
UNIVERSITY OF SOUTH CAROLINA USC BYRNES MECHANICAL – ELECTRICAL INFRASTRUCTURE UPGRADES

STATE PROJECT #H27-Z153

OCTOBER 6, 2014
CONSTRUCTION DOCUMENTS



A/E PROJECT # 14024.01

 **GMK**
ASSOCIATES, INC.



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UNIVERSITY OF SOUTH CAROLINA
USC BYRNES MECHANICAL - ELECTRICAL
INFRASTRUCTURE UPGRADES
COLUMBIA, SC

USC PROJECT #H27-Z153
GMKA PROJECT #14024.01

SECTION 00 0101 - PROJECT TITLE PAGE

OWNER:

**UNIVERSITY OF SOUTH CAROLINA
743 GREENE STREET
COLUMBIA, SOUTH CAROLINA 29208**

Owner Representative: Christian Mergner

ARCHITECT:

**GMK ASSOCIATES, INC.
1201 MAIN STREET, SUITE 2100
COLUMBIA, SOUTH CAROLINA 29201**

Contact: Jerome K. Simons

tel: 803.256.0000

fax: 803.255.7243

email: jsimons@gmka.com

MECHANICAL CONSULTANT:

**GMK ASSOCIATES, INC.
1201 MAIN STREET, SUITE 2100
COLUMBIA, SOUTH CAROLINA 29201**

Contact: Jeff Bernagozzi

tel: 803.256.0000

fax: 803.255.7243

email: jbernagozzi@gmka.com

ELECTRICAL CONSULTANT:

**BELKA ENGINEERING ASSOCIATES, INC.
7 CLUSTERS COURT, SUITE 201
COLUMBIA, SOUTH CAROLINA 29210**

Contact: Kevin Belka

tel: 803.731.0650

fax: 803.731.2880

email: kbelka@bellsouth.net

STRUCTURAL CONSULTANT:

**CHAO AND ASSOCIATES, INC.
7 CLUSTERS COURT
COLUMBIA, SOUTH CAROLINA 29210**

Contact: David Chao

tel: 803.772.8420

UNIVERSITY OF SOUTH CAROLINA
USC BYRNES MECHANICAL - ELECTRICAL
INFRASTRUCTURE UPGRADES
COLUMBIA, SC

STATE PROJECT #H27-Z153
GMKA PROJECT #14024.01

fax: 803.722.9120

email: davidc@chaoinc.com

END OF PROJECT TITLE PAGE

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INFRASTRUCTURE UPGRADES**

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SE-310 REQUEST FOR ADVERTISEMENT

2011 Edition
Rev. 7/28/2014

PROJECT NAME: USC Byrnes Mechanical - Electrical Infrastructure Upgrades

PROJECT NUMBER: H27-Z153

PROJECT LOCATION: University of South Carolina, Columbia, South Carolina

Contractor may be subject to performance appraisal at close of project

BID SECURITY REQUIRED? Yes ☒ No ☐

PERFORMANCE & PAYMENT BONDS REQUIRED? Yes ☒ No ☐

CONSTRUCTION COST RANGE: \$600,000 - \$700,000

DESCRIPTION OF PROJECT: The project consists of upgrades to the building's electrical and HVAC systems. These upgrades will require minor demolition, the construction of new vertical chases and electrical closets.

A/E NAME: GMK Associates, Inc.

A/E CONTACT: Jerome K. Simons

A/E ADDRESS: Street/PO Box: 1201 Main Street, Suite 2100

City: Columbia

State: South Carolina ZIP: 29201-

EMAIL: jsimons@gmka.com

TELEPHONE: 803-256-0000

FAX: 803-255-7243

All questions & correspondence concerning this Invitation shall be addressed to the A/E.

BIDDING DOCUMENTS/PLANS MAY BE OBTAINED FROM: purchasing.sc.edu

PLAN DEPOSIT AMOUNT: \$0.00 **IS DEPOSIT REFUNDABLE:** Yes ☐ No ☒

Only those Bidding Documents/Plans obtained from the above listed source(s) are official. Bidders rely on copies of Bidding Documents/Plans obtained from any other source at their own risk.

BIDDING DOCUMENTS/PLANS ARE ALSO ON FILE FOR VIEWING PURPOSES ONLY AT (list name and location for each plan room or other entity):

purchasing.sc.edu. It is the contractor's responsibility to download any documents from the purchasing website

PRE-BID CONFERENCE? Yes ☒ No ☐ **MANDATORY ATTENDANCE?** Yes ☐ No ☒

DATE: 10/21/2014 **TIME:** 10:00 am

PLACE: USC Facilities, Conference Room 53

743 Greene Street, Columbia, South Carolina 29208

AGENCY: University of South Carolina

NAME OF AGENCY PROCUREMENT OFFICER: Michelle Adams

ADDRESS: Street/PO Box: 743 Greene Street

City: Columbia

State: South Carolina ZIP: 29208-

EMAIL: MDADAMS@fmc.sc.edu

TELEPHONE: 803.777.0981

FAX: 803.777.7334

BID CLOSING DATE: 11/4/2014 **TIME:** 2:00 pm **LOCATION:** USC Facilities, Conference Room 53

743 Greene Street, Columbia, South Carolina 29208

BID DELIVERY ADDRESSES:

HAND-DELIVERY:

Attn: Michelle Adams

USC Facilities Office

743 Greene Street

Columbia, South Carolina 29208

MAIL SERVICE:

Attn: Michelle Adams

USC Facilities Office

743 Greene Street

Columbia, South Carolina 29208

IS PROJECT WITHIN AGENCY CONSTRUCTION CERTIFICATION? (Agency MUST check one) Yes ☒ No ☐

APPROVED BY (Office of State Engineer): _____ **DATE:** _____

UNIVERSITY OF SOUTH CAROLINA
USC BYRNES MECHANICAL - ELECTRICAL
INFRASTRUCTURE UPGRADES
COLUMBIA, SC

USC PROJECT #H27-Z153
GMKA PROJECT #14024.01

SECTION 00 2000 - INSTRUCTIONS TO BIDDERS

FORM OF INSTRUCTIONS TO BIDDERS

**1.01 SEE AIA DOCUMENT A701 (1997 EDITION), INSTRUCTIONS TO BIDDERS
FOLLOWING THIS DOCUMENT.**

- A. Copies of this document may be obtained from The American Institute of Architects, 1522
Richland Street, Columbia, SC 29201. Phone: 803-252-6050.

**1.02 REFER TO DOCUMENT OSE FORM 00201-STANDARD SUPPLEMENTAL
INSTRUCTIONS TO BIDDERS FOR MODIFICATIONS TO THIS DOCUMENT.**

END OF INSTRUCTIONS TO BIDDERS

OSE FORM 00201**STANDARD SUPPLEMENTAL INSTRUCTIONS TO BIDDERS**

OWNER: University of South Carolina**PROJECT NUMBER:** H27-Z153**PROJECT NAME:** USC Byrnes Mechanical - Electrical Infrastructure Upgrades**PROJECT LOCATION:** Columbia, South Carolina**PROCUREMENT OFFICER:** Michelle Adams**1. STANDARD SUPPLEMENTAL INSTRUCTIONS TO BIDDERS**

1.1. These Standard Supplemental Instructions To Bidders amend or supplement Instructions To Bidders (AIA Document A701-1997) and other provisions of Bidding and Contract Documents as indicated below.

1.2. Compliance with these Standard Supplemental Instructions is required by the Office of State Engineer (OSE) for all State projects when competitive sealed bidding is used as the method of procurement.

1.3. All provisions of A701-1997, which are not so amended or supplemented, remain in full force and effect.

1.4. Bidders are cautioned to carefully examine the Bidding and Contract Documents for additional instructions or requirements.

2. MODIFICATIONS TO A701-1997

2.1. *Delete Section 1.1 and insert the following:*

1.1 Bidding Documents, collectively referred to as the **Invitation for Bids**, include the Bidding Requirements and the proposed Contract Documents. The Bidding Requirements consist of the Advertisement, Instructions to Bidders (A-701), Supplementary Instructions to Bidders, the bid form (SE-330), the Intent to Award Notice (SE-370), and other sample bidding and contract forms. The proposed Contract Documents consist of the form of Agreement between the Owner and Contractor, Conditions of the Contract (General, Supplementary and other Conditions), Drawings, Specifications, all Addenda issued prior to execution of the Contract, and other documents set forth in the Bidding Documents. Any reference in this document to the Agreement between the Owner and Contractor, AIA Document A101, or some abbreviated reference thereof, shall mean the AIA A101, 2007 Edition as modified by OSE Form 00501 – Standard Modification to Agreement Between Owner and Contractor. Any reference in this document to the General Conditions of the Contract for Construction, AIA Document A201, or some abbreviated reference thereof, shall mean the AIA A201, 2007 Edition as modified by OSE Form 00811 – Standard Supplementary Conditions.

2.2. *In Section 1.8, delete the words “and who meets the requirements set forth in the Bidding Documents”.*

2.3. *In Section 2.1, delete the word “making” and substitute the word “submitting.”*

2.4. *In Section 2.1.1:*

After the words “Bidding Documents,” delete the word “or” and substitute the word “and.”

Insert the following at the end of this section:

Bidders are expected to examine the Bidding Documents and Contract Documents thoroughly and should request an explanation of any ambiguities, discrepancies, errors, omissions, or conflicting statements. Failure to do so will be at the Bidder's risk. Bidder assumes responsibility for any patent ambiguity that Bidder does not bring to the Owner's attention prior to bid opening.

2.5. *In Section 2.1.3, insert the following after the term “Contract Documents” and before the period:*

and accepts full responsibility for any pre-bid existing conditions that would affect the Bid that could have been ascertained by a site visit. As provided in Regulation 19-445.2042(B), A bidder's failure to attend an advertised pre-bid conference will not excuse its responsibility for estimating properly the difficulty and cost of successfully performing the work, or for proceeding to successfully perform the work without additional expense to the State.

OSE FORM 00201**STANDARD SUPPLEMENTAL INSTRUCTIONS TO BIDDERS**

2.6. *Insert the following Sections 2.2 through 2.6:*

2.2 CERTIFICATION OF INDEPENDENT PRICE DETERMINATION

GIVING FALSE, MISLEADING, OR INCOMPLETE INFORMATION ON THIS CERTIFICATION MAY RENDER YOU SUBJECT TO PROSECUTION UNDER SECTION 16-9-10 OF THE SOUTH CAROLINA CODE OF LAWS AND OTHER APPLICABLE LAWS.

(a) By submitting an bid, the bidder certifies that—

(1) The prices in this bid have been arrived at independently, without, for the purpose of restricting competition, any consultation, communication, or agreement with any other bidder or competitor relating to—

- (i) Those prices;
- (ii) The intention to submit an bid; or
- (iii) The methods or factors used to calculate the prices offered.

(2) The prices in this bid have not been and will not be knowingly disclosed by the bidder, directly or indirectly, to any other bidder or competitor before bid opening (in the case of a sealed bid solicitation) or contract award (in the case of a negotiated solicitation) unless otherwise required by law; and

(3) No attempt has been made or will be made by the bidder to induce any other concern to submit or not to submit an bid for the purpose of restricting competition.

(b) Each signature on the bid is considered to be a certification by the signatory that the signatory—

(1) Is the person in the bidder's organization responsible for determining the prices being offered in this bid, and that the signatory has not participated and will not participate in any action contrary to paragraphs (a)(1) through (a)(3) of this certification; or

(2)(i) Has been authorized, in writing, to act as agent for the bidder's principals in certifying that those principals have not participated, and will not participate in any action contrary to paragraphs (a)(1) through (a)(3) of this certification [As used in this subdivision (b)(2)(i), the term "principals" means the person(s) in the bidder's organization responsible for determining the prices offered in this bid];

(ii) As an authorized agent, does certify that the principals referenced in subdivision (b)(2)(i) of this certification have not participated, and will not participate, in any action contrary to paragraphs (a)(1) through (a)(3) of this certification; and

(iii) As an agent, has not personally participated, and will not participate, in any action contrary to paragraphs (a)(1) through (a)(3) of this certification.

(c) If the bidder deletes or modifies paragraph (a)(2) of this certification, the bidder must furnish with its offer a signed statement setting forth in detail the circumstances of the disclosure.

2.3 DRUG FREE WORKPLACE

By submitting a bid, the Bidder certifies that Bidder will maintain a drug free workplace in accordance with the requirements of Title 44, Chapter 107 of South Carolina Code of Laws, as amended.

2.4 CERTIFICATION REGARDING DEBARMENT AND OTHER RESPONSIBILITY MATTERS

(a) (1) By submitting an Bid, Bidder certifies, to the best of its knowledge and belief, that-

(i) Bidder and/or any of its Principals-

(A) Are not presently debarred, suspended, proposed for debarment, or declared ineligible for the award of contracts by any state or federal agency;

(B) Have not, within a three-year period preceding this bid, been convicted of or had a civil judgment rendered against them for: commission of fraud or a criminal offense in

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connection with obtaining, attempting to obtain, or performing a public (Federal, state, or local) contract or subcontract; violation of Federal or state antitrust statutes relating to the submission of bids; or commission of embezzlement, theft, forgery, bribery, falsification or destruction of records, making false statements, tax evasion, or receiving stolen property; and

(C) Are not presently indicted for, or otherwise criminally or civilly charged by a governmental entity with, commission of any of the offenses enumerated in paragraph (a)(1)(i)(B) of this provision.

(ii) Bidder has not, within a three-year period preceding this bid, had one or more contracts terminated for default by any public (Federal, state, or local) entity.

(2) "Principals," for the purposes of this certification, means officers; directors; owners; partners; and, persons having primary management or supervisory responsibilities within a business entity (e.g., general manager; plant manager; head of a subsidiary, division, or business segment, and similar positions).

(b) Bidder shall provide immediate written notice to the Procurement Officer if, at any time prior to contract award, Bidder learns that its certification was erroneous when submitted or has become erroneous by reason of changed circumstances.

(c) If Bidder is unable to certify the representations stated in paragraphs (a)(1), Bid must submit a written explanation regarding its inability to make the certification. The certification will be considered in connection with a review of the Bidder's responsibility. Failure of the Bidder to furnish additional information as requested by the Procurement Officer may render the Bidder nonresponsible.

(d) Nothing contained in the foregoing shall be construed to require establishment of a system of records in order to render, in good faith, the certification required by paragraph (a) of this provision. The knowledge and information of an Bidder is not required to exceed that which is normally possessed by a prudent person in the ordinary course of business dealings.

(e) The certification in paragraph (a) of this provision is a material representation of fact upon which reliance was placed when making award. If it is later determined that the Bidder knowingly or in bad faith rendered an erroneous certification, in addition to other remedies available to the State, the Procurement Officer may terminate the contract resulting from this solicitation for default.

2.5 ETHICS CERTIFICATE

By submitting a bid, the bidder certifies that the bidder has and will comply with, and has not, and will not, induce a person to violate Title 8, Chapter 13 of the South Carolina Code of Laws, as amended (ethics act). The following statutes require special attention: Section 8-13-700, regarding use of official position for financial gain; Section 8-13-705, regarding gifts to influence action of public official; Section 8-13-720, regarding offering money for advice or assistance of public official; Sections 8-13-755 and 8-13-760, regarding restrictions on employment by former public official; Section 8-13-775, prohibiting public official with economic interests from acting on contracts; Section 8-13-790, regarding recovery of kickbacks; Section 8-13-1150, regarding statements to be filed by consultants; and Section 8-13-1342, regarding restrictions on contributions by contractor to candidate who participated in awarding of contract. The state may rescind any contract and recover all amounts expended as a result of any action taken in violation of this provision. If contractor participates, directly or indirectly, in the evaluation or award of public contracts, including without limitation, change orders or task orders regarding a public contract, contractor shall, if required by law to file such a statement, provide the statement required by Section 8-13-1150 to the procurement officer at the same time the law requires the statement to be filed.

2.6 RESTRICTIONS APPLICABLE TO BIDDERS & GIFTS

Violation of these restrictions may result in disqualification of your bid, suspension or debarment, and may constitute a violation of the state Ethics Act. (a) After issuance of the solicitation, ***bidder agrees not to discuss this procurement activity in any way with the Owner or its employees, agents or officials.*** All communications must be solely with the Procurement Officer. This restriction may be lifted by express written permission from the Procurement Officer. This restriction expires once a contract has been formed. (b) Unless otherwise approved in writing by the Procurement

OSE FORM 00201**STANDARD SUPPLEMENTAL INSTRUCTIONS TO BIDDERS**

Officer, *bidder agrees not to give anything to the Owner, any affiliated organizations, or the employees, agents or officials of either, prior to award.* (c) Bidder acknowledges that the policy of the State is that a governmental body should not accept or solicit a gift, directly or indirectly, from a donor if the governmental body has reason to believe the donor has or is seeking to obtain contractual or other business or financial relationships with the governmental body. Regulation 19-445.2165(C) broadly defines the term donor.

2.7. *Delete Section 3.1.1 and substitute the following:*

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

2.8. *Delete the language of Section 3.1.2 and insert the word "Reserved."*

2.9. *In Section 3.1.4, delete the words "and Architect may make" and substitute the words "has made."*

2.10. *Insert the following Section 3.1.5*

3.1.5 All persons obtaining Bidding Documents from the issuing office designated in the Advertisement shall provide that office with Bidder's contact information to include the Bidder's name, telephone number, mailing address, and email address.

2.11. *In Section 3.2.2:*

Delete the words "and Sub-bidders"

Delete the word "seven" and substitute the word "ten"

2.12. *In Section 3.2.3:*

In the first Sentence, insert the word "written" before the word "Addendum."

Insert the following at the end of the section:

As provided in Regulation 19-445.2042(B), nothing stated at the pre-bid conference shall change the Bidding Documents unless a change is made by written Addendum.

2.13. *Insert the following at the end of Section 3.3.1:*

Reference in the Bidding Documents to a designated material, product, thing, or service by specific brand or trade name followed by the words "or equal" and "or approved equal" shall be interpreted as establishing a standard of quality and shall not be construed as limiting competition.

2.14. *Delete Section 3.3.2 and substitute the following:*

3.3.2 No request to substitute materials, products, or equipment for materials, products, or equipment described in the Bidding Documents and no request for addition of a manufacturer or supplier to a list of approved manufacturers or suppliers in the Bidding Documents will be considered prior to receipt of Bids unless written request for approval has been received by the Architect at least ten days prior to the date for receipt of Bids established in the Invitation for Bids. Any subsequent extension of the date for receipt of Bids by addendum shall not extend the date for receipt of such requests unless the addendum so specifies. Such requests shall include the name of the material or equipment for which it is to be substituted and a complete description of the proposed substitution including drawings, performance and test data, and other information necessary for an evaluation. A statement setting forth changes in other materials, equipment or other portions of the Work, including changes in the work of other contracts that incorporation of the proposed substitution would require, shall be included. The burden of proof of the merit of the proposed substitution is upon the proposer. The Architect's decision of approval or disapproval of a proposed substitution shall be final.

2.15. *Delete Section 3.4.3 and substitute the following:*

3.4.3 Addenda will be issued no later than 120 hours prior to the time for receipt of Bids except an Addendum withdrawing the request for Bids or one which includes postponement of the date for receipt of Bids.

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2.16. *Insert the following Sections 3.4.5 and 3.4.6:*

3.4.5 When the date for receipt of Bids is to be postponed and there is insufficient time to issue a written Addendum prior to the original Bid Date, Owner will notify prospective Bidders by telephone or other appropriate means with immediate follow up with a written Addendum. This Addendum will verify the postponement of the original Bid Date and establish a new Bid Date. The new Bid Date will be no earlier than the fifth (5th) calendar day after the date of issuance of the Addendum postponing the original Bid Date.

3.4.6. If an emergency or unanticipated event interrupts normal government processes so that bids cannot be received at the government office designated for receipt of bids by the exact time specified in the solicitation, the time specified for receipt of bids will be deemed to be extended to the same time of day specified in the solicitation on the first work day on which normal government processes resume. In lieu of an automatic extension, an Addendum may be issued to reschedule bid opening. If state offices are closed at the time a pre-bid or pre-proposal conference is scheduled, an Addendum will be issued to reschedule the conference. Useful information may be available at: http://www.scemd.org/scgovweb/weather_alert.html

2.17. *In Section 4.1.1, delete the word “forms” and substitute the words “SE-330 Bid Form.”***2.18.** *Delete Section 4.1.2 and substitute the following:*

4.1.2 Any blanks on the bid form to be filled in by the Bidder shall be legibly executed in a non-erasable medium. Bids shall be signed in ink or other indelible media.

2.19. *Delete Section 4.1.3 and substitute the following:*

4.1.3 Sums shall be expressed in figures.

2.20. *Insert the following at the end of Section 4.1.4:*

Bidder shall not make stipulations or qualify his bid in any manner not permitted on the bid form. An incomplete Bid or information not requested that is written on or attached to the Bid Form that could be considered a qualification of the Bid, may be cause for rejection of the Bid.

2.21. *Delete Section 4.1.5 and substitute the following:*

4.1.5 All requested Alternates shall be bid. The failure of the bidder to indicate a price for an Alternate shall render the Bid non-responsive. Indicate the change to the Base Bid by entering the dollar amount and marking, as appropriate, the box for “ADD TO” or “DEDUCT FROM”. If no change in the Base Bid is required, enter “ZERO” or “No Change.” For add alternates to the base bid, Subcontractor(s) listed on page BF-2 of the Bid Form to perform Alternate Work shall be used for both Alternates and Base Bid Work if Alternates are accepted.

2.22. *Delete Section 4.1.6 and substitute the following:*

4.1.6 Pursuant to Title 11, Chapter 35, Section 3020(b)(i) of the South Carolina Code of Laws, as amended, Section 7 of the Bid Form sets forth a list of subcontractor specialties for which Bidder is required to list only the subcontractors Bidder will use to perform the work of each listed specialty. Bidder must follow the Instructions in the Bid Form for filling out this section of the Bid Form. Failure to properly fill out Section 7 may result in rejection of Bidder’s bid as non-responsive.

2.23. *Delete Section 4.1.7 and substitute the following:*

4.1.7 Each copy of the Bid shall state the legal name of the Bidder and the nature of legal form of the Bidder. Each copy shall be signed by the person or persons legally authorized to bind the Bidder to a contract. A Bid submitted by an agent shall have a current power of attorney attached certifying the agent's authority to bind the Bidder.

2.24. *Delete Section 4.2.1 and substitute the following:*

4.2.1 If required by the Invitation for Bids, each Bid shall be accompanied by a bid security in an amount of not less than five percent of the Base Bid. The bid security shall be a bid bond or a certified cashier’s check. The Bidder pledges to enter into a Contract with the Owner on the terms stated in the Bid and will, if required, furnish bonds covering the faithful performance of the Contract and payment of all obligations arising thereunder. Should the Bidder refuse to enter into such Contract or fail to furnish such bonds if required, the amount of the bid security shall be forfeited to the Owner as liquidated damages, not as a penalty.

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2.25. Delete Section 4.2.2 and substitute the following:

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

- .1** Be issued by a surety company licensed to do business in South Carolina;
- .2** Be issued by a surety company having, at a minimum, a "Best Rating" of "A" as stated in the most current publication of "Best's Key Rating Guide, Property-Casualty", which company shows a financial strength rating of at least five (5) times the contract price.
- .3** Be enclosed in the bid envelope at the time of Bid Opening, either in paper copy or as an electronic bid bond authorization number provided on the Bid Form and issued by a firm or organization authorized by the surety to receive, authenticate and issue binding electronic bid bonds on behalf the surety.

2.26. Delete Section 4.2.3 and substitute the following:

4.2.3 By submitting a bid bond via an electronic bid bond authorization number on the Bid Form and signing the Bid Form, the Bidder certifies that an electronic bid bond has been executed by a Surety meeting the standards required by the Bidding Documents and the Bidder and Surety are firmly bound unto the State of South Carolina under the conditions provided in this Section 4.2.

2.27. Insert the following Section 4.2.4:

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

2.28. Delete Section 4.3.1 and substitute the following:

4.3.1 All copies of the Bid, the bid security, if any, and any other documents required to be submitted with the Bid shall be enclosed in a sealed opaque envelope. The envelope shall, unless hand delivered by the Bidder, be addressed to the Owner's designated purchasing office as shown in the Invitation for Bids. The envelope shall be identified with the Project name, the Bidder's name and address and, if applicable, the designated portion of the Work for which the Bid is submitted. If the Bid is sent by mail or special delivery service (UPS, Federal Express, etc.), the envelope should be labeled "BID ENCLOSED" on the face thereof. Bidders hand delivering their Bids shall deliver Bids to the place of the Bid Opening as shown in the Invitation for Bids. Whether or not Bidders attend the Bid Opening, they shall give their Bids to the Owner's procurement officer or his/her designee as shown in the Invitation for Bids prior to the time of the Bid Opening.

2.29. Insert the following Section 4.3.6 and substitute the following:

4.3.5 The official time for receipt of Bids will be determined by reference to the clock designated by the Owner's procurement officer or his/her designee. The procurement officer conducting the Bid Opening will determine and announce that the deadline has arrived and no further Bids or bid modifications will be accepted. All Bids and bid modifications in the possession of the procurement officer at the time the announcement is completed will be timely, whether or not the bid envelope has been date/time stamped or otherwise marked by the procurement officer.

2.30. Delete Section 4.4.2 and substitute the following:

4.4.2 Prior to the time and date designated for receipt of Bids, a Bid submitted may be withdrawn in person or by written notice to the party receiving Bids at the place designated for receipt of Bids. Withdrawal by written notice shall be in writing over the signature of the Bidder.

2.31. In Section 5.1, delete everything following the caption "OPENING OF BIDS" and substitute the following:

5.1.1 Bids received on time will be publicly opened and will be read aloud. Owner will not read aloud Bids that Owner determines, at the time of opening, to be non-responsive. .

5.1.2 At bid opening, Owner will announce the date and location of the posting of the Notice of Intended Award.

5.1.3 Owner will send a copy of the final Bid Tabulation to all Bidders within ten (10) working days of the Bid Opening.

OSE FORM 00201**STANDARD SUPPLEMENTAL INSTRUCTIONS TO BIDDERS**

5.1.4 If Owner determines to award the Project, Owner will, after posting a Notice of Intended Award, send a copy of the Notice to all Bidders.

5.1.5 If only one Bid is received, Owner will open and consider the Bid.

2.32. *In Section 5.2, insert the section number “5.2.1” before the words of the “The Owner” at the beginning of the sentence.*

2.33. *Insert the following Sections 5.2.2 and 5.2.3:*

5.2.2 The reasons for which the Owner will reject Bids include, but are not limited to:

- .1** Failure by a Bidder to be represented at a Mandatory Pre-Bid Conference or site visit;
- .2** Failure to deliver the Bid on time;
- .3** Failure to comply with Bid Security requirements, except as expressly allowed by law;
- .4** Listing an invalid electronic Bid Bond authorization number on the bid form;
- .5** Failure to Bid an Alternate, except as expressly allowed by law;
- .6** Failure to list qualified Subcontractors as required by law;
- .7** Showing any material modification(s) or exception(s) qualifying the Bid;
- .8** Faxing a Bid directly to the Owner or their representative; or
- .9** Failure to include a properly executed Power-of-Attorney with the bid bond.

5.2.3 The Owner may reject a Bid as nonresponsive if the prices bid are materially unbalanced between line items or sub-line items. A bid is materially unbalanced when it is based on prices significantly less than cost for some work and prices which are significantly overstated in relation to cost for other work, and if there is a reasonable doubt that the bid will result in the lowest overall cost to the Owner even though it may be the low evaluated bid, or if it is so unbalanced as to be tantamount to allowing an advance payment.

2.34. *Delete Section 6.1 and substitute the following:*

6.1 CONTRACTOR'S RESPONSIBILITY

Owner will make a determination of Bidder's responsibility before awarding a contract. Bidder shall provide all information and documentation requested by the Owner to support the Owner's evaluation of responsibility. Failure of Bidder to provide requested information is cause for the Owner, at its option, to determine the Bidder to be non-responsive

2.35. *Delete the language of Section 6.2 and insert the word “Reserved.”*

2.36. *Delete the language of Sections 6.3.2, 6.3.3, and 6.3.4 and insert the word “Reserved” after each Section Number.*

2.37. *Insert the following Section 6.4*

6.4 CLARIFICATION

Pursuant to Section 11-35-1520(8), the Procurement Officer may elect to communicate with a Bidder after opening for the purpose of clarifying either the Bid or the requirements of the Invitation for Bids. Such communications may be conducted only with Bidders who have submitted a Bid which obviously conforms in all material aspects to the Invitation for Bids and only in accordance with Appendix D (Paragraph A(6)) to the Manual for Planning and Execution of State Permanent Improvement, Part II. Clarification of a Bid must be documented in writing and included with the Bid. Clarifications may not be used to revise a Bid or the Invitation for Bids. [Section 11-35-1520(8); R.19-445.2080]

2.38. *Delete Section 7.1.2 and substitute the following:*

7.1.2 The performance and payment bonds shall conform to the requirements of Section 11.4 of the General Conditions of the Contract. If the furnishing of such bonds is stipulated in the Bidding Documents, the cost shall be included in the Bid.

2.39. *Delete the language of Section 7.1.3 and insert the word “Reserved.”*

2.40. *In Section 7.2, insert the words “CONTRACT, CERTIFICATES OF INSURANCE” into the caption after the word “Delivery.”*

OSE FORM 00201**STANDARD SUPPLEMENTAL INSTRUCTIONS TO BIDDERS****2.41. Delete Section 7.2.1 and substitute the following:**

7.2.1 After expiration of the protest period, the Owner will tender a signed Contract for Construction to the Bidder and the Bidder shall return the fully executed Contract for Construction to the Owner within seven days thereafter. The Bidder shall deliver the required bonds and certificate of insurance to the Owner not later than three days following the date of execution of the Contract. Failure to deliver these documents as required shall entitle the Owner to consider the Bidder's failure as a refusal to enter into a contract in accordance with the terms and conditions of the Bidder's Bid and to make claim on the Bid Security for re-procurement cost.

2.42. Delete the language of Section 7.2.2 and insert the word "Reserved."**2.43. Delete the language of Article 8 and insert the following:**

Unless otherwise required in the Bidding Documents, the Agreement for the Work will be written on South Carolina Modified AIA Document A101, 2007, Standard Form of Agreement Between Owner and Contractor as modified by OSE Form 00501 – Standard Modification to Agreement Between Owner and Contractor.

2.44. Insert the following Article 9:**ARTICLE 9 MISCELLANEOUS****9.1 NONRESIDENT TAXPAYER REGISTRATION AFFIDAVIT INCOME TAX WITHHOLDING
IMPORTANT TAX NOTICE - NONRESIDENTS ONLY**

Withholding Requirements for Payments to Nonresidents: Section 12-8-550 of the South Carolina Code of Laws requires persons hiring or contracting with a nonresident conducting a business or performing personal services of a temporary nature within South Carolina to withhold 2% of each payment made to the nonresident. The withholding requirement does not apply to (1) payments on purchase orders for tangible personal property when the payments are not accompanied by services to be performed in South Carolina, (2) nonresidents who are not conducting business in South Carolina, (3) nonresidents for contracts that do not exceed \$10,000 in a calendar year, or (4) payments to a nonresident who (a) registers with either the S.C. Department of Revenue or the S.C. Secretary of State and (b) submits a Nonresident Taxpayer Registration Affidavit - Income Tax Withholding, Form I-312 to the person letting the contract.

For information about other withholding requirements (e.g., employee withholding), contact the Withholding Section at the South Carolina Department of Revenue at 803-898-5383 or visit the Department's website at: www.sctax.org

This notice is for informational purposes only. This Owner does not administer and has no authority over tax issues. All registration questions should be directed to the License and Registration Section at 803-898-5872 or to the South Carolina Department of Revenue, Registration Unit, Columbia, S.C. 29214-0140. All withholding questions should be directed to the Withholding Section at 803-898- 5383.

PLEASE SEE THE "NONRESIDENT TAXPAYER REGISTRATION AFFIDAVIT INCOME TAX WITHHOLDING" FORM (FORM NUMBER I-312) LOCATED AT:
<http://www.sctax.org/Forms+and+Instructions/withholding/default.htm>.

9.2 CONTRACTOR LICENSING

Contractors and Subcontractors listed in Section 7 of the Bid Form who are required by the South Carolina Code of Laws to be licensed, must be licensed at the time of bidding.

9.3 SUBMITTING CONFIDENTIAL INFORMATION

For every document Bidder submits in response to or with regard to this solicitation or request, Bidder must separately mark with the word "CONFIDENTIAL" every page, or portion thereof, that Bidder contends contains information that is exempt from public disclosure because it is either (a) a trade secret as defined in Section 30-4-40(a)(1), or (b) privileged & confidential, as that phrase is used in Section 11-35-410. For every document Bidder submits in response to or with regard to this solicitation or request, Bidder must separately mark with the words "TRADE SECRET" every page, or portion thereof, that Bidder contends contains a trade secret as that term is defined by Section 39-8-20 of the Trade Secrets Act. For every document Bidder submits in response to or with regard to this solicitation or request, Bidder must separately mark with the word "PROTECTED" every page, or portion thereof, that Bidder contends is protected by Section 11-35-1810. All markings must be conspicuous; use color, bold, underlining, or some other method in order to conspicuously distinguish the mark from the other text. Do not mark your entire bid as confidential, trade secret, or protected! If your bid, or any part thereof, is improperly marked as confidential or trade

OSE FORM 00201**STANDARD SUPPLEMENTAL INSTRUCTIONS TO BIDDERS**

secret or protected, the State may, in its sole discretion, determine it nonresponsive. If only portions of a page are subject to some protection, do not mark the entire page. By submitting a response to this solicitation, Bidder (1) agrees to the public disclosure of every page of every document regarding this solicitation or request that was submitted at any time prior to entering into a contract (including, but not limited to, documents contained in a response, documents submitted to clarify a response, & documents submitted during negotiations), unless the page is conspicuously marked "TRADE SECRET" or "CONFIDENTIAL" or "PROTECTED", (2) agrees that any information not marked, as required by these bidding instructions, as a "Trade Secret" is not a trade secret as defined by the Trade Secrets Act, & (3) agrees that, notwithstanding any claims or markings otherwise, any prices, commissions, discounts, or other financial figures used to determine the award, as well as the final contract amount, are subject to public disclosure. In determining whether to release documents, the State will detrimentally rely on Bidders's marking of documents, as required by these bidding instructions, as being either "Confidential" or "Trade Secret" or "PROTECTED". By submitting a response, Bidder agrees to defend, indemnify & hold harmless the State of South Carolina, its officers & employees, from every claim, demand, loss, expense, cost, damage or injury, including attorney's fees, arising out of or resulting from the State withholding information that Bidder marked as "confidential" or "trade secret" or "PROTECTED".

9.4 POSTING OF INTENT TO AWARD

Notice of Intent to Award, SE-370, will be posted at the following location:

Room or Area of Posting: Reception Area

Building Where Posted: Facilities Management Center

Address of Building: 743 Greene Street, Columbia SC 29208

WEB site address (if applicable): purchasing.sc.edu

Posting date will be announced at bid opening. In addition to posting the notice, the Owner will promptly send all responsive bidders a copy of the notice of intent to award and the final bid tabulation

9.5 PROTEST OF SOLICITATION OR AWARD

Any prospective bidder, offeror, contractor, or subcontractor who is aggrieved in connection with the solicitation of a contract shall protest within fifteen days of the date of issuance of the applicable solicitation document at issue. Any actual bidder, offeror, contractor, or subcontractor who is aggrieved in connection with the intended award or award of a contract shall protest within ten days of the date notification of intent to award is posted in accordance with Title 11, Chapter 35, Section 4210 of the South Carolina Code of Laws, as amended. A protest shall be in writing, shall set forth the grounds of the protest and the relief requested with enough particularity to give notice of the issues to be decided, and must be received by the State Engineer within the time provided.

Any protest must be addressed to the CPO, Office of State Engineer, and submitted in writing:

(a) by email to protest-ose@mmo.sc.gov,

(b) by facsimile at 803-737-0639, or

(c) by post or delivery to 1201 Main Street, Suite 600, Columbia, SC 29201.

By submitting a protest to the foregoing email address, you (and any person acting on your behalf) consent to receive communications regarding your protest (and any related protests) at the e-mail address from which you sent your protest.

9.6 SOLICITATION INFORMATION FROM SOURCES OTHER THAN OFFICIAL SOURCE

South Carolina Business Opportunities (SCBO) is the official state government publication for State of South Carolina solicitations. Any information on State agency solicitations obtained from any other source is unofficial and any reliance placed on such information is at the bidder's sole risk and is without recourse under the South Carolina Consolidated Procurement Code.

9.7 BUILDER'S RISK INSURANCE

Bidder's are directed to Article 11.3 of the South Carolina Modified AIA Document A201, 2007 Edition, which, unless provided otherwise in the bid documents, requires the contractor to provide builder's risk insurance on the project.

OSE FORM 00201**STANDARD SUPPLEMENTAL INSTRUCTIONS TO BIDDERS**

9.8 TAX CREDIT FOR SUBCONTRACTING WITH MINORITY FIRMS

Pursuant to Section 12-6-3350, taxpayers, who utilize certified minority subcontractors, may take a tax credit equal to 4% of the payments they make to said subcontractors. The payments claimed must be based on work performed directly for a South Carolina state contract. The credit is limited to a maximum of fifty thousand dollars annually. The taxpayer is eligible to claim the credit for 10 consecutive taxable years beginning with the taxable year in which the first payment is made to the subcontractor that qualifies for the credit. After the above ten consecutive taxable years, the taxpayer is no longer eligible for the credit. The credit may be claimed on Form TC-2, "Minority Business Credit." A copy of the subcontractor's certificate from the Governor's Office of Small and Minority Business (OSMBA) is to be attached to the contractor's income tax return. Taxpayers must maintain evidence of work performed for a State contract by the minority subcontractor. Questions regarding the tax credit and how to file are to be referred to: SC Department of Revenue, Research and Review, Phone: (803) 898-5786, Fax: (803) 898-5888. The subcontractor must be certified as to the criteria of a "Minority Firm" by the Governor's Office of Small and Minority Business Assistance (OSMBA). Certificates are issued to subcontractors upon successful completion of the certification process. Questions regarding subcontractor certification are to be referred to: Governor's Office of Small and Minority Business Assistance, Phone: (803) 734-0657, Fax: (803) 734-2498. Reference: SC §11-35-5010 – Definition for Minority Subcontractor & SC §11-35-5230 (B) – Regulations for Negotiating with State Minority Firms.

§ 9.9 OTHER SPECIAL CONDITIONS OF THE WORK

Section 00210 - Supplement A - Request for Information

END OF DOCUMENT

UNIVERSITY OF SOUTH CAROLINA
USC BYRNES MECHANICAL - ELECTRICAL
INFRASTRUCTURE UPGRADES
COLUMBIA, SC

USC PROJECT #H27-Z153
GMKA PROJECT #14024.01

SECTION 00 2011 - SUPPLEMENT A - REQUEST FOR INFORMATION

TO: GMK ASSOCIATES, INC.**FROM:** _____

ATTENTION: JEROME K. SIMONS

DATE/TIME: _____ **TELEPHONE #:** _____

FAX NUMBER: 803.255.7243**FAX #:** _____

NUMBER OF PAGES _____ **CONTACT:** _____

PROJECT NAME: USC BYRNES MECHANICAL - ELECTRICAL INFRASTRUCTURE
UPGRADES

**INSTRUCTIONS: IN SPACES PROVIDED BELOW, LIST SPECIFICATION SECTION
AND/OR PLAN SHEET FOR WHICH INFORMATION OR CLARIFICATION IS NEEDED
FOLLOWED BY DESCRIPTION OR REQUIRED INFORMATION. USE ADDITIONAL
COPIES OF REQUEST FOR INFORMATION FORMS AS NEEDED FOR ADDITIONAL
REQUESTS. LIMIT TO ONE QUESTION OR SUBJECT INQUIRY PER R.F.I.**

SPECIFICATION SECTION(S):

DRAWING SHEET(S):

END OF SECTION

UNIVERSITY OF SOUTH CAROLINA
USC BYRNES MECHANICAL - ELECTRICAL
INFRASTRUCTURE UPGRADES
COLUMBIA, SC

USC PROJECT #H27-Z153
GMKA PROJECT #14024.01

SECTION 00 3000 - BID BOND

FORM OF BID BOND

1.01 SEE AIA DOCUMENT A310 (2010 EDITION) , BID BOND AVAILABLE AT THE OFFICE OF GMK ASSOCIATES, INC., 1201 MAIN STREET SUITE 2100, COLUMBIA, SC 29201. 803-256-0000 OR,

- A. Copies of this document may be obtained from The American Institute of Architects, 1522 Richland Street., Columbia, SC 29201. 803-252-6050.

PART 2 PRODUCTS - NOT USED

PART 3 EXECUTION - NOT USED

END OF SECTION

SE-330 – LUMP SUM BID BID FORM

2011 Edition

Rev. 2/14/14

Bidders shall submit bids on only Bid Form SE-330.

BID SUBMITTED BY: _____

(Bidder's Name)

BID SUBMITTED TO: University of South Carolina

(Owner's Name)

FOR PROJECT: PROJECT NAME USC Byrnes Mechanical - Electrical Infrastructure Upgrades

PROJECT NUMBER H27-Z153

OFFER

§ 1. In response to the Invitation for Construction Bids and in compliance with the Instructions to Bidders for the above-named Project, the undersigned Bidder proposes and agrees, if this Bid is accepted, to enter into a Contract with the Owner on the terms included in the Bidding Documents, and to perform all Work as specified or indicated in the Bidding Documents, for the prices and within the time frames indicated in this Bid and in accordance with the other terms and conditions of the Bidding Documents.

§ 2. Pursuant to Section 11-35-3030(1) of the SC Code of Laws, as amended, Bidder has submitted Bid Security as follows in the amount and form required by the Bidding Documents:

☐ Bid Bond with Power of Attorney ☐ Electronic Bid Bond ☐ Cashier's Check

(Bidder check one)

§ 3. Bidder acknowledges the receipt of the following Addenda to the Bidding Documents and has incorporated the effects of said Addenda into this Bid:

ADDENDUM No: _____

§ 4. Bidder accepts all terms and conditions of the Invitation for Bids, including, without limitation, those dealing with the disposition of Bid Security. Bidder agrees that this Bid, including all Bid Alternates, if any, may not be revoked or withdrawn after the opening of bids, and shall remain open for acceptance for a period of 60 Days following the Bid Date, or for such longer period of time that Bidder may agree to in writing upon request of the Owner.

§ 5. Bidder herewith offers to provide all labor, materials, equipment, tools of trades and labor, accessories, appliances, warranties and guarantees, and to pay all royalties, fees, permits, licenses and applicable taxes necessary to complete the following items of construction work:

§ 6.1 BASE BID WORK *(as indicated in the Bidding Documents and generally described as follows):* The project consists of upgrades to the building's electrical and HVAC systems. These upgrades will require minor demolition, the construction of new vertical chases and electrical closets.

_____, which sum is hereafter called the Base Bid.

(Bidder - insert Base Bid Amount on line above)

SE-330 – LUMP SUM BID BID FORM

2011 Edition

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§ 6.2 BID ALTERNATES - as indicated in the Bidding Documents and generally described as follows:

ALTERNATE # 1 (Brief Description): _____

☐ ADD TO or ☐ DEDUCT FROM BASE BID: _____

(Bidder to Mark appropriate box to clearly indicate the price adjustment offered for each alternate)

ALTERNATE # 2 (Brief Description): _____

☐ ADD TO or ☐ DEDUCT FROM BASE BID: _____

(Bidder to Mark appropriate box to clearly indicate the price adjustment offered for each alternate)

ALTERNATE # 3 (Brief Description): _____

☐ ADD TO or ☐ DEDUCT FROM BASE BID: _____

(Bidder to Mark appropriate box to clearly indicate the price adjustment offered for each alternate)

SE-330 – LUMP SUM BID BID FORM

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§ 7. LISTING OF PROPOSED SUBCONTRACTORS PURSUANT TO SECTION 3020(b)(i), CHAPTER 35, TITLE 11 OF THE SOUTH CAROLINA CODE OF LAWS, AS AMENDED – (See Instructions on the following page BF-2A)

Bidder shall use the below-listed Subcontractors in the performance of the Subcontractor Specialty work listed:

SUBCONTRACTOR SPECIALTY By License Classification and/or Subclassification (Completed by Owner)	SUBCONTRACTOR'S PRIME CONTRACTOR'S NAME (Must be completed by Bidder) BASE BID	SUBCONTRACTOR'S PRIME CONTRACTOR'S SC LICENSE NUMBER
ALTERNATE 1		
ALTERNATE 2		
ALTERNATE 3		

If a Bid Alternate is accepted, Subcontractors listed for the Bid Alternate shall be used for the work of both the Alternate and the Base Bid work.

INSTRUCTIONS FOR SUBCONTRACTOR LISTING

- 1.** Section 7 of the Bid Form sets forth a list of subcontractor specialties for which bidder is required to identify by name the subcontractor(s) Bidder will use to perform the work of each listed specialty. Bidder must identify only the subcontractor(s) who will perform the work and no others.
- 2.** For purposes of subcontractor listing, a Subcontractor is an entity who will perform work or render service to the prime contractor to or about the construction site. Material suppliers, manufacturers, and fabricators that will not perform physical work at the site of the project but will only supply materials or equipment to the bidder or proposed subcontractor(s) are not subcontractors and Bidder should not insert their names in the spaces provided on the bid form. Likewise, Bidder should not insert the names of sub-subcontractors in the spaces provided on the bid form but only the names of those entities with which bidder will contract directly.
- 3.** Bidder must only insert the names of subcontractors who are qualified to perform the work of the listed specialties as specified in the Bidding Documents and South Carolina Licensing Laws.
- 4.** If under the terms of the Bidding Documents, Bidder is qualified to perform the work of a specialty listed and Bidder does not intend to subcontract such work but to use Bidder's own employees to perform such work, the Bidder must insert its own name in the space provided for that specialty.
- 5.** If Bidder intends to use multiple subcontractors to perform the work of a single specialty listing, Bidder must insert the name of each subcontractor Bidder will use, preferably separating the name of each by the word **"and"**. If Bidder intends to use both his own employees to perform a part of the work of a single specialty listing and to use one or more subcontractors to perform the remaining work for that specialty listing, bidder must insert his own name and the name of each subcontractor, preferably separating the name of each with the word **"and"**.
- 6.** Bidder may not list subcontractors in the alternative nor in a form that may be reasonably construed at the time of bid opening as a listing in the alternative. A listing that requires subsequent explanation to determine whether or not it is a listing in the alternative is non-responsive. If bidder intends to use multiple entities to perform the work for a single specialty listing, bidder must clearly set forth on the bid form such intent. Bidder may accomplish this by simply inserting the word **"and"** between the name of each entity listed for that specialty. Owner will reject as non-responsive a listing that contains the names of multiple subcontractors separated by a blank space, the word "or", a virgule (that is a /), or any separator that the Owner may reasonably interpret as a listing in the alternative.
- 7.** If Bidder is awarded the contract, bidder must, except with the approval of the owner for good cause shown, use the listed entities to perform the work for which they are listed.
- 8.** If bidder is awarded the contract, bidder will not be allowed to substitute another entity as subcontractor in place of a subcontractor listed in Section 7 of the Bid except for one or more of the reasons allowed by the SC Code of Laws.
- 9.** Bidder's failure to insert a name for each listed specialty subcontractor will render the Bid non-responsive.

SE-330 – LUMP SUM BID BID FORM

2011 Edition

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§ 8. LIST OF MANUFACTURERS, MATERIAL SUPPLIERS, AND SUBCONTRACTORS OTHER THAN SUBCONTRACTORS LISTED IN SECTION 7 ABOVE (FOR INFORMATION ONLY): Pursuant to instructions in the Invitation for Bids, if any, Bidder will provide to Owner upon the Owner's request and within 24 hours of such request, a listing of manufacturers, material suppliers, and subcontractors, other than those listed in Section 7 above, that Bidder intends to use on the project. Bidder acknowledges and agrees that this list is provided for purposes of determining responsibility and not pursuant to the subcontractor listing requirements of SC Code Ann § 11-35-3020(b)(i).

§ 9. TIME OF CONTRACT PERFORMANCE AND LIQUIDATED DAMAGES

a. **CONTRACT TIME:** Bidder agrees that the Date of Commencement of the Work shall be established in a Notice to Proceed to be issued by the Owner. Bidder agrees to substantially complete the Work within 90 calendar days from the Date of Commencement, subject to adjustments as provided in the Contract Documents.

b. **LIQUIDATED DAMAGES:** Bidder further agrees that from the compensation to be paid, the Owner shall retain as Liquidated Damages the sum of \$250.00 for each calendar day the actual construction time required to achieve Substantial Completion exceeds the specified or adjusted time for Substantial Completion as provided in the Contract Documents. This sum is intended by the parties as the predetermined measure of compensation for actual damages, not as a penalty for nonperformance.

§ 10. AGREEMENTS

- a. Bidder agrees that this bid is subject to the requirements of the law of the State of South Carolina.
- b. Bidder agrees that at any time prior to the issuance of the Notice to Proceed for this Project, this Project may be canceled for the convenience of, and without cost to, the State.
- c. Bidder agrees that neither the State of South Carolina nor any of its agencies, employees or agents shall be responsible for any bid preparation costs, or any costs or charges of any type, should all bids be rejected or the Project canceled for any reason prior to the issuance of the Notice to Proceed.

§ 11. ELECTRONIC BID BOND

By signing below, the Principal is affirming that the identified electronic bid bond has been executed and that the Principal and Surety are firmly bound unto the State of South Carolina under the terms and conditions of the AIA Document A310, Bid Bond, included in the Bidding Documents.

Electronic Bid Bond Number: _____

Signature and Title: _____

SE-330 – LUMP SUM BID BID FORM

2011 Edition

Rev. 2/14/14

BIDDER'S TAXPAYER IDENTIFICATION

FEDERAL EMPLOYER'S IDENTIFICATION NUMBER: _____

OR

SOCIAL SECURITY NUMBER: _____

CONTRACTOR'S CLASSIFICATIONS AND SUBCLASSIFICATIONS WITH LIMITATIONS

Classification(s) & Limits: _____

Subclassification(s) & Limits: _____

SC Contractor's License Number(s): _____

BY SIGNING THIS BID, THE PERSON SIGNING REAFFIRMS ALL REPRESENTATIONS AND CERTIFICATIONS MADE BY BOTH THE PERSON SIGNING AND THE BIDDER, INCLUDING WITHOUT LIMITATION, THOSE APPEARING IN ARTICLE 2 OF THE INSTRUCTIONS TO BIDDER. THE INVITATION FOR BIDS, AS DEFINED IN THE INSTRUCTIONS TO BIDDERS, IS EXPRESSLY INCORPORATE BY REFERENCE.

SIGNATURE

BIDDER'S LEGAL NAME: _____

ADDRESS: _____

BY: _____
(Signature)

DATE: _____

TITLE: _____

TELEPHONE: _____

EMAIL: _____

SECTION 00 3100 - 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 as follows:
 - 1. Hazardous Material Survey: See attached for reference only.
 - 2. Original copy is available for inspection at Owner's offices during normal business hours.

PART 2 PRODUCTS (NOT USED)

PART 3 EXECUTION (NOT USED)

END OF SECTION



SPECIFICATIONS FOR ASBESTOS ABATEMENT

**UNIVERSITY OF SOUTH CAROLINA
JAMES F. BYRNES
BOILERS #1 AND #2 ABATEMENT/DEMOLITION**

July 16, 2014

PREPARED FOR:

**UNIVERSITY OF SOUTH CAROLINA UPSTATE
743 GREENE STREET
COLUMBIA, SOUTH CAROLINA 29208**

PREPARED BY:

**CROSSROADS ENVIRONMENTAL, LLC
1258 BOILING SPRINGS ROAD
SPARTANBURG, SOUTH CAROLINA 29303
CRE PROJECT NUMBER: PD14-0465-13075**

Prepared by:

A handwritten signature in black ink, appearing to read 'Kay H. Horton'.

Kay H. Horton

PD#: 23184, Exp. 02/26/15

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**SPECIFICATIONS FOR ASBESTOS ABATEMENT
UNIVERSITY OF SOUTH CAROLINA
JAMES F. BYRNES BOILERS
BOILERS #1 AND #2 ABATEMENT/DEMOLITION
CRE PROJECT DESIGN #: PD14-0465-13075**

I. PREFACE/GENERAL DESCRIPTION

Air monitoring and Project Management will be performed by a qualified and licensed environmental firm that has been hired by the building owner. The Building Owner or other representatives of the Building Owner shall not be held liable in any way for negligence, whereas it be intentional or unintentional on the part of the Contractor. The asbestos abatement activities are being performed prior to renovation activities.

The James F. Byrnes Building is located at 901 Sumter Street on the campus of the University of South Carolina. The boilers (2) are located in the mechanical room on the bottom floor of the building. Both boilers are gas driven units and are no longer in service.

Asbestos-containing sealer, gaskets, and debris have been identified in both boilers. In addition, other asbestos-containing materials may exist in areas of the boilers that could not be accessed.

II. SCOPE OF WORK

The scope of work will include dismantling and removal of both boilers under full negative pressure enclosures, removal from the mechanical room, and proper disposal.

BASE BID:

MATERIAL

- **BOILER #1 (Well-McLain, 6' x 5')**
Known ACM: 60 ln. ft. of gap sealer, 24 ln. ft. of inspection plate gasket, 224 ln. ft. of section rope gasket, 30 sq. ft. of insulation debris, 12 ln. ft. of
- **BOILER #2 (Bryant, 7' x 4')**
Known ACM: 56 sq. ft. of insulation debris, 192 ln. ft. of section sealer

Note: Additional ACM may exist in inaccessible parts of the boilers.

SCHEDULE

START DATE: 10 WORKING DAYS FOLLOWING NOTICE TO PROCEED
COMPLETION DATE: 10 WORKING DAYS FOLLOWING START DATE

III. CONTRACTOR INFORMATION

A. SUBMITTALS

See information provided by USC as well as requirements included in Section IX of these specifications.

