by the Subcontractor. List other questions regarding such system modifications.
10. List problems discovered during Commissioning that were corrected.
11. List problems discovered during Commissioning that were not corrected.
12. List recommended party that should take action on these problems.

PART 3 - EXECUTION

3.1 GENERAL

A. The Subcontractors shall be responsible for performing procedures presented in specification and contract drawings as detailed in the Functional Performance Tests (FPT). Members of the designated Commissioning Team shall witness various portions of the commissioning process. Responsibilities for these activities are listed in the following paragraphs. Commissioning Team members shall sign-off on appropriate sections after verifying installation, operation, or documentation. Final sign-off shall be by the Owner (BPSB) and Commissioning Agent.

B. Any test ports, gauges, test equipment, etc., needed to accomplish the functional performance tests shall be provided by Subcontractors.

C. Subcontractors shall provide to the Commissioning Team documentation of calibration of controls. Documentation shall include dates, setpoints, calibration coefficients, control loop verification, and other data required to verify system check-out. Documentation shall be dated and initialed by field engineer or technician performing the work.

3.2 OPERATIONAL STAFF TRAINING

A. System narrative descriptions will be prepared by the Commission Agent and supported by flow diagrams, one line diagrams, and appropriate specification sections for major systems to be commissioned. The Commission Agent will coordinate "system description" meetings with members of facility management and maintenance department groups to review system description documentation. The meetings will provide an overview of major system features, components, and arrangements.

B. The Subcontractor and associated manufacturer's representatives shall provide required training to operational staff after the system description meetings have occurred. The Subcontractor training sessions shall provide a more detailed analogy of systems operation and maintenance.

3.3 INSTRUMENTATION

A. Instrumentation will be provided by the Subcontractor. Instruments used for measurements shall be accurate. Calibration histories for each instrument shall be available for examination. Calibration and maintenance of instruments shall be in accordance with the requirements of NEBB or AABC Standards.

B. Application of instruments and accuracy of measurements shall be in accordance with NEBB or AABC Standards.

3.4 DOCUMENTATION

A. The installing Subcontractor shall be responsible for collection of pertinent data during system start-up and functional performance testing. The Subcontractor shall submit to the Commissioning Agent documentation of tests performed prior to and after system start-up. Documentation shall also include start-up procedures as approved by Commissioning Team.

- B. Documentation is to be typewritten on 8-1/2 by 11 inches (200 by 280 mm) paper and inserted in a 2 inches (50 mm) to 3 inches (75 mm) thick three ring binder. Indicate the project name, number, volume number, and volume title on the end panel of each binder.
- C. Provide a title sheet for each volume and list the following:
1. Volume Title and Section Name and Number requiring this submittal.
 2. Project name, project number, and address.
 3. Subcontractor name, address, and phone number.
 4. Name, title, signature, and date of person making the submittal.
 5. Name of school, a blank line for signature, and the date of person accepting the submittal.
 6. Name, address, and phone number of Commission Agent; a blank line for signature; and date of person accepting the submittal.
- D. Provide a Table of Contents for multiple submittals. List each submittal and page number. Number each page, centered on the bottom in sequential numerical order. Provide tabs for multiple submittals in a single binder.

3.5 STEP ONE - INSTALLATION VERIFICATION

A. General Commissioning responsibilities:

1. Before system start-up begins, the Commission Team shall conduct a final installation verification audit. The Subcontractor shall be responsible for completion of work including change orders and punch list items to the Owner's (BPSB) satisfaction. The audit shall include, but not be limited to, checking of:
 - a. Refrigerant piping specialties including control and isolation valves.
 - b. Ductwork specialty items including turning devices, balance, fire, control dampers, and access doors.
 - c. Control sensor types and location.
 - d. Identification of piping, valves, equipment, controls, etc.
 - e. Major equipment, valves, starters, gauges, thermometers, etc.
 - f. Documentation of prestart-up tests performed, including manufacturer's factory tests.
2. If work is found to be incomplete, incorrect, or non-functional, the Subcontractor shall correct the deficiency before system start-up work proceeds.

3.6 STEP TWO - SYSTEM START-UP

A. General Commissioning Responsibilities:

1. A start-up plan shall be developed and submitted by the installing Subcontractor. Start-up plan to include the following:
 - a. Flushing, cleaning and pressure testing of refrigerant piping.
 - b. Damper positions.

- c. Electrical tests.
 - d. Pressure tests.
 - e. Safeties.
 - f. Manufacturer's tests.
2. The start-up plan will be reviewed and a prestart-up inspection performed by designated members of the Commissioning Team. The installing Subcontractor shall commence with system start-up after approval has been given to start-up plan and the prestart-up inspection is completed. Designated members of the Commissioning Team shall witness system start-up and list system and equipment deficiencies noted during start-up. The Subcontractor shall take corrective action on system deficiencies noted and demonstrate to the Commissioning Team members suitable system operation.
3. Designated systems requiring test and balance work shall have this activity commence after systems have successfully completed start-up. System and equipment deficiencies observed during this activity is to be noted and corrected.

3.7 STEP THREE - FUNCTIONAL PERFORMANCE TESTING

A. General Commissioning Responsibilities:

- 1. Functional Performance Testing begins after operational testing, adjusting, and balancing of the systems have been completed by the Subcontractors; and the System Description and Hands-on Training sessions have been completed.
- 2. The objective of the Functional Performance Testing is to advance the building systems from a state of substantial completion to full dynamic operation in accordance with the specified design requirements and design intent.
- 3. Attaining this object will be accomplished by developing individual systems testing protocols which, when implemented by the Subcontractor, will allow the Commissioning Team to observe, evaluate, identify deficiencies, recommend modifications, tune, and document the systems and systems equipment performance over a range of load and functional levels.
- 4. Functional Performance tests for the systems to be commissioned are defined in the Commissioning Plan. These tests are intended to be conclusive but may require minor modifications as system operation dictates.

END OF SECTION

SECTION 23 09 00: TEMPERATURE CONTROLS

PART 1 - GENERAL

1.1 GENERAL:

Refer to Section 23 05 00 for Common Work Results for HVAC. The temperature controls contractor shall submit for approval complete temperature controls shop drawings to include but not limited to wiring diagrams, control diagrams, sequence of operation and interlocks.

1.2 SCOPE:

Furnish and install all materials, supplies, labor (except electrical) and services for, required in connection with, or properly incidental to, a complete system of temperature control for heating, ventilating and air conditioning. The mechanical contractor and the HVAC equipment supplier shall furnish all temperature control equipment as described under this heading and a factory trained employee of the HVAC equipment manufacturer shall provide installation supervision as required for the proper installation of the temperature control system. All temperature control wiring exterior to the building and/or exposed shall be installed in rigid metal conduit. All other temperature control wiring shall be installed in EMT. All wiring and conduit (50 VAC and above) in connection with the automatic temperature control system shall be provided by the Electrical Subcontractor under another section of this specification. All wiring and conduit (below 50 VAC) shall be provided by the mechanical contractor.

PART 2 - PRODUCTS

2.1 THERMOSTATS: <S><OM>

Thermostats for split system heat pumps shall be furnished by the unit manufacturer, installed by the mechanical contractor and shall be EnTouch Pro Motion Sensing Thermostats, touch screen fully programmable, combination heating/cooling (automatic change over); two stage heating where required and two stage cooling where required. Provide switching subbase: system-emergency heat/heat/off/cool/auto and fan – auto/on. Thermostat shall be capable of up to 4 different temperature settings per day, 7 days a week scheduling, manual override and battery back-up. Provide clear plastic-locking covers for thermostats. Thermostats shall be approved by the owner.

2.2 FIRE-STATS: <S><OM>

Provide in each air moving device such as air conditioning units, exhaust fans, etc., of 600 CFM capacity and larger, a fire-stat to "stop" each respective air moving device upon an entering air temperature to the fan in excess of 125 degrees Fahrenheit (or in excess of that specified in the local codes or by the authority having jurisdiction). Fire-stats shall be fully adjustable with a temperature range of 125°F to 200°F.

2.3 CONTROL PANEL: <S> <OM>

Unit control panels shall include a fully programmable multicircuit microprocessor based 7-day time clock with skip-a-day feature and manual override. Time clock shall interrupt line voltage circuit to a relay at each location to interrupt thermostat control circuit wired through relay low voltage contacts. Time clock shall be equipped with a 365-day programming feature including up to 16 holiday durations and/or single day holidays per year, programmable by date and true 7-day programming with each circuit independently programmed for each day of the week. A night set back thermostat shall override timeclock to energize each unit control circuit on a drop of space temperature below 55°F.

2.4 DUCT SMOKE DETECTORS: <S><OM>

Duct smoke detectors with accessories shall be provided by and connected by the fire alarm subcontractor. Installation of duct smoke detectors and interlock with unit shall be the responsibility of the mechanical contractor.

2.5 AUTOMATIC DAMPERS: <S>

Modulating dampers shall be of the opposed blade type and shall have blades not exceeding 6" width. Dampers shall be constructed of #16 gauge galvanized steel, rigidly constructed to prevent distortion. Dampers shall have neoprene edges and shall have 10 CFM/sq. ft. leakage maximum at 1" w.g. Provide motorized dampers in all intake and exhaust ducts over 300 CFM to open/close when fan is energized/deenergized.

2.6 DAMPER OPERATORS: <S><OM>

Damper motors shall be of the reversing, quiet, oil immersed type, ample in size to handle the load imposed on them and shall conform to the requirements detailed in the sequence descriptions of this specification.

2.7 MISCELLANEOUS:

The control manufacturer shall furnish all two position relays, capacity relays and all other controls necessary to meet the specifications and provide for a properly operating control system as specified herein. All electric switches and relays shall be UL listed and the type to meet current and voltage requirements of the particular application.

2.8 FLOAT SWITCH: <S><OM>

Provide float switch for all units requiring auxiliary drain pans (i.e. all horizontal units mounted above ceiling). Float switch shall stop the fan upon sensing water in auxiliary drain pan. Float switch shall be equal to Madison Model N8700, 24 volt DC, 30 watts.

PART 3 - EXECUTION

3.1 REQUIREMENTS FOR WORKMANSHIP AND QUALITY:

3.1.1 All wiring shall be terminated by connecting to the temperature control device or numbered terminal strip as indicated on the drawing furnished by the temperature control manufacturer. All wiring shall be color coded and shall be tagged for further identification. Splices in wiring shall be held in an absolute minimum and when necessary shall be made color to color throughout the entire control system.

3.1.2 All switches, panels, etc., furnished and/or installed by the temperature control manufacturer shall be identified by means of plates made of plastic or black anodized aluminum suitably engraved. Embossed or punched plastic tape will not be acceptable.

3.1.3 The Mechanical Contractor shall provide a complete detailed wiring diagram for the air conditioning units to the Electrical Contractor for installation.

3.1.4 The mechanical contractor and HVAC equipment supplier shall provide two (2) 4-hour training sessions to acquaint the owner with control operation instructions and programming training. Provide Architect documentation, signed by Owner, that training session has been completed.

3.1.5 Supply and exhaust fans shall be interlocked as scheduled on the plans.

3.2 SERVICE AND WARRANTY:

The control system herein specified shall be free from defects in workmanship and material under normal use and service. If within 12 months from date of acceptance by the Owners any of the equipment herein described is proved to be defective in workmanship or material, it shall be replaced or repaired free of any charge to the Owner. Upon completion of the job, the temperature controls shall be thoroughly checked, adjusted and calibrated and placed in operation all devices comprising the entire control system provided under this section of the work to the complete satisfaction of the Engineer and/or owner. The Subcontractor shall provide the Owner with complete instruction manuals

covering the function and operation of all control components on the project. A component technician shall be available for instruction purposes to the Owner.

3.3 OPERATING SEQUENCE:

Reference each specific HVAC equipment specification for operating sequences as applicable.

END OF SECTION

SECTION 23 30 00 - HVAC AIR DISTRIBUTION

PART 1 - GENERAL

1.1 GENERAL:

1.1.1 Where any reference to "sheet metal" or "ductwork" appears in this section of these specifications or on the drawings, it shall be construed to include exhaust ducts, relief ducts, plenums, casings for air handling units, duct taps, grille taps and diffuser connections and all other related pieces and parts of the air conveying systems.

1.1.2 Before starting shop drawings or fabrication of any ductwork, the Contractor must have an approved reflected ceiling plan with which he can coordinate location of air outlets, lights, tile patterns, etc.

1.2 SCOPE:

Furnish and install all labor, materials, equipment, tools and services and perform all operations required in connection with or properly incidental to the construction of complete Ductwork and Accessories System as indicated on the drawings, reasonably implied therefrom or as specified herein unless specifically excluded.

1.3 SHOP DRAWINGS:

Shop drawings shall be submitted on all items of sheet metal work.

1.4 REFERENCED STANDARDS:

- ASHRAE - Guide and Data Books.
- SMACNA - HVAC Duct System Design, Latest Edition.
- NFPA - 90A, 90B, 91, 96, 204
- SMACNA - HVAC Duct Construction Standards, Third Edition, 2005.

1.5 QUALITY ASSURANCE:

The contractor shall comply with this specification in its entirety. If on inspections, the specifier finds that changes have been made without written prior approval, the contractor shall make the applicable changes to comply with this specification, at the contractor's expense.

PART 2 - PRODUCTS

2.1 MATERIAL:

All sheet metal duct, plenum and casing construction, unless otherwise specified herein, shall be constructed of new, prime grade, continuous hot dip mill galvanized, lock forming quality steel sheets, per ASTM A653/A653M and A924/A924M, and shall have a galvanized coating of 1-1/4 ounces total for both sides of 1 sq. ft. of a sheet, in accordance W/G90 per ASTM A653/A653M and ASTM A924/A924M. Construction shall be in strict accordance with the construction details on plan and installation details in the referenced SMACNA and NFPA standards as specified. Referenced standards shall be used to define minimum construction requirements where more stringent standards are not detailed on plans or specified herein.

2.2 LABELING AND GAUGE:

Each sheet shall be stenciled with manufacturer's name and gauge. If coil steel is used, coils shall be stenciled throughout on ten foot (10') centers with manufacturer's name and gauge. Sheet metal must conform to the tolerances listed in SMACNA HVAC Duct Construction Standards, Third Edition, 2005. All duct systems penetrating 1 hour fire walls shall be of minimum 24 ga. construction.

2.3 LOW PRESSURE DUCTWORK CONSTRUCTION:

2.3.1 Construct low pressure ductwork to meet all functional criteria defined in NFPA 90A, NFPA 90B, and Section VII of the SMACNA "HVAC Duct Construction Standards Metal and Flexible" 2005 Edition. (This shall be subsequently referred to as the SMACNA manual.) All ductwork must comply with all local, state and federal code requirements.

2.3.2 Rectangular low pressure ducts shall be constructed and reinforced for 2"W.G. Longitudinal seams shall be Pittsburgh lock, sealed with mastic sealant. (Snaplock is not acceptable.)

Elbows shall be mitered with double thickness turning vanes or smooth radius long sweep elbows. Combination elbows (outside smooth radius with inside miter) are not acceptable.

2.3.3 Round low pressure ducts shall be constructed in accordance with Table 3-2 and 3-3 2" W.G. "Round Duct Gauge Selection" and Figure 3-2 "Transverse Joints-Round Duct" of SMACNA HVAC Duct Construction Standards, Third Edition, 2005 and NFPA 90A and 90B.

Elbows shall be smooth elbows; 5 piece 90 degree elbows or 3 piece 45 degree elbows all with centerline radius 1-1/2 times the duct diameter.

2.3.4 <S> Low pressure flexible ducts shall be in accordance with SMACNA HVAC Duct Construction Standards, Third Edition, 2005, NFPA 90A and 90B. Flexible duct shall be equal to Hart & Cooley FB214, with couplings and end connections as required for proper installation and compatibility with ductwork system in which they are installed.

- A. All flexible ducts shall have positive interior air seal permanently bounded to a zinc coated high carbon spring steel helix all sheathed in a Class 1 vapor barrier factory sealed at both ends. The composite assembly including foil faced vapor barrier shall meet the Class 1 requirements of NFPA for use in a return air plenum, and be labeled by Underwriters Laboratories, Inc. 181 with a flame spread rating of 25 or less and a smoke developed rating of 50 or under.
- B. Low pressure flexible duct shall be rated to 1 1/2" w.g. working pressure.
- C. Flexible duct taps into low pressure plenums or main ducts shall be made with 45 degree side take-offs and rigid round duct with damper on a 3/8" square rod, nylon end bearings, graduated operators with stand-off brackets, and raised bead for tight, positive flex duct connection. Use insulation guard for internally lined ductwork. Duct connections and dampers shall be constructed of galvanized sheet metal, 24 gauge minimum for 12" diameter and smaller, 22 gauge minimum for 14" diameter, and 20 gauge minimum for 15" diameter. Damper assemblies shall be as manufactured by Greenheck or Ruskin.
- D. Flexible Duct Clamps: 100 percent nylon strap, 175 pounds minimum loop tensile strength manufactured for this purpose or stainless steel strap with cadmium plated worm gear tightening devise. Apply clamps with sealant and as approved for UL 181, Class I installation.

2.3.5 <S> All exposed low pressure ductwork shall be factory lined, double wall spiral flat oval or spiral round as indicated on plans. Outer duct wall shall be paint-grip galvanized steel suitable for field painting unless noted otherwise. Inner duct wall shall be perforated with mastic coating.

2.4 JOINTS:

2.4.1 All joints shall be sealed airtight with water-based duct sealer equal to United duct sealer in a manner compatible with type joint being sealed. Sealer shall be installed per the instructions set forth in the SMACNA HVAC Duct Construction Standards, Third Edition, 2005.

2.4.2 All sealed ducts shall be pressure tested at a developed and maintained system pressure. Leaks that whistle or are excessive shall be repaired and the test repeated. See Part 3 Execution.

2.4.3 As a Contractor option, transverse duct joints may be made with Ductmate System or approved equal with the following stipulation: "Ductmate or equal system may be employed only after Contractor personnel have been properly instructed by a manufacturer's representative in the application and installation of said system." Duct gauges shall be in strict accordance with Ductmate instructions.

2.5 DUCT SUPPORTS:

2.5.1 All horizontal and vertical ducts shall be supported in accordance with SMACNA HVAC Duct Construction Standards, Third Edition, 2005.

2.5.2 Flexible ducts shall be free of sags and kinks and supported on minimum of 36" centers with 3/4" wide flat banding material. Perforated strap will not be acceptable.

2.6 DUCT LINER: <S>

2.6.1 All supply, return and outside air ductwork as noted on the plans with dashed lines drawn inside the duct, and all ductwork exposed in mechanical rooms shall have integral lining in accordance with SMACNA HVAC Duct Construction Standards, Third Edition, 2005, and NFPA 90A and 90B. Liner shall be 1-1/2 pound per cubic foot, 1" thick.

2.6.2 Dimensions given on the drawings are inside the insulation, sheet metal sizes shall be increased to allow for the thickness of liner called for. Refer to Section 15010 for Flame Spread Properties.

2.6.3 Duct liner shall be equal to Manville "Linacoustic Permacote" meeting ASTM C1071; flexible blanket properly sealed at all joints and bare ends. Adhesive shall be UL listed water proof type. Fasteners shall be galvanized steel pins, welded or mechanically fastened.

2.6.4 Round duct liner shall be equal to Manville "Spiracoustic" meeting ASTM C427; Rigid.

2.7 DUCT ACCESS DOORS: <S>

Duct access doors shall be hinged or Ductmate Sandwich Type Access Doors. (1" thick insulation bonded to interior face), 8" x 8" minimum size (duct opening) on ductwork up to 14" and 12" x 12" minimum size on larger ductwork. Doors shall be of adequate size to allow easy access to hardware/equipment that needs to be maintained.

2.8 AIR DISTRIBUTION DEVICES: <S>

2.8.1 Grilles, registers and ceiling outlets shall be as scheduled in the plans and shall be provided with sponge rubber or soft felt gaskets. If a manufacturer other than the one scheduled is used, the sizes shown on the drawings shall be checked for performance, noise level, face velocity, throw, pressure drop etc., before the submittal is made. Selections shall meet the manufacturer's own published data for the above performance criteria. The throw shall be such that the velocity at the end of the throw in the five foot occupancy zone will not be more than 50 FPM or less than 25 FPM. Should grilles other than those scheduled by name be furnished, manufacturer shall be prepared to demonstrate compliance with noise criteria on request to Architect's satisfaction. All devices shall be tested per Air Diffuser Council and labeled as such. Specialty air devices such as high volume drum louvers shall be provided as scheduled; no substitutions are acceptable.

2.8.2 Locations of devices on drawings are approximate and shall be coordinated with other trades to make symmetrical patterns and shall be governed by the established pattern of the lighting fixtures or Architectural reflected ceiling plan. Where called for on the schedules, the grilles, registers and ceiling outlets shall be provided with deflecting devices and manual dampers. These shall be the standard product of the manufacturer, subject to review by the Architect and equal to brand scheduled. All ceiling devices shall be furnished to be compatible with the type ceiling in which they are installed.

2.8.3 Air distribution devices shall be as manufactured by Titus, Metalaire, Krueger or Price only and shall be as scheduled on the drawings.

2.9 INSTRUMENT PORTS:

2.9.1 Instrument ports shall be a 2-5/8" diameter base, neoprene gasket 2" deep neck, screwed cover operated with No. 024 spanner wrench, mounting screws, equal to Young 1101.

2.10 AIR HOODS: <S>

2.10.1 Hood (s) shall be constructed of aluminum rigidly supported to withstand wind forces "oil canning" and normal rough treatment during installation. Units shall be designed and installed to eliminate any standing water. The underside of the hood shall be coated with insulating mastic to prevent condensation.

2.10.2 Provide expanded aluminum mesh birdscreens and a matching 14" high aluminum curb with built-in 3" cant strip and a treated wood nailer installed as indicated on the drawings.

2.10.3 Relief outlet hoods shall have a throat-to-hood outlet area ratio of 1 to 1.75 minimum.

2.10.4 Ventilation and outside air intake hoods shall have a throat-to-hood outlet area ratio of 1 to 1.75 minimum. Intake hoods shall be separated from exhaust outlets, flues, plumbing vent stacks, etc. a minimum of 15 ft.

2.10.5 Acceptable manufacturers: Louvers and Dampers, Ruskin, Acme, Greenheck, Loren Cook.

2.11 FIRE DAMPERS: <S>

2.11.1 Furnish and install UL labeled fire dampers with fusible links where indicated and/or required by local codes in accordance with NFPA 90A and 90B.

2.11.2 Fire dampers shall be 95% minimum free area Ruskin series IBD Classified UL-555.

2.11.3 Where dampers are installed in a horizontal position, provide stainless steel closure springs and cam type blade locks to insure complete damper shut-off.

2.11.4 Fire dampers shall be equipped with suitable frame style for round, oval or rectangular ducts.

2.11.5 Fire dampers shall only be installed in steel grilles, registers and diffusers. Aluminum air distribution devices may not be used in conjunction with fire dampers. It shall be the contractor's responsibility to verify that only steel devices are used with fire dampers.

2.11.6 Acceptable manufacturers: Advanced Air, Ruskin, Air Balance, Airstream Products, Greenheck, Pottorff.

2.12 SMOKE DAMPERS: <S>

2.12.1 Smoke Dampers: shall be UL labeled and a rating as scheduled on the Drawings, per UL 555S. The minimum free open area of dampers shall be the duct clear area.

A. Dampers shall be provided with the following:

1. Momentary Test Switch
2. Open Closed Indicator
3. Factory mounted actuator, UL listed
 - a. 115 volt power supply and 115-24 volt transformers as applicable
 - b. Spring return operation
 - c. Closed fail direction
 - d. Externally mounted unless otherwise reviewed with Landmark

e. NEMA 1 enclosure

B. One of the following equal manufacturers and products may be used:

1. Greenheck
2. Ruskin
3. Louvers and Dampers, Inc.
4. Additional approved equal products shall be considered

PART 3 - EXECUTION

3.1 WORKMANSHIP, QUALITY AND REQUIREMENTS:

3.1.1 Ductwork shown on the drawings, specified or required for the heating, ventilating and air conditioning systems shall be constructed and erected in a first class workmanlike manner in accordance with SMACNA recommendations for low pressure and medium pressure duct construction unless more stringent requirements are specified herein. This work shall be warranted for a period of one year from the date of acceptance of the job against noise, chatter, whistling or vibrations and free from pulsation under all conditions of operation. After the system is in operation, should these defects occur, they shall either be removed and replaced or reinforced as directed by the Architect.

3.1.2 Ductwork shall be erected in the general locations shown on the drawings, but must conform to all structural and finish conditions of the building. Before fabricating any ductwork, the Contractor shall check the physical conditions at the job site and shall make all necessary changes in cross sections, offsets, etc., whether they are specifically indicated or not.

3.1.3 Provide manually operated volume control dampers in all branches, splits and taps for proper balancing of air distribution whether indicated on the drawings or not. Dampers to be either single blade or multi-blade as shown in the SMACNA manual as required and as detailed on plans. They shall have an indicating device with lock to hold damper in position for proper setting.

3.1.4 Damper operators above inaccessible ceilings shall be furnished with extension rods operable through diffuser and grille faces or from remote locations.

3.1.5 All square elbows shall have double thickness turning vanes per the SMACNA manual requirements except for any return air jumper ducts noted on drawings.

3.1.6 Furnish and install in the ductwork, hinged or Ductmate Sandwich type access doors to provide access to all dampers, automatic dampers, fusible links, cleaning operations, etc. Where the ducts are insulated, the access doors shall be double skin doors with one inch (1") of insulation in the door. Factory fabricated doors as manufactured by Ductmate, Milcor or equal meeting these specifications will be acceptable.

3.1.7 Where ducts connect to mechanical equipment with fans, including roof exhausters, flexible connections shall be made using "Ventglas" fabric that is fire-resistant, waterproof, mildew-resistant and practically air tight and shall weigh approximately thirty ounces (30 oz.) per square yard. There shall be a minimum of one-half inch (1/2") slack in the connections and a minimum of two and one half inches (2-1/2") distance between the edges of the duct except that there shall also be a minimum of one inch (1") of slack for each inch of static pressure on the fan system.

3.1.8 Furnish and install screens on all ducts, fans, etc., and openings furnished by this Contractor which lead to, or are, outdoors. Screens shall be 16 gauge, one half inch (1/2") mesh in removable galvanized steel frames.

3.1.9 Furnish test openings with covers in each zone duct for taking readings of air velocities or pressures in ducts. See the SMACNA manual for cover construction.

3.1.10 All holes in ducts for damper rods and other necessary devices, shall be either drilled or machine punched, (not pin punched), and shall not be any larger than necessary. All duct openings shall be provided with sheet metal caps if the openings are to be left unconnected for any length of time. In general, sheet metal screws shall not be used in duct

construction unless the head (not the point) of the screw is in the airstream. Transformations shall have a ratio of not more than one inch (1") in transformation to every two inches (2") of length unless specifically shown otherwise on the drawings.

3.1.11 All duct drops to return and exhaust grilles shall be full size of the grille, and internally lined with 1" thick duct liner. The inside of all grilles, branch ductwork and duct drops shall be "black-out" with a minimum of two (2) coats flat black paint.

3.1.12 Ductwork Leakage Criteria:

- A. All transverse joints and longitudinal seams shall conform to SMACNA's Class A sealing requirements as defined on pages 1-6 of the 2005 SMACNA Manual, Third Edition.
- B. Constant Volume Systems/Supply Ductwork
Allowable Leakage-----1% of design cfm.
- C. Constant Volume Systems/Return Ductwork
Allowable Leakage-----2% of design cfm.
- D. Total allowable leakage of the system shall not exceed the percentage of design cfm outlined above.
- E. Leakage concentrated at one point may result in objectionable noise even if the system passes the leakage rate criteria. This noise source must be corrected to the satisfaction of the engineer.

3.2 DUCT LINER:

- A. Adhere insulation to sheet metal with full coverage of a UL listed adhesive.
- B. Secure insulation with mechanical liner fasteners as indicated by SMACNA or manufacturer. Pin length should be as recommended by the liner manufacturer.
- C. All exposed edges of the liner must be factory or field coated with mastic. For systems operating at 4000 fpm or higher a metal nosing must be installed over all liner leading edges in addition to the mastic coating.
- D. Repair liner surface penetrations with UL listed adhesive.
- E. Duct dimensions indicated are net inside dimensions required for air flow. Increase duct size to allow for insulation thickness.

3.3 FLASHING:

3.3.1 Where ducts pass through roofs or exterior walls, suitable flashing shall be provided to prevent rain or air current from entering the building. The flashing shall be not less than No. 24 gauge galvanized steel.

3.3.2 Where ducts exposed to view pass through walls, floors or ceilings, furnish and install sheet metal collars to cover the voids around the duct.

3.4 AUXILIARY DRAIN PANS:

Provide 18 gauge galvanized sheet metal auxiliary drain pan under all units mounted above ceiling, and under all units above any finished floor or occupied space in multistory facilities. (including units in mechanical or equipment rooms). Pan shall overhang equipment by 6" in all dimensions. Each pan shall be equipped with a 3/4" nipple soldered in place at the low part of the pan, and a 3/4" quarter-turn drain valve with 3/4" hose thread adapter for emergency draining of pan.

3.5 FIRE DAMPERS:

3.5.1 Fire dampers shall be installed in accordance with the SMACNA recommendations and as detailed on the drawings.

3.5.2 Provide a duct access panel for each fire damper.

3.5.3 Seal wall and floor penetrations with approved firestopping material. Firestop shall be equal to BIO Fireshield, Inc., BIO K-2.

3.6 SMOKE DAMPERS:

3.6.1 Smoke dampers shall be installed in accordance with the manufacturer's and SMACNA recommendations. Coordinate wiring requirements with electrical contractor.

3.6.2 Provide a duct access panel for each smoke damper.

END OF SECTION

SECTION 23 35 00 - HVAC EQUIPMENT

PART 1 - GENERAL

1.1 GENERAL:

Refer to Section 23 05 00 for General Requirements for Mechanical Work.

1.2 SCOPE:

Furnish and install all labor, materials, equipment, tools and services and perform all operations required in connection with, or properly incidental to, the construction of complete air conditioning equipment systems as indicated on the drawings, reasonably implied therefrom or as specified herein unless specifically excluded.

1.3 SCHEDULES ON DRAWINGS:

In general, all capacities of equipment and motor and starter characteristics are shown on schedules on the drawings. Reference shall be made to the schedules for such information. The capacities shown are minimum capacities. Variations in the characteristics will be permitted only on written approval of the Architect. Insofar as is possible, all items of the same type (i.e., air handling units, fans, etc.) shall be by the same manufacturer. Where instructions on installation are not included on these specifications or on the plans, the manufacturer's instructions shall be followed. Equipment shall be labeled and provided with installation and operating instructions in accordance with International Mechanical Code.

1.4 EQUIPMENT INSTALLATION AND WARRANTY SCHEDULE:

1.4.1 This Subcontractor shall refer to the architectural specifications for the required time schedule for the installation of equipment furnished as a part of this contract. The required time schedule will necessitate the setting-in-place of some items before the normal period of occupancy of the space and before the acceptance of substantial completion and subsequent approval by the Owner and Architect. The Subcontractor is advised that the warranty for each item of equipment will not begin until the documented time of beneficial use as defined in the architectural specifications, and the Subcontractor will, therefore, make the necessary arrangements with the equipment manufacturers for extended warranties as may be required.

1.4.2 All exterior equipment shall be provided with factory finished and fabricated, fully louvered coil guards completely enclosing coils preventing damage from outside sources. Wire screens or mesh are not acceptable. Where factory fabricated guards are not available, provide 300 series stainless steel, shop fabricated guards shall be provided.

1.5 REFERENCED STANDARDS:

ASHRAE Handbook - HVAC Applications (latest edition)
ASHRAE Handbook - HVAC Systems & Equipment (latest edition)
ASHRAE Handbook - Fundamentals (latest edition)
Standard for Mechanical Refrigeration Systems - ANSI B9.1
Standard for Installation of Air-Conditioning & Ventilating Systems - NFPA 90A
International Mechanical Code - IMC
Reference SECTION 23 05 00 for additional information

PART 2 - PRODUCTS

2.1 FILTERS: <S> <OM>

2.1.1 To protect the air-moving equipment during construction and for the purpose of testing and balancing, this Contractor shall furnish and install a complete set of filters (pre-filters and primary filters) for each air handling unit

and each piece of equipment requiring filters for use during construction. Provide three (3) complete sets of each type of filter for each piece of air moving equipment, in addition to the "construction" filters. Provide Architect documentation, signed by the Owner that these additional filters have been turned over to the Owner.

2.1.2 All primary filters for the air moving equipment shall be 2" thick MERV 8 30% efficient pleated throw-away filters.

2.2 MOTOR STARTERS: <S> <OM>

2.2.1 Starters shall be NEMA approved magnetic, line voltage type with overload relays in each phase, phase loss protection and phase unbalance protection. Each starter will be provided with pilot light on H-O-A switch.

2.2.2 Interlocks as required, plus one (1) spare, shall be provided for each starter. Holding coils shall be 120V AC from an individual control power transformer.

2.2.3 Motor starters shall be provided for all motors 1 HP and above and all motors requiring automatic control, unless indicated otherwise on the plans.

- A. Motor sizes shall be minimum sizes as indicated on schedule. If not indicated, motor size shall be large enough so driven load will not require motor to operate in service factor range above 1.0.
- B. Units will be equipped with 115/1/60 volt totally enclosed motors which include internal automatic reset thermal overload protection.
- C. For voltages other than 115/1/60, a unit must be supplied with the corresponding field installed transformer to step the voltage down to 115/1/60.
- D. Provide factory installed fan-blade guard, comply with OSHA specifications. Guard must be removable for maintenance.

2.3 MINI SPLIT AIR CONDITIONING UNIT: <S><OM>

2.5.2 SYSTEM DESCRIPTION – Heat Pump Units

The variable capacity, heat pump air conditioning system shall be an inverter driven series (heat/cool model) split system. The system shall consist of a slim duct evaporator exclusively matched to outdoor model direct expansion (DX), rotary swing air-cooled, variable speed driven compressor using R-410A refrigerant. The outdoor unit is a horizontal discharge air variable speed condenser fan using a single phase power supply. The system shall have a self-diagnostic function, 3-minute time delay mechanism and have a charge of R-32 refrigerant. The system shall have automatic restart capability after a power failure has occurred and a low voltage cut-off feature to prevent stalling during power supply issues.

2.5.3 WARRANTY: Compressors shall have a minimum 10 year warranty.

2.5.4 PERFORMANCE

- A. The system performance shall be in accordance with ARI 210/240 test conditions.
- B. The operating range in cooling will be 23°F DB ~ 115°F DB and 0°F DB ~ 115°F DB when used with an optional wind baffle.
- C. The system shall be capable of refrigerant piping up to 164 total feet with a 98 feet maximum vertical difference, without any oil traps or additional components.

2.3.5 OUTDOOR UNIT

- A. General: The outdoor condensing unit is designed specifically for use with matched capacity indoor evaporator units.
 - 1. The outdoor unit shall be factory assembled and pre-wired with all necessary electronic and refrigerant controls. The refrigeration circuit of the condensing unit shall consist of a swing compressor, motors, fan, condenser coil, electronic expansion valves, solenoid valves, 4-way valve, distribution headers, capillaries, filters, shut off valves, service ports and suction accumulator.
 - 2. Both liquid and suction lines must be individually insulated between the outdoor and indoor units.
 - 3. The outdoor unit can be wired and piped with outdoor unit access from the left, right, front or rear.
 - 4. The system will automatically restart operation after a power failure and will not cause any settings to be lost, thus eliminating the need for re-programming.
 - 5. The outdoor unit shall be modular in design and should allow for side-by-side installation with minimum spacing.
 - 6. The following safety devices shall be included on the condensing unit; high pressure switch, control circuit fuses, fusible plug, high pressure switch, overload relay, inverter overload protector, thermal protectors for compressor and fan motors, over current protection for the inverter and anti-recycling timers.
 - 7. Oil recovery cycle shall be automatic occurring 2 hours after start of operation and then every 8 hours of operation.
 - 8. The outdoor unit shall be capable of cooling operation at 30°F dry bulb ambient temperature without additional low ambient controls.
- B. Unit Cabinet:
 - 1. The outdoor unit shall be completely weatherproof and corrosion resistant. The unit shall be constructed from rust-proofed mild steel panels coated with a baked enamel finish.
- C. Fan:
 - 1. The condensing unit shall consist of one propeller type, direct-drive 70 W fan motor that has multiple speed operation via a DC (digitally commutating) inverter.
 - 2. The fan shall be a horizontal discharge configuration with a nominal airflow maximum of 1,835 cfm.
 - 3. The fan motor shall have inherent protection and permanently lubricated bearings and be mounted.
 - 4. The fan motor shall be provided with a fan guard to prevent contact with moving parts.
 - 5. The outdoor unit shall be capable of operating at further reduced sound levels during night time.
- D. Condenser Coil:
 - 1. The condenser coil shall be manufactured from copper tubes expanded into aluminum fins to form a mechanical bond.
 - 2. The heat exchanger coil shall be of a waffle louver fin and rifled bore tube design to ensure highly efficient performance.
 - 3. The heat exchanger on the condensing units shall be manufactured from seamless copper tube with internal grooves mechanically bonded on to aluminum fins.
- E. Compressor:
 - 1. The compressor shall be variable speed inverter controlled which is capable of changing the speed to follow the variations in total cooling load as determined by the suction gas pressure as measured in the condensing unit. In addition, samplings of evaporator and condenser temperatures shall be made so that the high/low pressures detected are read every 20 seconds and calculated. With each reading, the compressor capacity shall be controlled to eliminate deviation from target value.
 - 2. The inverter driven compressor shall be of highly efficient reluctance DC (digitally commutating), hermetically sealed swing “F-type” type.

3. Neodymium magnets shall be adopted in the rotor construction to yield a higher torque and efficiency in the compressor instead of the normal ferrite magnet type. At complete stop of the compressor, the neodymium magnets will position the rotor into the optimum position for a low torque start.
 4. The capacity control range shall be 35-100%.
 5. The compressor shall be equipped with a crankcase heater, high pressure safety switch and internal thermal overload protector.
 6. The compressor shall be mounted to avoid the transmission of vibration.
- F. Electrical:
1. The power supply to the outdoor unit shall be 208-230 volts, 1 phase, 60 hertz +/- 10%.
 2. The control voltage between the indoor and outdoor unit shall be 16VDC non-shielded, stranded 2 conductor cable.
 3. The control wiring shall be a two-wire multiplex transmission system, thus simplifying the wiring operation.

2.5.6 INDOOR UNIT – WALL MOUNT UNIT

A. General:

Indoor unit shall be a wall mounted fan coil unit, operable with R-410A refrigerant, equipped with an electronic expansion valve, for installation onto a wall within a conditioned space. Computerized PID control shall be used to control superheat to deliver a comfortable room temperature condition. The unit shall be equipped with a programmed drying mechanism that dehumidifies while inhibiting changes in room temperature. Provide Daikin BRC1D71 programmable controller with the unit. A mildew-proof, polyethylene air filter and condensate drain pan shall be included as standard equipment.

B. Indoor Unit:

1. The indoor unit shall be completely factory assembled and tested. Included in the unit is factory wiring, piping, electronic proportional expansion valve, control circuit board, fan motor thermal protector, flare connections, condensate drain pan, self-diagnostics, auto-restart function, 3-minute fused time delay, and test run switch. The unit shall have an auto-swing louver which ensures efficient air distribution, which closes automatically when the unit stops. The front grille shall be easily removed for washing. The discharge angle shall automatically set at the same angle as the previous operation upon restart. The drain pipe can be fitted to from either left or right sides.
2. Indoor unit and refrigerant pipes will be charged with dehydrated air prior to shipment from the factory.
3. Both refrigerant lines shall be insulated from the outdoor unit.
4. Return air shall be through a resin net mold resistant filter.
5. The indoor units shall be equipped with a condensate pan and internally powered condensate pump.
6. The indoor units shall be equipped with a return air thermistor.
7. The indoor unit will be separately powered with 208~230V/1-phase/60Hz.
8. The voltage range will be 253 volts maximum and 187 volts minimum.

C. Unit Cabinet:

1. The cabinet shall be affixed to factory supplied wall hanging brackets and located in the conditioned space.
2. The cabinet shall be constructed with sound absorbing foamed polystyrene and polyethylene insulation.

D. Fan:

1. The fan shall be direct-drive cross flow fan type with statically and dynamically balanced impeller with high and low fan speeds available.
2. The fan motor shall operate on 208-230 volts, 1 phase, 60 hertz with a motor requirement of 43 watts.
3. The air flow rate shall be available in high and low settings.
4. The fan motor shall be thermally protected.

- E. Filter:
 - 1. The return air shall be filtered by means of a washable long-life filter with mildew proof resin.
- F. Coil:
 - 1. Coils shall be of the direct expansion type constructed from copper tubes expanded into aluminum fins to form a mechanical bond.
 - 2. The coil shall be of a waffle louver fin and high heat exchange, rifled bore tube design to ensure highly efficient performance.
 - 3. The coil shall be a 2 row cross fin copper evaporator coil with a 17 FPI design completely factory tested.
 - 4. The refrigerant connections shall be flare connections and the condensate will be 11/16 inch outside diameter PVC.
 - 5. A thermistor will be located on the liquid and gas line to facilitate superheat control and PID temperature control logic.
- G. Electrical:
 - 1. A separate power supply will be required of 208-230 volts, 1 phase, 60 hertz. The acceptable voltage range shall be 187 to 253 volts.
 - 2. Transmission (control) wiring between the indoor and outdoor unit shall be a maximum of 3,280 feet (total 6,560 feet).
 - 3. Transmission (control) wiring between the indoor unit and remote controller shall be a maximum distance of 1,640 feet.
- H. Control:
 - 1. The unit shall have controls provided by the manufacturer to perform input functions necessary to operate the system.
 - 2. A full array of fault diagnostics shall be accessible via the wired remote controller.
 - 3. The unit shall be compatible with interfacing with connection to BACnet and LonWorks networks or interfacing with connection to FMCS system.
- I. Accessories Available:
 - 1. Replacement long-life type filter.
 - 2. Remote "in-room" controller.

The Daikin wall mounted, hard wired remote controller model BRC1E71.

2.6 VARIABLE SPEED SPLIT SYSTEM HEAT PUMP AIR CONDITIONERS

2.6.1 SYSTEM DESCRIPTION

The variable speed, heat pump air conditioning system shall be a Daikin Variable Speed Series split system. The RXTA outdoor units shall be a nominal 3 ton, 4 ton, or 5 ton direct expansion (DX), air-cooled heat pump air-conditioning system, inverter driven variable speed compressor, multi-zone split system, using R-32 refrigerant. The outdoor unit may connect an indoor evaporator capacity up to 130% to that of the outdoor condensing unit capacity.

2.6.2 HEAT PUMP FEATURES AND BENEFITS

- A. Voltage Platform – Heat pump condensing units shall be available in 208-230V/1/60 configurations.
- B. Independent Control – Each indoor unit shall use a dedicated electronic expansion valve for independent control.
- C. VFD Inverter Control – Each condensing unit shall use a high efficiency, variable speed "inverter" compressor coupled with inverter fan motors for superior part load performance. Compressor capacity shall be modulated automatically to maintain a constant suction pressure, while varying the refrigerant volume for the needs of the cooling or heating loads. Indoor units shall use PID control to control superheat to deliver a comfortable room temperature condition.
- D. Variable Refrigerant Temperature (VRT) Control – Each condensing unit shall utilize an algorithm to automatically adjust the refrigerant suction and condensing temperatures in response to the heating and cooling loads, and in response to the current weather conditions. The VRT control shall be capable of being customized in the following modes and sub-modes:

1. Automatic (factory preset) - The Automatic VRT mode shall allow the target evaporator temperature (Te) and target condensing temperature (Tc) to float based on outdoor ambient temperature conditions, and shall incorporate the following sub-modes:
 - i. Powerful
 - ii. Quick
 - iii. Mild (factory preset)
 2. High Sensible – The High Sensible mode shall allow the system Te and Tc values to be programmed to series of fixed Te and Tc values. The High Sensible mode shall also be capable of incorporating the following sub-modes:
 - i. Eco
 3. Basic – The Basic mode shall disable the VRT control of the outdoor unit and allow the system to operate with constant Te and Tc values.
- E. Flexible Design –
1. Systems shall be capable of up to 394ft (120m) of linear piping (492ft / 150m equivalent length) between the condensing unit and indoor unit.
 2. Systems shall be capable of up to 984ft (300m) total “one-way” piping in the piping network.
 3. Systems shall have a vertical (height) separation of up to 164 ft between the condensing unit and the indoor unit units.
 4. The outdoor unit shall connect an indoor evaporator capacity up to 130% of the outdoor condensing unit capacity.
- F. Simple Wiring – Systems shall use 2 wire, multi-stranded, non-shielded and non-polarized daisy chain control wiring.
- G. Space Saving – Each system shall have a condensing unit module footprint of the following dimensions: 34-1/4”H x 43-5/16”W x 18-1/8”D
- H. Advanced Diagnostics – Systems shall include a self diagnostic, auto-check function to detect a malfunction and display the type and location.
- I. Advanced Controls – Each system shall have at least one remote controller

2.6.3 QUALITY ASSURANCE

- A. The units shall be tested by a Nationally Recognized Testing Laboratory (NRTL), in accordance with ANSI/UL 60335-2-40 – Heating and Cooling Equipment and bear the Listed Mark.
- B. All wiring shall be in accordance with the National Electric Code (NEC).
- C. Each combination shall be rated in accordance with Air Conditioning, Heating and Refrigeration Institute’s (AHRI) Standard 210/240 and bear the AHRI label.
- D. The system will be produced in an ISO 9001 and ISO 14001 facility, which are standards set by the International Standard Organization (ISO). The system shall be factory tested for safety and function.
- E. The outdoor unit will be factory charged with R32.

2.6.4 DELIVERY, STORAGE AND HANDLING

Unit shall be stored and handled according to the manufacturer’s recommendations.

2.6.5 WARRANTY

STANDARD LIMITED WARRANTY

Daikin Comfort Technologies North America, Inc. warrants original owner of the non-residential building, multifamily residence, or residence in which the Daikin products are installed that under normal use and maintenance for comfort cooling and conditioning applications such products (the “Products”) will be free from defects in material and workmanship. This warranty applies to compressor and all parts and is limited in duration to ten (10) years starting from the “installation date” which is one of the two dates below:

- a. The installation date is the date that the unit is originally commissioned, but no later than 18 months after the manufacture date noted on the unit’s rating plate.
- b. If the date the unit is originally commissioned cannot be verified, the installation date is three months after the manufacture date.

2.6.6 PERFORMANCE

The RXTA system performance shall be in accordance with AHRI 210/240 test conditions as shown in the performance table below.

System	Combined with	Nominal Cooling Capacity	EER2	SEER2	Nominal Heating Capacity	Low Heating Capacity	HSPF2
		Btu/hr	95°F		Btu/hr	Btu/hr	
RXTA24AAVJU	Non-Ducted	24,000	14.80	23.3	27,000	24,600	9.6
	Ducted		11.80	16.0		23,800	8.2
RXTA36AAVJU	Non-Ducted	36,000	14.00	23.0	40,000	26,400	9.6
	Ducted		11.30	16.0		26,400	8.5
RXTA48AAVJU	Non-Ducted	48,000	12.00	20.0	52,000	34,000	9.5
	Ducted		9.00	16.0		33,600	8.5
RXTA60AAVJU	Non-Ducted	60,000	8.70	20.5	60,000	38,500	9.5
	Ducted		8.50	16.0		38,500	7.9

Performance Conditions:

Cooling: indoor temp. of 80°F DB, 67°F WB and outdoor temp. of 95°F DB.

Heating: indoor temp. of 70°F DB and outdoor temp. of 47°F DB, 43°F WB.

Equivalent piping length: 25ft

OPERATING RANGE

The operating range in cooling will be 23°F DB to 122°F DB (-5°C – 50°C).

The operating range in heating will be -5°F WB to 60°F WB (-20.5°C – 15.5°C).

Cooling mode indoor room temperature range will be 57°F-77°F WB (14°C – 25°C).

Heating mode indoor room temperature range will be 59°F-80°F DB (15°C – 26.6°C)

REFRIGERANT PIPING

The system shall be capable of refrigerant piping up to 394 actual feet (120m) or 492 equivalent feet (150m) from the outdoor unit to indoor unit, a total combined liquid line length of 984 feet (300m) piping between the condensing and indoor units, and with 164 feet (50m) maximum vertical difference between the outdoor unit and indoor units without any oil traps.

2.6.6 PRODUCTS

OUTDOOR UNIT

- A. General: The outdoor unit is designed specifically for use with VRV series components.
 1. The outdoor unit shall be factory assembled and pre-wired with all necessary electronic and refrigerant controls. The refrigeration circuit of the condensing unit shall consist of a Daikin swing compressor, motors, fans, condenser coil, electronic expansion valves, solenoid valves, 4-way valve, distribution headers, capillaries, filters, shut off valves, oil separator, service ports and suction line accumulator.
Liquid and suction lines must be individually insulated between the outdoor and indoor units.

2. The outdoor unit can be wired and piped with outdoor unit access from the left, right, rear or bottom.
 3. The connection ratio of indoor units to outdoor unit shall be permitted up to 130%.
 4. The sound pressure level standard shall be that value as listed in the Daikin engineering manual for the specified models at 3 feet from the front of the unit. The outdoor unit shall be capable of operating automatically at further reduced noise during night time.
 5. The system will automatically restart operation after a power failure and will not cause any settings to be lost, thus eliminating the need for reprogramming.
 6. The outdoor unit shall allow for side-by-side installation with minimum spacing.
 7. The following safety devices shall be included on the condensing unit; high pressure switch, low pressure sensor, control circuit fuses, crankcase heaters, fusible plug, overload relay, inverter overload protector, thermal protectors for compressor and fan motors, over current protection for the inverter and anti-recycling timers.
 8. The OD unit will shut down the compressor in the event of refrigerant leak detection at any of the connected indoor units.
 9. To ensure the liquid refrigerant does not flash when supplying to the various indoor unit units, the circuit shall be provided with a sub-cooling feature.
 10. Oil recovery cycle shall be automatic occurring 2 hours after start of operation and then every 8 hours of operation.
 11. The outdoor unit shall be capable of heating operation at 0°F dry bulb ambient temperature without additional low ambient controls.
- B. Unit Cabinet:
- The outdoor unit shall be completely weatherproof and corrosion resistant. The unit shall be constructed from rust-proofed mild steel panels coated with a baked enamel finish.
- C. Fan:
1. The condensing unit fan shall consist of propeller type, direct-drive fan motor that have multiple speed operation via a DC (digitally commutating) inverter.
 2. The fan shall be a horizontal discharge configuration with a nominal airflow maximum range of up to 3,000 CFM.
 3. Nominal sound pressure levels shall be as shown below.

Model Number	Sound Pressure Level dB(A) Cooling / Heating Modes
RXTA24AAVJU	56 / 59
RXTA36AAVJU	56 / 59
RXTA48AAVJU	56 / 59
RXTA60AAVJU	57 / 59

4. The fan motor shall have inherent protection and permanently lubricated bearings and be mounted.
 5. The fan motor shall be provided with a fan guard to prevent contact with moving parts.
- D. Condenser Coil:
1. The condenser coil shall be manufactured from copper tubes expanded into aluminum fins to form a mechanical bond.
 2. The heat exchanger coil shall be of a waffle louver fin and rifled bore tube design to ensure high efficiency performance.
 3. The heat exchanger on the condensing units shall be manufactured from Hi-X seamless copper tube.
 4. The fins are to be covered with an anti-corrosion acrylic resin and hydrophilic film type E1.

- E. Compressor:
 - 1. The Daikin inverter scroll compressor shall be variable speed (PAM inverter) controlled which is capable of changing the speed to follow the variations in total cooling and heating load as determined by the suction gas pressure as measured in the condensing unit. In addition, samplings of evaporator and condenser temperatures shall be made so that the high/low pressures detected are read every 20 seconds and calculated. With each reading, the compressor capacity shall be controlled to eliminate deviation from target value.
 - 2. The inverter driven compressor in each condensing unit shall be of highly efficient reluctance DC (digitally commutating), hermetically sealed swing type.
 - 3. Neodymium magnets shall be adopted in the rotor construction to yield a higher torque and efficiency in the compressor instead of the normal ferrite magnet type. At complete stop of the compressor, the neodymium magnets will position the rotor into the optimum position for a low torque start.
 - 4. The capacity control range shall be 14% to 100%.
 - 5. The compressor shall be equipped with a crankcase heater, high pressure safety switch, and internal thermal overload protector.
 - 6. Oil separators shall be standard with the equipment together with an intelligent oil management system.
 - 7. The compressor shall be mounted on vibration dampening rubber grommets to minimize the transmission of vibration, eliminating the standard need for external spring isolation.
- F. Electrical:
 - 1. The power supply to the outdoor unit shall be 208/230 volts, 1 phase, 60 hertz +/- 10%.
 - 2. The control voltage between the indoor and outdoor unit shall be 18VDC non-shielded, stranded 2 conductor cable.
 - 3. The control wiring shall be a two-wire multiplex transmission system, making it possible to connect multiple indoor units to one outdoor unit with one 2-cable wire, thus simplifying the wiring operation.

INDOOR MULTI_POSITION AIR HANDLING UNIT

- A. General: Basis of design Daikin indoor unit FXTA shall be a convertible floor mounted vertical, horizontal left, horizontal right, or downflow air handling unit, operable with refrigerant R32, equipped with an electronic expansion valve and direct-drive ECM type fan with constant CFM programming, for installation within a conditioned space. When installed in a vertical configuration it shall have top discharge air and bottom return air. When installed in a horizontal right or horizontal left configuration, it shall have a horizontal discharge air and horizontal return air. This compact design with pre-painted heavy-gauge steel casing shall be available in capacities from 9,500 Btu/h to 60,000 Btu/h. Computerized PID control shall be used to control superheat to deliver a comfortable room temperature condition. The unit shall be equipped with a programmed drying mechanism that dehumidifies while limiting changes in room temperature when used with Daikin remote control BRC1NRV71.
- B. Performance: Each unit's performance is based on operating conditions as scheduled on plans.
- C. Indoor Unit:
 - 1. The Daikin indoor unit FXTA_AA components shall be completely factory assembled and tested. Included in the unit is factory wiring, piping, electronic proportional expansion valve, control circuit board, fan motor thermal protector, brazed connections, self-diagnostics, auto-restart function, 3-minute fused time delay, and test run switch.
 - 2. Indoor unit and refrigerant pipes will be charged with dehydrated air prior to shipment from the factory.
 - 3. Both refrigerant lines shall be insulated from the outdoor unit.
 - 4. Return air shall be through an optional or field supplied filter.
 - 5. Condensate draining shall be made via gravity or external condensate pump.

6. The indoor unit will be separately powered with 208~230V/1-phase/60Hz.
 7. The voltage range will be 253 volts maximum and 187 volts minimum.
- D. Unit Cabinet:
1. The cabinet shall be constructed with sound absorbing, foil-faced insulation to control air leakage.
 2. Select an installation location with adequate structural support, space for service access and clearance for air return and supply duct connections.
 3. A field supplied secondary drain pan shall be installed where required by national, state, or local code.
- E. Fan:
1. The fan shall be a direct-drive Sirocco type fan, statically and dynamically balanced impeller with high and low fan speeds available.
 2. The fan motor shall operate on 208/230 volts, 1 phase, 60 hertz with a motor output range 0.2 to 1.0. HP.
 3. The airflow rate shall be available in high setting.
 4. The fan motor shall be thermally protected.
 5. Fan motor external static pressure capability up to 0.9"
- F. Filter:
1. The return air shall be filtered by means of a field supplied filter as previously specified.
- G. Coil:
1. Coils shall be of the direct expansion type constructed from aluminum tubes expanded into aluminum fins to form a mechanical bond.
 2. The coil shall be of a waffle louver fin and high heat exchange, rifled bore tube design to ensure highly efficient performance.
 3. The coils shall be a 2- to 4-row cross fin copper evaporator coil with 14 to 16 fpi design completely factory tested.
 4. The refrigerant connections shall be brazed connections and the condensate will be 3/4 inch outside diameter PVC.
 5. A thermistor will be located on the liquid and gas line.
- H. Electrical:
1. A separate power supply will be required of 208/230 volts, 1 phase, 60 hertz. The acceptable voltage range shall be 187 to 253 volts.
 2. Transmission (control) wiring between the indoor and outdoor unit shall be a maximum of 3,280 feet (total 6,560 feet).
 3. Transmission (control) wiring between the indoor unit and remote controller shall be a maximum distance of 1,640 feet.
- I. Control:
1. The unit shall have controls provided by Daikin to perform input functions necessary to operate the system.
 2. The unit shall be compatible with interfacing with a BMS system via optional LonWorks or BACnet gateways.
 3. The unit shall be compatible with a Daikin Intelligent Touch Manager advanced multi-zone controller.
- J. Optional Accessories Available:
1. Remote sensor KRCS01-6B
 2. BRC1NRV71 wireless controller.

PART 3 - EXECUTION

All equipment shall be installed strict accordance with manufacturer's instructions, maintaining all required access and service clearance.

END OF SECTION

SECTION 23 42 00-AIR PURIFICATION SYSTEM

PART 1 - GENERAL

1.1 DESCRIPTION OF WORK

- A. This section describes the design, performance and installation of an air purification system intended for use as part of another manufacturer's air handling unit or mounted on the duct as shown on the plans, details and equipment schedules.

1.2 REFERENCED CODES & STANDARDS

- A. The following codes and standards are referenced through out. The edition to be used is that currently enforced by the authority having jurisdiction (AHJ) or in absence of such direction that referenced by the current enforceable IBC code or as indicated by the contract documents, except where specifically referenced by this section of the specifications.
 - 1. ASHRAE Standards 62 & 52
 - 2. National Electric Code NFPA 70
 - 3. UL 86-2007 including ozone chamber test required as of December 21, 2007
 - 4. The cold plasma equipment and power supply shall be UL and CE listed.
 - 5. The technology shall have been tested to DO-160 by an independent lab and successfully passed all requirements for shock, vibration, EMF and line noise. Manufacturers not tested to DO-160 shall not be acceptable.

1.3 RELATED WORK

- A. Testing, Adjusting and Balancing
- B. Facility Access and Protection
- C. Ductwork
- D. Filters
- E. Water and Refrigerant Piping
- F. Electrical Wiring
- G. Control Wiring

1.4 QUALITY & IP ASSURANCE

- A. Basis of design is Global Plasma Solutions. Active Air Solutions and American Ion shall be considered equal subject to meeting all specifications herein. All other manufacturers requesting prior approval must submit product drawings, specifications and test results specified in section 2.2 at least four weeks prior to bid date and shall provide proof they are a licensed manufacturer not infringing upon patent # 9,289,779 B2. Manufacturers not having a license based on patent # 9,289,779 B2 shall not be acceptable.
- B. The Air Purification System shall be a product of an established manufacturer within the USA and shall be made of 100% USA sourced raw materials and components. Ion modules made outside the USA and assembled in the USA on mounting plates shall not be acceptable.
- C. A qualified representative from the manufacturer shall be available to inspect the installation of the air purification system to ensure installation in accordance with manufacturer's recommendation.
- D. Technologies that do not address gas disassociation such as UV Lights, Powered Particulate Filters and/or polarized media filters shall not be considered. Uni-polar ion generators shall not be acceptable. "Plasma" particulate filters shall not be acceptable. Any system containing titanium dioxide (TiO₂), which has been listed by the CDC as a known carcinogen, shall not be acceptable.
- E. Projects designed using ASHRAE Standard 62, IAQ Procedure shall require the manufacturer to provide Indoor Air Quality calculations using the formulas within ASHRAE Standard 62.1-2007 to validate acceptable indoor air quality at the quantity of outside air scheduled with the technology submitted. The manufacturer shall provide independent test data on a previous installation performed within the last two years and in a similar application, that proves compliance to ASHRAE 62 and the accuracy

of the calculations. The data shall be based on the manufacturer's use of the same make and model number as the equipment submitted on this project.

- F. The Air Purification Technology shall have been tested by UL or Intertek/ETL to prove conformance to UL 867-2007 including the ozone chamber testing and peak ozone test for electronic devices. Manufacturers that achieved UL 867 prior to December 21, 2007 and have not been tested in accordance with the newest UL 867 standard with the ozone amendment shall not be acceptable. All manufacturers requesting prior approval shall submit their independent UL 867 test data with ozone results to the engineer for preliminary review and during the submittal process. All manufacturers shall submit a copy with their quotation. Contractors shall not accept any proposal without the proper ozone testing documentation.
- G. The maximum allowable ozone concentration per the UL 867-2007 chamber test shall be 0.007 PPM. The maximum peak ozone concentration per the UL 867-2007 peak test as measured 2 inches away from the electronic air cleaner's output shall be no more than 0.0042 PPM. Manufacturers with ozone output exceeding these ozone values shall not be acceptable.

1.5 SUBMITTALS

- A. Product Data: Submit manufacturer's technical product data for ion generators including:
 - 1. Schedule of plasma generators indicating unit designation, number of each type required for each unit/application.
 - 2. Data sheet for each type of plasma generator, and accessory furnished; indicating construction, sizes, and mounting details.
 - 3. Performance data for each type of plasma device furnished.
 - 4. Indoor Air Quality calculations using the formulas within ASHRAE Standard 62.1-2007 to validate acceptable indoor air quality at the quantity of outside air Scheduled (when projects are designed with outside air reduction).
 - 5. Product drawings detailing all physical, electrical and control requirements.
 - 6. Copy of UL 867 independent ozone test.
 - 7. Statement on the manufacturer's letterhead stating that the technology contains no titanium dioxide (TiO₂).
- B. Operating & Maintenance Data: Submit O&M data and recommended spare parts lists.

1.6 PRODUCT DELIVERY, STORAGE AND HANDLING

- A. Deliver in factory fabricated shipping containers. Identify on outside of container type of product and location to be installed. Avoid crushing or bending.
- B. Store in original cartons and protect from weather and construction work traffic.
- C. Store indoors and in accordance with the manufacturers' recommendation for storage.

1.7 WARRANTY

- A. Equipment shall be warranted by the manufacturer against defects in material and workmanship for a period of eighteen months after shipment or twelve months from owner acceptance, whichever occurs first. Labor to replace equipment under warranty shall be provided by the owner or installing contractor.

PART 2 - PRODUCTS

2.1 GENERAL

- A. The air purification system(s) shall be of the size, type, arrangement and capacity indicated and required by the unit furnished and shall be of the manufacturer specified.
- B. Basis of Design: Global Plasma Solutions
- C. All other Suppliers of comparable products requesting prior approval shall:
 - 1. Submit for prior approval four weeks in advance in accordance with the requirements of Section 230500.

2. In addition, manufacturers submitting for prior approval for Bi-Polar Ionization must as part of the prior approval request provide their ASHRAE 62.1-2007 calculations that prove conformance to the ASHRAE Standard with the reduction of outside air to the scheduled values. A letter on the manufacturer's letterhead requesting prior approval must accompany the request for prior approval stating their calculations are ASHRAE compliant. A third party validation study performed on a previous installation of the same application using the same make and model equipment shall also be included.
3. Submit independent test data from ETL or UL showing ozone levels produced during the UL 867 ozone chamber test. Manufacturers without this test data shall not be acceptable.
4. Submit pathogen testing per section 2.2.
5. Submit at least two other end user references in the same application with contact phone number, email, equipment used and application for the equipment at that facility. Manufacturers not having the above references in similar applications using the same equipment models as proposed on the current project shall not be acceptable.
6. Ionization bars manufactured using DC output ionization modules shall not be permitted due to corrosion, ion short circuiting, intermittent coil coverage and shock hazard.
7. Manufacturers submitting as an alternate shall include their DO-160 test results.
8. It is the responsibility of any alternate manufacturer and mechanical contractor proposing an alternate to the basis of design to confirm any proposed substituted product does not infringe on the patented intellectual property of the basis of design. The engineer and owner recognize the basis of design holds multiple patents and multiple patents are pending.

2.2 BI-POLAR IONIZATION DESIGN & PERFORMANCE CRITERIA

- A. Each piece of air handling equipment, so designated on the plans, details, equipment schedules and/or specifications shall contain a Plasma Generator with Bi-polar Ionization output as described here within.
- B. The Bi-polar Ionization system shall be capable of:
 1. Effectively killing microorganisms downstream of the bi-polar ionization equipment (mold, bacteria, virus, etc.).
 2. Controlling gas phase contaminants generated from human occupants, building structure, furnishings and outside air contaminants.
 3. Capable of reducing static space charges.
 4. Effectively reducing space particle counts.
 5. When mounted to the air entering side of a cooling coil, keep the cooling coil free from pathogen and mold growth.
 6. All manufacturers shall provide documentation by an independent NELAC accredited laboratory that proves the product has minimum kill rates for the following pathogens given the allotted time and in a space condition:
 - A. MRSA - >96% in 30 minutes or less
 - B. E.coli - > 99% in 15 minutes or less
 - C. TB - > 69% in 60 minutes or less
 - D. C. diff - >86% in 30 minutes or less
 - E. Noro Virus -> 93.5% in 30 minutes or less

Manufacturers not providing the equivalent space kill rates shall not be acceptable. All manufactures requesting prior approval shall provide to the engineer independent test data from a NELEC accredited independent lab confirming kill rates and time meeting the minimum requirements stated in section 2.2 B, points 6A, 6B and 6C. Products tested only on Petri dishes to prove kill rates shall not be acceptable. Products being sold under different trade names than those tested shall not be acceptable.

- C. The bi-polar ionization system shall operate in a manner such that equal amounts of positive and negative ions are produced. Uni-polar ion devices shall not be acceptable. Ionizers with positive and negative output (DC type) shall not be acceptable on AHU's. All ionizers provided on AHU's and shall be AC type ionizers with one electrode pulsing between positive and negative.

1. Air exchange rates may vary through the full operating range of a constant Volume or VAV system. The quantity of air exchange shall not be increased due to requirements of the air purification system.
 2. Velocity Profile: The air purification device shall not have maximum velocity profile.
- D. Humidity: Plasma Generators shall not require preheat protection when the relative humidity of the entering air exceeds 85%. Relative humidity from 0 - 100%, condensing, shall not cause damage, deterioration or dangerous conditions within the air purification system. Air purification system shall be capable of wash down duty.
- E. Equipment Requirements for AHU's:
1. Electrode Specifications for AHU's (Bi-polar Ionization):
 - a. Each alternating current (AC) Ionization Bar with Bi-polar Ionization output shall include a minimum of sixteen 316 medical grade stainless steel ion needles per foot of coil face width shall be provided. The entire cooling coil width shall have equal distribution of ionization across the face. Systems without ion needles at least 0.75" apart shall not be acceptable. The plasma electrode shall require no more than one inch in the direction of airflow for mounting. All hardware required for mounting shall be provided by the air purification manufacturer except self tapping screws for the power supply. Bi-polar ionization tubes manufactured of glass and steel mesh shall not be acceptable due to replacement requirements, maintenance, and performance output reduction over time, ozone production and corrosion. Plasma generators and bars with recessed needles shall not be acceptable.
 - b. Electrodes shall be energized when the main unit disconnect is turned on.
 - c. The ionization output shall be a minimum of 35 million ions/cc per inch of cooling coil width as measured 1 inch from the cold plasma needles.
 - d. Ionization bars shall be provided with magnet mounting kits to prevent penetration into cooling coils.

Equipment Requirements for Fan Coils:

2. Electrode Specifications other than RTU's and AHU's (Bi-polar Ionization):
 - a. Each Plasma Generator with Bi-polar Ionization output shall include the required number of electrodes constructed from carbon fiber brushes and power generators sized to the air handling equipment capacity. A minimum of one electrode pair per 1,200 CFM (2,039 m³/h) of air flow shall be provided. Bi-polar ionization tubes manufactured of glass and steel mesh shall not be acceptable due to replacement requirements, maintenance, performance output reduction over time, ozone production and corrosion. Ion generators not using carbon fiber brushes shall not be acceptable.
 - b. Electrodes shall be energized when the main unit disconnect is turned on and the fan is operating. Ionization systems requiring the use of a mechanical air pressure switch to cycle the electrodes only when the fan is operating shall not be acceptable due to high failure rates and pressure sensitivity.
- F. Ionization Requirements:
1. Plasma Generators with Bi-polar ionization output shall be capable of controlling gas phase contaminants and shall be provided for all equipment listed above.
 - a. The Bi-polar ionization system shall consist of Bi-Polar Plasma Generator and integral power supply. The Bi-polar system shall be installed where indicated on the plans or specified to be installed. The device shall be capable of being powered by 110VAC or 200VAC to 240VAC without the use of an external transformer or intermediate power supply. Ionization systems requiring isolation transformers and supplemental power supplies shall not be acceptable.
 - b. Ionization Output: The ionization output shall be controlled such that an equal number of positive and negative ions are produced. Imbalanced levels shall not be acceptable. An LED indicator shall be provided to prove ion output is activated.

- c. Ionization output from each electrode shall be a minimum of 15 million ions/cc when tested at 2" from the ionization generator.
 - d. If scheduled, an optional control relay shall be provided to sense the ion output and indicate to the BAS via dry-contacts that the ion output is functioning normally. NO and NC contacts shall be available to the BAS system for ease of integration.
 - e. The ion generators shall be cable of mounting to the fan inlet via weather resistant double-sided tape, sheet metal screws or rare earth magnets.
- G. Air Handler Mounted Units:
 - 1. Where so indicated on the plans and/or schedules Plasma Generator(s) shall be supplied and installed. The mechanical contractor shall mount the Plasma Generator and wire it to the remote mount power supply using the high voltage cables provided by the air purification manufacturer. A 115VAC or 230VAC circuit shall be provided to the plasma generator power supply panel. Each plasma generator shall be designed with an aluminum casing, liquid tight flexible conduit and a high voltage quick connector.
- H. Plasma Requirements:
 - 1. Plasma Generators with Bi-polar ionization output shall be capable of controlling gas phase contaminants and shall be provided for all equipment listed above.
 - a. The Bi-polar ionization system shall consist of Bi-Polar Plasma Generator and power supply. The Bi-polar system shall be installed where indicated on the plans or specified to be installed. The device shall be capable of being powered by 115VAC or 230VAC without the use of an external transformer. Ionization systems requiring isolation transformers shall not be acceptable.
 - b. Ionization Output: The ionization output shall be controlled such that an equal number of positive and negative ions are produced (AC Ionizers only are acceptable). Imbalanced levels shall not be acceptable.
 - c. Ionization output from each electrode shall be a minimum of 35 million ions/cc when tested at 1" from the ionization generator. The ionization bar shall provide 35 million ions/cc per inch of bar over the entire width of the ionization bar. Bars with needles spaced further apart will not be acceptable.
 - 2. Ozone Generation:
 - a. The operation of the electrodes or Bi-polar ionization units shall conform to UL 867-2007 with respect to ozone generation.
- I. Electrical Requirements:
 - 1. Wiring, conduit and junction boxes shall be installed within housing plenums in accordance with NEC NFPA 70. Plasma Generator shall accept an electrical service of 115 VAC or 230VAC, 1 phase, 50/60 Hz. The contractor shall coordinate electrical requirements with air purification manufacturer during submittals.
- J. Control Requirements:
 - 1. All Plasma Generators shall have internal short circuit protection, overload protection, and automatic fault reset.
 - 2. AHU and RTU ionization systems shall be provided with a stand-alone, independent ion sensor designed for duct mounting to monitor the ion output and report to the BAS system that the ion device is working properly. Ion systems provided without an independent ion sensor, shall not be permitted. The control voltage to power the ion sensor shall be 12VDC or 24VAC to 240VAC and draw no more than 150mA of current. The sensor shall provide at minimum, dry contact status to the BAS and optionally a BacNet or Lonworks interface as specified on the control drawings. Manufacturers not providing a stand-alone ion sensor shall not be acceptable.
 - 3. The installing contractor shall mount and wire the Plasma device within the air handling unit specified or as shown on the plans. The contractor shall follow all manufacturer IOM instructions during installation.