B. NOTIFICATIONS/LICENSES

The Contractor will be responsible for filing proper notification to SC-DHEC. The Contractor must have a current SC-DHEC Asbestos Abatement Contractor's License at the time of bid.

Contractor is responsible for obtaining a City Business license, where applicable.

C. OSHA

It is the abatement contractor's responsibility to fulfill all Occupational Safety and Health Administration (OSHA) requirements under CFR 1926.1101 and all other safety requirements that may be required by the work site.

D. PERSONNEL

THE CONTRACTOR MUST PROVIDE AN ADEQUATE NUMBER OF QUALIFIED PERSONNEL TO MEET THE SCHEDULE REQUIREMENTS OF THE PROJECT.

GENERAL SUPERINTENDENT/SUPERVISOR:

Provide a General Superintendent licensed in Asbestos work that is experienced in administration, environmental remediation, general contracting coordinating, including work practices, protective measures for building and personnel, disposal procedures, etc. This person is responsible for compliance with all applicable federal, state and local regulations, particularly those relating to asbestos-containing materials as outlined in OSHA 29 CFR

1926.1101, and including 1926.20 through 1926.32. The Superintendent needs to be knowledgeable of the South Carolina Department of Health and Environmental Control Asbestos Regulation 61 61-86.1: Standards of Performance for Asbestos Projects, Effective May 27, 2011 and EPA NESHAP 61.140 Subpart M-National Emission Standard for Asbestos.

Experience and Training: The General Superintendent must be accredited as an Asbestos Abatement Supervisor in accordance with the AHERA regulation 40 CFR Part 763, Subpart E, Appendix C (ASHARA) and be licensed as a SCDHEC Asbestos Supervisor.

The General Superintendent must be on site at all times, and must be able to communicate in the language of Regulatory Personnel.

ASBESTOS SUPERVISOR(S):

Provide full time Supervisor(s) for inside the asbestos work area with experience in asbestos abatement projects including work practices, protective measures for building and personnel, disposal procedures, etc. One inside supervisor must be able to communicate in the language of the workers and be able to communicate in English to the Building Owner's Representative(s) and/or state regulatory personnel. All inside supervisor(s) are responsible for compliance with all applicable federal, state and local regulations, particularly those relating to asbestos-containing materials as outlined in OSHA 29 CFR 1926.1101, and including 1926.20 through 1926.32. The Supervisor(s) need to be knowledgeable of the South Carolina Department of Health and Environmental Control Asbestos Regulation 61 61-86.1: Standards of Performance for Asbestos Projects, Effective May 27, 2011 and EPA NESHAP 61.140 Subpart M-National Emission Standard for Asbestos.

Experience and Training: The Asbestos Supervisor(s) (competent person) must be accredited as an Asbestos Abatement Supervisor in accordance with the AHERA regulation 40 CFR Part 763, Subpart E, Appendix C (ASHARA) and be licensed as SCDHEC Supervisors.

NON-SUPERVISORY PERSONNEL:

Provide an adequate number of qualified personnel to meet the schedule requirements of the project. Submit to the Owner's Representative a request for approval for any person intended to be employed in the project with said employees' name, social security number, qualifications, "Certificate of Workers' Acknowledgment", and "Affidavit of Medical Surveillance and Respiratory Protection".

Experience and Training: All workers employed for abatement throughout the project shall be accredited as an Asbestos Abatement Worker in accordance with the AHERA regulation 40 CFR Part 763, Subpart E, Appendix C (ASHARA) and be licensed as SCDHEC Asbestos Workers.

EVERY ASBESTOS ABATEMENT ENTITY PERFORMING WORK MUST HAVE HIS/HER ORIGINAL LICENSE, AS WELL AS A COPY OF HIS/HER MOST CURRENT TRAINING CERTIFICATE.

E. BUILDING OWNER AND OWNER'S REPRESENTATIVE

1. **BUILDING OWNER:**
University of South Carolina
743 Greene Street
Columbia, South Carolina 29208
2. **FACILITY:**
James F. Byrnes
901 Sumter Street
Columbia, South Carolina
3. **DESIGN:**
Crossroads Environmental, LLC
1258 Boiling Springs Rd.
Spartanburg, South Carolina 29303
Point of Contact: Kay Horton
(864) 541-8736
E-mail address: khorton@crossroadsendv.net

F. SUMMARY OF TASKS:

Contractor shall remove and dispose of all asbestos-containing and/or asbestos contaminated material affected as indicated in the specifications for **James F. Byrnes boilers #1 and #2.**

Contract work includes:

1. Pre-abatement activities including pre-construction meeting, inspection, notifications, permits, submittal approvals, preparations, emergency arrangements and submittal of plan of action.

2. Abatement activities including preparation of work site, removal and disposal of asbestos containing and/or contaminated waste, recordkeeping, security of job site, pre-work and post-work inspections, and OSHA compliance air monitoring.
3. Cleaning, Decontaminating, and Clearance activities including final inspection, clearance testing, certification of decontamination, and all post work submittals.
4. Any equipment that is unable to be moved must be polyed and protected during abatement.

G. STOP WORK:

If the Building Owner or Owner's Representative verbally issues a stop work order, the abatement contractor shall immediately and automatically stop all work and initiate fiber reduction activities. Do not resume asbestos removal until authorized by the Building Owner or the Owner's Representative. Do not recommence work until authorized by the Building Owner or the Owner's Representative. Standby time and cost required for corrective action will be at the contractor's expense. The occurrence of the following events shall be reported in writing to the Owner's Representative and shall require the contractor to immediately stop asbestos removal and initiate fiber reduction and other appropriate activities:

1. Excessive airborne fibers outside the containment area (>0.01 f/cc or established background levels, whichever is greater).
2. Break in either the primary or critical containment barriers.
3. Serious injury to a worker within the containment area that necessitates interruption of the normal decontamination procedures.
4. Presence of a fire and/or safety emergency.
5. Respiratory Protection System failure.
6. Power failure.

H. CONTRACTOR'S USE OF PREMISES:

The Contractor shall cooperate fully with the Owner's Representative to minimize conflicts and to facilitate safe and efficient usage of the building. **Contractor will confine operations to the areas where he will perform the work in accordance with the specifications. Portions of the site beyond areas on which work is indicated are not to be disturbed.**

The Owner will occupy the site and the existing building during the entire period of construction. Cooperate fully with the Owner or his representative during construction operations to minimize conflicts and to facilitate Owner usage. Perform the work so as not to interfere with the Owner's operation.

I. USE OF THE EXISTING BUILDING:

Maintain existing building in a secure and weather tight condition throughout the construction period. The Contractor will repair any damage caused by construction operations including damage to landscape properties, unless otherwise noted in writing. Take all precautions necessary to protect the building and its occupants during the construction period.

1. Keep public areas such as hallways, stairs, elevator lobbies, and toilet areas free from accumulation of waste, rubbish or construction debris.
2. **Smoking** or open fires will not be permitted on the premises.
3. Except for facilities designated for use by the Contractor's personnel during the Pre-Bid Meeting, use of existing toilets within the building, by the Contractor and his personnel, will not be permitted. **Contractor employees that are found in unauthorized areas of the facility will be asked to leave the premises and will not be allowed to return.**

J. POWER:

Power will be provided by the building owner. The Contractor is responsible for determining if the power is adequate at the time of the pre-bid. If adequate power is not available, the Contractor will be responsible for providing a generator at no cost to the Building Owner.

K. WATER:

Water will be provided by the Building Owner. The Contractor must maintain hose connections and outlet valves in leak-proof condition. Where finish work below an outlet might be damaged by spillage or leakage, provide a drip pan of suitable size to minimize the possibility of water damage. Drain water promptly from pans as it accumulates. Should the water connection cause damage, the Environmental/Demolition Contractor is responsible for the repair at no cost to the building owner.

L. SANITARY FACILITIES:

The Environmental/Demolition Contractor will have a designated restroom provided by the Building Owner. The restroom must be kept clean at all times, and must be sanitized upon completion of the project. Contractor will be responsible for providing toilet paper and hand towels.

M. DRIVEWAYS AND PARKING AREAS:

There will not be parking available at the building. The Contractor may park vehicle directly behind the outside entrance of the mechanical room during load-out, but will not be able to park an unattended vehicle there. Keep existing driveways and entrances serving the premises clear and available at all times. The parking spaces behind the building do not belong to the Building Owner. Do not use these areas for parking or storage of materials.

IV. PERSONAL PROTECTIVE EQUIPMENT

The following work practices must be employed during the abatement of the above materials accordingly:

A. WORKER PROTECTION:

Before beginning work of this section provide workers with the required protective equipment. Require that appropriate protective equipment be used at all times.

Protective Clothing:

Coveralls: Provide disposable full-body coveralls with head covers, and require that they be worn by all workers in the Work/Isolation Area. Provide a sufficient number for all required changes, for all workers in the Work/Isolation Area.

Boots: Provide work boots with non-skid soles, and where required by OSHA, foot protection, for all workers. Provide boots at no cost to workers. Do not allow boots to be removed from the Work/Isolation Area for any reason, after being contaminated with asbestos-containing material. Thoroughly clean, decontaminate and bag boots before removing them from Work/Isolation Area at the end of the work.

Hard Hats: Provide head protection (hard hats) as required by OSHA for all workers, and provide 4 spares for use by Owner's Representative, Project

Administrator, and Owner. Require hard hats to be worn at all times that work is in progress that may potentially cause head injury. Provide hard hats with plastic strap type suspension. If hats are utilized in the Work/Isolation Area, thoroughly clean, decontaminate and bag hats before removing them from Work/Isolation Area at the end of the work.

Goggles: Provide eye protection (goggles) as required by OSHA for all workers involved in scraping, spraying, or any other activity which may potentially cause eye injury. Thoroughly clean, decontaminate and bag goggles before removing them from Work/Isolation Area at the end of the work.

B. RESPIRATORY PROTECTION:

Description of Work:

Instruct and train each worker involved in asbestos abatement or maintenance and repair of Class I, II, and III asbestos-containing materials in proper respiratory use and require that each worker always wear a respirator, properly fitted on the face in the Work/Isolation Area from the start of any operation which may cause airborne asbestos fibers until the Work/Isolation Area is completely decontaminated. Use respiratory protection appropriate for the fiber level encountered in the work place or as required for other toxic or oxygen-deficient situations encountered.

Respiratory Protection Program: Comply with ANSI Z88.2 - 1992 "Practices for Respiratory Protection" and OSHA 29 CFR 1910.134 and CFR 1926.1101. Require that respiratory protection be used at all times where there is any possibility of disturbance of asbestos-containing materials whether intentional or accidental. Require that a respirator be worn by anyone in a Work/Isolation Area at all times, regardless of activity, during a period that starts with any operation which could cause airborne fibers until a negative exposure assessment has been completed.

General: The employer shall provide respirators, and ensure that they are used where required. Respirators shall be used in the following circumstances:

- During all Class I asbestos jobs.
- During all Class II work where the ACM is not removed in a substantially intact state.

- During all Class II and III asbestos jobs where the employer does not produce a "negative exposure assessment".
- During all Class III jobs where TSI or surfacing ACM or PACM is being disturbed.
- During all Class IV work performed within the regulated areas where employees performing other work are required to wear respirators.
- During all work where employees are exposed above the TWA (0.1 f/cc) or excursion limit (1.0 f/cc).

V. PREPARATION OF THE WORK AREA(S)

A. REGULATED AREA DEMARCATION

The Regulated area is the location where environmental remediation work occurs. All class I, II, and III asbestos work as defined in OSHA CFR 1926.1101 (b) shall be conducted within regulated areas.

All work areas where asbestos work or other contaminants are being removed must be demarcated with barrier tape and signs. Waterproof signage must be utilized during all outdoor removal.

Access to the regulated area shall be limited to persons authorized in accordance with OSHA and SC-DHEC.

Prohibited activities within the regulated area include but are not limited to: no eating, drinking, smoking, chewing of tobacco or gum, or applying of cosmetics. The competent person shall ensure that all asbestos work performed within regulated area is supervised by a competent person, which is defined in South Carolina as a licensed Supervisor.

WORK/ISOLATION AREA:

The Work/Isolation area that is located within the regulated area is a variable of the extent of work of the Contract. It may be a portion of a room, a single room, or a complex of rooms. A "Work/Isolation Area" is considered contaminated during the work, and must be separated from the balance of the building, and decontaminated at the completion of the asbestos-control work.

Completely separate the Work/Isolation Area from other parts of the building to prevent asbestos-containing dust or debris from passing beyond the work/isolated area. Should the area beyond the Work/Isolation Area(s) become contaminated with asbestos-containing dust or debris because of the work, clean those areas in accordance with the specifications. Perform all such required cleaning or decontamination at no additional cost to owner.

Place all tools, scaffolding, staging, etc. necessary for the work in the area to be separated prior to completion of Work/Isolation Area separation.

CONTROL ACCESS:

Provide Warning Signs at each access to Regulated Area on doors and/or critical barriers. Post an approximately 20 inch by 14 inch manufactured caution sign displaying the following legend with letter sizes and styles of a visibility required by OSHA 29 CFR 1926.1101:

LEGEND:

DANGER

ASBESTOS

**CANCER AND LUNG DISEASE HAZARD
RESPIRATORS AND PROTECTIVE CLOTHING ARE REQUIRED
IN THIS AREA**

Provide spacing between respective lines at least equal to the height of the respective upper line.

B. CRITICAL BARRIERS AND PRIMARY BARRIERS:

CRITICAL BARRIERS:

Individually seal each opening between the work area and uncontaminated areas with a minimum of two (2) independent layers of polyethylene sheeting at least 6 millimeters (mil) in thickness taped securely in place. Seal all stationary equipment with a minimum of one (1) layer of polyethylene sheeting at least 4 mil in thickness. Maintain all seals until all work including Project Decontamination is complete and passing clearance results have been obtained.

PRIMARY BARRIERS

The Primary Barriers must be installed in addition to Critical Barriers as specified in the preceding paragraphs.

Cover all walls of each Work Area with one (1) layer of clear polyethylene sheeting, each at least 4 mil in thickness, mechanically supported and sealed with duct tape or spray-adhesive in the same manner as “Critical Barrier” sheet plastic barriers. Tape all joints.

Cover all ceilings with one (1) layer of clear polyethylene sheeting, each at least 4 mil in thickness, extending beyond wall/ceiling joints at least 12 inches, mechanically supported and sealed with tape in the same manner as “Critical Barrier” sheet plastic barriers. Tape all joints.

Install a viewing port measuring at least 24 inches by 24 inches in an external wall to allow unobstructed observation of abatement activities in the work area.

NOTE: FOR THE BOILER CONTAINMENTS, A TOTAL OF THREE LAYERS OF POLY WILL BE REQUIRED (TWO CRITICAL LAYERS AND ONE PRIMARY LAYER). THE INTERIOR LAYER MUST BE INSTALLED SUCH THAT IT CAN BE REMOVED FOLLOWING ENCAPSULATION/PRIOR TO CLEARANCE SAMPLING.

PRESSURE READINGS MUST BE RECORDED A MINIMUM OF FOUR TIMES PER 8-HR. SHIFT BY THE ON-SITE AIR MONITOR.

C. **DECONTAMINATION UNIT:**

Provide attached Personnel Decontamination facility for containment areas. Construct the decontamination facility in compliance with OSHA 29 CFR 1926.1101 and SC-DHEC Regulations. This requires that the decontamination enclosure (decon) include a clean room, airlock, shower with controllable hot and cold water, airlock, and equipment room. In addition, the Contractor must provide an adequate changing area that allows privacy when dressing out and a proper storage space for street clothes. Steps required to exit the work area through the decon are as follow:

- 1) Remove gross contamination and debris from protective clothing before entering the equipment room
- 2) Enter equipment room and remove and dispose of suit

- 3) Enter shower with respirator on, pass filters into equipment room for disposal
- 4) After showering, enter clean room to put on street clothes

The decontamination chambers must remain free of debris and standing water.

The Contractor must ensure that all contaminated water is filtered through a five-micron or smaller filter and discharged to a sanitary sewer system. No water (contaminated or filtered) shall be allowed to lead or drain outside of the work area.

D. LOAD-OUT:

Provide decontamination area for removal of bagged waste from work area. The load-out area should be separate from the personnel decon.

E. TEMPORARY LIGHTING FOR FULL CONTAINMENT:

Disconnect all existing power to lighting circuits in Work Area as described in Temporary Enclosures. All lighting to the Work Area and Decontamination facilities is to be provided from temporary electrical panel(s).

Provide the following or equivalent light level: One 100-watt incandescent lamp per 1,000 square feet of floor area, uniformly distributed, for general construction lighting, or equivalent illumination of a similar nature. In corridors and similar traffic areas provide one 100-watt incandescent lamp every 25 feet. In stairways, scaffold level, and at ladder runs, provide one lamp minimum per landing, located to illuminate each landing and flight. Provide sufficient temporary lighting to ensure proper workmanship everywhere.

- Provide lighting in areas where work is being performed to supply a 100-watt minimum light level in all areas of the work area.
- Provide lighting in any area being subjected to a visual inspection to supply a 100-watt minimum light level in all areas of the work area.
- Provide lighting in the Decontamination Unit supplying a 75-watt minimum light level.
- Provide sufficient lighting circuits as required by the work. All lighting circuits are to originate at temporary electrical panel.

F. HEPA FILTERED FAN UNITS:

Use units in the work areas that meet the following requirements.

Cabinets are to be constructed of durable materials able to withstand damage from rough handling and transportation. The width of the cabinet should be less than 30 inches to fit through standard-size doorways. Provide units whose cabinets are:

- * Factory-sealed to prevent asbestos-containing dust from being released during use, transport, or maintenance
- * Arranged to provide access to and replacement of all air filters from intake end
- * Mounted on casters or wheels
- * Rate capacity of fan according to usable air movement capacity under actual operating conditions.
- * Clean and operates with sufficient number of pre and secondary filters to be changed out throughout the day.

Provide an operational air circulation system supplying a minimum of the following air circulation rate: 4 air changes per hour to achieve required air circulation according to the following procedure:

Air Circulation Required in Cubic Feet of Air per Minute (CFM) =

$$\frac{\text{Volume of Work/isolation Area (cu. ft.)} \times \text{Number of air changes per hour (4)}}{60 \text{ (minutes per hour)}}$$

CFM/Capacity of unit= Number of units required

Capacity of a unit for purposes of this section is the capacity in cubic feet per minute with fully loaded filters (pressure differential which causes loaded filter warning light to come on) in the machine's labeled operating characteristics or 50% of the manufacturer's rated capacity for the unit. The capacity of the combined units shall at least be capable of maintaining a negative pressure differential of -0.02 inches of water around the entire perimeter of the Work/isolation Area.

Provide a minimum of 2 additional units per containment as back-ups.

Contractor is responsible for calculating the correct number of units per containment and for providing enough units during the removal process to ensure negative pressure.

ALL UNITS SHOULD HAVE NEW HEPA FILTERS INSTALLED PRIOR TO PLACEMENT ON PROJECT SITE. IF A UNIT IS FOUND TO CONTAIN A DIRTY UNIT, THE CONTRACTOR WILL BE REQUIRED TO HAVE NEW HEPA FILTERS INSTALLED IMMEDIATELY OR HAVE THE UNIT WITH THE DIRTY FILTER REMOVED FROM THE JOBSITE.

G. MANOMETER

A manometer must be utilized to measure the relative pressure. The inlet sensor of the manometer shall be located at the farthest point from any source of make-up air. The manometer must be calibrated by the Supervisor prior to the start of each work shift. The manometer record of daily readings must be recorded four times per eight-hour shift by the Licensed Air Monitor.

H. EQUIPMENT

The Contractor must ensure that all necessary equipment to perform the job efficiently is provided. This includes attachments for HEPA vacuums.

VI. REMOVAL PROCEDURES

• REMOVAL OF BOILERS

After construction of negative pressure enclosure, dismantle each boiler into manageable pieces. All associated materials must be kept wet throughout process. All debris and porous components must be wrapped in two layers of 6-mil polyethylene sheeting and disposed of as ACM. Smooth, non-porous metal (not rusted or damaged) may be thoroughly cleaned and disposed as non-asbestos. These materials may not be stored in the same waste container as the materials that will be disposed of as asbestos.

All materials must be removed from the building through the door in the mechanical room that goes directly to the outside of the building.

- **CLEAN UP**

Clean Floor after completion of removal of all environmental contaminated waste materials by wet mopping with amended water. Mop at least three times or until all residue is no longer present, allowing a drying time between each mopping.

Dispose of all rags, plastic sheet, etc. in accordance with the Disposal section of these specifications.

Decontaminate Equipment: After the completion of all work, decontaminate all equipment and machinery used for work of this section. Accomplish decontamination as required by the section on Project Decontamination.

VII. WASTE STORAGE AND DISPOSAL PROCEDURES

All materials are to be contained in one of the following lead-tight containers: Two 6 mil disposal bags, twist the top of both bags closed, fold over (gooseneck style), and seal both bags with duct tape; two layers of 6-mil polyethylene sheeting, sealed at seams; or DOT approved leak-tight drums.

Waste stored on the site prior to disposal, must be maintained in a secured, locked location where access is controlled. **Materials to be disposed of as non-asbestos cannot be stored in the same waste container as materials to be disposed of as asbestos.**

LABELING OF DISPOSAL CONTAINERS:

On the outside of the chosen disposal container, the following three labels must be placed and visible:

First Label: Provide in accordance with 29 CFR 1910.1200(f) of OSHA's Hazard Communication standard:

Second Label: Until October 1, 1993, provide in accordance with U. S. Department of Transportation regulation on hazardous waste marking. 49 CFR Parts 171 and 172. Hazardous Substances: Final Rule. Published November 21, 1986 and revised February 17, 1987:

Third Label: Provide in accordance with 40 CFR Part 61 (AMENDED), subpart M, section 61.150(a)(1)(v) of EPA's National Emission Standards for Hazardous Air Pollutants; Asbestos NESHAP Provision. Published November 20, 1990.

All waste is to be hauled by a waste hauler with all required licenses from all state and local authority with jurisdiction. Protect walls, floors, and ceilings of the interior of the truck or dumpster with one layer of 6 mil polyethylene sheeting. Floor sheeting shall be installed first and shall extend up the side wall at least 12 inches and taped securely into place. Wall sheeting shall overlap by at least six inches and be taped into place. Ceiling sheeting shall extend down the sides of the walls at least six inches and be taped into place. Take containers from the Work Area directly to a sealed truck or dumpster. Do not transport disposal bagged materials on open trucks. Comply with any local or state regulations for prior notice and delivery, and comply with any special landfill requirements.

At a disposal site, vehicles shall approach the dump location as closely as possible for unloading of the asbestos waste. Bags, drums and wrapped components shall be inspected when unloaded at the disposal site. Material in damaged containers shall be re-wrapped or re-packed in empty bags or drums. If more than 25% of the bags are broken or damaged, return to work site for re-bagging. Waste containers shall be placed on the ground at the disposal site, not pushed or thrown out. Following the removal of all containerized waste, polyethylene sheeting shall be removed and discarded in bags or drums along with contaminated cleaning materials and protective clothing. Clean cargo area of the truck or dumpster by wet-wiping with amended water and/or using a HEPA vacuum cleaner.

Retain Waste Shipment Records (WSRs) from landfill and/or processor for materials disposed of. At completion of hauling and disposal of each load submit copy of waste manifest and landfill receipts to Owner's Representative and comply with local and state regulations for disposal documentation.

As per NESHAPS 61.150 vii(3)(4) waste shipment records shall be obtained from the landfill/or hauler within 35 days, if not received within 45 days, EPA shall be notified by the contractor of unresponsive records.

VIII. AIR MONITORING AND PROJECT COMPLETION

A qualified and licensed air monitoring firm will provide all air monitoring and perform all visual inspections.

BACKGROUND AIR MONITORING:

Background monitoring will be performed both inside and outside of the work areas to establish existing ambient air levels under normal activity conditions.

The background samples will be analyzed using Phase Contrast Microscopy (PCM) analysis.

DAILY AREA AIR MONITORING:

The purpose of the Owner's daily area air monitoring is to evaluate quality, resolve problems, and minimize the potential for the spread of contamination beyond the work area. In addition, the work of the Owner's IH includes performance of the final visual inspection and testing to determine whether a space or a building has been adequately decontaminated. All daily air monitoring is to be done utilizing Phase Contrast Microscopy (PCM) except for Final Clearance Monitoring as specified in the following paragraphs. Owner's Air Monitor will perform the following tasks:

1. Perform continuous air monitoring, inspection and testing inside and outside the work area during actual abatement work to detect any faults in the work area isolation and any adverse impact on surrounding areas from work area activities.
2. Perform final inspection and testing of decontaminated areas or buildings at the conclusion of the abatement and clean-up work to certify compliance with decontamination standard.

All data, inspection results, and testing results generated by the Owner's IH will be available to the contractor for information and consideration. Contractor shall provide cooperation and support to the Owner's IH for efficient and smooth performance of their work.

Monitoring and inspection results of the IH may be used to issue any stop removal orders to the contractor during abatement work and to accept or reject an area or a building as decontaminated.

This section also sets forth airborne fiber levels both inside and outside the work area as action levels, and describes the action required by the Contractor if an action level is met or exceeded.

STOP ACTION LEVELS:

Inside Work Area: Maintain an average airborne count in the work area of less than .05 f/cc. If the fiber counts rise above this figure for any sample taken, revise work procedures to lower fiber counts. If the Time Weighted Average

(TWA) fiber count for any work shift or 8 hour period exceeds the Stop Action Level, stop all work except corrective action, leave pressure differential and air circulation system in operation and notify Owner's Representative. After correcting cause of high fiber levels, do not recommence work for 24 hours unless otherwise authorized, in writing, by Owner's Representative.

If airborne fiber counts exceed 0.1 f/cc cease all work except corrective action. Notify Owner's Representative. Do not recommence work other than corrective action for 24 hours unless otherwise authorized, in writing, by Owner's Representative.

Outside Work Area: If any air sample taken outside of the Work Area exceeds 0.01 f/cc or the base line established by background air monitoring, immediately and automatically stop all work except corrective action. The Owner's Representative will determine the source of the high reading and notify the Contractor in writing.

If the high reading was the result of a failure of Work Area isolation measures initiate the following actions:

- Immediately erect new critical barriers to isolate the affected area from the balance of the building. Erect Critical Barriers at the next existing structural isolation of the involved space (eg. wall, ceiling, floor).
- Decontaminate the affected area in accordance with Project Decontamination Procedures.
- Require that respiratory protection as set forth in Respiratory Protection be worn in affected area until area is cleared for re-occupancy in accordance with Final Clearance Monitoring.
- Leave Critical Barriers in place until completion of work and ensure that the operation of the pressure differential system in the Work Area results in a flow of air from the affected area into the existing Work Area.
- If the exit from the clean room of the personnel decontamination unit enters the affected area, establish a separate decontamination facility consisting of a Shower Room and Changing Room.

- After Certification of Visual Inspection in the Work Area, remove critical barriers separating the work area from the affected area. Final air samples will be taken within the entire area as set forth in Final Clearance Monitoring.

If the high fiber reading was the result of other causes, initiate the corrective action as determined by the Owner's Representative.

CONTRACTOR RELEASE CRITERIA FOR FINAL WORK AREA CLEARANCE:

1) VISUAL INSPECTION

Final Clearance Monitoring will not begin until the Asbestos Abatement Work Area airborne asbestos structure concentrations have been reduced to the level specified and described in Project Decontamination is complete, the area has passed a thorough visual inspection by the Owner's Air Monitor and the Project Manager and successful completion of these requirements has been certified by the Owner's Air Monitor and Project Manager. The visual inspection will be performed at the request of the Supervisor following fine cleaning of the work area.

2) ENCAPSULATION

A coating of compatible encapsulant must be applied to porous surfaces that have been stripped and cleaned of ACM. This must be compatible with the substrate of the replacement material.

3) REMOVAL OF PRIMARY BARRIERS

After all encapsulant is thoroughly dry, all primary barriers must be removed. If any evidence of contamination is observed after removal of the primary barriers, the debris/particulate should be HEPA vacuumed and wet-wiped under not residue remains.

4) FINAL AIR MONITORING

Final air monitoring will be performed in accordance with SC-DHEC Regulations, and will be analyzed using Phase Contrast Microscopy (PCM) analysis.

LABORATORY TESTING AND ANALYTICAL METHODS:

PHASE CONTRAST MICROSCOPY (PCM):

Analysis of background and daily samples will be performed utilizing the methods set forth in NIOSH 7400 method. All analysis will be performed by an AIHA accredited analyst.

SAMPLE VOLUMES:

The number and volume of air samples taken by the Air Monitor will be in accordance with all regulations and standards governing air monitoring. Additional samples may be taken at Owner's or Owner's Representatives discretion. If airborne fiber counts exceed allowed limits additional samples will be taken as necessary to monitor fiber levels.

SAMPLE CASSETTES:

PCM: Samples will be collected on 25 mm cassettes with a 0.80 micrometer mixed cellulose ester filter.

WRITTEN REPORTS:

Written reports will be posted at the job site on a daily basis, and within 24 hours of collection of the samples. Location will be determined by Owner's Representative and Contractor's General Superintendent. Clearance results shall be posted at the site prior to tear-down of the containment area(s).

ADDITIONAL TESTING:

The Contractor may conduct his own air monitoring and laboratory testing. If he elects to do this the cost of such air monitoring and laboratory testing shall be at no additional cost to the Owner.

PERSONAL MONITORING:

Contractor is responsible for performing air monitoring to meet Contractor's OSHA requirements for personnel sampling or any other purpose.

IX. SUBMITTALS

The attached sheets include the submittal requirements prior to the start of work, and before project closeout. Submittal for the section At Project Closeout must be submitted to the Owner's Representative with the Final Payment Request.

SUBMITTAL CHECKLIST - MANDATORY

Submittal for section Before Start of Work must be turned in to the Owner or the Owner's Representative at the Pre-Construction Meeting. If no Pre-Construction Meeting is held, then the paperwork must be submitted to the Owner's or the Owner's Representative Office 48 Hours before the start of work. The Owner or Owner's Representative will then give the contractor written permission to begin work. The Contractor will not begin work without written permission.

BEFORE START OF WORK

- _____1. Contractor's anticipated work schedule must be provided to the Project Manager five (5) working days prior to the start of work.
- _____2. Copy of Contractor's SC-DHEC Contractor's License.
- _____3. Copies of SC-DHEC Licenses for each individual that will be working on the job site. (Worker's that have submitted their training certification to SC-DHEC who have not yet received their license must be verified by our office and approved in writing before they are allowed on the job site).
- _____4. SC-DHEC Permit

Submittal for the section Periodically During Work or Before Project Closeout must be submitted to the Owner or Owner's Representative with the Progressive Payment Request. If Progressive Payments are not indicated, then the submittals must be turned into the Owner or Owner's Representative Office before the Project Closeout. Contractor must have written permission from Owner or Owner's Representative before beginning Project Closeout.

PERIODICALLY DURING WORK OR BEFORE PROJECT CLOSEOUT

- _____4. Copy of containment checklist filled out by Air Monitor and Contractor
- _____5. Daily Logs filled out and signed by the Project Supervisor
- _____6. Daily Sign In\Sign Out Sheets
- _____7. Contractor's copy of Initial Exposure Assessment
- _____8. Contractor's copy of Negative Exposure Assessment
- _____9. Contractor's copy of Daily Air Monitoring Results
- _____10. Accident and Incident Investigation Report
- _____11. Visitor Log and signed Visitor's Authorization Form
- _____12. Documentation of Manometer Readings and Asbestos Filtration (AFD) and Water Filtration (WFD) Device Inspections
- _____13. Personnel Air monitoring reports

Submittal for the section At Project Closeout must be submitted with the Final Payment Request.

AT PROJECT CLOSEOUT

- _____ 14. Certification of Removal
- _____ 15. Asbestos Chain-of-Custody Form (Trip Ticket) completed by and signed by the Contractor Representative, Transporter and Disposal Site Representative within 35 days as required by NESHAPS 61.150 vii(3)(4)
- _____ 16. Contractor's Application for Payment (Invoice)

ITEMS TO BE SUBMITTED BY THE AIR MONITORING FIRM(S)

- _____ 17. Air monitoring reports posted within 24 hours
- _____ 18. Clearance results
- _____ 19. Copy of Air Monitoring license(s)



LIMITED ASBESTOS INSPECTION REPORT

FOR

UNIVERSITY OF SOUTH CAROLINA

743 Greene Street
Columbia, South Carolina 29208
(803) 777-1208

LOCATION

James F. Byrnes Building
901 Sumter Street
Columbia, South Carolina 29208

INSPECTION DATE: July 10, 2014

REPORT DATE: July 22, 2014

INSPECTOR

**Travis Williams – SC-DHEC License #BI-00713, Exp. 11/19/14
(864) 640-7744**

For

**Crossroads Environmental, LLC
1258 Boiling Springs Road
Spartanburg, South Carolina 29303
(864) 541-8736
CRE Project #13074-IN**



July 22, 2014

Mr. Ty Russell
University of South Carolina
743 Greene Street
Columbia, South Carolina 29208

Re: Limited Asbestos Inspection Report
James F. Byrnes Building- Mechanical Room Boilers
901 Sumter Street, Columbia, South Carolina 29208
CRE Project Number: 13074-IN

Dear Mr. Russell:

Crossroads Environmental, LLC (CRE) completed a limited asbestos inspection of the James F. Byrnes Building boilers, located at 901 Sumter Street in Columbia, South Carolina on July 10, 2014. The scope of work included two boiler units, located in the mechanical room on the bottom floor of the building. The inspection was performed by a SC-DHEC Licensed Asbestos Inspector, and in accordance with South Carolina Department of Health and Environmental Control (SC-DHEC) and Environmental Protection Agency (EPA) Requirements. **A detailed summary table of the asbestos sampling and results is included in Attachment I; however, this report should be read in its entirety.**

Building/Area Description

The Mechanical Room has a concrete floor, brick and block walls, and houses the two boiler units that were sampled. It contains a large amount of piping, however, the only piping that was addressed in the inspection were those lines that were immediately connected to the boiler units. The boilers are gas driven units that feature metal shells. Inside, gaskets and other miscellaneous thermal insulators are present. It should be noted that there were several different debris types located on and around the boilers.

Inspection Strategy/Sampling Protocol

The asbestos inspection consisted of grouping suspect asbestos containing materials into homogeneous areas based on the color and texture of the material, and then performing representative sampling of the materials included in those homogeneous areas. SC-

1258 Boiling Springs Road
Spartanburg, SC 29303
Phone 864-541-8736 / Fax 864-541-8776
www.crossroadsendv.net

DHEC has requirements for the minimum number of samples that can be collected from each homogeneous area (three samples of each miscellaneous material, three samples of each type of thermal system insulation, and the sample requirements for surfacing are based on square footage).

Following completion of the on-site inspection/sampling, samples were submitted to an accredited laboratory for analysis. Stop positive analysis was requested on all materials except for surfacing (materials that have been sprayed-on or troweled-on), which means that if one sample of a material in a homogeneous area is found to contain asbestos, then the other samples of that material are not analyzed, but are assumed to contain asbestos based on the results from the first sample analyzed.

As of June 27, 2008, SC-DHEC requires that any non-friable organically bound (NOB) material that is suspect to contain asbestos, such as floor tile, mastics, roofing material, and caulking must be analyzed by transmission electron microscopy (TEM) if polarized light microscopy (PLM) analyses of that material indicate that no asbestos was detected.

Results

EPA recognizes a material as Asbestos Containing Material (ACM) if an asbestos content of greater than one percent asbestos is detected in a representative sample analyzed by polarized light microscopy.

Results indicated that greater than one percent asbestos was detected in the following materials on Unit #1: grey gap sealer, inspection plate gasket, section rope gasket, debris on top and below unit, and sealer on bottom of unit. Results indicated that greater than one percent asbestos was detected in the following materials on Unit #2: debris on top and below unit, inspection plate sealer, and section sealer.

Relevant Definitions and Regulatory Requirements/Recommendations

Friability-Friable materials are defined as materials that can be reduced to powder by hand pressure. It should be noted that non-friable materials may become friable depending on the method of removal. All non-friable materials must be removed by properly accredited asbestos personnel. If the non-friable materials are removed in a friable manner, then all regulations in regards to friable abatement will apply, and the abatement must be performed by a SC-DHEC Licensed Asbestos Contractor, and in accordance with all state and federal regulations.

Air Monitoring-Air monitoring by a SC-DHEC Licensed Air Monitor will be required for this abatement project.

Closing Statements and Limitations

Attachment I includes a table with descriptions, pictures, results and sample locations of the suspect asbestos-containing materials. Attachment II includes a copy of the analytical results from the laboratory. Attachment III includes a copy of the SC-DHEC Asbestos Inspector's License.

The scope of work included materials that could be impacted during removal. If any materials are scheduled to be disturbed that were not included in this inspection report, then they should be sampled prior to disturbance or assumed to contain asbestos.

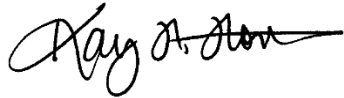
This document has been prepared by Crossroads Environmental, LLC at the request of and for the exclusive use of the University of South Carolina. This report represents the findings from the dates that it was inspected, and is limited in scope to that indicated above.

Crossroads Environmental, LLC appreciates the opportunity to provide the University of South Carolina with our consultative services. Should you have any questions or need additional information, please do not hesitate to contact us.

Sincerely,



Travis Williams
Licensed Inspector






Kay H. Horton
President

EH




Attachments (4)

ATTACHMENT I
ASBESTOS SUMMARY TABLE


**TABLE I.
ASBESTOS SUMMARY TABLE**

CROSSROADS ENVIRONMENTAL, LLC LIMITED ASBESTOS INSPECTION REPORT										Job#: 13074-IN
Location:	Byrnes Boilers, 901 Sumter Street, Columbia, South Carolina									
Client:	University of South Carolina									Date: 7/10/2014
Key: A=Amosite, C=Chrysotile, Cr=Crocidolite, Tr=Tremolite, Ac=Actinolite Asbestos, Misc.=Miscellaneous, HA#=Homogeneous Area #, PLM=Polarized Light Microscopy, TEM=Transmission Electron Microscopy, /=PLM and/or TEM Analysis Not Required sq.ft.=Square Feet, cu.ft.=Cubic Feet, ln.ft.=Linear Feet, HJI=Hard Joint Insulation, TSI=Thermal System Insulation, BUR=Built-up Roofing, Surf=Surfacing NAD=No Asbestos Detected, SP=Stop Positive, F=Friable, NF=Non-friable, Sig. Damage=Significantly Damaged										
HA#	Type of Material TSI, Surf, Misc	Photos	Material Type	Sample Info	PLM Asbestos %	TEM Asbestos %	Location of Sample	Approx. Quantity	Friability and Physical Condition	Location/ Comments
01	Misc.		Grey Gap Sealer	025	2% C	/	Boiler #1	48 ln. ft	Significantly Damaged- Friable	Located in the Byrnes building boiler room, located on Unit #1.
				026	SP	/	Boiler #1			
				027	SP	/	Boiler #1			
02	Misc.		Inspection Plate Gasket	028	85% C	/	Boiler #1	24 ln. ft.	Significantly Damaged- Friable	Located in the Byrnes building boiler room, located on the side of Unit #1.
				029	SP	/	Boiler #1			
				030	SP	/	Boiler #1			
03	Misc.		Section Rope Gasket	031	85% C	/	Boiler #1	224 ln. ft.	Significantly Damaged- non-Friable	Located in the Byrnes building boiler room, located on Unit #1. Separates the boiler coils.
				032	SP	/	Boiler #1			
				033	SP	/	Boiler #1			




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HA#	Type of Material TSI, Surf, Misc	Photos	Material Type	Sample Info	PLM Asbestos %	TEM Asbestos %	Location of Sample	Approx. Quantity	Friability and Physical Condition	Location/ Comments
04	TSI		Elbows	034 Wrap 034 Mud	NAD NAD	/ /	Boiler #1	3	Good- Friable	Located in the Byrnes building boiler room, located on Unit #1.
				035 Mud	NAD	/	Boiler #1			
				036 Wrap 036 Mud	NAD NAD	/ /	Boiler #1			
06	Misc.		Debris below and above Unit #1	037	65%	/	Boiler #1	30 sq. ft.	Significantly Damaged- Friable	Located in the Byrnes building boiler room, located on Unit #1 on the coils, on top, and below the unit.
				038	SP	/	Boiler #1			
				039	SP	/	Boiler #1			
08	Misc.		Inspection Plate Sealer	040	2% C	/	Boiler #2	80 ln.ft.	Significantly Damaged- Friable	Located in the Byrnes building boiler room, located on the sides of Unit #2.
				041	SP	/	Boiler #2			
				042	SP	/	Boiler #2			


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ASBESTOS SUMMARY TABLE**

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HA#	Type of Material TSI, Surf, Misc	Photos	Material Type	Sample Info	PLM Asbestos %	TEM Asbestos %	Location of Sample	Approx. Quantity	Friability and Physical Condition	Location/ Comments
09	TSI		Elbows	043 Wrap w/Mastic	NAD	/	Boiler #2	3	Good- Friable	Located in the Byrnes building boiler room, located on Unit #2.
				043 Gray Insulation	NAD	/	Boiler #2			
				043 Yellow Insulation	NAD	/				
				44 Wrap w/Mastic	NAD	/	Boiler #2			
				044 Gray Insulation	NAD	/				
				044 Yellow Insulation	NAD	/				
045	NAD	/	Boiler #2							

**TABLE I.
ASBESTOS SUMMARY TABLE**

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HA#	Type of Material TSI, Surf, Misc	Photos	Material Type	Sample Info	PLM Asbestos %	TEM Asbestos %	Location of Sample	Approx. Quantity	Friability and Physical Condition	Location/ Comments
10	Misc.		Debris below and above unit #2	046	2% C	/	Boiler #2	28 sq. ft.	Significantly Damaged- Friable	Located in the Byrnes building boiler room, located on Unit #2 above and below the unit.
				047	SP	/	Boiler #2			
				048	SP	/	Boiler #2			
11	Misc.		Section Sealer	049	2% C	/	Boiler #2	192 ln. ft.	Significantly Damaged- Friable	Located in the Byrnes building boiler room, located on Unit #2. separates the coils of the unit.
				050	SP	/	Boiler #2			
				051	SP	/	Boiler #2			
12	Misc.		Sealer on the Bottom of Unit #1	052	2% C	/	Boiler #1	12 ln. ft.	Significantly Damaged- Friable	Located in the Byrnes building boiler room, located on the bottom of Unit #1.
				053	SP	/	Boiler #1			
				054	SP	/	Boiler #1			

**TABLE I.
ASBESTOS SUMMARY TABLE**

CROSSROADS ENVIRONMENTAL, LLC LIMITED ASBESTOS INSPECTION REPORT										Job#: 13074-IN		
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HA#	Type of Material TSI, Surf, Misc	Photos	Material Type	Sample Info	PLM Asbestos %	TEM Asbestos %	Location of Sample	Approx. Quantity	Friability and Physical Condition	Location/ Comments		
13	Misc.		Debris on top of Unit #2	055	15% C 2% A	/	Boiler #2	28 sq. ft.	Significantly Damaged- Friable	Located in the Byrnes building boiler room, located on Unit #2.		

ATTACHMENT II
LABORATORY REPORT



ASBESTOS LABORATORY REPORT

Prepared for

Crossroads Environmental

PROJECT: University of South Carolina; 13074-IN

CEI LAB CODE: A14-9101

DATE ANALYZED: 07/11/14

DATE REPORTED: 07/14/14

TOTAL SAMPLES ANALYZED: 15

SAMPLES >1% ASBESTOS: 9

TEL: 866-481-1412

www.ceilabs.com



Asbestos Report Summary

By: POLARIZING LIGHT MICROSCOPY

PROJECT: University of South Carolina; 13074-IN

CEI LAB CODE: A14-9101

METHOD: EPA 600 / R93 / 116 and EPA 600 / M4-82 / 020

Client ID	Layer	Lab ID	Color	Sample Description	ASBESTOS %
25		A1762847	Gray	Gap Sealer Of #1	Chrysotile 2%
26		A1762848		Sample Not Analyzed per COC	
27		A1762849		Sample Not Analyzed per COC	
28		A1762850	Tan	Inspection Plate Gasket Of #1	Chrysotile 85%
29		A1762851		Sample Not Analyzed per COC	
30		A1762852		Sample Not Analyzed per COC	
31		A1762853	Tan	Sectional Rope Gasket Of #1	Chrysotile 85%
32		A1762854		Sample Not Analyzed per COC	
33		A1762855		Sample Not Analyzed per COC	
34	Layer 1	A1762856	Red	Elbows Of #1 - Wrap	None Detected
	Layer 2	A1762856	Off-white	Elbows Of #1 - Mud	None Detected
35		A1762857	Off-white	Elbows Of #1 - Mud	None Detected
36	Layer 1	A1762858	Red	Elbows Of #1 - Wrap	None Detected
	Layer 2	A1762858	Off-white	Elbows Of #1 - Mud	None Detected
37	Layer 1	A1762859	Gray	Debris On Top Of #1	Chrysotile +%
	Layer 2	A1762859	Off-white	Debris On Top Of #1 - Homogenous Material	Chrysotile 65%
38		A1762860		Sample Not Analyzed per COC	
39		A1762861		Sample Not Analyzed per COC	
40		A1762862	Tan	Inspection Plate Sealer Of #2	Chrysotile 2%
41		A1762863		Sample Not Analyzed per COC	
42		A1762864		Sample Not Analyzed per COC	
43	Layer 1	A1762865	Orange	Elbows Of #2 - Wrap With Mastic	None Detected
	Layer 2	A1762865	Gray	Elbows Of #2 - Insulation	None Detected
	Layer 3	A1762865	Yellow	Elbows Of #2 - Insulation	None Detected
44	Layer 1	A1762866	Orange	Elbows Of #2 - Wrap With Mastic	None Detected
	Layer 2	A1762866	Gray	Elbows Of #2 - Insulation	None Detected
	Layer 3	A1762866	Yellow	Elbows Of #2 - Insulation	None Detected
45	Layer 1	A1762867		Sample Submitted for TEM Analysis	
	Layer 2	A1762867	Yellow	Elbows Of #2 - Insulation	None Detected
46	Layer 1	A1762868	Gray	Debris On Top Of #2	Chrysotile +%



Asbestos Report Summary

By: POLARIZING LIGHT MICROSCOPY

PROJECT: University of South Carolina; 13074-IN

CEI LAB CODE: A14-9101

METHOD: EPA 600 / R93 / 116 and EPA 600 / M4-82 / 020

Client ID	Layer	Lab ID	Color	Sample Description	ASBESTOS %
	Layer 2	A1762868	Tan	Debris On Top Of #2 - Homogenous Material	Chrysotile 2%
47		A1762869		Sample Not Analyzed per COC	
48		A1762870		Sample Not Analyzed per COC	
49		A1762871	Gray	Sectional Sealer Of #2	Chrysotile 2%
50		A1762872		Sample Not Analyzed per COC	
51		A1762873		Sample Not Analyzed per COC	
52		A1762874	Gray	Sealer On Bottom Of #1	Chrysotile 2%
53		A1762875		Sample Not Analyzed per COC	
54		A1762876		Sample Not Analyzed per COC	
55		A1762877	Off-white	Debris On Top Of Unit #2 - Homog. Material	Chrysotile 15% Amosite 2%



ASBESTOS BULK ANALYSIS

By: POLARIZING LIGHT MICROSCOPY

Client: Crossroads Environmental
1258 Boiling Springs Road
Spartanburg, SC 29303

CEI Lab Code: A14-9101

Date Received: 07-11-14

Date Analyzed: 07-11-14

Date Reported: 07-14-14

Project: University of South Carolina; 13074-IN

ASBESTOS BULK PLM, EPA 600 METHOD

Client ID Lab ID	Lab Description	Lab Attributes	NON-ASBESTOS COMPONENTS				ASBESTOS %
			Fibrous		Non-Fibrous		
25 A1762847	Gap Sealer Of #1	Homogeneous Gray Fibrous Bound	8%	Talc	50% 25% 15%	Binder Silicates Calc Carb	2% Chrysotile
26 A1762848	Sample Not Analyzed per COC						
27 A1762849	Sample Not Analyzed per COC						
28 A1762850	Inspection Plate Gasket Of #1	Homogeneous Tan Fibrous Loosely Bound			15%	Binder	85% Chrysotile
29 A1762851	Sample Not Analyzed per COC						
30 A1762852	Sample Not Analyzed per COC						
31 A1762853	Sectional Rope Gasket Of #1	Homogeneous Tan Fibrous Loosely Bound			15%	Binder	85% Chrysotile
32 A1762854	Sample Not Analyzed per COC						
33 A1762855	Sample Not Analyzed per COC						
34 Layer 1 A1762856	Elbows Of #1 - Wrap	Homogeneous Red Fibrous Bound	75%	Cellulose	25%	Binder	None Detected



ASBESTOS BULK ANALYSIS

By: POLARIZING LIGHT MICROSCOPY

Client: Crossroads Environmental
1258 Boiling Springs Road
Spartanburg, SC 29303

CEI Lab Code: A14-9101

Date Received: 07-11-14

Date Analyzed: 07-11-14

Date Reported: 07-14-14

Project: University of South Carolina; 13074-IN

ASBESTOS BULK PLM, EPA 600 METHOD

Client ID Lab ID	Lab Description	Lab Attributes	NON-ASBESTOS COMPONENTS				ASBESTOS %
			Fibrous		Non-Fibrous		
Layer 2 A1762856	Elbows Of #1 - Mud	Homogeneous Off-white Fibrous Loosely Bound	10%	Fiberglass	60% 15% 15%	Calc Carb Binder Silicates	None Detected
35 A1762857	Elbows Of #1 - Mud	Homogeneous Off-white Fibrous Loosely Bound	10%	Fiberglass	60% 15% 15%	Calc Carb Binder Silicates	None Detected
Lab Notes: Wrap material not observed.							
36 Layer 1 A1762858	Elbows Of #1 - Wrap	Homogeneous Red Fibrous Bound	75%	Cellulose	25%	Binder	None Detected
Layer 2 A1762858	Elbows Of #1 - Mud	Homogeneous Off-white Fibrous Loosely Bound	10%	Fiberglass	60% 15% 15%	Calc Carb Binder Silicates	None Detected
37 Layer 1 A1762859	Debris On Top Of #1	Heterogeneous Gray Fibrous Loosely Bound	+	Cellulose	+	Non-Fibrous Debris Binder	+% Chrysotile
Lab Notes: A plus (+) symbol indicates the listed material is present.							
Layer 2 A1762859	Debris On Top Of #1 - Homogenous Material	Homogeneous Off-white Fibrous Loosely Bound	10%	Cellulose	25%	Binder	65% Chrysotile
38 A1762860	Sample Not Analyzed per COC						
39 A1762861	Sample Not Analyzed per COC						



ASBESTOS BULK ANALYSIS

By: POLARIZING LIGHT MICROSCOPY

Client: Crossroads Environmental
1258 Boiling Springs Road
Spartanburg, SC 29303

CEI Lab Code: A14-9101

Date Received: 07-11-14

Date Analyzed: 07-11-14

Date Reported: 07-14-14

Project: University of South Carolina; 13074-IN

ASBESTOS BULK PLM, EPA 600 METHOD

Client ID Lab ID	Lab Description	Lab Attributes	NON-ASBESTOS COMPONENTS				ASBESTOS %
			Fibrous		Non-Fibrous		
40 A1762862	Inspection Plate Sealer Of #2	Homogeneous Tan Fibrous Loosely Bound			68% 15% 15%	Calc Carb Binder Silicates	2% Chrysotile
41 A1762863	Sample Not Analyzed per COC						
42 A1762864	Sample Not Analyzed per COC						
43 Layer 1 A1762865	Elbows Of #2 - Wrap With Mastic	Heterogeneous Orange Fibrous Bound	25%	Cellulose	65% 10%	Binder Paint	None Detected
Layer 2 A1762865	Elbows Of #2 - Insulation	Homogeneous Gray Fibrous Loosely Bound	10%	Fiberglass	55% 10% 25%	Binder Silicates Calc Carb	None Detected
Layer 3 A1762865	Elbows Of #2 - Insulation	Homogeneous Yellow Fibrous Loosely Bound	100%	Fiberglass			None Detected
44 Layer 1 A1762866	Elbows Of #2 - Wrap With Mastic	Heterogeneous Orange Fibrous Bound	25%	Cellulose	65% 10%	Binder Paint	None Detected
Layer 2 A1762866	Elbows Of #2 - Insulation	Homogeneous Gray Fibrous Loosely Bound	10%	Fiberglass	55% 10% 25%	Binder Silicates Calc Carb	None Detected



ASBESTOS BULK ANALYSIS

By: POLARIZING LIGHT MICROSCOPY

Client: Crossroads Environmental
1258 Boiling Springs Road
Spartanburg, SC 29303

CEI Lab Code: A14-9101

Date Received: 07-11-14

Date Analyzed: 07-11-14

Date Reported: 07-14-14

Project: University of South Carolina; 13074-IN

ASBESTOS BULK PLM, EPA 600 METHOD

Client ID Lab ID	Lab Description	Lab Attributes	NON-ASBESTOS COMPONENTS		ASBESTOS %
			Fibrous	Non-Fibrous	
Layer 3 A1762866	Elbows Of #2 - Insulation	Homogeneous Yellow Fibrous Loosely Bound	100% Fiberglass		None Detected
45 Layer 1 A1762867	Sample Submitted for TEM Analysis				
Layer 2 A1762867	Elbows Of #2 - Insulation	Homogeneous Yellow Fibrous Loosely Bound	100% Fiberglass		None Detected
Lab Notes: Gray insulation not observed.					
46 Layer 1 A1762868	Debris On Top Of #2	Heterogeneous Gray Fibrous Loosely Bound	+% Cellulose	+% Non-Fibrous Debris +% Binder	+% Chrysotile
Lab Notes: A plus (+) symbol indicates the listed material is present.					
Layer 2 A1762868	Debris On Top Of #2 - Homogenous Material	Homogeneous Tan Fibrous Loosely Bound		68% Calc Carb 15% Binder 15% Silicates	2% Chrysotile
47 A1762869	Sample Not Analyzed per COC				
48 A1762870	Sample Not Analyzed per COC				
49 A1762871	Sectional Sealer Of #2	Homogeneous Gray Fibrous Loosely Bound		68% Calc Carb 25% Binder 5% Silicates	2% Chrysotile



ASBESTOS BULK ANALYSIS

By: POLARIZING LIGHT MICROSCOPY

Client: Crossroads Environmental
1258 Boiling Springs Road
Spartanburg, SC 29303

CEI Lab Code: A14-9101

Date Received: 07-11-14

Date Analyzed: 07-11-14

Date Reported: 07-14-14

Project: University of South Carolina; 13074-IN

ASBESTOS BULK PLM, EPA 600 METHOD

Client ID Lab ID	Lab Description	Lab Attributes	NON-ASBESTOS COMPONENTS				ASBESTOS %
			Fibrous		Non-Fibrous		
50 A1762872	Sample Not Analyzed per COC						
51 A1762873	Sample Not Analyzed per COC						
52 A1762874	Sealer On Bottom Of #1	Homogeneous Gray Fibrous Bound	8%	Talc	50% 25% 15%	Binder Silicates Calc Carb	2% Chrysotile
53 A1762875	Sample Not Analyzed per COC						
54 A1762876	Sample Not Analyzed per COC						
55 A1762877	Debris On Top Of Unit #2 - Homog. Material	Homogeneous Off-white Fibrous Loosely Bound			68% 15%	Calc Carb Binder	15% Chrysotile 2% Amosite



LEGEND: Non-Anth = Non-Asbestiform Anthophyllite
 Non-Trem = Non-Asbestiform Tremolite
 Calc Carb = Calcium Carbonate


METHOD: **EPA 600 / R93 / 116 and EPA 600 / M4-82 / 020**

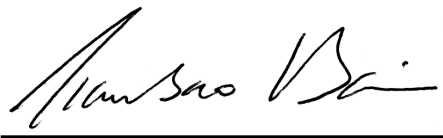
The detection limit for the method is <1% by visual estimation and 0.25% by 400 point counts or 0.1% by 1,000 point counts.