4. An optional fiberglass NEMA 4X panel with Plasma On/Off Indicator Light (interfaced with stand-alone ionization detector), Ionization Output On/Off Indicator Light and an On/Off Illuminated Switch shall be provided to house the power supply, if scheduled.

PART 3 - EXECUTION

3.1 GENERAL

- A. The Contractor shall be responsible for maintaining all air systems until the owner accepts the building (Owner Acceptance).

3.2 ASSEMBLY & ERECTION: PLASMA GENERATOR

- A. All equipment shall be assembled and installed in a workman like manner to the satisfaction of the owner, architect, and engineer.
- B. Any material damaged by handling, water or moisture shall be replaced, by the mechanical contractor, at no cost to the owner.
- C. All equipment shall be protected from dust and damage on a daily basis throughout construction.

3.3 TESTING

- A. Provide the manufacturers recommended electrical tests.

3.4 COMMISSIONING & TRAINING

- A. A manufacturer's authorized representative shall provide start-up supervision and training of owner's personnel in the proper operation and maintenance of all equipment.

END OF SECTION

SECTION 23 74 35 - DEDICATED OUTSIDE AIR AND ENERGY RECOVERY PACKAGED UNITS
(DOAS-H1)

PART 1: GENERAL

1.1 SECTION INCLUDES:

- A. Packaged rooftop air conditioners

1.2 REFERENCES

- A. AFBMA 9—Load Ratings and Fatigue Life for Ball Bearings.
- B. AMCA 99—Standards Handbook
- C. AMCA 210—Laboratory Methods of Testing Fans for Rating Purposes
- D. AMCA 500—Test Methods for Louver, Dampers, and Shutters.
- E. ARI 340/360 - Unitary Large Equipment
- F. NEMA MG1—Motors and Generators
- G. National Electrical Code.
- H. NFPA 70—National Fire Protection Agency.
- I. SMACNA—HVAC Duct Construction Standards—Metal and Flexible.
- J. UL 900—Test Performance of Air Filter Units.

1.3 SUBMITTALS

- A. Shop Drawings: Indicate assembly, unit dimensions, weight loading, required clearances, construction details, field connection details, electrical characteristics and connection requirements.
- B. Product Data:
 - 1. Provide literature that indicates dimensions, weights, capacities, ratings, fan performance, and electrical characteristics and connection requirements.
 - 2. Provide computer generated fan curves with specified operating point clearly plotted.
 - 3. Manufacturer's Installation Instructions.

1.4 OPERATION AND MAINTANENCE DATA

- A. Maintenance Data: Provide instructions for installation, maintenance and service

1.5 QUALIFICATIONS

- A. Manufacturer: Company specializing in manufacturing the Products specified in this section with minimum five years documented experience, who issues complete catalog data on total product.
- B. Startup must be done by trained personnel experienced with rooftop equipment.

- C. Do not operate units for any purpose, temporary or permanent, until ductwork is clean, filters and remote controls are in place, bearings lubricated, and manufacturers' installation instructions have been followed.

1.6 DELIVERY, STORAGE, AND HANDLING

- A. Deliver, store, protect and handle products to site.
- B. Accept products on site and inspect for damage.
- C. Store in clean dry place and protect from weather and construction traffic. Handle carefully to avoid damage to components, enclosures, and finish.

PART 2 – PRODUCTS

2.1 MANUFACTURERS

- A. Basis of Design: Daikin Applied
- B. Approved Manufacturers:
 - 1. Daikin Applied
 - 2. Engineered Air
 - 3. Munters
 - 4. Aaon

2.2 GENERAL DESCRIPTION

- A. Furnish as shown on plans, Singlezone Heating and Cooling Units. Unit performance and electrical characteristics shall be per the job schedule.
- B. Configuration:
 - 1. Return plenum / economizer section
 - 2. Energy recovery wheel section
 - 3. Filter section
 - 4. Cooling coil section
 - 5. Hot gas reheat coil section
 - 6. Supply fan section
 - 7. Gas heating section
 - 8. Condensing unit section
- C. The complete unit shall be ETL/CETL listed
- D. The burner and gas train for the unit furnace shall be CETL approved.

- E. Each unit shall be specifically designed for outdoor application and include a weatherproof cabinet. Each unit shall be completely factory assembled and shipped in one piece. Packaged units shall be shipped fully charged with Refrigerant 410A and oil.
- F. The unit shall undergo a complete factory run test prior to shipment. The factory test shall include final balancing of the supply fan assemblies, a refrigeration circuit run test, a unit control system operations checkout, a unit refrigerant leak test and a final unit inspection.
- G. All units shall have decals and tags to indicate caution areas and aid unit service. Unit nameplates shall be fixed to the main control panel door. Electrical wiring diagrams shall be attached to the control panels. Installation, operating and maintenance bulletins and start-up forms shall be supplied with each unit.
- H. Performance: All scheduled EER, IEER, capacities and face areas are minimum accepted values. All scheduled amps, kW, and HP are maximum accepted values that allow scheduled capacity to be met.
- I. Warranty: The manufacturer shall provide 12-month parts only warranty. Defective parts shall be repaired or replaced during the warranty period at no charge. The warranty period shall commence at startup or six months after shipment, whichever occurs first.
- J. The manufacturer shall provide extended 60-month, parts, labor and refrigerant, warranty on the compressor.
- K. All stainless steel heat exchangers shall be warranted for a period of fifteen (15) years.

2.3 CABINET, CASING, AND FRAME

- A. Panel construction shall be double-wall construction for all panels. All floor panels shall have a solid galvanized steel inner liner on the air stream side of the unit to protect insulation during service and maintenance. Insulation shall be a minimum of 1" thick with a minimum R-value of 4.0, and shall be neoprene coated glass fiber or injected foam. Panel design shall include no exposed insulation edges. Unit cabinet shall be designed to operate at total static pressures up to 5.0 inches w.g.
- B. Exterior surfaces shall be constructed of pre-painted galvanized steel for aesthetics and long term durability. Paint finish to include a base primer with a high quality, polyester resin topcoat of a neutral beige color. Finished panel surfaces to withstand a minimum 750-hour salt spray test in accordance with ASTM B117 standard for salt spray resistance.
- C. Hinged Service doors, not access panels, shall be provided on the fan section and the filter section in order to provide user access to unit components. All service access doors shall be mounted on multiple, stainless steel hinges and shall be secured by a latch system. Removable service panels secured by multiple mechanical fasteners are not acceptable.
- D. The unit base shall overhang the support frame/platform for positive water runoff. Lifting brackets shall be provided on the unit base to accept cable or chain hooks for rigging the equipment.

2.4 SUPPLY FAN

- A. Supply fan shall be a single width, single inlet (SWSI) airfoil centrifugal fan. The fan blade design shall be a double blade with the airfoil geometry, a backward inclined blade fan wheel design will not be acceptable. The fan wheel shall be Class II construction with aluminum fan blades welded to the back plate and end rim. The supply fan shall be mounted using solid-steel shafts and wheel hubs with mating keyways
- B. The fan assembly shall have fixed pitched drives with a minimum of two belts. The drives shall be selected with a minimum diameter of 4 inches and a 1.2 service factor. The belts shall be of the grip-notch design.
- C. In lieu of belt drive fan assembly the manufacturer may utilize direct drive total enclosed ECM operated fan with speed controlled by the unit controller. The motor shall include thermal overload protection and protect the motor in the case of excessive motor temperatures. The motor shall have phase failure protection and prevent the motor from operation in the event of a loss of phase. Motors shall be premium efficiency.
- D. All fan assemblies shall be statically and dynamically balanced at the factory, including a final trim balance, prior to shipment. All fan assemblies shall employ solid steel fan shafts. Heavy-duty pillow block type, self-aligning, grease lubricated ball bearings shall be used. Bearings shall be sized to provide a L-50 life at 250,000 hours. The entire fan assembly shall be isolated from the fan bulkhead and mounted on 1" spring isolators.
- E. Belt drive fan motors shall be heavy-duty 1800 rpm open drip-proof (ODP) type with grease lubricated ball bearings. Motors shall be premium efficiency. Motors shall be mounted on an adjustable base that provides for proper alignment and belt tension adjustment. Motors shall be suitable for use with a variable frequency drive.
- F. The supply fan shall be capable of airflow modulation from 30% to 100% of the scheduled designed airflow. The fan shall not operate in a state of surge at any point within the modulation range.

2.5 ENERGY RECOVERY

- A. The unit shall be provided with an AHRI certified rotary wheel air-to-air heat exchanger in a cassette frame complete with seals, drive motor and drive belt. The energy recovery wheel shall be an integral part of the rooftop unit with unitary construction and does not require field assembly. Bolt-on energy recovery units that require field assembly and section to section gasketing and sealing are not acceptable.
- B. The wheel capacity, air pressure drop and effectiveness shall be AHRI certified per AHRI Standard 1060. Thermal performance shall be certified by the manufacturer in accordance with ASHRAE Standard 84, Method of Testing Air-to-Air Heat Exchangers and AHRI Standard 1060, Rating Air-to-Air Heat Exchangers For Energy Recovery Ventilation Equipment.

- C. The unit shall be designed with a track so the entire energy recovery wheel cassette can slide out from the rooftop unit to facilitate cleaning.
- D. The unit shall have 2" Merv 13 filters for the outdoor air before the wheel to help keep the wheel clean and reduce maintenance. Filter access shall be by a hinged access door with ¼ turn latches.
- E. The matrix design shall have channels to reduce cross contamination between the outdoor air and the exhaust air. The layers shall be effectively captured in aluminum and stainless steel segment frames that provide a rigid and self-supporting matrix. All diameter and perimeter seals shall be provided as part of the cassette assembly and shall be factory set. Drive belt of stretch urethane shall be provided for wheel rim drive without the need for external tensioners or adjustment.
- F. The total energy recovery wheel shall be coated with silica gel desiccant permanently bonded without the use of binders or adhesives, which may degrade desiccant performance. The substrate shall be lightweight polymer and shall not degrade nor require additional coatings for application in marine or coastal environments. Coated segments shall be washable with detergent or alkaline coil cleaner and water. Desiccant shall not dissolve nor deliquesce in the presence of water or high humidity.
- G. Wheels shall be provided with removable energy transfer matrix. Wheel frame construction shall be a welded hub, spoke and rim assembly of stainless, plated and/or coated steel and shall be self-supporting without matrix segments in place. Segments shall be removable without the use of tools to facilitate maintenance and cleaning.
- H. Wheel bearings shall be selected to provide an L-10 life in excess of 400,000 hours. Rim shall be continuous rolled stainless steel. Wheels shall be connected to the shaft by means of taper lock hubs.
- I. The exhaust air fan shall be a direct drive SWSI plenum fan. The exhaust fan shall be sized for the airflow requirements per the construction schedule. The unit controller shall control and modulate the exhaust fan to maintain building pressure. A VFD shall be provided for the exhaust fan motor or the exhaust fan motor shall be an ECM motor. The packaged unit shall have single point electrical power connection and shall be ETL listed.
- J. The control of the energy recovery wheel shall be an integral part of the packaged unit's DDC controller. The DDC controller shall have visibility of the outdoor air temperature, leaving wheel temperature, return air temperature, and exhaust air temperature. These temperatures shall be displayed at the packaged units DDC controller LCD display. All of these temperatures shall be made available through the BACnet interface.
- K. The unit with the energy recovery wheel shall incorporate the economizer operation. The energy recovery wheel shall have a bypass damper. When the unit is in the economizer mode of operation the energy recovery wheel shall stop and the bypass dampers shall be opened. The outdoor air shall be drawn through the bypass dampers to reduce the pressure drop of the outdoor airstream.

- L. The unit DDC controller shall provide frost control for the energy recovery wheel. When a frost condition is encountered the unit controller shall stop the wheel. When in the frost control mode the wheel shall be jogged periodically and not be allowed to stay in the stationary position.

2.6 ELECTRICAL

- A. Unit wiring shall comply with NEC requirements and with all applicable UL standards. All electrical components shall be UL recognized where applicable. All wiring and electrical components provided with the unit shall be number and color-coded and labeled according to the electrical diagram provided for easy identification. The unit shall be provided with a factory wired weatherproof control panel. Unit shall have a single point power terminal block for main power connection. A terminal board shall be provided for low voltage control wiring. Branch short circuit protection, 115-volt control circuit transformer and fuse, system switches, and a high temperature sensor shall also be provided with the unit. Each compressor and condenser fan motor shall be furnished with contactors and inherent thermal overload protection. Supply fan motors shall have contactors and external overload protection. Knockouts shall be provided in the bottom of the main control panels for field wiring entrance. A GFI receptacle shall be unit mounted. The receptacle shall be powered by a factory installed and wired 120V, 15 amp power supply, unless a separate power supply is shown on the electrical drawings.
- B. The power supply shall be wired to the line side of the unit's main disconnect, so the receptacle is powered when the main unit disconnect is off. This option shall include a GFI receptacle, 2.0 KVA transformer and a branch circuit disconnect. The electrical circuit shall be complete with primary and secondary overload protection.
- C. A single non-fused disconnect switch shall be provided for disconnecting electrical power at the unit, unless the specifications call for the disconnect switch to be provided and installed by the electrical contractor. Disconnect switches shall be mounted internally to the control panel and operated by an externally mounted handle.

2.7 HEATING AND COOLING SECTIONS

- A. The direct expansion (DX) coil section shall be installed in a draw through configuration, upstream of the supply air fan. The coil section shall be complete with a factory piped cooling coil and an ASHRAE 62.1 compliant double sloped drain pan.
- B. Direct expansion (DX) cooling coils shall be fabricated of seamless high efficiency copper tubing that is mechanically expanded into high efficiency aluminum plate fins. Coils shall be a multi-row, staggered tube design with a minimum of 3 rows and a maximum of 12 fins per inch. All units shall have a minimum of two independent refrigerant circuits and shall use an interlaced coil circuiting that keeps the full coil face active at all load conditions. All coils shall be factory leak tested with high pressure air under water.
- C. A positively sloped drain pan shall be provided with the cooling coil. The slope of the drain pan shall be in two directions and comply with ASHRAE Standard 62.1. The drain pan shall have a minimum slope of 1/8" per foot to provide positive draining. The drain pan shall extend beyond

the leaving side of the coil. The drain pan construction shall be a stainless steel design. The drain pan shall be connected to a threaded drain connection extending through the unit base. Drain pan shall be removable from the side of the unit without the removal of the cooling coil.

- D. The unit shall include a natural gas heating section. The gas furnace design shall have a natural gas fired heating module factory installed downstream of the supply air fan in the heat section. The module shall be complete with furnace controller and control valve capable of modulating operation from 100% down to 28% of full fire capacity. The heating module shall be a tubular design with in-shot gas burners. The heat exchanger tubes shall be constructed of stainless steel. The module shall have an induced draft fan that will maintain a negative pressure in the heat exchanger tubes for the removal of the flue gases.
- E. Each burner module shall have two flame roll-out safety protection switches and a high temperature limit switch that will shut the gas valve off upon detection of improper burner manifold operation. The induced draft fan shall have an airflow safety switch that will prevent the heating module from turning on in the event of no airflow in the flue chamber.
- F. The factory-installed DDC unit control system shall control the gas heat module. Field installed heating modules shall require a field ETL certification. The manufacturer's rooftop unit ETL certification shall cover the complete unit including the gas heating modules.

2.8 HOT GAS REHEAT

- A. Unit shall be equipped with a fully modulating hot gas reheat coil with hot gas coming from the unit condenser.
- B. Hot gas coil shall be an all aluminum design. The aluminum tube shall be a micro channel design with high efficiency aluminum fins. Fins shall be brazed to the tubing for a direct bond. Each condenser coil shall be factory leak tested with high-pressure air under water.
- C. Hot gas coil shall be sized to allow for full condensing across the operation range of the unit. High temperature liquid shall be piped downstream of the unit's condenser coils into the liquid line.
- D. The refrigeration circuit shall not require receivers. The hot gas coil shall be used for refrigerant storage when the unit is not operation in a dehumidification or reheat mode.
- E. The hot gas reheat option shall have a fully modulated control to allow for unit leaving air temperature control to +/- 2°.
- F. The modulating hot gas reheat systems shall allow for independent control of the cooling coil leaving air temperature and the reheat coil leaving air temperature. The cooling and reheat leaving air temperature setpoints shall be adjustable through the unit unit controller without the need for an external interface device.

2.9 FILTERS

- A. Units shall be provided with a draw-through filter section. The filter rack shall be designed to accept a 2" prefilter and a 4" final filter. The unit design shall have a hinged access door for the filter section. The manufacturer shall ship the unit with 2" MERV 13 construction filter. The contractor shall furnish and install, at building occupancy, the final set of filters and spare filters per the contract documents.

2.10 OUTDOOR / RETURN AIR SECTION

- A. Unit shall be provided with an outdoor air economizer. The economizer section shall include outdoor, return, and exhaust air dampers. The economizer operation shall be fully integral to the mechanical cooling and allow up to 100% of mechanical cooling if needed to maintain the cooling discharge air temperature. The outdoor air hood shall be factory installed and constructed from galvanized steel finished with the same durable paint finish as the main unit. The hood shall include moisture eliminator filters to drain water away from the entering air stream. The outside and return air dampers shall be sized to handle 100% of the supply air volume. The dampers shall be parallel blade design. Damper blades shall be gasketed with side seals to provide an air leakage rate of 4 cfm / square foot of damper area at 1" differential pressure per ASHRAE 90.1 Energy Standard. A barometric exhaust damper shall be provided to exhaust air out of the back of the unit. A bird screen shall be provided to prevent infiltration of rain and foreign materials. Exhaust damper blades shall be lined with vinyl gasketing on contact edges. Control of the dampers shall be by a factory installed direct coupled actuator. Damper actuator shall be of the modulating, spring return type. A comparative enthalpy control shall be provided to sense and compare enthalpy in both the outdoor and return air streams to determine if outdoor air is suitable for "free" cooling. If outdoor air is suitable for "free" cooling, the outdoor air dampers shall modulate in response to the unit's temperature control system.
- B. Damper blades shall be gasketed with side seals to provide an air leakage rate of no more than 4 cfm / square foot of damper area at 1" differential pressure per ASHRAE 90.1 Energy Standard. Leakage rate to be tested in accordance with AMCA Standard 500. Damper blades shall be operated from multiple sets of linkages mounted on the leaving face of the dampers. Single blade dampers are not acceptable.
- C. Unit shall be equipped with a low leak OA damper. OA shall enter the unit through the end of the unit and shall have hoods sized to prevent water carry over during inclement weather. Damper shall be controlled with a modulating, direct coupled actuator to allow for field adjustment of unit airflow. Damper blades shall be gasketed with side seals to provide an air leakage rate of no more than 4 cfm / square foot of damper area at 1" differential pressure per ASHRAE 90.1 Energy Standard. Leakage rate to be tested in accordance with AMCA Standard 500. Damper blades shall be operated from multiple sets of linkages mounted on the leaving face of the dampers. Single blade dampers are not acceptable.

2.11 CONDENSING SECTION

- A. Condenser coils shall be an all aluminum design. The aluminum tube shall be a micro channel design with high efficiency aluminum fins. Fins shall be brazed to the tubing for a direct bond. Each condenser coil shall be factory leak tested with high-pressure air under water. Condenser coils shall be protected from incidental contact to coil fins by a coil guard. Coil guard shall be constructed of cross wire welded steel with PVC coating.
- B. Condenser fans shall be direct drive, axial type designed for low tip speed and vertical air discharge. Condenser fan rpm shall be 1140 rpm maximum. Fan blades shall be constructed of steel and riveted to a steel center hub. Condenser fan motors shall be heavy-duty, inherently protected, three-phase, non-reversing type with permanently lubricated ball bearing and integral rain shield.
- C. Each circuit shall have fan cycling of at least one condenser fan to maintain positive head pressure. An ambient thermostat shall prevent the refrigeration system from operating below 0° F.
- D. Condenser coils shall be protected from hail damage as an integral part of the unit design. Hail guards shall be provided on all units with vertical mounted condenser coils.
- E. For units with a nominal capacity greater than fifteen (15) tons: Each unit shall have multiple, heavy-duty scroll compressors. Each compressor shall be complete with gauge ports, crankcase heater, sight-glass, anti-slug protection, motor overload protection and a time delay to prevent short cycling and simultaneous starting of compressors following a power failure. Compressors shall be isolated with resilient rubber isolators to decrease noise transmission
- F. For units with a nominal capacity greater than fifteen (15) tons: Each unit shall have two independent refrigeration circuits. Each circuit shall be complete with a low pressure control, filter-drier, liquid moisture indicator/sight-glass, thermal expansion valve, and a manual reset high pressure safety switch. The thermal expansion valve shall be capable of modulation from 100% to 25% of its rated capacity. Sight-glasses shall be accessible for viewing without disrupting unit operation. Each circuit shall be dehydrated and factory charged with Refrigerant 410A and oil.
- G. For units less than fifteen (15) nominal tons and less: The unit shall have scroll compressors. One of the compressors shall be an inverter compressor or digital scroll providing proportional control. The unit controller shall control the speed of the compressor to maintain the discharge air temperature.

2.12 CONTROLS

- A. Provide a complete integrated microprocessor based Direct Digital Control (DDC) system to control all unit functions including temperature control, scheduling, monitoring, unit safety protection, including compressor minimum run and minimum off times, and diagnostics. This system shall consist of all required temperature sensors, pressure sensors, controller and keypad/display operator interface. All microprocessors, controllers and sensors shall be factory mounted, wired and tested.

- B. The stand-alone DDC controllers shall not be dependent on communications with any on-site or remote PC or master control panel for proper unit operation. The microprocessor shall maintain existing set points and operate stand-alone if the unit loses either direct connect or network communications. The microprocessor memory shall be protected from voltage fluctuations as well as any extended power failures. All factory and user set schedules and control points shall be maintained in nonvolatile memory. No settings shall be lost, even during extended power shutdowns.
- C. If a DDC control system is utilized, it shall permit starting and stopping of the unit locally or remotely. The control system shall be capable of providing a remote alarm indication. The unit control system shall provide for outside air damper actuation, emergency shutdown, remote heat enable/disable, remote cool enable/disable, heat indication, cool indication, and fan operation.
- D. All digital inputs and outputs shall be protected against damage from transients or incorrect voltages. All field wiring shall be terminated at a separate, clearly marked terminal strip.
- E. The DDC controller shall have a built-in time schedule. The schedule shall be programmable from the unit keypad interface. The schedule shall be maintained in nonvolatile memory to insure that it is not lost during a power failure. There shall be one start/stop per day and a separate holiday schedule. The controller shall accept up to sixteen holidays each with up to a 5-day duration. Each unit shall also have the ability to accept a time schedule via BAS network communications.
- F. The keypad interface shall allow convenient navigation and access to all control functions. The unit keypad/display character format shall be 4 lines x 20 characters. All control settings shall be password protected against unauthorized changes. For ease of service, the display format shall be English language readout. Coded formats with look-up tables will not be accepted. The user interaction with the display shall provide the following information as a minimum:
 - 1. Return air temperature
 - 2. Discharge air temperature
 - 3. Outdoor air temperature
 - 4. Space air temp
 - 5. Dirty filter indication
 - 6. Airflow verification
 - 7. Cooling status
 - 8. Control temperature (Changeover)
 - 9. Cooling status/capacity
 - 10. Unit status
 - 11. All time schedules
 - 12. Active alarms w/time and date
 - 13. Previous alarms with time and date
 - 14. Optimal start
 - 15. System operating hours
 - a. Fan
 - b. Exhaust fan
 - c. Cooling
 - d. Individual compressor

- e. Heating
 - f. Economizer
 - g. Owner override
- G. The user interaction with the keypad shall provide the following setpoints as a minimum:
- 1. Controls mode
 - a. Off manual
 - b. Auto
 - c. Heat/cool
 - d. Cool only
 - e. Heat only
 - f. Fan only
 - 2. Occupancy mode
 - a. Auto
 - b. Occupied
 - c. Unoccupied
 - d. Tenant override
 - 3. Unit operation changeover control
 - a. Return air temperature
 - b. Space temperature
 - 4. Cooling and heating change-over temperature with deadband
 - 5. Cooling discharge air temperature (DAT)
 - 6. Supply reset options
 - a. Return air temperature
 - b. Outdoor air temperature
 - c. Space temperature
 - 7. Temperature alarm limits
 - a. High supply air temperature
 - b. Low supply air temperature
 - c. High return air temperature
 - 8. Lockout control for compressors
 - 9. Compressor interstage timers
 - 10. Night setback and setup space temperature
 - 11. Building static pressure
 - 12. Economizer changeover
 - a. Enthalpy
 - 13. Tenant override time
 - 14. Occupied/unoccupied time schedule
 - 15. One event schedule
 - 16. Holiday dates and duration
 - 17. Service mode
 - a. Timers normal (all time delays normal)
 - b. Timers fast (all time delays 20 sec)
- H. Units shall have night setback or setup function, a space sensor shall be provided. Space sensors shall be provided to support field selectable features. Sensors shall include:

1. Zone sensor with override switch plus digital heating and cooling set point adjustment with LED display.
 - I. The unit exhaust fan shall maintain the space pressure relative to the adjacent space with direct space pressurization control. Each room shall be provided with an occupancy sensor to put the equipment in the unoccupied mode of operation. When the occupancy sensor is enable i.e. people are in the room, the minimum on time shall be two (2) hours (adjustable).
 - J. The temperature and humidity sensor shall properly stage/modulate the heating and cooling to maintain the discharge air temperature and humidity.
 - K. In all cases, in the unoccupied mode, the low leak outside air and exhaust dampers, shall be closed.

END OF SECTION

SECTION 26 00 00 – COMMON WORK RESULTS FOR ELECTRICAL

PART 1 - GENERAL

1.1 GENERAL REQUIREMENTS

- A. Perform all work in strict accordance with the requirements and recommendations stated in the below list of codes and on these plans except when requirements are modified by the contract documents. Provide a complete and properly operating electrical system.
- B. Perform all work per, but not limited to, the latest version of the following standards: NECA (standards for installation), NFPA, National Electric Code (NEC), all applicable State and Local Codes and Ordinances, OSHA Standard 2207 – Construction Industry Standard, and OSHA 29 CFR 1926 - Regulation of Excavation.
- C. All materials and components furnished under this contract shall be UL listed and approved for the purpose intended. Additionally, they shall be new, free from defects of any kind and of the quality and design hereinafter specified and as required.
- D. It shall be the contractor's responsibility to obtain all necessary applicable manufacturer's instructions and install all products in accordance with the manufacturer's instructions. It shall be the Contractor's responsibility to install all equipment, materials, and devices shown on the plans and as called out in these specifications even if manufacturer's instructions are absolutely unattainable.
- E. This Contractor shall keep a set of plans on the job, noting daily all changes made in connection with the final installation including exact dimensioned locations of all new and existing switchgear, devices, luminaires, equipment and new or existing site utilities and lights.
- F. The Contractor will examine the site, verify all requirements, service points, and availability of all services required to complete this project. No consideration will be granted for any alleged misunderstanding of the materials and labor to be provided as necessitated by nature of the site including those items which may be fairly implied as essential to the execution and completion of any and all parts of this project. All proposals shall take these existing conditions into consideration and the lack of specific information on the Drawings shall not relieve the Contractor of any responsibility. Verify location and check for existing underground utilities and lines before ditching.
- G. Work must be performed by workmen skilled in their trade. The installation must be complete whether the work is concealed or exposed.
- H. Conceal electrical work in walls, floors, chases, under floors, underground and above ceilings. Branch circuits shall not be installed in the slab or under the slab unless shown or required on the Drawings.
- I. All equipment shall be new. Refurbished or used equipment will not be allowed.

1.2 GENERAL REQUIREMENTS TO SUPPORT OTHER TRADES

- A. Throughout the project, the Electrical Contractor shall coordinate installation of all portions of the electrical system with the General Contractor, Mechanical, Plumbing, Communications and other Contractors to insure a complete working system for the Owner.
- B. This contractor shall coordinate and provide all conduit and back boxes required for other trades.

- C. All conduit and boxes for thermostats and/or sensors shall be provided by this contractor. A thermostat or sensor junction box and 1/2" conduit to accessible attic and/or to corridor shall be provided for each room served with HVAC equipment. Coordinate with Division 23 for exact locations and requirements.
- D. Unless otherwise indicated on the Drawings, all contactors, relays, motor starters, and any other control devices and control wiring (other than line-voltage) required for HVAC / Mechanical control equipment shall be provided by the Mechanical Contractor. Electrical Contractor shall provide all control wiring operating at line-voltage.

1.3 WARRANTY

- A. This Contractor shall warranty all work against defective materials and workmanship for a period of one year from and after date of acceptance of the installation by the Owner.

1.4 SUBMITTALS

- A. This contractor shall provide electronic submittals on all devices and equipment used on this project. They shall be provided in PDF format. Paper submittals will be rejected. Submittals to include the manufacturer, model / series, and list all required accessories for a complete system.
- B. Provide shop drawings for the following items: panelboards, luminaires and battery packs, lighting control system, motor starters and safety switches.

1.5 EXISTING CONDITIONS

- A. Verify existing field measurements, circuiting arrangements, wiring and equipment served in areas as shown on the Drawings. Adjust all circuiting, wiring and materials to be provided as required by job conditions. Verify abandoned wiring and equipment serving only abandoned facilities. These construction documents are based on casual field observation and existing record documents. Report discrepancies to the Engineer before disturbing existing installation. The Contractor accepts the existing conditions when beginning demolition.
- B. Provide temporary wiring and connections to maintain required existing systems in service during construction. When work must be performed on energized equipment or circuits, use personnel experienced in such operations. Verify phasing on existing equipment and coordinate new phasing before energizing revised service.

PART 2 - PRODUCTS

2.1 CONDUCTORS AND WIRING

- A. Conductors shall be manufactured in the United States by Encore, Southwire, Cerro or General Cable. Minimum wire size shall be #12. Wire sizes #12 and #10 shall be solid and larger sizes may be stranded.
- B. All feeders and branch circuit conductors shall be soft-drawn annealed copper / aluminum rated for at least 600V. The insulation for branch circuit conductors shall be type THWN-2 or THHN/THWN or better. The insulation for service entrance and feeder conductors shall be type XHHW or better.

2.2 GROUNDING AND BONDING

- A. Comply with NEC 250 for sizes and quantities of equipment grounding conductors, except where larger sizes or more conductors are indicated.

2.3 CONDUIT, FITTINGS AND BACK BOXES

- A. All conduit and fittings shall be provided of the proper type and installed using methods per NEC. Acceptable conduit types include PVC, EMT and Rigid Galvanized. MC Cable is / is NOT allowed on this project.

2.4 IDENTIFICATION AND LABELLING

- A. All labeling on equipment (panels, switchgear, transformers, disconnects, etc.) shall be black melamine plastic laminate with white engraving and affixed with permanent stainless steel fasteners.

2.5 TIME SWITCHES AND TIME CLOCKS

- A. At all water heaters, provide Tork Model EH10/20 Digital Control Clock or approved equal. Consult Owner for schedule.
- B. For all exterior lighting, provide Intermatic Inc. #ET Series (Astro type). See lighting controls detail for schedule.

2.6 CONTACTORS

- A. Contactors shall be from the same manufacturer as the panelboards and switchgear where possible.
- B. Provide NEMA 1 for interior and NEMA 4 for exterior installations.
- C. Contactors shall be electrically-held unless otherwise noted on the Drawings.
- D. Lighting contactors shall be mechanically-held unless otherwise noted on the Drawings. All contactors shall be installed in groups in NEMA 1 enclosures and shall be sized as needed for the application.

2.7 LIGHTING CONTROLS

- A. A non-networked distributed lighting control system is required. Relay panels are not acceptable unless otherwise noted on the Lighting Control Chart. Battery operated devices and controls are not acceptable.
- B. The system shall include all required devices for a complete and proper operating system to automatically control the lighting to meet the intent of the locally adopted version of the IECC. The system may include but not be limited to motion sensors, room controllers, low voltage control wiring, photocells, smart switches, intelligent luminaires and all required back boxes and appurtenances.
- C. In the event of a hardware, software or component failure, the lighting control system shall drive the luminaires in the affected spaces to 100% light output.
- D. Motion Sensors and Photocells: Provide the quantity of motion sensors and photocells required for complete and proper coverage without gaps within the range of coverage of controlled areas. Rooms shall have 100% coverage to completely cover the controlled area to accommodate all occupancy habits of single or multiple occupants at any location within the room. The locations and quantities of sensors shown on the Drawings are diagrammatic and indicate only rooms that are to be provided with sensors. Provide additional sensors if required to properly and completely cover the respective room. Proper judgment must be exercised in executing the work so as to ensure the best possible installation in the available space and to overcome local difficulties due to space limitations or interference of structural components. All motion sensors shall be dual technology and are to be corner (preferred) or ceiling mounted except in single toilets or small closets (40sqft) or unless otherwise indicated on the Drawings.
- E. Provide a five-year parts and one-year labor warranty on the entire control system. Warranty coverage shall begin at the time of project substantial completion.
- F. Approved manufacturers are Acuity nLight Controls, Current NX Controls, Intelligent Lighting Controls, Leviton, and Lutron.

- G. Refer to Luminaire Schedule and Lighting Controls Chart for more information.

2.8 SERVICE ENTRANCE

- A. Provide products matching the brand of the panels and transformers where possible.
- B. All products provided shall be rated for the application and environment in which they are being installed and used.

2.9 PANELBOARDS AND SWITCHBOARDS

- A. Panelboard and switchgear shall be from Square-D, Siemens, ABB(GE) or Eaton (CH).
- B. All panelboards and switchgear shall include a neutral bus, ground bus and shall have copper / aluminum bussing, and a hinged lockable door. Each panelboard and switchgear enclosure shall be NEMA rated for the environment it is installed.
- C. Provide circuit breakers unless the Drawings indicate that fused switches are required. All circuit breakers shall be bolt-in type, Quick-make, quick-break. Manual and automatic operation. Trip free and trip indicating. All circuit breakers shall be capable of field-installable shunt trip, ground fault shunt-trip or under voltage trip.
- D. Provide ground fault circuit breakers (GFCI) where indicated on the plans, panel schedules and as required by NEC 422.5, 210.8(B), etc. Provide protection at all EWCs, vending machines, kitchen equipment, concessions equipment, etc. Re-pull separate neutrals to circuits as required to ensure correct GFCI operation.
- E. Switchboards rated 2,000 amps or greater shall have a minimum depth of 30".
- F. Provide a surge protective device at the main switchgear equivalent to Square-D SDSA series at all new services larger than 400A.
- G. Provide and install all required labels and applicable marking on all service entrance equipment and electrical panels per NEC Article 110.

2.10 BREAKER COORDINATION STUDY

- A. For any project where service entrance equipment is added or changed, this contractor shall provide a breaker coordination study for the entire system and shall make adjustments so all breakers are properly coordinated.
- B. For any project where electrical panels are added or changed but the service entrance equipment is not changed, this contractor shall provide a breaker coordination study for the service entrance equipment and all affected panels and shall make adjustments so all breakers are properly coordinated.

2.11 WIRING DEVICES

- A. All devices shall be UL Listed, spec grade or hospital grade, rated at 20A or greater at 120/277Vac and manufactured by Leviton, Hubbell, Eaton, Bryant, Wiremold or P&S. Commercial grade or residential grade devices will not be accepted.
- B. Provide factory fabricated wiring devices of the type and electrical rating for the service indicated, provide proper selection to fulfill the wiring requirements. Wiring devices (receptacles, special purpose outlets, switches, etc.) shall be colored to match wall plates.
- C. In all finished spaces, use smooth nylon / stainless steel device plates and covers. Device and device plate color to be white, except as otherwise indicated or required by code. Provide oversize plates where

required to completely cover wall opening. Where oversize plates are used, all plates in room shall be oversize style.

- D. All receptacle covers used outside shall be in accordance with NEC 406.8.
- E. Provide tamper resistant outlets in all spaces in accordance with NEC 406.12.
- F. Motor rated switches shall be heavy duty, oil-tight, water-tight, 600V and be installed everywhere switching controls are required or mentioned on the Drawings.

2.12 FUSES

- A. All fuses shall be manufactured by Bussman, Littlefuse or Mersen and shall be Class RK-1 dual element, time delay. (No Exceptions)
- B. Fuses at service entrance shall be Class R minimum.
- C. Prior to ordering fuses or fuse holders, coordinate fuse ratings with the mechanical contractor to verify that fuses for HVAC equipment matches the MOCP values of the HVAC equipment being provided.

2.13 ENCLOSED SAFETY SWITCHES AND DISCONNECTS

- A. Safety switches and disconnects shall be from the same manufacturer as the panelboards and switchgear where possible and shall be UL listed for the application and environment.
- B. In accordance with the service indicated, use 240 or 600 volt switches, single throw, fusible, horsepower rated, 100% load break and make rated, designed for locking in "ON" or "OFF" position, in code gauge steel cabinets, as required by the application and the NEC.
- C. Provide NEMA 1 enclosures indoors and NEMA 3R Heavy Duty enclosures outdoors (or where otherwise required).

2.14 GROUND FAULT PROTECTION

- A. Ground fault protection shall be from the same manufacturer as the panelboards and switchgear and shall be UL listed.
- B. Provide ground fault protection (GFPE) at all service entrance equipment and any other location mentioned in the Drawings, in accordance with 2020 NEC 230.95 Ground Fault Protection of Equipment.

2.15 SURGE PROTECTION DEVICES (SPDS)

- A. SPDs shall be manufactured by ACT Communications, Eaton, Emerson ABB, Mersen, Square-D or SSI.
- B. Provide UL rated SPD protection where indicated on the Drawings. Protection shall be of the MOV type with at least seven mode protection (L-N, L-G, N-G) with discrete protection elements on each mode. SPD shall be tested and performance rated per UL1449.
- C. Provide SPDs at service entrance with SCCR: 200kAIC and shall be rated for a nominal discharge current: 20kA and have a maximum single impulse current rating: 100kA/mode and 200kA/phase.
- D. SPDs at all other panelboards shall have be SCCR: 100kAIC and shall be rated for a nominal discharge current: 20kA and have a maximum single impulse current rating: 50kA /mode and 100kA/phase
- E. SPDs at rooftop units and condensers shall be in a NEMA 4X enclosure, nipple-mounted (preferred), suitable for outdoor installation and have SCCR: 100kAIC and shall be rated for a nominal discharge current: 10kA and have a maximum single impulse current rating: 50kA/phase.

2.16 LIGHTING

- A. Only those manufacturers of luminaires listed on the Luminaire Schedule are acceptable.
- B. All luminaires shall be LED, spec-grade quality, UL listed, Energy Star or DLC approved, 80 CRI minimum, 10% THD, minimum L70 rating of 50,000 hours, lumen output tolerance of +/-8% and VA tolerance of +5% / -10%, dimmable to 10% unless otherwise noted and have a five-year complete system warranty.
- C. Emergency battery packs shall be factory installed. All emergency luminaire troffers shall operate at 1400 lumen or greater output for at least 90 minutes. All battery backups installed in exterior luminaires shall be rated for damp location and rated to operate at 32°F.
- D. LED exit signs shall be rated for at least ten-years, provided with maintenance free batteries good for at least 90 minutes, provided with status indicator lamp and test switch and UL tested and approved with 100'-0" visibility.
- E. Luminaires and exit signs in gyms, play areas, multipurpose spaces, etc. shall have a wire guard.

PART 3 - INSTALLATION, TESTING AND COMMISSIONING

3.1 CONDUCTORS AND WIRING

- A. Provide a separate neutral conductor for each circuit. Multiple circuits shall not share a common neutral. Neutral conductors shall be sized as large as the phase conductors. Neutral conductors shall not be of a reduced size.
- B. There shall be no more than three current carrying conductors in each conduit run. For three-phase balanced loads, the neutral need not be included in this requirement.
- C. The insulation of each feeder run and each branch circuit shall be tested with a megger. The test shall be performed after the conductors have been pulled into the conduit and after terminations have been added, but before final connections are made.
- D. All wiring, regardless of voltage, shall be enclosed in conduit or raceway in all exposed areas such as gymnasium, shops, stages, or similar locations.

3.2 GROUNDING AND BONDING

- A. Provide grounding and bonding per NEC, ANSI/IEEE 142 - Recommended Practice for Grounding of Industrial and Commercial Power Systems and ANSI/UL 467 - Safety Standard for Grounding and Bonding Equipment.
- B. All outdoor and below grade grounding connections shall be exothermic cadweld or thermoweld connected. No exceptions.
- C. Grounding resistance values shall be tested and must meet or exceed the following: Equipment rated at 500kVA or less = 10 ohms or less to ground and Equipment grounds shall be 25 ohms or less to ground.

3.3 CONDUIT, FITTINGS AND BACK BOXES

- A. Conduit shall NOT be used as the means of grounding. Provide a grounding electrode conductor in all feeder and branch circuit conduits sized per NEC.
- B. Apply fire caulking as required. All conduits shall be internally sealed on each end as required by the NEC.

- C. Wherever possible and unless otherwise indicated on the Drawings, install conduit concealed in walls, partitions and above the ceiling. Install conduit exposed in ceiling area at the structure in electrical rooms, mechanical rooms and other rooms where ceilings are not present or scheduled. All conduits and back boxes shall be installed per NEC.
- D. Mounting height of a wall-mounted outlet box means the height from finished floor to bottom of box. Install and support boxes per NEC 314-23 as required and as directed.
- E. Exterior conduits and conduit risers above grade shall be rigid galvanized.
- F. Leave a pull-wire in all empty conduits.

3.4 IDENTIFICATION AND LABELLING

- A. Provide all proper identification, labeling and signs for equipment, devices, etc. including values and conditions as shown on Drawings and as required by NEC.

3.5 FEEDER TESTING

- A. Provide testing on all feeders and grounding per manufacturer's printed testing procedures, applicable industry standards, ANSI standards, IEEE standards, NEMA standards and as directed by the Engineer. Provide testing equipment in good working order and which complies with the applicable industry standards and manufacturer's requirements. Include a list of testing equipment used and date of last calibration.

3.6 SERVICE ENTRANCE

- A. All underground primary and secondary conduits: Provide schedule 40 PVC with PVC coated rigid metal long sweep elbows. Minimum cover shall be 24 inches from finished grade to top of highest conduit or power utility company requirements, whichever is greater. No trench shall exceed 58 inches in depth. Encase conduits in concrete extending 3 inches in all directions beyond the conduit's perimeter. Install a pull wire and cap all conduits at both ends until the conductors are installed. Provide red or yellow plastic identification tape no more than 1'-0" below grade with the following wording: "Caution - Buried Conduit" or reasonable facsimile over the entire length of the pipe ditch.
- B. Underground Primary: Provide two 4" conduits from the power utility company service point to pad-mounted transformers. Primary conductors will be provided by the power utility company. Coordinate exact location of service point with the power utility company.
- C. Pad-mounted Transformer: Construct the transformer pad in accordance with the power utility company specifications. Coordinate with the power utility company before installation of concrete for exact size, location and all requirements. The transformer will be provided by the power utility company.
- D. Secondary Enclosure: Coordinate with the power utility company and provide a secondary enclosure where required to transition from the transformer output to the service entrance feeder. Construct the pad for the secondary enclosure. Provide all conduit, wire, and terminations between the transformer and the secondary enclosure.
- E. Underground Service Entrance: Provide all trenching, conduit, conductors and electrical equipment from the secondary terminals of the transformer/secondary enclosure to the main service disconnects.
- F. Overhead Service Entrance: Provide all conduit, conductors, supports, weather heads, and sleeving from the electric service point to the main service disconnects.
- G. Metering: Provide conduits, conductors, cabinets, racks, transocket, and supports as required by the power utility company for service metering. All utility metering equipment will be provided by the power utility company.

- H. Final Connection: Arrange for and provide final connection by the power utility company.

3.7 PANELBOARDS AND SWITCHBOARDS

- A. More than one conductor shall not be installed in any termination in a panelboard unless the termination is marked as suitable for more than one conductor.
- B. Provide typewritten circuit directories with clear plastic protectors in all panels. Directory entries must clearly identify each circuit uniquely from another per NEC 408.4.

3.8 BREAKER COORDINATION AND ARC FLASH ANALYSIS

- A. Provide a breaker coordination study and arc flash study on all projects per Part 2 above.

3.9 WIRING DEVICES

- A. Mount all devices between 18" AFF (from the bottom of the backbox) to 46" AFF (to the top of the backbox). Receptacles to be at 18" AFF and switches/controls to be at a maximum of 46" AFF unless otherwise noted on the Drawings.

3.10 LIGHTING AND CONTROLS

- A. Install all luminaires and controls according to manufacturer's requirements and NEC requirements.
- B. Sensors in spaces shall be installed per manufacturer shop drawings for proper coverage.
- C. Upon completion of testing and adjustment (factory representative commissioning), Contractor and a direct employee of the equipment manufacturer (who is already familiar with the details of the project) shall demonstrate operation, proper maintenance, troubleshooting and adjustment of the lighting control system and all sensors throughout the building. Owner shall receive a minimum of 4 hours and a maximum of 8 hours in an on-site training session. The date, time, location and length of the training session shall be at the discretion of Owner.

END OF SECTION

SECTION 26 05 05 - SELECTIVE DEMOLITION FOR ELECTRICAL

PART 1 - GENERAL

1.1 GENERAL REQUIREMENTS

- A. Selective demolition of electrical and lighting systems and equipment and the off-site removal of the portions of those systems and equipment not reused, in a code-compliant and lawful manner.

PART 2 - PRODUCTS

2.1 NOT APPLICABLE.

PART 3 - EXECUTION

3.1 ELECTRICAL EXAMINATION

- A. Verify existing field measurements, circuiting arrangements, wiring and equipment served in areas as shown on the Drawings. Adjust all circuiting, wiring and materials to be provided as required by job conditions.
- B. The Contractor accepts all existing conditions when beginning demolition, whether or not those conditions are reflected in the Contract Documents.

3.2 LIGHTING EXAMINATION

- A. Emergency interior and exterior lighting: If the unswitched phase conductor needed for proper operation does not exist, provide a new unswitched phase conductor to each luminaire as needed for proper operation. The unswitched phase conductor must come from the same branch circuit that powers the luminaire.

3.3 PREPARATION

- A. Provide temporary wiring and connections to maintain required existing systems that must remain operational during construction.

3.4 DEMOLITION OF EXISTING ELECTRICAL

- A. Where demolition of equipment or materials is required, this Contractor shall minimize cutting and exercise all due caution to leave undamaged surfaces, material and equipment meant to remain.
- B. Disconnect and remove all unused or abandoned wiring, devices, conduits, panels and distribution equipment back to source, unless otherwise specified in the drawings. Mark all unused breakers and fused switches as spares and turn them off.
- C. Mark all unused breakers and fused switches as spares and turn them off.
- D. When luminaires, receptacles, switches, conduits or similar are removed and the location is not reused, patch all unused floor, wall and ceiling back boxes, penetrations or similar openings to match the existing surfaces and maintain existing fire ratings.

3.5 EXTENSION / EDITING OF EXISTING ELECTRICAL

- A. Where existing circuits are edited or existing equipment is partially removed, extend / repair existing circuits to ensure all devices and equipment that are not intended to be removed remain in place and are fully operational.
- B. Install identification on all existing unmarked equipment to remain in accordance with Section 26 05 53 - Identification for Electrical Systems. Replace all lost nameplates, labels or markers.

3.6 RE-INSTALLATION

- A. Install all relocated materials and equipment under the provisions of Divisions 01 and 26.

END OF SECTION

SECTION 26 05 19 - LOW VOLTAGE ELECTRICAL POWER CONDUCTORS AND CABLES

PART 1 - GENERAL

1.1 GENERAL REQUIREMENTS

- A. This section includes conductors for power circuits, including terminations and connectors.

1.2 SUBMITTALS

- A. Submittals required in this section shall conform to and be submitted in accordance with the General Conditions, Division 01, and Division 26.

PART 2 - PRODUCTS

2.1 MANUFACTURERS

- A. Conductors shall be manufactured in the United States. Acceptable manufacturers are:
 - 1. Alan Wire, Cerrowire, Encore Wire, General Cable, Republic Wire, and Southwire

2.2 MATERIALS

- A. All feeders to be soft-drawn annealed copper.
- B. All branch circuit conductors shall be soft-drawn annealed copper.
- C. Aluminum is permissible ONLY where specifically indicated on the Drawings. Aluminum used shall be AA-8xxx rated and compact stranding is preferred.

2.3 MANUFACTURED UNITS

- A. Manufactured Power Circuit Conductors:
 - 1. Conductors for shall be rated for at least 600 volts and 90°C. No exceptions.
 - 2. Conductor insulation shall be type THHN / THWN-2 or XHHW-2.
 - 3. All conductors shall be #12 AWG or larger.
 - 4. Conductors that are #8 AWG and larger shall be stranded. Conductors that are #12 AWG and #10 AWG may be stranded if crimp on fork terminals are used for device terminations. Otherwise, #12 AWG and #10 AWG shall be solid conductors. Never place bare stranded conductors directly under device screws.

PART 3 - EXECUTION

3.1 INSTALLATION

- A. More than one conductor shall not be installed in any termination unless the termination is marked as suitable for more than one conductor.
- B. Wire Sizing: Provide conductors sized as indicated on Drawings. Where sizing is unclear or has been omitted, provide conductors with an ampacity at least as large as the ampacity of the load and provide an overcurrent protection device sized as large as the ampacity of the conductors. In such cases, notify the Engineer before installation for size verification.

- C. Voltage Drop: The intent of the drawings is to limit the voltage drop from the service entrance conductors to each branch circuit to less than 5%. The electrician is responsible to ensure proper voltage drop values are maintained as mentioned here and mentioned in the NEC.
- D. Neutral Conductors: Provide a separate neutral conductor for each feeder or branch circuit. Multiple circuits shall not share a common neutral. Neutral conductors shall be sized as large as the phase conductors. Neutral conductors shall not be of a reduced size.
- E. Equipment Grounding Conductors: Provide equipment grounding conductors in accordance with Section 26 05 26 - Grounding and Bonding for Electrical Systems.
- F. Number of Current Carrying Conductors (CCC) per conduit:
1. #12 Wire - no more than six (6) CCCs in a single conduit.
 2. #10 Wire - no more than nine (9) CCCs in a single conduit.
 3. ELSE - no more than three (3) CCCs in a single conduit.
 4. Regarding #12 and #10 wire above (ONLY #1 and #2 above), when more than three (3) CCCs are in a single conduit, the electrician is responsible for derating the available ampacity of the current carrying conductors per NEC and provide calculations to the Engineer, when requested. If any derating results in a conductor ampacity lower than the load for the circuit, all conductors must be removed and repulled in separate conduits to eliminate the derating. No exceptions.
- G. Installation in Raceways:
1. All conductors shall be installed in a raceway.
- H. Terminations:
1. Use compression (crimp) or mechanical (screw set) type lugs or connectors for all terminations or splices of stranded conductors. See 26 05 26 Grounding and Bonding where thermal welding may be used.
 2. Use ring tongue type terminators on all control wiring.
 3. Conductive antioxidant shall be applied on all connections per manufacturer's instructions, regardless of conductor material.
- I. Splices:
1. Where splices are required, they shall be in a box or enclosure. Splices within a conduit run are not acceptable.
- J. Color Coding:
1. Provide factory colored insulated conductors for #6 AWG and smaller.
 2. If existing wiring in renovation or addition work has a consistent color coding, then match the existing and note in record documents. Otherwise, colors shall be as follows:
- | Line | 208/120V | 240/208V 1ph | 240/120V | 480/277V |
|-----------|---------------|----------------|----------------|----------------|
| A | Black | Black | Black | BROWN |
| B | Red | n/a | Orange | ORANGE |
| C | Blue | Red | Blue | Yellow |
| Neutral | White | White | White | Gray |
| Ground | Green | Green | Green | Green |
| Isol Grnd | Green +Yellow | Green + Yellow | Green + Yellow | Green + Yellow |
- K. Identification: All conductors in a panelboard shall be identified by means of tags or tape.

3.2 SITE TESTS

- A. Perform in accordance with manufacturer's printed testing procedures, applicable industry standards, ANSI standards, IEEE standards, and NEMA standards. Provide calibrated testing equipment in good working order and which complies with the above requirements. The below test shall be performed after the conductors have been pulled into the conduit and after terminations have been added, but before final connections are made. Document all readings and testing and make documentation available to Owner upon request.
- B. Feeder Insulation Test: The insulation of new service entrance conductors and each new feeder run shall be tested using a megger. Readings must indicate not less than one (1) megohm to be acceptable.
- C. Branch Circuit Insulation Test: The insulation of each new branch circuit shall be tested using an ohm meter. Readings must indicate not less than one (1) megohm to be acceptable.

END OF SECTION

SECTION 26 05 26 - GROUNDING AND BONDING FOR ELECTRICAL SYSTEMS

PART 1 - GENERAL

1.1 GENERAL REQUIREMENTS

- A. Grounding and bonding shall include the solid grounding of the various electrical systems and equipment and the proper bonding of all electrical system components and equipment to meet NEC 250 and all other applicable NEC sections, codes, and ordinances. These systems shall be provided for the proper protection of life, equipment, circuits, and systems.
- B. Permanently ground entire lighting and power systems in accordance with the latest adopted version of the NEC, including service equipment, distribution, panelboards, switch and starter enclosures, motor frames, devices, transformers, grounding type receptacles, and other exposed non-current carrying metal parts of electrical equipment.
- C. Grounding and bonding requirements specified in this section may be supplemented in other sections of these Specifications.

1.2 COORDINATION

- A. On all additions and new construction, complete grounding and bonding of concrete encased electrode system (building reinforcing steel /rebar) to the satisfaction of the local AHJ prior to concrete placement.

PART 2 - PRODUCTS

2.1 MANUFACTURERS

- A. Apache Grounding, Copperweld, Inc., ILSCO Corporation, nVENT (Cadweld, Critec, Erico), Thermoweld, and Thomas & Betts (T&B)

2.2 PERFORMANCE REQUIREMENTS

- A. General:
 - 1. All grounding and bonding shall be in strict accordance with NEC 250, 517, etc.
 - 2. Grounding electrode system shall have a resistance to earth of five (5) ohms or less. Where this cannot be met, provide two additional ground rods to form a "triple ground rod" installation. Under no conditions shall the system have a resistance greater than twenty-five (25) ohms to ground, per NEC 250, at any location in the system.
- B. Ground Rods:
 - 1. Copper cladding permanently bonded to a high-strength steel core.
 - 2. 3/4 inch by 10 feet (19mm by 3m) straight, conform to UL 467.
- C. Conductors:
 - 1. Grounding Conductor: Copper, insulated (green) where required or uninsulated where allowed in the Specifications or by code, sized per Drawings or NEC Table 250.66.
 - 2. Bonding Jumpers - Insulated conductor, sized to be minimum cross-sectional area greater than or equal to that of the equivalent grounding conductor as determined from NEC Table 250.102.
 - 3. Grounding Ring around a building - #2 AWG uninsulated copper, otherwise sized per NEC.
 - 4. Grounding Ring around a utility transformer - #2 AWG uninsulated copper (unless sized per drawings), otherwise sized per NEC or by utility requirements.

- D. Connections:
 - 1. General: All connectors shall be listed and labeled as grounding connectors for the materials used.
 - 2. Welded Bond - Exothermic welded connection or bond such as "Cadweld". No phosphorous or any other caustic, toxic or explosive substance may be used.
 - a. Provide exothermic materials, accessories, and tools for preparing and making permanent field connections between grounding system components.
 - 3. Clamps - Listed bronze connectors, suitable for grounding and bonding applications, in configurations required for a particular installation.
- E. Buss Bars:
 - 1. Bare annealed copper bars, 1/4" x 4" x 20" unless otherwise noted on the Drawings.

PART 3 - EXECUTION

3.1 APPLICATION

- A. Unless otherwise indicated, the below list of connection styles shall be followed.
- B. Outdoor Below Grade Grounding Connections:
 - 1. Welded bond only, no exception.
- C. Outdoor Above Grade Grounding Connections:
 - 1. Clamps may be used. Use welded bond where clamping is not accessible or practical.
- D. Indoor Grounding and Power Connections:
 - 1. Clamps may be used. Use low-smoke/low emission welded bond where clamping is not accessible or practical.

3.2 INSTALLATION

- A. General:
 - 1. Where the Drawings or Specifications exceed NEC requirements, then follow the Drawings or Specifications.
 - 2. Bond all ground electrodes together to form the grounding electrode system including metal underground water pipe, metal frame of the building or structure, concrete encased electrodes, ground ring, rod and pipe electrodes and plate electrodes.
 - 3. At all electrical system components, assemblies, circuits, etc. that are over 120v to ground, provide locknuts and / or listed fittings per NEC 250.97 for bonding of metal raceways. In case of oversized, concentric or eccentric knockouts, comply with NEC 250.92(B). The use of snap-in, wedge-type, or pivot-type connectors is prohibited.
 - 4. Refer to Drawings for additional special grounding systems or grounding requirements not mentioned here.
- B. Concrete Encased Electrode:
 - 1. Fabricate with twenty (20) feet (6m) of conductor laid lengthwise in excavation for foundation or footings. Install such that conductor is within two (2) inches (50mm) of the bottom of the concrete. Where base of foundation is less than twenty (20) feet (6m) in length, coil excess conductor at base of foundation. Bond conductor to reinforcing steel at four (4) locations, minimum. Extend conductor below grade and connect to building grounding electrode.
- C. Main Electrode:
 - 1. Provide a building ground rod and bond it to the grounding electrode system. Where ohmic values exceed 5 ohms to ground, the building ground rod shall consist of three ground rods, arranged in an equilateral triangular pattern located at least five (5) feet outside an exterior building wall or as

- otherwise directed. Space fifteen (15) feet apart and drive into the earth to a point two (2) feet below finished grade to top of rods. Grounding electrode conductor shall form a continuous loop around rods, and conductor shall be properly bonded to each rod by a fusion weld similar to "Cadweld".
2. Extend grounding electrode conductor from ground rod(s) to the grounded service conductor (neutral) in the main switchboard at an accessible point on the ground bus per NEC 250.24.
- D. Main Bonding Jumper: Shall be sized in accordance with NEC 250.102, if not indicated on the Drawings, and installed within the same enclosure as the point of bonding of the system neutral service entrance.
- E. Water Pipe Electrode: A ten (10) foot minimum length of electrically-continuous underground metal water pipe. Bond around insulating joints or sections, insulating pipe, and water meters to make pipe electrically continuous.
- F. Fuel Gas Piping:
1. Each above ground portion of a gas piping system upstream from the equipment shutoff valve shall be made electrical continuous and bonded to the building grounding electrode system, as required in NFPA 54.
 2. Gas piping shall not be used as a grounding electrode.
- G. Transformers: Ground as a separately derived source.
1. Where transformer secondary includes a neutral, the neutral shall be bonded to the equipment enclosure and connected to the system ground conductor.
 2. Size system bonding jumper per NEC Table 250.102.
 3. Grounding conductor shall be in raceway and shall be bonded to nearest available point of the building grounding electrode system.
- H. Equipment Grounding Conductor (EGC):
1. Comply with NEC 250 for sizes and quantities of equipment grounding conductors, except where larger sizes or more conductors are indicated.
 2. All power circuits shall be provided with a separate copper insulated EGC run in the raceway with the power conductors. The conduit shall not be used as the sole means of grounding. The insulation of the EGC shall be green.
 3. Bonding to the EGC shall be provided at each end of metallic conduit runs and at all boxes and enclosures.
 4. Connect wiring device grounding terminal to outlet box with bonding jumper and branch circuit equipment grounding conductor.
- I. Isolated Ground (IG) Equipment Grounding Conductor:
1. All branch circuits and feeders that require an IG equipment grounding conductor shall be provided with a separate copper insulated IG equipment grounding conductor run in the raceway with the power conductors. The IG equipment grounding conductor shall be provided in addition to the normal EGC. The insulation of the IG equipment grounding conductor shall be green with a yellow stripe.
 2. Conduits and boxes of IG circuits shall be bonded to the normal EGC as stated above. At outlet locations, the IG equipment grounding conductor shall connect only to the isolated ground terminal of an isolated ground outlet. There shall be no connection, either directly or indirectly, between the normal EGC and the IG equipment grounding conductor at any point other than at the source of a separately derived system (transformer) or at the service entrance.
 3. The following circuits shall be provided with an IG equipment grounding conductor:
 - a. Feeders providing power to panels equipped with an IG buss.
 - b. All branch circuits originating at a panel with an IG buss.
- J. Grounding Busses:

1. Provide a copper buss bar where indicated on Drawings or in rooms containing any of the below list.
 - a. Provide a #2 AWG insulated grounding electrode conductor from the grounding electrode system to each grounding buss.
 - b. Provide in each IDF and MDF room.
 - c. Provide at each CATV / MATV head-end mounting board.
 - d. Provide at each building communications rack.
 - e. Provide at each sound reinforcement equipment rack.
- K. Communications Systems:
 1. Bond each server, patch panel, data and other communications equipment ground (buss type or grounding conductor type) at each piece of equipment and each equipment rack back to the copper grounding buss installed in the room with a bare #6 AWG ground wire.
- L. Other Grounding Systems:
 1. Other buildings served from common service:
 - a. The main building service is the source for electric service.
 - b. Bond grounding conductor of building main feeder to grounding electrode system.

3.3 CONNECTIONS

- A. General:
 1. Make connections in such a manner as to minimize possibility of galvanic action or electrolysis. Select connectors, connection hardware, conductors, and connection methods so metals in direct contact will be galvanically compatible.
 2. Aluminum to steel connections shall be with stainless steel separators and mechanical clamps. Aluminum to galvanized steel connections shall be with tin-plated copper jumpers and mechanical clamps.
 3. Coat and seal connections involving dissimilar metals with inert material such as red lead paint to prevent future penetration of moisture to contact surfaces.
- B. Exothermic Welded Connections:
 1. Use for connections to structural steel and for underground connections except those at test wells. Install at connections to ground rods and plate electrodes. Comply with manufacturer's written recommendations. Welds that are puffed up or that show convex surfaces indicating improper cleaning are not acceptable.
 2. Terminate insulated EGCs for feeders and branch circuits with pressure-type grounding lugs. Where metallic raceways terminate at metallic housings without mechanical and electrical connection to the housing, terminate each conduit with a grounding bushing. Connect grounding bushings with a bare grounding conductor to the ground buss in the housing. Bond electrically noncontinuous conduits at both entrances and exits with grounding bushing and bare grounding conductors.
- C. Compression Type Connections:
 1. Use hydraulic compression tools to provide the correct circumferential pressure for compression connectors. Use tools and dies recommended by the manufacturer of the connectors. Provide embossing die code or other standard method to make a visible indication that a connector has been adequately compressed on the ground conductor.
- D. Moisture Protection:
 1. Where insulated ground conductors are connected to ground rods or ground busses, insulate the entire area of the connection and seal against moisture penetration of the insulation and cable.

3.4 SITE TESTING

- A. Testing:
1. Test the electrical system after installation is complete. Inspect and test for stray currents, unintended ground shorts, and proper physical condition of grounding system. Correct any deficiencies and re-test to verify satisfactory installation.
 2. Document all readings and testing and make documentation available to Owner upon request.
 3. Perform ground resistance and continuity testing in accordance with IEEE 142.

END OF SECTION

SECTION 26 05 33 - RACEWAYS AND BOXES FOR ELECTRICAL SYSTEMS

PART 1 - GENERAL

1.1 GENERAL REQUIREMENTS

- A. Provide all raceway and conduits, outlet boxes, pull and splice boxes, floor boxes, poke-thru boxes, wireways, gutters, and associated fittings as indicated on the Drawings and as required for feeders, branch circuits, splices, taps, equipment connections, and for compliance with regulatory requirements. All locations shown on the Drawings are approximate unless dimensioned.
- B. Provide complete, separate conduit systems for all electrical systems on this project to include, but not limited to service entrance, feeders, branch circuit, control wiring furnished by this contractor, emergency and standby power and lighting circuits, critical power, communication systems, and other electrical systems as required.
- C. Provide outlet wiring boxes of the type, shape and size, including depth of box, to suit each respective location and installation; constructed with knockouts or threaded hubs in back and sides, and with threaded holes with screws for securing box covers or wiring devices. Provide outlets as shown and as required per NEC.

1.2 DESIGN REQUIREMENTS

- A. Boxes and fittings shall be made of the same material as the conduit material they are installed with, unless modified below or otherwise noted on the Drawings.

1.3 SUBMITTALS

- A. Submit on all conduit, raceways, pull boxes, back boxes, hand holes, cover plates, extension rings, fittings, labeling, and supports for conduits inside and on roof.

1.4 COORDINATION

- A. Coordinate mounting heights, orientation and locations of back boxes for outlets mounted above counters, benches, back splashes, etc.
- B. Conduit systems shall not be covered or otherwise concealed until review has been made and approvals obtained from the AHJ.

PART 2 - PRODUCTS

2.1 ACCEPTABLE MANUFACTURERS

- A. Raceways, Wireways, Gutters and Conduits: Aflex, Atkore (AFC, Allied, FRE, Power Strut, TJ Cope), American Conduit, Calbond, Cantex, Champion, Hoffman, Hubbell, KorKap, Nepco, Nucor, Omega, Plasti-Bond, Perma-Cote, Pittsburgh, Prime Conduit, Sedco, Spang, Square-D, Thomas & Betts, Western Tube and Wheatland, Walker and Wiremold.
- B. Surface-mount Raceways: Hubbell, Mono-Systems, Panduit, Tehalit and Wiremold.
- C. Boxes and Fittings: Appleton, Atkore (AFC, Allied, Power Strut, TJ Cope), Cantex, Eaton, ECN Korns, Hoffman, Hubbell, Keystone, Lew, Madison, nVent Caddy, Orbit Industries, Quazite, Racor, Regal, Stahlin, Steel City, Thomas & Betts and Walker.

- D. Others: Where specifically listed on Drawings.

2.2 GENERAL PERFORMANCE REQUIREMENTS

- A. Minimum conduit / raceway size shall be 1/2" for all circuits.
- B. Fittings shall be threaded or compression type. Set screw or bolt-on fittings are NOT acceptable.
- C. All fittings shall have an insulated throat bushing, no exceptions.
- D. See Section 26 05 19 - Low Voltage Conductors for information on where MC cable is allowed.
- E. Aluminum conduit shall not be installed in direct contact with concrete or masonry construction.

2.3 RIGID METAL CONDUIT - STEEL (RMC)(IMC) - PER ANSI C80

- A. Steel: Hot-dipped galvanized rigid steel (GRC) and galvanized intermediate metallic conduit (IMC) with zinc-coated threads and an outer coating of zinc chromate.
- B. Fittings: Per NEMA FB 1.
 - 1. Malleable iron, either cadmium plated or hot-dipped galvanized. Die cast zinc.
 - 2. Use deflection and expansion couplings with bonding jumpers at all expansion joints where required.

2.4 RIGID METAL CONDUIT - ALUMINUM (RAC) - PER ANSI C80

- A. Fittings: Per NEMA FB 1
 - 1. Aluminum fittings required.
 - 2. Use deflection and expansion couplings with bonding jumpers at all expansion joints where required.

2.5 PVC COATED RIGID METAL CONDUIT - NEMA RN 1

- A. Steel: Galvanized rigid steel conduit with external polyvinyl chloride (PVC) coating complying with NEMA RN 1 and listed and labeled as complying with UL 6 and ETL PVC-001.
- B. Fittings: Per NEMA FB 1.
 - 1. Malleable iron or steel, PVC coated (40 mils) exterior, urethane coated (2 mils) interior.
 - 2. Use fittings listed and labeled as complying with UL 514B.
- C. Conditions: The installer shall be certified by a manufacturer to install coated conduit.

2.6 ELECTRICAL METALLIC TUBING (EMT) - ANSI C80.3

- A. Galvanized thin wall steel or aluminum tubing.
- B. Fittings: Per NEMA FB 1.
 - 1. Die cast zinc, pressure cast, malleable iron or steel. Clamps shall be steel. Where aluminum tubing is allowed, aluminum fittings are required unless otherwise noted.

2.7 RIGID NONMETALLIC CONDUIT (RNC)

- A. PVC: Schedule 40 PVC, NEMA TC 2, high impact resistant.
- B. RTRC: Fiberglass, NEMA TC 14, standard wall.
- C. Fittings: Per NEMA TC 3 & 14, solvent weld socket type.

- D. Conditions: Do NOT use PVC for elbows in sizes 1-1/2" and larger.

2.8 FLEXIBLE METAL CONDUIT (FMC)

- A. Steel: Spiral-wound, square interlocked, hot-dipped galvanized steel.
- B. Aluminum: Spiral-wound, square interlocked aluminum.
- C. Fittings: Per NEMA FB 1.
 - 1. Cadmium plated two-screw, double-clamp malleable iron. Hot-dipped galvanized two-screw, double-clamp malleable iron. Pressure cast. Steel cast. Zinc coated, aluminum.

2.9 LIQUID-TIGHT FLEXIBLE METAL CONDUIT (LFC)

- A. Steel: Spiral-wound, square interlocked, hot-dipped galvanized steel strip with a bonded outer jacket of PVC.
- B. Fittings: Per NEMA FB 1.
 - 1. Cadmium plated, compression type, malleable iron. Hot-dipped galvanized, compression type, malleable iron. Terminations shall be insulated throat type.
 - 2. Aluminum: Copper free (1% or less).

2.10 GENERAL OUTLET / BACK BOX / JUNCTION BOX

- A. All boxes shall meet NEMA OS 1 (metallic) and NEMA OS 2 (nonmetallic).
- B. Cast Boxes: NEMA FB 1, Type FS or FD malleable iron or aluminum. Furnish gasketed cover by box manufacturer and provide threaded hubs.
- C. Floor-mounted Back Boxes: Shall be adjustable and gasketed.
- D. Outlet and Pull Boxes: Single or ganged back boxes.
 - 1. Interior: Standard box shall be 2-1/8" deep or better. Use 3-1/2" deep boxes as needed and 1-1/2" shallow boxes as required for wall depth.
 - 2. Exterior: Standard box shall be 3-1/2" deep NEMA 3R or better.
 - 3. In Ground or Concrete: NEMA 4 cast iron box with external recessed flanged cover. Depth as required.
- E. Box Ganging: Gang type boxes shall be used where multiple devices are located adjacent to one another, including ceiling, wall and cast in floor boxes.
- F. Box Barriers: In boxes with multiple switches, where the voltage between adjacent switches exceeds 150 volts to ground, provide an enclosure equipped with identified, securely installed barriers between adjacent devices.

2.11 PULL / SPLICE BOXES AND HAND HOLES

- A. Surface Mounted Cast Metal Box: NEMA 250, Cast aluminum with ground flange, neoprene gasket and stainless steel cover screws.
- B. In-Ground Cast Box: NEMA 250, Type 6, cast aluminum, concrete or fiberglass with flanged (smooth/nonskid) cover, recessed cover box for flush mounting.
- C. Handholes: Fiberglass with weatherproof nonskid cover with pre-cut 6 inch x 6 inch (150 mm x 150 mm) cable entrance at center bottom of each side.