Due to the limitations of the EPA 600 Method, nonfriable organically bound materials (NOBs) such as vinyl floor tiles can be difficult to analyze via polarizing light microscopy (PLM). EPA recommends that all NOBs analyzed by PLM, and found not to contain asbestos, be further analyzed by Transmission Electron Microscopy (TEM). Please note that PLM analysis of dust and soil samples for asbestos is not covered under NVLAP accreditation.

CEI Labs, Inc. can perform positive stop analysis if requested by customer. However, it is the responsibility of the customer to determine if the samples grouped together are in fact the same type of material and belong to the same homogeneous area.

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ANALYST: 
Susannah Small

APPROVED BY: 
Tianbao Bai, Ph.D.
Laboratory Director





107 New Edition Court, Cary, NC 27511

Tel: 866-481-1412; Fax: 919-481-1442

FEDEX # 804866608537

CHAIN OF CUSTODY

LAB USE ONLY:

CEI Lab Code:

A14. 9101 (31)

CEI Lab I.D. Range:

A1762 847-A1762 877

COMPANY CONTACT INFORMATION

Company: Crossroads Environmental	Client #:
Address: 1258 Boiling Springs Rd	Job Contact: Travis Williams
Spartanburg, SC 29303	Email:
	Tel: 864-541-8776
Project Name: University of South Carolina	Fax:
Project ID #:13074-IN	P.O. #:

ASBESTOS	METHOD	4 HR*	8 HR*	24 HR	2 DAY	3 DAY	5 DAY
PLM BULK	EPA 600	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
TEM BULK	CHATFIELD	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
PLM POINT COUNT (400)	EPA 600	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
PLM POINT COUNT (1000)	EPA 600	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
PLM GRAVIMETRIC	EPA 600	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
PLM GRAV w POINT COUNT	EPA 600	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
OTHER:		<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

POSITIVE STOP ANALYSIS	<input checked="" type="checkbox"/>
SOUTH CAROLINA SAMPLES	<input checked="" type="checkbox"/>

TEM INSTRUCTIONS

BEGIN TEM ANALYSIS AFTER NEGATIVE PLM	<input checked="" type="checkbox"/>
ANALYZE TEM SAMPLES SIMULTANEOUSLY WITH PLM	<input type="checkbox"/>

REMARKS: If needed, combine samples from the same group to achieve sufficient weight for TEM analysis.



Accept Samples



Reject Samples

Relinquished By:	Date/Time	Received By:	Date/Time
<i>Travis Williams</i>	7-10-14	<i>gm</i>	7/11/14 9:40

*Call to confirm RUSH analysis.

Samples will be disposed of 30 days after analysis



SAMPLING FORM

A14. 9101

COMPANY CONTACT INFORMATION

Company: Crossroads Environmental

Job Contact: Travis Williams

Project Name: University of South Carolina

Project ID #: 13074-IN

Tel: 864-541-8776

SAMPLE ID#	DESCRIPTION / LOCATION	TEST	
25	Grey Gap Sealer of #1	PLM <input checked="" type="checkbox"/>	TEM <input type="checkbox"/>
26	Grey Gap Sealer of #1	PLM <input checked="" type="checkbox"/>	TEM <input type="checkbox"/>
27	Grey Gap Sealer of #1	PLM <input type="checkbox"/>	TEM <input checked="" type="checkbox"/>
28	Inspection Plate Gasket of #1	PLM <input checked="" type="checkbox"/>	TEM <input type="checkbox"/>
29	Inspection Plate Gasket of #1	PLM <input checked="" type="checkbox"/>	TEM <input type="checkbox"/>
30	Inspection Plate Gasket of #1	PLM <input checked="" type="checkbox"/>	TEM <input type="checkbox"/>
31	Sectional Rope Gasket of #1	PLM <input checked="" type="checkbox"/>	TEM <input type="checkbox"/>
32	Sectional Rope Gasket of #1	PLM <input checked="" type="checkbox"/>	TEM <input type="checkbox"/>
33	Sectional Rope Gasket of #1	PLM <input checked="" type="checkbox"/>	TEM <input type="checkbox"/>
34	Elbows of #1	PLM <input checked="" type="checkbox"/>	TEM <input type="checkbox"/>
35	Elbows of #1	PLM <input checked="" type="checkbox"/>	TEM <input type="checkbox"/>
36	Elbows of #1	PLM <input checked="" type="checkbox"/>	TEM <input type="checkbox"/>
37	Debris on top of #1	PLM <input checked="" type="checkbox"/>	TEM <input type="checkbox"/>
38	Debris on top of #1	PLM <input checked="" type="checkbox"/>	TEM <input type="checkbox"/>
39	Debris on Bottom of #1	PLM <input checked="" type="checkbox"/>	TEM <input type="checkbox"/>
40	Inspection Plate Sealer of #2	PLM <input checked="" type="checkbox"/>	TEM <input type="checkbox"/>
41	Inspection Plate Sealer of #2	PLM <input checked="" type="checkbox"/>	TEM <input type="checkbox"/>
42	Inspection Plate Sealer of #2	PLM <input type="checkbox"/>	TEM <input checked="" type="checkbox"/>
43	Elbows of #2	PLM <input checked="" type="checkbox"/>	TEM <input type="checkbox"/>
44	Elbows of #2	PLM <input checked="" type="checkbox"/>	TEM <input type="checkbox"/>
45	Elbows of #2	PLM <input checked="" type="checkbox"/>	TEM <input type="checkbox"/>
46	Debris on top of #2	PLM <input checked="" type="checkbox"/>	TEM <input type="checkbox"/>
47	Debris on top of #2	PLM <input checked="" type="checkbox"/>	TEM <input type="checkbox"/>
48	Debris on Bottom of #2	PLM <input checked="" type="checkbox"/>	TEM <input type="checkbox"/>
49	Sectional Sealer of #2	PLM <input checked="" type="checkbox"/>	TEM <input type="checkbox"/>
50	Sectional Sealer of #2	PLM <input checked="" type="checkbox"/>	TEM <input type="checkbox"/>
51	Sectional Sealer of #2	PLM <input type="checkbox"/>	TEM <input checked="" type="checkbox"/>
52	Sealer on bottom of #1	PLM <input checked="" type="checkbox"/>	TEM <input type="checkbox"/>
53	Sealer on bottom of #1	PLM <input checked="" type="checkbox"/>	TEM <input type="checkbox"/>
54	Sealer on bottom of #1	PLM <input type="checkbox"/>	TEM <input checked="" type="checkbox"/>
55	Debris Top of Unit #2	PLM <input checked="" type="checkbox"/>	TEM <input type="checkbox"/>

ATTACHMENT III
INSPECTOR'S SC-DHEC LICENSE

SCDHEC ISSUED
Asbestos ID Card

Travis Williams

Expires



CONSULTBI
AIRSAMPLER

BI-00713 11/19/14
AS-00171 03/03/15

EMSL ANALYTICAL, INC.
200 ROUTE 130 NORTH
CINNAMINSON, NJ 08077
PHONE: (800) 220-3675
FAX: (856) 786-5974

Controlled Document - Asbestos CDC - R65 - 11/28/2012



Sample Analysis

Type of Analysis: Lead / Asbestos

Date: 7/11/14

Turn Around Time 24 hrs

Building # 001 BYRNES COLLEGE

3817

Area	Sample ID	Material Sampled	Material Location	F/NF	Cond	Quantity	Pot to Disturb
A	1	WHITE MASTIC	CHILL WATER SUPPLY LINES BASEMENT MECH RM	NF	G	<3 SQ FT	LOW
A	2	WHITE MASTIC	CHILL WATER RETURN LINE BASMENT MECH RM	NF	G	<3 SQ FT	LOW
A	3	WHITE MASTIC	(1st fl) CHILL WATER RETURN LINE BASMENT MECH RM	NF	G	<3 SQ FT	LOW
B	4	WHITE MASTIC	HOT WATER LINES BASEMENT MECH RM ON VALVES	NF	G	<5 SQ FT	LOW
B	5	WHITE MASTIC	HOT WATER LINES BASEMENT MECH RM ON VALVES	NF	G	<5 SQ FT	LOW
B	6	WHITE MASTIC	(1st fl) HOT WATER LINES BASEMENT MECH RM ON VALVES	NF	G	<5 SQ FT	LOW
C	7	CREAM MASTIC	HOT WATER LINES BASEMENT MECH RM ON VALVES	NF	G	<5 SQ FT	LOW
C	8	CREAM MASTIC	HOT WATER LINES BASEMENT MECH RM ON VALVES	NF	G	<5 SQ FT	LOW
C	9	CREAM MASTIC	(1st fl) HOT WATER LINES BASEMENT MECH RM ON VALVES	NF	G	<5 SQ FT	LOW
D	10	TEXTURED PLASTER	BASEMENT MECH RM CEILING	F	G	<1000 SQ FT	LOW

Requestor CHRIS MERGNER

Signature

FM# FM00451413

License # BI-00568

3017

Turn Around Time

Date: _____

[illegible]

License # _____ FM# _____ Signature _____ Requestor _____

Description HAZMAT SURVEY - BLDG 001	
Site COLUMBIA	Assigned To JPROVENCE
Building 001 JAMES F. BYRNES BUILDING	Crew HAZMAT
Floor 00 Room:	Start Date Priority 3
Equipment	Due date 07-JUL-14
	Request Date 06-MAR-14 by CAMOORE

Request # FM00451413	Description HAZMAT SURVEY - BLDG 001
Parent WO #	

CP Number CP00399735	BYRNES MECHANICAL/ELECTRICAL INFRASTRUCTURE UPGRADES
----------------------	--

State/Internal Project Number H27-Z153
--

Requestor	Project Manager MERGNER, CHRISTIAN F.
Telephone	Telephone 777-4569
Alternate	Estimated Cost \$ 1,000.00
Telephone	Billing FIXED PRICE
Non-Available Time	53100-W660-57120 (BYRNES MECH AND ELECT INFRASTRCTURE RENO)

Task List <p>REVIEW SCOPE, BUDGET AND SCHEDULE TO ABATE AND DISPOSE OF 2-TWO BOILERS IN THE BEASEMENT (CIRCA 1950-1960)</p> <p>ADDITIONAL SURVERY WORK INCLUDES HAZMAT SURVEY TESTING IN TWO VERTICAL LOCATIONS FROM THE BASEMENT TO THE 7TH FLOOR TO INSTALL 1-NEW ELECTRICAL BUSWAY IN THE NW SECTOR OF THE BUILDING @ BYRNES. PLUS: 1-NEW MECHANICAL SYSTEM UPGRADE AND RACEWAY IN THE BASEMENT, WHICH WILL TRANSVERSE THROUGH THE EXISTING BASEMENT MECHANICAL ROOM AND PENATRATE THE SOFFIT OF THE MECHANICAL CHASE WITH ALL NEW PIPING INSIDE EXISTING CHASE UP TO 7TH FLOOR, WITH TAP IN VALVES ABOVE LAY-IN CEILINGS IN HALLWAY AT EACH FLOOR.</p> <p>PLEASE FOLLOW UP AND CONFIRM DATE AND TIME TO MEET ONSITE WITH CHRIS MERGNER TO PREVIEW BOUNDARY OF SCOPE. THANK YOU.</p> <p>CHRIS MERGNER 7-4569 CELL: 587-0893</p>

DATE WORK STARTED	CAUSE
DATE WORK COMPLETED	CONDITION
EQUIPMENT	
CLOSING REMARKS	
BENCHSTOCK MATERIALS	
Qty	Description Price Per Unit

Supervisor's Approval	
-----------------------	--

Note Date Title
16-JUL-14 HAZMAT SURVEY RESULTS
SURVEY DATES: 7/14/14

INSPECTOR #: DARRYL WASHINGTON (BI-00568)

STATUS: THIS SURVEY WAS CONDUCTED IN PREPARATION FOR THE MECHANICAL SYSTEM UPGRADES IN BYRNES. THE SCOPE CONSISTS OF TAPPING INTO EXISTING CHILL WATER (BOTH SUPPLY AND RETURN) AND HOT WATER LINES IN THE BASEMENT MECHANICAL ROOM. NEW CHILL AND HOT WATER LINES WILL RUN UP THROUGH THE CENTRAL CHASE ACROSS FROM THE MAIN ELEVATORS WITH TIE-IN VALVES LOCATED ABOVE THE CEILING GRID ON EACH FLOOR. THE FOLLOWING MATERIALS HAVE BEEN TESTED FOR ASBESTOS AND LEAD RESULTS FOLLOW.

ASBESTOS SECTION:

TEXTURED CEILING (MECH RM) (CHASE WALL AND CEILINGS)- POSITIVE FOR ASBESTOS

WHITE MASTIC (CHILL WATER SUPPLY AND RETURN LINES)- NEGATIVE FOR ASBESTOS

WHITE MASTIC (HOT WATER LINES)- NEGATIVE FOR ASBESTOS

CREAM MASTIC (HOT WATER LINES)- NEGATIVE FOR ASBESTOS

PREVIOUS SURVEY INFORMATION (ASBESTOS) PLEASE REFERENCE FM00398449,FM00452845,FM00421529,FM00421500

- JOINT COMPOUND- NEGATIVE FOR ASBESTOS
- SHEET ROCK- NEGATIVE FOR ASBESTOS
- BROWN FIREPROOFING- NEGATIVE FOR ASBESTOS
- TEXTURED PLASTER (STAIRWAY)- NEGATIVE FOR ASBESTOS
- 2X2 CEILING TILE- NEGATIVE FOR ASBESTOS
- PLASTER WALLS- NEGATIVE FOR ASBESTOS

LEAD SECTION

GREEN PAINT (BASEMENT WALL)- POSITIVE FOR LEAD

PINK PAINT- NEGATIVE FOR LEAD

TAN PAINT- NEGATIVE FOR LEAD

WHITE PAINT- NEGATIVE FOR LEAD

DARK GREY PAINT- NEGATIVE FOR LEAD

CREAM PAINT- NEGATIVE FOR LEAD

BLUE PAINT- NEGATIVE FOR LEAD

RED PAINT- NEGATIVE FOR LEAD

INSPECTORS NOTES:

- CHASE IN BASEMENT MECH RM HAS ASBESTOS TSI IN POOR CONDITION, AND HAS DELAMINATED INTO SPACE WITH CONCRETE DEBRIS IN PLACE.
- MASTIC WAS NOT DETECTED WHERE TIE IN WILL TAKE PLACE ON EACH FLOOR.
- CHASE CONSIST OF CONCRETE BLOCK WITH PLASTER SURFACE COAT. CONCRETE BLOCK IS NOT SUSPECT FOR ASBESTOS.
- CHILL AND HOT WATER LINES ARE FIBERGLASS INSULATION AND NOT SUSPECT FOR ASBESTOS.

IF YOU ENCOUNTER ANY OTHER MATERIALS IN PLACE AND DEEM THEM SUSPECT FOR ASBESTOS AND/OR LEAD, PLEASE STOP WORK AND CONTACT THE ASBESTOS PROGRAM MANAGER FOR FURTHER TESTING OR ABATEMENT.

MATERIAL QUANTITY PROVIDED ON THE FIELD SHEET IS ONLY AN ESTIMATE FOR SAMPLING PURPOSES. THE QUANTITY SHOULD BE FIELD VERIFIED FOR ALL OTHER PURPOSES INCLUDING ABATEMENT.

REFER TO THE SURVEY RESULTS ATTACHED TO THE WORK ORDER FOR DETAILED INFORMATION.

02-APR-04 ASBESTOS MAY BE PRESENT IN THIS BUILDING

WARNING - ASBESTOS EXPOSURE ALERT - EXPOSURE TO ASBESTOS MAY BE HARMFUL TO YOUR HEALTH

AS OF 4/2/2004 THE FOLLOWING AREAS WITHIN THE BUILDING HAVE BEEN IDENTIFIED BY SURVEY TO CONTAIN ASBESTOS:

BLDG. NO. 001 .J. BYRNES CENTER

BASEMENT MECHANICAL ROOM--> SPRAY ON 3 COATS PLASTER --> CEILING [800 SQ FT]

ENTRANCE FOYER ASBESTOS --> HAS BEEN REMOVED

BASEMENT MECHANICAL ROOM --> SUPPLY DUCT PLENUM ON AIR HANDING UNIT [225 SQUARE FEET.]

SOUTH WEST CORNER --> ABANDONED DUCT [10 SQ FT]

SOUTH WEST CORNER --> BOILER PIPE [8 LIN FT]

THE FOLLOWING COMMON TYPES OF BUILDING COMPONENTS COULD CONTAIN MATERIALS THAT, WHEN DISTURBED, MIGHT EXPOSE YOU TO ASBESTOS:

1. FLOOR TILE
2. PIPE INSULATION
3. BLACK MASTIC
4. HVAC DUCT MASTIC
5. SPRAYED-ON FIREPROOFING
6. SPRAYED-ON CEILINGS
7. SHEETROCK JOINT COMPOUND

BEFORE DISTURBING THESE TYPES OF COMPONENTS, CONFIRM THAT THEY DO NOT CONTAIN ASBESTOS AND TAKE PROPER PRECAUTIONS AT ALL TIMES.

04-AUG-10 2009-09-15 BLDG COMPONENT ASBESTOS/LEAD EXPOSURE UPDATE

BELOW ARE THE ASBESTOS AND LEAD TESTING RESULTS FOR THE J F BYRNES BUILDING:

SHEET ROCK: NEGATIVE FOR ASBESTOS CONTAINING MATERIALS

JOINT COMPOUND: NEGATIVE FOR ASBESTOS CONTAINING MATERIALS

PLASTER WALL MATERIAL: NEGATIVE FOR ASBESTOS CONTAINING MATERIALS

WHITE WALL PAINT: NEGATIVE FOR LEAD BASE PAINT

BLUE PAINT: NEGATIVE FOR LEAD BASE PAINT

2X2 WHITE CEILING TILES: NEGATIVE FOR ASBESTOS CONTAINING MATERIALS

HVAC DUCT RETURNS: POSITIVE FOR BLACK MASTIC

FIBERGLASS LINES ABOVE THE CEILING: POSITIVE FOR BLACK MASTIC

FLOOR TILE: POSITIVE FOR BLACK MASTIC

JOINTS AND ENDS: POSITIVE FOR ASBESTOS CONTAINING MATERIALS

IF YOU AND/OR CONTRACTORS NEED TO DISTURB ANY MATERIALS YOU DEEM SUSPECT THAT ARE NOT LISTED ABOVE, STOP WORK AND CONTACT THE ASBESTOS PROGRAM MANAGER, 777-1208. IF YOU NEED TO DISTURB ANY MATERIAL LISTED AS POSITIVE, YOU MUST CONTACT THE ASBESTOS PROGRAM MANAGER TO ARRANGE FOR REMOVAL. THIS INFORMATION MUST BE PASSED ALONG TO ALL CONTRACTORS, SUB-CONTRACTORS, AND INDIVIDUALS WORKING IN THIS BUILDING

**EMSL Analytical, Inc.**

706 Gralin Street, Kernersville, NC 27284

Phone/Fax: (336) 992-1025 / (336) 992-4175

<http://www.EMSL.com>greensborolab@emsl.com

EMSL Order: 021403817

CustomerID: UNSC62

CustomerPO:

ProjectID:

Attn: **USC Hazmat**
University of South Carolina
743 Greene Street
Columbia, SC 29208

Phone: (803) 777-7000
Fax: (803) 777-3990
Received: 07/14/14 10:20 AM
Analysis Date: 7/15/2014
Collected:

Project: **001 Byrnes College**

Test Report: Asbestos Analysis of Bulk Materials via EPA 600/R-93/116 Method using Polarized Light Microscopy

Sample	Description	Appearance	Non-Asbestos		Asbestos
			% Fibrous	% Non-Fibrous	% Type
1 021403817-0001	White Mastic	Beige Non-Fibrous Homogeneous	<1% Cellulose	100% Non-fibrous (other)	None Detected
2 021403817-0002	White Mastic	White/Beige Non-Fibrous Homogeneous	<1% Glass <1% Cellulose	100% Non-fibrous (other)	None Detected
3 021403817-0003	White Mastic	White Non-Fibrous Homogeneous	<1% Cellulose <1% Glass 1% Wollastonite	99% Non-fibrous (other)	None Detected
4 021403817-0004	White Mastic	White Non-Fibrous Homogeneous	<1% Cellulose <1% Glass	100% Non-fibrous (other)	None Detected
5 021403817-0005	White Mastic	Beige Fibrous Homogeneous	5% Cellulose 1% Glass	94% Non-fibrous (other)	None Detected
6 021403817-0006	White Mastic	White/Black/Beige Fibrous Heterogeneous	5% Cellulose 1% Glass	94% Non-fibrous (other)	None Detected
7 021403817-0007	Cream Mastic	Cream Non-Fibrous Homogeneous	3% Glass <1% Cellulose	97% Non-fibrous (other)	None Detected
8 021403817-0008	Cream Mastic	Beige Non-Fibrous Homogeneous	1% Wollastonite <1% Cellulose	99% Non-fibrous (other)	None Detected

Analyst(s)

Nicole Shutts (3)

Scott Combs (7)

Stephen Bennett, Laboratory Manager
or other approved signatory

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Samples analyzed by EMSL Analytical, Inc. Kernersville, NC NVLAP Lab Code 102104-0, CA ELAP 2689, Virginia 3333-000228, West Virginia LT000321

Initial report from 07/15/2014 09:15:46

**EMSL Analytical, Inc.**

706 Gralin Street, Kernersville, NC 27284

Phone/Fax: (336) 992-1025 / (336) 992-4175

<http://www.EMSL.com>greensborolab@emsl.com

EMSL Order: 021403817

CustomerID: UNSC62

CustomerPO:

ProjectID:

Attn: **USC Hazmat**
University of South Carolina
743 Greene Street
Columbia, SC 29208

Phone: (803) 777-7000
Fax: (803) 777-3990
Received: 07/14/14 10:20 AM
Analysis Date: 7/15/2014
Collected:

Project: **001 Byrnes College**

Test Report: Asbestos Analysis of Bulk Materials via EPA 600/R-93/116 Method using Polarized Light Microscopy

Sample	Description	Appearance	Non-Asbestos		Asbestos
			% Fibrous	% Non-Fibrous	% Type
9	Cream Mastic	White	3% Glass	96% Non-fibrous (other)	None Detected
021403817-0009		Fibrous	1% Wollastonite		
		Heterogeneous			
10	Textured Plaster	Gray/Tan/Beige	3% Cellulose	15% Mica	3% Chrysotile
021403817-0010		Fibrous		79% Non-fibrous (other)	
		Heterogeneous			
11	Textured Plaster				Stop Positive (Not Analyzed)
021403817-0011					
12	Textured Plaster				Stop Positive (Not Analyzed)
021403817-0012					

Analyst(s)

Nicole Shutts (3)

Scott Combs (7)

Stephen Bennett, Laboratory Manager
or other approved signatory

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Samples analyzed by EMSL Analytical, Inc. Kernersville, NC NVLAP Lab Code 102104-0, CA ELAP 2689, Virginia 3333-000228, West Virginia LT000321

Initial report from 07/15/2014 09:15:46

**EMSL Analytical, Inc.**

706 Gralin Street, Kernersville, NC 27284

Phone/Fax: (336) 992-1025 / (336) 992-4175

<http://www.EMSL.com>greensborolab@emsl.com

EMSL Order: 021403817

CustomerID: UNSC62

CustomerPO:

ProjectID:

Attn: **USC Hazmat**
University of South Carolina
743 Greene Street
Columbia, SC 29208

Phone: (803) 777-7000
Fax: (803) 777-3990
Received: 07/14/14 10:20 AM
Analysis Date: 7/16/2014
Collected:

Project: **001 Byrnes College**

Test Report: Asbestos Analysis of Non-Friable Organically Bound Materials by TEM
via EPA/600/R-93/116 Section 2.5.5.1

SAMPLE ID	DESCRIPTION	APPEARANCE	% MATRIX MATERIAL	% NON-ASBESTOS FIBERS	ASBESTOS TYPES
3 021403817-0003	White Mastic	Beige Fibrous Heterogeneous	100	None	No Asbestos Detected
6 021403817-0006	White Mastic	White Non-Fibrous Homogeneous	100	None	No Asbestos Detected
9 021403817-0009	Cream Mastic	Beige Non-Fibrous Heterogeneous	100	None	No Asbestos Detected

Analyst(s)

Kristie Elliott (3)

Stephen Bennett, Laboratory Manager
or other approved signatory

This laboratory is not responsible for % asbestos in total sample when the residue only is submitted for analysis. The above report relates only to the items tested. This report may not be reproduced, except in full, without written approval by EMSL Analytical, Inc. Samples received in good condition unless otherwise noted. Unless requested by the client, building materials manufactured with multiple layers (i.e. linoleum, wallboard, etc.) are reported as a single sample.

Samples analyzed by EMSL Analytical, Inc. Kernersville, NC

Initial report from 07/16/2014 09:29:09

Reading No	Time	Type	Duration	Units	Sequence	Component	Substrate	Side	Condition	Color	Site	Inspector	Floor	Room	Misc 1	Misc 2	Res	EScale1	EscleCT	Results	Depth Index	Action Level	PbC	PbC Error	PbL	PbL Error	PbK	PbK Error
3	7/11/2014 8:21	PAINT	1.75	mg / cm ^2	Final	calibrate				green	byrnes	melaro								Negative	2.51	0.7 < LOD	0.37 < LOD	0.37 < LOD	0.37 < LOD		1.35	
4	7/11/2014 8:24	PAINT	11.74	mg / cm ^2	Final	wall	plaster		good	pink	byrnes	melaro	2nd	hall						Negative	7.36	0.7 < LOD	0.07 < LOD	0.07 < LOD	0.07 < LOD	0.6	0.3	
5	7/11/2014 8:25	PAINT	3.38	mg / cm ^2	Final	wall	plaster		good	pink	byrnes	melaro	2nd	hall						Null	2.79	0.7 < LOD	0.04 < LOD	0.04 < LOD	0.04 < LOD		1.05	
6	7/11/2014 8:26	PAINT	4.27	mg / cm ^2	Final	wall	plaster		good	pink	byrnes	melaro	2nd	hall						Negative	2.12	0.7 < LOD	0.03 < LOD	0.03 < LOD	0.03 < LOD		0.9	
7	7/11/2014 8:26	PAINT	3.25	mg / cm ^2	Final	wall	plaster		good	tan	byrnes	melaro	2nd	hall						Negative	2.25	0.7 < LOD	0.05 < LOD	0.05 < LOD	0.05 < LOD		1.05	
8	7/11/2014 8:27	PAINT	3.26	mg / cm ^2	Final	wall	plaster		good	tan	byrnes	melaro	2nd	hall						Negative	3.49	0.7 < LOD	0.08 < LOD	0.08 < LOD	0.08 < LOD		0.9	
9	7/11/2014 8:28	PAINT	3.25	mg / cm ^2	Final	wall	plaster		good	white	byrnes	melaro	3rd	hall						Negative	1	0.7 < LOD	0.03 < LOD	0.03 < LOD	0.03 < LOD		0.97	
10	7/11/2014 8:29	PAINT	5.49	mg / cm ^2	Final	wall	plaster		good	white	byrnes	melaro	3rd	hall						Negative	1	0.7 < LOD	0.03 < LOD	0.03 < LOD	0.03 < LOD		0.75	
11	7/11/2014 8:30	PAINT	1.5	mg / cm ^2	Final	wall	plaster		good	purple	byrnes	melaro	3rd	hall						Negative	1	0.7 < LOD	0.03 < LOD	0.03 < LOD	0.03 < LOD		1.71	
12	7/11/2014 8:30	PAINT	2.37	mg / cm ^2	Final	wall	plaster		good	purple	byrnes	melaro	3rd	hall						Negative	1	0.7 < LOD	0.03 < LOD	0.03 < LOD	0.03 < LOD		1.33	
13	7/11/2014 8:34	PAINT	2.99	mg / cm ^2	Final	wall	plaster		good	cream	byrnes	melaro	6th	hall						Null	1	0.7 < LOD	0.03 < LOD	0.03 < LOD	0.03 < LOD		1.05	
14	7/11/2014 8:34	PAINT	0.25	mg / cm ^2	Final	wall	plaster		good	cream	byrnes	melaro	6th	hall						Null	1	0.7 < LOD	0.1 < LOD	0.1 < LOD	0.1 < LOD		5.4	
15	7/11/2014 8:35	PAINT	1.26	mg / cm ^2	Final	wall	plaster		good	cream	byrnes	melaro	6th	hall						Negative	2.49	0.7 < LOD	0.07 < LOD	0.07 < LOD	0.07 < LOD		1.77	
16	7/11/2014 8:35	PAINT	1.25	mg / cm ^2	Final	wall	plaster		good	cream	byrnes	melaro	6th	hall						Negative	1	0.7 < LOD	0.03 < LOD	0.03 < LOD	0.03 < LOD		1.62	
17	7/11/2014 8:36	PAINT	1.87	mg / cm ^2	Final	wall	plaster		good	cream	byrnes	melaro	7th	hall						Null	1	0.7 < LOD	0.03 < LOD	0.03 < LOD	0.03 < LOD		1.47	
18	7/11/2014 8:38	PAINT	2.12	mg / cm ^2	Final	wall	plaster		good	cream	byrnes	melaro	7th	hall						Negative	3.05	0.7 < LOD	0.03 < LOD	0.03 < LOD	0.03 < LOD	0.29	0.85	
19	7/11/2014 8:39	PAINT	2.12	mg / cm ^2	Final	wall	plaster		good	cream	byrnes	melaro	7th	hall						Null	1	0.7 < LOD	0.02 < LOD	0.02 < LOD	0.02 < LOD	0.4	0.9	
20	7/11/2014 8:39	PAINT	1.25	mg / cm ^2	Final	wall	plaster		good	cream	byrnes	melaro	7th	hall						Negative	1.36	0.7 < LOD	0.02 < LOD	0.02 < LOD	0.02 < LOD		0	
21	7/11/2014 8:41	PAINT	21.81	mg / cm ^2	Final	wall	plaster		good	red	byrnes	melaro	7th	hall						Null	10	0.7 < LOD	0.2 < LOD	0.05 < LOD	0.05 < LOD	0.8	0.2	
22	7/11/2014 8:42	PAINT	7.27	mg / cm ^2	Final	wall	plaster		good	red	byrnes	melaro	7th	hall						Null	8.16	0.7 < LOD	0.4 < LOD	0.09 < LOD	0.09 < LOD	0.7	0.4	
23	7/11/2014 8:43	PAINT	19.99	mg / cm ^2	Final	wall	plaster		good	red	byrnes	melaro	7th	hall						Null	10	0.7 < LOD	0.2 < LOD	0.08 < LOD	0.06 < LOD	0.7	0.2	
24	7/11/2014 8:44	PAINT	4	mg / cm ^2	Final	wall	plaster		good	red	byrnes	melaro	7th	hall						Negative	2.82	0.7 < LOD	0.03 < LOD	0.03 < LOD	0.03 < LOD	0.6	0.6	
25	7/11/2014 8:45	PAINT	5.11	mg / cm ^2	Final	wall	plaster		good	tan	byrnes	melaro	7th	hall						Null	1	0.7 < LOD	0.02 < LOD	0.02 < LOD	0.02 < LOD	0.5	0.4	
26	7/11/2014 8:45	PAINT	1.38	mg / cm ^2	Final	wall	plaster		good	tan	byrnes	melaro	7th	hall						Null	1.44	0.7 < LOD	0.02 < LOD	0.02 < LOD	0.02 < LOD	0.05	1.41	
27	7/11/2014 8:45	PAINT	1.75	mg / cm ^2	Final	wall	plaster		good	tan	byrnes	melaro	7th	hall						Negative	1	0.7 < LOD	0.02 < LOD	0.02 < LOD	0.02 < LOD		0	
28	7/11/2014 8:46	PAINT	2.62	mg / cm ^2	Final	wall	plaster		good	tan	byrnes	melaro	7th	hall						Negative	1	0.7 < LOD	0.02 < LOD	0.02 < LOD	0.02 < LOD	0.06	0.96	
29	7/11/2014 8:48	PAINT	6	mg / cm ^2	Final	wall	plaster		good	blue	byrnes	melaro	1st	hall						Null	8.32	0.7 < LOD	0.13 < LOD	0.12 < LOD	0.13 < LOD	0.5	0.5	
30	7/11/2014 8:49	PAINT	5.75	mg / cm ^2	Final	wall	plaster		good	blue	byrnes	melaro	1st	hall						Negative	6.27	0.7 < LOD	0.08 < LOD	0.08 < LOD	0.08 < LOD	0.7	0.5	
31	7/11/2014 8:49	PAINT	9.49	mg / cm ^2	Final	wall	plaster		good	blue	byrnes	melaro	1st	hall						Negative	7.84	0.7 < LOD	0.11 < LOD	0.08 < LOD	0.11 < LOD	0.08 < LOD	0.7	0.4
32	7/11/2014 8:51	PAINT	1.25	mg / cm ^2	Final	calibrate				green	byrnes	melaro								Negative	1.83	0.7 < LOD	0.24 < LOD	0.21 < LOD	0.24 < LOD	0.21 < LOD	0.17	1.04
33	7/11/2014 8:57	PAINT	3.36	mg / cm ^2	Final	wall	concrete block		good	gray	byrnes	melaro		ME001	electrical rm					Null	1.1	0.7 < LOD	0.03 < LOD	0.02 < LOD	0.03 < LOD	0.02 < LOD	0.6	0.7
34	7/11/2014 8:57	PAINT	6.26	mg / cm ^2	Final	wall	concrete block		good	gray	byrnes	melaro		ME001	electrical rm					Negative	1.72	0.7 < LOD	0.05 < LOD	0.03 < LOD	0.05 < LOD	0.03 < LOD	0.7	0.5
35	7/11/2014 8:58	PAINT	10.26	mg / cm ^2	Final	wall	concrete block		good	gray	byrnes	melaro		ME001	electrical rm					Negative	1.28	0.7 < LOD	0.04 < LOD	0.02 < LOD	0.04 < LOD	0.02 < LOD	0.8	0.4
36	7/11/2014 8:59	PAINT	4.51	mg / cm ^2	Final	wall	concrete block		good	gray	byrnes	melaro		ME001	electrical rm					Negative	2.08	0.7 < LOD	0.06 < LOD	0.04 < LOD	0.06 < LOD	0.04 < LOD	0.6	0.6
37	7/11/2014 9:20	PAINT	9.52	mg / cm ^2	Final	wall	concrete block		good	dark gray	byrnes	melaro	basement		mechanical rm					Null	2.38	0.7 < LOD	0.1 < LOD	0.04 < LOD	0.1 < LOD	0.04 < LOD	1	0.4
38	7/11/2014 9:21	PAINT	0.38	mg / cm ^2	Final	wall	concrete block		good	dark gray	byrnes	melaro	basement		mechanical rm					Null	7.49	0.7 < LOD	0.2 < LOD	0.95 < LOD	0.2 < LOD	0.95 < LOD	0.8	4.5
39	7/11/2014 9:22	PAINT	10.01	mg / cm ^2	Final	wall	concrete block		good	dark gray	byrnes	melaro	basement		mechanical rm					Null	1.9	0.7 < LOD	0.06 < LOD	0.02 < LOD	0.06 < LOD	0.02 < LOD	1	0.4
40	7/11/2014 9:22	PAINT	2.64	mg / cm ^2	Final	wall	concrete block		good	dark gray	byrnes	melaro	basement		mechanical rm					Null	1.06	0.7 < LOD	0.02 < LOD	0.03 < LOD	0.02 < LOD	0.03 < LOD	0.7	1.1
41	7/11/2014 9:23	PAINT	1.76	mg / cm ^2	Final	wall	concrete block		good	dark gray	byrnes	melaro	basement		mechanical rm					Null	1.36	0.7 < LOD	0.03 < LOD	0.05 < LOD	0.03 < LOD	0.05 < LOD	0.7	1.4
42	7/11/2014 9:24	PAINT	12.76	mg / cm ^2	Final	wall	concrete block		good	dark gray	byrnes	melaro	basement		mechanical rm					Null	2	0.7 < LOD	0.04 < LOD	0.02 < LOD	0.04 < LOD	0.02 < LOD	1	0.3
43	7/11/2014 9:24	PAINT	1.13	mg / cm ^2	Final	wall	concrete block		good	dark gray	byrnes	melaro	basement		mechanical rm					Negative	1.22	0.7 < LOD	0.02 < LOD	0.05 < LOD	0.02 < LOD	0.05 < LOD	0.27	1.94
44	7/11/2014 9:25	PAINT	4.64	mg / cm ^2	Final	wall	concrete block		good	dark gray	byrnes	melaro	basement		mechanical rm					Negative	2.13	0.7 < LOD	0.07 < LOD	0.04 < LOD	0.07 < LOD	0.04 < LOD	0.6	0.5
45	7/11/2014 9:26	PAINT	16.89	mg / cm ^2	Final	wall	concrete block		good	dark gray	byrnes	melaro	basement		mechanical rm					Negative	2.87	0.7 < LOD	0.08 < LOD	0.03 < LOD	0.08 < LOD	0.03 < LOD	0.9	0.3
46	7/11/2014 9:26	PAINT	1.13	mg / cm ^2	Final	wall	concrete block		good	dark gray	byrnes	melaro	basement		mechanical rm					Negative	1	0.7 < LOD	0.01 < LOD	0.03 < LOD	0.01 < LOD	0.03 < LOD	0.2	1.91
47	7/11/2014 9:27	PAINT	1.51	mg / cm ^2	Final	wall	concrete block		good	white	byrnes	melaro	basement		mechanical rm					Null	1.31	0.7 < LOD	0.04 < LOD	0.06 < LOD	0.04 < LOD	0.06 < LOD	0.7	1.5
48	7/11/2014 9:28	PAINT	2.87	mg / cm ^2	Final	wall	concrete block		good	white	byrnes	melaro	basement		mechanical rm					Null	1.75	0.7 < LOD	0.06 < LOD	0.06 < LOD	0.06 < LOD	0.06 < LOD	0.8	1.1
49	7/11/2014 9:28	PAINT	4.64	mg / cm ^2	Final	wall	concrete block		good	white	byrnes	melaro	basement		mechanical rm					Negative	2.32	0.7 < LOD	0.08 < LOD	0.05 < LOD	0.08 < LOD	0.05 < LOD	0.6	0.6
50	7/11/2014 9:29	PAINT	0.75	mg / cm ^2	Final	wall	concrete block		good	white	byrnes	melaro	basement		mechanical rm					Null	5.32	0.7 < LOD	0.21 < LOD	0.62 < LOD	0.21 < LOD	0.62 < LOD	1	2.9
51	7/11/2014 9:29	PAINT	9.52	mg / cm ^2	Final	wall	concrete block		good	white	byrnes	melaro	basement		mechanical rm					Negative	2.6	0.7 < LOD	0.08 < LOD	0.04 < LOD	0.08 < LOD	0.04 < LOD	0.8	0.4
52	7/11/2014 9:30	PAINT	6.28	mg / cm ^2	Final	wall	concrete block		good	white	byrnes	melaro	basement		mechanical rm					Null	2.48	0.7 < LOD	0.07 < LOD	0.04 < LOD	0.07 < LOD	0.04 < LOD	0.8	0.5
53	7/11/2014 9:31	PAINT	6.13	mg / cm ^2	Final	wall	concrete block		good	white	byrnes	melaro	basement		mechanical rm					Negative	1.67	0.7 < LOD	0.05 < LOD	0.03 < LOD	0.05 < LOD	0.03 < LOD	0.7	0.5
54	7/11/2014 9:32	PAINT	1.63	mg / cm ^2	Final	wall	concrete block		good	green	byrnes	melaro	basement		mechanical rm					Null	1.4	0.7 < LOD	0.02 < LOD	0.04 < LOD	0.02 < LOD	0.04 < LOD	0.7	1.4
55	7/11/2014 9:33	PAINT	8.25	mg / cm ^2	Final	wall	concrete block		good	green	byrnes	melaro	basement		mechanical rm					Positive	1.2	0.7 < LOD	1.1 < LOD	0.4 < LOD	0.03 < LOD	0.02 < LOD	1.1	0.4
56	7/11/2014 9:33	PAINT	0.88	mg / cm ^2	Final	wall	concrete block		good	green	byrnes	melaro	basement		mechanical rm					Null	2.03	0.7 < LOD	0.06 < LOD</					

SECTION 00 4000 - PROCUREMENT FORMS AND SUPPLEMENTS

PART 1 GENERAL

1.01 FORMS

- A. Use the following forms for the specified purposes unless otherwise indicated elsewhere in the procurement requirements.
- B. Substitution Request Form (During Procurement): See attached Supplement B - Substitution Request Form.

PART 2 PRODUCTS - NOT USED

PART 3 EXECUTION - NOT USED

END OF SECTION

UNIVERSITY OF SOUTH CAROLINA
USC BYRNES MECHANICAL - ELECTRICAL
INFRASTRUCTURE UPGRADES
COLUMBIA, SC

USC PROJECT #H27-Z153
GMKA PROJECT #14024.01

SECTION 00 4010 - SUPPLEMENT B - SUBSTITUTION REQUEST FORM

UNIVERSITY OF SOUTH CAROLINA
USC BYRNES MECHANICAL - ELECTRICAL
INFRASTRUCTURE UPGRADES
COLUMBIA, SC

STATE PROJECT #H27-Z153
GMKA PROJECT #14024.01

TO: JEROME K. SIMONS
GMK ASSOCIATES, INC.
1201 MAIN STREET, SUITE 2100
COLUMBIA, SOUTH CAROLINA 29201
FAX: 803.255.7243

**WE HEREBY SUBMIT FOR YOUR CONSIDERATION THE FOLLOWING PRODUCT
INSTEAD OF THE SPECIFIED ITEM FOR THE ABOVE PROJECT:**

DRAWING NO. _____ DRAWING NAME _____
SPEC. SECT. SPEC NAME PARAGRAPH SPECIFIED ITEM

PROPOSED SUBSTITUTION: _____

**ATTACHED COMPLETE INFORMATION ON CHANGES TO DRAWINGS AND/OR
SPECIFICATIONS, WHICH PROPOSED SUBSTITUTION WOULD REQUIRE FOR ITS
PROPER INSTALLATION.**

**SUBMIT WITH REQUEST NECESSARY SAMPLES AND SUBSTANTIATING DATA TO
PROVE EQUAL QUALITY AND PERFORMANCE TO THAT WHICH IS SPECIFIED.
CLEARLY MARK MANUFACTURER'S LITERATURE TO INDICATE EQUALITY IN
PERFORMANCE.**

**THE UNDERSIGNED CERTIFIES THAT THE FUNCTION, APPEARANCE AND QUALITY
ARE OF EQUAL PERFORMANCE AND ASSUMES LIABILITY FOR EQUAL
PERFORMANCE, EQUAL DESIGN AND COMPATIBILITY WITH ADJACENT MATERIALS.**
SUBMITTED BY:

SIGNATURE

TITLE

FIRM

ADDRESS

TELEPHONE

DATE

**SIGNATURE SHALL BE BY PERSON HAVING AUTHORITY TO LEGALLY BIND HIS FIRM
TO THE ABOVE TERMS. FAILURE TO PROVIDE LEGALLY BINDING SIGNATURE WILL
RESULT IN RETRACTION OF APPROVAL.**

FOR USE BY THE ARCHITECT:

FOR USE BY THE OWNER:

__ RECOMMENDED __ RECOMMENDED AS NOTED __ APPROVED
__ NOT RECOMMENDED __ RECEIVED TOO LATE __ NOT APPROVED
__ INSUFFICIENT DATA RECEIVED __ APPROVED AS NOTED

UNIVERSITY OF SOUTH CAROLINA
USC BYRNES MECHANICAL - ELECTRICAL
INFRASTRUCTURE UPGRADES
COLUMBIA, SC

STATE PROJECT #H27-Z153
GMKA PROJECT #14024.01

BY:
DATE:

BY:
DATE:

FILL IN BLANKS BELOW:

DOES THE SUBSTITUTION AFFECT DIMENSIONS SHOWN ON DRAWINGS:
YES ___ NO ___ IF YES, CLEARLY INDICATE
CHANGES. _____

WILL THE UNDERSIGNED PAY FOR CHANGES TO THE BUILDING DESIGN,
INCLUDING ENGINEERING AND DETAILING COSTS CAUSED BY THE REQUESTED
SUBSTITUTION? YES ___ NO ___ IF NO, FULLY
EXPLAIN: _____

WHAT AFFECT DOES SUBSTITUTION HAVE ON OTHER CONTRACTS OR OTHER
TRADES? _____

WHAT AFFECT DOES SUBSTITUTION HAVE ON CONSTRUCTION SCHEDULE?

MANUFACTURER'S WARRANTIES OF THE PROPOSED AND SPECIFIED ITEMS
ARE: ___ SAME ___ DIFFERENT (IF DIFFERENT, EXPLAIN ON ATTACHMENT)

REASON FOR REQUEST: _____

ITEMIZED COMPARISON OF SPECIFIED ITEM(S) WITH THE PROPOSED
SUBSTITUTION; LIST SIGNIFICANT
VARIATIONS: _____

ACCURATE COST DATA COMPARING PROPOSED SUBSTITUTION WITH
PRODUCT SPECIFIED:

DESIGNATION OF MAINTENANCE SERVICES AND SOURCES:

(ATTACH ADDITIONAL SHEETS IF REQUIRED.)

END OF SECTION

SECTION 00 5000 - AGREEMENT

PART 1 GENERAL

FORM OF AGREEMENT

1.01 AIA DOCUMENT A101-2007, STANDARD FORM OF AGREEMENT BETWEEN OWNER AND CONTRACTOR, FORMS THE BASIS OF CONTRACT BETWEEN THE OWNER AND CONTRACTOR.

1.02 THIS DOCUMENT IS NOT BOUND WITHIN THE PROJECT MANUAL.

- A. Copies of this document may be obtained from The American Institute of Architects, 1522
Richland Street., Columbia, SC 29201. 803-252-6050.
- B. OR it can be viewed at the offices of GMK Associates, Inc., 1201 Main Street Suite 2100
Columbia, SC 29201 (803)256-0000

1.03 REFER TO DOCUMENT OSE FORM 00501-STANDARD MODIFICATIONS TO AGREEMENT BETWEEN OWNER AND CONTRACTOR 2011 FOR MODIFICATIONS TO THIS DOCUMENT.

PART 2 PRODUCTS - NOT USED

PART 3 EXECUTION - NOT USED

END OF SECTION

OSE FORM 00501

STANDARD MODIFICATIONS TO AGREEMENT BETWEEN OWNER AND CONTRACTOR

OWNER: University of South Carolina

PROJECT NUMBER: H27-Z153

PROJECT NAME: USC Byrnes Mechanical - Electrical Infrastructure Upgrades

1. STANDARD MODIFICATIONS TO AIA A101-2007

1.1. These Standard Modifications amend or supplement the *Standard Form of Agreement Between Owner and Contractor* (AIA Document A101-2007) and other provisions of Bidding and Contract Documents as indicated below.

1.2. All provisions of A101-2007, which are not so amended or supplemented, remain in full force and effect.

2. MODIFICATIONS TO A101

2.1. *Insert the following at the end of Article 1:*

Any reference in this document to the Agreement between the Owner and Contractor, AIA Document A101, or some abbreviated reference thereof, shall mean the AIA A101, 2007 Edition as modified by OSE Form 00501 – Standard Modification to Agreement Between Owner and Contractor. Any reference in this document to the General Conditions of the Contract for Construction, AIA Document A201, or some abbreviated reference thereof, shall mean the AIA A201, 2007 Edition as modified by OSE Form 00811 – Standard Supplementary Conditions.

2.2. *Delete Section 3.1 and substitute the following:*

3.1 The Date of Commencement of the Work shall be the date fixed in a Notice to Proceed issued by the Owner. The Owner shall issue the Notice to Proceed to the Contractor in writing, no less than seven days prior to the Date of Commencement. Unless otherwise provided elsewhere in the contract documents, and provided the contractor has secured all required insurance and surety bonds, the contractor may commence work immediately after receipt of the Notice to Proceed.

2.3. *Delete Section 3.3 and substitute the following:*

3.3 The Contract Time shall be measured from the Date of Commencement as provided in Section 9(a) of the Bid Form (SE-330) for this Project. Contractor agrees that if the Contractor fails to achieve Substantial Completion of the Work within the Contract Time, the Owner shall be entitled to withhold or recover from the Contractor liquidated damages in the amounts set forth in Section 9(b) of the Bid Form (SE-330, subject to adjustments of this Contract Time as provided in the Contract Documents.

2.4. *In Section 5.1.1, insert the words “and Owner” after the phrase “Payment submitted to the Architect.”*

2.5. *Delete Section 5.1.3 and substitute the following:*

5.1.3 The Owner shall make payment of the certified amount to the Contractor not later than 21 days after receipt of the Application for Payment.

2.6. *In Section 5.1.6, Insert the following after the phrase “Subject to other provisions of the Contract Documents”:*

and subject to Title 12, Chapter 8, Section 550 of the South Carolina Code of Laws, as amended (Withholding Requirements for Payments to Non-Residents)

In the spaces provided in Sub-Sections 1 and 2 for inserting the retainage amount, insert “three and one-half percent (3.5%).”

OSE FORM 00501**STANDARD MODIFICATIONS TO AGREEMENT BETWEEN
OWNER AND CONTRACTOR**

2.7. *In Section 5.1.8, delete the word "follows" and the colon and substitute the following:*

set forth in S.C. Code Ann. § 11-35-3030(4).

2.8. *In Section 5.1.9, delete the words "Except with the Owner's prior approval, the" before the word "Contractor."*

2.9. *In Section 5.2.2, delete the number 30 and substitute the number 21, delete everything following the words "Certificate for Payment" and place a period at the end of the resulting sentence.*

2.10. *Delete the language of Sections 6.1 and 6.2 and substitute the word "Reserved" for the deleted language of each Section .*

2.11. *Delete the language of Section 8.2 and substitute the word "Reserved."*

2.12. *In Section 8.3, make the word "Representative" in the title plural, delete everything following the title, and substitute the following:*

8.3.1 Owner designates the individual listed below as its Senior Representative ("Owner's Senior Representative"), which individual has the responsibility for and, subject to Section 7.2.1 of the General Conditions, the authority to resolve disputes under Section 15.6 of the General Conditions:

Name: Tom Opal

Title: USC Senior Project Manager

Address: 743 Greene Street, Columbia, South Carolina 29208

Telephone: 803-777-5996 **FAX:** 803-777-8739

Email: topal@fmk.sc.edu

8.3.2 Owner designates the individual listed below as its Owner's Representative, which individual has the authority and responsibility set forth in Section 2.1.1 of the General Conditions:

Name: Christian Mergner

Title: USC Project Manager

Address: 743 Greene Street, Columbia, South Carolina 29208

Telephone: 803-777-4569 **FAX:** 803-777-8739

Email: CMERGNER@fmc.sc.edu

2.13. *In Section 8.4, make the word "Representative" in the title plural, delete everything following the title, and substitute the following:*

8.4.1 Contractor designates the individual listed below as its Senior Representative ("Contractor's Senior Representative"), which individual has the responsibility for and authority to resolve disputes under Section 15.6 of the General Conditions:

Name: _____

Title: _____

Address: _____

Telephone: _____ **FAX:** _____

Email: _____

**STANDARD MODIFICATIONS TO AGREEMENT BETWEEN
OWNER AND CONTRACTOR**

8.4.2 Contractor designates the individual listed below as its Contractor's Representative, which individual has the authority and responsibility set forth in Section 3.1.1 of the General Conditions:

Name: _____

Title: _____

Address: _____

Telephone: _____ **FAX:** _____

Email: _____

- 2.14.** *Add the following Section 8.6.1:*

8.6.1 The Architect's representative:

Name: Jerome K. Simons

Title: Project Architect

Address: 1201 Main Street, Suite 2100, Columbia, South Carolina 29201

Telephone: 803-256-0000 **FAX:** 803-255-7243

Email: jsimons@gmka.com

- 2.15.** *In Section 9.1.7, Sub-Section 2, list the following documents in the space provided for listing documents:*

Invitation for Construction Bids (SE-310)

Instructions to Bidders (AIA Document A701-1997)

Standard Supplemental Instructions to Bidders (OSE Form 00201)

Contractor's Bid (Completed SE-330)

Notice of Intent to Award (Completed SE-370)

- 2.16.** *In Article 10, delete everything after the first sentence.*

END OF DOCUMENT

SECTION 00 7000 - GENERAL CONDITIONS

PART 1 GENERAL

FORM OF GENERAL CONDITIONS

1.01 AIA DOCUMENT A201, 2007 EDITION, GENERAL CONDITIONS OF THE CONTRACT FOR CONSTRUCTION, IS THE GENERAL CONDITIONS BETWEEN THE OWNER AND CONTRACTOR.