2.12 POWER AND COMMUNICATIONS FLOOR BOXES AND POKE-THRU:

- A. Shallow Floor Boxes: Lid to be square, color to be per Owner's Representative.
 - 1. Provide 2-gang and 4-gang: RFBA series by Walker, CFB series by Hubbell.
- B. Standard Floor Boxes: Lid to be square, color to be per Owner's Representative.
 - 1. Provide 2-gang, 4-gang, 6-gang, and 10-gang: RFBAX by Walker, CFBx by Hubbell.

PART 3 - EXECUTION

3.1 PREPARATION

- A. Place conduit sleeves in the cavities of walls and floor slabs for the free passage of conduits.
- B. Apply caulking for all conduit sleeves through floors and through exterior walls.

3.2 GENERAL INSTALLATION

- A. The Drawings indicate an approximate location of boxes for switches, lighting outlets, power outlets, raceways, etc. The Drawings may not give complete and accurate information in regard to locations of such items. The exact locations shall be determined by reference to the Drawings and by actual measurements during construction of the building, subject to approval by the Owner's Representative.
- B. The Owner's Representative reserves the right to adjust locations of raceway and boxes up to six (6) feet in any direction prior to rough-in to accommodate intended purpose at no additional cost.
- C. All installations shall meet NEC requirements for acceptable fill ratings and conductor derating. NO exceptions. Listed partitions are acceptable in gutters or similar for proper partitioning.

3.3 CONDUIT, RACEWAY, FITTING AND BOX APPLICATION

- A. General Application:
 - 1. Conduit Sleeves: Provide RMC sleeves at all locations where conduits pass through beams, outside walls, fire rated walls, or structural members. The size of these sleeves shall be such as to permit readily the subsequent insertion of conduit of the proper size with adequate clearance for movement due to expansion and contraction. Where conduits pass through outside walls, the inside diameter of each pipe sleeve shall be at least 1/2" greater than the outside diameter of the service pipe. After the conduits are installed, fill the annular space between the conduit and its sleeve with a mastic or caulk. Use packing as required to accomplish this. At fire rated wall penetrations, use fire barrier.
 - 2. Surface-mount Raceway: Not permitted except as noted on the Drawings or in locations where concealing conduit is not possible.
 - 3. Branch Circuits: Shall not be installed in or under the ground floor slab unless specifically required on the Drawings or pre-approved by the EOR. No exceptions.
- B. Underground / In-ground:
 - 1. Acceptable Conduit: RMC, PVC, and Fiberglass.
 - 2. Fittings: All elbows shall be long sweep galvanized steel or fiberglass, no PVC. Other fittings shall match the conduit material.
 - 3. Boxes: Shall be cast metal, concrete or fiberglass. Shall be ANSI 77 traffic rated for the location.
 - a. Street / Drive: Vehicle Tier 22 rated.
 - b. Sidewalk: Personnel or vehicle Tier 8 rated.
 - c. Grass: Personnel Light Duty rated.
 - 4. Conditions: Conduit risers from elbow to above grade shall be RMC.
- C. Imbedded in / Passing through concrete:
 - 1. Acceptable Conduit: RMC, PVC, and Fiberglass.

2. Fittings: All elbows shall be long sweep galvanized steel or fiberglass, no PVC. Other fittings shall match the conduit material.
 3. Masonry Boxes: Galvanized steel masonry rated box.
 4. Conditions:
 - a. PVC allowed in concrete filled storm shelter walls or where required by utility provider.
 - b. Where allowed, conduit imbedded in concrete shall not be larger than 3/4". Verify with project Structural Engineer prior to placing.
- D. Wet and Damp Locations:
1. Acceptable Conduit: RMC.
 2. Fittings: Shall be rated for the space and shall match the material of the conduit they are installed with.
 3. Boxes: Recessed shall match conduit material. Surface-mount shall be stainless steel.
- E. Concealed / Exposed Dry Locations:
1. Acceptable Conduit - EMT.
 2. Fittings: Shall match the conduit material.
 3. Boxes: Malleable iron or cast aluminum (type FS / FD), with threaded hubs and gasketed covers.
 4. Conditions: Do not use aluminum in cinder-fill walls.
- F. Existing Walls:
1. Acceptable Conduit:
 - a. Concealed: FMC and EMT.
 - b. Surface-Mount: Surface-Mount Raceway and EMT.
 2. Fittings: Shall match the conduit material.
 3. Conditions: Surface-mount raceway shall be used in finished spaces. EMT may be used only in unfinished spaces, unless otherwise directed on the Drawings.
- G. Indoor Equipment Connections:
1. Acceptable Conduit: FMC and LFC (Liquid-Tight FMC).
 2. Fittings: Shall match the conduit material.
 3. Boxes: Shall match the conduit material.
 4. Conditions:
 - a. Where FMC or FNC are used, total length not to exceed 72" above ceiling, 48" exposed below ceiling.
 - b. In kitchen or similar spaces, use LFC unless otherwise directed on the Drawings.
 - c. Install flexible conduit to all recessed luminaires in accessible ceilings. Do not use more than four (4) flexible metal conduits per junction box to supply luminaires in a location. Do not supply a luminaire from another with any raceway or FMC. Suspend junction boxes and conduits from high roofs with hangers and trapeze.
- H. Outdoor Above Grade:
1. Acceptable Conduit: RMC.
 2. Fittings: Shall match the conduit material.
 3. Boxes: Weatherproof cast steel or cast aluminum.
 4. Conditions: Conduits may be used on a roof ONLY where indicated on the Drawings and shall be supported per the Specifications.
- I. Outdoor Equipment Connections:
1. Acceptable Conduit: LFC (Liquid-Tight FMC).
 2. Fittings: Shall be rated for the space or environment.
 3. Boxes: Shall be rated for the space or environment.
 4. Conditions: Flexible conduit types shall not exceed 72" in length.

- J. Corrosive Environments:
 - 1. Acceptable Conduit: PVC and LFNC.
 - 2. Fittings & Boxes: Shall be rated for the space or environment.
 - 3. Conditions: Flexible conduit for equipment connections only unless otherwise noted on the Drawings.
- K. Passing Through a Firewall:
 - 1. Acceptable Conduit: EMT and RMC.
 - 2. Conditions: Provide fire caulking at all penetrations.

3.4 CONDUIT, RACEWAY, FITTING AND BOX APPLICATION

- A. General:
 - 1. Unless otherwise indicated on the Drawings, conduits shall be concealed in walls, partitions and above the ceiling. In rooms where ceilings are not present or scheduled, orient conduit parallel or perpendicular to structure.
 - 2. Conduits shall be continuous between enclosures such as outlet, junction and pull boxes, panels, cabinets, motor control centers, etc. The conduit must enter and be secured to enclosures so that each system is electrically continuous throughout. Where knockouts are used, provide double locknuts, one on each side. At conduit terminations, provide insulated throat fittings. Where conduits terminate in equipment having a ground buss, such as in switchgear, and panelboards, provide conduit with an insulated grounding bushing.
 - 3. Capping
 - a. Cap open ends of raceways until conductors are installed to prevent ingress of dirt and moisture.
 - b. Cap or close ends and unused openings in wireways and gutters.
 - 4. Sealing
 - a. Seal both ends of all conduits that serve as a passageway for control wiring, data, etc. through a rated wall to prevent air / gasses / contaminants from moving from one space to another.
 - b. Seal both ends of underground conduits as required to prevent ingress of water and other contaminants from outside.
 - c. All Sealant shall be fire caulk, putty packs, etc. to maintain the rating of the wall.
 - 5. Provide insulated ground wire in all PVC conduit and extend to ground buss.
 - 6. Moisture traps: Provide junction box with drain fitting at low points in conduit system to avoid moisture traps.
 - 7. Use expansion-deflection fittings on conduits two (2) inches and larger crossing structural expansion joints and on exposed conduit runs where necessary. Provide bonding jumpers across fittings in metal raceway systems. Provide fittings to accommodate expansion and deflection where raceway crosses seismic, control and expansion joints.
- B. Support:
 - 1. Install conduits parallel and supported on unistrut or equal trapezes and anchored with split ring hangers, conduit straps or other devices specifically designed for the purpose. Wire ties are not permitted. Do not attach raceway to ceiling support wires or other piping systems.
 - 2. Securely fasten and support all conduit runs. Provide required clamps, straps, clips, hangers and brackets. Raceways installed in joists shall be secured to joists with clamps at 20'-0" maximum spacing. Raceways installed parallel to joists shall be supported by caddy clips (1 inch or smaller) or in unistrut / threaded rods / beam clamps trapeze at 15'-0" centers. Raceways installed perpendicular to bottom of joists shall be secured with individual conduit hangers at 10'-0" maximum spacing or unistrut / threaded rods / beam clamps at 15'-0" maximum centers. Raceways supported by straps at walls shall be supported per NEC. Support all raceways within one (1) foot of each box, cabinet, disconnect, bend or other raceway termination.
 - 3. Raceways shall be supported with 2-hole straps. Single hole straps are not acceptable.

4. Support raceway using coated steel or malleable iron straps, clevis hangers, and split hangers.
 5. Do not support raceway with wire or perforated pipe straps. Remove wire used for temporary supports.
- C. Raceway Spacing:
1. Maintain twelve (12) inch (300 mm) clearance between raceway and surfaces with temperatures exceeding 104°F (40°C). (Excluding roof mounted conduits.)
- D. Raceway Bends:
1. Make bends with standard ells or conduit bent in accordance with the NEC.
- E. Concealed Locations:
1. Install concealed conduit as directly and with the largest radius bends as possible. Conceal conduit in finished areas.
- F. Pull String:
1. Provide a Greenlee #431 or equal (240 lbs.) nylon pulling line in all conduits that are to be used as spares and all conduits used by other divisions, such as controls, communications, and similar systems. Identify both ends of the line by means of labels or tags reading "Pulling Line".
- G. Fire Rated Walls:
1. Install material at fire rated construction perimeters and openings containing penetrating sleeves, piping, ductwork, conduit and other items, requiring firestopping to comply with the latest applicable edition of the UL Fire Resistance Directory, Volumes I and II.
- H. Raceway Assemblies:
1. Bring conduit to shoulder of fittings; fasten securely.
 2. Provide conduit hubs or sealing locknuts to fasten conduit to sheet metal boxes in damp and wet locations and to cast boxes.

3.5 COMMUNICATION SYSTEMS CONDUIT INSTALLATION

- A. This Contractor shall provide all raceways and conduits for all communication systems shown and / or required per Specifications and as shown on the Electrical and Communications Drawings. Communication systems may include but are not limited to fire alarms, intercoms, data, security, antenna and media management.
- B. This contractor shall provide a conduit pathway (minimum 12" long) above ceiling for fire alarm, data, AV systems, etc. between all spaces and the corridor, where walls go to deck. Coordinate exact conduit sizes and quantities (range from one (1x) 1" to two (2x) 4" conduits) with low voltage Contractors and Installers.

3.6 BACK BOXES, OUTLETS AND FITTINGS APPLICATION

- A. Back Boxes: Sizes and configuration shall be as required for the intended service and shall conform to and be applied in accordance with NEC Table 314.16(A). Provide extension rings, expandable bars sets, supports, gaskets for weatherproof type etc., where required.
- B. Ceiling-mounted Boxes: Provide supports and attachments to properly support ceiling and bracket-type devices or luminaires. Where the box shall support the device, the box shall be rated for the weight of the device / luminaire supported.
- C. Voice & Data Outlet: Provide back boxes at each voice and data outlet. Communications wiring, device and plate to be provided by communications Contractor. See Divisions 27 and 28 for additional requirements.

3.7 BACK BOXES, OUTLETS AND FITTINGS INSTALLATION

- A. Do not connect or install outlet boxes back-to-back.
- B. Unless otherwise shown or specified, install boxes for switches at 44" and receptacles at 18" AFF. Verify door swings with Drawings and schedules and locate switches and pull stations on the strike side of the door unless otherwise noted.
- C. Where back boxes are required for switches, receptacles, data jacks, thermostats, CO₂ sensors, etc. and are shown next to each other, all devices shall be installed at the same height and, where possible, provide a gang back box and cover them with a multi-gang cover plate.
- D. Protect boxes in such a manner as to prevent foreign material, such as plaster, from entering boxes. Boxes shall be thoroughly cleaned of foreign materials before pulling conductors.
- E. Install pull boxes and junction boxes above accessible ceilings and in unfinished areas only.
- F. Accessible Ceilings: Install outlet and junction boxes no more than six (6) inches (150 mm) from ceiling access panel or from removable recessed luminaire. Provide suitable access doors for all boxes mounted above gypsum / hard or otherwise inaccessible ceilings.
- G. Do not fasten boxes to ceiling support wires or other piping systems.
- H. Support boxes independently of conduit.
- I. Install gang box where more than one device is mounted together. Do not use sectional box.
- J. Provide plaster rings for all boxes in plastered walls and ceilings.
- K. At all ceiling-mounted receptacle and luminaire locations (exit light, pendants, linear direct / indirect, etc.), provide a heavy-duty dual bar hanger with ceiling ties to support the back box. Provide Cooper Industries BA50F or approved equal with appropriate back box for the application.
- L. All outlet boxes shall be supported by both adjacent joists / studs using a mounting bracket that stretches the entire length between the joists / studs and is mechanically fastened to joists / studs at both ends. An outlet box fastened to a stud must be supported by both ends as mentioned above, OR a CV style back box shall be used IF it is fastened with at least two mechanical fasteners and IF it has far-side box supports (Morris 18350, Orbit ABS-6, Caddy 766A or approved equal). No other style back box mounting styles shall be used.
- M. Plates shall cover any cracks between box and tile. Use oversize plates where necessary.

3.8 FLUSH BOXES

- A. Mount all outlet boxes such that finished installation with mud ring is within 1/4 inch of the finished wall or ceiling line unless otherwise indicated. Provide knockout closures to cap unused knock out holes where knock out holes have been removed. Install outlets flush with finish walls or ceiling surfaces for concealed wiring.
- B. Provide galvanized steel extension rings where required to extend the box forward in conformance to NEC requirements. Attach ring with at least two machine screws. Install electrical boxes and fittings in compliance with NEC requirements and in accordance with the manufacturer's written instructions and with recognized industry practices to ensure that the boxes and fittings serve the intended purposes. Under no circumstances shall a conduit enter/exit an extension ring. Conduits shall enter / exit the electrical box only.

- C. Locate boxes and conduit bodies to ensure accessibility of electrical wiring. Install blank cover plates, painted to match surrounding, at pull boxes, junction boxes and all others to which no luminaire or device is to be attached.

3.9 POWER AND COMMUNICATIONS FLOOR BOXES AND POKE-THRU DEVICES

- A. Provide and install all wiring, devices, back boxes, covers, plates, conduit and hardware as required for a complete installation. Do not daisy-chain floor boxes or poke-thru devices with conduits unless otherwise noted on the Drawings. See Section 26 27 26 - Wiring Devices for wiring devices to go in floor boxes.
- B. Provide duplex receptacles and associated wiring per table below unless otherwise noted on the Drawings. Provide circuits as shown on the Drawings. If powered by an isolated ground circuit, all receptacles shall be isolated ground. Provide conduits indicated in the table below from each box to nearest wall and then up to accessible attic space for power, data, A/V and other wiring.

SIZE	Recept. Qty.	Power Conduit	Data Conduits
2-gang	1x duplex	1x - 1"	1x - 1-1/4"
4-gang	2x duplex	*1x - 1"	2x - 1-1/4"
6-gang	3x duplex	*2x - 1"	3x - 1-1/4"
8-gang	4x duplex	*2x - 1"	See Plans
10-gang	5x duplex	*2x - 1"	See Plans

* or as required.

3.10 INTERFACE WITH OTHER PRODUCTS

- A. Install conduit to preserve fire resistance rating of partitions and other elements, using materials and methods in accordance with Section 07 84 00 - Firestopping.
- B. Route conduit through roof openings for piping and ductwork or through suitable roof jack with pitch pocket. Coordinate location with roofing installation.

3.11 ADJUSTING

- A. Adjust flush-mounting outlets to make front flush with finished wall material.
- B. Install knockout closures in unused openings in boxes.

END OF SECTION

SECTION 26 05 53 - IDENTIFICATION FOR ELECTRICAL SYSTEMS

PART 1 - GENERAL

1.1 GENERAL REQUIREMENTS

- A. All identification for electrical equipment and systems that is required by code or ordinance shall be provided, whether or not shown on Drawings or specified herein.

1.2 SUBMITTALS

- A. Submit Electrical Identification schedule including list of wording, symbols, letter size, color coding, tag number, location, and function.

PART 2 - PRODUCTS

2.1 MATERIALS

- A. General Requirements:
 - 1. All means of identification referenced in this section shall be of sufficient durability to withstand the environment per NEC 110.21. Where plastic is used outdoors, it shall be UV rated or treated.
 - 2. Lettering shall be Arial font and colors shall conform to FS L-P-387.
 - 3. Thickness for signs and engraved labels shall be 1/16" thick minimum.
- B. Equipment Labels: For panelboards, switchboards, switchgear, disconnects, equipment, etc.
 - 1. Provide UV rated engravable plastic (L-P-387) OUTDOORS and Engravable plastic (L-P-387) INDOORS.
 - 2. Appearance: Lettering shall be 1/4" tall minimum that is White with black lettering for Non-Emergency and Red with Black lettering for Emergency
- C. Electrical Safety Labels: For fault current and arc flash labelling.
 - 1. Inside building or enclosure to be self-adhesive vinyl.
 - 2. Appearance: Color, layout and dimensions per city requirement. In the absence of any city requirement, use industry standard colors and layout.
- D. Marker Labels / Sleeves: For circuit identification and other labelling.
 - 1. Marker Label - 2" or wider write-on marker label with white writing portion and clear laminating portion for protection.
 - 2. Marker Sleeves - 2" or wider sleeve colored to identify electrical systems per requirements in Part 3.
- E. Wire Markers: For circuit or voltage identification.
 - 1. Conductor Marking: Electrical tape.
 - 2. Circuit Marking: Tubing type, cloth tape, split sleeve.
 - 3. Appearance: Colors to match requirements in Part 3.
- F. Underground Warning Tape:
 - 1. Four (4) inch wide plastic tape.
 - 2. Appearance: Colored red and yellow with suitable warning legend describing buried electrical lines.
- G. Mechanical Fasteners: Stainless steel screws, non-corroding pop rivets.

PART 3 - EXECUTION

3.1 PREPARATION

- A. Coordinate with the Owner's Representative to obtain a list of the finalized owner's room number list before ordering identification tags.
- B. Degrease and clean surfaces to receive adhesive for identification materials.

3.2 APPLICATION OF EQUIPMENT LABELLING

- A. Main Service Disconnecting Means:
 - 1. Mark the label on the main service disconnecting means with the calculated fault current listed on the panel schedule along with the issue date of the Drawings per NEC 110.24(A). The calculated fault current shall be labelled "Maximum Fault Current" and the date shall be labelled "Date Calculations Performed". Use the seal date on the drawings for the date field.
 - 2. Provide a sign at each service at each structure per NEC 230.2(E).
- B. Panelboards, Switchboards, Switchgear:
 - 1. Circuit directory shall be frame mounted inside the door with heat-resistant transparent face and a directory card that is type written and completely filled out.
 - 2. Circuit directory shall coordinate each breaker with the proper load served. Each circuit shall be uniquely identifiable per NEC 408.4(A) including room numbers. Room numbers shall be as directed by Owner.
 - 3. Circuit directory shall indicate all spares and spaces in erasable pencil.
 - 4. Equipment Label shall indicate the high leg per NEC 408.3.
- C. Instantaneous Fault Current (AIC): Electrician to field-mark the equipment labels with the calculated instantaneous fault current (as shown on panel boards) per NEC 110.24(A) and use the issue date of the drawings as the calculation date.
- D. When series rated panels are specifically allowed, provide a label affixed by the manufacturer indicating the tested and approved series rating combinations per NEC 240.86. Provide an additional label affixed behind the panel door to be field marked in accordance with NEC 110.22(C).

3.3 INSTALLATION OF EQUIPMENT IDENTIFICATION

- A. General:
 - 1. Install all labels in an easily visible location and parallel to equipment lines.
 - 2. Provide signs and tags for equipment requiring identification as shown on Drawings and for equipment as required by the NEC.
 - 3. All signs and tags to be mechanically fastened. Double-sided tape or other fastening methods are not acceptable.
 - 4. Provide for each main disconnect not grouped together.
 - 5. Install signs on outside of cover for safety switches and time clocks.
 - 6. Install signs on outside top, not on door, and at each circuit for panelboards, switchboards and motor control centers.
 - 7. All labeling identification shall contain both the owner's and architect's room names and numbers. Coordinate with General Contractor to secure construction room numbers.
 - 8. Provide all additional signage required by the AHJ at no cost to the Owner.
- B. Conduit Identification:
 - 1. Underground Conduits

- a. All primary and secondary service conduits and all other underground conduits (2" and larger) shall be identified using Underground Warning Tape located no more than 12" below finished grade and run the entire length of all underground conduits.
 2. When any of the below systems are required to be run in conduits (per Drawings, Div. 27, Div. 28, AHJ or Owner Requirements), conduits shall be colored with painted band, marker labels or marker sleeves every ten feet (10') maximum and at back box locations using paint or marker labels. All colors shall be by system per the below list:
 - a. Fire Alarm System: Red
 - b. Voice / Data cabling: Blue
 - c. Security System: Green
 - d. Intercom, A/V, etc. (Media Mgmt.): Yellow
 - e. CATV / MATV: Black
 - f. Lighting Controls: Orange
- C. Back Box Cover Identification:
1. When any of the below systems are required to be run in conduits (per Drawings, Div. 27, Div. 28, AHJ or Owner Requirements), identify the back box covers per system. by painting the entire cover or by using marker labels. Marker labels not acceptable for back box covers for Fire Alarm. See below for colors.
 2. Cover Identification: Paint the entire cover or use marker labels. Marker labels not acceptable for back box covers for Fire Alarm. See below for colors.
 3. Back Box Cover Information: Label the back box with the source panel and circuiting using Marker Labels or Sharpie. Label as "Future Use" if there are no conductors pulled.
 4. Back Box Cover Color:
 - a. Fire Alarm System: Red
 - b. Voice / Data cabling: Blue
 - c. Security System: Green
 - d. Intercom, A/V, etc. (Media Mgmt.): Yellow
 - e. CATV / MATV: Black
 - f. Lighting Controls: Orange
 - g. Other (unless otherwise specified herein): White
- D. Electrical Distribution Nameplates:
1. Application: Panelboards, Switchboards, Switchgear, Transformers, MCCs, etc.
 2. Identification: Sign or Equipment Label with mechanical fasteners, per NEC 408.4(B).
 3. Information shall include (Example in parenthesis):
 - a. Panel designation (CHAC).
 - b. Voltage, phase and wires (277/480v 3ph 4w).
 - c. Source of service (Fed from MSB).
- E. Electrical Equipment Nameplates:
1. Application: Safety switches, disconnects for HVAC, motors, time clocks, water heaters, etc. and enclosure for controls, relays, contactors, solenoids, other electrical assemblies.
 2. Identification: Sign or Equipment Label with mechanical fasteners.
 3. Information shall include (Example in parenthesis):
 - a. Load served (A/H #C206) or (Parking Lot Lighting).
 - b. Voltage and phase (480v 3ph).
 - c. Circuits used (CHAC-15,17,19).

END OF SECTION

SECTION 26 05 73 - POWER SYSTEM STUDIES

PART 1 - GENERAL

1.1 GENERAL REQUIREMENTS

- A. Provide calculation of various parameters of the new and / or existing electrical system along with feedback to the Electrical Contractor to ensure:
 - 1. Proper adjustment of all adjustable breakers for proper operation and tripping sequence.
 - 2. Proper labelling for equipment and personnel safety.
- B. Provide Protective Device Coordination Studies.
- C. Provide Arc Flash analysis with proper equipment labelling.

1.2 COORDINATION

- A. Coordinate special tests and / or equipment start-up as specified or implied in related sections.

PART 2 - PRODUCTS

2.1 PERFORMANCE / DESIGN CRITERIA

- A. Submit studies in accordance with ANSI / IEEE Standard 242.
- B. Submit one-line diagram for each electrical service. Key all equipment and components on diagram to items in the studies.

PART 3 - EXECUTION

3.1 GENERAL

- A. This Contractor shall coordinate with the submitted equipment manufacturer to provide the below studies per the requirements in the Specifications. This Contractor shall coordinate all wire and conduit sizes and feeder lengths to the equipment manufacturer for the purposes of conducting the studies.
- B. The submitted equipment manufacturer shall provide the below studies, complete with a report including any cautionary items, equipment adjustments and proper equipment labels.

3.2 APPLICATION

- A. Short-Circuit Current Study (SCCS):
 - 1. Provide a short-circuit current analysis for each main switchboard and all downstream distribution as required to complete the breaker coordination study and arc flash study requirements below. Short-circuit analysis shall calculate short-circuit levels at service transformer secondary, switchboard main breaker, each feeder breaker and all levels of downstream distribution equipment. Assume infinite source buss at the utility transformer primary if the primary short-circuit current information cannot be obtained from the utility company.
 - 2. Coordinate the Short Circuit Current Ratings (SCCR / Withstand Rating) of mechanical equipment with the available short circuit current. The SCCR of all electrical and mechanical equipment shall exceed the available short circuit current.

3. Label each switchboard and panelboard with the Instantaneous Fault Current per Section 26 05 53 - Identification for Electrical Systems.
- B. Overcurrent Protective Device Coordination Study (Breaker Coordination) (BCS):
 1. Provide a time-current coordination study for each system. Coordination study shall compare the operating levels and times of the protective devices to the withstand levels and times that the equipment can sustain without damage or failure. Determine electronic trip unit settings necessary to achieve optimal selective coordination throughout the entire electrical distribution system. Determine setting for all adjustments of trip units of all electronic circuit breakers that are linked by zone-selective interlocking.
 2. Provide a breaker coordination study for the entire electrical distribution system when any of the following happen:
 - a. Where service entrance equipment is added or changed.
 - b. Where distribution panels or sub-panels are added or changed.
 - c. Where feeders are changed.
 - d. Where the utility transformer is changed.
 3. Provide a breaker coordination study for all affected electrical distribution equipment including switchboards, panelboards, MCCs, disconnects, safety switches, etc. when any of the following happen:
 - a. Where electrical panels are added or changed but the service entrance equipment is not changed.
 - b. Where any mechanical equipment is changed including chillers, cooling towers, air handlers, condensers, pumps, or rooftop units.
 4. Submit the short circuit and OCPD coordination to the AHJ / city upon request. The level of detail and format shall conform to city requirements.
 5. Provide in the close-out documents, a copy of the breaker coordination study along with an acknowledgement from the electrician that all adjustments have been made with who did the adjustments and on what date.
 6. Adjust settings of adjustable circuit breakers to achieve selective coordination of the system. Notify the Engineer if selective coordination cannot be achieved.
 7. Overcurrent Protective Device Coordination Study shall be performed in accordance with NEC and NFPA 99.

END OF SECTION

SECTION 26 08 00 - COMMISSIONING OF ELECTRICAL SYSTEMS

PART 1 - GENERAL

1.1 GENERAL REQUIREMENTS

A. Commissioning:

1. Commissioning is a systematic process of ensuring that all building systems perform interactively according to the design intent and the owner's operational needs. Commissioning during the construction phase is intended to achieve the following specific objectives according to the Contract Documents:
 - a. Verify that applicable equipment and systems are installed according to the manufacturer's recommendations and to industry accepted minimum standards and that they receive adequate operational checkout by installing contractors.
 - b. Verify and document proper performance of equipment and systems.
 - c. Verify that O&M documentation is complete.
 - d. Verify that the Owner's operating personnel are adequately trained
2. The systems to be commissioned include: electrical switchgear and panels, emergency power systems (if included), UPS Systems (if included), Solar Photovoltaic Systems (if included), electrical and lighting controls, fire alarm system, and life safety systems and controls.
3. Commissioning requires the participation of affected Division contractors to ensure that all systems are operating in a manner consistent with the Contract Documents. All affected Division contractors shall be familiar with all parts of the commissioning plan issued by the CA (Commissioning Authority) and shall execute all commissioning responsibilities assigned to them in the Contract Documents.
4. Commissioning Team:
 - a. The members of the commissioning team consist of the Commissioning Authority (CA), the designated representative of the owner, the General Contractor (GC or Contractor), the Architect and Design Engineers, the Mechanical Contractor (MC), the Electrical Contractor (EC), the Controls Contractor (CC), the Fire Alarm Contractor, and any other installing subcontractors or suppliers of equipment. The Owner's building or plant operator/engineer is also a member of the commissioning team.

1.2 COMMISSIONING AUTHORITY

- A. The commissioning authority and/or agency shall be selected and employed by the building owner. The commissioning agent shall be a licensed professional engineer in the State where the work will be performed, and shall be experienced in the commissioning of mechanical and electrical systems of the type installed in this project. Experience in construction process, direct digital control systems, test and balance and ASHRAE Guideline 1 - 1998 is mandatory. The commissioning agent shall not be associated with or employed by a mechanical contractor, or equipment supplier.

1.3 COMMISSIONING PLAN

A. Commissioning Plan:

1. The commissioning plan provides guidance in the execution of the commissioning process. Just after the initial commissioning scoping meeting the CA will provide the plan, which will continue to evolve and expand as the project progresses. The Specifications will take precedence over the Commissioning Plan.

B. Commissioning Process:

1. The following narrative provides a brief overview of the typical commissioning tasks during construction and the general order in which they occur.
2. Commissioning during construction begins with a scoping meeting conducted by the CA where the commissioning process is reviewed with the commissioning team members.
3. Additional meetings will be required throughout construction, scheduled by the CA with necessary parties attending, to plan, scope, coordinate, schedule future activities and resolve problems. Generally, these meetings will be included with or will be sequential with regular subcontractor meetings.
4. Equipment documentation is submitted to the CA during normal submittals, including detailed start-up procedures.
5. The CA works with the Subs in developing startup plans and startup documentation formats, including prefunctional checklists to be completed, during the startup process.
6. In general, the checkout and performance verification proceeds from simple to complex; from component level to equipment to systems and intersystem levels with prefunctional checklists being completed before functional testing.
7. The Subcontractors, under their own direction, execute and document the prefunctional checklists and perform startup and initial checkout. The CA documents that the checklists and startup were completed according to the approved plans. This may include the CA witnessing start-up of selected equipment and systems.
8. The installing contractors, suppliers and manufacturers, develops specific equipment and system functional performance test procedures with the assistance of the CA.
9. The procedures are executed by the Subcontractors, under the direction of, and documented by the CA.
10. Items of non-compliance in material, installation or setup are corrected at the Subcontractor's expense and the system retested.
11. The CA reviews the O&M documentation for completeness. All O&M documentation must be submitted and approved before the start of training.
12. Commissioning shall be completed before Substantial Completion.
13. The CA reviews, pre-approves and coordinates the training provided by the Subs and verifies that it was completed.
14. Deferred testing is conducted, as specified or required.

1.4 RESPONSIBILITIES

A. General Contractor (GC):

1. Facilitate the coordination of the commissioning work by the CA, and with the CA ensure that commissioning activities are being scheduled into the master schedule.
2. Include the cost of commissioning in the contract price.
3. Furnish a copy of all construction documents, addenda, change orders and approved submittals and shop drawings related to commissioned equipment to the CA.
4. In each purchase order or subcontract written, include requirements for submittal data, Systems/O&M data, commissioning tasks and training.
5. Ensure that all Subs execute their commissioning responsibilities according to the Contract Documents and schedule.
6. A representative shall attend a commissioning scoping meeting and other necessary meetings scheduled by the CA to facilitate the Commissioning process.
7. Coordinate the training of owner personnel.
8. Prepare Systems/O&M manuals and Systems manuals, according to the Contract Documents, including clarifying and updating the original sequences of operation to as-built conditions.

B. Warranty Period:

1. Ensure that Subcontractors execute seasonal or deferred functional performance testing, witnessed by the CA, according to the specifications.

2. Ensure that Subs correct deficiencies and make necessary adjustments to O&M manuals and as-built drawings for applicable issues identified in any seasonal testing.
- C. Electrical Contractors and Sub-Contractors:
1. The commissioning responsibilities applicable to each of the subcontractors are generally as follows (all references apply to commissioned equipment only). Specific requirements are shown in the appropriate Divisions.
 2. Construction and Acceptance Phases
 - a. Include the cost of commissioning in the contract price.
 - b. In each purchase order or subcontract written, include requirements for submittal data, commissioning documentation, Systems/O&M data and training.
 - c. Attend a commissioning scoping meeting and other meetings necessary to facilitate the Commissioning process.
 - d. Contractors shall provide the CA with normal cut sheets and shop drawing submittals of commissioned equipment as part of the normal submittal process.
 - e. Provide additional requested documentation, prior to normal O&M manual submittals, to the CA for development of start-up and functional testing procedures.
 - 1) Typically this will include detailed manufacturer installation and start-up, operating, troubleshooting and maintenance procedures, full details of any owner-contracted tests, full factory testing reports, if any, and full warranty information, including all responsibilities of the Owner to keep the warranty in force clearly identified. In addition, the installation, start-up and checkout materials that are actually shipped inside the equipment and the actual field checkout sheet forms to be used by the factory or field technicians shall be submitted to the Commissioning Authority.
 - 2) The Commissioning Authority may request further documentation necessary for the commissioning process.
 - f. Provide a copy of the Systems/O&M manuals and submittals of commissioned equipment, through normal channels, to the CA for review and approval.
 - g. Contractors shall assist (along with the design engineers) in clarifying the operation and control of commissioned equipment in areas where the specifications, control drawings or equipment documentation is not sufficient for writing detailed testing procedures.
 - h. Provide assistance to the CA in preparing the specific functional performance test procedures. Subs shall review test procedures to ensure feasibility, safety and equipment protection and provide necessary written alarm limits to be used during the tests.
 - i. Develop a full start-up and initial checkout plan using manufacturer's start-up procedures and the prefunctional checklists from the CA for all commissioned equipment. Submit to CA for review and approval prior to startup.
 - j. During the startup and initial checkout process, execute the prefunctional checklists for all commissioned equipment.
 - k. Perform and clearly document all completed startup and system operational checkout procedures, providing a copy to the CA.
 - l. Address current A/E punch list items before functional testing
 - m. Provide skilled technicians to execute starting of equipment and to execute the functional performance tests. Ensure that they are available and present during the agreed upon schedules and for sufficient duration to complete the necessary tests, adjustments and problem solving.
 - n. Perform functional performance testing under the direction of the CA for specified equipment. Assist the CA in interpreting the monitoring data, as necessary.
 - o. Correct deficiencies (differences between specified and observed performance) as interpreted by the CA, and A/E and retest the equipment.
 - p. Prepare Systems/O&M manuals according to the Contract Documents, including clarifying and updating the original sequences of operation to as-built conditions.