1.02 THIS DOCUMENT IS NOT BOUND WITHIN THE PROJECT MANUAL.

- A. Copies of this document may be obtained from The American Institute of Architects, 1522 Richland Street., Columbia, SC 29201. 803-252-6050.
- B. OR it can be viewed at the offices of GMK Associates, Inc., 1201 Main Street Suite 2100 Columbia, SC 29201 (803)256-0000

1.03 SUPPLEMENTARY CONDITIONS

- A. Refer to Document OSE 00811-STANDARD SUPPLEMENTARY CONDITIONS 2011 for amendments to these General Conditions.

PART 2 PRODUCTS - NOT USED

PART 3 EXECUTION - NOT USED

END OF SECTION

SECTION 00 8000 - SUPPLEMENTARY CONDITIONS

PART 1 GENERAL

**1.01 THESE SUPPLEMENTARY CONDITIONS AMEND AND SUPPLEMENT THE
GENERAL CONDITIONS DEFINED IN DOCUMENT 00 7000 AND OTHER
PROVISIONS OF THE CONTRACT DOCUMENTS AS INDICATED BELOW. ALL
PROVISIONS THAT ARE NOT SO AMENDED OR SUPPLEMENTED REMAIN IN FULL
FORCE AND EFFECT.**

PART 2 PRODUCTS - NOT USED

PART 3 EXECUTION - NOT USED

END OF SECTION

OSE FORM 00811**STANDARD SUPPLEMENTARY CONDITIONS**

OWNER: University of South Carolina**PROJECT NUMBER:** H27-Z153**PROJECT NAME:** USC Byrnes Mechanical - Electrical Infrastructure Upgrades**1 GENERAL CONDITIONS**

The *General Conditions of the Contract for Construction*, AIA Document A201, 2007 Edition, Articles 1 through 15 inclusive, is a part of this Contract and is incorporated as fully as if herein set forth. For brevity, AIA Document A201 is also referred to in the Contract Documents collectively as the "General Conditions."

2 STANDARD SUPPLEMENTARY CONDITIONS

2.1 The following supplements modify, delete and/or add to the General Conditions. Where any portion of the General Conditions is modified or any paragraph, Section or clause thereof is modified or deleted by these Supplementary Conditions, the unaltered provisions of the General Conditions shall remain in effect.

2.2 Unless otherwise stated, the terms used in these Standard Supplementary Conditions which are defined in the General Conditions have the meanings assigned to them in the General Conditions.

3 MODIFICATIONS TO A201-2007

3.1 *Insert the following at the end of Section 1.1.1:*

Any reference in this document to the Agreement between the Owner and Contractor, AIA Document A101, or some abbreviated reference thereof, shall mean the AIA A101, 2007 Edition as modified by OSE Form 00501 – Standard Modification to Agreement Between Owner and Contractor. Any reference in this document to the General Conditions of the Contract for Construction, AIA Document A201, or some abbreviated reference thereof, shall mean the AIA A201, 2007 Edition as modified by OSE Form 00811 – Standard Supplementary Conditions.

3.2 *Delete the language of Section 1.1.8 and substitute the word "Reserved."*

3.3 *Add the following Section 1.1.9:*

1.1.9 NOTICE TO PROCEED

Notice to Proceed is a document issued by the Owner to the Contractor, with a copy to the Architect, directing the Contractor to begin prosecution of the Work in accordance with the requirements of the Contract Documents. The Notice to Proceed shall fix the date on which the Contract Time will commence.

3.4 *Insert the following at the end of Section 1.2.1:*

In the event of patent ambiguities within or between parts of the Contract Documents, the contractor shall 1) provide the better quality or greater quantity of Work, or 2) comply with the more stringent requirement, either or both in accordance with the Architect's interpretation.

3.5 *Delete Section 1.5.1 and substitute the following:*

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

OSE FORM 00811**STANDARD SUPPLEMENTARY CONDITIONS**

3.6 *Delete Section 2.1.1 and substitute the following:*

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 provided in Section 7.1.2. 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 Representative. [Reference § 8.2 of the Agreement.]

3.7 *Delete Section 2.1.2 and substitute the following:*

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 post Notice of Project Commencement pursuant to Title 29, Chapter 5, Section 23 of the South Carolina Code of Laws, as amended..

3.8 *Delete Section 2.2.3 and substitute the following:*

2.2.3 The Owner shall furnish surveys describing physical characteristics, legal limitations and utility locations for the site of the Project, and a legal description of the site. Subject to the Contractor's obligations, including those in Section 3.2, the Contractor shall be entitled to rely on the accuracy of information furnished by the Owner pursuant to this Section but shall exercise proper precautions relating to the safe performance of the Work.

3.9 *Replace the period at the end of the last sentence of Section 2.2.4 with a semicolon and insert the following after the inserted semicolon:*

"however, the Owner does not warrant the accuracy of any such information requested by the Contractor that is not otherwise required of the Owner by the Contract Documents. Neither the Owner nor the Architect shall be required to conduct investigations or to furnish the Contractor with any information concerning subsurface characteristics or other conditions of the area where the Work is to be performed beyond that which is provide in the Contract Documents."

3.10 *Delete Section 2.2.5 and substitute the following:*

2.2.5 Unless otherwise provided in the Contract Documents, the Owner shall furnish to the Contractor with ten copies of the Contract Documents. The Contractor may make reproductions of the Contract Documents pursuant to Section 1.5.2. All copies of the drawings and specifications, except the Contractor's record set, shall be returned or suitably accounted for to the Owner, on request, upon completion of the Work.

3.11 *Add the following Sections 2.2.6 and 2.2.7:*

2.2.6 The Owner assumes no responsibility for any conclusions or interpretation made by the Contractor based on information made available by the Owner.

2.2.7 The Owner shall obtain, at its own cost, general building and specialty inspection services as required by the Contract Documents. The Contractor shall be responsible for payment of any charges imposed for reinspections.

3.12 *Delete Section 2.4 and substitute the following:*

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

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3.13 *Insert the following at the end of Section 3.2.1:*

The Contractor acknowledges that it has investigated and satisfied itself as to the general and local conditions which can affect the work or its cost, including but not limited to (1) conditions bearing upon transportation, disposal, handling, and storage of materials; (2) the availability of labor, water, electric power, and roads; (3) uncertainties of weather, river stages, tides, or similar physical conditions at the site; (4) the conformation and conditions of the ground; and (5) the character of equipment and facilities needed preliminary to and during work performance. The Contractor also acknowledges that it has satisfied itself as to the character, quality, and quantity of surface and subsurface materials or obstacles to be encountered insofar as this information is reasonably ascertainable from an inspection of the site, including all exploratory work done by the Owner, as well as from the drawings and specifications made a part of this contract. Any failure of the Contractor to take the actions described and acknowledged in this paragraph will not relieve the Contractor from responsibility for estimating properly the difficulty and cost of successfully performing the work, or for proceeding to successfully perform the work without additional expense to the Owner.

3.14 *In the third sentence of Section 3.2.4, insert the word “latent” before the word “errors.”***3.15** *In the last sentence of Section 3.3.1, insert the words “by the Owner in writing” after the word “instructed.”***3.16** *Delete the third sentence of Section 3.5 and substitute the following sentences:*

Work, materials, or equipment not conforming to these requirements shall be considered defective. Unless caused by the Contractor or a subcontractor at any tier, 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.

3.17 *Insert the following at the end of Section 3.6:*

The Contractor shall comply with the requirements of Title 12, Chapter 9 of the South Carolina Code of Laws, as amended, regarding withholding tax for nonresidents, employees, contractors and subcontractors.

3.18 *In Section 3.7.1, delete the words “the building permit as well as for other” and insert the following sentence at the end of this section:*

Pursuant to Title 10, Chapter 1, Section 180 of the South Carolina Code of Laws, as amended, no local general or specialty building permits are required for state buildings.

3.19 *Delete the last sentence of Section 3.7.5 and substitute the following:*

Adjustments in the Contract Sum and Contract Time arising from the existence of such remains or features may be made as provided in Article 7.3.3.

3.20 *Delete the last sentence of Section 3.8.2.3 and substitute the following:*

The amount of the Change Order shall reflect the difference between actual costs, as documented by invoices, and the allowances under Section 3.8.2.1.

3.21 *In Section 3.9.1, insert a comma after the word “superintendent” in the first sentence and insert the following after the inserted comma:*

acceptable to the Owner,

3.22 *Delete Section 3.9.2 and substitute the following:*

3.9.2 The Contractor, as soon as practicable after award of the Contract, shall furnish in writing to the Owner the name and qualifications of a proposed superintendent. The Owner may reply within 14 days to the Contractor in writing stating (1) whether the Owner has reasonable objection to the proposed superintendent or (2) that the

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Owner requires additional time to review. Failure of the Owner to reply within the 14-day period shall constitute notice of no reasonable objection.

3.23 *After the first sentence in Section 3.9.3, insert the following sentence:*

The Contractor shall notify the Owner, in writing, of any proposed change in the superintendent, including the reason therefore, prior to making such change.

3.24 *Delete Section 3.10.3 and substitute the following:*

3.10.3 Additional requirements, if any, for the constructions schedule are as follows:
(Check box if applicable to this Contract))

☒ The construction schedule shall be in a detailed precedence-style critical path management (CPM) or primavera-type format satisfactory to the Owner and the Architect that shall also (1) provide a graphic representation of all activities and events that will occur during performance of the work; (2) identify each phase of construction and occupancy; and (3) set forth dates that are critical in ensuring the timely and orderly completion of the Work in accordance with the requirements of the Contract Documents (hereinafter referred to as "Milestone Dates"). Upon review and acceptance by the Owner and the Architect of the Milestone Dates, the construction schedule shall be deemed part of the Contract Documents and attached to the Agreement as Exhibit "A." If not accepted, the construction schedule shall be promptly revised by the Contractor in accordance with the recommendations of the Owner and the Architect and resubmitted for acceptance. The Contractor shall monitor the progress of the Work for conformance with the requirements of the construction schedule and shall promptly advise the Owner of any delays or potential delays. Whenever the approved construction schedule no longer reflects actual conditions and progress of the work or the Contract Time is modified in accordance with the terms of the Contract Documents, the Contractor shall update the accepted construction schedule to reflect such conditions. In the event any progress report indicates any delays, the Contractor shall propose an affirmative plan to correct the delay, including overtime and/or additional labor, if necessary. In no event shall any progress report constitute an adjustment in the Contract Time, any Milestone Date, or the Contract Sum unless any such adjustment is agreed to by the Owner and authorized pursuant to Change Order.

3.25 *Add the following Section 3.10.4:*

3.10.4 Owner's review and acceptance of Contractor's schedule is not conducted for the purpose of either determining its accuracy and completeness or approving the construction means, methods, techniques, sequences or procedures. The Owner's approval shall not relieve the Contractor of any obligations. Unless expressly addressed in a Modification, the Owner's approval of a schedule shall not change the Contract Time.

3.26 *Add the following Section 3.12.5.1:*

3.12.5.1 The fire sprinkler shop drawings shall be prepared by a licensed fire sprinkler contractor and shall accurately reflect actual conditions affecting the required layout of the fire sprinkler system. The fire sprinkler contractor shall certify the accuracy of his shop drawings prior to submitting them for review and approval. The fire sprinkler shop drawings shall be reviewed and approved by the Architect's engineer of record who, upon approving the sprinkler shop drawings will submit them to the State Fire Marshal or other authorities having jurisdiction for review and approval. The Architect's engineer of record will submit a copy of the State Fire Marshal's approval letter to the Contractor, Architect, and OSE. Unless authorized in writing by OSE, neither the Contractor nor subcontractor at any tier shall submit the fire sprinkler shop drawings directly to the State Fire Marshal or other authorities having jurisdiction for approval.

3.27 *In the fourth sentence of Section 3.12.10, after the comma following the words "licensed design professional," insert the following:*

who shall comply with reasonable requirements of the Owner regarding qualifications and insurance and

3.28 *In Section 3.13, insert the section number "3.13.1" before the opening words "The Contractors shall."*

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3.29 Add the following Sections 3.13.2 and 3.13.3:

3.13.2 Protection of construction materials and equipment stored at the Project site from weather, theft, vandalism, damage, and all other adversity is solely the responsibility of the Contractor. The Contractor shall perform the work in a manner that affords reasonable access, both vehicular and pedestrian, to the site of the Work and all adjacent areas. The Work shall be performed, to the fullest extent reasonably possible, in such a manner that public areas adjacent to the site of the Work shall be free from all debris, building materials, and equipment likely to cause hazardous conditions.

3.13.3 The Contractor and any entity for whom the Contractor is responsible shall not erect any sign on the Project site without the prior written consent of the Owner.

3.30 *In the first sentence of Section 3.18.1, after the parenthetical “...(other than the Work itself),...” and before the word “...but...”, insert the following:*

including loss of use resulting therefrom,

3.31 *Delete Section 4.1.1 and substitute the following:*

4.1.1 The Architect is that person or entity identified as the Architect in the Agreement and is referred to throughout the Contract Documents as if singular in number.

3.32 *Insert the following at the end of Section 4.2.1:*

Any reference in the Contract Documents to the Architect taking action or rendering a decision with a “reasonable time” is understood to mean no more than fourteen days, unless otherwise specified in the Contract Documents or otherwise agreed to by the parties.

3.33 *Delete the first sentence of Section 4.2.2 and substitute the following:*

The Architect will visit the site as necessary to fulfill its obligation to the Owner for inspection services, if any, and, at a minimum, to assure conformance with the Architect’s design as shown in the Contract Documents and to observe the progress and quality of the various components of the Contractor’s Work, and to determine 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.

3.34 *Delete the first sentence of Section 4.2.3 and substitute the following:*

On the basis of the site visits, the Architect will keep the Owner informed about the progress and quality of the portion of the Work completed, and report to the Owner (1) deviations from the Contract Documents and from the most recent construction schedule submitted by the Contractor, and (2) defects and deficiencies observed in the Work.

3.35 *In Section 4.2.5, after the words “evaluations of the” and before the word “Contractor’s,” insert the following:*

Work completed and correlated with the

3.36 *Delete the first sentence of Section 4.2.11 and substitute the following:*

4.2.11 The Architect will, in the first instance, interpret and decide matters concerning performance under, and requirements of, the Contract Documents on written request of either the Owner or Contractor. Upon receipt of such request, the Architect will promptly provide the non-requesting party with a copy of the request.

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3.37 *Insert the following at the end of Section 4.2.12:*

If either party disputes the Architects interpretation or decision, that party may proceed as provided in Article 15. The Architect's interpretations and decisions may be, but need not be, accorded any deference in any review conducted pursuant to law or the Contract Documents.

3.38 *Delete Section 4.2.14 and substitute the following:*

The Architect will review and respond to requests for information about the Contract Documents so as to avoid delay to the construction of the Project. The Architect's response to such requests will be made in writing with reasonable promptness. If appropriate, the Architect will prepare and issue supplemental Drawings and Specifications in response to the requests for information. Any response to a request for information must be consistent with the intent of, and reasonably inferable from, the Contract Documents and will be in writing or in the form of drawings. Unless issued pursuant to a Modification, supplemental Drawings or Specifications will not involve an adjustment to the Contract Sum or Contract Time.

3.39 *Delete Section 5.2.1 and substitute the following:*

5.2.1 Unless otherwise stated in the Contract Documents or the bidding requirements, the Contractor, within fourteen days after posting of the Notice of Intent to Award the Contract, shall furnish in writing to the Owner through the Architect the names of persons or entities (excluding Listed Subcontractors but including those who are to furnish materials or equipment fabricated to a special design) proposed for each principal portion of the Work. The Owner may reply within 14 days to the Contractor in writing stating (1) whether the Owner has reasonable objection to any such proposed person or entity. Failure of the Owner to reply within the 14 day period shall constitute notice of no reasonable objection.

3.40 *Delete Section 5.2.2 and substitute the following:*

5.2.2 The Contractor shall not contract with a proposed person or entity to whom the Owner has made reasonable and timely objection. The Owner shall not direct the Contractor to contract with any specific individual or entity for supplies or services unless such supplies and services are necessary for completion of the Work and the specified individual or entity is the only source of such supply or services.

3.41 *In the first sentence of Section 5.2.3, delete the words "...or Architect..." in the two places they appear.***3.42** *Delete the words "...or Architect..." in the in the first sentence of Section 5.2.4 and insert the following sentence at the end of Section 5.2.4:*

The Contractor's request for substitution must be made to the Owner in writing accompanied by supporting information.

3.43 *Add the following Section 5.2.5:*

5.2.5 A Subcontractor identified in the Contractor's Bid in response the specialty subcontractor listing requirements of Section 7 of the Bid Form (SE-330) may only be substituted in accordance with and as permitted by the provisions of Title 11, Chapter 35, Section 3021 of the South Carolina Code of Laws, as amended. A proposed substitute for a Listed Subcontractor shall be subject to the Owner's approval as set forth in Section 5.2.3.

3.44 *In Section 5.3, delete everything following the heading "SUBCONTRACTUAL RELATIONS" and insert the following Sections 5.3.1, 5.3.2, 5.3.3, and 5.3.4:*

5.3.1 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, which the Contractor, by these Documents, assumes toward the Owner and Architect. Each subcontract agreement shall preserve and protect the rights of the Owner and Architect under the Contract Documents with respect to the Work to be performed by the Subcontractor so that subcontracting thereof will not

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prejudice such rights, and shall allow to the Subcontractor, unless specifically provided otherwise herein or 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.

§ 5.3.2 Without limitation on the generality of Section 5.3.1, each Subcontract agreement and each Sub-subcontract agreement shall include, and shall be deemed to include, the following Sections of these General Conditions: 3.2, 3.5, 3.18, 5.3, 5.4, 6.2.2, 7.3.3, 7.5, 7.6, 13.1, 13.12, 14.3, 14.4, and 15.1.6.

§ 5.3.3 Each Subcontract Agreement and each Sub-subcontract agreement shall exclude, and shall be deemed to exclude, Sections 13.2.1 and 13.6 and all of Article 15, except Section 15.1.6, of these General Conditions. In the place of these excluded sections of the General Conditions, each Subcontract Agreement and each Sub-subcontract may include Sections 13.2.1 and 13.6 and all of Article 15, except Section 15.1.6, of AIA Document A201-2007, Conditions of the Contract, as originally issued by the American Institute of Architects.

§ 5.3.4 The Contractor shall assure the Owner that all agreements between the Contractor and its Subcontractor incorporate the provisions of Subparagraph 5.3.1 as necessary to preserve and protect the rights of the Owner and the Architect under the Contract Documents with respect to the work to be performed by Subcontractors so that the subcontracting thereof will not prejudice such rights. The Contractor's assurance shall be in the form of an affidavit or in such other form as the Owner may approve. Upon request, the Contractor shall provide the Owner or Architect with copies of any or all subcontracts or purchase orders.

3.45 *Delete the last sentence of Section 5.4.1.*

3.46 *Add the following Sections 5.4.4, 5.4.5 and 5.4.6:*

§ 5.4.4 Each subcontract shall specifically provide that the Owner shall only be responsible to the subcontractor for those obligations of the Contractor that accrue subsequent to the Owner's exercise of any rights under this conditional assignment.

§ 5.4.5 Each subcontract shall specifically provide that the Subcontractor agrees to perform portions of the Work assigned to the Owner in accordance with the Contract Documents.

§ 5.4.6 Nothing in this Section 5.4 shall act to reduce or discharge the Contractor's payment bond surety's obligations to claimants for claims arising prior to the Owner's exercise of any rights under this conditional assignment.

3.47 *Delete the language of Section 6.1.4 and substitute the word "Reserved."*

3.48 *Insert the following at the end of Section 7.1.2:*

If the amount of a Modification exceeds the limits of the Owner's Construction Change Order Certification (reference Section 9.1.7.2 of the Agreement), then the Owner's agreement is not effective, and Work may not proceed, until approved in writing by the Office of State Engineer.

3.49 *Delete Section 7.2.1 and substitute the following:*

7.2.1 A Change Order is a written instrument prepared by the Architect (using State Form SE-480 "Construction Change Order") and signed by the Owner, Contractor and Architect stating their agreement upon all of the following:

- .1** The change in the Work;

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- .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.

3.50 *Add the following Sections 7.2.2, 7.2.3, 7.2.4, and 7.2.5:*

7.2.2 If a Change Order provides for an adjustment to the Contract Sum, the adjustment must be calculated in accordance with Section 7.3.3.

7.2.3 At the Owner's request, the Contractor shall prepare a proposal to perform the work of a proposed Change Order setting forth the amount of the proposed adjustment, if any, in the Contract Sum; and the extent of the proposed adjustment, if any, in the Contract Time. Any proposed adjustment in the Contract sum shall be prepared in accordance with Section 7.2.2. The Owner's request shall include any revisions to the Drawings or Specifications necessary to define any changes in the Work. Within fifteen days of receiving the request, the Contractor shall submit the proposal to the Owner and Architect along with all documentation required by Section 7.6.

7.2.4 If the Contractor requests a Change Order, the request shall set forth the proposed change in the Work and shall be prepared in accordance with Section 7.2.3. If the Contractor requests a change to the Work that involves a revision to either the Drawings or Specifications, the Contractor shall reimburse the Owner for any expenditures associated with the Architects' review of the proposed revisions, except to the extent the revisions are accepted by execution of a Change Order.

7.2.5 Agreement on any Change Order shall constitute a final settlement of all matters relating to the change in the Work that is the subject of the Change Order, including, but not limited to, any adjustments to the Contract Sum or the Contract Time.

3.51 *Delete 7.3.3 and substitute the following:***7.3.3 PRICE ADJUSTMENTS**

§ 7.3.3.1 If any Modification, including a Construction Change Directive, provides for an adjustment to the Contract Sum, the adjustment shall be based on whichever of the following methods is the most valid approximation of the actual cost to the contractor, with overhead and profit as allowed by Section 7.5:

- .1 Mutual acceptance of a lump sum;
- .2 Unit prices stated in the Contract Documents, except as provided in Section 7.3.4, or subsequently agreed upon;
- .3 Cost attributable to the events or situations under applicable clauses with adjustment of profits or fee, all as specified in the contract, or subsequently agreed upon by the parties, or by some other method as the parties may agree; or
- .4 As provided in Section 7.3.7.

§ 7.3.3.2 Consistent with Section 7.6, costs must be properly itemized and supported by substantiating data sufficient to permit evaluation before commencement of the pertinent performance or as soon after that as practicable. All costs incurred by the Contractor must be justifiably compared with prevailing industry standards. Except as provided in Section 7.5, all adjustments to the Contract Price shall be limited to job specific costs and shall not include indirect costs, overhead, home office overhead, or profit.

3.52 *Delete Section 7.3.7 and substitute the following:*

7.3.7 If the Contractor does not respond promptly or disagrees with the method for adjustment in the Contract Sum, the Architect shall make an initial determination, consistent with Section 7.3.3, of the method and the adjustment on the basis of reasonable expenditures and savings of those performing the Work attributable to the change, including, in case of an increase in the Contract Sum, an amount for overhead and profit as set forth in Section 7.5. In such case, and also under Section 7.3.3.1.3, the Contractor shall keep and present, in such form as the Architect may prescribe, an itemized accounting together with appropriate supporting data. Unless otherwise provided in the Contract Documents, costs for the purposes of this Section 7.3.7 shall be limited to the following:

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

3.53 *Delete Section 7.3.8 and substitute the following:*

7.3.8 Using the percentages stated in Section 7.5, any adjustment to the Contract Sum for deleted work shall include any overhead and profit attributable to the cost for the deleted Work.

3.54 *Add the following Sections 7.5 and 7.6:***7.5 AGREED OVERHEAD AND PROFIT RATES**

7.5.1 For any adjustment to the Contract Sum for which overhead and profit may be recovered, other than those made pursuant to Unit Prices stated in the Contract Documents, the Contractor agrees to charge and accept, as full payment for overhead and profit, the following percentages of costs attributable to the change in the Work. The percentages cited below shall be considered to include all indirect costs including, but not limited to: field and office managers, supervisors and assistants, incidental job burdens, small tools, and general overhead allocations. The allowable percentages for overhead and profit are as follows:

- .1 To the Contractor for work performed by the Contractor's own forces, 17% of the Contractor's actual costs.
- .2 To each Subcontractor for work performed by the Subcontractor's own forces, 17% of the subcontractor's actual costs.
- .3 To the Contractor for work performed by a subcontractor, 10% of the subcontractor's actual costs (not including the subcontractor's overhead and profit).

7.6 PRICING DATA AND AUDIT**§ 7.6.1 Cost or Pricing Data.**

Upon request of the Owner or Architect, Contractor shall submit cost or pricing data prior to execution of a Modification which exceeds \$500,000. Contractor shall certify that, to the best of its knowledge and belief, the cost or pricing data submitted is accurate, complete, and current as of a mutually determined specified date prior to the date of pricing the Modification. Contractor's price, including profit, shall be adjusted to exclude any significant sums by which such price was increased because Contractor furnished cost or pricing data that was inaccurate, incomplete, or not current as of the date specified by the parties. Notwithstanding Subparagraph 9.10.4, such adjustments may be made after final payment to the Contractor.

§ 7.6.2 Cost or pricing data means all facts that, as of the date specified by the parties, prudent buyers and sellers would reasonably expect to affect price negotiations significantly. Cost or pricing data are factual, not judgmental; and are verifiable. While they do not indicate the accuracy of the prospective contractor's judgment about estimated future costs or projections, they do include the data forming the basis for that judgment. Cost or pricing data are more than historical accounting data; they are all the facts that can be reasonably expected to contribute to the soundness of estimates of future costs and to the validity of determinations of costs already incurred.

§ 7.6.3 Records Retention.

As used in Section 7.6, the term "records" means any books or records that relate to cost or pricing data that Contractor is required to submit pursuant to Section 7.6.1. Contractor shall maintain records for three years from the date of final payment, or longer if requested by the chief procurement officer. The Owner may audit Contractor's records at reasonable times and places.

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3.55 Delete Section 8.2.2 and substitute the following:

8.2.2 The Contractor shall not knowingly commence operations on the site or elsewhere prior to the effective date of surety bonds and insurance required by Article 11 to be furnished by the Contractor and Owner. The date of commencement of the Work shall not be changed by the effective date of such surety bonds or insurance.

3.56 Delete Section 8.3.1 and substitute the following:

8.3.1 If the Contractor is delayed at any time in the commencement or progress of the Work by an act or neglect of the Owner or Architect, or of an employee of either, or of a separate contractor employed by the Owner; or by changes ordered in the Work; or by labor disputes, fire, unusual delay in deliveries, unavoidable casualties or other causes beyond the control of the Contractor and any subcontractor at any tier; or by delay authorized by the Owner pending dispute resolution; or by other causes that the Architect determines may justify delay, then to the extent such delay will prevent the Contractor from achieving Substantial Completion within the Contract Time and provided the delay (1) is not caused by the fault or negligence of the Contractor or a subcontractor at any tier and (2) is not due to unusual delay in the delivery of supplies, machinery, equipment, or services when such supplies, machinery, equipment, or services were obtainable from other sources in sufficient time for the Contractor to meet the required delivery, the Contract Time shall be extended by Change Order for such reasonable time as the Architect may determine.

3.57 Insert the following at the end of Section 9.1:

All changes to the Contract Sum shall be adjusted in accordance with Section 7.3.3.

3.58 Delete Section 9.2 and substitute the following:**9.2 SCHEDULE OF VALUES**

9.2.1 The Contractor shall submit to the Architect, within ten days of full execution of the Agreement, a schedule of values allocating the entire Contract Sum to the various portions of the Work and prepared in such form and supported by such data to substantiate its accuracy as the Architect may require. This schedule, unless objected to by the Architect, shall be used as a basis for reviewing the Contractor's Applications for Payment. As requested by the Architect, the Contractor and each Subcontractor shall prepare a trade payment breakdown for the Work for which each is responsible, such breakdown being submitted on a uniform standardized format approved by the Architect and Owner. The breakdown shall be divided in detail, using convenient units, sufficient to accurately determine the value of completed Work during the course of the Project. The Contractor shall update the schedule of values as required by either the Architect or Owner as necessary to reflect:

- .1 the description of Work (listing labor and material separately);
- .2 the total value;
- .3 the percent and value of the Work completed to date;
- .4 the percent and value of previous amounts billed; and
- .5 the current percent completed and amount billed.

9.2.2 Any schedule of values or trade breakdown that fails to include sufficient detail, is unbalanced, or exhibits "front-loading" of the value of the Work shall be rejected. If a schedule of values or trade breakdown is used as the basis for payment and later determined to be inaccurate, sufficient funds shall be withheld from future Applications for Payment to ensure an adequate reserve (exclusive of normal retainage) to complete the Work.

3.59 Delete Section 9.3.1 and substitute the following:

Monthly, the Contractor shall submit to the Architect an itemized Application for Payment prepared in accordance with the schedule of values, if required under Section 9.2., for completed portions of the Work. Such application shall be notarized, if required, and supported by such data substantiating the Contractor's right to payment as the Owner or Architect may require (such as copies of requisitions from Subcontractors and material suppliers) and shall reflect retainage and any other adjustments provided in Section 5 of the Agreement. If required by the Owner or Architect, the Application for Payment shall be accompanied by a current construction schedule.

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- 3.60** In Section 9.3.2, add the following words to the end of the second sentence:

provided such materials or equipment will be subsequently incorporated in the Work

Insert the following at the end of Section 9.3.2:

The Contractor shall 1) protect such materials from diversion, vandalism, theft, destruction, and damage, 2) mark such materials specifically for use on the Project, and 3) segregate such materials from other materials at the storage facility. The Architect and the Owner shall have the right to make inspections of the storage areas at any time.

- 3.61** *In Section 9.4.2, in the first sentence, after the words “Work has progressed to the point indicated,” insert the following:*

in both the Application for Payment and, if required to be submitted by the Contractor, the accompanying current construction schedule

In the last sentence, delete the third item starting with “(3) reviewed copies” and ending with “Contractor’s right to payment,”

- 3.62** *In Section 9.5.1, in the first sentence, delete the word “may” after the opening words “The Architect” and substitute the word “shall.”*

In Section 9.5.1, insert the following sentence after the first sentence:

The Architect shall withhold a Certificate of Payment if the Application for Payment is not accompanied by the current construction schedule required by Section 3.10.1.

- 3.63** *In Section 9.6.2, delete the word “The...” at the beginning of the first sentence and substitute the following:*

Pursuant to Chapter 6 of Title 29 of the South Carolina Code of Laws, as amended, the

- 3.64** *Delete Section 9.7 and substitute following:*

9.7 FAILURE OF PAYMENT

If the Architect does not issue a Certificate for Payment to the Owner, 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 time established in the Contract Documents the amount certified by the Architect or awarded by a final dispute resolution order, then the Contractor may, upon seven additional days’ written notice to the Owner and Architect, stop the Work until payment of the amount owing has been received. The Contract Time shall be extended appropriately and the Contract Sum shall be increased, in accordance with the provisions of Section 7.3.3, by the amount of the Contractor’s reasonable costs of shut-down, delay and start-up, plus interest as provided for in the Contract Documents.

- 3.65** *Insert the following words at the end of the sentence in Section 9.8.1:*

and when all required occupancy permits, if any, have been issued and copies of same have been delivered to the Owner.

- 3.66** *In Section 9.8.2, insert the word “written” after the word “comprehensive” and before the word “list.”*

- 3.67** *Delete Section 9.8.3 and substitute the following:*

9.8.3.1 Upon receipt of the Contractor’s list, the Architect, with the Owner and any other person the Architect or the Owner choose, will make an inspection on a date and at a time mutually agreeable to the Architect, Owner, and Contractor, to determine whether the Work or designated portion thereof is substantially complete. The Contractor shall furnish access for the inspection and testing as provided in this Contract. The inspection shall include a

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demonstration by the Contractor that all equipment, systems and operable components of the Work function properly and in accordance with the Contract Documents. 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. If more than one Substantial Completion inspection is required, the Contractor shall reimburse the Owner for all costs of reinspections or, at the Owner's option, the costs may be deducted from payments due to the Contractor.

9.8.3.2 If the Architect and Owner concur in the Contractor's assessment that the Work or a portion of the Work is safe to occupy, the Owner and Contractor may arrange for a Certificate of Occupancy Inspection by OSE. The Owner, Architect, and Contractor shall be present at OSE's inspection. Upon verifying that the Work or a portion of the Work is substantially complete and safe to occupy, OSE will issue, as appropriate, a Full or Partial Certificate of Occupancy.

3.68 *In the second sentence of Section 9.8.5, delete the words "and consent of surety, if any."*

3.69 *In the first sentence of Section 9.9.1, delete the words "Section 11.3.1.5" and substitute the words "Section 11.3.1.3."*

3.70 *Delete Section 9.10.1 and substitute the following:*

9.10.1 Unless the parties agree otherwise in the Certificate of Substantial Completion, the Contractor shall achieve Final Completion no later than thirty days after Substantial Completion. Upon receipt of the Contractor's written notice that the Work is ready for final inspection and acceptance and upon receipt of a final Application for Payment, the Architect, with the Owner and any other person the Architect or the Owner choose, will make an inspection on a date and at a time mutually agreeable to the Architect, Owner, and Contractor, and, when the Architect finds the Work acceptable under the Contract Documents and the Contract fully performed, the Architect will promptly issue a final Certificate for Payment stating that to the best of the Architect's knowledge, information and belief, and on the basis of the Architect's on-site visits and inspections, the Work has been completed in accordance with terms and conditions of the Contract Documents and that the entire balance found to be due the Contractor and noted in the final Certificate is due and payable. The Architect's final Certificate for Payment will constitute a further representation that conditions listed in Section 9.10.2 as precedent to the Contractor's being entitled to final payment have been fulfilled. If more than one Final Completion inspection is required, the Contractor shall reimburse the Owner for all costs of reinspections or, at the Owner's option, the costs may be deducted from payments due to the Contractor. If the Contractor does not achieve final completion within thirty days after Substantial Completion or the timeframe agreed to by the parties in the Certificate of Substantial Completion, whichever is greater, the Contractor shall be responsible for any additional Architectural fees resulting from the delay.

3.71 *Delete the first sentence of Section 9.10.2 and substitute the following:*

Neither final payment nor any remaining retained percentage shall become due until the Contractor submits to the Architect (1) an affidavit that payrolls, bills for materials and equipment, and other indebtedness connected with the Work for which the Owner or the Owner's property might be responsible or encumbered (less amounts withheld by Owner) have been paid or otherwise satisfied, (2) a certificate evidencing that insurance required by the Contract Documents to remain in force after final payment is currently in effect and will not be canceled or allowed to expire until at least 30 days' prior written notice has been given to the Owner, (3) a written statement that the Contractor knows of no substantial reason that the insurance will not be renewable to cover the period required by the Contract Documents, (4) consent of surety, if any, to final payment (5), if required by the Owner, other data establishing payment or satisfaction of obligations, such as receipts, releases and waivers of liens, claims, security interests or encumbrances arising out of the Contract, to the extent and in such form as may be designated by the Owner, (6) required Training Manuals, (7) equipment Operations and Maintenance Manuals, (8) any certificates of testing, inspection or approval required by the Contract Documents and not previously provided (9) all warranties and guarantees required under or pursuant to the Contract Documents, and (10) one copy of the Documents required by Section 3.11.

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- 3.72** Delete the first sentence of Section 9.10.3 and substitute the following:

If, after Substantial Completion of the Work, final completion thereof is delayed 60 days through no fault of the Contractor or by issuance of Change Orders affecting final completion, and the Architect so confirms, the Owner shall, upon application by the Contractor and certification by the Architect, and without terminating the Contract, make payment of the balance due for that portion of the Work fully completed and accepted.

- 3.73** Delete Section 9.10.5 and substitute the following:

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

- 3.74** Add the following Section 9.10.6:

9.10.6 If OSE has not previously issued a Certificate of Occupancy for the entire Project, the Parties shall arrange for a representative of OSE to participate in the Final Completion Inspection. Representatives of the State Fire Marshal's Office and other authorities having jurisdiction may be present at the Final Completion Inspection or otherwise inspect the completed Work and advise the Owner whether the Work meets their respective requirements for the Project.

- 3.75** Delete Section 10.3.1 and substitute the following:

10.3.1 If the Contractor encounters a hazardous material or substance which was not discoverable as provided in Section 3.2.1 and not required by the Contract Documents, and if reasonable precautions will be inadequate to prevent foreseeable bodily injury or death to persons or serious loss to real or personal property resulting from such material or substance encountered on the site by the Contractor, the Contractor shall, upon recognizing the condition, immediately stop Work in the affected area and report the condition to the Owner and Architect in writing. Hazardous materials or substances are those hazardous, toxic, or radioactive materials or substances subject to regulations by applicable governmental authorities having jurisdiction, such as, but not limited to, the S.C. Department of Health and Environmental Control, the U.S. Environmental Protection Agency, and the U.S. Nuclear Regulatory Commission.

- 3.76** Insert the following at the end of Section 10.3.2:

In the absence of agreement, the Architect will make an interim determination regarding any delay or impact on the Contractor's additional costs. 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. Any adjustment in the Contract Sum shall be determined in accordance with Section 7.3.3.

- 3.77** Delete Section 10.3.3 and substitute the following:

10.3.3 The Work in the affected area shall be resumed immediately following the occurrence of any one of the following events: (a) the Owner causes remedial work to be performed that results in the absence of hazardous materials or substances; (b) the Owner and the Contractor, by written agreement, decide to resume performance of the Work; or (c) the Work may safely and lawfully proceed, as determined by an appropriate governmental authority or as evidenced by a written report to both the Owner and the Contractor, which is prepared by an environmental engineer reasonably satisfactory to both the Owner and the Contractor.

- 3.78** In Section 10.3.5, delete the word "The" at the beginning of the sentence and substitute the following:

In addition to its obligations under Section 3.18, the

- 3.79** Delete the language of Section 10.3.6 and substitute the word "Reserved."

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The Contractor shall immediately give the Architect notice of the emergency. This initial notice may be oral followed within five days by a written notice setting forth the nature and scope of the emergency. Within fourteen days of the start of the emergency, the Contractor shall give the Architect a written estimate of the cost and probable effect of delay on the progress of the Work.

3.81 *Delete 11.1.2 and substitute the following:*

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

(1) COMMERCIAL GENERAL LIABILITY:

(a) General Aggregate (per project)	<u>\$1,000,000</u>
(b) Products/Completed Operations	<u>\$1,000,000</u>
(c) Personal and Advertising Injury	<u>\$1,000,000</u>
(d) Each Occurrence	<u>\$1,000,000</u>
(e) Fire Damage (Any one fire)	<u>\$50,000</u>
(f) Medical Expense (Any one person)	<u>\$5,000</u>

(2) BUSINESS AUTO LIABILITY (including All Owned, Non-owned, and Hired Vehicles):

(a) Combined Single Limit	<u>\$1,000,000</u>
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(3) WORKER'S COMPENSATION:

(a) State Statutory	
(b) Employers Liability	<u>\$100,000</u> Per Acc.
	<u>\$500,000</u> Disease, Policy Limit
	<u>\$100,000</u> Disease, Each Employee

In lieu of separate insurance policies for Commercial General Liability, Business Auto Liability, and Employers Liability, the Contractor may provide an umbrella policy meeting or exceeding all coverage requirements set forth in this Section 11.1.2. The umbrella policy limits shall not be less than \$3,000,000.

3.82 *Delete Section 11.1.3 and substitute the following:*

11.1.3 Prior to commencement of the Work, and thereafter upon replacement of each required policy of insurance, Contractor shall provide to the Owner a written endorsement to the Contractor's general liability insurance policy that:

- (i) names the Owner as an additional insureds for claims caused in whole or in part by the Contractor's negligent acts or omissions during the Contractor's operations;
- (ii) provides that no material alteration, cancellation, non-renewal, or expiration of the coverage contained in such policy shall have effect unless all additional insureds have been given at least ten (10) days prior written notice of cancellation for non-payment of premiums and thirty (30) days prior written notice of cancellation for any other reason; and
- (iii) provides that the Contractor's liability insurance policy shall be primary, with any liability insurance of the Owner as secondary and noncontributory.

Prior to commencement of the Work, and thereafter upon renewal or replacement of each required policy of insurance, Contractor shall provide to the Owner a signed, original certificate of liability insurance (ACORD 25). Consistent with this Section 11.1, the certificate shall identify the types of insurance, state the limits of liability for each type of coverage, name the Owner a Consultants as Certificate Holder, provide that the general aggregate limit applies per project, and provide that coverage is written on an occurrence basis. Both the certificates and the

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endorsements must be received directly from either the Contractor's insurance agent or the insurance company. An additional certificate evidencing continuation of liability coverage, including coverage for completed operations, naming the Owner as an additional insured for claims made under the Contractor's completed operations, and otherwise meeting the above requirements, shall be submitted with the final Application for Payment as required by Section 9.10.2 and thereafter upon renewal or replacement of such coverage until the expiration of the time required by Section 11.1.2. Information concerning reduction of coverage on account of revised limits or claims paid under the General Aggregate, or both, shall be furnished by the Contractor with reasonable promptness.

3.83 *Delete Section 11.1.4 and substitute the following:*

11.1.4 A failure by the Owner either (i) to demand a certificate of insurance or written endorsement required by Section 11.1, or (ii) to reject a certificate or endorsement on the grounds that it fails to comply with Section 11.1 shall not be considered a waiver of Contractor's obligations to obtain the required insurance.

3.84 *In Section 11.3.1, delete the first sentence and substitute the following:*

Unless otherwise provided in the Contract Documents, the Contractor shall purchase and maintain, in a company or companies lawfully authorized to do business in the jurisdiction in which the Project is located, property insurance written on a builder's risk "all-risk" or equivalent policy form in the amount of the initial Contract Sum, plus value of subsequent Contract Modifications and cost of materials supplied or installed by others, comprising total value for the entire Project at the site on a replacement cost basis.

3.85 *Delete the language of Section 11.3.1.2 and substitute the word "Reserved."*

3.86 *Delete the language of Section 11.3.1.3 and substitute the word "Reserved."*

3.87 *Delete Section 11.3.2 and substitute the following:*

11.3.2 BOILER AND MACHINERY INSURANCE

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

3.88 *Delete Section 11.3.3 and substitute the following:*

11.3.3 LOSS OF USE INSURANCE

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

3.89 *Delete Section 11.3.4 and substitute the following:*

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

3.90 *Delete the language of Section 11.3.5 and substitute the word "Reserved."*

3.91 *Delete Section 11.3.6 and substitute the following:*

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

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3.92 Delete the first sentence of Section 11.3.7 and substitute the following:

The Owner and Contractor waive all rights against (1) each other and any of their subcontractors, sub-subcontractors, agents and employees, each of the other, and (2) the Architect, Architect's consultants, separate contractors described in Article 6, if any, and any of their subcontractors, sub-subcontractors, agents and employees, for damages caused by fire or other causes of loss to the extent the property insurance provided by the Contractor pursuant to this Section 11.3 covers and pays for the damage, except such rights as they have to proceeds of such insurance held by the Contractor as fiduciary.

3.93 Delete the first sentence of Section 11.3.8 and substitute the following:

A loss insured under the Contractor's property insurance shall be adjusted by the Contractor as fiduciary and made payable to the Contractor as fiduciary for the insureds, as their interests may appear, subject to requirements of any applicable mortgagee clause and of Section 11.3.10.

3.94 Delete Section 11.3.9 and substitute the following:

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

3.95 Delete Section 11.3.10 and substitute the following:

11.3.10 The Contractor as fiduciary shall have power to adjust and settle a loss with insurers unless one of the parties in interest shall object in writing within five days after occurrence of loss to the Contractor's exercise of this power; if such objection is made, the dispute shall be resolved in the manner provided in the contract between the parties in dispute as the method of binding dispute resolution. The Contractor as fiduciary shall make settlement with insurers or, in the case of a dispute over distribution of insurance proceeds, in accordance with a final order or determination issued by the appropriate authority having jurisdiction over the dispute..

3.96 Delete Section 11.4.1 and substitute the following:

11.4.1 Before commencing any services hereunder, the Contractor shall provide the Owner with Performance and Payment Bonds, each in an amount not less than the Contract Price set forth in Article 4 of the Agreement. The Surety shall have, at a minimum, a "Best Rating" of "A" as stated in the most current publication of "Best's Key Rating Guide, Property-Casualty". In addition, the Surety shall have a minimum "Best Financial Strength Category" of "Class V", and in no case less than five (5) times the contract amount. The Performance Bond shall be written on Form SE-355, "Performance Bond" and the Payment Bond shall be written on Form SE-357, "Labor and Material Payment Bond", and both shall be made payable to the Owner.

3.97 Delete Section 11.4.2 and substitute the following:

11.4.2 The Performance and Labor and Material Payment Bonds shall:

- .1** be issued by a surety company licensed to do business in South Carolina;
- .2** be accompanied by a current power of attorney and certified by the attorney-in-fact who executes the bond on the behalf of the surety company; and
- .3** remain in effect for a period not less than one (1) year following the date of Substantial Completion or the time required to resolve any items of incomplete Work and the payment of any disputed amounts, whichever time period is longer.

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3.98 *Add the following Sections 11.4.3 and 11.4.4:*

11.4.3 Any bonds required by this Contract shall meet the requirements of the South Carolina Code of Laws and Regulations, as amended.

11.4.4 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.

3.99 *Delete Section 12.1.1 and substitute the following:*

12.1.1 If a portion of the Work is covered contrary to the requirements specifically expressed in the Contract Documents, including inspections of work-in-progress required by all authorities having jurisdiction over the Project, it must, upon demand of the Architect or authority having jurisdiction, be uncovered for observation and be replaced at the Contractor's expense without change in the Contract Time.

3.100 *In Section 12.2.2.1, delete the words "and to make a claim for breach of warranty" at the end of the third sentence.***3.101** *In Section 12.2.2.3, add the following to the end of the sentence:*

unless otherwise provided in the Contract Documents.

3.102 *Insert the following at the end of Section 12.2.4:*

If, prior to the date of Substantial Completion, the Contractor, a Subcontractor, or anyone for whom either is responsible, uses or damages any portion of the Work, including, without limitation, mechanical, electrical, plumbing, and other building systems, machinery, equipment, or other mechanical device, the Contractor shall cause such item to be restored to "like new" condition at no expense to the Owner.

3.103 *Delete Section 13.1 and substitute the following:***13.1 GOVERNING LAW**

The Contract, any dispute, claim, or controversy relating to the Contract, and all the rights and obligations of the parties shall, in all respects, be interpreted, construed, enforced and governed by and under the laws of the State of South Carolina, except its choice of law rules.

3.104 *Delete Section 13.2, including its Sub-Sections 13.2.1 and 13.2.2, and substitute the following:***13.2 SUCCESSORS AND ASSIGNS**

The Owner and Contractor respectively bind themselves, their partners, successors, assigns and legal representatives to covenants, agreements and obligations contained in the Contract Documents. Neither party to the Contract shall assign the Contract as a whole, or in part, without written consent of the other and then only in accordance with and as permitted by Regulation 19-445.2180 of the South Carolina Code of Regulations, as amended. If either party attempts to make such an assignment without such consent, that party shall nevertheless remain legally responsible for all obligations under the Contract.

3.105 *Delete Section 13.3 and substitute the following:***13.3 WRITTEN NOTICE**

Unless otherwise permitted herein, all notices contemplated by the Contract Documents shall be in writing and shall be deemed given:

- .1 upon actual delivery, if delivery is by hand;
- .2 upon receipt by the transmitting party of confirmation or reply, if delivery is by electronic mail, facsimile, telex or telegram;
- .3 upon receipt, if delivery is by the United States mail.

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Notice to Contractor shall be to the address provided in Section 8.3.2 of the Agreement. Notice to Owner shall be to the address provided in Section 8.2.2 of the Agreement. Either party may designate a different address for notice by giving notice in accordance with this paragraph.

3.106 *In Section 13.4.1, insert the following at the beginning of the sentence:*

Unless expressly provided otherwise,

3.107 *Add the following Section 13.4.3:*

13.4.3 Notwithstanding Section 9.10.4, the rights and obligations which, by their nature, would continue beyond the termination, cancellation, rejection, or expiration of this contract shall survive such termination, cancellation, rejection, or expiration, including, but not limited to, the rights and obligations created by the following clauses:

1.5 Ownership and Use of Drawings, Specifications and Other Instruments of Service;

3.5 Warranty

3.17 Royalties, Patents and Copyrights

3.18 Indemnification

7.6 Cost or Pricing Data

11.1 Contractor's Liability Insurance

11.4 Performance and Payment Bond

15.1.6 Claims for Listed Damages

15.1.7 Waiver of Claims Against the Architect

15.6 Dispute Resolution

15.4 Service of Process

3.108 *Delete Section 13.6 and substitute the following:*

13.6 INTEREST

Payments due to the Contractor and unpaid under the Contract Documents shall bear interest only if and to the extent allowed by Title 29, Chapter 6, Article 1 of the South Carolina Code of Laws. Amounts due to the Owner shall bear interest at the rate of one percent a month or a pro rata fraction thereof on the unpaid balance as may be due.

3.109 *Delete the language of Section 13.7 and substitute the word "Reserved."*

3.110 *Add the following Sections 13.8 through 13.16:*

13.8 PROCUREMENT OF MATERIALS BY OWNER

The Contractor accepts assignment of all purchase orders and other agreements for procurement of materials and equipment by the Owner that are identified as part of the Contract Documents. The Contractor shall, upon delivery, be responsible for the storage, protection, proper installation, and preservation of such Owner purchased items, if any, as if the Contractor were the original purchaser. The Contract Sum includes, without limitation, all costs and expenses in connection with delivery, storage, insurance, installation, and testing of items covered in any assigned purchase orders or agreements. Unless the Contract Documents specifically provide otherwise, all Contractor warranty of workmanship and correction of the Work obligations under the Contract Documents shall apply to the Contractor's installation of and modifications to any Owner purchased items,.

13.9 INTERPRETATION OF BUILDING CODES

As required by Title 10, Chapter 1, Section 180 of the South Carolina Code of Laws, as amended, OSE shall determine the enforcement and interpretation of all building codes and referenced standards on state buildings. The Contractor shall refer any questions, comments, or directives from local officials to the Owner and OSE for resolution.

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13.10 MINORITY BUSINESS ENTERPRISES

Contractor shall notify Owner of each Minority Business Enterprise (MBE) providing labor, materials, equipment, or supplies to the Project under a contract with the Contractor. Contractor's notification shall be via the first monthly status report submitted to the Owner after execution of the contract with the MBE. For each such MBE, the Contractor shall provide the MBE's name, address, and telephone number, the nature of the work to be performed or materials or equipment to be supplied by the MBE, whether the MBE is certified by the South Carolina Office of Small and Minority Business Assistance, and the value of the contract.

13.11 SEVERABILITY

If any provision or any part of a provision of the Contract Documents shall be finally determined to be superseded, invalid, illegal, or otherwise unenforceable pursuant to any applicable Legal Requirements, such determination shall not impair or otherwise affect the validity, legality, or enforceability of the remaining provision or parts of the provision of the Contract Documents, which shall remain in full force and effect as if the unenforceable provision or part were deleted.

13.12 ILLEGAL IMMIGRATION

Contractor certifies and agrees that it will comply with the applicable requirements of Title 8, Chapter 14 of the South Carolina Code of Laws and agrees to provide to the State upon request any documentation required to establish either: (a) that Title 8, Chapter 14 is inapplicable both to Contractor and its subcontractors or sub-subcontractors; or (b) that Contractor and its subcontractors or sub-subcontractors are in compliance with Title 8, Chapter 14. Pursuant to Section 8-14-60, "A person who knowingly makes or files any false, fictitious, or fraudulent document, statement, or report pursuant to this chapter is guilty of a felony, and, upon conviction, must be fined within the discretion of the court or imprisoned for not more than five years, or both." Contractor agrees to include in any contracts with its subcontractors language requiring its subcontractors to (a) comply with the applicable requirements of Title 8, Chapter 14, and (b) include in their contracts with the sub-subcontractors language requiring the sub-subcontractors to comply with the applicable requirements of Title 8, Chapter 14. (An overview is available at www.procurement.sc.gov)

13.13 SETOFF

The Owner shall have all of its common law, equitable, and statutory rights of set-off.

13.14 DRUG-FREE WORKPLACE

The Contractor certifies to the Owner that Contractor will provide a Drug-Free Workplace, as required by Title 44, Chapter 107 of the South Carolina Code of Laws, as amended.

13.15 FALSE CLAIMS

According to the S.C. Code of Laws § 16-13-240, "a person who by false pretense or representation obtains the signature of a person to a written instrument or obtains from another person any chattel, money, valuable security, or other property, real or personal, with intent to cheat and defraud a person of that property is guilty" of a crime.

13.16 NON-INDEMNIFICATION:

Any term or condition is void to the extent it requires the State to indemnify anyone. It is unlawful for a person charged with disbursements of state funds appropriated by the General Assembly to exceed the amounts and purposes stated in the appropriations. (§ 11-9-20) It is unlawful for an authorized public officer to enter into a contract for a purpose in which the sum is in excess of the amount appropriated for that purpose. It is unlawful for an authorized public officer to divert or appropriate the funds arising from any tax levied and collected for any one fiscal year to the payment of an indebtedness contracted or incurred for a previous year. (§ 11-1-40)

3.111 *Delete Section 14.1.1 and substitute the following:*

14.1.1 The Contractor may terminate the Contract if the Work is stopped for a period of 45 consecutive days through no act or fault of the Contractor or a Subcontractor, Sub-subcontractor or their agents or employees or any other persons or entities performing portions of the Work under direct or indirect contract with the Contractor, for any of the following reasons:

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

OSE FORM 00811**STANDARD SUPPLEMENTARY CONDITIONS**

- .2** An act of government, such as a declaration of national emergency that requires substantially 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 and the Contractor has stopped work in accordance with Section 9.7

3.112 *Insert the following at the end of Section 14.1.3:*

Any adjustment to the Contract Sum pursuant to this Section shall be made in accordance with the requirements of Article 7.

3.113 *In Section 14.1.4, replace the word “repeatedly” with the word “persistently.”***3.114** *Delete Section 14.2.1 and substitute the following:***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, or otherwise fails to prosecute the Work, or any separable part of the Work, with the diligence, resources and skill that will ensure its completion within the time specified in the Contract Documents, including any authorized adjustments;
- .2** fails to make payment to Subcontractors for materials or labor in accordance with the Contract Documents and the respective agreements between the Contractor and the Subcontractors;
- .3** repeatedly disregards applicable laws, statutes, ordinances, codes, rules and regulations, or lawful orders of a public authority; or
- .4** otherwise is guilty of substantial breach of a provision of the Contract Documents.

3.115 *In Section 14.2.2, delete the parenthetical statement “, upon certification by the Initial Decision Maker that sufficient cause exists to justify such action,” immediately following the word “Owner” in the first line.***3.116** *In Section 14.2.4, replace the words “Initial Decision Maker” with the word “Architect”***3.117** *Add the following Section 14.2.5:*

14.2.5 If, after termination for cause, it is determined that the Owner lacked justification to terminate under Section 14.2.1, or that the Contractor’s default was excusable, the rights and obligations of the parties shall be the same as if the termination had been issued for the convenience of the Owner under Section 14.4.

3.118 *Delete the second sentence of Section 14.3.2 and substitute the following:*

Any adjustment to the Contract Sum made pursuant to this section shall be made in accordance with the requirements of Article 7.3.3.

3.119 *Delete Section 14.4.1 and substitute the following:*

14.4.1 The Owner may, at any time, terminate the Contract, in whole or in part for the Owner’s convenience and without cause. The Owner shall give written notice of the termination to the Contractor specifying the part of the Contract terminated and when termination becomes effective.

3.120 *Delete Section 14.4.2 and substitute the following:*

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

- .1** cease operations as directed by the Owner in the notice;
- .2** take actions necessary, or that the Owner may direct, for the protection and preservation of the Work;

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- .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; and
- .4 complete the performance of the Work not terminated, if any.

3.121 *Delete Section 14.4.3 and substitute the following:*

14.4.3 In case of such termination for the Owner's convenience, the Contractor shall be entitled to receive payment for Work executed, costs incurred by reason of such termination, and any other adjustments otherwise allowed by the Contract. Any adjustment to the Contract Sum made pursuant to this Section 14.4 shall be made in accordance with the requirements of Article 7.3.3.

3.122 *Add the following Sections 14.4.4, 14.4.5, and 14.5:*

14.4.4 Contractor's failure to include an appropriate termination for convenience clause in any subcontract shall not (i) affect the Owner's right to require the termination of a subcontract, or (ii) increase the obligation of the Owner beyond what it would have been if the subcontract had contained an appropriate clause.

14.4.5 Upon written consent of the Contractor, the Owner may reinstate the terminated portion of this Contract in whole or in part by amending the notice of termination if it has been determined that:

- .1 the termination was due to withdrawal of funding by the General Assembly, Governor, or Budget and Control Board or the need to divert project funds to respond to an emergency as defined by Regulation 19-445.2110(B) of the South Carolina Code of Regulations, as amended;
- .2 funding for the reinstated portion of the work has been restored;
- .3 circumstances clearly indicate a requirement for the terminated work; and
- .4 reinstatement of the terminated work is advantageous to the Owner.

14.5 CANCELLATION AFTER AWARD BUT PRIOR TO PERFORMANCE

Pursuant to Title 11, Chapter 35 and Regulation 19-445.2085 of the South Carolina Code of Laws and Regulations, as amended, this contract may be canceled after award but prior to performance.

3.123 *Insert the following sentence after the second sentence of Section 15.1.1:*

A voucher, invoice, payment application or other routine request for payment that is not in dispute when submitted is not a Claim under this definition.

3.124 *Delete Section 15.1.2 and substitute the following:***15.1.2 NOTICE OF CLAIMS**

Claims by either the Owner or Contractor must be initiated by written notice to the other party and to the Architect. Such notice shall include sufficient information to advise the Architect and other party of the circumstances giving rise to the claim, the specific contractual adjustment or relief requested and the basis of such request. Claims by either party arising prior to the date final payment is due must be initiated within 21 days after occurrence of the event giving rise to such Claim or within 21 days after the claimant first recognizes the condition giving rise to the Claim, whichever is later except as stated for adverse weather days in Section 15.1.5.2. By failing to give written notice of a Claim within the time required by this Section, a party expressly waives its claim.

3.125 *Delete Section 15.1.3 and substitute the following:***15.1.3 CONTINUING CONTRACT PERFORMANCE**

Pending final resolution of a Claim, including any administrative review allowed under Section 15.6, except as otherwise agreed in writing or as provided in Section 9.7 and Article 14, the Contractor shall proceed diligently with performance of the Contract and the Owner shall continue to make payments in accordance with the Contract Documents. The Architect will issue Certificates for Payment in accordance with the initial decisions and determinations of the Architect.

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3.126 *Insert the following at the end of Section 15.1.5.1:*

Claims for an increase in the Contract Time shall be based on one additional calendar day for each full calendar day that the Contractor is prevented from working.

3.127 *Insert the following Sub-Sections at the end of Section 15.1.5.2:*

- .1** Claims for adverse weather shall be based on actual weather conditions at the job site or other place of performance of the Work, as documented in the Contractor's job site log.
- .2** For the purpose of this Contract, a total of five (5) calendar days per calendar month (non-cumulative) shall be anticipated as "adverse weather" at the job site, and such time will not be considered justification for an extension of time. If, in any month, adverse weather develops beyond the five (5) days, the Contractor shall be allowed to claim additional days to compensate for the excess weather delays only to the extent of the impact on the approved construction schedule. The remedy for this condition is for an extension of time only and is exclusive of all other rights and remedies available under the Contract Documents or imposed or available by law.
- .3** The Contractor shall submit monthly with their pay application all claims for adverse weather conditions that occurred during the previous month. The Architect shall review each monthly submittal in accordance with Section 15.5 and inform the Contractor and the Owner promptly of its evaluation. Approved days shall be included in the next Change Order issued by the Architect. Adverse weather conditions not claimed within the time limits of this Subparagraph shall be considered to be waived by the Contractor. Claims will not be allowed for adverse weather days that occur after the scheduled (original or adjusted) date of Substantial Completion.

3.128 *Delete Section 15.1.6 and substitute the following:***15.1.6 CLAIMS FOR LISTED DAMAGES**

Notwithstanding any other provision of the Contract Documents, including Section 1.2.1, but subject to a duty of good faith and fair dealing, the Contractor and Owner waive Claims against each other for listed damages arising out of or relating to this Contract.

15.1.6.1 For the Owner, listed damages are (i) lost revenue and profit, (ii) losses resulting from injury to business or reputation, (iii) additional or escalated overhead and administration expenses, (iv) additional financing costs, (v) costs suffered by a third party unable to commence work, (vi) attorney's fees, (vii) any interest, except to the extent allowed by Section 13.6 (Interest), (viii) lost revenue and profit for lost use of the property, (ix) costs resulting from lost productivity or efficiency.

15.1.6.2 For the Contractor, listed damages are (i) lost revenue and profit, (ii) losses resulting from injury to business or reputation, (iii) additional or escalated overhead and administration expenses, (iv) additional financing costs, (v) attorney's fees, (vi) any interest, except to the extent allowed by Section 13.6 (Interest); (vii) unamortized equipment costs; and, (viii) losses incurred by subcontractors for the types of damages the Contractor has waived as against the Owner. Without limitation, this mutual waiver is applicable to all damages due to either party's termination in accordance with Article 14.

15.1.6.3 Nothing contained in this Section shall be deemed to preclude an award of liquidated damages, when applicable, in accordance with the requirements of the Contract Documents. This mutual waiver is not applicable to amounts due or obligations under Section 3.18 (Indemnification).

3.129 *Add the following Section 15.1.7:***15.1.7 WAIVER OF CLAIMS AGAINST THE ARCHITECT**

Notwithstanding any other provision of the Contract Documents, including Section 1.2.1, but subject to a duty of good faith and fair dealing, the Contractor waives all claims against the Architect and any other design professionals who provide design and/or project management services to the Owner, either directly or as independent contractors or subcontractors to the Architect, for listed damages arising out of or relating to this

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Contract. The listed damages are (i) lost revenue and profit, (ii) losses resulting from injury to business or reputation, (iii) additional or escalated overhead and administration expenses, (iv) additional financing costs, (v) attorney's fees, (vi) any interest; (vii) unamortized equipment costs; and, (viii) losses incurred by subcontractors for the types of damages the Contractor has waived as against the Owner. This mutual waiver is not applicable to amounts due or obligations under Section 3.18 (Indemnification).

3.130 *Delete the language of Sections 15.2, 15.3, and 15.4, including all Sub-Sections, and substitute the word "Reserved" for the deleted language of each Section and Sub-Section.*

3.131 *Add the following Sections 15.5 and 15.6 with their sub-sections:*

**15.5 CLAIM AND DISPUTES - DUTY OF COOPERATION, NOTICE, AND ARCHITECTS
INITIAL DECISION**

15.5.1 Contractor and Owner are fully committed to working with each other throughout the Project to avoid or minimize claims. To further this goal, Contractor and Owner agree to communicate regularly with each other and the Architect at all times notifying one another as soon as reasonably possible of any issue that if not addressed may cause loss, delay, and/or disruption of the Work. If claims do arise, Contractor and Owner each commit to resolving such claims in an amicable, professional, and expeditious manner to avoid unnecessary losses, delays, and disruptions to the Work.

15.5.2 Claims shall first be referred to the Architect for initial decision. An initial decision shall be required as a condition precedent to resolution pursuant to Section 15.6 of any Claim arising prior to the date of final payment, unless 30 days have passed after the Claim has been referred to the Architect with no decision having been rendered, or after all the Architect's requests for additional supporting data have been answered, whichever is later. The Architect will not address claims between the Contractor and persons or entities other than the Owner.

15.5.3 The Architect will review Claims and within ten days of the receipt of a Claim (1) request additional supporting data from the claimant or a response with supporting data from the other party or (2) render an initial decision in accordance with Section 15.5.5.

15.5.4 If the Architect requests a party to provide a response to a Claim or to furnish additional supporting data, such party shall respond, within ten days after receipt of such request, and shall either (1) provide a response on the requested supporting data, (2) advise the Architect when the response or supporting data will be furnished or (3) advise the Architect that all supporting data has already been provided. Upon receipt of the response or supporting data, the Architect will render an initial decision in accordance with Section 15.5.5.

15.5.5 The Architect will render an initial decision in writing; (1) stating the reasons therefor; and (2) notifying the parties of any change in the Contract Sum or Contract Time or both. The Architect will deliver the initial decision to the parties within two weeks of receipt of any response or supporting data requested pursuant to Section 16.4, or within such longer period as may be mutually agreeable to the parties. If the parties accept the initial decision, the Architect shall prepare a Change Order with appropriate supporting documentation for the review and approval of the parties and the Office of State Engineer. If either the Contractor, Owner, or both, disagree with the initial decision, the Contractor and Owner shall proceed with dispute resolution in accordance with the provisions of Section 15.6.

15.5.6 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.

15.6 DISPUTE RESOLUTION

15.6.1 If a claim is not resolved pursuant to Section 15.5 to the satisfaction of either party, both parties shall attempt to resolve the dispute at the field level through discussions between Contractor's Representative and Owner's Representative. If a dispute cannot be resolved through Contractor's Representative and Owner's Representative, then the Contractor's Senior Representative and the Owner's Senior Representative, upon the request of either party, shall meet as soon as conveniently possible, but in no case later than twenty-one days after such a request is made, to attempt to resolve such dispute. Prior to any meetings between the Senior

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Representatives, the parties will exchange relevant information that will assist the parties in resolving their dispute. The meetings required by this Section are a condition precedent to resolution pursuant to Section 15.6.2.

15.6.2 If after meeting in accordance with the provisions of Section 15.6.1, the Senior Representatives determine that the dispute cannot be resolved on terms satisfactory to both the Contractor and the Owner, then either party may submit the dispute by written request to South Carolina's Chief Procurement Officer for Construction (CPOC). Except as otherwise provided in Article 15, all claims, claims, or controversies relating to the Contract shall be resolved exclusively by the appropriate Chief Procurement Officer in accordance with Title 11, Chapter 35, Article 17 of the South Carolina Code of Laws, or in the absence of jurisdiction, only in the Court of Common Pleas for, or in the absence of jurisdiction a federal court located in, Richland County, State of South Carolina. Contractor agrees that any act by the State regarding the Contract is not a waiver of either the State's sovereign immunity or the State's immunity under the Eleventh Amendment of the United State's Constitution.

15.6.3 If any party seeks resolution to a dispute pursuant to Section 15.6.2, the parties shall participate in non-binding mediation to resolve the claim. If the claim is governed by Title 11, Chapter 35, Article 17 of the South Carolina Code of Laws as amended and the amount in controversy is \$100,000.00 or less, the CPOC shall appoint a mediator, otherwise, the mediation shall be conducted by an impartial mediator selected by mutual agreement of the parties, or if the parties cannot so agree, a mediator designated by the American Arbitration Association ("AAA") pursuant to its Construction Industry Mediation Rules. The mediation will be governed by and conducted pursuant to a mediation agreement negotiated by the parties or, if the parties cannot so agree, by procedures established by the mediator.

15.6.4 Without relieving any party from the other requirements of Sections 15.5 and 15.6, either party may initiate proceedings in the appropriate forum prior to initiating or completing the procedures required by Sections 15.5 and 15.6 if such action is necessary to preserve a claim by avoiding the application of any applicable statutory period of limitation or repose.

15.6.5 SERVICE OF PROCESS

Contractor consents that any papers, notices, or process necessary or proper for the initiation or continuation of any claims, claims, or controversies relating to the Contract; for any court action in connection therewith; or for the entry of judgment on any award made, may be served on Contractor by certified mail (return receipt requested) addressed to Contractor at the address provided for the Contractor's Senior Representative or by personal service or by any other manner that is permitted by law, in or outside South Carolina. Notice by certified mail is deemed duly given upon deposit in the United States mail.

3.132 Add the following Article 16:

ARTICLE 16 PROJECT-SPECIFIC REQUIREMENTS AND INFORMATION**16.1. Inspection Requirements:** *(Indicate the inspection services required by the Contract)*

- ☒ Special Inspections are required and are not part of the Contract Sum. *(see section 01400)*
- ☒ Building Inspections are required and are not part of the Contract Sum. *(see section 01400)*
- ☐ Building Inspections are required and are part of the Contract Sum.

The inspections required for this Work are :

(Indicate which services are required and the provider)

- ☐ Civil: _____
- ☒ Structural: _____
- ☒ Mechanical: _____
- ☐ Plumbing: _____
- ☒ Electrical: _____
- ☐ Gas: _____
- ☐ Other *(list)*: _____

Remarks: _____

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16.1.1 Contractor shall schedule and request inspections in an orderly and efficient manner and shall notify the Owner whenever the Contractor schedules an inspection in accordance with the requirements of Section 16.1. Contractor shall be responsible for the cost of inspections scheduled and conducted without the Owner's knowledge and for any increase in the cost of inspections resulting from the inefficient scheduling of inspections.

16.2 List Cash Allowances, if any. *(Refer to attachments as needed. If none, enter NONE)*

None

16.3. Requirements for Record Drawings, if any. *(Refer to attachments as needed. If none, enter NONE)*

Refer to Section 01 7800 - Closeout Submittals

16.4. Requirements for Shop Drawings and other submittals, if any, including number, procedure for submission, list of materials to be submitted, etc. *(Refer to attachments as needed. If none, enter NONE)*

Refer to Section 01 3000 - Administrative Requirements

16.5. Requirements for signage, on-site office or trailer, utilities, restrooms, etc., in addition to the Contract, if any. *(Refer to attachments as needed. If none, enter NONE)*

None

16.6. Requirements for Project Cleanup in addition to the Contract, if any. *(Refer to attachments as needed. If none, enter NONE)*

None

16.7. List all attachments that modify these General Conditions. *(If none, enter NONE)*

None

SE-355
Performance Bond

2011 Edition
Rev.10-29-12

KNOW ALL MEN BY THESE PRESENTS, that *(Insert full name or legal title and address of Contractor)*

Name: _____
Address: _____

Hereinafter referred to as "Contractor", and *(Insert full name and address of principal place of business of Surety)*

Name: _____
Address: _____

Hereinafter called the "surety", are jointly and severally held and firmly bound unto *(Insert full name and address of Agency)*

Name: University of South Carolina
Address: 743 Greene Street
Columbia, South Carolina 29208

hereinafter referred to as "Agency", or its successors or assigns, the sum of _____ (\$ _____), being the sum of the Bond to which payment to be well and truly made, the 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 Agency to construct

State Project Name: USC Byrnes Mechanical - Electrical Infrastructure Upgrades
State Project Number: H27-Z153
Brief Description of Awarded Work, as found on the SE-330, Bid Form: The project consists of upgrades to the building's electrical and HVAC systems. These upgrades will require minor demolition, the construction of new vertical chases and electrical closets.

In accordance with Drawings and Specifications prepared by *(Insert full name and address of A/E)*

Name: GMK Associates, Inc.
Address: 1201 Main Street, Suite 2100
Columbia, South Carolina 29201

Which agreement is by reference made a part hereof, and is hereinafter referred to as the Contract.

IN WITNESS WHEREOF, Surety and Contractor, intending to be legally bound hereby, subject to the terms stated herein, do each cause this Performance Bond to be duly executed on its behalf by its authorized officer, agent or representative.

DATED this _____ day of _____, 2____ BOND NUMBER _____
(shall be no earlier than Date of Contract)

CONTRACTOR

SURETY

By: _____
(Seal)

By: _____
(Seal)

Print Name: _____

Print Name: _____

Print Title: _____

Print Title: _____
(Attach Power of Attorney)

Witness: _____

Witness: _____

(Additional Signatures, if any, appear on attached page)

Performance Bond

NOW, THEREFORE, THE CONDITION OF THIS OBLIGATION IS SUCH THAT:

1. The Contractor and the Surety, jointly and severally, bind themselves, their heirs, executors, administrators, successors and assigns to the Agency for the full and faithful performance of the contract, which is incorporated herein by reference

2. If the Contractor performs the contract, the Surety and the Contractor have no obligation under this Bond, except to participate in conferences as provided in paragraph 3.1.

3. The Surety's obligation under this Bond shall arise after:

3.1 The Agency has notified the Contractor and the Surety at the address described in paragraph 10 below, that the Agency is considering declaring a Contractor Default and has requested and attempted to arrange a conference with the Contractor and the Surety to be held not later than 15 days after receipt of such notice to discuss methods of performing the Contract. If the Agency, the Contractor and the Surety agree, the Contractor shall be allowed a reasonable time to perform the Contract, but such an agreement shall not waive the Agency's right, if any, subsequently to declare a Contractor Default; or

3.2 The Agency has declared a Contractor Default and formally terminated the Contractor's right to complete the Contract.

4. The Surety shall, within 15 days after receipt of notice of the Agency's declaration of a Contractor Default, and at the Surety's sole expense, take one of the following actions:

4.1 Arrange for the Contractor, with consent of the Agency, to perform and complete the Contract; or

4.2 Undertake to perform and complete the Contract itself, through its agents or through independent contractors; or

4.3 Obtain bids or negotiated proposals from qualified contractors acceptable to the Agency for a contract for performance and completion of the Contract, arrange for a contract to be prepared for execution by the Agency and the contractor selected with the Agency's concurrence, to be secured with performance and payment bonds executed by a qualified surety equivalent to the Bonds issued on the Contract, and pay to the Agency the amount of damages as described in paragraph 7 in excess of the Balance of the Contract Sum incurred by the Agency resulting from the Contractor Default; or

4.4 Waive its right to perform and complete, arrange for completion, or obtain a new contractor, and:

4.4.1 After investigation, determine the amount for which it may be liable to the Agency and, within 60 days of waiving its rights under this paragraph, tender payment thereof to the Agency; or

4.4.2 Deny liability in whole or in part and notify the Agency, citing the reasons therefore.

5. Provided Surety has proceeded under paragraphs 4.1, 4.2, or 4.3, the Agency shall pay the Balance of the Contract Sum to either:

5.1 Surety in accordance with the terms of the Contract; or

5.2 Another contractor selected pursuant to paragraph 4.3 to perform the Contract.

5.3 The balance of the Contract Sum due either the Surety or another contractor shall be reduced by the amount of damages as described in paragraph 7.

6. If the Surety does not proceed as provided in paragraph 4 with reasonable promptness, the Surety shall be deemed to be in default on this Bond 15 days after receipt of written notice from the Agency to the Surety demanding that the Surety perform its obligations under this Bond, and the Agency shall be entitled to

enforce any remedy available to the Agency.

6.1 If the Surety proceeds as provided in paragraph 4.4, and the Agency refuses the payment tendered or the Surety has denied liability, in whole or in part, then without further notice the Agency shall be entitled to enforce any remedy available to the Agency.

6.2 Any dispute, suit, action or proceeding arising out of or relating to this Bond shall be governed by the Dispute Resolution process defined in the Contract Documents and the laws of the State of South Carolina.

7. After the Agency has terminated the Contractor's right to complete the Contract, and if the Surety elects to act under paragraph 4.1, 4.2, or 4.3 above, then the responsibilities of the Surety to the Agency shall be those of the Contractor under the Contract, and the responsibilities of the Agency to the Surety shall those of the Agency under the Contract. To a limit of the amount of this Bond, but subject to commitment by the Agency of the Balance of the Contract Sum to mitigation of costs and damages on the Contract, the Surety is obligated to the Agency without duplication for:

7.1 The responsibilities of the Contractor for correction of defective Work and completion of the Contract; and

7.2 Additional legal, design professional and delay costs resulting from the Contractor's Default, and resulting from the actions or failure to act of the Surety under paragraph 4; and

7.3 Damages awarded pursuant to the Dispute Resolution Provisions of the Contract. Surety may join in any Dispute Resolution proceeding brought under the Contract and shall be bound by the results thereof; and

7.4 Liquidated Damages, or if no Liquidated Damages are specified in the Contract, actual damages caused by delayed performance or non-performance of the Contractor.

8. The Surety shall not be liable to the Agency or others for obligations of the Contractor that are unrelated to the Contract, and the Balance of the Contract Sum shall not be reduced or set-off on account of any such unrelated obligations. No right of action shall accrue on this Bond to any person or entity other than the Agency or its heirs, executors, administrators, or successors.

9. The Surety hereby waives notice of any change, including changes of time, to the contract or to related subcontracts, purchase orders and other obligations.

10. Notice to the Surety, the Agency or the Contractor shall be mailed or delivered to the address shown on the signature page.

11. Definitions

11.1 Balance of the Contract Sum: The total amount payable by the Agency to the Contractor under the Contract after all proper adjustments have been made, including allowance to the Contractor of any amounts to be received by the Agency in settlement of insurance or other Claims for damages to which the Contractor is entitled, reduced by all valid and proper payments made to or on behalf of the Contractor under the Contract.

11.2 Contractor Default: Failure of the Contractor, which has neither been remedied nor waived, to perform the Contract or otherwise to comply with the terms of the Contract.

SE-357
Labor and Material Payment Bond

2011 Edition
Rev.10-29-12

KNOW ALL MEN BY THESE PRESENTS, that *(Insert full name or legal title and address of Contractor)*

Name: _____
Address: _____

Hereinafter referred to as "Contractor", and *(Insert full name and address of principal place of business of Surety)*

Name: _____
Address: _____

Hereinafter called the "surety", are jointly and severally held and firmly bound unto *(Insert full name and address of Agency)*

Name: University of South Carolina
Address: 743 Greene Street
Columbia, South Carolina 29208

hereinafter referred to as "Agency", or its successors or assigns, the sum of _____ (\$ _____), being the sum of the Bond to which payment to be well and truly made, the 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 Agency to construct

State Project Name: USC Byrnes Mechanical - Electrical Infrastructure Upgrades
State Project Number: H27-Z153
Brief Description of Awarded Work, as found on the SE-330, Bid Form: The project consists of upgrades to the building's electrical and HVAC systems. These upgrades will require minor demolition, the construction of new vertical chases and electrical closets.

In accordance with Drawings and Specifications prepared by *(Insert full name and address of A/E)*

Name: GMK Associates, Inc.
Address: 1201 Main Street, Suite 2100
Columbia, South Carolina 29201

Which agreement is by reference made a part hereof, and is hereinafter referred to as the Contract.

IN WITNESS WHEREOF, Surety and Contractor, intending to be legally bound hereby, subject to the terms stated herein, do each cause this Labor and Material Payment Bond to be duly executed on its behalf by its authorized officer, agent or representative.

DATED this _____ day of _____, 2____ BOND NUMBER _____
(shall be no earlier than Date of Contract)

CONTRACTOR

SURETY

By: _____
(Seal)

By: _____
(Seal)

Print Name: _____

Print Name: _____

Print Title: _____

Print Title: _____
(Attach Power of Attorney)

Witness: _____

Witness: _____

(Additional Signatures, if any, appear on attached page)

NOW, THEREFORE, THE CONDITION OF THIS OBLIGATION IS SUCH THAT:

1. The Contractor and the Surety, jointly and severally, bind themselves, their heirs, executors, administrators, successors and assigns to the Agency to pay for all labor, materials and equipment required for use in the performance of the Contract, which is incorporated herein by reference.

2. With respect to the Agency, this obligation shall be null and void if the Contractor:

2.1 Promptly makes payment, directly or indirectly, for all sums due Claimants; and

2.2 Defends, indemnifies and holds harmless the Agency from all claims, demands, liens or suits by any person or entity who furnished labor, materials or equipment for use in the performance of the Contract.

3. With respect to Claimants, this obligation shall be null and void if the Contractor promptly makes payment, directly or indirectly, for all sums due.

4. With respect to Claimants, and subject to the provisions of Title 29, Chapter 5 and the provisions of §11-35-3030(2)(c) of the SC Code of Laws, as amended, the Surety's obligation under this Bond shall arise as follows:

4.1 Every person who has furnished labor, material or rental equipment to the Contractor or its subcontractors for the work specified in the Contract, and who has not been paid in full therefore before the expiration of a period of ninety (90) days after the date on which the last of the labor was done or performed by him or material or rental equipment was furnished or supplied by him for which such claim is made, shall have the right to sue on the payment bond for the amount, or the balance thereof, unpaid at the time of institution of such suit and to prosecute such action for the sum or sums justly due him.

4.2 A remote claimant shall have a right of action on the payment bond upon giving written notice by certified or registered mail to the Contractor within ninety (90) days from the date on which such person did or performed the last of the labor or furnished or supplied the last of the material or rental equipment upon which such claim is made.

4.3 Every suit instituted upon a payment bond shall be brought in a court of competent jurisdiction for the county or circuit in which the construction contract was to be performed, but no such suit shall be commenced after the expiration of one year after the day on which the last of the labor was performed or material or rental equipment was supplied by the person bringing suit.

5. When the Claimant has satisfied the conditions of paragraph 4, the Surety shall promptly and at the Surety's expense take the following actions:

5.1 Send an answer to the Claimant, with a copy to the Agency, within sixty (60) days after receipt of the claim, stating the amounts that are undisputed and the basis for challenging any amounts that are disputed.

5.2 Pay or arrange for payment of any undisputed amounts.

5.3 The Surety's failure to discharge its obligations under this paragraph 5 shall not be deemed to constitute a waiver of defenses the Surety or Contractor may have or acquire as to a claim. However, if the Surety fails to discharge its obligations under this paragraph 5, the Surety shall indemnify the Claimant for the reasonable attorney's fees the Claimant incurs to recover any sums found to be due and owing to the Claimant.

6. Amounts owed by the Agency to the Contractor under the Contract shall be used for the performance of the Contract and to

satisfy claims, if any, under any Performance Bond. By the Contractor furnishing and the Agency accepting this Bond, they agree that all funds earned by the contractor in the performance of the Contract are dedicated to satisfy obligations of the Contractor and the Surety under this Bond, subject to the Agency's prior right to use the funds for the completion of the Work.

7. The Surety shall not be liable to the Agency, Claimants or others for obligations of the Contractor that are unrelated to the Contract. The Agency shall not be liable for payment of any costs or expenses of any claimant under this bond, and shall have under this Bond no obligations to make payments to, give notices on behalf of, or otherwise have obligations to Claimants under this Bond.

8. The Surety hereby waives notice of any change, including changes of time, to the Contract or to related Subcontracts, purchase orders and other obligations.

9. Notice to the Surety, the Agency or the Contractor shall be mailed or delivered to the addresses shown on the signature page. Actual receipt of notice by Surety, the Agency or the contractor, however accomplished, shall be sufficient compliance as of the date received at the address shown on the signature page.

10. By the Contractor furnishing and the Agency accepting this Bond, they agree that this Bond has been furnished to comply with the statutory requirements of the South Carolina Code of Laws, as amended, and further, that any provision in this Bond conflicting with said statutory requirements shall be deemed deleted herefrom and provisions conforming to such statutory or other legal requirement shall be deemed incorporated herein. The intent is that this Bond shall be construed as a statutory Bond and not as a common law bond.

11. Upon request of any person or entity appearing to be a potential beneficiary of this bond, the Contractor shall promptly furnish a copy of this Bond or shall permit a copy to be made.

12. Any dispute, suit, action or proceeding arising out of or relating to this Bond shall be governed by the laws of the State of South Carolina.

13. DEFINITIONS

13.1 Claimant: An individual or entity having a direct contract with the Contractor or with a Subcontractor of the Contractor to furnish labor, materials, or equipment for use in the performance of the Contract. The intent of this Bond shall be to include without limitation in the terms "labor, materials or equipment" that part of water, gas, power, light, heat, oil, gasoline, telephone service or rental equipment used in the Contract, architectural and engineering services required for performance of the Work of the Contractor and the Contractor's Subcontractors, and all other items for which a mechanic's lien might otherwise be asserted.

13.2 Remote Claimant: A person having a direct contractual relationship with a subcontractor of the Contractor or subcontractor, but no contractual relationship expressed or implied with the Contractor.

13.3 Contract: The agreement between the Agency and the Contractor identified on the signature page, including all Contract Documents and changes thereto.

USC SUPPLEMENTAL GENERAL CONDITIONS FOR CONSTRUCTION PROJECTS

1. Contractor's employees shall take all reasonable means not to interrupt the flow of student traffic in building corridors, lobbies and stairs. All necessary and reasonable safety precautions shall be taken to prevent injury to building occupants while transporting materials and equipment through the building to the work area. Providing safe, accessible, plywood pedestrian ways around construction may be required if a suitable alternative route is not available.
2. Fraternization between Contractor's employees and USC students, faculty or staff is strictly prohibited-zero tolerance!
3. USC will not tolerate rude, abusive or degrading behavior on the job site. Heckling and cat-calling directed toward students, faculty or staff or any other person on USC property is strictly prohibited. Any contractor whose employees violate this requirement will be assessed a fine of up to \$500 per violation.
4. Contractor's employees must adhere to the University's policy of maintaining a drug-free and smoke-free/tobacco free workplace.
5. Contractor must sign a Contractor Key Receipt/Return form before any keys are issued. Keys must be returned immediately upon the completion of the work. The Contractor will bear the cost of any re-keying necessary due to the loss of or failure to return keys.
6. A welding permit must be issued by the University Fire Marshall before any welding can begin inside a building. Project Manager will coordinate.
7. Contractor must notify the University immediately upon the discovery of suspect material such as those potentially containing asbestos or other such hazardous materials. These materials **must not** be disturbed until approved by the USC Project Manager.
8. At the beginning of the project, the USC Project Manager will establish the Contractor's lay-down area. This area will also be used for the Contractor's work vehicles. No personal vehicles will be allowed in this area, or in any areas surrounding the construction site that are not regular or authorized parking lots. Personal vehicles must be parked in the perimeter parking lots. Parking permits can be obtained at the USC Parking Office located in the Pendleton Street parking garage. The lay down area will be clearly identified to the contractor by the PM, with a sketch or drawing provided to Parking. In turn, the contractor will mark off this area with a sign containing the project name, PM name, Contractor name and contact number, and end date. Where this area is subject to foot traffic, protective barriers will be provided as specified by the PM. The area will be maintained in a neat and orderly fashion. Vehicles parked in the lay down area (or designated parking areas) will be clearly marked or display a CPC furnished placard for identification.
9. Contractor will be responsible for providing its own temporary toilet facilities, unless prior arrangements are made with the USC Project Manager.
10. Use of USC communications facilities (telephones, computers, etc.) by the Contractor is prohibited, unless prior arrangements are made with the USC Project Manager.

Updated: July 15, 2011

11. For all projects over \$100,000, including IDC 's, an SE-395, Contractor Performance Evaluation, will be completed by the USC Project Manager and reviewed with the GC at the beginning of the project and a copy given to the GC. At the end of the project the form will be completed and a Construction Performance rating will be established.
12. Contractor is responsible for removal of all debris from the site, and is required to provide the necessary dumpsters which will be emptied at least _____ times per week. Construction waste must not be placed in University dumpsters. THE CONSTRUCTION SITE MUST BE THOROUGHLY CLEANED WITH ALL TRASH PICKED UP AND PROPERLY DISPOSED OF ON A DAILY BASIS AND THE SITE MUST BE LEFT IN A SAFE AND SANITARY CONDITION EACH DAY. THE UNIVERSITY WILL INSPECT JOB SITES REGULARLY AND WILL FINE ANY CONTRACTOR FOUND TO BE IN VIOLATION OF THIS REQUIREMENT AN AMOUNT OF UP TO \$1,000 PER VIOLATION.
13. **Contractor must provide all O&M manuals, as-built drawings, and training of USC personnel on new equipment, controls, etc. prior to Substantial Completion. Final payment will not be made until this is completed.**
14. The contractor will comply with all regulations set forth by OSHA and SCDHEC. Contractor must also adhere to USC's internal policies and procedures (available by request). As requested, the contractor will submit all Safety Programs and Certificates of Insurance to the University for review.
15. Tree protection fencing is required to protect existing trees and other landscape features to be preserved within a construction area. The limits of this fence will be evaluated for each situation with the consultant, USC Arborist and USC Project Manager. The tree protection fence shall be 5' high chain link fence unless otherwise approved by USC Project Manager. No entry or materials storage will be allowed inside the tree protection zone. A 4" layer of mulch shall be placed over the tree protection area to maintain moisture in the root zone.
16. Where it is necessary to cross walks, tree root zones (i.e., under canopy) or lawns the following measures shall be taken: For single loads up to 9,000 lbs., a 3/4" minimum plywood base shall be placed over areas impacted. For single loads over 9,000 lbs., two layers of 3/4" plywood is required.
17. For projects requiring heavy loads to cross walks tree root zones or lawns. A construction entry road consisting of 10' X 16' oak logging mates on 12" coarse, chipped, hardwood base. Mulch and logging mats shall be supplemented throughout the project to keep matting structurally functional.
18. Any damage to existing landscaping (including lawn areas) will be remediated before final payment is made.
19. Orange safety fence to be provided by the contractor. (USC Arborist, Kevin Curtis may be contacted at 777-0033 or 315-0319)

CAMPUS VEHICLE EXPECTATIONS

1. All motorized vehicles on the University campus are expected to travel and park on roadways and/or in parking stalls.
2. All motorized vehicle traffic on USC walkways must first receive the Landscape Manager=s authorization. Violators may be subject to fines and penalties.
3. All motorized vehicles that leak or drip liquids are prohibited from traveling or parking on walks or landscaped areas.
4. Contractors, vendors, and delivery personnel are required to obtain prior parking authorization before parking in a designated space. Violators may be subject to fines and/or penalties. See Item 10 below.
5. Drivers of equipment or motor vehicles that damage university hardscape or landscape will be held personally responsible for damages and restoration expense.
6. Vehicle drivers who park on landscape or drives must be able to produce written evidence of need or emergency requiring parking on same.
7. All vehicles parked on landscape, hardscape, or in the process of service delivery, must display adequate safety devices, i.e. flashing lights, cones, signage, etc.
8. All drivers of equipment and vehicles will be respectful of University landscape, equipment, structures, fixtures and signage.
9. All incidents of property damage will be reported to Parking Services or the Work Management Center.
10. Parking on campus is restricted to spaces designated by Parking Services at the beginning of the project. Once the project manager and contractor agree on how many spaces are needed, the project manager will obtain a placard for each vehicle. This placard must be hung from the mirror of the vehicle, otherwise a ticket will be issued and these tickets cannot be “fixed”. Parking spaces are restricted to work vehicles only; no personal vehicles.

UNIVERSITY OF SOUTH CAROLINA
USC BYRNES MECHANICAL - ELECTRICAL
INFRASTRUCTURE UPGRADES
COLUMBIA, SC

USC PROJECT # H27-Z153
GMKA PROJECT #14024.01

Project Name: USC Byrnes Mechanical - Electrical Infrastructure Upgrades

Project Number: H27-Z153

University of South Carolina

CONTRACTOR'S ONE YEAR GUARANTEE

STATE OF _____

COUNTY OF _____

WE _____

as General Contractor on the above-named project, do hereby guarantee that all work executed under the requirements of the Contract Documents shall be free from defects due to faulty materials and /or workmanship for a period of one (1) year from date of acceptance of the work by the Owner and/or Architect/Engineer; and hereby agree to remedy defects due to faulty materials and/or workmanship, and pay for any damage resulting wherefrom, at no cost to the Owner, provided; however, that the following are excluded from this guarantee;

Defects or failures resulting from abuse by Owner.

Damage caused by fire, tornado, hail, hurricane, acts of God, wars, riots, or civil commotion.

[Name of Contracting Firm]

*By _____

Title _____

*Must be executed by an office of the Contracting Firm.

SWORN TO before me this _____ day of _____, 2____ (seal) _____ State

My commission expires _____

D I V I S I O N 1

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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. Coordinate the Schedule of Values and Applications for Payment with the Contractor's Construction Schedule, List of Subcontracts, and Submittal Schedule.
- D. The Contractor's Construction Schedule and Submittal Schedule are included in other sections of Division 1.
- E. See also the payment requirements in Supplementary Conditions.
- F. Change procedures.
- G. Correlation of Contractor submittals based on changes.
- H. Procedures for preparation and submittal of application for final payment.

1.02 SCHEDULE OF VALUES

- A. Form to be used: AIA G703.
- B. Electronic media printout including equivalent information will be considered in lieu of standard form specified; submit sample to Architect for approval.
- C. Forms filled out by hand will not be accepted.
- D. Submit Schedule of Values in duplicate within 30 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 and bonds and insurance.
 - 1. Provide minimum of 1% of the Construction Cost for Project Record Drawings.
 - 2. Provide minimum of 1% of the Construction Cost for Operating and Maintenance Data.
 - 3. Provide a breakdown of the Contract Sum in sufficient detail to facilitate continued evaluation of Applications for Payment and progress reports. Break principal subcontract amounts down into several line items.
- F. Correlate line items in the Schedule of Values with other required administrative schedules and forms, including:
 - 1. Contractor's construction schedule.
 - 2. Application for Payment form.
 - 3. List of Subcontractors.
 - 4. Schedule of allowances.
 - 5. List of principal suppliers and fabricators.
 - 6. Schedule of submittals.
- G. Sub-Schedules: Where the Work is separated into phases that require separately phased payments, provide sub-schedules showing values correlated with each phase of payment.
- H. Identification: Include the following Project identification on the Schedule of Values:
 - 1. Project name and location.

2. Name of the Architect.
 3. Contractor's name and address.
 4. Date of submittal.
- I. Round amounts off to the nearest whole dollar; the total shall equal the Contract Sum.
 - J. Include within each line item, a direct proportional amount of Contractor's overhead and profit.
 - K. For each part of the Work where an Application for Payment may include materials or equipment, purchased or fabricated and stored, but not yet installed, provide separate line items on the Schedule of Values for initial cost of the materials, for each subsequent stage of completion, and for total installed value of that part of the Work.
 - L. Temporary facilities and other major cost items that are not direct cost of actual work-in-place may be shown as separate line items in the Schedule of Values.
 - M. Revise schedule to list approved Change Orders, with each Application For Payment.

1.03 APPLICATIONS FOR PROGRESS PAYMENTS

- A. Payment Period: Submit at intervals stipulated in the Agreement.
- B. Form to be used: AIA G702.
- C. Forms filled out by hand will not be accepted.
- D. Initial Application for Payment: Administrative actions and submittals that must precede or coincide with submittal of the first Application for Payment include the following:
 1. List of Subcontractors.
 2. List of principal suppliers and fabricators.
 3. Schedule of Values.
 4. Contractor's Construction Schedule (preliminary if not final).
 5. Schedule of principal products.
 6. Submittal Schedule (preliminary if not final).
 7. List of Contractor's staff assignments.
 8. List of Contractor's principal consultants.
 9. Copies of building permits.
 10. Copies of authorizations and licenses from governing authorities for performance of the Work.
 11. Initial progress report.
 12. Report of pre-construction meeting.
 13. Certificates of insurance and insurance policies.
 14. Performance and payment bonds (if required).
 15. Data needed to acquire Owner's insurance.
 16. Initial settlement survey and damage report, if required.
- 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.
1. Incomplete applications will be returned without action.
- 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 three copies of each Application for Payment.
- J. Waiver Forms: Submit waivers of lien on forms, and executed in a manner, acceptable to Owner.
- K. Include the following with the application:
1. Transmittal letter as specified for Submittals in Section 01 3000.
 2. Construction progress schedule, revised and current as specified in Section 01 3216.
 3. Partial release of liens from major Subcontractors and vendors.
 4. Project record documents as specified in Section 01 7800, for review by Owner which will be returned to the Contractor.
- L. Waiver Delays: Submit each Application for Payment with the Contractor's waiver of mechanics lien for the period of construction covered by the application.
- M. When an application shows completion of an item, submit final or full waivers.
- N. When Architect requires substantiating information, submit data justifying dollar amounts in question. Provide one copy of data with cover letter for each copy of submittal. Show application number and date, and line item by number and description.
- O. Application for Payment at Substantial Completion: Following issuance of the Certificate of Substantial Completion, submit an Application for Payment; this application shall reflect any Certificates of Partial Substantial Completion issued previously for Owner occupancy of designated portions of the Work.
- P. Administrative actions and submittals that shall proceed or coincide with this application include:
1. Occupancy permits and similar approvals.
 2. Warranties (guarantees) and maintenance agreements.
 3. Test/adjust/balance records.
 4. Meter readings.
 5. Start-up performance reports.
 6. Change-over information related to Owner's occupancy, use, operation and maintenance.
 7. Final cleaning.
 8. Application for reduction of retainage, and consent of surety.
 9. Advice on shifting insurance coverages.
- Q. List of incomplete Work, recognized as exceptions to Architect's Certificate of Substantial Completion.

- R. Contractor is required to assemble and complete information required by SC Department of Health and Environmental Control for project close-out. Copies of these regulations and guidelines are available from SCDHEC or will be given to successful bidder upon start of work. Three copies of all information is required.

1.04 MODIFICATION PROCEDURES

- A. Submit name of the individual authorized to receive change documents and who will be responsible for informing others in Contractor's employ or subcontractors of changes to the Contract Documents.
- B. For minor changes not involving an adjustment to the Contract Price or Contract Time, Architect will issue instructions directly to Contractor.
- C. 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.
- D. 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 with a stipulation of any overtime work required and the period of time during which the requested price will be considered valid. Contractor shall prepare and submit a fixed price quotation within 14 days.
- E. 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 and a statement describing the effect on Work by separate or other contractors. Document any requested substitutions in accordance with Section 01 6000.
- F. 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 pre-determined unit prices and quantities, the amount will be based on the fixed unit prices.
 4. 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.
- G. Substantiation of Costs: Provide full information required for evaluation.
1. Provide 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. Support each claim for additional costs with additional information:
 - a. Origin and date of claim.
 - b. Dates and times work was performed, and by whom.
 - c. Time records and wage rates paid.
 - d. Invoices and receipts for products, equipment, and subcontracts, similarly documented.
3. 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.
- H. Execution of Change Orders: Architect will issue Change Orders for signatures of parties as provided in the Conditions of the Contract.
- I. 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.
- J. 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.
- K. Promptly enter changes in Project Record Documents.

1.05 APPLICATION FOR FINAL PAYMENT

- A. Submit final Application for Payment with or preceded by final waivers from every entity involved with performance of Work covered by the application who could lawfully be entitled to a lien.
- B. Prepare Application for Final Payment as specified for progress payments, identifying total adjusted Contract Sum, previous payments, and sum remaining due.
- C. Final Payment Application: Administrative actions and submittals which must precede or coincide with submittal of the final payment Application for Payment include the following:
 1. Completion of Project closeout requirements.
 2. Completion of items specified for completion after Substantial Completion.
 3. Assurance that unsettled claims will be settled.
 4. Assurance that Work not complete and accepted will be completed without undue delay.
 5. Transmittal of required Project construction records to Owner.
 6. Certified property survey.
 7. Proof that taxes, fees and similar obligations have been paid.
 8. Removal of temporary facilities and services.
 9. Removal of surplus materials, rubbish and similar elements.
 10. Change of door locks to Owner's access.
- D. Application for Final Payment will not be considered until the following have been accomplished:
 1. All closeout procedures specified in Section 01 7000.

END OF SECTION

SECTION 01 3000 - ADMINISTRATIVE REQUIREMENTS

PART 1 GENERAL

1.01 SECTION INCLUDES

- A. Preconstruction meeting.
- B. Progress meetings.
- C. Coordination drawings.
- D. Submittals for review, information, and project closeout.
- E. Number of copies of submittals.
- F. Submittal procedures.

1.02 PROJECT COORDINATION

- A. USC Project Manager: Christian Mergner.
- B. Cooperate with the Project Manager in allocation of mobilization areas of site; for field offices, for site access, traffic, and parking facilities.
- C. During construction, coordinate use of site and facilities through the Project Manager.
- D. Comply with Project Manager's procedures for intra-project communications; submittals, reports and records, schedules, coordination drawings, and recommendations; and resolution of ambiguities and conflicts.
- E. Comply with instructions of the Project Manager for use of temporary utilities and construction facilities.
- F. Coordinate field engineering and layout work under instructions of the Project Manager.
- G. Make the following types of submittals to Architect:
 - 1. Requests for interpretation.
 - 2. Requests for substitution.
 - 3. Shop drawings, product data, and samples.
 - 4. Test and inspection reports.
 - 5. Manufacturer's instructions and field reports.
 - 6. Applications for payment and change order requests.
 - 7. Progress schedules.
 - 8. Coordination drawings.
 - 9. Closeout submittals.

PART 2 PRODUCTS - NOT USED

PART 3 EXECUTION

3.01 PRECONSTRUCTION MEETING

- A. Owner will schedule a meeting after Notice of Award.
- B. Attendance Required:
 - 1. Owner.
 - 2. Architect.
 - 3. Contractor.
- C. Agenda:

1. Submission of list of Subcontractors, list of Products, schedule of values, and progress schedule.
 2. Designation of personnel representing the parties to Contract, Owner, and Architect.
 3. Procedures and processing of field decisions, submittals, substitutions, applications for payments, proposal request, Change Orders, and Contract closeout procedures.
 4. Scheduling.
 5. Scheduling activities of Special Inspector.
- D. Contractor to 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.

3.02 PROGRESS MEETINGS

- A. Schedule and administer meetings throughout progress of the Work at maximum weekly intervals on day and time convenient for all parties involved.
- B. Make arrangements for meetings, prepare agenda with copies for participants prior to meetings, preside at meetings.
- C. Attendance Required: Job superintendent, major Subcontractors and suppliers as appropriate to agenda topics for each meeting. The Architect and Owner may attend.
- D. Agenda:
1. Review minutes of previous meetings.
 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 status of Request for Information (RFI).
 7. Review of status of Architectural Supplemental Instructions (ASI).
 8. Review of status of proposal requests (PR).
 9. Review of status of Change Orders (CO).
 10. Review of off-site fabrication and delivery schedules.
 11. Maintenance of progress schedule.
 12. Corrective measures to regain projected schedules.
 13. Planned progress during succeeding work period.
 14. Coordination of projected progress.
 15. Maintenance of quality and work standards.
 16. Effect of proposed changes on progress schedule and coordination.
 17. Other business relating to Work.
- E. Record minutes and distribute copies within five days after meeting to participants, with three copies to Architect, one copy to Owner, participants, and those affected by decisions made.

3.03 COORDINATION DRAWINGS

- A. Review drawings prior to submission to Architect.

3.04 SUBMITTALS FOR REVIEW

- A. When the following are specified in individual sections, submit them for review:
1. Product data.

- a. When product data submittals are prepared specifically for this project (in the absence of standard printed information) submit such information as shop drawings and not as product data submittals.
 - b. Content:
 - 1) Identify the particular product being submitted; submit only pertinent pages.
 - 2) Show compliance with properties specified.
 - 3) Identify which options and accessories are applicable.
 - 4) Show compliance with the specific standards referenced.
 - 5) Show compliance with specified testing agency listings; show the limitations of their labels or seals, if any.
 - 6) Identify dimensions which have been verified by field measurement.
 - 7) Show special coordination requirements for the product.
2. Shop drawings.
 - a. Original drawings, prepared by Contractor, Subcontractor, supplier or distributor, which illustrate portion of the work, showing fabrication, layout, setting and erection details.
 - b. Do not reproduce the Contract Drawings for the shop drawing submittals. Electronic media of the Construction Documents are not available for the Contractor's Subcontractor's, or material suppliers use.
 - c. Identify details by reference to drawing sheet number(s) and pertinent detail number(s).
 - d. Shop drawings shall not include the phrase by others, except when relating to materials, products or equipment not included under the total Contract.
3. Samples.
 - a. Provide samples that are the same as proposed product.
 - b. Where products are to match a sample prepared by other entities, prepare sample to match.
 - c. Preparation:
 - 1) Attach a description to each sample.
 - 2) Attach name of manufacturer or source to each sample.
 - 3) Where compliance with specified properties is required, attach documentation showing compliance.
 - 4) Where selection is required, the first submittal may be a single set of all options; after return of submittal with selection indicated, submit standard number of sets of selected item.
 - d. Keep final sample set(s) at the project site, available for use during progress of the work.
 - e. Contractor shall be responsible for submitting all interior and exterior materials samples that require a color and/or finish selection or is required to be part of a mock up assembly at the same time. The Contractor shall include the color, finish, material selection schedule in the shop drawing submittal schedule. The Architect will provide final color, finish, and material selections only when they have all been submitted by the Contractor.
- B. Submit to Architect for review for the limited purpose of checking for conformance with information given and the design concept expressed in the contract documents.

- C. 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.

3.05 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. No action will be taken.

3.06 SUBMITTALS FOR PROJECT CLOSEOUT

- A. When the following are specified in individual sections, submit them at project closeout:
1. Project record documents.
 2. Operation and maintenance data.
 3. Warranties.
 4. Bonds.
 5. Other types as indicated.
- B. Submit for Owner's benefit during and after project completion.

3.07 NUMBER OF COPIES OF SUBMITTALS

- A. Documents for Review:
1. Small Size Sheets, Not Larger Than 8-1/2 x 11 inches (215 x 280 mm): Submit the number of copies that Contractor requires, plus two copies that will be retained by Architect.
- B. Documents for Information: Submit two copies.
- C. Documents for Project Closeout: Make one reproduction of submittal originally reviewed. Submit one extra of submittals for information.

3.08 SUBMITTAL PROCEDURES

- A. Transmit each submittal with AIA Form G810, in duplicate.
1. Submittals received without a transmittal form will be returned without review or action.
 2. Fill out a separate transmittal form for each submittal; also include the following:
 - a. Other relevant information.
 - b. Requests for additional information.
 3. Sequentially number the transmittal form. Revise submittals with original number and a sequential alphabetic suffix.
- B. Identify Project name and numbers, Contractor's, Subcontractor's or supplier's name and address, Architect's name and address, Manufacturer's name ; pertinent drawing and detail number, and specification section number, as appropriate on each copy.

- C. Apply Contractor's stamp, signed or initialed certifying that review, approval, verification of Products required, field dimensions, quantities, adjacent construction Work, and coordination of information is in accordance with the requirements of the Work and Contract Documents.
 - 1. Contractor's responsibility regarding errors and omissions in submittals is not relieved by Architect's review of submittals.
 - 2. Contractor's responsibility regarding deviations in submittals from requirements of Contract Documents is not relieved by Architect's review submittals, unless Architect gives written acceptance of specific deviations as approved by Owner.
 - 3. When work is directly related and involves more than one trade, shop drawings shall be coordinated by the submitting Contractor/Subcontractor with other trades prior submission and related work submitted under one cover.
 - a. After shop drawing has been submitted for review, no changes may be made to that Drawing other than changes resulting from review notes made by the Architect unless such changes are clearly identified and circled before being resubmitted. Any failure to comply with this requirement shall nullify and invalidate the Architect's review.
 - 4. Submittals without Contractor's stamp of review will not be reviewed and will be returned for resubmission.
- D. Submittals will be accepted from the Contractor only. Submittals received from other entities will be returned without review or action.
- E. Do not submit substitute items that have not been approved by means of the procedure specified elsewhere.
- F. Do not include requests for substitution (either direct or indirect) on submittals; comply with procedures for substitutions specified elsewhere.
- G. Schedule submittals to expedite the Project, and coordinate submission of related items.
 - 1. Prepare and submit, in accordance with the approved Project Construction Schedule, a separate document listing dates by which shop drawings, product data and samples must be submitted for each material, product or equipment item requiring submittal.
 - 2. The schedule shall reflect an orderly sequence so as to cause no delay in the Work.
 - 3. Coordinate submittals and activities that must be performed in sequence, so that the Architect has enough information to properly review the submittals.
 - 4. Coordinate submittals of different types for the same product or system so that the Architect has enough information to properly review each submittal.
 - 5. The dates indicated shall allow reasonable time for the review process of checking, correcting and resubmitting and reasonable time for procurement.
 - 6. No extension of time will be granted to the Contractor/Subcontractor because of failure to expeditiously submit shop drawings and samples in reasonable time to allow for review process.
 - 7. For each submittal for review, allow 15 days excluding delivery time to and from the Contractor. Architect shall review with reasonable promptness.
- H. Identify variations from Contract Documents and Product or system limitations that may be detrimental to successful performance of the completed Work.