- q. Prepare redline as-built drawings for all drawings and final as-builds for contractor-generated coordination drawings.
 - r. Provide training of the Owner's operating personnel as specified.
 - s. Coordinate with equipment manufacturers to determine specific requirements to maintain the validity of the warranty.
- D. Warranty Period:
 - 1. Execute seasonal or deferred functional performance testing, witnessed by the CA, according to the specifications.
 - 2. Correct deficiencies and make necessary adjustments to O&M manuals and as-built drawings for applicable issues identified in any seasonal testing.
- E. Equipment Suppliers:
 - 1. Provide all requested submittal data, including detailed start-up procedures and specific responsibilities of the Owner to keep warranties in force.
 - 2. Assist in equipment testing per agreements with Subs.
 - 3. Include all special tools and instruments (only available from vendor, specific to a piece of equipment) required for testing equipment according to these Contract Documents in the base bid price to the Contractor, except for stand-alone data logging equipment that may be used by the CA.
 - 4. Provide information requested by CA regarding equipment sequence of operation and testing procedures.
 - 5. Review test procedures for equipment installed by factory representatives.
- F. Commissioning Authority (CA):
 - 1. The CA is not responsible for design concept, design criteria, compliance with codes, design or general construction scheduling, cost estimating, or construction management. The CA may assist with problem-solving non-conformance or deficiencies, but ultimately that responsibility resides with the general contractor and the A/E. The primary role of the CA is to develop and coordinate the execution of a testing plan, observe and document performance - that systems are functioning in accordance with the documented design intent and in accordance with the Contract Documents. The Contractors will provide all tools or the use of tools to start, checkout and functionally test equipment and systems, except for specified testing equipment supplied and installed by the CA.
 - a. Coordinates and directs the commissioning activities in a logical, sequential and efficient manner using consistent protocols and forms, centralized documentation, clear and regular communications and consultations with all necessary parties, frequently updated timelines and schedules and technical expertise.
 - b. Coordinate the commissioning work and, with the GC, ensure that commissioning activities are being scheduled into the master schedule.
 - c. Revise, as necessary, Commissioning Plan-Construction Phase.
 - d. Plan and conduct a commissioning scoping meeting.
 - e. Request and review additional information required to perform commissioning tasks, including Systems/O&M materials, contractor start-up and checkout procedures.
 - f. Before startup, gather and review the current control sequences and interlocks and work with contractors and design engineers until sufficient clarity has been obtained, in writing, to be able to write detailed testing procedures.
 - g. Review and approve normal Contractor submittals applicable to systems being commissioned for compliance with commissioning needs, along with A/E reviews.
 - h. Perform site visits, as necessary, to observe component and system installations. Attend selected planning and job-site meetings to obtain information on construction progress. Review construction meeting minutes for revisions/substitutions relating to the commissioning process. Assist in resolving any discrepancies.

- i. Approve pre-functional tests and checklist completion by reviewing prefunctional checklist reports and by selected site observation and spot checking.
- j. Approve systems startup by reviewing start-up reports and by selected site observation.
- k. Review the functional performance test procedures for equipment and systems developed by the subcontractors and suppliers. This may include energy management control system trending, or manual functional testing.
- l. Coordinate, witness and approve manual functional performance tests performed by installing contractors. Coordinate retesting as necessary until satisfactory performance is achieved.
- m. Review equipment warranties to ensure that the Owner's responsibilities are clearly defined.
- n. Oversee and approve the training of the Owner's operating personnel.
- o. Compile and maintain a commissioning record.
- p. Review and approve the preparation of the Systems/O&M manuals.
- q. Provide a final commissioning report.

1.5 WARRANTY PERIOD

- A. Coordinate and supervise required seasonal or deferred testing and deficiency corrections.
 - 1. Return to the site at 10 months into the 12-month warranty period and review with facility staff the current building operation and the condition of outstanding issues. Also interview facility staff and identify problems or concerns they have operating the building as originally intended. Make suggestions for improvements and for recording these changes in the Systems/O&M manuals. Identify areas that may come under warranty or under the original construction contract. Assist facility staff in developing reports, documents and requests for services to remedy outstanding problems.
- B. Scheduling:
 - 1. The CA will work with the GC according to established protocols to schedule the commissioning activities. The CA will provide sufficient notice to the CM and GC for scheduling commissioning activities. The GC will integrate all commissioning activities into the master schedule. All parties will address scheduling problems and make necessary notifications in a timely manner in order to expedite the commissioning process.

PART 2 - PRODUCTS

2.1 TEST EQUIPMENT

- A. All standard testing equipment required to perform startup and initial checkout and required functional performance testing shall be provided by the Division contractor for the equipment being tested.
- B. Special equipment, tools and instruments (only available from vendor, specific to a piece of equipment) required for testing equipment, according to these Contract Documents shall be included in the base bid price to the Contractor and left on site.
- C. All testing equipment shall be of sufficient quality and accuracy to test and/or measure system performance with the tolerances specified in the Specifications.

PART 3 - EXECUTION

3.1 MEETINGS

- A. Scoping Meeting:
 - 1. Within 90 days of commencement of construction, the CA will schedule, plan and conduct a commissioning scoping meeting with the entire commissioning team in attendance. Meeting

minutes will be distributed to all parties by the GC. Information gathered from this meeting will allow the CA to revise the Commissioning Plan to its “final” version, which will also be distributed to all parties.

B. Miscellaneous Meetings:

1. Other meetings will be planned and conducted by the CA as construction progresses. These meetings will cover coordination, deficiency resolution and planning issues with particular subs. The CA will plan these meetings and will minimize unnecessary time being spent by Subs.

3.2 REPORTING

- A. The CA will regularly communicate with all members of the commissioning team, keeping them apprised of commissioning progress and scheduling changes through memos, progress reports, etc.
- B. Testing or review approvals and non-conformance and deficiency reports are made regularly with the review and testing as described in later sections.
- C. A final summary report by the CA will be provided focusing on evaluating commissioning process issues and identifying areas where the process could be improved. All acquired documentation, logs, minutes, reports, deficiency lists, communications, findings, unresolved issues, etc., will be compiled in appendices and provided with the summary report.

3.3 SUBMITTALS

- A. The CA will provide appropriate contractors with a specific request for the type of submittal documentation the CA requires to facilitate the commissioning work. These requests will be integrated into the normal submittal process and protocol of the construction team. At minimum, the request will include the manufacturer and model number, the manufacturer’s printed installation and detailed start-up procedures, full sequences of operation, Systems/O&M data, performance data, any performance test procedures, control drawings and details of owner contracted tests. In addition, the installation and checkout materials that are actually shipped inside the equipment and the actual field checkout sheet forms to be used by the factory or field technicians shall be submitted to the Commissioning Authority. All documentation requested by the CA will be included by the Subs in their Systems/O&M manual contributions.
- B. The Commissioning Authority will review and approve submittals related to the commissioned equipment for conformance to the Contract Documents as it relates to the commissioning process, to the functional performance of the equipment and adequacy for developing test procedures. This review is intended primarily to aid in the development of functional testing procedures and only secondarily to verify compliance with equipment specifications. The Commissioning Agent will notify the appropriate persons as requested, of items missing or areas that are not in conformance with Contract Documents and which require resubmission.
- C. The CA may request additional design narrative from the A/E and Controls Contractor, depending on the completeness of the design intent documentation and sequences provided with the Specifications.

3.4 START-UP, PREFUNCTIONAL CHECKLISTS AND INITIAL CHECKOUT

- A. The following procedures apply to all equipment to be commissioned. Some systems that are not comprised so much of actual dynamic machinery may have very simplified PCs and startup.
- B. General:
 1. Prefunctional checklists are important to ensure that the equipment and systems are hooked up and operational. It ensures that functional performance testing (in-depth system checkout) may proceed without unnecessary delays. Each piece of equipment receives full prefunctional checkout. No

sampling strategies are used. The prefunctional testing for a given system must be successfully completed prior to formal functional performance testing of equipment or subsystems of the given system.

C. Start-up and Initial Checkout Plan:

1. The CA shall assist the commissioning team members responsible for start-up of any equipment in developing detailed start-up plans for all equipment. The primary role of the CA in this process is to ensure that there is written documentation that each of the manufacturer-recommended procedures have been completed. Parties responsible for prefunctional checklists and start-up are identified in the commissioning scoping meeting and in the checklist forms. Parties responsible for executing functional performance tests are identified in the testing requirements.
 - a. The CA assist in the development of checklists that indicate required procedures to be executed as part of start-up and initial checkout of the systems and the party responsible for their execution.
 - b. The Contractor determines which trade is responsible for executing and documenting each of the line item tasks and notes that trade on the form. Each form may have more than one trade responsible for its execution.
 - c. The subcontractor responsible for the purchase of the equipment develops the full start-up plan by combining (or adding to) the CA's checklists with the manufacturer's detailed start-up and checkout procedures from the O&M manual and the normally used field checkout sheets. The plan will include checklists and procedures with specific boxes or lines for recording and documenting the checking and inspections of each procedure and a summary statement with a signature block at the end of the plan.
 - d. The full start-up plan could consist of something as simple as:
 - 1) The contractor and CA prefunctional checklists.
 - 2) The manufacturer's standard written start-up procedures copied from the installation manuals with check boxes by each procedure and a signature block added by hand at the end.
 - 3) The manufacturer's normally used field checkout sheets.
 - e. The subcontractor submits the full startup plan to the CA for review and approval.
 - f. The CA reviews and approves the procedures and the format for documenting them, noting any procedures that need to be added.
 - g. The full start-up procedures and the approval form may be provided to the CM for review and approval, depending on management protocol.

D. Execution of Prefunctional Checklists and Startup:

1. Four weeks prior to startup, the Subs and vendors schedule startup and checkout with the GC and CA. The performance of the prefunctional checklists, startup and checkout are directed and executed by the Sub or vendor. When checking off prefunctional checklists, signatures may be required of other Subs for verification of completion of their work.
2. The CA shall observe, at minimum, the procedures for each piece of primary equipment, unless there are multiple units, (in which case a sampling strategy may be used as approved).
3. For lower-level components of equipment the CA shall observe a sampling of the prefunctional and start-up procedures.
4. The Subs and vendors shall execute startup and provide the CA with a signed and dated copy of the completed start-up and prefunctional tests and checklists.
5. Only individuals that have direct knowledge and witnessed that a line item task on the prefunctional checklist was actually performed shall initial or check that item off.

E. Deficiencies, Non-Conformance and Approval in Checklists and Startup:

1. The Subcontractors shall clearly list any outstanding items of the initial start-up and prefunctional procedures that were not completed successfully, at the bottom of the procedures form or on an

attached sheet. The procedures form and any outstanding deficiencies are provided to the CA within two days of test completion.

2. The CA shall work with the Subcontractors and vendors to correct and retest deficiencies or uncompleted items. The CA will involve the CM or GC and others as necessary. The installing Subcontractors or vendors shall correct all areas that are deficient or incomplete in the checklists and tests in a timely manner, and shall notify the CA as soon as outstanding items have been corrected and resubmit an updated start-up report and a Statement of Correction on the original non-compliance report. When satisfactorily completed, the CA recommends approval of the execution of the checklists and startup of each system using a standard form.

3.5 FUNCTIONAL TESTING

A. This sub-section applies to all commissioning functional testing for all divisions.

1. Objectives and Scope:
 - a. The objective of functional testing is to demonstrate that each system is operating according to the documented design intent and Contract Documents. Functional testing facilitates bringing the systems from a state of substantial completion to full dynamic operation. Additionally, during the testing process, areas of deficient performance are identified and corrected, improving the operation and functioning of the systems.
 - b. In general, each system should be operated through all modes of operation where there is a specified system response. Verifying each sequence in the sequences of operation is required.
2. Development of Test Procedures:
 - a. Before test procedures are written, the CA shall obtain all requested documentation and a current list of change orders affecting equipment or systems, including an updated points list, program code, control sequences and parameters. Each Sub or vendor responsible to execute a test, shall provide assistance to the CA in developing the procedures review (answering questions about equipment, operation, sequences, etc.). Prior to execution, the CA shall provide a copy of the test procedures to the Sub(s) who shall review the tests for feasibility, safety, equipment and warranty protection. The CA may submit the tests to the A/E for review, if requested.
 - b. The purpose of any given specific test is to verify and document compliance with the stated criteria of acceptance given on the test form.
3. Test Methods:
 - a. Functional testing and verification may be achieved by manual testing (persons manipulate the equipment and observe performance) or by monitoring the performance and analyzing the results. The CA will determine which method is most appropriate for tests that do not have a method specified.
4. Coordination and Scheduling:
 - a. The Subs shall provide sufficient notice to the CA regarding their completion schedule for the prefunctional checklists and startup of all equipment and systems. The CA will schedule functional tests through the GC and affected Subcontractors. The CA shall direct, witness and document the functional testing of all equipment and systems. The Subs shall execute the tests.
 - b. In general, functional testing is conducted after prefunctional testing and startup has been satisfactorily completed. Testing proceeds from components to subsystems to systems. When the proper performance of all interacting individual systems has been achieved, the interface or coordinated responses between systems is checked.

3.6 DOCUMENTATION, NON-CONFORMANCE AND APPROVAL OF TESTS

A. Documentation:

1. The CA shall witness and document the results of all functional tests using the specific procedural forms developed for that purpose. Prior to testing, these forms are provided to the GC for review

and approval and to the Subs for review. The CA will include the filled out forms in the Commissioning Report.

B. Non-Conformance:

1. The CA will record the results of the functional test on the procedure or test form. All deficiencies or non-conformance issues shall be noted and reported on a standard non-compliance form.
2. Corrections of minor deficiencies identified may be made during the tests at the discretion of the CA. In such cases the deficiency and resolution will be documented on the procedure form.
3. Every effort will be made to expedite the testing process and minimize unnecessary delays, while not compromising the integrity of the procedures.
4. As tests progress and a deficiency is identified, the CA discusses the issue with the executing contractor.
 - a. When there is no dispute on the deficiency and the Sub accepts responsibility to correct it:
 - 1) The CA documents the deficiency and the Sub's response and intentions and they go on to another test or sequence
 - b. If there is a dispute about a deficiency, regarding whether it is a deficiency or who is responsible:
 - 1) The deficiency shall be documented on the non-compliance form with the Sub's response and a copy given to the GC and to the Subcontractor representative assumed to be responsible.
 - 2) Resolutions are made at the lowest management level possible. Other parties are brought into the discussions as needed. Final interpretive authority is with the A/E. Final acceptance authority is with the Owner.
 - 3) Once the interpretation and resolution have been decided, the appropriate party corrects the deficiency, signs the statement of correction on the non-compliance form and provides it to the CA. The CA reschedules the test and the test is repeated until satisfactory performance is achieved.

C. Cost of Retesting:

1. The cost for the Subcontractor to retest a prefunctional or functional test, if they are responsible for the deficiency, shall be theirs. If they are not responsible, any cost recovery for retesting costs shall be negotiated with the GC.
2. The Contractor shall respond in writing to the CA at least as often as commissioning meetings are being scheduled concerning the status of each apparent outstanding discrepancy identified during commissioning. Discussion shall cover explanations of any disagreements and proposals for their resolution.
3. The CA retains the original non-conformance forms until the end of the project.

D. Failure Due to Manufacturer Defect:

1. If 10%, or three, whichever is greater, of identical pieces (size alone does not constitute a difference) of equipment fail to perform to the Contract Documents (mechanically or substantively) due to manufacturing defect, not allowing it to meet its submitted performance spec, all identical units may be considered unacceptable. In such case, the Contractor shall provide the Owner with the following:
 - a. Within one week of notification, the Contractor or manufacturer's representative shall examine all other identical units making a record of the findings. The findings shall be provided within two weeks of the original notice.
 - b. Within two weeks of the original notification, the Contractor or manufacturer shall provide a signed and dated, written explanation of the problem, cause of failures, etc. and all proposed solutions which shall include full equipment submittals. The proposed solutions shall not significantly exceed the specification requirements of the original installation.
 - c. The Owner will determine whether a replacement of all identical units or a repair is acceptable.

- d. Upon acceptance, the Contractor and/or manufacturer shall replace or repair all identical items, at their expense and extend the warranty accordingly, if the original equipment warranty had begun. The replacement/repair work shall proceed with reasonable speed beginning within one week from when parts can be obtained.
- E. Approval:
 - 1. The CA notes each satisfactorily demonstrated function on the test form. The CA recommends acceptance of each test using a standard form. The Owner gives final approval on each test using the same form, providing a signed copy to the CA and the Contractor.

3.7 SYSTEMS/OPERATION AND MAINTENANCE (O&M) MANUALS

- A. The following Systems/O&M manual requirements do not replace O&M manual documentation requirements elsewhere in these specifications.
- B. Each Division shall compile and prepare documentation for all equipment and systems covered in that Division and deliver this documentation to the GC for inclusion in the Systems/O&M manuals, according to this section, prior to the training of owner personnel.
- C. The CA shall receive a copy of the O&M manuals for review.
- D. Field checkout sheets and logs should be provided to the CA for inclusion in the Commissioning Record Book.
- E. Review and Approvals:
 - 1. Review of the commissioning related sections of the Systems/O&M manuals shall be made by the A/E and by the CA.

3.8 TRAINING OF OWNER PERSONNEL

- A. The GC shall be responsible for training coordination and scheduling and ultimately to ensure that training is completed.
- B. The CA shall be responsible for overseeing and approving the content and adequacy of the training of Owner personnel for commissioned equipment.

3.9 WRITTEN WORK PRODUCTS

- A. Written work products of Contractors will consist of the start-up and initial checkout plan described and the filled out start-up, initial checkout and prefunctional checklists, manufacturer's factory and field testing and inspection forms, contractors' inspection and functional testing forms, Systems/O&M Manuals, training plans and training records.
- B. These work products will be supplied to the CA to be included in the final commissioning report.

END OF SECTION

SECTION 26 10 00 - MEDIUM VOLTAGE ELECTRICAL DISTRIBUTION

PART 1 - GENERAL

1.1 GENERAL REQUIREMENTS

- A. Medium voltage electrical service including underground and overhead conductor requirements, transformer and secondary enclosure requirements, service entrance requirements, metering, and final connections.
- B. Provide and install all components of the medium voltage distribution system(s) including all switchgear, transformers, fuses, circuit breakers, testing, etc. as shown on the Drawings and as required for a complete and working system. All equipment shall be sized to meet the latest adopted version of NEC requirements as a minimum.
- C. Construction shall allow installation in locations accessible to the general public without the need for protective fencing or vaults.

1.2 SUBMITTALS

- A. Provide scaled shop drawings for each electrical equipment area showing the placement of all switchgear, transformers, and equipment of other trades, drawn to scale and dimensioned. Such shop drawings will be reviewed for compliance with the intent of the Drawings and the spaces available for all electrical equipment.
- B. Include the following parameters as applicable in the submittal: equipment name, description, voltage, phase, ampacity, kVA rating, K-rating, control voltage, impedance, AIC rating, MCB vs MLO, shunt-trip, etc.

1.3 MAINTENANCE MATERIALS

- A. Provide one set of any special tools required to operate and maintain transformers.
- B. Provide one set of each unique fuse size.

1.4 EXISTING FIELD CONDITIONS

- A. Verify field measurements of pad, conduit locations, and so on, prior to ordering or fabrication of enclosures, supports, equipment, etc.

PART 2 - PRODUCTS

2.1 MANUFACTURERS

- A. Switchgear Manufacturers - ABB (formerly GE), Eaton (Cutler Hammer), S & C Equipment, Siemens, Square-D, and States Manufacturing
- B. Pickup Relays - Schweitzer Engineering Laboratories (SEL)
- C. Transformer Manufacturers - ABB (formerly GE), Delta Star Inc., Eaton (Cutler Hammer), Hammond, Jefferson, MagneTek, Siemens, and Square-D
- D. Conductor Manufacturers - Alan Wire, General Cable, and Southwire.

- E. Terminations Manufacturers - 3M.
- F. All other manufacturers shall require pre-approval in accordance with Section 26 00 00 - Electrical.

2.2 GENERAL REQUIREMENTS:

- A. All products / equipment in these Specifications shall meet the requirements outlined below, unless specifically noted otherwise on the Drawings.
- B. Switchgear / Disconnects shall meet all IEEE C37.47, IEEE 386 and NETA ATS standards and requirements, be sized per the Drawings and conductor material shall be copper.
- C. Unless otherwise indicated on the Drawings, provide a NEMA rated enclosure for all switchgear, disconnects, transformers, etc. suitable for the environment in which the equipment is installed -
 - 1. NEMA 1 - All equipment located in interior dry locations.
 - 2. NEMA 3R - All equipment located in damp, wet or exterior locations.
 - 3. NEMA 4X - All equipment located in corrosive environments.
- D. All conductors shall meet all ASTM B3, B8, B230, B231, B609, IEEE C48, C386, 400, 404, NEMA WC 71, WC 74 and UL 1072 standards and requirements.
- E. All equipment shall have a factory applied gray finish applied over a rust inhibiting treatment.
- F. The momentary rating of the buss and all interrupting ratings of fuses and / or circuit breakers shall equal or exceed the short-circuit ratings of the pad-mounted gear.

2.3 FUSIBLE INTERRUPTOR SWITCHGEAR REQUIREMENTS:

- A. Fusible Switchgear - shall consist of self-supporting enclosures containing interrupter switches and power fuses with the necessary accessory components, factory assembled and checked.
- B. Equipment Ratings - 15kV (nominal voltage at 60hz) - 600A buss rating, 25kA short-circuit rating min. (for bussing and OCPD's), BIL (insulation rating) = 95.
- C. Fusing - Fuses shall be sized per the Drawings.
- D. Enclosure Construction - shall have NEMA enclosure rated for the environment.

2.4 CONDUCTORS:

- A. General Properties:
 - 1. Shall have a rating of MV-105 for normal operation and shall be sized per the Drawings.
 - 2. Shall be treated to prevent the migration of water into the cable.
 - 3. Conductor shield and insulation shield shall both be semi-conducting.
 - 4. Heavy duty, overall protective polyvinyl chloride jacket shall enclose every cable.
 - 5. Cable temperature ratings for continuous operation, emergency overload operation, and short circuit operation shall be not less than the NEC, NEMA WC 71, NEMA WC 74, or UL 1072 standard for the respective cable.
- B. 15kV Conductors: For all distribution systems ranging from 5kV to 15kV.
 - 1. Shall be compressed stranded aluminum (ASTM B230, B231 and B609).
 - 2. Insulation level shall be 133% with the following properties:
- C. Conductor Labelling: The manufacturer's name, cable type and size, and other pertinent information shall be marked or molded clearly on the overall protective jacket.

2.5 TERMINATIONS:

- A. Terminations shall meet all currently adopted industry standards.
- B. Materials shall be compatible with the cables being terminated, and shall be suitable for the prevailing environmental conditions.
- C. Terminations:
 - 1. Shall comply with IEEE 48. Include shield ground strap for shielded cable terminations.
 - 2. Class 1 terminations for indoor use: Kit with stress-relief tube, molded-silicone rubber insulator modules, and compression-type connector.
 - 3. Load-break terminations for indoor and outdoor use: load-break premolded rubber elbow connectors with bushing inserts, suitable for submersible applications. Separable connectors shall comply with the requirements of IEEE 386, and shall be interchangeable between suppliers. Allow sufficient slack in medium-voltage cable, ground, and drain wires to permit elbow connectors to be moved to their respective parking stands.
 - 4. Ground metallic cable shields with a device designed for that purpose, consisting of a solderless connector enclosed in watertight rubber housing covering the entire assembly.
 - 5. Provide insulated cable supports to relieve any strain imposed by cable weight or movement. Ground cable supports to the grounding system.

2.6 FIREPROOFING TAPE

- A. Fireproofing tape shall be flexible, non-corrosive, self-extinguishing, arcproof, and fireproof intumescent elastomer. Securing tape shall be glass cloth electrical tape not less than 0.18 mm (7 mils) thick, and 19 mm (0.75 inch) wide.

PART 3 - EXECUTION

3.1 PREPARATION

- A. Coordinate any / all utility requirements with the power utility company and include in the base bid.
- B. Coordinate with the power utility company to obtain information regarding the available short circuit current at the service point. Provide this information to the electrical gear manufacturer for use in the overcurrent protective device coordination study required by Section 26 05 73 - Power System Studies.
- C. Verify pads and supports are suitable for installation.

3.2 APPLICATION

- A. GFCI Protection:
 - 1. Provide ground fault protection at all service entrance equipment in accordance with NEC 230.95.
 - 2. Provide ground fault protection at any additional locations indicated on the Drawings.

3.3 INSTALLATION

- A. General:
 - 1. Set all equipment plumb, straight and level.
 - 2. Provide grounding and bonding in accordance with Section 26 05 26 - Grounding and Bonding.
 - 3. Provide and install all equipment, including electrical connections, in accordance with the manufacturer's written instructions, the applicable requirements of NEC and the NECA "Standard of Installation", and in accordance with recognized industry practices to ensure that products serve the intended function.

4. Coordinate installation of all electrical equipment and enclosures with other trades, including Mechanical and Plumbing to avoid clearance issues with dedicated equipment space and working clearances.
5. Any items which have a marred / scratched finish shall be touched up or refinished to a new condition before final acceptance. This shall include, but shall not be limited to, sanding and properly removing rust or other contaminants and completely repainting equipment. Overall acceptance is subject to approval of the Engineer.

B. Conductors General:

1. Installation and sizing shall be in accordance with the NEC, as shown on the Drawings, and per manufacturer's instructions.
2. Contractor to generate wire pull calculations per NEC, prior to pulling conductors.
3. Install in raceways to mechanically protect conductors. Do not install the conductors until raceway system is complete.
4. Use suitable lubricating compounds on the cables to prevent pulling damage. Provide compounds that are not injurious to the cable jacket and do not harden or become adhesive.
5. Do not exceed manufacturer's recommended values for maximum pulling tension, maximum pull length or bend radius either permanently or temporarily during installation.
6. All elbows shall be a minimum of 36" radius or larger as required by code.
7. Cable shall be installed in conduit above grade and duct bank below grade unless otherwise indicated.
8. All cables of a feeder shall be pulled simultaneously.
9. Conductors of different systems (e.g., 5kV and 15kV) shall not be installed in the same raceway.
10. Locate an access point / manhole / pull box every 500' maximum and splice the cables only in manholes and pullboxes.
11. Ground shields in accordance with Section 26 05 26 - Grounding and Bonding for Electrical Systems.
12. Seal the cable ends prior to pulling, to prevent the entry of moisture or lubricant.

C. Conductors - Pulling in ducts and manholes:

1. Cables shall be pulled into ducts with equipment designed for this purpose, including power-driven winches, cable-feeding flexible tube guides, cable grips, pulling eyes, and lubricants. A sufficient number of qualified workers and equipment shall be employed to ensure the careful and proper installation of the cable.
2. Cable reels shall be set up at the side of the manhole opening and above the duct or hatch level, allowing cables to enter through the opening without reverse bending. Flexible tube guides shall be installed through the opening in a manner that will prevent cables from rubbing on the edges of any structural member.
3. Cable shall be unreeled from the top of the reel. Pay-out shall be carefully controlled. Cables to be pulled shall be attached through a swivel to the main pulling wire by means of a suitable cable grip and pulling eye.
4. Woven-wire cable grips shall be used to grip the cable end when pulling small cables and short straight lengths of heavier cables.
5. Pulling eyes shall be attached to the cable conductors to prevent damage to the cable structure.
6. Cables shall be pulled into ducts at a reasonable speed. Cable pulling using a vehicle shall not be permitted. Pulling operations shall be stopped immediately at any indication of binding or obstruction and shall not be resumed until the potential for damage to the cable is corrected. Sufficient slack shall be provided for free movement of cable due to expansion or contraction.
7. Splices in manholes shall be firmly supported on cable racks. Cable ends shall overlap at the ends of a section to provide sufficient undamaged cable for splicing.

D. Conductors - Terminations:

1. Install the materials as recommended by the manufacturer, including precautions pertaining to air temperature and humidity during installation.
 2. Installation shall be accomplished by qualified workers trained to perform medium-voltage equipment installations. Use tools as recommended or provided by the manufacturer. All manufacturer's instructions shall be followed.
- E. Fireproofing:
1. Cover all cable segments exposed in manholes and pullboxes with fireproofing tape.
 2. Apply the tape in a single layer, wrapped in a half-lap manner, or as recommended by the manufacturer. Extend the tape not less than 25 mm (1 inch) into each duct.
 3. At each end of a taped cable section, secure the fireproof tape in place with glass cloth tape.

3.4 IDENTIFICATION

- A. Furnish and install an engraved laminated nameplate for each circuit breaker or fused switch in switchgear.
- B. Refer to Section 26 05 53 - Identification for Electrical Systems for additional requirements.
- C. In each manhole and pullbox, install permanent identification tags on each circuit's cables to clearly designate the circuit identification and voltage. The tags shall be the embossed brass type, 40 mm (1.5 inches) in diameter and 40 mils thick. Attach tags with plastic ties. Position the tags so they will be easy to read after the fireproofing tape is installed.

3.5 SITE QUALITY CONTROL

- A. Switchgear - Manufacturer shall test relays at startup / commissioning of each piece of equipment.
- B. Conductor Checks and Testing:
1. Perform tests in accordance with the manufacturer's recommendations. Include the following visual and electrical inspections.
 2. Test equipment, labor, and technical personnel shall be provided as necessary to perform the acceptance tests. Arrangements shall be made to have tests witnessed by the Engineer.
 3. Visual Inspection:
 - a. Inspect exposed sections of cables for physical damage.
 - b. Inspect shield grounding, cable supports, splices, and terminations.
 - c. Verify that visible cable bends meet manufacturer's minimum bending radius requirement.
 - d. Verify installation of fireproofing tape and identification tags.
 4. Electrical Tests:
 - a. Acceptance tests shall be performed on new and service-aged cables as specified herein.
 - b. Test new cable after installation, splices, and terminations have been made, but before connection to equipment and existing cable.
 5. Insulation-Resistance Test: Test all new and service-aged cables with respect to ground and adjacent conductors.
 - a. Test data shall include megohm readings and leakage current readings. Cables shall not be energized until insulation-resistance test results have been approved by the Engineer. Test voltages and minimum acceptable resistance values shall be:

Voltage Class	Test Voltage	Min. Insulation Resistance
15kV	2.5kV DC	5k megohms

- b. Submit a field test report to the Engineer that describes the identification and location of cables tested, the test equipment used, and the date tests were performed; identifies the persons who performed the tests; and identifies the insulation resistance and leakage current results for each

- cable section tested. The report shall provide conclusions and recommendations for corrective action.
6. Online Partial Discharge Test: Comply with IEEE 400 and 400.3. Test all new and service-aged cables. Perform tests after cables have passed the insulation-resistance test, and after successful energization.
 - a. Testing shall use a time or frequency domain detection process, incorporating radio frequency current transformer sensors with a partial discharge detection range of 10 kHz to 300 MHz.
 - b. Submit a field test report to the Engineer that describes the identification and location of cables tested, the test equipment used, and the date tests were performed; identifies the persons who performed the tests; and numerically and graphically identifies the magnitude of partial discharge detected for each cable section tested. The report shall provide conclusions and recommendations for corrective action.
 7. Final Acceptance: Final acceptance shall depend upon the satisfactory performance of the cables under test. No cable shall be put into service until all tests are successfully passed, and field test reports have been approved by the Engineer.

3.6 ADJUSTING

- A. Transformer Voltage Adjustments: Measure primary and secondary voltages and make appropriate tap adjustments to within 2% of rated voltage.

END OF SECTION

SECTION 26 20 00 - LOW VOLTAGE ELECTRICAL DISTRIBUTION

PART 1 - GENERAL

1.1 GENERAL REQUIREMENTS

- A. Electrical service including underground primary requirements, transformer and secondary enclosure requirements, overhead and underground service entrance requirements, metering, and final connections.
- B. Provide and install all components of the low voltage distribution system(s) including all switchboards, panelboards, transformers, fuses, circuit breakers, disconnects, MCCs, etc. as shown on the Drawings and as required for a complete and working system. All equipment shall be sized to meet the latest adopted version of NEC 220 requirements as a minimum.

1.2 COORDINATION

- A. Prior to ordering disconnects and fuses or fuse holders, coordinate fuse ratings with the Mechanical Contractor to verify that fuses for all mechanical equipment matches the Maximum Over-Current Protection (MOCP) values of the mechanical equipment being provided. This Contractor to adjust upstream breaker sizes, branch circuit conductor sizes, whip sizes and disconnect sizes to accommodate the fuse (Over-Current Protection Device, OCPD) requirements for the supplied equipment.

1.3 SUBMITTALS

- A. Provide scaled shop drawings for each electrical equipment room showing the placement of all panelboards, transformers, and other equipment such as mechanical equipment, drawn to scale and dimensioned. Such shop drawings will be reviewed for compliance with the intent of the Drawings and the spaces available for all electrical equipment.
- B. Clearly indicate on the submittals whether equipment is fully-rated or series-rated and arrange the submittals in order the panelboards appear on the Drawings.
- C. Include the following parameters as applicable in the submittal: equipment name, description, voltage, phase, ampacity, kVA rating, K-rating, control voltage, impedance, etc.

PART 2 - PRODUCTS

2.1 MANUFACTURERS

- A. All panelboards, switchboards, disconnects, OCPDs, etc. shall be from the same manufacturer to ensure proper breaker coordination.
- B. All equipment on this project shall be new. Refurbished or used equipment will not be acceptable.
- C. Approved Manufacturers: ABB (formerly GE), ACT Communications, Asco, Bussman, Eaton (Cutler Hammer), Hammond Power Solutions, Industrial Electric Manufacturing (IEM), Jefferson, Littlefuse, Mersen (Ferraz Shawmut), MGM Transformer, Mirus International, Powersmith, Siemens, Square-D, and States Manufacturing.
- D. All other manufacturers shall require pre-approval in accordance with Section 26 00 00 - Electrical.

2.2 GENERAL REQUIREMENTS

- A. Unless specifically noted otherwise on the Drawings, all equipment in these Specifications shall meet the requirements outlined below.
- B. Conductor material for switchboards, panelboards, disconnects, etc. shall be copper.
- C. Transformer coils shall be continuous wound and conductor material shall be copper.
- D. Unless otherwise indicated on the Drawings, provide the following enclosures for all panelboards, switchboards, switchgear, disconnects, transformers, etc.:
 - 1. NEMA 1 - All equipment located in interior dry locations.
 - 2. NEMA 3R - All equipment located in damp, wet or exterior locations.
 - 3. NEMA 4X - All equipment located in corrosive environments.
- E. All panelboards, switchboards, disconnects, etc. shall have weatherproof threaded hubs for top / bottom / side conduit entries.
- F. All equipment shall have a factory applied gray finish applied over a rust inhibiting treatment. Any items which have the finish marred shall be touched up or refinished to like new condition before final acceptance. This shall include, but shall not be limited to, sanding and properly removing rust or other contaminants and completely repainting equipment if damage is extensive. Overall acceptance is subject to approval of the Owner's Representative.
- G. Provide all labeling / identification per Section 26 05 53 - Identification of Electrical Systems.
- H. Provide, at each main switchboard and all downstream distribution, a complete (time-current) coordination study and an arc flash study with all required labels. Contractor may use the equipment manufacturer to provide both the required studies and the required labels. Contractor to adjust all settings for electronic-trip circuit breakers. See Section 26 05 73 - Power System Studies for more details.

2.3 PANELBOARD / SWITCHBOARD COMMON REQUIREMENTS

- A. Construction: NEMA PB 1, UL 67, interiors shall be completely factory assembled. See General Requirements above for NEMA enclosure rating requirements.
- B. Enclosure Properties: Door in door construction, standard conduit knockouts in ends and sides of cabinet. Provide flush type combination catch and key door locks on all panelboards and load centers. Key all locks alike, provide two keys with each panelboard.
- C. Bus Information:
 - 1. Ground Bus: Full length, 25% phase rated, bonded to each bus, additional isolated bus in computer and communication panels.
 - 2. Neutral Bus: Full length
 - a. 200% of phase rated for all non-linear, computer or isolated ground (IG) panels.
 - b. 100% of phase rated for all lighting and power panels.
- D. OCPDs: Provide bolt-on circuit breakers unless otherwise indicated on the Drawings.
- E. Fault Withstandability: Suitable for operation and able to withstand the symmetrical short circuit current as indicated on the Drawings or available at the location, whichever is larger.
- F. Spaces: Install all allotted or indicated spaces so that future OCPDs can be added without additional machining, drilling, tapping or bus extensions.
- G. Circuit Identification:
 - 1. Frame-mounted directory with a heat-resistant transparent face for identifying circuits. Mount inside the panelboard door. Use equipment names as reflected by panelboard schedules on the

Drawings. Use room names and numbers selected by the Owner's Representative, which may differ from those shown on Drawings.