- I. Provide space for Contractor and Architect review stamps. Submittals to receive Architect's action marking: Provide blank space on the label or on the submittal itself for action marking; 4 inches wide by 6 inches high.
- J. Do not commence work which requires review of any submittals until receipt of returned submittals with an acceptable action.
 - 1. Stamped Reviewed, no corrections or resubmissions required, fabrication may proceed.
 - 2. Stamped Revise and Resubmit.
 - a. If Contractor/Subcontractor complies with noted corrections, fabrication may proceed.
 - 3. If for any reason the Contractor/Subcontractor cannot comply with the noted corrections, fabrication shall not proceed and Contractor/Subcontractor shall resubmit, following procedures outlined herein before.
 - 4. Stamped Revise and Resubmit or Resubmit.
 - a. Contractor/Subcontractor shall revise and resubmit for review. Fabrication shall not proceed.
- K. When revised for resubmission, identify all changes made since previous submission.
- L. Distribute reviewed submittals as appropriate. Instruct parties to promptly report any inability to comply with requirements.
- M. Submittals not requested will not be recognized or processed.

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.
- C. Reports.

1.02 SUBMITTALS

- A. Within 7 days after date established in Notice to Proceed, submit preliminary schedule defining planned operations for the first 45 days of Work, with a general outline for remainder of Work.
- B. If preliminary schedule requires revision after review, submit revised schedule within 3 working days.
- C. Within 10 days after date established in Notice to Proceed, submit draft of proposed complete schedule for review.
 - 1. Include written certification that major contractors have reviewed and accepted proposed schedule.
- D. Within 3 days after Architect's review, submit complete schedule.
- E. Submit Daily Construction Reports every week.
- F. Submit updated schedule and Progress Reports with each Application for Payment.
- G. Submit the number of opaque reproductions that Contractor requires, plus three copies that will be retained by Architect.
- H. Submit under transmittal letter form specified in Section 01 3000.

1.03 QUALITY ASSURANCE

- A. Scheduler: Contractor's personnel or specialist Consultant specializing in CPM scheduling with one years minimum experience in scheduling construction work of a complexity comparable to this Project, and having use of computer facilities capable of delivering a detailed graphic printout within 48 hours of request.

1.04 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. Diagram Sheet Size: Maximum 22 x 17 inches (560 x 432 mm) or width required.
- C. Sheet Size: Multiples of 8-1/2 x 11 inches (216 x 280 mm).
- D. Scale and Spacing: To allow for notations and revisions.

1.05 COORDINATION

- A. In preparation of schedules, take into account the time allowed or required for the Architect's administrative procedures.

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. Provide full description of work in each phase and overall impact of phasing on the project.
- C. Identify each item by specification section number.
- D. Identify work of separate stages and other logically grouped activities.
- E. Provide sub-schedules to define critical portions of the entire schedule.
- F. Include conferences and meetings in schedule.
- G. Show accumulated percentage of completion of each item, and total percentage of Work completed, as of the first day of each month.
- H. Provide separate schedule of submittal dates for shop drawings, product data, and samples, owner-furnished products, Products identified under Allowances, and dates reviewed submittals will be required from Architect. Indicate decision dates for selection of finishes.
- I. Indicate delivery dates for owner-furnished products.
- J. Coordinate content with schedule of values specified in Section 01 2000.
- K. Provide legend for symbols and abbreviations used.
- L. Use the same terminology as that used in the Contract Documents.

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.
- C. Coordinate each element on the schedule with other construction activities.
- D. Show activities in proper sequence.
- E. Include cost bar at top of chart, showing estimated and actual costs of work performed at the date of each application for payment.
- F. Use vertical lines to mark the time scale at not more than one week intervals.

3.04 CONTRACTOR'S CONSTRUCTION SCHEDULE

- A. Provide construction schedule in the form of bar charts:
 - 1. Use the same items of work as shown in the schedule of values.
 - 2. Where related activities must be performed in sequence, show relationship graphically.
 - 3. Incorporate the submittal schedule specified elsewhere.
 - 4. Incorporate the quality control activities schedule specified elsewhere.
 - 5. Show dates of:
 - a. Each activity that influences the construction time.
 - b. Preconstruction meeting.

- c. Ordering dates for products requiring long lead time.
 - d. Completion of demolition for each phase.
 - e. Completion of mechanical work for each phase.
 - f. Completion of electrical work for each phase.
 - g. Instruction of the Owner's personnel in operation and maintenance of equipment and systems.
 - h. Substantial and final completion of each phase, with time frames for the Architect's completion procedures and owner move in dates.
6. In developing the schedule take into account:
- a. Continued occupancy of areas adjacent to the work area as well as throughout the building.
 - b. Interruption of services to occupied facilities
 - c. The owner will require a week to move staff between phases of the project.
 - d. Each phase will require Certificate of Occupancy from the Office of the State Engineer.
 - e. Each phase will have a punch list produced and must be completed prior to the owner's acceptance of the space and occupancy.
 - f. Site limitations

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. Annotate 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 progress reports required to support recommended changes.

3.06 DISTRIBUTION OF SCHEDULE

- A. Distribute copies of updated schedules and reports 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 shown in schedules.

3.07 REPORTS

- A. Daily Construction Logs: Every day, record the following information concerning events at the site:
 - 1. Approximate number of persons at the site.
 - 2. Visitors to the site.
 - 3. Modifications to the contract received; modifications implemented.
 - 4. Changes in occupancy.
 - 5. Delays; reasons for delay.
 - 6. Emergencies and accidents.
 - 7. Equipment and system start-ups and tests.

8. Losses of material and property.
 9. Meetings held and significant decisions made there.
 10. Names of Subcontractors at site.
 11. Orders and requests of representatives of governing authorities.
 12. Unusual events.
 13. Utility service disconnections and connections.
- B. Progress Reports: Prepare a narrative report describing the general state of completion of the work and describing in detail the following:
1. Actual and anticipated delays, their impact on the schedule, and corrective actions taken or proposed.
 2. Actual and potential problems.
 3. Status of change order work.
 4. Effect of delays, problems, and changes on the schedules of Subcontractors.
 5. Outstanding change proposal requests.
 6. Status of corrective work ordered by the Architect

END OF SECTION

SECTION 01 4000 - QUALITY REQUIREMENTS

PART 1 GENERAL

1.01 SECTION INCLUDES

- A. References and standards.
- B. Mock-ups.
- C. Control of installation.
- D. Tolerances.
- E. Testing and inspection services.
- F. Manufacturers' field services.

1.02 SUBMITTALS

- A. Design Data: Submit for Architect's knowledge as contract administrator for the limited purpose of assessing conformance with information given and the design concept expressed in the contract documents, or for Owner's information.
- B. Test Reports: After each test/inspection, promptly submit two copies of report to Architect and to Contractor.
 - 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. Conformance 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 conformance 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 conforms to or exceeds specified requirements. Submit supporting reference data, affidavits, and certifications as appropriate.
- 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 10 days of observation to Architect for information.
 2. Submit for information for the limited purpose of assessing conformance with information given and the design concept expressed in the contract documents.
- F. Erection Drawings: Submit drawings for Architect's benefit as contract administrator or for Owner.
1. Submit for information for the limited purpose of assessing conformance with information given and the design concept expressed in the contract documents.
 2. Data indicating inappropriate or unacceptable Work may be subject to action by Architect or Owner.

1.03 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. Conform to 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. Maintain copy at project site during submittals, planning, and progress of the specific work, until Substantial Completion.
- E. Should specified reference standards conflict with Contract Documents, request clarification from Architect before proceeding.
- F. Neither the contractual relationships, duties, or responsibilities of the parties in Contract nor those of Architect shall be altered from the Contract Documents by mention or inference otherwise in any reference document.

1.04 TESTING AND INSPECTION AGENCIES

- A. Owner will employ and pay for services of an independent testing agency to perform other specified testing.
- B. Employment of agency in no way relieves Contractor of obligation to perform Work in accordance with requirements of Contract Documents.

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. Tests will be performed under provisions identified in this section and identified in the respective product specification sections.
- B. Assemble and erect specified items with specified attachment and anchorage devices, flashings, seals, and finishes.
- C. Accepted mock-ups shall be a comparison standard for the remaining Work.
- D. Where mock-up has been accepted by Architect and is specified in product specification sections to be removed, remove mock-up and clear area when directed to do so.

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 required.
- B. Testing Agency Duties:
 - 1. Test samples of mixes 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-conformance of Work or products.
 - 6. Perform additional tests and inspections required by Architect.
 - 7. 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-conformance to specified requirements shall be performed by the same agency on instructions by Architect.
- F. Re-testing required because of non-conformance to 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 of 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 conforming to 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 5000 - TEMPORARY FACILITIES AND CONTROLS

PART 1 GENERAL

1.01 SECTION INCLUDES

- A. Temporary sanitary facilities.
- B. Waste removal facilities and services.
- C. Campus Policy

1.02 SUBMITTALS

- A. Implementation and Termination Schedule: Submit a schedule indicating implementation and termination of each temporary utility connection within 10 days of the date established for commencement of the Work.

1.03 QUALITY ASSURANCE

- A. Regulations: Comply with industry standards and applicable laws and regulations if authorities having jurisdiction, including but not limited to:
 - 1. Building Code requirements.
 - 2. Health and safety regulations.
 - 3. Utility company regulations.
 - 4. Police, Fire Department and Rescue Squad rules.
 - 5. Environmental protection regulations.
- B. Standards: Comply with NFPA Code 241, "Building Construction and Demolition Operations", ANSI-A10 Series standards for "Safety Requirements for Construction and Demolition", and NECA Electrical Design Library, "Temporary Electrical Facilities."
- C. Electrical Service: Comply with NEMA, NECA and UL standards and regulations for temporary electric service. Install service in compliance with National Electric Code (NFPA 70).
- D. Inspections: Arrange for authorities having jurisdiction to inspect and test each temporary utility before use. Obtain required certifications and permits.

1.04 PROJECT CONDITIONS

- A. Temporary Utilities: Prepare a schedule indicating dates for implementation and termination of each temporary utility connection. At the earliest feasible time, when acceptable to the Owner, change over from use of temporary service to use of the permanent service.

1.05 MATERIALS

- A. General: Provide new materials; if acceptable to the Architect, undamaged previously used materials in serviceable condition may be used. Provide materials suitable for the use intended.
- B. Gypsum Wallboard: Provide gypsum wallboard complying with requirements of ASTM C 36 on interior walls of temporary offices.
- C. Paint: Comply with requirements of Division-9 Section "Paints and Coatings."
- D. Water: Provide potable water approved by local health authorities.

1.06 EQUIPMENT

- A. General: Provide new equipment; if acceptable to the Architect, undamaged, previously used equipment in serviceable condition may be used. Provide equipment suitable for use intended.
- B. Water Hoses: Provide 3/4" heavy-duty, abrasion-resistant, flexible rubber hoses 100 ft. long, with pressure rating greater than the maximum pressure of the water distribution system; provide adjustable shut-off nozzles at hose discharge.
- C. Electrical Outlets: Provide properly configured NEMA polarized outlets to prevent insertion of 110-120 volt plugs into higher voltage outlets. Provide receptacle outlets equipped with ground-fault circuit interrupters, reset button and pilot light, for connection of power tools and equipment.
- D. Electrical Power Cords: Provide grounded extension cords; use "hard-service" cords where exposed to abrasion and traffic. Provide waterproof connectors to connect separate lengths of electric cords, if single lengths will not reach areas where construction activities are in progress.
- E. Lamps and Light Fixtures: Provide general service incandescent lamps of wattage required for adequate illumination. Provide guard cages or tempered glass enclosures, where exposed to breakage. Provide exterior fixtures where exposed to moisture.
- F. Heating Units: Provide temporary heating units that have been tested and labeled by UL, FM or another recognized trade association related to the type of fuel being consumed.
- G. Temporary Offices: Locate office within the construction site as directed by Owner.
- H. Temporary Toilet Units: Provide and maintain temporary portable units. Location as directed by owner.
- I. First Aid Supplies: Comply with governing regulations. All accidents or injuries shall be reported to Owner.
- J. Fire Extinguishers: Provide hand-carried, portable UL-rated, class "A" fire extinguishers for temporary offices and similar spaces. In other locations provide hand-carried, portable, UL-rated, class "ABC" dry chemical extinguishers, or a combination of extinguishers of NFPA recommended classes for the exposures.
- K. Comply with NFPA 10 and 241 for classification, extinguishing agent and size required by location and class of fire exposure.
- L. Conditions of Use: Keep temporary services and facilities clean and neat in appearance. Operate in a safe and efficient manner. Take necessary fire prevention measures. Do not overload facilities, or permit them to interfere with progress. Do not allow hazardous dangerous or unsanitary conditions, or public nuisances to develop or persist on the site

1.07 TEMPORARY UTILITIES

- A. Existing facilities may be used.

1.08 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.

1.09 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, to allow for owner's use of site and to protect existing facilities and adjacent properties from damage from construction operations and demolition.
- B. Provide barricades and covered walkways required by governing authorities for public rights-of-way and for public access to existing building.
- C. Provide protection for plants designated to remain. Replace damaged plants.
- D. Protect non-owned vehicular traffic, stored materials, site, and structures from damage.

1.10 EXTERIOR ENCLOSURES

- A. Provide temporary insulated 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.

1.11 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 closed joints and sealed edges at intersections with existing surfaces:
 - 1. STC rating of 35 in accordance with ASTM E90.
 - 2. Maximum flame spread rating of 75 in accordance with ASTM E84.
- C. Paint surfaces exposed to view from Owner-occupied areas.

1.12 SECURITY

- A. Provide security and facilities to protect Work, existing facilities, and Owner's operations from unauthorized entry, vandalism, or theft.
- B. Except for use of permanent fire protection as soon as available, do not change over from use of temporary security and protection facilities to permanent facilities until Substantial Completion, or longer as requested by the Architect.
- C. Temporary Fire Protection: Until fire protection needs are supplied by permanent facilities, install and maintain temporary fire protection facilities of the types needed to protect against reasonably predictable and controllable fire losses. Comply with NFPA 10 "Standard for Portable Fire Extinguishers," and NFPA 241 "Standard for Safeguarding Construction, Alterations and Demolition Operations."
- D. Store combustible materials in containers in fire-safe locations
- E. Maintain unobstructed access to fire extinguishers, fire hydrants, temporary fire protection facilities for fighting fires. Prohibit smoking in the building.
- F. Provide supervision of welding operations, combustion type temporary heating units, and similar sources of fire ignition.

- G. Security Enclosure and Lockup: Install substantial temporary enclosure of partially completed areas of construction. Provide locking entrances to prevent unauthorized entrance, vandalism, theft and similar violations of security.
- H. Environmental Protection: Provide protection, operate temporary facilities and conduct construction in ways and by methods that comply with environmental regulations, and minimize the possibility that air, might be contaminated or polluted, or that other undesirable effects might result.
- I. Coordinate with Owner's security program.

1.13 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. Designated existing on-site roads may be used for construction traffic.
- F. Provide temporary parking areas to accommodate construction personnel. When site space is not adequate, provide additional off-site parking.
- G. Existing parking areas may be used for construction parking as directed by Owner.

1.14 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.
- C. If materials to be recycled or re-used on the project must be stored on-site, provide suitable non-combustible containers; locate containers holding flammable material outside the structure unless otherwise approved by the authorities having jurisdiction.
- D. Open free-fall chutes are not permitted. Terminate closed chutes into appropriate containers with lids.

1.15 CAMPUS POLICY

- A. Smoking is not allowed on campus. The campus is smoke free and smoking is strictly prohibited.
- B. Food and canned or bottled drinks are prohibited in the areas of interior construction work. Contractor shall provide designated areas for water stations and consumption of food.
- C. Workers not complying with these requirements shall be subject to dismissal.

1.16 REMOVAL OF UTILITIES, FACILITIES, AND CONTROLS

- A. Remove temporary utilities, equipment, facilities, materials, prior to Substantial Completion inspection.
- B. Clean and repair damage caused by installation or use of temporary work.
- C. Restore existing facilities used during construction to original condition.

- D. Restore new permanent facilities used during construction to specified condition.

END OF SECTION

SECTION 01 6000 - PRODUCT REQUIREMENTS

PART 1 GENERAL

1.01 SECTION INCLUDES

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

1.02 REFERENCE STANDARDS

- A. NFPA 70 - National Electrical Code; National Fire Protection Association; Most Recent Edition Adopted by Authority Having Jurisdiction, Including All Applicable Amendments and Supplements.

1.03 SUBMITTALS

- A. Proposed Products List: Submit list of major products proposed for use, with name of manufacturer, trade name, and model number of each product.
 - 1. Submit within 15 days after date of Agreement.
 - 2. For products specified only by reference standards, list applicable reference standards.
- B. 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.
- C. 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.
- D. 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 the Contract Documents.
- B. Unforeseen historic items encountered remain the property of the Owner; notify Owner promptly upon discovery; protect, remove, handle, and store as directed by Owner.
- C. 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.
- D. Reused Products: Reused products include materials and equipment previously used in this or other construction, salvaged and refurbished as specified.

2.02 NEW PRODUCTS

- A. Provide new products unless specifically required or permitted by the Contract Documents.
- B. Where all other criteria are met, Contractor shall give preference to products that:
 - 1. Are extracted, harvested, and/or manufactured closer to the location of the project.
 - 2. Have longer documented life span under normal use.
 - 3. Result in less construction waste.
- C. Provide interchangeable components of the same manufacture for components being replaced.
- D. Motors: Refer to Section 22 0513, NEMA MG 1 Type. Specific motor type is specified in individual specification sections.
- E. Wiring Terminations: Provide terminal lugs to match branch circuit conductor quantities, sizes, and materials indicated. Size terminal lugs to NFPA 70, include lugs for terminal box.
- F. Cord and Plug: Provide minimum 6 foot (2 m) cord and plug including grounding connector for connection to electric wiring system. Cord of longer length is specified in individual specification sections.

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 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 to Project site; obtain receipt prior to final payment.

PART 3 EXECUTION

3.01 SUBSTITUTION PROCEDURES

- A. Instructions to Bidders specify time restrictions for submitting requests for substitutions during the bidding period. Comply with requirements specified in this section.
- B. Substitutions may be considered when a product becomes unavailable through no fault of the Contractor.
- C. Document each request with complete data substantiating compliance of proposed substitution with Contract Documents.
- D. A request for substitution 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.
 - 2. Will provide the same warranty for the substitution as for the specified product.
 - 3. Will coordinate installation and make changes to other Work that may be required for the Work to be complete with no additional cost to Owner.
 - 4. Waives claims for additional costs or time extension that may subsequently become apparent.

5. Will reimburse Owner and Architect for review or redesign services associated with re-approval by authorities.
- E. Substitutions will not be considered when they are indicated or implied on shop drawing or product data submittals, without separate written request, or when acceptance will require revision to the Contract Documents.
- F. Substitution Submittal Procedure:
 1. Submit three copies of request for substitution for consideration. Limit each request to one proposed substitution.
 2. Submit shop drawings, product data, and certified test results attesting to the proposed product equivalence. Burden of proof is on proposer.
 3. The Architect will notify Contractor in writing of decision to accept or reject request.
- G. Substitution Request Form:
 1. SUBSTITUTIONS WILL BE CONSIDERED ONLY WHEN THE ATTACHED FORM IS COMPLETED AND INCLUDED WITH THE SUBMITTAL WITH ALL BACK-UP DATA.

3.02 OWNER-SUPPLIED PRODUCTS

- A. See Section 01 1000 - Summary for identification of Owner-supplied products.
- B. Owner's Responsibilities:
 1. Arrange for and deliver Owner reviewed shop drawings, product data, and samples, to Contractor.
 2. Arrange and pay for product delivery to site.
 3. On delivery, inspect products jointly with Contractor.
 4. Submit claims for transportation damage and replace damaged, defective, or deficient items.
 5. Arrange for manufacturers' warranties, inspections, and service.
- C. Contractor's Responsibilities:
 1. Review Owner reviewed shop drawings, product data, and samples.
 2. Receive and unload products at site; inspect for completeness or damage jointly with Owner.
 3. Handle, store, install and finish products.
 4. Repair or replace items damaged after receipt.

3.03 TRANSPORTATION AND HANDLING

- A. Coordinate schedule of product delivery to designated prepared areas in order to minimize site storage time and potential damage to stored materials.
- B. Transport and handle products in accordance with manufacturer's instructions.
- C. Transport materials in covered trucks to prevent contamination of product and littering of surrounding areas.
- D. Promptly inspect shipments to ensure that products comply with requirements, quantities are correct, and products are undamaged.
- E. Provide equipment and personnel to handle products by methods to prevent soiling, disfigurement, or damage.
- F. Arrange for the return of packing materials, such as wood pallets, where economically feasible.

3.04 STORAGE AND PROTECTION

- A. Designate receiving/storage areas for incoming products so that they are delivered according to installation schedule and placed convenient to work area in order to minimize waste due to excessive materials handling and misapplication.
- B. Store and protect products in accordance with manufacturers' instructions.
- C. Store with seals and labels intact and legible.
- D. Store sensitive products in weather tight, climate controlled, enclosures in an environment favorable to product.
- E. For exterior storage of fabricated products, place on sloped supports above ground.
- F. Provide bonded off-site storage and protection when site does not permit on-site storage or protection.
- G. Cover products subject to deterioration with impervious sheet covering. Provide ventilation to prevent condensation and degradation of products.
- H. Store loose granular materials on solid flat surfaces in a well-drained area. Prevent mixing with foreign matter.
- I. Prevent contact with material that may cause corrosion, discoloration, or staining.
- J. Provide equipment and personnel to store products by methods to prevent soiling, disfigurement, or damage.
- K. 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, except removal, disposal, and/or remediation of hazardous materials and toxic substances.
- 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. Closeout procedures, except payment procedures.
- I. General requirements for maintenance service.

1.02 SUBMITTALS

- A. See Section 01 3000 - Administrative Requirements, for submittal procedures.
- B. Demolition Plan: Submit demolition plan as specified by OSHA and local authorities.
 - 1. Indicate extent of demolition, removal sequence, bracing and shoring, and location and construction of barricades and fences. Include design drawings and calculations for bracing and shoring.
 - 2. Identify demolition firm and submit qualifications.
 - 3. Include a summary of safety procedures.
- C. 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.
 - f. Effect on work of Owner or separate Contractor.
 - g. Written permission of affected separate Contractor.
 - h. Date and time work will be executed.
- D. Project Record Documents: Accurately record actual locations of capped and active utilities.

1.03 PROJECT CONDITIONS

- A. Use of explosives is not permitted.

- B. Provide methods, means and facilities to prevent water intrusion into new construction and renovations. Eliminate standing water immediately. Remove wet materials and replace with new.
- C. Ventilate enclosed areas to assist cure of materials, to dissipate humidity, and to prevent accumulation of dust, fumes, vapors, or gases.
- D. 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.
 - 1. Provide dust-proof enclosures to prevent entry of dust generated outdoors.
 - 2. Provide dust-proof barriers between construction areas and areas continuing to be occupied by Owner.
 - 3. Clean interior spaces prior to the start of the finish painting and continue cleaning on an as-needed basis until painting is finished.
 - 4. Schedule operations so that dust and other contaminants resulting from cleaning process will not fall on wet or newly-coated surfaces.
 - 5. Handle materials in a controlled manner with as little handling as possible; do not drop or throw materials from heights.
- E. Noise Control: Provide methods, means, and facilities to minimize noise produced by construction operations.
 - 1. Outdoors: Limit conduct of especially noisy exterior work to the hours of 8 am to 5 pm.
- F. Pest and Rodent Control: Provide methods, means, and facilities to prevent pests and insects from damaging the work.
- G. Rodent Control: Provide methods, means, and facilities to prevent rodents from accessing or invading premises.
- H. 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.

1.04 COORDINATION

- A. See Section 01 1000 for occupancy-related requirements.
- B. 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, with provisions for accommodating items installed later.
- C. Notify affected utility companies and comply with their requirements.
- D. 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.
- E. Coordinate space requirements, supports, and installation of mechanical and electrical work that are indicated diagrammatically on Drawings. Follow routing shown for pipes, ducts, and conduit, as closely as practicable; place runs parallel with lines of building. Utilize spaces efficiently to maximize accessibility for other installations, for maintenance, and for repairs.
- F. In finished areas except as otherwise indicated, conceal pipes, ducts, and wiring within the construction. Coordinate locations of fixtures and outlets with finish elements.

- G. Coordinate completion and clean-up of work of separate sections.
- H. After Owner occupancy of premises, coordinate access to site for correction of defective work and work not in accordance with Contract Documents, to minimize disruption of Owner's activities.

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.
- C. Product Substitution: For any proposed change in materials, submit request for substitution described in Section 01 6000.

PART 3 EXECUTION

3.01 EXAMINATION

- A. Examine and verify specific conditions described in individual specification sections.
- B. Take field measurements before confirming product orders or beginning fabrication, to minimize waste due to over-ordering or misfabrication.
- C. Verify that utility services are available, of the correct characteristics, and in the correct locations.
- D. 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. When required in individual specification sections, convene a preinstallation meeting at the site prior to commencing work of the section.
- B. Require attendance of parties directly affecting, or affected by, work of the specific section.
- C. Notify Architect four days in advance of meeting date.
- D. Prepare agenda and preside at meeting:
 - 1. Review conditions of examination, preparation and installation procedures.
 - 2. Review coordination with related work.
- E. Record minutes and distribute copies within two days after meeting to participants, with two copies to Architect, Owner, participants, and those affected by decisions made.

3.04 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.

3.05 ALTERATIONS

- A. Drawings showing existing construction and utilities are based on casual field observation and existing record documents only.
 - 1. Verify that construction and utility arrangements are as shown.
 - 2. Report discrepancies to Architect before disturbing existing installation.
 - 3. Beginning of alterations work constitutes acceptance of existing conditions.
- B. Keep areas in which alterations are being conducted separated from other areas that are still 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; take care to prevent water and humidity damage.
 - 1. Where openings in exterior enclosure exist, provide construction to make exterior enclosure weatherproof.
 - 2. Insulate existing ducts or pipes that are exposed to outdoor ambient temperatures by alterations work.
- D. Remove existing work as indicated and as required to accomplish new work.
 - 1. Remove rotted wood, corroded metals, and deteriorated masonry and concrete; replace with new construction specified.
 - 2. Remove items indicated on drawings.
 - 3. Relocate items indicated on drawings.
 - 4. Where new surface finishes are to be applied to existing work, perform removals, patch, and prepare existing surfaces as required to receive new finish; remove existing finish if necessary for successful application of new finish.
 - 5. Where new surface finishes are not specified or indicated, patch holes and damaged surfaces to match adjacent finished surfaces as closely as possible.
- E. Services (Including but not limited to HVAC, Plumbing, Electrical, and Telecommunications): Remove, relocate, and extend existing systems to accommodate new construction.
 - 1. Maintain existing active systems that are to remain in operation; maintain access to equipment and operational components; if necessary, modify installation to allow access or provide access panel.
 - 2. Where existing systems or equipment are not active and Contract Documents require reactivation, put back into operational condition; repair supply, distribution, and equipment as required.

3. Where existing active systems serve occupied facilities but are to be replaced with new services, maintain existing systems in service until new systems are complete and ready for service.
 - a. Disable existing systems only to make switchovers and connections; minimize duration of outages.
 - b. See Section 01 1000 for other limitations on outages and required notifications.
 - c. Provide temporary connections as required to maintain existing systems in service.
 4. Verify that abandoned services serve only abandoned facilities.
 5. Remove abandoned pipe, ducts, conduits, and equipment, including those above accessible ceilings; remove back to source of supply where possible, otherwise cap stub and tag with identification; patch holes left by removal using materials specified for new construction or match existing adjacent construction materials.
- F. Protect existing work to remain.
1. Prevent movement of structure; provide shoring and bracing if necessary.
 2. Perform cutting to accomplish removals neatly and as specified for cutting new work.
 3. Repair adjacent construction and finishes damaged during removal work.
- G. Adapt existing work to fit new work: Make as neat and smooth transition as possible.
- H. When existing finished surfaces are cut so that a smooth transition with new work is not possible, terminate existing surface along a straight line at a natural line of division and make recommendation to Architect.
- I. Where removal of partitions or walls results in adjacent spaces becoming one, rework floors, walls, and ceilings to a smooth plane without breaks, steps, or bulkheads.
- J. Where a change of plane of 1/4 inch (6 mm) or more occurs in existing work, submit recommendation for providing a smooth transition for Architect review and request instructions.
- K. Trim existing wood doors as necessary to clear new floor finish. Refinish trim as required.
- L. Patching: Where the existing surface is not indicated to be refinished, patch to match the surface finish that existed prior to cutting. Where the surface is indicated to be refinished, patch so that the substrate is ready for the new finish.
- M. Refinish existing surfaces as indicated:
- N. Where rooms or spaces are indicated to be refinished, refinish all visible existing surfaces to remain to the specified condition for each material, with a neat transition to adjacent finishes.
- O. If mechanical or electrical work is exposed accidentally during the work, re-cover and refinish to match.
- P. Clean existing systems and equipment.
- Q. Remove demolition debris and abandoned items from alterations areas and dispose of off-site; do not burn or bury.
- R. Do not begin new construction in alterations areas before demolition is complete.
- S. Comply with all other applicable requirements of this section.

3.06 CUTTING AND PATCHING

- A. Whenever possible, execute the work by methods that avoid cutting or patching.

- B. See Alterations article above for additional requirements.
- C. 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-conforming work.
- D. 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.
- E. Employ original installer to perform cutting for weather exposed and moisture resistant elements, and sight exposed surfaces.
- F. Cut rigid materials using masonry saw or core drill. Pneumatic tools not allowed without prior approval.
- G. Restore work with new products in accordance with requirements of Contract Documents.
- H. Fit work air tight to pipes, sleeves, ducts, conduit, and other penetrations through surfaces.
- I. 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.
- J. 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.
- K. Meet with management staff of the area of construction for required infection control practices in that department and comply with the Owner's policies.

3.07 PROGRESS CLEANING

- A. Conduct cleaning and disposal operations to comply with codes, ordinances, regulations, and anti-pollution laws.
- B. Contractor shall assess the amount of air borne dust and debris for construction and apprise the Owner of the need to change the air filtration filters in the air handling system at an increased frequency.
- C. Maintain areas free of waste materials, debris, and rubbish. Maintain site in a clean and orderly condition.
- D. Remove debris and rubbish from pipe chases, plenums, attics, crawl spaces, and other closed or remote spaces, prior to enclosing the space.

- E. Broom and vacuum clean interior areas prior to start of surface finishing, and continue cleaning to eliminate dust.
- F. Collect and remove waste materials, debris, and rubbish from site periodically and dispose off-site.
- G. Do not dispose of volatile wastes such as mineral spirits, oil or paint thinner in storm or sanitary drains.

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. Provide protective coverings at walls, projections, jambs, sills, and soffits of openings.
- E. Protect finished floors, stairs, and other surfaces from traffic, dirt, wear, damage, or movement of heavy objects, by protecting with durable sheet materials.
- 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. Prohibit traffic from landscaped areas.
- H. Remove protective coverings when no longer needed; reuse or recycle plastic coverings if possible.

3.09 SYSTEM STARTUP

- A. Coordinate schedule for start-up of various equipment and systems.
- B. Notify Architect and owner seven days prior to start-up of each item.
- C. Verify that each piece of equipment or system has been checked for proper lubrication, drive rotation, belt tension, control sequence, 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 and manufacturer's representative in accordance with manufacturers' instructions.
- G. Submit a written report that equipment or system has been properly installed and is functioning correctly.

3.10 ADJUSTING

- A. Adjust operating products and equipment to ensure smooth and unhindered operation.
- B. Testing, adjusting, and balancing HVAC systems: See Section 23 0593.

3.11 FINAL CLEANING

- A. Employ skilled workmen for final cleaning.
- B. Materials:

1. Use only those cleaning materials which will not create hazards to health or property and which will not damage surfaces.
 2. Use only those cleaning materials and methods recommended by manufacturer of the surface material to be cleaned.
 3. Use cleaning materials only on surfaces recommended by cleaning material manufacturer.
 4. Sweeping compounds used in cleaning operations shall leave no residue on concrete floor surfaces that may effect installation of finish flooring materials.
- C. Execute final cleaning prior to final project assessment.
1. Clean areas to be occupied by Owner prior to final completion before Owner occupancy.
- D. Use cleaning materials that are nonhazardous.
- E. 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.
- F. Remove all labels that are not permanent. Do not paint or otherwise cover fire test labels or nameplates on mechanical and electrical equipment.
- G. Remove grease, mastic, adhesives, dust, dirt, stains, fingerprints, labels, and other foreign materials from sight-exposed interior surfaces.
- H. Clean equipment and fixtures to a sanitary condition with cleaning materials appropriate to the surface and material being cleaned.
- I. Dust cabinetwork and remove markings.
- J. Prior to final completion, or Owner occupancy, the Contractor shall conduct an inspection of sight-exposed interior surfaces, and all work areas, to verify that the entire Work is clean
- K. Tunnels and closed off spaces shall be cleaned of packing boxes, wood frame members and other waste materials used in the construction.
- L. The entire system of piping and equipment shall be cleaned internally. The Contractor installing those items shall open all dirt pockets and strainers, completely blowing down as required and clean strainer screens of all accumulated debris.
- M. Tanks, fixtures and pumps shall be drained and proved free of sludge and accumulated matter.
- N. Temporary labels, stickers, etc., shall be removed from fixtures and equipment. (Do not remove permanent name plates, equipment model numbers, ratings, etc.)
- O. Heating and air conditioning equipment, tanks, pumps and traps shall be thoroughly cleaned and new filters or filter media installed.
- P. Before being placed in service, domestic water distribution systems, including those for cold water, drinking water and the hot water system shall be chlorinated. The method to be used shall be at the option of the Contractor installing the systems, and one of the methods set forth in the AWWA Standard specifications, latest edition, including all amendments thereto. The treatment shall consist of a solution of not less than 50 parts per million of available chlorine. The chlorinating material shall be either liquid chlorine or sodium hypochloride. After sterilization the system shall be flushed with clear water until the chlorine residual is not greater than 0.2 per million.
- Q. Clean filters of operating equipment.

- R. Remove waste, surplus materials, trash/rubbish, and construction facilities from the site; dispose of in legal manner; do not burn or bury.

3.12 CLOSEOUT PROCEDURES

- A. Contract requirements shall be met when construction activities have successfully produced, in this order, these three terminal activities:
1. Substantial Completion.
 2. Final Completion.
 3. Final Payment.
- B. Make submittals that are required by governing or other authorities.
1. Provide copies to Architect and Owner.
- C. Substantial Completion:
1. The date of Substantial Completion of the Work or designated portion thereof is the date certified by the Architect when construction is sufficiently complete, in accordance with the Contract Documents, so the Owner may occupy the Work or designated portion thereof for the use for which it is intended.
 2. When the Contractor considers the Work is substantially complete, he shall submit to the Architect:
 - a. A written notice that the Work, or designated portion thereof, is substantially complete.
 - b. A list of items to be completed or corrected, (herein after referred to as Punch List).
 - c. Request Substantial Completion Observation at a mutually agreeable date.
 3. Within a reasonable time after receipt of such notice, the Architect, the Contractor, and at his option, the Owner, will make an observation to determine the status of completion.
 4. Should the Architect determine that the Work is not substantially complete:
 - a. The Architect will promptly notify the Contractor in writing, giving the reasons thereof.
 - b. The Contractor shall remedy the deficiencies in the Work, and send a second written notice of substantial completion to the Architect.
 - c. The Architect will re-observe the Work and the cost of the Architect's time and reimbursable expenses will be charged to the Contractor.
 5. When the Architect concurs that the Work is substantially complete, he will:
 - a. Prepare a Certificate of Substantial Completion on AIA Form G704, accompanied by the Contractor's Punch List of items to be completed or corrected, as verified and amended by the Architect. (Note: Contract responsibilities are not altered by inclusion or omission of required work from the Punch List.)
 - b. Submit the Certificate to the Owner and the Contractor for their written acceptance of the responsibilities assigned to them in the Certificate.
 6. The Contractor shall complete or correct all items identified on the Punch List and required by the Contract requirements within time limits established by the Certificate.
 7. Notify Architect when work is considered ready for Substantial Completion.
 8. Submit written certification that Contract Documents have been reviewed, work has been inspected, and that work is complete in accordance with Contract Documents and ready for Architect's review.
 9. Owner will occupy portions of the building as specified in Section 01 1000.

10. Correct items of work listed in executed Certificates of Substantial Completion and comply with requirements for access to Owner-occupied areas.
- D. Final Completion:
1. To attain final completion the Contractor shall complete activities pertaining to Substantial Completion, and complete work on punch list items. Only then shall he issue written request to the Architect for Final Observation.
 2. When the Contractor considers the Work is complete, he shall submit written certification that:
 - a. Contract Documents have been reviewed.
 - b. Work has been inspected for compliance with Contract Documents.
 - c. Work has been completed in accordance with Contract Documents.
 - d. Equipment and systems have been tested in the presence of the Owner's representative and are operational.
 - e. Work is completed and ready for final observation.
 3. The Architect, the Contractor and the Owner will make an observation to verify the status of completion with reasonable promptness after receipt of such certification.
 4. Should the Architect consider that the Work is incomplete or defective:
 - a. The Architect will promptly notify the Contractor in writing, listing the incomplete or defective work.
 - b. The Contractor shall take immediate steps to remedy the stated deficiencies, and send a second written certification to the Architect that the Work is complete.
 - c. The Architect will reinspect the Work.
 5. When the Architect finds that the Work is acceptable under the Contract Documents, he shall request the Contractor to make closeout submittals.
 6. Notify Architect when work is considered finally complete.
 7. Complete items of work determined by Architect's final inspection.
- E. The Contractor's Closeout Submittals to the Architect:
1. Evidence of compliance with requirements of governing authorities:
 - a. Certificate of Occupancy
 - b. Certificates of Inspection
 - c. Mechanical
 - d. Electrical
 2. Project Record Documents: To requirements of Section 01 7800.
 3. Operating and Maintenance Data, Instructions to the Owner's Personnel: To requirements of Section 01 7800.
 4. Warranties and Bonds: To requirements of individual sections.
 5. Spare Parts and Maintenance Materials: To requirements of individual sections.
 6. Evidence of Payment and Release of Liens: To requirements of General and Supplementary Conditions.
- F. Final Adjustment of Accounts:
1. Submit a final statement of accounting to the Architect.
 2. Statement shall reflect all adjustments to the Contract Sum:
 - a. The original Contract Sum.
 - b. Additions and deductions resulting from:
 - 1) Previous Change Orders.

- 2) Deductions for uncorrected Work.
 - 3) Deductions for reinspection payments.
 - 4) Other adjustments.
 - c. Total contract sum, as adjusted.
 - d. Previous payments
 - e. Sum remaining due.
 3. Architect will prepare a final Change Order, reflecting adjustments to the Contract Sum which were not previously made by Change Orders.
- G. Final Application for Payment:
1. The Contractor shall submit the final Application and Certificate for Payment in accordance with procedures and requirements stated in the Conditions of the Contract.

3.13 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 01 3000 - Administrative Requirements: Submittals procedures, shop drawings, product data, and samples.
- B. Section 01 7000 - Execution and Closeout Requirements: Contract closeout procedures.
- C. Individual Product Sections: Specific requirements for operation and maintenance data.
- D. Individual Product Sections: Warranties required for specific products or Work.

1.03 SUBMITTALS

- A. Project Record Documents: Submit documents to Architect prior to claim for final Application for Payment.
- B. Operation and Maintenance Data:
 - 1. Submit two copies of preliminary draft or proposed formats and outlines of contents before start of Work. Architect will review draft and return one copy 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 one copy of completed documents 15 days prior to final inspection. This copy will be reviewed and returned after final inspection, with Architect comments. Revise content of all document sets as required prior to final submission.
 - 4. Submit two sets of revised final documents in final form within 10 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 15 days after acceptance.
 - 2. Make other submittals within 10 days after Date of Substantial Completion, prior to final Application for Payment. If the Architect's Certificate of Substantial Completion designates a commencement date for warranties other than the date of Substantial Completion for the Work, or a designated portion of the Work, submit written warranties upon request of the Architect.
 - 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.
 - 4. When a special warranty is required to be executed by the Contractor, or the Contractor and a subcontractor, supplier or manufacturer, prepare a written document that contains appropriate terms and identification, ready for execution by the required parties. Submit a draft to the Owner through the Architect for approval prior to final execution.
 - 5. Refer to individual Sections of Divisions-2 through -16 for specific content requirements, and particular requirements for submittal of special warranties.

6. Form of Submittal: At Final Completion compile two copies of each required warranty and bond properly executed by the Contractor, or by the Contractor, subcontractor, supplier, or manufacturer. Organize the warranty documents into an orderly sequence based on the table of contents of the Project Manual.
7. Bind warranties and bonds in two (or more) duplicate heavy-duty, commercial quality, durable 3-hole punch tab binders, thickness as necessary to accommodate contents, and sized to receive 8-1/2" by 11" paper.
8. Provide heavy paper dividers with celluloid covered tabs for each separate warranty. Mark the tab to identify the product or installation. Provide a typed description of the product or installation, including the name of the product, and the name, address and telephone number of the installer.
9. Identify each binder on the front and the spine with the typed or printed title "WARRANTIES AND BONDS," the Project title or name, and the name of the Contractor.
10. When operating and maintenance manuals are required for warranted construction, provide additional copies of each required warranty, as necessary, for inclusion in each required manual.

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.
 6. Manufacturer's instruction for assembly, installation, and adjusting.
- B. Ensure entries are complete and accurate, enabling future reference by Owner.
- C. Store record documents separate from documents used for construction.
- D. Record information concurrent with construction progress.
- E. Specifications: Legibly mark and record at each product section description of actual products installed, including the following:
 1. Manufacturer's name and product model and number.
 2. Product substitutions or alternates utilized.
 3. Changes made by Addenda and modifications.
- F. Record Drawings and Shop Drawings: Legibly mark each item to record actual construction including:
 1. Measured locations of internal utilities and appurtenances concealed in construction, referenced to visible and accessible features of the Work.
 2. Field changes of dimension and detail.
 3. Details not on original Contract drawings.

3.02 OPERATION AND MAINTENANCE DATA

- A. 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.
- E. Manuals:
 - 1. Purpose:
 - a. Operation and maintenance manuals will be used for training of, and use by, Owner's personnel in operation and maintenance of mechanical and electrical systems and equipment. A separate manual or chapter within a manual shall be prepared for each class of equipment or system.
 - b. For additional requirements refer to various specification sections.
- F. Instructions of Owner's Personnel
 - 1. Fully instruct Owner's designated operating and maintenance personnel in operating, adjustments and maintenance of all mechanical and electrical systems and equipment as required by respective and pertinent sections, after all final inspection, tests and repairs have been completed.
 - 2. Operating and maintenance manuals shall constitute the basis of instructions. Contents of manual shall be reviewed in full detail, explaining all aspects of operations and maintenance.
 - 3. Prepare and include additional data when need for such data becomes apparent during instruction and training and sessions.
 - 4. Training sessions shall be jointly arranged with Owner during Contractor's normal week and daily hours. The Owner shall have the responsibility of scheduling its shift work personnel accordingly.
 - 5. Owner and Contractor shall coordinate and cooperate to keep training sessions to a reasonable minimum.

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.
 - 2. Information for re-ordering custom manufactured products.
- 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. Additional information as specified in individual product specification sections.

- E. Provide a listing in Table of Contents for design data, with tabbed fly sheet and space for insertion of data.

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. Panelboard Circuit Directories: Provide electrical service characteristics, controls, and communications; typed.
- C. Include color coded wiring diagrams as installed.
- D. 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.
- E. 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.
- F. Provide servicing and lubrication schedule, and list of lubricants required.
- G. Include manufacturer's printed operation and maintenance instructions.
- H. Include sequence of operation by controls manufacturer.
- I. Provide original manufacturer's parts list, illustrations, assembly drawings, and diagrams required for maintenance.
- J. Provide control diagrams by controls manufacturer as installed.
- K. Provide Contractor's coordination drawings, with color coded piping diagrams 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. Safety instructions.
- P. Additional Requirements: As specified in individual product specification sections.

3.05 OPERATION AND MAINTENANCE MANUALS

- A. Prepare instructions and data by personnel experienced in maintenance and operation of described products.
- B. Prepare data in the form of an instructional manual.
- C. Binders: Commercial quality, 8-1/2 by 11 inch (216 by 280 mm) three D side ring binders with durable plastic covers; 2 inch (50 mm) maximum ring size. When multiple binders are used, correlate data into related consistent groupings.

- D. Cover: Identify each binder on the front and the spine with typed or printed title OPERATION AND MAINTENANCE INSTRUCTIONS; identify title of Project; identify subject matter of contents.
- E. Provide heavy duty paper tabbed dividers for each separate product and system, with typed description of product and major component parts of equipment.
- F. Text: Manufacturer's printed data, or typewritten data on 24 pound paper.
- G. Drawings: Provide with reinforced punched binder tab. Bind in with text; fold larger drawings to size of text pages.
- H. Arrange content by systems under section numbers and sequence of Table of Contents of this Project Manual.
- I. Contents: Prepare a Table of Contents for each volume, with each product or system description identified, in three parts as follows:
 - 1. Part 1: Directory, listing names, addresses, and telephone numbers of Architect, Contractor, Subcontractors, and major equipment suppliers.
 - 2. Part 2: Operation and maintenance instructions, arranged by system and subdivided by specification section. For each category, identify names, addresses, and telephone numbers of Subcontractors and suppliers. Identify the following:
 - a. Significant design criteria.
 - b. List of equipment.
 - c. Parts list for each component.
 - d. Operating instructions.
 - e. Maintenance instructions for equipment and systems.
 - f. Maintenance instructions for special finishes, including recommended cleaning methods and materials, and special precautions identifying detrimental agents.
 - 3. Part 3: Project documents and certificates, including the following:
 - a. Shop drawings and product data.
 - b. Air and water balance reports.
 - c. Certificates.
- J. Provide a listing in Table of Contents for design data, with tabbed dividers and space for insertion of data.
- K. Table of Contents: Provide title of Project; names, addresses, and telephone numbers of Architect, Consultants, and Contractor with name of responsible parties; schedule of products and systems, indexed to content of the volume.

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 the Date of Substantial completion is determined.
- B. Verify that documents are in proper form, contain full information, and are notarized.
- C. Co-execute submittals when required.
- D. Retain warranties and bonds until time specified for submittal.

- E. Manual: Bind in commercial quality 8-1/2 by 11 inch (216 by 279 mm) three D side ring binders with durable plastic covers.
- F. Cover: Identify each binder on the front and the spine with typed or printed title WARRANTIES AND BONDS, with title of Project; name, address and telephone number of Contractor and equipment supplier; 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 with index tab sheets keyed to the Table of Contents listing. Provide full information, using separate typed sheets as necessary. List Subcontractor, supplier, and manufacturer, with name, address, and telephone number of responsible principal.
- I. See all provisions under "3.5 WARRANTY:" in General Conditions.
- J. Related Damages and Losses: When correcting warranted Work that has failed, remove and replace other Work that has been damaged as a result of such failure or that must be removed and replaced to provide access for correction of warranted Work.
- K. Reinstatement of Warranty: When Work covered by a warranty has failed and been corrected by replacement or rebuilding, guarantee the corrected work with a new warranty equal to the original.
- L. Replacement Cost: Upon determination that Work covered by a warranty has failed, replace or rebuild the Work to an acceptable condition complying with requirements of Contract Documents. The Contractor is responsible for the cost of replacing or rebuilding defective Work regardless of whether the Owner has benefited from use of the Work through a portion of its anticipated useful service life.
- M. Owner's Recourse: Written warranties made to the Owner are in addition to implied warranties, and shall not limit the duties, obligations, right and remedies otherwise available under the law, nor shall warranty periods be interpreted as limitations on time in which the Owner can enforce such other duties, obligations, rights, or remedies.
- N. Rejection of Warranties: The Owner reserves the right to reject warranties and to limit selections to products with warranties not in conflict with requirements of the Contract Documents.
- O. The Owner reserves the right to refuse to accept Work for the Project where a special warranty, certification, or similar commitment is required on such Work or part of the Work, until evidence is presented that entities required to countersign such commitments are willing to do so.

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. waterproofing, and other weather-exposed or moisture protection products.
 - 2. Finishes, including flooring, wall finishes, ceiling finishes.
 - 3. Fixtures and fittings.
 - 4. Items specified in individual product Sections.

1.02 RELATED REQUIREMENTS

- A. Section 01 7800 - Closeout Submittals: Operation and maintenance manuals.

1.03 SUBMITTALS

- A. See Section 01 3000 - Administrative Requirements, for submittal procedures.
- B. Training Plan: Owner will designate personnel to be trained; tailor training to needs and skill-level of attendees.
 - 1. Submit to Architect for transmittal to Owner.
 - 2. Submit not less than four weeks prior to start of training.
 - 3. Revise and resubmit until acceptable.
 - 4. Provide an overall schedule showing all training sessions.
 - 5. Include at least the following for each training session:
 - a. Identification, date, time, and duration.
 - b. Description of products and/or systems to be covered.
 - c. Name of firm and person conducting training; include qualifications.
 - d. Intended audience, such as job description.
 - e. Objectives of training and suggested methods of ensuring adequate training.
 - f. Methods to be used, such as classroom lecture, live demonstrations, hands-on, etc.
 - g. Media to be used, such as slides, hand-outs, etc.
 - h. Training equipment required, such as projector, projection screen, etc., to be provided by Contractor.
- C. 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.

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. Perform demonstrations not less than two weeks prior to Substantial Completion.
 - 2. 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.
 - 1. Perform demonstrations not less than two weeks prior to Substantial Completion.

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.
 - 3. Typical uses of the O&M manuals.
- 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

D I V I S I O N 2

**Applicable Portions Of The Conditions
Of The Contract And Division 1 General
Requirements Apply To The Work Of
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SECTION 02 4100 - MINOR DEMOLITION FOR REMODELING

PART 1 GENERAL

1.01 SECTION INCLUDES

- A. Removal of designated building equipment and fixtures.
- B. Removal of designated construction.
- C. Disposal of materials.
- D. Identification of utilities.

1.02 SUBMITTALS

- A. See Section 01 3000 - Administrative Requirements, for submittal procedures.
- B. Project Record Documents: Accurately record actual locations of capped utilities.
 - 1. Indicate unanticipated structural, electrical, or mechanical conditions.

1.03 REGULATORY REQUIREMENTS

- A. Conform to applicable code for demolition work, dust control, products requiring electrical disconnection and re-connection .
- B. Obtain required permits from authorities.
- C. Do not close or obstruct egress from any building exit or site exit.
- D. Do not disable or disrupt building fire or life safety systems without 5 days' prior written notice to Owner.
- E. Conform to applicable regulatory procedures when hazardous or contaminated materials are discovered.

1.04 SCHEDULING

- A. Schedule work under the provisions of Section 01 3216.
- B. Arrange schedule so as not to interfere with the Owner's operations.
- C. Describe demolition removal procedures and schedule.
- D. Perform noisy work:
 - 1. Coordinate times with the Owner representative. Owner will coordinate with building occupants.

1.05 PROJECT CONDITIONS

- A. Conduct demolition to minimize interference with adjacent and occupied building areas.
- B. Cease operations immediately if structure appears to be in danger and notify Architect. Do not resume operations until directed.
- C. Occupancy:
 - 1. The Owner will continue to occupy portions of the existing building.
 - 2. Adjacent spaces will not be vacated during demolition activities.
- D. Existing Conditions:
 - 1. After the project is begun, the Contractor is responsible for the condition of structures to be demolished. The Owner does not warrant that the condition of structures to be demolished will not have changed since the time of inspection for bidding purposes.

2. Cover existing carpet in all interior spaces with polyethelene sheets. Overlap and tape all joints. Inspect and repair damage to polyethelene sheets daily. Protect carpet throughout construction duration.
- E. Unforeseen Conditions: Should unforeseen conditions be encountered that affect design or function of project, investigate fully and submit an accurate, detailed, written report to the architect. While awaiting the architect's response, reschedule operations if necessary to avoid delay of overall project.
- F. The fire alarm system must remain functional throughout construction. During required shut downs a fire watch must be provided 24 hours a day by a dedicated full time trained employee of the contractor.

PART 2 PRODUCTS - NOT USED.

PART 3 EXECUTION

3.01 EXAMINATION

- A. Survey existing conditions and correlate with drawings and specifications to determine extent of demolition required.
- B. Insofar as is practicable, arrange operations to reveal unknown or concealed structural conditions for examination and verification before removal or demolition.
- C. Perform continuing surveys as the work progresses to detect hazards resulting from demolition or construction activities.
- D. Verify actual conditions to determine in advance whether removal or demolition of any element will result in structural deficiency, overloading, failure, or unplanned collapse.

3.02 PREPARATION

- A. Provide, erect, and maintain temporary barriers as required.
- B. Provide for the protection of persons passing around or through the area of demolition.
- C. Erect and maintain temporary partitions to prevent spread of dust, odors, and noise to permit continued building occupancy. Insulate to provide noise protection to occupied areas.
- D. Construct temporary partitions in a manner at least equal to the following (or superior, if necessary to provide effective protection specified):
 1. Gypsum-board surfaces adjacent to occupied areas, with joints taped.
- E. Protect existing materials that are not to be demolished.
- F. Prevent movement of structure; provide bracing and shoring.
- G. Notify affected utility companies before starting work and comply with their requirements.
- H. Mark location and termination of utilities.
- I. Provide appropriate temporary signage including signage for exit or building egress.
- J. Damages: Without cost to the Owner and without delay, repair any damages caused to facilities to remain.
- K. Cover existing carpet in all interior spaces with polyethelene sheets. Overlap and tape all joints. Inspect and repair damage to polyethelene sheets daily. Protect carpet throughout construction duration.

3.03 POLLUTION CONTROLS

- A. Control as much as practicable the spread of dust and dirt.
- B. Observe environmental protection regulations.
- C. Do not allow water usage that results in freezing or flooding.
- D. Do not allow adjacent improvements to remain to become soiled by demolition operations.

3.04 DEMOLITION

- A. Disconnect, remove, and identify designated utilities within demolition areas.
- B. Demolish in an orderly and careful manner. Protect existing supporting structural members .
- C. Remove demolished materials from site except where specifically noted otherwise. Do not burn or bury materials on site.
- D. Remove materials as demolition progresses. Upon completion of demolition, leave areas in clean condition.
- E. Remove temporary facilities.
- F. Remove: Unless items are otherwise indicated to be reinstalled or salvaged, remove and scrap.
- G. Remove and Reinstall: Remove items indicated; clean, service, and otherwise prepare for service; reinstall in the same location (or in the location indicated).
- H. Remove and Install New: Remove and dispose of items indicated and install new items in the same location (or in the location indicated).
- I. Remove and Salvage: Items indicated to be salvaged will remain the Owner's property. Carefully remove and clean items indicated to be salvaged; pack or crate to protect against damage; identify contents of containers; deliver to the locations indicated.
- J. Remove and Scrap: Remove and dispose of items indicated.
 - 1. All demolished or removed items and materials shall be considered scrap except for those indicated to remain, those indicated to be reinstalled, and those indicated to be salvaged.
 - 2. Items of value to the contractor:
 - a. Do not store removed items on site.
- K. Existing to Remain: Construction or items indicated to remain shall be protected against damage during demolition operations. Where practicable, and with the Architect's permission, the Contractor may elect to remove items to a suitable storage location during demolition and then properly clean and reinstall the items.
- L. Detailed requirements for cutting are specified under cutting and patching in Division 1.
- M. Perform work in a systematic manner.
- N. Demolish and remove existing construction only to the extent required by new construction and as indicated in the contract documents.
- O. Perform selective demolition using methods which are least likely to damage work to remain and which will provide proper surfaces for patching.
- P. Remove debris daily.
- Q. Masonry: Detach masonry to be demolished from adjoining construction to remain with power-driven masonry saws or hand tools.

- R. Use any methods permitted by governing regulations and the requirements of the contract documents.

3.05 REPAIRS AND PATCHING

- A. Perform repairs in accordance with patching requirements specified in Division 1 under cutting and patching.

3.06 CLEANING

- A. Remove tools and equipment. Dispose of scrap.
- B. Broom clean interior areas.
- C. Clean soil, smudges, and dust from surfaces to remain.
- D. Leave exterior areas free of debris.
- E. Return structures and surfaces to remain to condition existing prior to commencement of demolition.

END OF SECTION

D I V I S I O N 6

**Applicable Portions Of The Conditions
Of The Contract And Division 1 General
Requirements Apply To The Work Of
This Division.**

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SECTION 06 1000 - ROUGH CARPENTRY

PART 1 GENERAL

1.01 SECTION INCLUDES

- A. Concealed wood blocking, nailers, and supports.

1.02 REFERENCE STANDARDS

- A. ASTM A153/A153M - Standard Specification for Zinc Coating (Hot-Dip) on Iron and Steel Hardware; 2009.
- B. PS 20 - American Softwood Lumber Standard; National Institute of Standards and Technology, Department of Commerce; 2010.
- C. SPIB (GR) - Grading Rules; Southern Pine Inspection Bureau, Inc.; 2002.

1.03 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 GENERAL REQUIREMENTS

- A. Dimension Lumber: Comply with PS 20 and requirements of specified grading agencies.
 - 1. If no species is specified, provide any species graded by the agency specified; if no grading agency is specified, provide lumber graded by any grading agency meeting the specified requirements.
 - 2. Grading Agency: Any grading agency whose rules are approved by the Board of Review, American Lumber Standard Committee (www.alsc.org) and who provides grading service for the species and grade specified; provide lumber stamped with grade mark unless otherwise indicated.
- B. Lumber fabricated from old growth timber is not permitted.

2.02 DIMENSION LUMBER FOR CONCEALED APPLICATIONS

- A. Grading Agency: Southern Pine Inspection Bureau, Inc. (SPIB).
- B. Sizes: Nominal sizes as indicated on drawings, S4S.
- C. Moisture Content: S-dry or MC19.
- D. Miscellaneous Framing, Blocking, Nailers, Grounds, and Furring:
 - 1. Lumber: S4S, No. 2 or Standard Grade.
 - 2. Boards: Standard or No. 3.

2.03 ACCESSORIES

- A. Fasteners and Anchors:
 - 1. Metal and Finish: Hot-dipped galvanized steel per ASTM A 153/A 153M for high humidity and preservative-treated wood locations, unfinished steel elsewhere.

PART 3 EXECUTION

3.01 PREPARATION

- A. Coordinate installation of rough carpentry members specified in other sections.

3.02 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.

3.03 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 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. Provide the following specific non-structural framing and blocking:
 - 1. Electrical panels, disconnects, etc..

3.04 CLEANING

- A. Do not leave any wood, shavings, sawdust, etc. on the ground or buried in fill.

END OF SECTION

D I V I S I O N 7

**Applicable Portions Of The Conditions
Of The Contract And Division 1 General
Requirements Apply To The Work Of
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SECTION 07 8400 - FIRESTOPPING

PART 1 GENERAL

1.01 SECTION INCLUDES

- A. Firestopping systems.
- B. Firestopping of all penetrations through fire barriers.
- C. Extent of fire barriers is indicated on drawings.
- D. All work of this section shall be performed by a single firm.
- E. Work Not Included: Repairing penetrations made in error and repairing penetrations which are too large to be sealed by the methods indicated; these are to be repaired using the original material of the construction.
- F. Products Furnished but Not Installed:
 - 1. Sleeves which are an integral part of the firestopping assembly but which must be set by installer of other construction.
- G. Firestopping of all joints and penetrations in fire-resistance rated assemblies, whether indicated on drawings or not, and other openings indicated.

1.02 REFERENCE STANDARDS

- A. ASTM E119 - Standard Test Methods for Fire Tests of Building Construction and Materials; 2012.
- B. ASTM E814 - Standard Test Method for Fire Tests of Through-Penetration Fire Stops; 2011a.
- C. ITS (DIR) - Directory of Listed Products; Intertek Testing Services NA, Inc.; current edition.
- D. FM P7825 - Approval Guide; Factory Mutual Research Corporation; current edition.
- E. UL (FRD) - Fire Resistance Directory; Underwriters Laboratories Inc.; current edition.

1.03 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.
- D. Manufacturer's Installation Instructions: Indicate preparation and installation instructions.
- E. Manufacturer's Certificate: Certify that products meet or exceed specified requirements.

1.04 QUALITY ASSURANCE

- A. Fire Testing: Provide firestopping assemblies of designs that provide the scheduled fire ratings when tested in accordance with ASTM E 814 and ASTM E 119.
 - 1. Listing in the current-year classification or certification books of UL, FM, or ITS (Warnock Hersey) will be considered as constituting an acceptable test report.
- B. Manufacturer Qualifications: Company specializing in manufacturing the products specified in this section with minimum five years documented experience.
- C. Installer Qualifications: Company specializing in performing the work of this section and:
 - 1. With minimum 3 years documented experience installing work of this type.

1.05 DELIVERY, STORAGE, AND HANDLING

- A. Coordinate delivery of products to minimize storage time at site.
- B. Deliver products to project site in original unopened containers bearing the name of the manufacturer, product name, type, and testing agency's identification mark.
- C. Store products in accordance with manufacturer's instructions.

1.06 SEQUENCING AND SCHEDULING

- A. Perform firestopping work after completion of work which penetrates fire barriers, but prior to covering up or eliminating access to the penetration. Coordinate with installers of such other work.

1.07 FIELD CONDITIONS

- A. Comply with firestopping manufacturer's recommendations for temperature and conditions during and after installation. Maintain minimum temperature before, during, and for 3 days after installation of materials.
- B. Provide ventilation in areas where solvent-cured materials are being installed.

PART 2 PRODUCTS

2.01 FIRESTOPPING - GENERAL REQUIREMENTS

- A. Manufacturers:
 - 1. A/D Fire Protection Systems Inc: www.adfire.com.
 - 2. 3M Fire Protection Products: www.3m.com/firestop.
 - 3. Hilti, Inc: www.us.hilti.com.
 - 4. Nelson FireStop Products: www.nelsonfirestop.com.
- B. Firestopping: Any material meeting requirements.
- C. Primers, Sleeves, Forms, Insulation, Packing, Stuffing, and Accessories: Type required for tested assembly design.

2.02 FIRESTOPPING ASSEMBLY REQUIREMENTS

- A. Floor-to-Floor, Wall-to-Wall, and Wall-to-Floor Joints, Except Perimeter, Where Both Are Fire-Rated: Use any 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. Movement: In addition, provide systems that have been tested to show movement capability as indicated.
 - 2. Air Leakage: In addition, provide systems that have been tested to show L Rating as indicated.
 - 3. Listing by UL, FM, or Intertek in their certification directory will be considered evidence of successful testing.
- B. Through Penetration Firestopping: Use any system that has been tested according to ASTM E814 to have fire resistance F Rating equal to required fire rating of penetrated assembly.
 - 1. Temperature Rise: In addition, provide systems that have been tested to show T Rating as indicated.
 - 2. Air Leakage: In addition, provide systems that have been tested to show L Rating as indicated.

3. Listing by UL, FM, or Intertek in their certification directory will be considered evidence of successful testing.

2.03 FIRESTOPPING FOR FLOOR-TO-FLOOR, WALL-TO-FLOOR, AND WALL-TO-WALL JOINTS

A. Gypsum Board Walls:

1. Wall to Wall Joints:
 - a. 1 Hour Construction: UL System WW-D-0067; Hilti CP 606 Flexible Firestop Sealant.
2. Top of Wall Joints at Underside of Steel Beam and Concrete Over Metal Deck Floor with Sprayed On Fireproofing:
 - a. 1 Hour Construction: UL System HW-D-0259; Hilti CFS-SP WB Firestop Joint Spray and CP 672.
3. Top of Wall Joints at Underside of Flat plaster:
 - a. 1 Hour Construction: UL System HW-D-1068; Hilti CFS-SP WB Firestop Joint Spray and CP 672.

2.04 FIRESTOPPING PENETRATIONS THROUGH CONCRETE AND CONCRETE MASONRY CONSTRUCTION

A. Penetrations Through Floors or Walls By:

1. Multiple Penetrations in Large Openings:
 - a. 1 Hour Construction: UL System C-AJ-8143; Hilti FS-ONE Intumescent Firestop Sealant.
2. Uninsulated Metallic Pipe, Conduit, and Tubing:
 - a. 1 Hour Construction: UL System C-AJ-1421; Hilti FS-ONE Intumescent Firestop Sealant or CP 604 Self-Leveling Firestop Sealant.
3. Uninsulated Non-Metallic Pipe, Conduit, and Tubing:
 - a. 1 Hour Construction: UL System C-AJ-2567; Hilti FS-ONE Intumescent Firestop Sealant.
4. Insulated Pipes:
 - a. 1 Hour Construction: UL System C-AJ-5048; Hilti FS-ONE Intumescent Firestop Sealant, CP 606 Flexible Firestop Sealant, CP 601S Elastomeric Firestop Sealant, or CP 604 Self-Leveling Firestop Sealant.
5. HVAC Ducts, Uninsulated:
 - a. 1 Hour Construction: UL System C-AJ-7084; Hilti FS-ONE Intumescent Firestop Sealant, CP 606 Flexible Firestop Sealant, CP 601S Elastomeric Firestop Sealant, or CP 604 Self-Leveling Firestop Sealant.

2.05 FIRESTOPPING PENETRATIONS THROUGH GYPSUM BOARD WALLS

A. Blank Openings:

1. 1 Hour Construction: UL System W-L-3334; Hilti CP 653 Speed Sleeve.

B. Penetrations By:

1. Multiple Penetrations in Large Openings:
 - a. 1 Hour Construction: UL System W-L-1389; Hilti FS-ONE Intumescent Firestop Sealant.
2. Uninsulated Metallic Pipe, Conduit, and Tubing:

- a. 1 Hour Construction: UL System W-L-1054; Hilti FS-ONE Intumescent Firestop Sealant.
3. Uninsulated Non-Metallic Pipe, Conduit, and Tubing:
 - a. 1 Hour Construction: UL System W-L-2078; Hilti CP 643N/644 Firestop Collar.
4. Insulated Pipes:
 - a. 1 Hour Construction: UL System W-L-5028; Hilti FS-ONE Intumescent Firestop Sealant.
5. HVAC Ducts, Insulated:
 - a. 1 Hour Construction: UL System W-L-7156; Hilti FS-ONE Intumescent Firestop Sealant.

2.06 MATERIALS

- A. Manufacturers: Provide products complying with requirements of the contract documents and made by one of the following:
 1. Hilti Construction Chemicals, Inc.
 2. Minnesota Mining & Mfg. Co.
 3. 3M Ceramic Materials Department.
 4. Tremco Incorporated.
- B. Firestopping Materials: Provide penetration seal assemblies whose fire-resistance ratings have been determined by testing in the configurations required and which have fire-resistance ratings at least as high as that of the fire-rated assembly in which they are to be installed.
 1. Use the materials required for the tested assemblies indicated on the drawings.
 - a. Where no tested assembly is indicated for a particular penetration, use any tested assembly which complies with the requirements of the specification.
 2. T rating: Not less than one-half of F rating.
 3. Provide products which:
 - a. Allow normal expansion and contraction movement of the penetrating item without failure of the penetration seal.
 - b. Emit no hazardous, combustible, or irritating by-products during installation or curing period.
 - c. Do not require special tools for installation.
- C. Labels: Red, permanent marking using the words "Fire-Rated Assembly - Do not disturb - See maintenance instructions" and the testing agency designation, or equivalent as approved by the authority having jurisdiction.
 1. For marking fire and smoke barriers themselves, use letters at least 2 inches high.
- D. 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 matter that could adversely affect bond of firestopping material.
- B. Remove incompatible materials that could adversely affect bond.

- C. Install backing materials to arrest liquid material 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 authority having jurisdiction.
- C. Install labeling required by code.

3.04 CLEANING

- A. Clean adjacent surfaces of firestopping materials.

3.05 PROTECTION

- A. Protect adjacent surfaces from damage by material installation.

END OF SECTION

D I V I S I O N 8

**Applicable Portions Of The Conditions
Of The Contract And Division 1 General
Requirements Apply To The Work Of
This Division.**

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SECTION 08 1113 - HOLLOW METAL DOORS AND FRAMES

PART 1 GENERAL

1.01 SECTION INCLUDES

- A. Non-fire-rated steel doors and frames.
- B. Fire-rated steel doors and frames.

1.02 REFERENCE STANDARDS

- A. ANSI/ICC A117.1 - American National Standard for Accessible and Usable Buildings and Facilities; International Code Council; 2009.
- B. ANSI A250.8 - SDI-100 Recommended Specifications for Standard Steel Doors and Frames; 2003 (R2008).
- C. ANSI A250.10 - Test Procedure and Acceptance Criteria for Prime Painted Steel Surfaces for Steel Doors and Frames; 1998 (R2011).
- D. BHMA A156.115 - Hardware Preparation in Steel Doors and Steel Frames; 2006.
- E. NAAMM HMMA 840 - Guide Specifications for Installation and Storage of Hollow Metal Doors and Frames; The National Association of Architectural Metal Manufacturers; 2007.
- F. NFPA 80 - Standard for Fire Doors and Other Opening Protectives; 2013.
- G. UL (BMD) - Building Materials Directory; Underwriters Laboratories Inc.; current edition.
- H. UL 10C - Standard for Positive Pressure Fire Tests of Door Assemblies; Current Edition, Including All Revisions.

1.03 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; and one copy of referenced grade standard.
- C. Shop Drawings: Details of each opening, showing elevations, glazing, frame profiles, and identifying location of different finishes, if any.
- D. Installation Instructions: Manufacturer's published instructions, including any special installation instructions relating to this project.
- E. Manufacturer's Certificate: Certification that products meet or exceed specified requirements.

1.04 QUALITY ASSURANCE

- A. Manufacturer Qualifications: Company specializing in manufacturing the products specified in this section with minimum three years documented experience.
- B. Maintain at the project site a copy of all reference standards dealing with installation.

1.05 DELIVERY, STORAGE, AND HANDLING

- A. Store in accordance with NAAMM HMMA 840.
- B. Protect with resilient packaging; avoid humidity build-up under coverings; prevent corrosion.

PART 2 PRODUCTS

2.01 MANUFACTURERS

- A. Steel Doors and Frames:
 - 1. Assa Abloy Ceco, Curries, or Fleming: www.assaabloydss.com.
 - 2. Republic Doors: www.republicdoor.com.
 - 3. Steelcraft, an Allegion brand: www.allegion.com/us.
 - 4. Substitutions: See Section 01 6000 - Product Requirements.

2.02 DOORS AND FRAMES

- A. Requirements for All Doors and Frames:
 - 1. Accessibility: Comply with ANSI/ICC A117.1.
 - 2. Door Top Closures: Flush with top of faces and edges.
 - 3. Door Edge Profile: Beveled on both edges.
 - 4. Door Texture: Smooth faces.
 - 5. Hardware Preparation: In accordance with BHMA A156.115, with reinforcement welded in place, in addition to other requirements specified in door grade standard.
 - 6. Finish: Factory primed, for field finishing.
- B. Combined Requirements: If a particular door and frame unit is indicated to comply with more than one type of requirement, comply with all the specified requirements for each type; for instance, an exterior door that is also indicated as being sound-rated must comply with the requirements specified for exterior doors and for sound-rated doors; where two requirements conflict, comply with the most stringent.

2.03 STEEL DOORS

- A. Interior Doors, Non-Fire-Rated:
 - 1. Grade: ANSI A250.8 - SDI-100; Level 1 - Standard-Duty, Physical Performance Level C, Model 1 - Full Flush.
 - 2. Core: Kraftpaper honeycomb.
 - 3. Thickness: 1-3/4 inch (44.5 mm).
 - 4. Texture: Smooth faces.
 - 5. Finish: Factory primed, for field finishing.
- B. Interior Doors, Fire-Rated:
 - 1. Grade: ANSI A250.8 - SDI-100; Level 1 - Standard-Duty, Physical Performance Level C, Model 1 - Full Flush.
 - 2. Fire Rating: As indicated on Door and Frame Schedule, tested in accordance with UL 10C ("positive pressure").
 - a. Provide units listed and labeled by UL (Underwriters Laboratories) - UL (BMD).
 - b. Attach fire rating label to each fire rated unit.
 - 3. Core: Mineral board.
 - 4. Thickness: 1-3/4 inch (44.5 mm).
 - 5. Texture: Smooth faces.
 - 6. Finish: Factory primed, for field finishing.

2.04 STEEL FRAMES

- A. General:

1. Comply with the requirements of grade specified for corresponding door.
 - a. ANSI A250.8 - SDI-100, Level 1 Door Frames: 16 gage, 0.053 inch (1.3 mm), minimum thickness.
 - b. ANSI A250.8 - SDI-100, Level 2 and 3 Door Frames: 14 gage, 0.067 inch (1.7 mm), minimum thickness.
 - c. ANSI A250.8 - SDI-100, Level 4 Door Frames: 12 gage, 0.093 inch (2.3 mm), minimum thickness.
 2. Finish: Same as for door.
 3. Frames Wider than 48 Inches (1219 mm): Reinforce with steel channel fitted tightly into frame head, flush with top.
- B. Interior Door Frames, Non-Fire-Rated: Fully welded type.
1. Terminated Stops: Provide at all interior doors; closed end stop terminated 6 inches (150 mm) above floor at 45 degree angle.
- C. Interior Door Frames, Fire-Rated: Fully welded type.
1. Fire Rating: Same as door, labeled.

2.05 ACCESSORY MATERIALS

- A. Astragals for Double Doors:
1. Fire-Rated Doors: Steel, shape as required to accomplish fire rating.
- B. Silencers: Resilient rubber, fitted into drilled hole; 3 on strike side of single door, 3 on center mullion of pairs, and 2 on head of pairs without center mullions.

2.06 FINISH MATERIALS

- A. Primer: Rust-inhibiting, complying with ANSI A250.10, door manufacturer's standard.

PART 3 EXECUTION

3.01 EXAMINATION

- A. Verify existing conditions before starting work.
- B. Verify that opening sizes and tolerances are acceptable.

3.02 INSTALLATION

- A. Install in accordance with the requirements of the specified door grade standard and NAAMM HMMA 840.
- B. In addition, install fire rated units in accordance with NFPA 80.
- C. Coordinate frame anchor placement with wall construction.
- D. Coordinate installation of hardware.
- E. Touch up damaged factory finishes.

3.03 TOLERANCES

- A. Clearances Between Door and Frame: As specified in ANSI A250.8 - SDI-100.
- B. Maximum Diagonal Distortion: 1/16 in (1.5 mm) measured with straight edge, corner to corner.

3.04 ADJUSTING

- A. Adjust for smooth and balanced door movement.

3.05 SCHEDULE

- A. Refer to Door and Frame Schedule on the drawings.

END OF SECTION

SECTION 08 7110 - FINISH HARDWARE

PART 1 GENERAL

1.01 RELATED DOCUMENTS:

- A. Drawings and general provisions of Contract, including General and Supplementary Conditions and Division - 1 Specification sections, apply to work of this section.
- B. Hollow metal frames are specified with door frames elsewhere in Division 8.
- C. Wood doors are specified elsewhere in Division 8.
- D. Paint - Division 9.

1.02 DESCRIPTION OF WORK:

- A. Definition: "Finish Hardware" includes items known commercially as finish hardware which are requested for swinging, sliding and folding doors, except special types of unique and non-matching hardware specified in the same section as the door and door frame.
- B. Extent of finish hardware required is indicated on drawings and in schedules.

1.03 QUALITY ASSURANCE:

- A. Supplier: A recognized AHI certified architectural finish hardware supplier, with warehousing facilities, who has been furnishing hardware in the project's vicinity for a period of not less than 2 years, and who is available, at reasonable times during the course of the work, for consultation about project's hardware requirements, to Owner, Architect and Contractor.
 - 1. Information contained below describes the grade and general functional intent of the design. If additional hardware devices are required or if hardware specified isn't appropriate to provide a functional and code compliant opening, or if hardware indicated below has been discontinued, the supplier shall include correct devices in his scope of work at no cost to the Owner.
- B. Fire-Rated Openings: Provide hardware for fire-rated openings in compliance with NFPA Standard No. 80 and local building code requirements. Provide only hardware which has been tested and listed by UL or FM for types and sizes of doors required and complies with requirements of the door and door frame labels.
- C. Americans with Disabilities Act (ADA): Provide and install finish hardware in accordance with requirements of Americans with Disabilities Act (ADA). Specifically, comply with ADA sections relating to accessibility and usability.
 - 1. Notification of Architect: Before installation of finish hardware, notify Architect of any Contract Document requirements that are suspected to be in noncompliance with ADA.
 - 2. ANSI Standards for Physically Handicapped: Finish Hardware shall comply with:
 - 3. American National Standard for Buildings and Facilities -- Providing Accessibility and Usability for Physically Handicapped People" (ANSI A117.1-1986). 1986 edition, by American National Standards Institute, Inc.; New York, New York. Before installation of finish hardware, Notify Architect of any Contract Document requirements that are suspected to be in noncompliance with ANSI A117.1-1986. In addition, before installation of finish hardware, notify Architect of conflicting requirements of ADA and ANSI A117.1-1986.

1.04 SUBMITTALS:

- A. Product Data: Submit manufacturers technical product data for each item of hardware in accordance with Division-1 section "Submittals". Include whatever information may be necessary to show compliance with requirements, and include instructions for installation and for maintenance of operating parts and finish.
- B. Vertical Hardware Schedule: Submit final hardware schedule in manner indicated below. Coordinate hardware with doors, frames, and related work to ensure proper size, thickness, hand, function and finish of hardware.
 - 1. Final Hardware Schedule Content: Based on finish hardware indicated, organize hardware schedule into "hardware sets" indicating complete designations of every item required for each door or opening. Include the following information:
 - a. Type, style, function, size and finish of each hardware item.
 - b. Name and manufacturer of each item.
 - c. Fastening and other pertinent information.
 - d. Location of hardware set cross-referenced to indications on Drawings both on floor plans and in door schedule.
 - e. Explanation of all abbreviations, symbols, codes, etc. contained in schedule.
 - f. Door and frame sizes and materials.
 - g. Keying information.
- C. Submittal Sequence: Submit schedule at earliest possible date particularly where acceptance of hardware schedule must precede fabrication of other work (e.g., hollow metal frames) which is critical in the project construction schedule. Include with schedule the product data, samples, shop drawings of other work affected by finish hardware, and other information essential to the coordination review of hardware schedule.
- D. Templates: Furnish hardware templates to each fabricator of doors, frames, and other work being factory-prepared for the installation of hardware. Upon request, check shop drawings of other such others work to confirm that adequate provisions are made for proper location and installation of hardware.
- E. Operations and Maintenance Data: After installation, representative templates, instructions sheets and installation details shall be provided to the owner when building is accepted. Include one copy of each hardware schedule, keying and wiring diagrams.

1.05 PRODUCT HANDLING:

- A. Tag each item or package separately, with identification related to final hardware schedule, and include basic installation instructions with each item or package.
- B. Packaging of hardware, is responsibility of supplier. As material is received by hardware supplier from various manufacturers, sort and repackage in containers clearly marked with appropriate hardware set number to match set numbers of approved hardware schedule. Two or more identical sets may be packaged in the same container.
- C. Inventory hardware jointly with representatives of hardware supplier and hardware installer until each is satisfied that count is correct.
- D. Deliver individually packaged hardware items at the proper times to the proper locations (shop or project site) for installation.

PART 2 PRODUCTS

2.01 SCHEDULED HARDWARE:

- A. Requirements for design, grade, function, finish, size and other distinctive qualities of each type of finish hardware is indicated in the Hardware Schedule at the end of this section. Products are identified by using hardware designation numbers of the following.
 - 1. Manufacturer's Product Designations: One or more manufacturers are listed for each hardware type required.
 - 2. Warranty: Provide published warranties in accordance this Section .
 - a. LOCKSETS: 7 years
 - b. DOOR CLOSERS: 10 years
 - c. EXIT DEVICES: 2 years
 - d. OTHER HARDWARE: One year
 - 3. Maintenance Materials: Provide special wrenches and tools applicable to each different or special hardware component. Provide maintenance tools and accessories supplied by hardware component manufacturer to owner representative.

2.02 ACCEPTABLE MANUFACTURES:

- A. Hinges: PBB Inc., Stanley , McKinney
 - 1. Locksets: Corbin Russwin, Sargent, Yale
 - 2. Exit Device: Corbin Russwin, Sargent, Yale
 - 3. Closers: Norton, Sargent, Yale,
 - 4. Flat Goods: McKinney, Trimco, BBW, Quality
 - 5. Gasketing: McKinney, Pemko, Reese, Zero
 - 6. Cores: Best
 - 7. Key cabinet: Telkee, Lund, Key Control
 - 8. Substitutions: In accordance with Instructions to Bidders.
- B. Provide free wheeling outside trim when unit is locked. Provide locksets with one piece lever handles both sides not less than 4 ½ inches and 3 ½ inch diameter rose cold forged, for accessibility by Handicapped. Torqued tested at 1300 lbs.
- C. Provide closers with the following functions: Unitrol shock absorber foot, independent sweep, fast latch, hydraulic check "V" grooved valves, accessibility by Handicapped, delay action, adjustable spring tensions. Closers must meet barrier free requirements. Closers must have two-tooth engagement rack and pinion. All valves must be accessible without removing closer from the door. Cover must not have slotted cover. Cover must be secured with screw holes in cover. Provide installation and sizing instructions in cover.
- D. Closers shall have cast aluminum alloy shell. Closer shall be surface mounted and shall project no more than 2 1/8" from the surface of the door. Closer shall be non-handed. Closers shall be mounted on side of door not seen from common area.
- E. Exit Devices (as scheduled) "touchbar" Provide all exposed surfaces same material and finish. Exit device must have free wheeling outside trim when device is locked. Touch bar must not protrude from housing when pad is compressed.
- F. Latchbolt shall be investment cast stainless steel pullman type with 3/4" throw. All devices to be furnished with auxiliary dead-latching mechanism. Roller strike shall be furnished.

- G. Unless otherwise specified. Vandal resistant outside lever escutcheon trim shall be heavy duty cold forged constructed incorporating four threaded studs for through-bolting. All escutcheon trim shall be UL listed and constructed with beveled edges. Rigid levers while locked or manual type clutch mechanisms are not acceptable.

2.03 MATERIALS AND FABRICATION:

- A. General: Hand of Door: Drawings show direction of slide, swing or hand of each door leaf. Furnish each item of hardware for proper installation and operation of door movement as shown.
- B. Base Metals: Produce hardware units of basic metal and forming method indicated, using manufacture's standard metal alloy, composition, temper, and hardness, but in no case of lesser (commercially recognized) quality than specified for applicable hardware units by applicable ANSI A 156 series standard for each type hardware item and with ANSI A156.18 for finish designations indicated. Do not furnish "optional" materials or forming methods for those indicated, except as otherwise specified.
- C. Fasteners: Provide hardware manufactured to conform to published templates, generally prepared for machine screw installation. Do not provide hardware which has been prepared for self-tapping sheet metal screws, except as specifically indicated.
- D. Furnish screws for installation, with each hardware item. Provide Phillips flat-head screws except as otherwise indicated. Finish exposed (exposed under any condition) screws to match hardware finish or, if exposed in surfaces of other work, to match finish of such other work as closely as possible, including "prepared for paint" in surfaces to receive painted finish.

2.04 LOCK CYLINDERS AND KEYING:

- A. General: Supplier will meet with Owner to finalize keying requirements and to obtain final instructions in writing.
- B. Comply with Owner's instructions for masterkeying and except as otherwise indicated, provide individual change key for each lock which is not designated to be keyed alike with a group of related locks.
 - 1. Permanently inscribe each key with number or lock that identifies cylinder manufacturer key symbol, and notation "DO NOT DUPLICATE".
- C. Key Material: Provide keys of nickel silver only.
- D. Key Quantity: Furnish 2 change keys for each lock.
 - 1. Deliver permanent keys to Owner's representative.
 - 2. Factory construction key project.
 - 3. Keyway must accommodate regular and side bar keying.

2.05 KEYING

- A. Door Locks: Grand master keyed.
 - 1. Include control keying with removable core cylinders.
 - 2. Key to existing keying system.
 - 3. During the construction period all exterior doors and (20) specific interior doors to be designated after construction begins, shall be keyed to a Construction Master Key System by Best Lock Corporation that shall remain operative until Final Acceptance of building by the Owner.

4. Base the permanent keying system on the Owner's existing Great Grand Master system, which is the Best Lock Corporation. Determine keyed-alike sets jointly by the Owner's Representative and the Contractor immediately after contract award. Perform keying and biting by and registered with the lock manufacturer.
5. Final keying shall be keyed to a 7-pin Master Keyed plan by Best Lock Corporation. All keying and biting shall be performed by and registered with the lock manufacturer.
6. Provide key control system with a capacity of 1.75 times the number of door locks, with complete dual tag system.
7. Tags: set for permanent attachment of file key without the use of tools and one set with snap hook holding at least four keys.

2.06 HARDWARE FINISHES:

- A. Provide matching finishes for hardware units at each door or opening, to the greatest extent possible, and except as otherwise indicated. Reduce differences in color and textures as much as commercially possible where the base metal or metal forming process is different for individual units of hardware exposed at the same door opening. In general, match items to the manufacture's standard finish for the latch and lockset or (push-pull units if no latch-lock sets) for color and texture.
- B. Provide finishes which match those established by BHMA.
- C. Provide quality of finish, including thickness of plating or coating (if any), composition, hardness and other qualities complying with manufacturer's standards, but in no cases less than specified for the applicable units of hardware by referenced standards.
- D. Provide unless specified in schedule.
 1. 652 satin chrome plated on steel US26D
 2. 626 satin chrome plated on brass or bronze US26D
 3. 630 satin stainless steel US32D
 4. 689 satin aluminum sprayed AL

PART 3 EXECUTION

3.01 INSTALLATION:

- A. Mount hardware units at heights indicated in "Recommended Locations for Builders Hardware for Standard Steel Doors and Frames" by the Door and Hardware institute, except as specifically indicated or required to comply with governing regulations, and except as may be otherwise directed by Architect.
- B. Install each hardware item in compliance with the manufacturer's instructions and recommendations. Wherever cutting and fitting is required to install hardware onto or into surfaces which are later to be painted or finished in another way, coordinate removal, storage and reinstallation or application of surface preparations with finishing work specified in Division - 9 sections. Do not install surface-mounted items until finishes have completed on the substrate.
- C. Set units level, plumb and true to line and location. Adjust and reinforce the attachment substrate as necessary for proper installation and operation.
- D. Drill and countersink units which are not factory-prepared for anchorage fasteners. Space fasteners and anchors in accordance with industry standards.
- E. Set thresholds for exterior doors in full bed of butyl-rubber or polyisobutylene mastic sealant.

3.02 ADJUST AND CLEAN:

- A. Adjust and check each operating item of hardware and each door, to ensure proper operation or function of every unit. Replace units which cannot be adjusted to operate freely and smoothly as intended for the application made at no expense to the Owner.
- B. Clean adjacent surfaces soiled by hardware installation.
- C. Instruct Owner's Personnel in proper adjustment and maintenance of hardware and hardware finishes, during the final adjustment of hardware.

3.03 PART 4 SCHEDULE

- A. Refer to drawings for schedule.

END OF SECTION

D I V I S I O N 9

**Applicable Portions Of The Conditions
Of The Contract And Division 1 General
Requirements Apply To The Work Of
This Division.**

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SECTION 09 2116 - GYPSUM BOARD ASSEMBLIES

PART 1 GENERAL

1.01 SECTION INCLUDES

- A. Performance criteria for gypsum board assemblies.
- B. Metal stud wall framing.
- C. Acoustic insulation.
- D. Gypsum wallboard.
- E. Joint treatment and accessories.

1.02 REFERENCE STANDARDS

- A. ASTM C475/C475M - Standard Specification for Joint Compound and Joint Tape for Finishing Gypsum Board; 2012.
- B. ASTM C645 - Standard Specification for Nonstructural Steel Framing Members; 2013.
- C. ASTM C665 - Standard Specification for Mineral-Fiber Blanket Thermal Insulation for Light Frame Construction and Manufactured Housing; 2012.
- D. ASTM C754 - Standard Specification for Installation of Steel Framing Members to Receive Screw-Attached Gypsum Panel Products; 2011.
- E. ASTM C840 - Standard Specification for Application and Finishing of Gypsum Board; 2013.
- F. ASTM C1002 - Standard Specification for Steel Self-Piercing Tapping Screws for the Application of Gypsum Panel Products or Metal Plaster Bases to Wood Studs or Steel Studs; 2007 (Reapproved 2013).
- G. ASTM C1047 - Standard Specification for Accessories for Gypsum Wallboard and Gypsum Veneer Base; 2010a.
- H. ASTM C1396/C1396M - Standard Specification for Gypsum Board; 2014.
- I. ASTM E90 - Standard Test Method for Laboratory Measurement of Airborne Sound Transmission Loss of Building Partitions and Elements; 2009.
- J. ASTM E413 - Classification for Rating Sound Insulation; 2010.
- K. GA-216 - Application and Finishing of Gypsum Board; Gypsum Association; 2013.
- L. UL (FRD) - Fire Resistance Directory; Underwriters Laboratories Inc.; current edition.

PART 2 PRODUCTS

2.01 GYPSUM BOARD ASSEMBLIES

- A. Provide completed assemblies complying with ASTM C840 and GA-216.
- B. Interior Partitions Indicated as Acoustic: Provide completed assemblies with the following characteristics:
 - 1. Acoustic Attenuation: STC of 45-49 calculated in accordance with ASTM E413, based on tests conducted in accordance with ASTM E90.
- C. Fire Rated Assemblies: Provide completed assemblies with the following characteristics:
 - 1. Fire Rated Partitions: UL listed assembly No. U465.
 - 2. UL Assembly Numbers: Provide construction equivalent to that listed for the particular assembly in the current UL Fire Resistance Directory.

2.02 METAL FRAMING MATERIALS

- A. Manufacturers - Metal Framing, Connectors, and Accessories:
 - 1. Clarkwestern Dietrich Building Systems LLC: www.clarkdietrich.com.
 - 2. Marino: www.marinoware.com.
 - 3. Phillips Manufacturing Company: www.phillipsmfg.com.
 - 4. Substitutions: See Section 01 6000 - Product Requirements.
- B. Non-Loadbearing Framing System Components: ASTM C645; 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/240 at 5 psf (240 Pa).
 - 1. Studs: "C" shaped with flat or formed webs with knurled faces.
 - 2. Runners: U shaped, sized to match studs.
- C. Partition Head To Structure Connections: Provide track fastened to structure with legs of sufficient length to accommodate deflection, for friction fit of studs cut short and fastened as indicated on drawings.

2.03 BOARD MATERIALS

- A. Manufacturers - Gypsum-Based Board:
 - 1. American Gypsum: www.americangypsum.com.
 - 2. Georgia-Pacific Gypsum: www.gpgypsum.com.
 - 3. National Gypsum Company: www.nationalgypsum.com.
 - 4. USG Corporation: www.usg.com.
- 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. At Assemblies Indicated with Fire-Rating: Use type required by indicated tested assembly; if no tested assembly is indicated, use Type X board, UL or WH listed.
 - 3. Thickness:
 - a. Vertical Surfaces: 5/8 inch (16 mm).

2.04 ACCESSORIES

- A. Acoustic Insulation: ASTM C665; preformed glass fiber, friction fit type, unfaced.
- B. Acoustic Sealant: Non-hardening, non-skinning, for use in conjunction with gypsum board.
- C. Finishing Accessories: ASTM C1047, galvanized steel or rolled zinc, unless otherwise indicated.
 - 1. Types: As detailed or required for finished appearance.
 - 2. Manufacturers - Finishing Accessories:
 - a. Same manufacturer as framing materials.
- D. Joint Materials: ASTM C475 and as recommended by gypsum board manufacturer for project conditions.
 - 1. Tape: 2 inch (50 mm) wide, coated glass fiber tape for joints and corners, except as otherwise indicated.
 - 2. Ready-mixed vinyl-based joint compound.
 - 3. Chemical hardening type compound.

- E. Screws for Attachment to Steel Members Less Than 0.03 inch (0.7 mm) In Thickness, to Wood Members, and to Gypsum Board: ASTM C1002; self-piercing tapping type.
- F. Anchorage to Substrate: Tie wire, nails, screws, and other metal supports, of type and size to suit application; to rigidly secure materials in place.

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 C754 and manufacturer's instructions.
- B. Studs: Space studs as permitted by standard.
 - 1. Extend partition framing to structure where indicated and to ceiling in other locations.
 - 2. Partitions Terminating at Ceiling: Attach ceiling runner securely to ceiling framing in accordance with details.
 - 3. Partitions Terminating at Structure: Attach extended leg top runner to structure, maintain clearance between top of studs and structure, and brace both flanges of studs with continuous bridging.
- C. Openings: Reinforce openings as required for weight of doors or operable panels, using not less than double studs at jambs.

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.
- B. Acoustic Sealant: Install in accordance with manufacturer's instructions.
 - 1. Place one bead continuously on substrate before installation of perimeter framing members.
 - 2. Place continuous bead at perimeter of each layer of gypsum board.
 - 3. In non-fire-rated construction, seal around all penetrations by conduit, pipe, ducts, and rough-in boxes.

3.04 BOARD INSTALLATION

- A. Comply with ASTM C 840, 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 in most economical direction, with ends and edges occurring over firm bearing.
 - 1. Exception: Tapered edges to receive joint treatment at right angles to framing.
- C. Fire-Rated Construction: Install gypsum board in strict compliance with requirements of assembly listing.
- D. Installation on Metal Framing: Use screws for attachment of all gypsum board except face layer of non-rated double-layer assemblies, which may be installed by means of adhesive lamination.

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 (10 meters) apart on walls and ceilings over 50 feet (16 meters) long.
- B. Corner Beads: Install at external corners, using longest practical lengths.

3.06 JOINT TREATMENT

- A. Paper Faced Gypsum Board: Use fiberglass joint tape, bedded with ready-mixed vinyl-based joint compound and finished with ready-mixed vinyl-based joint compound.
- B. 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 1: Fire rated wall areas above finished ceilings, whether or not accessible in the completed construction.
- C. 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 (0.8 mm).

3.07 TOLERANCES

- A. Maximum Variation of Finished Gypsum Board Surface from True Flatness: 1/8 inch in 10 feet (3 mm in 3 m) in any direction.

END OF SECTION

SECTION 09 5100 - ACOUSTICAL CEILINGS

PART 1 GENERAL

1.01 SECTION INCLUDES

- A. Suspended metal grid ceiling system.
- B. Acoustical units.
- C. Seismic grid restraint.

1.02 REFERENCE STANDARDS

- A. ASTM C635 - Standard Specification for the Manufacture, Performance, and Testing of Metal Suspension Systems for Acoustical Tile and Lay-in Panel Ceilings; 2007.
- B. ASTM C636/C636M - Standard Practice for Installation of Metal Ceiling Suspension Systems for Acoustical Tile and Lay-in Panels; 2008.
- C. ASTM E580/E580M - Standard Practice for Installation of Ceiling Suspension Systems for Acoustical Tile and Lay-in Panels in Areas Subject to Earthquake Ground Motions; 2011.
- D. ASTM E1264 - Standard Classification for Acoustical Ceiling Products; 2008e1.

1.03 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.

1.04 QUALITY ASSURANCE

- A. Seismic Grid Restraint: Design and install in accordance to International Building Code Section 1708.6 and ASCE 7.
- B. Suspension System Manufacturer Qualifications: Company specializing in manufacturing the products specified in this section with minimum three years documented experience.
- C. Acoustical Unit Manufacturer Qualifications: Company specializing in manufacturing the products specified in this section with minimum three years documented experience.

1.05 FIELD CONDITIONS

- A. Maintain uniform temperature of minimum 60 degrees F (16 degrees C), and maximum humidity of 40 percent prior to, during, and after acoustical unit installation.

1.06 PROJECT CONDITIONS

- A. In a timely manner, furnish to affected installers, attachment devices for incorporation into other work.
- B. 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.
- C. Coordination Data: Prepare and distribute to affected installers, data necessary for coordination with related work. Include setting diagrams showing placement of attachment devices for acoustical ceiling hangers.
- D. Install acoustical units after interior wet work is dry.

- E. Work above ceilings has been finished, tested, and approved.
- F. Coordinate ceiling system installation with work of other sections as required, including the following:
 - 1. Light fixtures.
 - 2. HVAC equipment.
 - 3. Fire Alarm System Components.
 - 4. Partitions.
- G. Do not begin installation of ceiling system until building's normal operating temperature and humidity levels have been reached and will be maintained.

1.07 EXTRA MATERIALS

- A. See Section 01 6000 - Product Requirements, for additional provisions.
- B. Provide 2.5 percent of total acoustical unit area of each type of acoustical unit for Owner's use in maintenance of project.

PART 2 PRODUCTS

2.01 MANUFACTURERS

- A. Acoustic Panels:
 - 1. Armstrong World Industries, Inc: www.armstrong.com.
 - 2. Acoustic Ceiling Products, Inc: www.acpideas.com.
 - 3. CertainTeed Corporation: www.certainteed.com.
- B. Suspension Systems:
 - 1. Same as for acoustical units.

2.02 ACOUSTICAL UNITS

- A. Manufacturers:
 - 1. Armstrong World Industries, Inc: www.armstrong.com.
 - 2. CertainTeed Corporation: www.certainteed.com.
 - 3. USG: www.usg.com.
 - 4. Substitutions: See Section 01 6000 - Product Requirements.
- B. Acoustical Units - General: ASTM E1264, Class A.
- C. Acoustical Tile Type 1: Painted mineral fiber, ASTM E1264 Type III, with to the following characteristics:
 - 1. Size: 24 x 24 inches (600 x 600 mm).
 - 2. Thickness: 5/8 inches (15 mm).
 - 3. Composition: Water felted.
 - 4. Edge: Square.
 - 5. Surface Color: White.
 - 6. Surface Pattern: Non-directional fissured.
 - 7. Product: Fine Fissured by Armstrong World Industries.

2.03 SUSPENSION SYSTEM(S)

- A. Manufacturers:
 - 1. Armstrong World Industries, Inc: www.armstrong.com.
 - 2. Chicago Metallic Corporation: www.chicagometallic.com.

3. USG: www.usg.com.
4. Substitutions: See Section 01 6000 - Product Requirements.
- B. Suspension Systems - General: ASTM C635; die cut and interlocking components, with stabilizer bars, clips, splices, and perimeter moldings as required. Grids in toilet and utility rooms shall be aluminum, all others are to be electro-galvanized unless noted otherwise.
- C. Colors: Provide colors as selected by the architect from manufacturer's complete set of standard colors.
- D. Finishes: Manufacturer's standard shop-applied finishes.
- E. Attachment Devices for Suspension System:
- F. Anchors and intermediate support members: Provide sizes capable of sustaining 5 times the load-carrying capabilities shown in ASTM C 635, Table 1, "Direct Hung" column.
- G. Deck inserts and hanger clips: Fabricate from hot-dip galvanized sheet steel with loops or holes for attachment at hanger wires.
- H. Hanger wire: Zinc-coated (galvanized) carbon steel wire, ASTM A 641, soft temper, with Class 1 coating, minimum 10 gage (0.135 inch diameter).
- I. Exposed Steel Suspension System: Formed steel, commercial quality cold rolled; heavy-duty.
 1. Profile: Tee; 15/16 inch (24 mm) wide face.
 2. Construction: Double web.
 3. Finish: White painted.

2.04 ACCESSORIES

- A. Support Channels and Hangers: Galvanized steel; size and type to suit application, seismic requirements, and ceiling system flatness requirement specified.
- B. Perimeter Moldings: Same material and finish as grid.
 1. At Exposed Grid: Provide L-shaped molding for mounting at same elevation as face of grid.
- C. Touch-up Paint: Type and color to match acoustical and grid units.

PART 3 EXECUTION

3.01 EXAMINATION

- A. Examine substrates and conditions under which products of this section are to be installed and verify that the work properly may commence.
- B. Verify existing conditions before starting work.
- C. Verify that layout of hangers will not interfere with other work.
- D. Verify that products furnished as work of this section, but not installed under this section, have been properly installed by the entity performing the installation.

3.02 INSTALLATION - SUSPENSION SYSTEM

- A. Install suspension system in accordance with ASTM C 636, ASTM E 580, and manufacturer's instructions and as supplemented in this section.
- B. Install suspension system in accordance with Guideline CISCA 3-4.
- C. Rigidly secure system, including integral mechanical and electrical components, for maximum deflection of 1:360.

- D. Layout: Position ceiling components to maximize use of full-sized acoustical units and to provide border units which are equal in size and shape at opposing ceiling edges. Use of acoustical units which are smaller than 1/2 full-width is prohibited at ceiling perimeters. Conform to reflected ceiling plans to greatest extent possible.
- E. Install after major above-ceiling work is complete. Coordinate the location of hangers with other work.
- F. Provide hanger clips during steel deck erection. Provide additional hangers and inserts as required.
- G. 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. Do not allow hangers to contact any objects or materials in ceiling plenum which are not actual components of ceiling system.
 - 1. Splay hangers only where necessary to avoid obstacles. Provide counter splaying, bracing, or other acceptable devices to compensate for lateral stresses caused by splayed hangers.
 - 2. Install splay hangers or other means of seismic restraint as required to meet the requirements of International Building Code Section 1621.2.5.2.2, ASTM E 580, and ASCE 7.
 - 3. Do not attach hangers to piping, conduit, or duct. Provide carrying channel trapeze support where obstruction cannot be avoided by splaying hanger 45 degrees from vertical or less.
- H. Space hangers at not more than 48 inches on center and within 6 inches of ends of each direct-hung runner or carrying channel, unless indicated otherwise.
- I. Loop and tie wire hangers securely to building's structural members; to attachment devices indicated; or, where not indicated, to devices suitable for substrate and capable of permanently supporting ceiling weight without failure or deterioration.
- J. Level ceiling suspension system to tolerance of 1/8 inch in 12 feet, with cumulative tolerance not to exceed 1/4 inch. Bending or kinking of hangers is not allowed.
- K. Exposed (Lay-in) Grid Installation: Install grid members square, with ends of members securely interlocked. Remove and replace dented, bent, or kinked members.
- L. 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.
- M. Do not support components on main runners or cross runners if weight causes total dead load to exceed deflection capability.
- N. Support fixture loads using supplementary hangers located within 6 inches (150 mm) of each corner, or support components independently.
- O. Do not eccentrically load system or induce rotation of runners.
- P. Perimeter Molding: Install at intersection of ceiling and vertical surfaces and at junctions with other interruptions.
 - 1. Molding and trim attachment: Space screws not more than 16 inches on center and within 3 inches of ends of each trim-piece being installed. Install moldings and trim level with suspension system and within tolerance specified for suspension system.
 - 2. Use longest practical lengths.

3. Miter corners and align butt joints carefully to form tight hairline joints.
4. Face-riveting of trim and moldings is not allowed.

3.03 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.

3.04 ADJUST AND CLEAN

- A. Use ceiling manufacturer's recommended methods and materials to clean and touch-up exposed components of ceiling system.
- B. Replace ceiling system components which are discolored or damaged in any way, in a manner which results in the ceiling system showing no evidence of replacement work.

3.05 TOLERANCES

- A. Maximum Variation from Flat and Level Surface: 1/8 inch in 10 feet (3 mm in 3 m).
- 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.

1.02 REFERENCE STANDARDS

- A. ASTM E648 - Standard Test Method for Critical Radiant Flux of Floor-Covering Systems Using a Radiant Heat Energy Source; 2010e1.
- B. ASTM F710 - Standard Practice for Preparing Concrete Floors to Receive Resilient Flooring; 2011.
- C. ASTM F1066 - Standard Specification for Vinyl Composition Floor Tile; 2004 (Reapproved 2010)e1.
- D. ASTM F1303 - Standard Specification for Sheet Vinyl Floor Covering with Backing; 2004 (Reapproved 2009).
- E. ASTM F1861 - Standard Specification for Resilient Wall Base; 2008.
- F. ASTM F 1869 -Standard Test Method for Measuring Moisture Vapor Emission Rate of Concrete Sub-floor Using Anhydrous Calcium Chloride; 1998
- G. ASTM F1913 - Standard Specification for Vinyl Sheet Floor Covering Without Backing; 2004 (Reapproved 2010).

1.03 PERFORMANCE REQUIREMENTS

- A. Conform to applicable code for fire performance ratings as follows:
 - 1. Critical radiant flux (CRF): Minimum 0.22 watt per square centimeter, per ASTM E 648.
 - 2. Flame spread: Maximum 75, per ASTM E 84.
 - 3. Smoke developed: Maximum 450, per ASTM E 84.
 - 4. Smoke density: Maximum 450, per ASTM E 662.

1.04 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. Selection Samples: Submit manufacturer's complete set of color samples for Architect's initial selection.
- D. Maintenance Data: Include maintenance procedures, recommended maintenance materials, and suggested schedule for cleaning, stripping, and re-waxing.

1.05 DELIVERY, STORAGE, AND HANDLING

- A. Protect roll materials from damage by storing on end.

1.06 FIELD CONDITIONS

- A. Maintain temperature in storage area between 55 degrees F (13 degrees C) and 90 degrees F (72 degrees C).

- B. Store materials for not less than 48 hours prior to installation in area of installation at a temperature of 70 degrees F (21 degrees C) to achieve temperature stability. Thereafter, maintain conditions above 55 degrees F (13 degrees C).

1.07 EXTRA MATERIALS

- A. See Section 01 6000 - Product Requirements, for additional provisions.
- B. Extra Materials: At time of completing installation, deliver stock of maintenance materials to the owner. Furnish products matching those actually installed, packaged for storage and clearly labeled.
 - 1. Resilient tile: 10 percent of each variety installed.
 - 2. Resilient base: 10 percent of each variety installed.
 - 3. Sheet flooring: 10 percent of each variety installed.

PART 2 PRODUCTS

2.01 TILE FLOORING

- A. Vinyl Composition Tile: Homogeneous, with color extending throughout thickness, and:
 - 1. Minimum Requirements: Comply with ASTM F1066, of Class corresponding to type specified.
 - 2. Size: 12 x 12 inch (305 x 305 mm).
 - 3. Thickness: 0.125 inch (3.2 mm).
 - 4. Manufacturers:
 - a. Armstrong World Industries, Inc: www.armstrong.com.
 - b. Mannington Mills, Inc: www.mannington.com.
 - c. Tarkett Inc: www.tarkett.com.
 - d. Substitutions: See Section 01 6000 - Product Requirements.

2.02 RESILIENT BASE

- A. Resilient Base: ASTM F1861, Type TV, vinyl, thermoplastic; top set Style B, Cove, and as follows:
 - 1. Height: 4 inch (100 mm).
 - 2. Thickness: 0.125 inch (3.2 mm) thick.
 - 3. Finish: Satin.
 - 4. Length: 4 foot (1.2 m) sections.
 - 5. Color: Selected from full range of manufacturer's colors.
 - 6. Accessories: Premolded external corners, internal corners, and end stops.
 - 7. Manufacturers:
 - a. Burke Flooring: www.burkemercer.com.
 - b. Johnsonite, Inc: www.johnsonite.com.
 - c. Roppe Corp: www.roppe.com.
 - d. Marley Flexco .
 - e. Substitutions: See Section 01 6000 - Product Requirements.