2. Provide on all new and revised existing panelboards per Division 26 with new information. See Section 26 05 53 - Identification for Electrical Systems for more information.

H. Features and Accessories:

1. Provide metering and instrumentation per Section 26 09 13 - Electrical Power Monitoring and per Division 23 Energy Management Control System requirements.
2. Provide GFCI and GFPE protection as indicated here, as shown on the Drawings and where required per NEC.
3. Provide SPDs at each main switchgear per Section 26 43 00 - Surge Protective Devices.

2.4 PANELBOARDS

A. Construction:

1. Flush-mounted panelboards: Trims shall fasten to permit both horizontal and vertical adjustment. Provide barriers per NEC 215.15.
2. Surface-mounted panelboards: Trims shall fasten to insure no overhang.

2.5 SAFETY SWITCHES AND ENCLOSED CIRCUIT BREAKERS

A. Product Description:

1. Provide single-throw, horsepower rated, 100% load break and make rated, designed for locking in "ON" or "OFF" position, steel cabinets, as required by the application and required per the NEC.
2. Provide equipment rated for the required voltage and with the number of poles required, dependent on the equipment requirements.
3. Provide SPDs at equipment in accordance with Section 26 43 00 - Surge Protection Devices.

B. Construction:

1. All safety switches and enclosed circuit breakers shall be Heavy Duty (HD) type and built per NEMA KS 1 and UL 98.

C. Disconnect / Safety Switches:

1. Safety switches shall be fused, unless indicated as non-fused on the Drawings.
2. All disconnects / safety switches shall be lockable in the OFF position.
3. Use fuse clips which are rejecting type to accept Class RK or L fuses only.
4. Size fused safety switches and upstream conductors serving motor loads at 175% of motor nameplate or per NEC values, whichever is larger, and round to the next standard size.

- D. Enclosed Circuit Breakers: Provide where indicated on Drawings, otherwise provide a disconnect / safety switch.

2.6 CIRCUIT BREAKERS

- A. Product Description: Bolt-on, quick-make, quick-break, over center toggle, trip-free, trip-indicating circuit breakers; listed and labeled as complying with UL 489; ratings, configurations, and features as indicated on the Drawings.

- B. Interrupting Ratings: Provide size (ampacity) and withstand (AIC) rating as indicated on the Drawings. Series rated panels are NOT allowed. All panels shall be FULLY RATED.

- C. Thermal Magnetic Circuit Breaker: Bi-metallic overload elements, magnetic trip, common trip type so that an overload or fault on one pole will trip all poles simultaneously. Handle ties are not acceptable.

- D. Electronic-Trip Circuit Breaker: Solid-state, microprocessor-based, true RMS sensing trip units with the following field-adjustable trip response settings:
 - 1. Long time pickup, adjustable by replacing interchangeable trip unit or by setting dial.
 - 2. Long time delay.
 - 3. Short time pickup and delay.
 - 4. Instantaneous pickup.
- E. Features and Accessories: Provide as required by NEC, as indicated in the Specifications and as shown on the Drawings.
 - 1. AFCI: Arc fault sensing where arc fault protection is indicated or required.
 - 2. GFCI / GFPE: Ground fault pickup and delay where ground fault protection is indicated or required by NEC.
 - 3. Shunt Trip: Provide coil voltage as required for connection to indicated trip actuator.
 - 4. Lock-Out Provision: For locking the circuit breaker in the off position.
- F. Provide number of poles indicated for the specified equipment or service, with common trip handle for all poles.
- G. Independently mount so that a single unit can be removed from the front of the panelboard without disturbing or removing main bus, other units or other branch circuit connections.
- H. All circuit breakers that have an overcurrent trip setting fixed or adjustable at 1200a or higher shall have an Energy-Reducing Maintenance Switch or similar approved method for arc energy reduction and shall meet all requirements of NEC 240.67 and NEC 240.87. No exceptions.

2.7 FUSES

- A. Performance Requirements:
 - 1. All fuses shall be from the same manufacturer.
 - 2. Provide ampacity rating as indicated on the Drawings or required by NEC.
 - 3. Unless otherwise indicated on the Drawings, size fuses serving all motor loads at 175% of motor nameplate FLA or NEC motor table ampacity, whichever is larger.
- B. 600-amp and less: UL Class RK-1 dual element, time delay.
- C. 601-amp and larger: UL Class L time delay.

2.8 GROUND FAULT PROTECTION

- A. Ground Fault Protection System:
 - 1. Ground sensor relay (GSR) system with ground break components, solid state construction, adjustable current pick-up and time delay settings.
 - 2. Coordinate ground sensor (CT) with integral test winding of sufficient size to encircle all phase and neutral conductors, for zero-sequence monitoring and a solid-state relay to operate the trip circuit on the main switches.
 - 3. Provide required transformer to supply power for tripping switches and connect phase to phase.
- B. Accessories Included:
 - 1. Ground fault relaying system for main switches to be zero-sequence type.
 - 2. Ground fault current-detection range to be 100a to 1,200a.
 - 3. Time delay range to be instantaneous to 60 cycles.
 - 4. Derive tripping and control power from control power transformers in switchboard.
 - 5. Components shall include static ground fault sensor, current monitor, and test panel.

- C. Where ground fault protection is required per NEC or indicated in the Specifications or the Drawings, coordinate with the equipment manufacturer to provide all proper GFCI / GFPE requirements for personnel (5ma) and equipment (30ma).

2.9 FRACTIONAL HORSEPOWER MOTOR-RATED SWITCH

- A. Product Description: NEMA WD-1 & WD-6, motor-rated toggle switch. For use when switch-mounted thermal overload relays are not required.
- B. See Specifications section 26 27 26 - Wiring Devices for additional requirements.

2.10 CONTACTORS AND RELAYS

- A. General:
 - 1. NEMA ICS 2, magnetically operated contactor with poles and contacts to match the circuit function and load. All contactors used for lighting shall be "lighting-rated".
 - 2. Coordinate coil voltage with controls system. 120v preferred. Provide fused control circuit transformers as required.
 - 3. Provide an enclosure to house all contactors and relays. See General Requirements above for NEMA enclosure rating requirements.
 - 4. All contactors to be rated for the load type, voltage and continuously rated current.
 - 5. Provide sufficient contactors and/or poles to accommodate quantity of circuits required to be switched plus an additional 25% for future growth.
 - 6. Mechanically-held contactors are required except where electrically-held contactors are specifically noted in the Drawings or Specifications.
- B. Mechanically-Held Contactors:
 - 1. Mechanism electrically operated by solenoids and mechanically latched.
 - 2. Coil clearing contacts to de-energized coils when device is held closed.
 - 3. Required remote control relay and controls for proper latching and unlatching.
- C. Electrically-Held Contactors:
 - 1. Mechanism electrically-held by a solenoid.
 - 2. Required relays and controls for proper operation.

PART 3 - EXECUTION

3.1 EXAMINATION

- A. Verify mounting supports are properly sized and located including concealed bracing in walls.

3.2 PREPARATION

- A. Coordinate with the power utility company to obtain information regarding the available short circuit current at the service point. Provide this information to the electrical gear manufacturer for use in the overcurrent protective device coordination study required by Section 26 05 73 - Power System Studies.
- B. Coordinate all requirements with the power utility company and include in the base bid, including but not limited to the following:
 - 1. Whether the service will be overhead or underground.
 - 2. The extent of any underground primary.
 - 3. The need for a secondary enclosure. Provide in bid if required.
 - 4. Any charges from the power utility company for providing service.
 - 5. The need for a transocket for utility metering.

3.3 APPLICATION

- A. Panelboards and Switchboards: Provide a complete isolated ground system including isolated ground panelboard with 200% neutral, SPD and separate isolated ground bus where indicated on the Drawings.
- B. Transformers:
 - 1. Provide K-1 transformers when serving panelboards, unless altered by below items.
 - 2. Provide K-13 transformers when serving isolated ground panelboards.
 - 3. Provide K-20 transformers when serving panelboards in network operations centers (NOC).
- C. Circuit Breakers:
 - 1. Provide ground fault circuit breakers (GFCI) where indicated on the Drawings, panelboard schedules and / or as required by NEC 210.8(B), 422.5, etc. For example, provide protection at all EWCs, hand dryers, kitchen equipment, concessions equipment, etc. Pull separate neutrals with each circuit to ensure correct GFCI operation.
 - 2. Provide combination AFCI / GFCI circuit breakers where AFCI protection is required per NEC and as indicated on the Drawings.
- D. GFCI Protection:
 - 1. Provide ground fault protection at all service entrance equipment in accordance with NEC 230.95.
 - 2. Provide ground fault sensing and indication on emergency systems in accordance with NEC 700.27.
 - 3. Provide ground fault protection at any additional locations indicated on the Drawings.
- E. Motor Disconnecting Means:
 - 1. Provide a motor-rated switch as a disconnecting means at all motors powered by 120v, 277v and 208v 1ph 20A circuits, unless otherwise indicated on the Drawings.
 - 2. Provide a fused disconnect at all motors not listed above, unless otherwise indicated on the Drawings.

3.4 INSTALLATION

- A. General:
 - 1. Set all equipment plumb, straight and level.
 - 2. Provide and install all equipment, including electrical connections, in accordance with the manufacturer's written instructions, the applicable requirements of NEC and the NECA "Standard of Installation", and in accordance with recognized industry practices to ensure that products serve the intended function.
- B. Electrical Service:
 - 1. Underground primary: Unless otherwise noted on the Drawings, provide two 4" conduits from the power utility company service point to pad-mounted transformers. Primary conductors will be provided by the power utility company. Coordinate exact location of service point with the power utility company.
 - 2. Pad-mounted transformer: Construct the transformer pad in accordance with the power utility company specifications. Coordinate with the power utility company before installation of concrete for exact size, location and all requirements. The transformer will be provided by the power utility company, unless otherwise noted.
 - 3. Secondary enclosure: Coordinate with the power utility company and provide a secondary enclosure where required to transition from the transformer output to the service entrance feeder. Provide the pad for the secondary enclosure. Provide all conduit, wire, and terminations between the transformer and the secondary enclosure.
 - 4. Underground service entrance: Provide all trenching, conduit, conductors and electrical equipment from the secondary terminals of the transformer / secondary enclosure to the main service disconnects.

5. Overhead service entrance: Provide all conduit, conductors, supports, weatherheads, and sleeving from the electric service point to the main service disconnects.
 6. Metering: Provide conduits, conductors, cabinets, racks, transocket, and supports as required by the power utility company for service metering. All utility metering equipment will be provided by the power utility company.
 7. Final connection: Coordinate final connection with the power utility company.
- C. Panelboards and Switchboards:
1. Install in the locations as shown and as recommended in NEMA PB1.1. Mount the panelboards such that the top of the switch or circuit breaker in the highest position will not be more than 6-1/2 feet above the floor or working platform. Space all panelboards and switchboards to meet the requirements of NEC 110 and 408. Anchor enclosures firmly to walls and structural surfaces, ensuring that they are permanently and mechanically secured.
 2. Provide required SPD breaker for each panelboard/ switchboard as indicated on the Drawings.
 3. Coordinate installation of panelboards and enclosures with other trades, including Mechanical and Plumbing to avoid clearance issues with dedicated equipment space and working clearances.
 4. Place all free standing or floor mounted equipment on four (4) inch housekeeping pads.
- D. Fuses:
1. Check fasteners on fuse clips for tightness when installing fuses.
 2. Install fuses so label is in an upright, readable position. Fuses without labels are not acceptable.
 3. Do not install fuses until equipment is ready to be energized.
- E. Safety Switches and Enclosed Circuit Breakers:
1. Mount switches within six (6) feet of the equipment served, so that operating handle is easily accessible. Align tops of switches when grouped together.
 2. Provide a four (4) inch housekeeping pad for all free standing / floor mounted safety switches whether they are mounted inside or outside.
 3. Mount vertically on required separate support system hardware with switch easily accessible (door to open 90 degrees minimum).
 4. Permanently mount safety switches from inside with plated or stainless bolts, toggle bolts or anchors. Exposed mounting bolts, screws, etc. are not acceptable.
 5. Permanently install fusible switches with Class R fuse kits so that fuses are readable when looking at open switch.
 6. Do not mount switches / disconnects to access panels or on nameplate data on equipment per NEC.
 7. Installation of conductors: Switches shall not be used as "junction boxes" between HVAC units (splicing or "pig tailing" is not permitted). The maximum number of conductors allowed per termination is determined by the manufacturer's approved rating for each terminal or lug.
- F. Contactors and Relays:
1. Unless otherwise indicated on the Drawings, mount contactors in electrical enclosures in the electrical room, mechanical room or designated area on Drawings in accordance with manufacturer's instructions and recommendations.
 2. Provide an override toggle switch for maintenance and testing located beside each contactor used for lighting.
 - a. Provide relay with integral override switch per Exterior Lighting Controls details on the Drawings.

3.5 ELECTRICAL SERVICE AND METERING PROVISIONS

- A. The Contractor shall provide all materials and labor shown on the Drawings and / or required for the complete installation except as specifically indicated to be by the serving power utility company. The Contractor shall meet all requirements as directed by the serving power utility company at the cost to the Contractor.

3.6 ADJUSTING

- A. Electrical Load Balancing: Balance panelboards by checking each phase of all panels under full load and arrange so that all phases carry the same load as near as possible by moving individual branch circuits. After load balancing is complete, correct panelboard schedule directories to reflect all breakers and loads correctly.
- B. Transformer Voltage Adjustments: Measure primary and secondary voltages and make appropriate tap adjustments.
- C. GFCI Protection: Initial adjustments at service entrance equipment:
 - 1. Initial settings: At the time of installation, adjust the settings of the ground fault protection device as follows:
 - a. Time delay: Adjust the time delay to 0.3 seconds.
 - b. Pick-up: In no case can the setting exceed 1,200a. Observing this absolute maximum, adjust the ground fault trip setting to the greater of the following two options:
 - 1) 15% of the trip rating of the main breaker in the service entrance equipment.
 - 2) At least as large as the trip rating of the largest downstream overcurrent device that serves a single piece of equipment.

END OF SECTION

SECTION 26 50 00 - LIGHTING

PART 1 - GENERAL

1.1 GENERAL REQUIREMENTS

- A. Interior and exterior lighting systems including, but not limited to, luminaires, drivers, emergency drivers, emergency lighting, power transfer devices, poles and pole bases, etc.
- B. Exceptions include Section 26 55 61 - Theatrical Lighting and Section 26 56 68 - Exterior Athletic Lighting.

1.2 COORDINATION

- A. Coordinate the location, mounting height and mounting style of luminaires with architectural RCP, mechanical (HVAC duct work, grilles, etc.), plumbing (exposed piping, sprinkler heads, etc.), technology (A/V, projectors, etc.) and other trades, as required, before installation.
- B. In any space with a ceiling other than gypsum, T-grid or exposed, the Contractor shall install 3-4 luminaires and make the installation available for review by the Owner's Representative before installing the remaining luminaires in the space.

1.3 SUBMITTALS

- A. Submit luminaires shown on the Luminaire Schedule on the Drawings and those noted on the Drawings but not on the schedule.
- B. Product Data: In addition to the above requirements, submit complete product information for the following:
 - 1. Luminaires - complete manufacturer part number, delivered lumens, L70 rating, LM-80 testing hours, CCT (Correlated Color Temperature), CRI (Color Rendering Index), input wattage, finish, EPA (Effective Projected Area).
 - 2. Drivers - controls / dimming, power factor, THD (Total Harmonic Distortion).
 - 3. Emergency LED drivers - run time, battery chemistry, wattage.
 - 4. Power transfer devices for emergency lighting - manufacturer part number, wiring diagram.
 - 5. Poles - pole height, material, thickness, finish.
- C. Indicate if DLC (DesignLights® Consortium) listing applies only to certain color temperatures, beam spreads, or other luminaire options. Indicate if any luminaire options void the DLC listing.

1.4 SAMPLES

- A. Submit non-returnable samples of luminaires upon request. Include all components necessary for a working product.

1.5 WARRANTY

- A. Provide a five (5) year manufacturer's warranty for all luminaires and emergency LED drivers. The warranty shall include all luminaire components including, but not limited to, LED arrays, drivers, luminaire body and hardware. LED arrays will be considered defective if a total of 15% or more of the individual diodes fail to illuminate.
- B. Provide a one (1) year factory warranty on the pole and five (5) year extended warranty on pole finishes.

- C. The warranty period shall cover the cost of equipment, materials, mobilization and labor for repair and replacement.

PART 2 - PRODUCTS

2.1 MANUFACTURERS

- A. Only those manufacturers of luminaires and poles listed on the Luminaire Schedule are acceptable.

2.2 PERFORMANCE / DESIGN CRITERIA

- A. All luminaires shall be compatible with lighting controls shown on the Drawings or specified in Section 26 09 16 - Electrical Control Components and / or Section 26 09 23 - Lighting Control Devices.
- B. Pole assemblies shall meet wind loading requirements for the area in which they are installed or 100 mph, whichever is greater. Pole assemblies include the pole, the pole base, pole-mounted luminaires, and any other component that would affect wind loading. Pole bases shall be designed by a Structural Engineer licensed to work in the state.
- C. IECC 2021: To meet the enhanced digital lighting controls option, all luminaires shall be digitally addressable through the lighting control system. Refer to Section 26 09 23 - Lighting Control Devices, for additional requirements.
- D. Exterior lighting shall meet all current city ordinances for light levels, light trespass and specific shielding requirements.

2.3 LUMINAIRES

- A. All luminaires shall have the following listings based on usage:
 - 1. LED luminaires shall comply with UL 8750 and UL 1598 requirements.
 - 2. Emergency luminaires, including exit signs, shall be UL 924 listed.
 - 3. Luminaires in hazardous locations shall comply with UL 844 requirements and be suitable for the environment.
- B. See the Luminaire Schedule for CCT, THD, CRI, lumen output tolerance, wattage tolerance, L70 rating. When these values are not listed on the schedule, use the following values:
 - 1. CCT - 4000K, minimum 80 CRI (interior) and 70 CRI (exterior), THD 10% max, life expectancy - L70 at 50,000 hours per LM-80 test data using TM-21 procedures.
 - 2. Tolerance for Lumen Output shall be + / - 8% and Wattage (VA) shall be +5% / -10%.
- C. CCT: Color Temperature shall be within a 3-step Standard Deviation Color Matching (SCDM) or MacAdam ellipse in accordance with ANSI C78.377.
- D. Expected Life: The estimated L70 of LED luminaires shall be derived from LM-80 test data in accordance with TM-21 procedures. LM-80 test data shall be measured in accordance with LM-79 procedures.
- E. Efficacy: All general purpose LED luminaires shall have a minimum efficacy of 90 lumens / watt.
- F. Finishes: Unless otherwise noted, consult Owner's Representative for factory luminaire finish.

2.4 INTERIOR LUMINAIRES

- A. All luminaires in gyms, play areas, multipurpose spaces, etc. shall have a hinged wire guard and retainer latches for tool-less maintenance.

2.5 EMERGENCY LIGHTING AND EXIT SIGNS

- A. All emergency lighting and exit signs shall be provided with status indicator lamp and test switch. Integral test switch is preferred.
- B. See Emergency LED Drivers part below for emergency driver information.

2.6 LED DRIVERS

- A. Shall be factory installed, unless otherwise indicated on the Drawings or prior approval is given by the Engineer.
- B. Drivers shall comply with UL 8750, be UL Type TL or UL Class P listed and bear such labels.
- C. Voltage: Drivers shall be 60hz, universal input voltage (120v thru 277v) + / - 10% unless otherwise indicated on the Luminaire Schedule. Drivers shall demonstrate no visible change in light output with a variation of + / - 10% change in line voltage input.
- D. Remote Drivers: Unless otherwise dictated on the Drawings, remote drivers shall have remote wiring capability of fifty (50) feet minimum.
- E. Sensor Compatibility: Drivers shall be compatible with and not cause interference with the operation of motion sensors or other infrared control systems.
- F. Performance: Drivers shall have a power factor of 0.9 or greater, have an efficiency of 85% or greater and have an audible noise rating of 27dB Class A or less.
- G. Case Temperature: Interior drivers shall have a maximum case temperature rating of 75°C. Exterior drivers shall have a maximum case temperature rating of 85°C.
- H. Operating Ambient Temperature Range: Drivers shall be rated for a temperature range of 32°F - 122°F when mounted inside and rated to 0°F when outside or above an outside ceiling.
- I. Electromagnetic Compliance: Drivers shall comply with CFR Title 47 Part 15 Class A.

2.7 EMERGENCY LED DRIVERS

- A. In addition to the above driver requirements, Emergency drivers shall also meet the following:
 - 1. Shall be rated for at least ninety (90) minutes at full light output (120 minutes in storm shelters) unless otherwise noted on the Drawings.
 - 2. Shall operate with constant output power to maintain the output wattage to the LED array even as the system voltage diminishes.
 - 3. Shall be maintenance-free, nickel-cadmium battery technology.

PART 3 - EXECUTION

3.1 INSTALLATION

- A. Provide all luminaires of the types indicated, in accordance with NEMA standards, manufacturer's recommendations, and NEC requirements.
- B. Install indoor lighting systems in accordance with NECA / IESNA 500 and all exterior lighting systems in accordance with NECA / IESNA 501.
- C. Install all interior and exterior luminaires as shown on the Drawings. Where the layout needs to be altered, coordinate with the Owner's Representative for direction before installing luminaires to ensure even illumination and proper light levels.

- D. Provide support for all interior luminaires by means of bar hangers extended across the main ceiling support members. See lighting details on the Drawings for more information.
- E. All interior luminaires shall be independently supported from the building structure.
- F. Provide luminaires complete with LED arrays, LED drivers, and other accessories necessary for proper installation in the building construction and listed for fire rated ceilings where required by code or shown on the Drawings.
- G. Lighting Control: Provide switches with matching technology (line voltage dimming, 0-10V dimming, etc.) for dimming drivers in the locations shown on the Drawings. Provide lighting controls in accordance with Section 26 09 16 - Electrical Control Components, Section 26 09 23 - Lighting Control Devices and / or Section 26 55 61 - Theatrical Lighting.
- H. Emergency Lighting: Provide an emergency LED driver, power transfer switch, internal wiring etc. in each luminaire that is indicated on the Drawings as an emergency luminaire or night light.
- I. Emergency Lighting Power: For all emergency lighting powered by a generator or UPS, provide an emergency power circuit to every power transfer device.
- J. Mount recessed luminaires in the center of a ceiling tile or as shown on the Drawings.
- K. Provide luminaire whips (flex conduit / metal clad cable) from a junction box to each luminaire (not to exceed four luminaires per junction box) access plate. Luminaire whips between luminaires will not be accepted. Refer to luminaire installation details on the Drawings for more information.
- L. Locate all remote LED drivers and / or emergency LED drivers as noted on the Drawings. Otherwise, install above the ceiling above each luminaire or in an adjacent room with a low ceiling for easy access. Provide a permanent label on the ceiling t-grid to identify locations of all remote drivers. Mount drivers on rubber insulators.
- M. All exit signs and night lights shall not be switched. Provide a constant hot tied back to the panelboard serving the lighting in the space.

3.2 SITE QUALITY CONTROL

- A. Prior to final inspection, check all luminaires for damage during construction and replace damaged luminaires at no additional expense to the Owner. Test all emergency luminaires for proper operation, including exercising all transfer switching, emergency LED drivers, generator, etc. All luminaires shall be cleaned and completely operational at the time of final acceptance of the building.
- B. Where specific light levels are mentioned on the Drawings and the luminaire type, quantity, locations or lumen output is changed, the Contractor shall ensure light levels are met. Re-aim or add lighting as necessary.
- C. The design intent shown on the Drawings meets the city ordinances for outdoor lighting trespass and minimum light level requirements. It is the responsibility of this Contractor to ensure that the lighting is installed to meet the design intent and city ordinances. Where required, re-aim or add shields to meet these requirements.

3.3 ADJUSTING

- A. The Contractor shall move any luminaire up to six feet in any direction as directed at no additional cost.

END OF SECTION

SECTION 27 05 00 – FIRE ALARM EXTENSION

PART 1 - GENERAL

1.1 SCOPE:

Work of this Section shall be in accordance with the intent of the Contract Documents and shall include the following principal items:

Fire Alarm System Extension

1.2 REFERENCED STANDARDS:

NFPA 70 - National Electrical Code

NFPA 72 - National Fire Alarm Code

ASME A117.1 Safety Code for Elevators and Escalators

NFPA 101 - Life Safety Code

Americans with Disabilities Act - Accessibility Guidelines for Building and Facilities (ADA-AG)

1.3 SHOP DRAWINGS AND APPROVALS: <S>

The Fire Alarm System Subcontractor shall prepare complete shop drawings and dimensional working drawings for the entire installation in accordance with the Fire Marshal's Requirements. First submit to the architect for approval of the basic arrangement and layout. Such submittal will be noted for corrections or changes if required. Contractor shall upload the approved submittal to the Fire Marshal or local authority for approval. Upon written approval from the State Fire Marshal's Office or local authority, approved set must remain on the project site throughout the duration of the project. Contractor shall include as a minimum in the submittal to the Fire Marshal the following: (as applicable)

FIRE ALARM SUBMITTAL REQUIREMENTS

Drawings

- Two copies of each.

- Drawn to an indicated scale. (1/8" = 1'-0" minimum)

- Site plan.

- Dimensions of each room.

- Occupancy of each room.

- Ceiling height.

- Cross section (if other than flat ceiling).

- Riser diagram

 - floor

 - zone

 - circuit

- Logic diagram (first "a" happens, then "b" happens)

- All connections to other systems, e.g.

 - sprinkler system valves, flow switches, etc.

 - elevator recall, shut down, etc.

- Legend

- Title block

Means of Occupant Notification

- Horns

- Speakers

- Strobes

Means of Fire Department Notification

- Digital alarm communicator transmitter (DACT or digital dialer)
 - two telephone lines
 - between telephone line and PBX
- Central station

Power Sources

- battery calculations
- emergency generator
 - fuel supply
 - 24-hour trained attendant

Full Cut Sheet and Manuals on ALL Devices

All Existing Systems or Devices

Completed Application

Review Fee

It shall be the fire alarm contractor's responsibility to pay any and all submittal fees and provide any and all material and labor required to obtain an approved submittal by the State Fire Marshal.

PART 2 – PRODUCTS <S> <OM>

2.1 FIRE ALARM SYSTEM EXTENSION:

- 2.1.1 Manufacturer: The equipment specified herein is to provide extension of existing system. The existing fire alarm control panel shall be expanded or replaced as necessary to add the devices indicated on plans and in specifications and as required by code. All annunciators shall be modified or replaced as required to indicate modified and/or new zones.
- 2.1.2 Fire Alarm System Operation: Alarm initiating devices shall be grouped in zones identified by zone light emitting diodes (LED's) on the control panel.

Actuation of an alarm initiating device shall:

- A. Cause the respective red zone alarm LED on the control panel to flash, until the acknowledge switch is actuated at the control panel. Once acknowledged, the zone LED will be constantly illuminated until the actuating device is restored to normal and the system is reset.
 - B. The audible alarm indicating appliance shall sound in a general alarm pattern throughout the entire facility until the system alarm acknowledge/silence switch is operated.
 - C. Visual indicating appliance units shall flash until the alarm acknowledge switch is reset.
- 2.1.3 After the acknowledge switch is operated, activation of a subsequent initiating device on another zone shall cause the audible indicating appliances to resound and the visual indicating appliances to flash,
 - 2.1.4 Each alarm initiating circuit and indicating appliance circuit shall be electrically supervised. Any disarrangement of system wiring such as opens or grounds, shall activate the audible and visual trouble

indicators at the control panel. Actuation of the trouble silence switch shall silence the audible trouble indicator, but the trouble LED will remain lit. The trouble LED shall be non-canceling, except by an actual clearing of the trouble condition and restoring the trouble silence switch to normal.

- 2.1.5 The activation of any system smoke detector shall initiate an Alarm Verification operation whereby the panel shall reset the activated detector and wait for a second activation. If, after reset, a second alarm is reported from the same or any other smoke detector within one (1) minute the system shall process the alarm per the operations listed above. If no second alarm occurs within one minute the system shall resume normal operations. The Alarm Verification shall operate only for smoke detectors. Other activated initiating devices shall be processed immediately.
- 2.1.6 Audible alarm indicating appliances shall be 24 volt DC horns of metal construction with a minimum sound pressure level output of 87 dB at 10 feet. Fire alarm horns shall be finished in baked-on red enamel paint and be UL listed for fire alarm use. Horns shall be adaptable for surface or semi-flush mounting and be suitable for use within combination audio/visual units. Horns match existing.
- 2.1.7 Visual indicating appliances shall comprise a Xenon flashtube and be entirely solid state. These devices shall be UL listed and be capable of either ceiling or wall mounting. Visual units shall be incorporated as part of the horn unit. Units shall match existing.
- 2.1.8 Smoke and heat detectors shall match existing. The detector shall be designed to latch into alarm following a 6 to 10 second processing delay verifying the continued presence of smoke within the sensing chamber. Smoke detectors shall have an integral fixed temperature heat detector rated at 135°F. Heat detector shall operate the alarm circuit and illuminate the smoke detector "Alarm" indicator light.
- 2.1.9 Duct mounted smoke detectors match existing and shall be provided with a remote test station. Provide where indicated on drawing or mechanical specifications.
- 2.1.10 Stand Alone Voice Evacuation Control Panel
 1. A stand alone Voice Evacuation Control Panel shall be available from the same manufacturer of the main fire alarm system.
 2. This Voice Evacuation Control Panel shall work stand alone or as a slave to the Main Fire Alarm Control Panel.
 3. Shall have as minimum requirements:
 - a. Integral 25 Watt, 25 Vrms audio amplifier with optional converter for 70.7 volt systems. The system shall be capable of expansion to 50 watts total via the insertion of an additional 25 watt audio amplifier module into the same cabinet.
 - b. Speaker circuit shall be capable of either Class A or B wiring.
 - c. Integral Digital Message Generator with a memory capacity for up to 60 seconds of messaging. The Digital Message Generator shall be capable of producing five distinct messages (12 seconds each). These messages shall field programmable without the use of additional equipment.
 - d. Built-in alert tone generators with steady, slow whoop, high/low and chime tone field programmable.
 - e. The Voice Evacuation Control Panel will be capable of detecting and annunciating the following conditions: Loss of Power (AC and DC), System Trouble, Ground Fault, Alarm, Microphone Trouble, Message Generator Trouble, Tone Generator Trouble, and Amplifier Fault.

4. The Voice Evacuation Control Panel shall be fully supervised including microphone, amplifier output, message generator, speaker wiring, and tone generation.
5. Speaker outputs shall be fully power-limited.
6. Amplifiers shall be independently powered and protected to eliminate a short on one circuit from affecting other circuits.
7. The Voice Evacuation Control Panel shall provide full supervision on both active (alarm or music) and standby conditions.
8. An optional zone splitter version shall be available that permits splitting speaker circuits into 8 specific zones.
9. An optional distributed amplifier unit shall be available that permits splitting speaker circuits into up to a total of 24 zones when two distributed amplifiers are combined with the master unit.
10. An optional fire fighter telephone unit with keypad shall be available that permits up to a total of 24 telephone circuits.

PART 3 - EXECUTION

3.1 FIRE ALARM SYSTEMS:

- 3.1.1 Wire shall be run in conduits (3/4" minimum trade size). Quantity of conductors shall be as required by manufacturer. All wiring shall be installed in strict compliance with the National Electrical Code, Article 725 and 760 and all state and local codes. Contractor shall provide as-built fire alarm wiring diagrams to owner.
- 3.1.2 A representative of the manufacturer shall instruct the Owner's maintenance personnel in the operation of the fire alarm and demonstrate the system after the Owner has occupied the building.

END OF SECTION

SECTION 27 05 33 - CONDUITS AND BACKBOXES FOR COMMUNICATIONS SYSTEMS

PART 1 GENERAL

1.1 SUMMARY

- A. Section includes conduit and tubing, surface raceways, wireways, outlet boxes, pull and junction boxes, and handholes.
- B. Related Sections:
 - 1. Section 26 05 03 - Equipment Wiring Connections.
 - 2. Section 26 05 33 - Raceway and Boxes for Electrical Systems.
 - 3. Section 26 05 34 - Floor Boxes for Electrical Systems.
 - 4. Section 26 27 26 - Wiring Devices.

1.2 REFERENCES

- A. American National Standards Institute:
 - 1. ANSI C80.1 - Rigid Steel Conduit, Zinc Coated.
 - 2. ANSI C80.3 - Specification for Electrical Metallic Tubing, Zinc Coated.
 - 3. ANSI C80.5 - Aluminum Rigid Conduit - (ARC).
- B. National Electrical Manufacturers Association:
 - 1. NEMA 250 - Enclosures for Electrical Equipment (1000 Volts Maximum).
 - 2. NEMA FB 1 - Fittings, Cast Metal Boxes, and Conduit Bodies for Conduit and Cable Assemblies.
 - 3. NEMA OS 1 - Sheet Steel Outlet Boxes, Device Boxes, Covers, and Box Supports.
 - 4. NEMA OS 2 - Nonmetallic Outlet Boxes, Device Boxes, Covers, and Box Supports.
 - 5. NEMA RN 1 - Polyvinyl Chloride (PVC) Externally Coated Galvanized Rigid Steel Conduit and Intermediate Metal Conduit.
 - 6. NEMA TC 2 - Electrical Polyvinyl Chloride (PVC) Tubing and Conduit.
 - 7. NEMA TC 3 - PVC Fittings for Use with Rigid PVC Conduit and Tubing.

1.3 SYSTEM DESCRIPTION

- A. Raceway and boxes located as indicated on Drawings, and at other locations required for splices, taps, wire pulling, equipment connections, and compliance with regulatory requirements. Raceway and boxes are shown in approximate locations unless dimensioned. Provide raceway to complete wiring system. Each raceway entry and exit shall be provided with a suitable bushing.
- B. Concealed Dry Locations: Provide electrical metallic tubing. Provide sheet-metal boxes. Provide flush mounting outlet box in finished areas. Provide hinged enclosure for large pull boxes.
- C. Exposed Dry Locations: Provide electrical metallic tubing. Provide sheet-metal boxes. Provide flush mounting outlet box in finished areas. Provide hinged enclosure for large pull boxes.

1.4 DESIGN REQUIREMENTS

- A. Minimum Raceway Size: 3/4 inch unless otherwise specified.

1.5 SUBMITTALS

- A. Section 01 33 00 - Submittal Procedures: Submittal procedures.

- B. Product Data: Submit for the following:
 - 1. Flexible metal conduit.
 - 2. Liquidtight flexible metal conduit.
 - 3. Nonmetallic conduit.
 - 4. Flexible nonmetallic conduit.
 - 5. Nonmetallic tubing.
 - 6. Raceway fittings.
 - 7. Conduit bodies.
 - 8. Surface raceway.
 - 9. Wireway.
 - 10. Pull and junction boxes.
 - 11. Handholes.
- C. Manufacturer's Installation Instructions: Submit application conditions and limitations of use stipulated by Product testing agency specified under Regulatory Requirements. Include instructions for storage, handling, protection, examination, preparation, and installation of Product.

1.6 CLOSEOUT SUBMITTALS

- A. Section 01 70 00 - Execution and Closeout Requirements: Requirements for submittals.
- B. Project Record Documents:
 - 1. Record actual routing of all conduits.
 - 2. Record actual locations and mounting heights of outlet, pull, and junction boxes.

1.7 DELIVERY, STORAGE, AND HANDLING

- A. Section 01 60 00 - Product Requirements: Product storage and handling requirements.
- B. Protect conduit from corrosion and entrance of debris by storing above grade. Provide appropriate covering.
- C. Protect PVC conduit from sunlight.

1.8 COORDINATION

- A. Section 01 30 00 - Administrative Requirements: Coordination and project conditions.
- B. Coordinate installation of outlet boxes for equipment connected under Section 26 05 03.
- C. Coordinate mounting heights, orientation and locations of outlets mounted above counters, benches, and backsplashes.

PART 2 PRODUCTS

2.1 METAL CONDUIT

- A. Manufacturers:
 - 1. Substitutions: Section 01 60 00 - Product Requirements.

- B. Rigid Steel Conduit: ANSI C80.1.
- C. Rigid Aluminum Conduit: ANSI C80.5.
- D. Intermediate Metal Conduit (IMC): Rigid steel.
- E. Fittings and Conduit Bodies: NEMA FB 1; material to match conduit.

2.2 ELECTRICAL METALLIC TUBING (EMT)

- A. Manufacturers:
 - 1. Substitutions: Section 01 60 00 - Product Requirements.
- B. Product Description: ANSI C80.3; galvanized tubing.
- C. Fittings and Conduit Bodies: NEMA FB 1; steel , compression type.

2.3 OUTLET BOXES

- A. Manufacturers:
 - 1. Substitutions: Section 01 60 00 - Product Requirements.
- B. Sheet Metal Outlet Boxes: NEMA OS 1, galvanized steel.
 - 1. Luminaire and Equipment Supporting Boxes: Rated for weight of equipment supported; furnish 1/2 inch (13 mm) male fixture studs where required.
 - 2. Concrete Ceiling Boxes: Concrete type.
- C. Nonmetallic Outlet Boxes: NEMA OS 2.
- D. Cast Boxes: NEMA FB 1, Type FD, aluminum. Furnish gasketed cover by box manufacturer. Furnish threaded hubs.
- E. Wall Plates for Finished Areas: As specified in Section 26 27 26.
- F. Wall Plates for Unfinished Areas: Furnish gasketed cover.

2.4 PULL AND JUNCTION BOXES

- A. Manufacturers:
 - 1. Substitutions: Section 01 60 00 - Product Requirements.
- B. Sheet Metal Boxes: NEMA OS 1, galvanized steel.

PART 3 EXECUTION

3.1 EXAMINATION

- A. Section 01 30 00 - Administrative Requirements: Coordination and project conditions.
- B. Verify outlet locations and routing and termination locations of raceway prior to rough-in.

3.2 INSTALLATION

- A. Ground and bond raceway and boxes in accordance with Section 26 05 26 .
- B. Fasten raceway and box supports to structure and finishes in accordance with Section 26 05 29.
- C. Identify raceway and boxes in accordance with Section 26 05 53.
- D. Arrange raceway and boxes to maintain headroom and present neat appearance.

3.3 INSTALLATION - RACEWAY

- A. Raceway routing is shown in approximate locations unless dimensioned. Route to complete wiring system. Raceway shall be supported from building structure.
- B. Arrange raceway supports to prevent misalignment during wiring installation.
- C. Support raceway using coated steel or malleable iron straps, lay-in adjustable hangers, clevis hangers, and split hangers.
- D. Group related raceway; support using conduit rack. Construct rack using steel channel specified in Section 26 05 29; provide space on each for 25 percent additional raceways.
- E. Do not support raceway with wire or perforated pipe straps. Remove wire used for temporary supports
- F. Do not attach raceway to ceiling support wires or other piping systems.
- G. Construct wireway supports from steel channel specified in Section 26 05 29.
- H. Route exposed raceway parallel and perpendicular to walls.
- I. Route raceway installed above accessible ceilings parallel and perpendicular to walls.
- J. Route conduit in and under slab from point-to-point.
- K. Maintain clearance between raceway and piping for maintenance purposes.
- L. Maintain 12 inch clearance between raceway and surfaces with temperatures exceeding 104 degrees F (40 degrees C).
- M. Cut conduit square using saw or pipe cutter; de-burr cut ends, provide bushed ends as required.
- N. Bring conduit to shoulder of fittings; fasten securely.
- O. Join nonmetallic conduit using cement as recommended by manufacturer. Wipe nonmetallic conduit dry and clean before joining. Apply full even coat of cement to entire area inserted in fitting. Allow joint to cure for minimum 20 minutes.
- P. Install conduit hubs to fasten conduit.
- Q. Install no more than equivalent of three 90 degree bends between boxes. Install conduit bodies to make sharp changes in direction, as around beams.

- R. Avoid moisture traps; install junction box with drain fitting at low points in conduit system.
- S. Install fittings to accommodate expansion and deflection where raceway crosses expansion joints.
- T. Install suitable pull string or cord in each empty raceway except sleeves and nipples.
- U. Install suitable caps to protect installed conduit against entrance of dirt and moisture.
- V. Surface Raceway: Install flat-head screws, clips, and straps to fasten raceway channel to surfaces; mount plumb and level. Install insulating bushings and inserts at connections to outlets and corner fittings.
- W. Close ends and unused openings in wireway.

3.4 INSTALLATION - BOXES

- A. Install wall mounted boxes at elevations to accommodate mounting heights as indicated on Drawings and specified in section for outlet device.
- B. Adjust box location up to prior to rough-in to accommodate intended purpose.
- C. Orient boxes to accommodate wiring devices oriented as specified in Section 26 27 26.
- D. Install pull boxes and junction boxes above accessible ceilings and in unfinished areas only.
- E. In Accessible Ceiling Areas: Install outlet and junction boxes no more than 6 inches (150 mm) from ceiling access panel or from removable recessed luminaire.
- F. Locate flush mounting box in masonry wall to require cutting of masonry unit corner only. Coordinate masonry cutting to achieve neat opening.
- G. Do not install flush mounting box back-to-back in walls; install with minimum 6 inches (150 mm) separation. Install with minimum 24 inches (600 mm) separation in acoustic rated walls.
- H. Secure flush mounting box to interior wall and partition studs. Accurately position to allow for surface finish thickness.
- I. Install stamped steel bridges to fasten flush mounting outlet box between studs.
- J. Install flush mounting box without damaging wall insulation or reducing its effectiveness.
- K. Install adjustable steel channel fasteners for hung ceiling outlet box.
- L. Do not fasten boxes to ceiling support wires or other piping systems.
- M. Support boxes independently of conduit.
- N. Install gang box where more than one device is mounted together. Do not use sectional box.
- O. Install gang box with plaster ring for single device outlets.

3.5 INTERFACE WITH OTHER PRODUCTS

- A. Install conduit to preserve fire resistance rating of partitions and other elements.
- B. Route conduit through roof openings for piping and ductwork or through suitable roof jack with pitch pocket. Coordinate location with roofing installation specified in Section
- C. Locate outlet boxes to allow luminaires positioned as indicated on Drawings and reflected ceiling plan.
- D. Align adjacent wall mounted outlet boxes for switches, thermostats, and similar devices.

3.6 ADJUSTING

- A. Section 01 70 00 - Execution and Closeout Requirements: Testing, adjusting, and balancing.
- B. Adjust flush-mounting outlets to make front flush with finished wall material.
- C. Install knockout closures in unused openings in boxes.

3.7 CLEANING

- A. Section 01 70 00 - Execution and Closeout Requirements : Final cleaning.
- B. Clean interior of boxes to remove dust, debris, and other material.
- C. Clean exposed surfaces and restore finish.

END OF SECTION

SECTION 27 13 43: DATA, TELEPHONE, INTERCOM CABLING

PART 1 - GENERAL

1.1 GENERAL REQUIREMENTS:

The requirements of the Contract Documents, including the General and Supplementary General Condition and Division 1 - General Requirements shall apply to the work of this section.

7 days prior to bid, all exceptions taken to these Specifications, all variances from these Specification and all substitutions of operating capabilities or equipment called for in these Specification shall be listed in writing and forwarded to the Engineer. Any such exception, variances or substitutions not listed at the time of bid in the specification and or addenda and are identified in the submittal, shall be immediately stamped disapproved without comment.

1.2 GENERAL SCOPE:

Work of this Section shall be in accordance with the intent of the Contract Documents and shall include the following principal items:

Data Equipment and Wiring Installation
Telephone Wiring Installation
Intercom Wiring Installation

1.2.1 Scope

The work covered by this Section of the Specification shall include all labor, equipment, materials and services to furnish and install complete Data, Telephone, and Intercom Wiring System.

1.3 REFERENCED STANDARDS:

NFPA 70 - National Electrical Code
TIA/EIA 568B
Americans with Disabilities Act - Accessibility Guidelines for Building and Facilities
(ADA-AG)

1.4 CONTRACTOR QUALIFICATIONS:

The contractor shall be the authorized factory distributor of the products submitted. The contractor shall have the proper Telecommunications license as required by the State of Louisiana. The company shall employ trained installers. A copy of the training certificates shall also be supplied to the engineer for verification.

1.5 WARRANTY:

Manufacturer shall guarantee the system equipment for a period of one (1) year from date of final acceptance of the system. The contractor shall guarantee all wiring and raceways to be free from inherent mechanical or electrical defects for one (1) year from date of final acceptance of the system.

PART 2 – PRODUCTS <S><OM>

2.1 DATA, TELEPHONE, AND INTERCOM WIRING SYSTEM: <S> <OM>

- a) This Section includes the wire, cable, outlet assemblies, installation, and testing for wiring systems to be used as signals pathways for high-speed data, telephone transmission.

- b) The contractor shall be certified by the manufacturer to install that manufacturer's products. The installer shall certify by letter that the installation complies with the manufacturer's recommendations and the requirements of TIA/EIA 568B. The name and qualifications of the installer shall be submitted and approved prior to beginning the installation of data systems products.
- c) Provide products specified in this section that are listed and labeled per UL and meets NFPA.
- d) Submittals shall include Product Data for each component specified, including detailed manufacturer's specifications. Include data on features, rating, and performance. Telecommunications contracting company qualification data shall be submitted for approval and shall include documentation verifying qualifications.
- e) Use the following number products or the later generation upgrade of the models where appropriate meeting the project requirements (as determined by the Engineer, where there is question, request clarification prior to last addenda). Subject to compliance with requirements, provide products by one of the following:

Category 6, Unshielded Twisted Pair Data Cable (600 MHZ Minimum) Reel-In-Box (Plenum):

ICC: ICCABP6VXX

Panduit: pup6004X

2-Port Faceplate (stainless steel):

ICC: IC107SF2SS

Panduit: CFPL2WHY

4-Port Faceplate (stainless steel):

ICC: IC107SF4SS

Panduit: CFPL4WHY

Category 6, 24-Port Patch Panels:

ICC: IC107BP242

Panduit: CPPL24WBLYY

Category 6, 48-Port Patch Panels:

ICC: IC107BP482

Panduit: CPPL48WBLYY

Category 6, Modular Jack

Panduit: CJ688TGX

Fiber Optic Cable, 6-Strand Multimode (Plenum):

AMP

CORNING

Fiber Optic, 24-Port Pre-Loaded Rack-Mount, Drawer-Style Enclosure:

ICC

Panduit

4-Post 19" Open Frame Rack (30" depth)

ICC: ICCMSR1984

Panduit: R4P

Wall Hung Frame Racket (30" depth)

Synergy: WR1007-F

Velcro tie (0.75" w.x 12.00" l. Min.) and Saddle:

Panduit #HLS3S-XO/TMEH-S8-QO

Nordex/CDT #AX100784/#AX100781

SPEAKERS:

2x2 Layin IP Ceiling Speaker (Talkback):

Valcom: VIP-422A

Wall IP Speaker:

Valcom: VIP-430A-VB-A13

Outdoor IP Speaker with protective wire cage:

Valcom: VIP-130AL – V-WGHORN

NOTE: CONTRACTOR SHALL INCLUDE FIVE ADDITIONAL SPEAKERS OF EACH TYPE IN BID.

f) Coordinate the feature of materials and equipment so they form an integrated system. Match components and interconnections for optimum performance.

g) TWISTED PAIR CABLES, CONNECTORS, AND TERMINAL EQUIPMENT SHALL BE AS FOLLOWS:

- 1) Listed as Complying with Category 6 and 6A: Provide evidence of listing for all products specified in this Article.
- 2) Unshielded Twisted Pair (UTP) Cable: Meets or exceeds TIA/EIA 568B requirements for Category 6 and 6A. Multipair No. 24 AWG, color-coded, thermoplastic- insulated conductors in a polyvinyl chloride (PVC) jacket. Wiring shall be solid copper.
- 3) Jacks and Jacks Assemblies for UTP Cable: Modular, color-coded, RJ-45 receptacle units with integral IDC-type terminals. Non-keyed, thermoplastic face, T568B wiring. Independently verified to exceed TIA/EIA 568B requirements for category 6.
- 4) Workstation Outlets: mounting strap for four jacks maximum in duplex receptacle configuration flush to exterior surface of faceplate. Provide blank filler for unused ports. Device shall be ivory plastic. Device plate is to be 302 stainless steel. Mount in surface raceway box unless specifically noted, flush.
- 5) Category 6 and 6A, 48-port and 24-Port Patch Panels are to be pass-through with RJ-45 jacks in front and back of the indication strip. Unit shall be for 19" rack mounting and 1.75" high and shall be Category 6 compliant. Patch cables shall be provided by Owner.

Operating Wavelength (Nanometers)	Minimum Bandwidth (MHz-km)	Max.Attenuation (dB/km)
850	400	3.0
1300	400	1.0

6) Fiber Optic Cable, 6-strand, Tight Buffer, Distribution Type is to be six separate glass fibers of 62.5/12.5 micron (core/cladding) construction with tight buffer construction in the overall PVC jacket. The minimum optic characteristics shall be the same as the fiber optic outdoor cable above.

7) Fiber Optic Cable Connector, Type St, Simplex, Multimode is to be ST type connector & shall have ferrule.

8) Fiber Optic, 24-Port, Rack Mount, Drawer-Style Enclosure is to be steel housing, preloaded with 24 ST style couplings in slide out drawer with fiber optic storage drums and brackets and 19-inch rack mounting. Unit shall occupy one rack unit of mounting space.

9) FIBER AND CAT 6 IDENTIFICATION: Identify system components and cables as per details on project drawings. Workstations outlets shall have cables labeled within outlet boxes and each jack at outlets. IDF Cabinets shall have labels on or over each jack and at patch panels. Cables in any location shall be labeled on each cable within 4 inches (100mm) of each termination and tap, where it is accessible in a cabinet or junction or outlet box, and elsewhere as indicated. Wiring cable labels are to be self-adhesive vinyl or vinyl-cloth wrap-around tape markers, machine printed with alphanumeric cable designations.

10) IDF Racks are to have Legend Plates of engraved plastic laminate, bakelite identification sign, minimum ½" high letters, for each utility cabinet, screwed or epoxied to top of rack.

11) Cables for Data Service shall be unshielded twisted pair cable conforming to category 6 of TIA/EIA-568B, for runs between IDF's and workstation outlets,

12) Cat 6 and 6A cable Installation: All installation, labeling and testing shall be performed as per TIA/EIA-568B. Install cable without damaging conductors, glass fibers, or jackets. Do not bend cable in handling or installation to smaller radii than minimums recommended by manufacturers. Pull cables without exceeding cable manufacturers recommended pulling tensions. Pull cables simultaneously where more than one is being installed in the same raceway. Use pulling compound or lubricant where necessary. Use compounds that will not affect the conductor or insulation. Use pulling means, including fish tape, cable, rope, and basket-weave wire/cable grips that will not damage media or raceway. Separation of wires shall comply with TIA/EIA-569 rules for separation of unshielded copper voice data and system cables for potential EMI sources, including electrical power lines and equipment. Splices will not be permitted.

2.2 BOSSIER PARISH SCHOOL BOARD TECHNOLOGY DEPARTMENT ("BPSB") IDF EQUIPMENT ("the equipment")

- a) BPSB shall be responsible for installing all switches and/or routers, telephone and intercom equipment in the MDF and IDF racks. BPSB shall provide all patch cables from patch panels to switches.
- b) Contractor shall install all required devices and wiring to each rack. Contractor shall terminate, test and label each cable. Contractor shall contact BPSB Technology Department when completed with each rack so BPSB can install the equipment.

PART 3 - EXECUTION

- a) Termination, testing and documentation for all cabling shall be performed by Electrical Contractor's installer that has at least five (5) years experience performing similar work, with the state of Louisiana State contractor licensee in telecommunications. Fiber optic cable shall be terminated per manufacturer's recommendations. Prepare fiber optic cable strands for termination as per cable and the connector manufacturers' instructions. Take care not to kink or damage the individual fiber strands. Carefully clean each fiber strand to prevent misalignment.
- b) Provide a NETWORK CABLE RECORD for each IDF listing each network cable and a DISTRIBUTION CABLE RECORD listing each distribution cable each facility. At each new IDF, provide a NETWORK CABLE RECORD bound in plastic report cover with double with double-hang fasteners and with pages in individual plastic sleeves.
- c) d) The label given each existing and each new jack shall be clearly marked on the set of record drawings. Each outlet shall be represented by a rectangle within which the label for each jack in each outlet shall be written and a line shall be marked connecting the rectangle to the outlet symbol, if

shown, or outlet location if not shown. Contractor is permitted to adhere jack labels on the record drawings with a line drawn to the appropriate outlet in lieu of writing each jack number.

- e) Testing: Upon installation of cable and connectors, demonstrate product capability and compliance with requirements. Test each signal path for end-to-end performance. Remove temporary connections when tests have satisfactorily completed.
 - 1) Copper Cables shall be inspected for physical damage and each cable signal path shall be tested for continuity and shorts. Use time-domain reflectometer with strip chart recording capability and anomaly resolution to within 12 inches (300mm) in runs up to 1000 feet (300m) in length. Test for faulty connectors, splices, and terminators. Link performance for UTP cables must meet minimum criteria for TIA/EIA-568B. Test shall be done as per TIA/EIA-568B.
 - 2) Fiber Optic Cables shall be given visual inspection for mechanical damage and optical test to verify performance, The optical tests shall conform to TIA/EIA-568B: Optical Power Loss Measurements of Installed Multimode Fiber Cable Plant.
- g) Correct malfunctioning units and retest to demonstrate compliance; otherwise, remove and replace with new units and retest.
- h) Work shall be performed in first class, craftsman-like fashion. Remove burrs, dirt, and construction debris and repair damaged finish, including chips, scratches, and abrasions.

END OF SECTION

SECTION 31 2200 - GRADING

PART 1 GENERAL

1.01 SECTION INCLUDES

- A. Removal of topsoil.
- B. Rough grading the site for site structures.
- C. Finish grading.

1.02 RELATED REQUIREMENTS

- A. Section 31 2323 - Fill: Filling and compaction.
- B. Section 01 5713 - Temporary Erosion and Sediment Control.

1.03 SUBMITTALS

- A. Project Record Documents: Accurately record actual locations of utilities remaining by horizontal dimensions, elevations or inverts, and slope gradients.

PART 2 PRODUCTS

2.01 MATERIALS

- A. Topsoil: See Section 31 2323.
- B. Other Fill Materials: See Section 31 2323.

PART 3 EXECUTION

3.01 EXAMINATION

- A. Verify that survey bench mark and intended elevations for the Work are as indicated.
- B. Verify the absence of standing or ponding water.

3.02 PREPARATION

- A. Identify required lines, levels, contours, and datum.
- B. Stake and flag locations of known utilities.
- C. Locate, identify, and protect from damage above- and below-grade utilities to remain.
- D. Provide temporary means and methods to remove all standing or ponding water from areas prior to grading.
- E. Protect site features to remain, including but not limited to bench marks, survey control points, paving, and curbs, from damage by grading equipment and vehicular traffic.

3.03 ROUGH GRADING

- A. Remove topsoil from areas to be further excavated, re-landscaped, or re-graded, without mixing with foreign materials.
- B. Do not remove topsoil when wet.
- C. Remove and replace soils deemed unsuitable by classification and which are excessively moist due to lack of surface water control.

3.04 SOIL REMOVAL

- A. Stockpile topsoil to be re-used on site; remove remainder from site.
- B. Stockpile subsoil to be re-used on site; remove remainder from site.
- C. Stockpiles: Use areas designated on site; pile depth not to exceed 8 feet; protect from erosion.

3.05 FINISH GRADING

- A. Before Finish Grading:
 - 1. Verify building and trench backfilling have been inspected.
 - 2. Verify subgrade has been contoured and compacted.
- B. Remove debris, roots, branches, stones, in excess of 1 inch in size. Remove soil contaminated with petroleum products.
- C. Where topsoil is to be placed, scarify surface to depth of 3 inches.
- D. In areas where vehicles or equipment have compacted soil, scarify surface to depth of 3 inches.
- E. Place topsoil in areas where seeding, sodding, and planting are indicated.
- F. Place topsoil where required to level finish grade.
- G. Place topsoil to the following compacted thicknesses:
 - 1. Areas to be Sodded: 4 inches.
- H. Place topsoil during dry weather.
- I. Remove roots, weeds, rocks, and foreign material while spreading.
- J. Fine grade topsoil to eliminate uneven areas and low spots. Maintain profiles and contour of subgrade.
- K. Lightly compact placed topsoil.
- L. Maintain stability of topsoil during inclement weather. Replace topsoil in areas where surface water has eroded thickness below specifications.

3.06 TOLERANCES

- A. Top Surface of Subgrade: Plus or minus 0.10 foot (1-3/16 inches) from required elevation.
- B. Top Surface of Finish Grade: Plus or minus 0.04 foot (1/2 inch).

3.07 REPAIR AND RESTORATION

- A. Existing Facilities, Utilities, and Site Features to Remain: If damaged due to this work, repair or replace to original condition.

3.08 FIELD QUALITY CONTROL

- A. See Section 31 2323 for compaction density testing.

3.09 CLEANING

- A. Remove unused stockpiled topsoil and subsoil. Grade stockpile area to prevent standing water.
- B. Leave site clean and raked, ready to receive landscaping.

END OF SECTION

SECTION 31 2323 - FILL

PART 1 GENERAL

1.01 SECTION INCLUDES

- A. Filling, backfilling, and compacting for footings, slabs-on-grade, paving, site structures, and utilities within the building.
- B. Filling holes, pits, and excavations generated as a result of removal (demolition) operations.

1.02 RELATED REQUIREMENTS

- A. Section 00 9000 - Available Project Information: Geotechnical report.
- B. Section 01 4000 - Quality Requirements: Payment for testing services.
- C. Section 01 5713 - Temporary Erosion and Sediment Control: Slope protection and erosion control.
- D. Section 03 3000 - Cast-in-Place Concrete.
- E. Section 31 2200 - Grading: Removal and handling of soil to be re-used.

1.03 DEFINITIONS

- A. Finish Grade Elevations: Indicated on drawings.
- B. Subgrade Elevations: 4 inches below finish grade elevations indicated on drawings, unless otherwise indicated.

1.04 REFERENCE STANDARDS

- A. ASTM C136/C136M - Standard Test Method for Sieve Analysis of Fine and Coarse Aggregates; 2014.
- B. ASTM D698 - Standard Test Methods for Laboratory Compaction Characteristics of Soil Using Standard Effort (12,400 ft-lbf/ft³ (600 kN-m/m³)); 2012, with Editorial Revision (2015).
- C. ASTM D2487 - Standard Practice for Classification of Soils for Engineering Purposes (Unified Soil Classification System); 2011.

1.05 SUBMITTALS

- A. See Section 01 3000 - Administrative Requirements, for submittal procedures.
- B. Soil Samples: 10 pounds sample of each type of fill; submit in air-tight containers to testing laboratory.
- C. Fill Composition Test Reports: Results of laboratory tests on proposed and actual materials used.
- D. Compaction Density Test Reports.

1.06 DELIVERY, STORAGE, AND HANDLING

- A. When necessary, store materials on site in advance of need.

PART 2 PRODUCTS

2.01 FILL MATERIALS

- A. General Fill: Local or imported borrow.
 - 1. Graded.
 - 2. Free of lumps larger than 3 inches, rocks larger than 2 inches, and debris.
 - 3. Complying with ASTM D2487 Group Symbol SC, GC, or CL.
 - 4. Dry density: 105.0 to 115.0 pcf.
 - 5. Plasticity Index: between 5 and 20.
- B. Granular Fill : Angular crushed or natural stone; free of shale, clay, friable material and debris.
 - 1. Graded in accordance with ASTM C136/C136M, within the following limits:
 - a. 1-1/2 inch sieve: 100 percent passing.
 - b. No. 4 sieve: 15 to 50 percent passing.
 - c. No. 200: less than 12 percent passing.

- 1) Clean granular fill with less than 3 percent clay or friable particles.
- C. Topsoil: Friable loam; imported borrow.
 1. Unclassified.
 2. Free of roots, rocks larger than 2 inch, subsoil, debris, large weeds and foreign matter.
 3. Containing a minimum of 4 percent and a maximum of 25 percent inorganic matter.

2.02 SOURCE QUALITY CONTROL

- A. See Section 01 4000 - Quality Requirements, for general requirements for testing and analysis of soil material.
- B. Where fill materials are specified by reference to a specific standard, test and analyze samples for compliance before delivery to site.
- C. If tests indicate materials do not meet specified requirements, change material and retest.
- D. Provide materials of each type from same source throughout the Work.

PART 3 EXECUTION

3.01 EXAMINATION

- A. Verify that survey bench marks and intended elevations for the Work are as indicated.
- B. Identify required lines, levels, contours, and datum locations.
- C. Verify subdrainage, dampproofing, or waterproofing installation has been inspected.
- D. Verify structural ability of unsupported walls to support imposed loads by the fill.
- E. Verify areas to be filled are not compromised with surface or ground water.

3.02 PREPARATION

- A. Scarify and proof roll subgrade surface to a depth of 6 inches to identify soft spots.
- B. Cut out soft areas of subgrade not capable of compaction in place. Backfill with general fill.
- C. Compact subgrade to density equal to or greater than requirements for subsequent fill material.
- D. Until ready to fill, maintain excavations and prevent loose soil from falling into excavation.

3.03 FILLING

- A. Fill up to subgrade elevations unless otherwise indicated.
- B. Employ a placement method that does not disturb or damage other work.
- C. Systematically fill to allow maximum time for natural settlement. Do not fill over porous, wet, frozen or spongy subgrade surfaces.
- D. Maintain optimum moisture content of fill materials to attain required compaction density.
- E. Soil Fill: Place and compact material in equal continuous layers not exceeding 8 inches depth.
- F. Slope grade away from building minimum 2 inches in 10 feet, unless noted otherwise. Make gradual grade changes. Blend slope into level areas.
- G. Correct areas that are over-excavated.
 1. Load-bearing foundation surfaces: Use general fill, flush to required elevation, compacted to 98 percent of maximum dry density (ASTM D-698). Maintain moisture within a range of optimum minus 2% to plus 2%.
 2. Other areas: Use general fill, flush to required elevation, compacted to minimum 95 percent of maximum dry density.
- H. Compaction Density Unless Otherwise Specified or Indicated:
 1. Under slabs-on-grade and similar construction: 98 percent of maximum dry density (ASTM D-698).
 2. At other locations: 95 percent of maximum dry density.
- I. Reshape and re-compact fills subjected to vehicular traffic.
- J. Maintain temporary means and methods, as required, to remove all water while fill is being placed as required, or until directed by the Architect. Remove and replace soils deemed unsuitable by classification and which are excessively moist due to lack of dewatering or surface water control.

3.04 TOLERANCES

- A. Top Surface of General Filling: Plus or minus 1 inch from required elevations.
- B. Top Surface of Filling Under Paved Areas: Plus or minus 1 inch from required elevations.

3.05 FIELD QUALITY CONTROL

- A. See Section 01 4000 - Quality Requirements, for general requirements for field inspection and testing.
- B. Soil Fill Materials:
 - 1. Evaluate results in relation to compaction curve determined by testing uncompacted material in accordance with ASTM D698 ("standard Proctor").
 - 2. If tests indicate work does not meet specified requirements, remove work, replace and retest.
 - 3. Frequency of Tests: 1 test for every 2500 square feet of building area for every 8 inch lift, but in no case fewer than 2 tests. Reduce to 1 test for every 7,500 square feet of paving area..
 - 4. Proof roll existing subgrade after excavation prior to installing fill slabs-on-grade and paving.

END OF SECTION

SECTION 31 3116 - TERMITE CONTROL

PART 1 GENERAL

1.01 SECTION INCLUDES

- A. Chemical soil treatment.

1.02 RELATED REQUIREMENTS

- A. Section 03 3000 - Cast-in-Place Concrete: Vapor barrier placement under concrete slab-on-grade.

1.03 REFERENCE STANDARDS

- A. Title 7, United States Code, 136 through 136y - Federal Insecticide, Fungicide and Rodenticide Act; 2006.

1.04 SUBMITTALS

- A. See Section 01 3000 - Administrative Requirements, for submittal procedures.
- B. Product Data: Indicate toxicants to be used, composition by percentage, dilution schedule, intended application rate.
- C. Manufacturer's Instructions: Indicate caution requirement.
- D. Warranty: Submit warranty and ensure that forms have been completed in Owner's name.

1.05 QUALITY ASSURANCE

- A. Installer Qualifications: Company specializing in performing this type of work and:
 - 1. Having minimum of three (3) years documented experience.
 - 2. Licensed in Louisiana.

1.06 WARRANTY

- A. See Section 01 7800 - Closeout Submittals, for additional warranty requirements.
- B. Provide five year installer's warranty against damage to building caused by termites.
 - 1. Include coverage for repairs to building and to contents damaged due to building damage. Repair damage and, if required, re-treat.

PART 2 PRODUCTS

2.01 CHEMICAL SOIL TREATMENT

- A. Toxicant Chemical: EPA ({}rs\#1{}) approved; synthetically color dyed to permit visual identification of treated soil.
- B. Diluent: Recommended by toxicant manufacturer.
- C. Manufacturers:
 - 1. Bayer Environmental Science Corp; Product Premise 75: www.backedbybayer.com/pest-management/#sle.
 - 2. Aventis Environmental Science USA LP; Product Termidor: www.aventis.com.
 - 3. Control Solutions, Inc.; Dominion PT: www.controlsolutions.com.
 - 4. Substitutions: See Section 01 6000 - Product Requirements.
- D. Mixes: Mix toxicant to manufacturer's instructions.

PART 3 EXECUTION

3.01 EXAMINATION

- A. Verify that soil surfaces are unfrozen, sufficiently dry to absorb toxicant, and ready to receive treatment.
- B. Verify final grading is complete.

3.02 Application

- A. Comply with manufacturer's written instructions.

3.03 APPLICATION - CHEMICAL TREATMENT

- A. Comply with requirements of U.S. EPA and applicable state and local codes.
- B. Spray apply toxicant in accordance with manufacturer's instructions.
- C. Apply toxicant at following locations:
 - 1. Under Slabs-on-Grade.
- D. Under slabs, apply toxicant immediately prior to installation of vapor barrier.
- E. At foundation walls, apply toxicant immediately prior to finish grading work outside foundations.
- F. Apply extra treatment to structure penetration surfaces such as pipe or ducts, and soil penetrations such as grounding rods or posts.
- G. Re-treat disturbed treated soil with same toxicant as original treatment.
- H. If inspection or testing identifies the presence of termites, re-treat soil and re-test.

3.04 PROTECTION

- A. Do not permit soil grading over treated work.

END OF SECTION

SECTION 32 9223 - SODDING

PART 1 GENERAL

1.01 Section Includes

- A. Preparation of subsoil.
- B. Placing topsoil.
- C. Fertilizing.
- D. Sod installation.
- E. Maintenance.

1.02 Related Requirements

- A. Section 31 2200 - Grading.
- B. Section 32 9119 - Landscape Grading.
- C. Section 31 2323 - Fill: Topsoil material.

1.03 DEFINITIONS

- A. Weeds: Includes Dandelion, Jimsonweed, Quackgrass, Horsetail, Morning Glory, Rush Grass, Mustard, Lambsquarter, Chickweed, Cress, Crabgrass, Canadian Thistle, Nutgrass, Poison Oak, Blackberry, Tansy Ragwort, Bermuda Grass, Johnson Grass, Poison Ivy, Nut Sedge, Nimble Will, Bindweed, Bent Grass, Wild Garlic, Perennial Sorrel, and Brome Grass.

1.04 Reference Standards

- A. TPI (SPEC) - Guideline Specifications to Turfgrass Sodding; 2006.

1.05 QUALITY ASSURANCE

- A. Sod Producer: Company specializing in sod production and harvesting with minimum five years experience, and certified by the State of Louisiana.

1.06 DELIVERY, STORAGE, AND HANDLING

- A. Deliver sod on pallets. Protect exposed roots from dehydration.
- B. Do not deliver more sod than can be laid within 24 hours.

PART 2 PRODUCTS

2.01 REGULATORY REQUIREMENTS

- A. Comply with regulatory agencies for fertilizer and herbicide composition.

2.02 MATERIALS

- A. Sod: TPI (SPEC), Certified Turfgrass Sod quality; cultivated grass sod; type indicated below; with strong fibrous root system, free of stones, burned or bare spots; containing no more than 5 weeds per 1000 sq ft. Minimum age of 18 months, with root development that will support its own weight without tearing, when suspended vertically by holding the upper two corners.
 - 1. "Celebration" Bermuda Sod, machine cut at a uniform thickness of 1 inch within a tolerance of +/- 1/4 inch with a sand base, delivered in 42 inch split cut jumbo rolls.
- B. Fertilizer: recommended for grass, with fifty percent of the elements derived from organic sources; of proportion necessary to eliminate any deficiencies of topsoil, as indicated by analysis.
- C. Water: Clean, fresh and free of substances or matter that could inhibit vigorous growth of grass.

2.03 ACCESSORIES

- A. Wood Pegs: Softwood, sufficient size and length to ensure anchorage of sod on slope.

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- B. Edging: Galvanized steel.

PART 3 EXECUTION

3.01 PREPARATION

- A. Prepare subgrade in accordance with Section 31 2200.
- B. Place topsoil in accordance with Section 32 9119.

3.02 FERTILIZING

- A. Apply fertilizer in accordance with manufacturer's instructions.
- B. Apply after smooth raking of topsoil and prior to installation of sod.
- C. Apply fertilizer no more than 48 hours before laying sod.
- D. Mix thoroughly into upper 2 inches of topsoil.
- E. Lightly water to aid the dissipation of fertilizer.

3.03 LAYING SOD

- A. Moisten prepared surface immediately prior to laying sod.
- B. Lay sod immediately after delivery to site to prevent deterioration.
- C. Lay sod smooth and tight with no open joints visible, and no overlapping; stagger end joints 12 inches minimum. Do not stretch or overlap sod pieces.
- D. Where new sod adjoins existing grass areas, align top surfaces.
- E. Where sod is placed adjacent to hard surfaces, such as curbs, pavements, etc., place top elevation of sod 1/2 inch below top of hard surface.
- F. On slopes 6 inches per foot and steeper, lay sod perpendicular to slope and secure every row with wooden pegs at maximum 2 feet on center. Drive pegs flush with soil portion of sod.
- G. Water sodded areas immediately after installation. Saturate sod to 4 inches of soil.
- H. After sod and soil have dried, roll sodded areas to ensure good bond between sod and soil and to remove minor depressions and irregularities.

3.04 Maintenance

- A. Provide maintenance at no extra cost to Owner; Owner will pay for water.
- B. See Section 01 7000 - Execution and Closeout Requirements, for additional requirements relating to maintenance service.
- C. Mow grass at regular intervals to maintain at a maximum height of 2-1/2 inches. Do not cut more than 1/3 of grass blade at any one mowing.
- D. Neatly trim edges and hand clip where necessary.
- E. Immediately remove clippings after mowing and trimming.
- F. Water to prevent grass and soil from drying out.
- G. Roll surface to remove irregularities.
- H. Control growth of weeds. Apply herbicides in accordance with manufacturer's instructions. Remedy damage resulting from improper use of herbicides.
- I. Immediately replace sod to areas that show deterioration or bare spots.
- J. Protect sodded areas with warning signs during maintenance period.
- K. Maintain turf to produce healthy turf, uniform in color and leaf texture, and free from weeds and other undesirable growth.

END OF SECTION