2.03 ACCESSORIES

- A. Subfloor Filler: Latex leveling and patching compound; type recommended by adhesive material manufacturer.

- B. Primers, Adhesives, and Seaming Materials: Waterproof; types recommended by flooring manufacturer.
- C. Filler for Coved Base: Plastic.
- D. Sealer and Wax: Types recommended by flooring manufacturer.

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. General: Inspect substrates and conditions of installation to verify that work may properly commence. Do not proceed with the work until unsatisfactory conditions have been corrected.
- C. 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.
- D. Verify that sub-floor surfaces are dust-free and free of substances which would impair bonding of adhesive materials to sub-floor surfaces.
- E. Verify that concrete sub-floor surfaces are dry enough and ready for resilient flooring installation by testing for moisture emission rate and alkalinity in accordance with ASTM F710; obtain instructions if test results are not within limits recommended by resilient flooring manufacturer and adhesive materials manufacturer.
- F. 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 sub-floor ridges and bumps. Fill minor low spots, cracks, joints, holes, and other defects with sub-floor filler to achieve smooth, flat, hard surface.
- C. Prohibit traffic until filler is cured.
- D. Prepare concrete surface as per ASTM F 711 in conjunction with findings from the moisture test.
- E. Clean substrate.
- F. Apply primer as required to prevent "bleed-through" or interference with adhesion by substances that cannot be removed.

3.03 INSTALLATION

- A. Starting installation constitutes acceptance of sub-floor conditions.
- B. Install in accordance with manufacturer's instructions.
- C. Spread only enough adhesive to permit installation of materials before initial set.
- D. Fit joints tightly.
- E. Set flooring in place, press with heavy roller to attain full adhesion.
- F. Where type of floor finish, pattern, or color are different on opposite sides of door, terminate flooring under centerline of door.

- G. Install edge strips at unprotected or exposed edges, where flooring terminates, and where indicated.
 - 1. Resilient Strips: Attach to substrate using adhesive.
- H. Scribe flooring to walls, columns, cabinets, floor outlets, and other appurtenances to produce tight joints.

3.04 TILE FLOORING

- A. Install in accordance with manufacturer's instructions.
- B. Mix tile from container to ensure shade variations are consistent when tile is placed, unless manufacturer's instructions say otherwise.
- C. Layout: Establish center of each space and lay tile from center point, so tiles at each edge will be not less than 1/2 tile and equal in width.
- D. Installation: Apply adhesive with notched trowel, following manufacturer's instructions. Install tile only after adhesive has developed sufficient tack, firmly butting tiles to achieve hairline joints. Roll each area of installation at regular intervals, to assure firm bonding of tiles to substrate.
- E. Spread only enough adhesive to permit installation of materials before initial set.
- F. Set flooring in place, press with heavy roller to attain full adhesion.
- G. Matching: In each space, use tiles from same production run, and lay tiles in same sequence as removed from cartons. Discard broken, chipped, or otherwise damaged tiles.
 - 1. Lay tile to achieve monolithic appearance, with pattern in all tiles oriented in same direction.
 - 2. Lay tile in patterns indicated on drawings.
- H. Lay flooring with joints and seams parallel to building lines to produce symmetrical tile pattern.
- I. Where floor finishes are different on opposite sides of door, terminate flooring under centerline of door.
- J. Install edge strips at unprotected or exposed edges, where flooring terminates, and where indicated.
- K. Scribe flooring to walls, columns, cabinets, floor outlets, and other appurtenances to produce tight joints.
- L. Install flooring in recessed floor access covers. Maintain floor pattern.

3.05 RESILIENT BASE

- A. Apply base securely in locations indicated, using maximum lengths available to minimize joints. Adhere to substrate with full spread of adhesive, assuring continuous contact with vertical and horizontal surfaces. Provide preformed corner units at 90 degree intersections.
 - 1. Apply resilient base to columns and other fixed, freestanding elements in spaces where resilient base is scheduled.
 - 2. At irregular vertical surfaces where top edge of resilient base does not make continuous contact, fill voids with manufacturer's recommended adhesive compound.
- B. Fit joints tightly and make vertical. Maintain minimum dimension of 18 inches (45 mm) between joints.

- C. Miter internal corners. At external corners, use premolded units. At exposed ends, use premolded units.
- D. Install base on solid backing. Bond tightly to wall and floor surfaces.
- E. Scribe and fit to door frames and other interruptions.

3.06 CLEANING

- A. Remove excess adhesive from base, and wall surfaces without damage.
- B. Clean in accordance with manufacturer's instructions.
- C. Initial Cleaning: Remove excess and waste materials promptly, and sweep or vacuum clean resilient flooring as soon as installation has been completed in each area. After adhesive has had adequate time to set, mop each area with damp mop and mild detergent.
- D. Final Cleaning: Remove scuff marks, excess adhesive, and other foreign substances, using only cleaning products and techniques recommended by manufacturer of resilient products.
- E. Clean, seal, and wax resilient flooring products in accordance with manufacturer's instructions.

3.07 PROTECTION

- A. Prohibit traffic on resilient flooring for 48 hours after installation.
- B. Construction Period: Cover traffic routes across completed resilient flooring with plywood, hardboard, or other durable material to protect against damage from loaded dollies and other construction traffic.
 - 1. Polish: Apply protective polish to clean resilient flooring surfaces, unless manufacturer of resilient product recommends otherwise.
- C. Final Protection: Cover resilient floor surface with nonstaining building paper until substantial completion in each area.

END OF SECTION

SECTION 09 9000 - PAINTING AND COATING

PART 1 GENERAL

1.01 SECTION INCLUDES

- A. Surface preparation.
- B. Field application of paints and other coatings.
- C. Scope: Finish all interior surfaces exposed to view, unless fully factory-finished and unless otherwise indicated, including the following:
- D. Do Not Paint or Finish the Following Items:
 - 1. Items fully factory-finished unless specifically so 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. Floors, unless specifically so indicated.
 - 6. Glass.
 - 7. Concealed pipes, ducts, and conduits.

1.02 SUBMITTALS

- A. See Section 01 3000 - Administrative Requirements, for submittal procedures.
- B. Product Data: Provide complete list of all 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 on cleaning, touch-up, and repair of painted and coated surfaces.

1.03 QUALITY ASSURANCE

- A. Manufacturer Qualifications: Company specializing in manufacturing the products specified, with minimum three years documented experience.

1.04 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 (7 degrees C) and a maximum of 90 degrees F (32 degrees C), in ventilated area, and as required by manufacturer's instructions.

1.05 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. Minimum Application Temperatures for Latex Paints: 45 degrees F (7 degrees C) for interiors; 50 degrees F (10 degrees C) for exterior; unless required otherwise by manufacturer's instructions.
- D. Provide lighting level of 80 ft candles (860 lx) measured mid-height at substrate surface.

PART 2 PRODUCTS

2.01 MANUFACTURERS

- A. Provide all paint and coating products used in any individual system from the same manufacturer; no exceptions.
- B. Paints:
 - 1. Duron, Inc: www.duron.com.
 - 2. Glidden Professional: www.gliddenprofessional.com.
 - 3. Benjamin Moore & Co: www.benjaminmoore.com.
 - 4. Sherwin-Williams Company: www.sherwin-williams.com.
- C. Substitutions: See Section 01 6000 - Product Requirements.

2.02 PAINTS AND COATINGS - GENERAL

- A. Paints and Coatings: Ready mixed, unless intended to be a field-catalyzed coating.
 - 1. Where MPI paint numbers are specified, provide products listed in Master Painters Institute Approved Product List, current edition available at www.paintinfo.com, for specified MPI categories, except as otherwise indicated.
 - 2. Provide paints and coatings 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.
 - 3. 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.
 - 4. 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.
 - 5. Supply each coating material in quantity required to complete entire project's work from a single production run.
 - 6. Do not reduce, thin, or dilute coatings or add materials to coatings unless such procedure is specifically described in manufacturer's product instructions.
- B. Primers: 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 coatings 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.
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. Colors: To be selected from manufacturer's full range of available colors.
 1. Selection to be made by Architect after award of contract.

2.03 PAINT SYSTEMS - INTERIOR

- A. Paint I-OP - All Interior Surfaces Indicated to be Painted, Unless Otherwise Indicated: Including gypsum board, concrete, plaster, uncoated steel, and shop primed steel.
 1. Two top coats and one coat primer.
 2. Top Coat(s): MPI High Performance Architectural Interior Latex; MPI #138-141.
 3. Eggshell: MPI gloss level 3; use this sheen at all locations.
 4. Semi-Gloss: MPI gloss level 5; use this sheen at hollow metal doors and frames.
 5. Primer(s): As recommended by manufacturer of top coats.

2.04 ACCESSORY MATERIALS

- A. Accessory Materials: Provide all primers, sealers, cleaning agents, cleaning cloths, sanding materials, and clean-up materials required to achieve the finishes specified whether specifically indicated or not; commercial quality.
- B. Patching Material: Latex filler.
- C. Fastener Head Cover Material: Latex filler.

PART 3 EXECUTION

3.01 EXAMINATION

- A. Do not begin application of coatings 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 affect 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. Gypsum Wallboard: 12 percent.
 2. Plaster and Stucco: 12 percent.

3.02 PREPARATION

- A. Clean surfaces thoroughly and correct defects prior to coating 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 mask 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. Gypsum Board Surfaces to be Painted: Fill minor defects with filler compound. Spot prime defects after repair.
- G. Plaster Surfaces to be Painted: Fill hairline cracks, small holes, and imperfections with latex patching plaster. Make smooth and flush with adjacent surfaces. Wash and neutralize high alkali surfaces.
- H. Shop-Primed Steel Surfaces to be Finish Painted: 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.
- I. Metal Doors to be Painted: Prime metal door top and bottom edge surfaces.

3.03 APPLICATION

- A. Apply products in accordance with manufacturer's instructions.
- B. Where adjacent sealant is to be painted, do not apply finish coats until sealant is applied.
- C. Do not apply finishes to surfaces that are not dry. Allow applied coats to dry before next coat is applied.
- D. Apply each coat to uniform appearance.
- E. Dark Colors and Deep Clear Colors: Regardless of number of coats specified, apply as many coats as necessary for complete hide.
- F. Sand metal surfaces lightly between coats to achieve required finish.
- G. Vacuum clean surfaces of loose particles. Use tack cloth to remove dust and particles just prior to applying next coat.
- H. Reinstall electrical cover plates, hardware, light fixture trim, escutcheons, and fittings removed prior to finishing.

3.04 FIELD QUALITY CONTROL

- A. See Section 01 4000 - Quality Requirements, for general requirements for field inspection.

3.05 CLEANING

- A. Collect waste material that could constitute a fire hazard, place in closed metal containers, and remove daily from site.

3.06 PROTECTION

- A. Protect finished coatings until completion of project.
- B. Touch-up damaged coatings after Substantial Completion.

END OF SECTION

D I V I S I O N 23

**Applicable Portions Of The Conditions
Of The Contract And Division 1 General
Requirements Apply To The Work Of
This Division.**

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SECTION 23 0513 - COMMON MOTOR REQUIREMENTS FOR HVAC EQUIPMENT

PART 1 GENERAL

1.01 SECTION INCLUDES

- A. Three phase electric motors.

1.02 REFERENCE STANDARDS

- A. ABMA STD 9 - Load Ratings and Fatigue Life for Ball Bearings; American Bearing Manufacturers Association, Inc.; 1990 (Reapproved 2008).
- B. IEEE 112 - IEEE Standard Test Procedure for Polyphase Induction Motors and Generators; Institute of Electrical and Electronic Engineers; 2004.
- C. NEMA MG 1 - Motors and Generators; National Electrical Manufacturers Association; 2011.
- D. NFPA 70 - National Electrical Code; National Fire Protection Association; Most Recent Edition Adopted by Authority Having Jurisdiction, Including All Applicable Amendments and Supplements.

1.03 SUBMITTALS

- A. See Section 01 3000 - Administrative Requirements, for submittal procedures.

1.04 DELIVERY, STORAGE, AND HANDLING

- A. Protect motors stored on site from weather and moisture by maintaining factory covers and suitable weather-proof covering. For extended outdoor storage, remove motors from equipment and store separately.

1.05 WARRANTY

- A. See Section 01 7800 - Closeout Submittals, for additional warranty requirements.

PART 2 PRODUCTS

2.01 MANUFACTURERS

- A. Lincoln Motors: www.lincolnmotors.com.
- B. A. O. Smith Electrical Products Company: www.aosmithmotors.com.
- C. Reliance Electric/Rockwell Automation: www.reliance.com.
- D. Substitutions: See Section 01 6000 - Product Requirements.

2.02 GENERAL CONSTRUCTION AND REQUIREMENTS

- A. Construction:
 - 1. Open drip-proof type except where specifically noted otherwise.
 - 2. Design for continuous operation in 40 degrees C environment.
 - 3. Design for temperature rise in accordance with NEMA MG 1 limits for insulation class, service factor, and motor enclosure type.
- B. Visible Nameplate: Indicating motor horsepower, voltage, phase, cycles, RPM, full load amps, locked rotor amps, frame size, manufacturer's name and model number, service factor, power factor, efficiency.
- C. Wiring Terminations:
 - 1. Provide terminal lugs to match branch circuit conductor quantities, sizes, and materials indicated. Enclose terminal lugs in terminal box sized to NFPA 70, threaded for conduit.

2. For fractional horsepower motors where connection is made directly, provide threaded conduit connection in end frame.

2.03 APPLICATIONS

2.04 THREE PHASE POWER - SQUIRREL CAGE MOTORS

- A. Starting Torque: Between 1 and 1-1/2 times full load torque.
- B. Starting Current: Six times full load current.
- C. Power Output, Locked Rotor Torque, Breakdown or Pull Out Torque: NEMA Design B characteristics.
- D. Design, Construction, Testing, and Performance: Conform to NEMA MG 1 for Design B motors.
- E. Insulation System: NEMA Class B or better.
- F. Testing Procedure: In accordance with IEEE 112. Load test motors to determine free from electrical or mechanical defects in compliance with performance data.
- G. Motor Frames: NEMA Standard T-Frames of steel, aluminum, or cast iron with end brackets of cast iron or aluminum with steel inserts.
- H. Thermistor System (Motor Frame Sizes 254T and Larger): Three PTC thermistors embedded in motor windings and epoxy encapsulated solid state control relay for wiring into motor starter.
- I. Bearings: Grease lubricated anti-friction ball bearings with housings equipped with plugged provision for relubrication, rated for minimum ABMA STD 9, L-10 life of 20,000 hours. Calculate bearing load with NEMA minimum V-belt pulley with belt center line at end of NEMA standard shaft extension. Stamp bearing sizes on nameplate.
- J. Sound Power Levels: To NEMA MG 1.
- K. Part Winding Start Where Indicated: Use part of winding to reduce locked rotor starting current to approximately 60 percent of full winding locked rotor current while providing approximately 50 percent of full winding locked rotor torque.
- L. Weatherproof Epoxy Sealed Motors: Epoxy seal windings using vacuum and pressure with rotor and starter surfaces protected with epoxy enamel; bearings double shielded with waterproof non-washing grease.
- M. Nominal Efficiency: As scheduled at full load and rated voltage when tested in accordance with IEEE 112.
- N. Nominal Power Factor: As scheduled at full load and rated voltage when tested in accordance with IEEE 112.

PART 3 EXECUTION

3.01 INSTALLATION

- A. Install in accordance with manufacturer's instructions.
- B. Install securely on firm foundation. Mount ball bearing motors with shaft in any position.
- C. Check line voltage and phase and ensure agreement with nameplate.

END OF SECTION

SECTION 23 0519 - METERS AND GAGES FOR HVAC PIPING

PART 1 GENERAL

1.01 SECTION INCLUDES

- A. Flow meters.
- B. Pressure gages and pressure gage taps.
- C. Thermometers and thermometer wells.

1.02 RELATED REQUIREMENTS

- A. Section 23 2113 - Hydronic Piping.
- B. Section 23 0923 - Direct-Digital Control System for HVAC.
- C. Section 23 0993 - Sequence of Operations for HVAC Controls.

1.03 SUBMITTALS

- A. See Section 01 3000 - Administrative Requirements, for submittal procedures.

PART 2 PRODUCTS

2.01 HEAT CONSUMPTION METERS

- A. Manufacturers:
 - 1. Onicon.
 - 2. Substitutions: See Section 01 6000 - Product Requirements.

2.02 PRESSURE GAGES

- A. Manufacturers:
 - 1. Dwyer Instruments, Inc: www.dwyer-inst.com.
 - 2. Moeller Instrument Co., Inc: www.moellerinstrument.com.
 - 3. Omega Engineering, Inc: www.omega.com.
 - 4. Substitutions: See Section 01 6000 - Product Requirements.
- B. Pressure Gages: ASME B40.100, UL 393 drawn steel case, phosphor bronze bourdon tube, rotary brass movement, brass socket, with front recalibration adjustment, black scale on white background.
 - 1. Case: Steel with brass bourdon tube.
 - 2. Size: 4-1/2 inch (115 mm) diameter.
 - 3. Mid-Scale Accuracy: One percent.
 - 4. Scale: Psi and KPa.

2.03 PRESSURE GAGE TAPPINGS

- A. Gage Cock: Tee or lever handle, brass for maximum 150 psi (1034 kPa).
- B. Needle Valve: Brass, 1/4 inch (6 mm) NPT for minimum 150 psi (1034 kPa).
- C. Pulsation Damper: Pressure snubber, brass with 1/4 inch (6 mm) connections.

2.04 STEM TYPE THERMOMETERS

END OF SECTION

SECTION 23 0520 - VARIABLE FREQUENCY CONTROLLERS

PART 1 GENERAL

1.01 SECTION INCLUDES

- A. Variable frequency controllers.

1.02 RELATED SECTIONS

1.03 REFERENCES

- A. NEMA ICS 7.1 - Safety Standards for Construction and Guide for Selection, Installation, and Operation of Adjustable Speed Drive Systems; National Electrical Manufacturers Association; 1995.
- B. NEMA ICS 7 - Industrial Control and Systems: Adjustable Speed Drives; National Electrical Manufacturers Association; 1993.
- C. NEMA 250 - Enclosures for Electrical Equipment (1000 Volts Maximum); National Electrical Manufacturers Association; 1997.
- D. NETA STD ATS - Acceptance Testing Specifications for Electrical Power Distribution Equipment and Systems; International Electrical Testing Association; 1999.
- E. NFPA 70 - National Electrical Code; National Fire Protection Association; 1999.

1.04 SUBMITTALS

- A. See Section 01300 - Administrative Requirements, for submittal procedures.
- B. Product Data: Provide catalog sheets showing voltage, controller size, ratings and size of switching and overcurrent protective devices, short circuit ratings, dimensions, and enclosure details.
- C. Shop Drawings: Indicate front and side views of enclosures with overall dimensions and weights shown; conduit entrance locations and requirements; and nameplate legends.
- D. Test Reports: Indicate field test and inspection procedures and test results.
- E. Manufacturer's Instructions: Indicate application conditions and limitations of use stipulated by testing agency. Include instructions for storage, handling, protection, examination, preparation, and installation of product.
- F. Manufacturer's Field Reports: Indicate start-up inspection findings.
- G. Operation Data: NEMA ICS 7.1. Include instructions for starting and operating controllers, and describe operating limits that may result in hazardous or unsafe conditions.
- H. Maintenance Data: NEMA ICS 7.1. Include routine preventive maintenance schedule.
- I. Operation and Maintenance Manuals: Include in manuals the information listed below. For information on how to prepare and submit manuals see section 1780 (Closeout Submittals).
 - 1. Local representative
 - 2. Emergency instructions
 - 3. Recommended spare parts
 - 4. Spare parts lists
 - 5. Operating instructions
 - 6. Maintenance instructions, including preventative and corrective maintenance.
 - 7. Copies of warranties

- 8. Wiring diagrams
- 9. Shop drawings and product data

1.05 QUALITY ASSURANCE

- A. Conform to requirements of NFPA 70.
- B. Manufacturer Qualifications: Company specializing in manufacturing the products specified in this section with minimum three years documented experience and with service facilities within 100 miles (160 km) of Project.
- C. Products: Listed and classified by Underwriters Laboratories, Inc. as suitable for the purpose specified and indicated.

1.06 DELIVERY, STORAGE, AND HANDLING

- A. Store in a clean, dry space. Maintain factory wrapping or provide an additional heavy canvas or heavy plastic cover to protect units from dirt, water, construction debris, and traffic.
- B. Handle in accordance with manufacturer's written instructions. Lift only with lugs provided for the purpose. Handle carefully to avoid damage to components, enclosure, and finish.

1.07 MAINTENANCE SERVICE

- A. Provide service and maintenance of controller for one year from Date of Substantial Completion.

PART 2 PRODUCTS

2.01 MANUFACTURERS

- A. Emerson
- B. AAB
- C. Eaton
- D. Square D:

2.02 DESCRIPTION

- A. Variable Frequency Controllers: Enclosed controllers suitable for operating the indicated loads, in conformance with requirements of NEMA ICS 7. Select unspecified features and options in accordance with NEMA ICS 3.1.
 - 1. Employ microprocessor-based inverter logic isolated from power circuits.
 - 2. Employ pulse-width-modulated inverter system.
 - 3. Design for ability to operate controller with motor disconnected from output.
 - 4. Design to attempt five automatic restarts following fault condition before locking out and requiring manual restart.
- B. Enclosures: NEMA 250, Type 1, suitable for equipment application in places regularly open to the public.

2.03 COMPONENTS

- A. Display: Provide integral digital display to indicate output voltage, output frequency, and output current.
- B. Status Indicators: Separate indicators for overcurrent, overvoltage, ground fault, overtemperature, and input power ON.
- C. Furnish HAND-OFF-AUTOMATIC selector switch and manual speed control.

- D. Include undervoltage release.
- E. Control Power Source: Integral control transformer.
- F. Door Interlocks: Furnish mechanical means to prevent opening of equipment with power connected, or to disconnect power if door is opened; include means for defeating interlock by qualified persons.
- G. Safety Interlocks: Furnish terminals for remote contact to inhibit starting under both manual and automatic mode.
- H. Control Interlocks: Furnish terminals for remote contact to allow starting in automatic mode.
- I. Manual Bypass: Furnish contactor, motor running overload protection, and short circuit protection for full voltage, non-reversing operation of the motor. Include isolation switch to allow maintenance of inverter during bypass operation.
- J. Emergency Stop: Use dynamic brakes for emergency stop function.
- K. Disconnecting Means: Include integral fused disconnect switch on the line side of each controller.
- L. Wiring Terminations: Match conductor materials and sizes indicated.
- M. Manual Speed Control Potentiometer to set speed in the manual mode.
- N. Minimum and maximum speed adjustment potentiometers.
- O. Isolation transformer or line filters to guarantee compliance with FCC Rule 15, subpart J and IEEE STD 519-1981.
- P. Speed indicating meter, calibrated in per cent speed, to indicate speed of the converter-powered motor.
- Q. Status lights for all normal and alarm functions.
- R. 120 volt control transformer and instrument outlet.
- S. Voltmeter - 0-500 volt scale.
- T. Over temperature trip and alarm light.
- U. Manual - Auto bypass with across the line magnetic motor starter - To operate motor at constant speed.

PART 3 EXECUTION

3.01 EXAMINATION

- A. Verify that surface is suitable for controller installation.
- B. Do not install controller until building environment can be maintained within the service conditions required by the manufacturer.

3.02 INSTALLATION

- A. Install in accordance with NEMA ICS 7.1 and manufacturer's instructions.
- B. Tighten accessible connections and mechanical fasteners after placing controller.
- C. Provide fuses in fusible switches; refer to Section 16491 for product requirements.
- D. Select and install overload heater elements in motor controllers to match installed motor characteristics.

- E. Neatly type label inside each motor controller door identifying motor served, nameplate horsepower, full load amperes, code letter, service factor, and voltage/phase rating. Place in clear plastic holder.

3.03 FIELD QUALITY CONTROL

- A. Perform field inspection and testing in accordance with Section 01400.
- B. Inspect and test in accordance with NETA STD ATS, except Section 4.
- C. Perform inspections and tests listed in NETA STD ATS, Section 7.17.

3.04 MANUFACTURER'S FIELD SERVICES

- A. Provide the service of the manufacturer's field representative to prepare and start controllers.

3.05 ADJUSTING

- A. Make final adjustments to installed controller to assure proper operation of load system. Obtain performance requirements from installer of driven loads.

3.06 DEMONSTRATION

- A. Demonstrate operation of controllers in automatic and manual modes.

END OF SECTION

SECTION 23 0548 - VIBRATION AND SEISMIC CONTROLS

PART 1 GENERAL

1.01 SECTION INCLUDES

- A. Seismic restraints for suspended components and equipment..
- B. Vibration isolators.
- C. Seismic restraints.

1.02 REFERENCE STANDARDS

- A. ASCE 7 - Minimum Design Loads for Buildings and Other Structures; 2010.
- B. ASHRAE (HVACA) - ASHRAE Handbook - HVAC Applications; American Society of Heating, Refrigerating and Air-Conditioning Engineers, Inc.; 2011.
- C. FEMA 414 - Installing Seismic Restraints for Duct and Pipe; 2004.

1.03 SUBMITTALS

- A. See Section 01 3000 - Administrative Requirements, for submittal procedures.

PART 2 PRODUCTS

2.01 MANUFACTURERS

- A. Isolation Technology, Inc: www.isolationtech.com.
- B. Kinetics Noise Control, Inc: www.kineticsnoise.com.
- C. Mason Industries: www.mason-ind.com.

2.02 VIBRATION ISOLATION AND SEISMIC RESTRAINTS

- A. General:
 - 1. Housekeeping Pads
 - a. Housekeeping pad reinforcement and monolithic pad attachment to the structure details and design shall be prepared by the restraint vendor if not already indicated on the drawings.
 - b. Housekeeping pads shall be coordinated with restraint vendor and sized to provide a minimum edge distance of ten (10) bolt diameters all around the outermost anchor bolt to allow development of full drill-in wedge anchor ratings. If cast-in anchors are to be used, the housekeeping pads shall be sized to accommodate the ACI requirements for bolt coverage and embedment.
 - 2. Supplementary Support Steel
 - a. Contractor shall supply supplementary support steel for all equipment, piping, ductwork, etc. including roof mounted equipment, as required or specified.
 - 3. Attachments:
 - a. Contractor shall supply restraint attachment plates cast into housekeeping pads, concrete inserts, double sided beam clamps, etc. in accordance with the requirements of the vibration vendor's calculations.
- B. Specification Type "E"
 - 1. Spring isolators shall be free standing and laterally stable without any housing and complete with a molded neoprene cup or 1/4" (6mm) neoprene acoustical friction pad between the baseplate and the support. All mountings shall have leveling bolts that must

be rigidly bolted to the equipment. Spring diameters shall be no less than 0.8 of the compressed height of the spring at rated load. Springs shall have a minimum additional travel to solid equal to 50% of the rated deflection. Submittals shall include spring diameters, deflection, compressed spring height and solid spring height.

2. Mason Industries, Inc. type SLF

C. Specification Type "F"

1. Restrained spring mountings shall have an SLF mounting as described in Specification 5, within a rigid housing that includes vertical limit stops to prevent spring extension when weight is removed. The housing shall serve as blocking during erection. Installed and operating heights are equal. A minimum clearance of 1/2" (12mm) shall be maintained around restraining bolts and between the housing and the spring so as not to interfere with the spring action. Restraining Bolts shall have a neoprene bushing between the bolt and the housing. Limit stops shall be out of contact during normal operation. Since housings will be bolted or welded in position there must be an internal isolation pad. Housing shall be designed to resist all seismic forces. Mountings shall have Anchorage Preapproval "OPA" Number from OSHPD in the state of California certifying the maximum certified horizontal and vertical load ratings.
2. Mason Industries, Inc. type SLR or SLRS.

D. Specification Type "J"

1. Hangers shall consist of rigid steel frames containing minimum 1 1/4" (32mm) thick neoprene elements at the top and a steel spring with general characteristics as in specification E seated in a steel washer reinforced neoprene cup on the bottom. The neoprene element and the cup shall have neoprene bushings projecting through the steel box. To maintain stability the boxes shall not be articulated as clevis hangers nor the neoprene element stacked on top of the spring. Spring diameters and hanger box lower hole sizes shall be large enough to permit the hanger rod to swing through a 30 arc from side to side before contacting the rod bushing and short circuiting the spring. Submittals shall include a hanger drawing showing the 30 capability.
2. Mason Industries, Inc. type 30N.

E. Specification Type "JA"

1. Hangers shall be as described in J, but they shall be supplied with a combination rubber and steel rebound washer as the seismic upstop for suspended piping, ductwork, equipment and electrical cabletrays. Rubber thickness shall be a minimum of 1/4" (6mm). Submittals shall include a drawing of the hanger showing the installation of the rebound washer.
2. Mason Industries, Inc. type RW30N.

F. Specification Type "K"

1. Hangers shall be as described in J, but they shall be precompressed and locked at the rated deflection by means of a resilient seismic upstop to keep the piping or equipment at a fixed elevation during installation. The hangers shall be designed with a release mechanism to free the spring after the installation is complete and the hanger is subjected to its full load. Deflection shall be clearly indicated by means of a scale. Submittals shall include a drawing of the hanger showing the 30 capability.
2. Mason Industries, Inc. type PC30N.

G. Specification Type "L"

1. Seismic Cable Restraints shall consist of galvanized steel aircraft cables sized to resist seismic loads with a minimum safety factor of two and arranged to provide all-directional restraint. Cables must be prestretched to achieve a certified minimum modulus of elasticity. Cable end connections shall be steel assemblies that swivel to final installation angle and utilize two clamping bolts to provide proper cable engagement. Cables must not be allowed to bend across sharp edges. Cable assemblies shall have an Anchorage Preapproval "OPA" Number from OSHPD in the State of California verifying the maximum certified load ratings.
 2. Mason Industries, Inc. type SCB at the ceiling and at the clevis bolt, SCBH between the hanger rod nut and the clevis or SCBV if clamped to a beam.
 3. Specifications L applies to trapeze as well as clevis hanger locations. At trapeze anchor locations piping must be shackled to the trapeze.
 4. Specification L applies to hanging equipment as well.
- H. Specification Type "M"
1. Seismic solid braces shall consist of steel angles or channels to resist seismic loads with a minimum safety factor of 2 and arranged to provide all directional restraint. Seismic solid brace end connectors shall be steel assemblies that swivel to the final installation angle and utilize two through bolts to provide proper attachment. Seismic solid brace assembly shall have anchorage preapproval "OPA" number from OSHPD in the state of California verifying the maximum certified load ratings.
 2. Mason Industries, Inc. type SSB, SSBS or SSRF.
 3. Specifications M applies to trapeze as well as clevis hanger locations. At trapeze anchor locations piping must be shackled to the trapeze.
 4. Specification M applies to hanging equipment as well.
- I. Specification Type "N"
1. Steel angles, sized to prevent buckling, shall be clamped to pipe or equipment rods utilizing a minimum of three ductile iron clamps at each restraint location when required. Welding of support rods is not acceptable. Rod clamp assemblies shall have an Anchorage Preapproval "OPA" Number from OSHPD in the State of California.
 2. Mason Industries, Inc. type SRC or UC.
 3. Specifications N applies to trapeze as well as clevis hanger locations. At trapeze anchor locations piping must be shackled to the trapeze.
 4. Specification N applies to hanging equipment as well.
- J. Specification Type "O"
1. Pipe clevis cross bolt braces are required in all restraint locations. They shall be special purpose preformed channels deep enough to be held in place by bolts passing over the cross bolt. Clevis cross braces shall have an Anchorage Preapproval "OPA" Number from OSHPD in the State of California.
 2. Mason Industries, Inc. type CCB.
- K. Specification Type "P"
1. All-directional seismic snubbers shall consist of interlocking steel members restrained by a one-piece molded neoprene bushing of bridge bearing neoprene. Bushing shall be replaceable and a minimum of 1/4" (6mm) thick. Rated loadings shall not exceed 1000 psi (.7kg/mm²). A minimum air gap of 1/8" (3mm) shall be incorporated in the snubber design in all directions before contact is made between the rigid and resilient surfaces.

Snubber end caps shall be removable to allow inspection of internal clearances. Neoprene bushings shall be rotated to insure no short circuits exist before systems are activated.

Snubbers shall have an Anchorage Preapproval "OPA" Number from OSHPD in the State of California verifying the maximum certified horizontal and vertical load ratings.

2. Mason Industries, Inc. type Z-1225.

L. Specification Type "U"

1. Vibration isolation manufacturer shall furnish rectangular steel concrete pouring forms for floating and inertia foundations. Bases for split case pumps shall be large enough to provide for suction and discharge elbows. Bases shall be a minimum of 1/12 of the longest dimension of the base but not less than 6" (150mm). The base depth need not exceed 12" (300mm) unless specifically recommended by the base manufacturer for mass or rigidity. Forms shall include minimum concrete reinforcing consisting of 1/2" (12mm) bars welded in place on 6" (150mm) centers running both ways in a layer 1 1/2" (38mm) above the bottom. Forms shall be furnished with steel templates to hold the anchor bolts sleeves and anchors while concrete is being poured. Height saving brackets shall be employed in all mounting locations to maintain a 1" (25mm) clearance below the base. Wooden formed bases leaving a concrete rather than a steel finish are not acceptable.
2. Mason Industries, Inc. type BMK or K.

M. Specification Type "W"

1. Flexible spherical expansion joints shall employ peroxide cured EPDM in the covers, liners and Kevlar® tire cord frictioning. Any substitutions must have equal or superior physical and chemical characteristics. Solid steel rings shall be used within the raised face rubber flanged ends to prevent pullout. Flexible cable bead wire is not acceptable. Sizes 2" (50mm) and larger shall have two spheres reinforced with a ductile iron external ring between spheres. Flanges shall be split ductile iron or steel with hooked or similar interlocks. Sizes 16" (400mm) to 24" (600mm) may be single sphere. Sizes 3/4" (19mm) to 1 1/2" (38mm) may have threaded two piece bolted flange assemblies, one sphere and cable retention. Connectors shall be rated at 250 psi (1.72MPa) up to 170F (77C) with a uniform drop in allowable pressure to 215 psi (1.48MPa) at 250F (121C) in sizes through 14" (350mm). 16" (400mm) through 24" (600mm) single sphere minimum ratings are 180 psi (1.24MPa) at 170F (77C) and 150 psi (1.03MPa) at 250F (121C). Higher rated connectors may be used to accommodate service conditions. All expansion joints must be factory tested to 150% of rated pressure for 12 minutes before shipment. Safety factors to burst and flange pullout shall be a minimum of 3/1. Concentric reducers to the above ratings may be substituted for equal ended expansion joints.
 - a. Expansion joints shall be installed in piping gaps equal to the length of the expansion joints under pressure. Control rods need only be used in unanchored piping locations where the manufacturer determines the installation exceeds the pressure requirement without control rods. If control rods are used, they must have 1/2" (12mm) thick Neoprene washer bushings large enough in diameter to take the thrust at 1000 psi (.7 kg/mm²) maximum on the washer area.
 - b. Submittals shall include two test reports by independent consultants showing minimum reductions of 20 DB in vibration accelerations and 10 DB in sound pressure levels at typical blade passage frequencies on this or a similar product by the same manufacturer. All expansion joints shall be installed on the equipment side of the shut off valves.

2. Mason Industries, Inc. type SAFEFLEX SFDEJ, SFEJ, SFDJR or SFU and Control Rods CR.
- N. Specification Type "X"
1. Flexible stainless steel hose shall have stainless steel braid and carbon steel fittings. Sizes 3" (75mm) and larger shall be flanged. Smaller sizes shall have male nipples. Minimum lengths shall be as tabulated:
 - a. Flanged
 - 1) 3" x 14" (75 x 350mm)
 - 2) 6" x 20" (150 x 500mm)
 - 3) 12" x 28" (300 x 700mm)
 - 4) 4" x 15" (100 x 375mm)
 - 5) 8" x 22" (200 x 550mm)
 - 6) 14" x 30" (350 x 750mm)
 - 7) 5" x 19" (125 x 475mm)
 - 8) 10" x 26" (250 x 650mm)
 - 9) 16" x 32" (400 x 800mm)
 - b. Male Nipples
 - 1) 1/2" x 9" (12 x 225mm)
 - 2) 1 1/4" x 12" (32 x 300mm)
 - 3) 2" x 14" (50 x 350mm)
 - 4) 3/4" x 10" (19 x 250mm)
 - 5) 1 1/2" x 13" (38 x 325mm)
 - 6) 2 1/2" x 18" (64 x 450mm)
 - 7) 1" x 11" (25 x 275mm)
 - c. Hoses shall be installed on the equipment side of the shut-off valves horizontally and parallel to the equipment shafts wherever possible.
 2. Mason Industries, Inc. type BSS.
- O. Specification Type "Y"
1. All-directional acoustical pipe anchor, consisting of two sizes of steel tubing separated by a minimum 1/2" (12mm) thick 60 durometer neoprene. Vertical restraint shall be provided by similar material arranged to prevent vertical travel in either direction. Allowable loads on the isolation material should not exceed 500 psi (.35 kg/mm²) and the design shall be balanced for equal resistance in any direction.
 2. Mason Industries, Inc. type ADA.
- P. Specification Type "Z"
1. Pipe guides shall consist of a telescopic arrangement of two sizes of steel tubing separated by a minimum 1/2" (12mm) thickness of 60 durometer neoprene. The height of the guides shall be preset with a shear pin to allow vertical motion due to pipe expansion or contraction. Shear pin shall be removable and reinsertable to allow for selection of pipe movement. Guides shall be capable of $\pm 1 \frac{5}{8}$ " (41mm) motion, or to meet location requirements.
 2. Mason Industries, Inc. type VSG.
- Q. Specification Type "AA"

1. Split Wall Seals consist of two bolted pipe halves with minimum 3/4" (19mm) thick neoprene sponge bonded to the inner faces. The seal shall be tightened around the pipe to eliminate clearance between the inner sponge face and the piping. Concrete may be packed around the seal to make it integral with the floor, wall or ceiling if the seal is not already in place around the pipe prior to the construction of the building member. Seals shall project a minimum of 1" (25mm) past either face of the wall. Where temperatures exceed 240F(115C), 10# (4.5kg) density fiberglass may be used in lieu of the sponge.
2. Mason Industries, Inc. type SWS.

2.03 VIBRATION ISOLATION OF PIPING

A. Horizontal pipe isolation:

1. The first four pipe hangers in the main lines near the mechanical equipment shall be as described in specification K. Brace hanger rods with SRC clamps specification N.
2. Horizontal runs in all other locations throughout the building shall be isolated by hangers as described in specification J & JA.
3. Floor supported piping shall rest on isolators as described in specification F.
4. Heat exchangers and expansion tanks are considered part of the piping run. The first three isolators from the isolated equipment will have the same static deflection as specified for the mountings under the connected equipment.
5. Piping connected to equipment located in basements and hangs from ceilings under occupied spaces the first three hangers shall have:
 - a. 0.75" (19mm) deflection for pipe sizes up to and including 3" (75mm).
 - b. 1 1/2" (38mm) deflection for pipe sizes up to and including 6" (150mm).
 - c. 2 1/2" (64mm) deflection thereafter.
 - d. Hangers shall be located as close to the overhead structure as practical. Hanger locations that also have seismic restraints attached must have type RW Rebound Washers to limit uplift.
6. Where piping connects to mechanical equipment install specification W expansion joints or specification X stainless hoses if W is not suitable for the service.

B. Riser isolation:

1. Risers shall be suspended from specification JA hangers or supported by specification E mountings, anchored with specification Y anchors, and guided with specification Z sliding guides.
2. Steel springs shall be a minimum of 0.75" (19mm) except in those expansion locations where additional deflection is required to limit load changes to $\pm 25\%$ of the initial load.
3. Submittals must include riser diagrams and calculations showing anticipated expansion and contraction at each support point, initial and final loads on the building structure, spring deflection changes and seismic loads. Submittal data shall include certification that the riser system has been examined for excessive stresses and that none will exist in the proposed design.

2.04 SEISMIC DESIGN

A. General

1. Specifications and plans shall indicate minimum requirements and general intent. The actual requirements shall be determined by the seismic system designer but those requirements shall not be less than indicated on the plans and in these specifications.

2. Calculations shall be submitted and signed by a licensed professional engineer in the state where the project is located.
 3. This project is subject to the seismic bracing requirements of the International Building Code, 2012 edition. The following criteria are applicable to this project.
 - a. Seismic Use Group (Table 1604.5): III
 - b. Site Class Category (Table 1615.1.1): C
 - c. Forces shall be calculated for the above requirements and Equation 16-67, 68, & 69 in section 1621.1.4, unless exempted by 1621.1.1.
- B. Seismic restraint of piping:
1. Seismically restrain all piping listed as a, b or c below. Use specification M cables if isolated. Specification M or N restraints may be used on unisolated piping.
 - a. Piping located in mechanical equipment rooms that is 1 1/4" (32mm) I.D. and larger.
 - b. All other piping 2 1/2" (64mm) diameter and larger.
 2. Transverse piping restraints shall be at 40' (12m) maximum spacing for all pipe sizes, except where lesser spacing is required to limit anchorage loads.
 3. Longitudinal restraints shall be at 80' (24m) maximum spacing for all pipe sizes, except where lesser spacing is required to limit anchorage loads.
 4. Where thermal expansion is a consideration, guides and anchors may be used as transverse and longitudinal restraints provided they have a capacity equal to or greater than the restraint loads in addition to the loads induced by expansion or contraction.
 5. For fuel oil and all gas piping transverse restraints must be at 20' (6m) maximum and longitudinal restraints at 40' (12m) maximum spacing.
 6. Transverse restraint for one pipe section may also act as a longitudinal restraint for a pipe section of the same size connected perpendicular to it if the restraint is installed within 24" (600mm) of the elbow or TEE or combined stresses are within allowable limits at longer distances.
 7. Hold down clamps must be used to attach pipe to all trapeze members before applying restraints in a manner similar to clevis supports.
 8. Branch lines may not be used to restrain main lines.
 9. Connection to the structure must be made with a non-friction connection (i.e. no "C" clamps)
 10. Hanger locations that also have seismic restraints attached must have Specification JA.
 11. Pipe Exclusions
 - a. Gas piping less than 1" (25mm) inside diameter.
 - b. Piping in boiler and mechanical rooms less than 1 1/4" (32mm) inside diameter.
 - c. All other piping less than 2 1/2" (64mm) inside diameter.
 - d. All piping suspended by clevis hangers where the distance from the top of the pipe to the suspension point is 12" or less.
 - e. All trapezed piping where the distance from the suspension point to the trapeze member is 12" or less.
 - f. If any suspension location in the run exceeds the above, the entire run must be braced.

PART 3 EXECUTION

3.01 GENERAL

- A. All vibration isolators and seismic restraint systems must be installed in strict accordance with the manufacturers written instructions and all certified submittal data.
- B. Installation of vibration isolators and seismic restraints must not cause any change of position of equipment, piping or ductwork resulting in stresses or misalignment.
- C. No rigid connections between equipment and the building structure shall be made that degrades the noise and vibration control system herein specified.
- D. The contractor shall not install any equipment, piping, duct or conduit which makes rigid connections with the building unless isolation is not specified. "Building" includes, but is not limited to, slabs, beams, columns, studs and walls.
- E. Coordinate work with other trades to avoid rigid contact with the building.
- F. Any conflicts with other trades which will result in rigid contact with equipment or piping due to inadequate space or other unforeseen conditions should be brought to the architects/engineers attention prior to installation. Corrective work necessitated by conflicts after installation shall be at the responsible contractors expense.
- G. Bring to the architects/engineers attention any discrepancies between the specifications and the field conditions or changes required due to specific equipment selection, prior to installation. Corrective work necessitated by discrepancies after installation shall be at the responsible contractors expense.
- H. Correct, at no additional cost, all installations which are deemed defective in workmanship and materials at the contractors expense.
- I. Overstressing of the building structure must not occur because of overhead support of equipment. Contractor must submit loads to the structural engineer of record for approval. Generally bracing may occur from:
 - 1. Flanges of structural beams.
 - 2. Upper truss cords in bar joist construction.
 - 3. Cast in place inserts or wedge type drill-in concrete anchors.
- J. Specification L cable restraints shall be installed slightly slack to avoid short circuiting the isolated suspended equipment, piping or conduit.
- K. Specification L cable assemblies are installed taut on non-isolated systems. Specification M seismic solid braces may be used in place of cables on rigidly attached systems only.
- L. At locations where specification L or M restraints are located, the support rods must be braced when necessary to accept compressive loads with specification N braces.
- M. At locations where specification L cable restraints are installed on support rods with spring isolators, the spring isolation hangers must be specification type JA.
- N. At all locations where specification L or M restraints are attached to pipe clevis, the clevis cross bolt must be reinforced with specification type O braces.
- O. Drill-in concrete anchors for ceiling and wall installation shall be specification type R, and specification type S female wedge type for floor mounted equipment.

- P. Vibration isolation manufacturer shall furnish integral structural steel bases as required. Independent steel rails are not permitted on this project.
- Q. Hand built elastomeric expansion joints may be used when pipe sizes exceed 24" or specified movements exceed specification W capabilities.
- R. Where piping passes through walls, floors or ceilings the vibration isolation manufacturer shall provide specification AA wall seals.
- S. Locate isolation hangers as near to the overhead support structure as possible.
- T. All mechanical equipment shall be vibration isolated and seismically restrained as per the schedules in the drawings.

3.02 SEISMIC CERTIFICATION AND ANALYSIS:

- A. Seismic restraint calculations must be provided for all connections of equipment to the structure. Calculations must be stamped by a registered professional engineer licensed in the state of the job location.
- B. Calculations (including the combining of tensile and shear loadings) to support seismic restraint designs must be stamped by a registered professional engineer licensed in the state of the job location. Testing and calculations must include both shear and tensile loads as well as one test or analysis at 45 to the weakest mode.
- C. Analysis must indicate calculated dead loads, static seismic loads and capacity of materials utilized for connections to equipment and structure. Analysis must detail anchoring methods, bolt diameter, embedment and/or welded length. All seismic restraint devices shall be designed to accept, without failure.

3.03 INSTALLATION - SEISMIC

- A. Floor and Base-Mounted Equipment, Vibration Isolated Equipment and associated Vibration and Seismic Controls for Connections:
 - 1. Install equipment anchorage items designed to resist seismic design force in any direction.
 - 2. Install vibration and seismic controls designed to include base and isolator requirements.
 - 3. Provide flexible connections between equipment and interconnected piping.
 - 4. Provide isolators and restraints designed for amplified code forces per ASCE 7 and with demonstrated ability to resist required forces including gravity, operational and seismic forces.
 - 5. Where equipment is not designed to be point loaded, provide base capable of transferring gravity and seismic demands from equipment to isolator base plate anchorage.
 - 6. Where concrete floor thickness is less than required for expansion anchor installation, install through bolt in lieu of expansion anchor.
 - 7. Where timber/wood floor or other substrate is inadequate for installation of lag bolts, screws or other mechanical fasteners, install supplemental framing or blocking to transfer loads to structural elements.
- B. Piping:
 - 1. Provide seismic bracing in accordance ASC 7.
 - 2. Provide supports, braces, and anchors to resist gravity and seismic design forces.
 - 3. Provide flexible connections between floor mounted equipment and suspended piping; between unbraced piping and restrained suspended items; as required for thermal

movement; at building separations and seismic joints; and wherever relative differential movements could damage pipe in an earthquake.

4. Brace resiliently supported pipe with cable bracing or alternate means designed to prevent transmission of vibrations and noise to the structure.
5. Brace every run 5.0 feet (1.5 m) or more in length with two transverse and one longitudinal bracing locations.
6. Pipes and Connections Constructed of Ductile Materials (copper, ductile iron, steel or aluminum and brazed, welded or screwed connections):
 - a. Provide transverse bracing at spacing not more than 40.0 feet (12.2 m) on center.
 - b. Provide longitudinal bracing at spacing not more than 80.0 feet (24.4 m) on center.
7. Provide lateral restraint for risers at not more than 30 feet (9.1 m) on center or as required for horizontal runs, whichever is less.

3.04 SCHEDULE

A. Pipe Isolation Schedule.

1. 1 Inch (25 mm) Pipe Size: Isolate 120 diameters from equipment.
2. 2 Inch (50 mm) Pipe Size: Isolate 90 diameters from equipment.
3. 3 Inch (80 mm) Pipe Size: Isolate 80 diameters from equipment.
4. 4 Inch (100 mm) Pipe Size: Isolate 75 diameters from equipment.
5. 6 Inch (150 mm) Pipe Size: Isolate 60 diameters from equipment.

3.05 EQUIPMENT ISOLATION SCHEDULE.

A. HVAC Pumps.

1. Base: Structural steel base.
2. Isolator Specification Type: E, P, U, and W
3. Isolator Deflection: [0.75] inches

END OF SECTION

SECTION 23 0553 - IDENTIFICATION FOR HVAC PIPING AND EQUIPMENT

PART 1 GENERAL

1.01 SECTION INCLUDES

- A. Nameplates.
- B. Tags.
- C. Pipe Markers.

1.02 RELATED REQUIREMENTS

- A. Section 09 9000 - Painting and Coating: Identification painting.

1.03 REFERENCE STANDARDS

- A. ASME A13.1 - Scheme for the Identification of Piping Systems; The American Society of Mechanical Engineers; 2007.
- B. ASTM D709 - Standard Specification for Laminated Thermosetting Materials; 2001 (Reapproved 2007).

1.04 SUBMITTALS

- A. See Section 01 3000 - Administrative Requirements, for submittal procedures.
- B. Chart and Schedule: Submit valve chart and schedule, including valve tag number, location, function, and valve manufacturer's name and model number.
- C. Project Record Documents: Record actual locations of tagged valves.

PART 2 PRODUCTS

2.01 IDENTIFICATION APPLICATIONS

- A. Automatic Controls: Tags. Key to control schematic.
- B. Control Panels: Nameplates.
- C. Heat Transfer Equipment: Nameplates.
- D. Major Control Components: Nameplates.
- E. Piping: Pipe markers.
- F. Pumps: Nameplates.

2.02 NAMEPLATES

- A. Manufacturers:
 - 1. Advanced Graphic Engraving: www.advancedgraphicengraving.com.
 - 2. Kolbi Pipe Marker Co.: www.kolbipipemarkers.com.
 - 3. Seton Identification Products: www.seton.com.
- B. Letter Color: White.
- C. Letter Height: 1/4 inch (6 mm).
- D. Background Color: Black.
- E. Plastic: Conform to ASTM D709.

2.03 TAGS

2.04 PIPE MARKERS

- A. Manufacturers:
 - 1. Brady Corporation: www.bradycorp.com.
 - 2. Kolbi Pipe Marker Co.: www.kolbipipemarkers.com.
 - 3. MIFAB, Inc.: www.mifab.com.
 - 4. Seton Identification Products: www.seton.com.
 - 5. Substitutions: See Section 01 6000 - Product Requirements.
- B. Color: Conform to ASME A13.1.
- C. Plastic Tape Pipe Markers: Flexible, vinyl film tape with pressure sensitive adhesive backing and printed markings.
- D. Color code as follows:
 - 1. Heating, Cooling, and Boiler Feedwater: Green with white letters.

PART 3 EXECUTION

3.01 PREPARATION

- A. Degrease and clean surfaces to receive adhesive for identification materials.

3.02 INSTALLATION

- A. Install nameplates with corrosive-resistant mechanical fasteners, or adhesive. Apply with sufficient adhesive to ensure permanent adhesion and seal with clear lacquer.
- B. Install plastic pipe markers in accordance with manufacturer's instructions.
- C. Install plastic tape pipe markers complete around pipe in accordance with manufacturer's instructions.

END OF SECTION

SECTION 23 0593 - TESTING, ADJUSTING, AND BALANCING FOR HVAC

PART 1 GENERAL

1.01 SECTION INCLUDES

- A. Testing, adjustment, and balancing of air systems.
- B. Testing, adjustment, and balancing of hydronic systems.
- C. Measurement of final operating condition of HVAC systems.

1.02 REFERENCE STANDARDS

- A. AABC MN-1 - AABC National Standards for Total System Balance; Associated Air Balance Council; 2002.
- B. ASHRAE Std 111 - Practices for Measurement, Testing, Adjusting and Balancing of Building Heating, Ventilation, Air-Conditioning, and Refrigeration Systems; American Society of Heating, Refrigerating and Air-Conditioning Engineers, Inc.; 2008.
- C. NEBB (TAB) - Procedural Standards for Testing Adjusting Balancing of Environmental Systems; National Environmental Balancing Bureau; 2005, Seventh Edition.
- D. SMACNA (TAB) - HVAC Systems Testing, Adjusting, and Balancing; Sheet Metal and Air Conditioning Contractors' National Association; 2002.

1.03 SUBMITTALS

- A. See Section 01 3000 - Administrative Requirements, for submittal procedures.
- B. TAB Plan: Submit a written plan indicating the testing, adjusting, and balancing standard to be followed and the specific approach for each system and component.
 - 1. Include at least the following in the plan:
 - a. Preface: An explanation of the intended use of the control system.
 - b. List of all air flow, water flow, sound level, system capacity and efficiency measurements to be performed and a description of specific test procedures, parameters, formulas to be used.
 - c. Copy of field checkout sheets and logs to be used, listing each piece of equipment to be tested, adjusted and balanced with the data cells to be gathered for each.
 - d. Identification and types of measurement instruments to be used and their most recent calibration date.
 - e. Discussion of what notations and markings will be made on the duct and piping drawings during the process.
 - f. Final test report forms to be used.
 - g. Detailed step-by-step procedures for TAB work for each system and issue, including:
 - 1) Terminal flow calibration (for each terminal type).
 - 2) Diffuser proportioning.
 - 3) Branch/submain proportioning.
 - 4) Total flow calculations.
 - 5) Rechecking.
 - 6) Diversity issues.
 - h. Expected problems and solutions, etc.
 - i. Details of how TOTAL flow will be determined; for example:

- 1) Air: Sum of terminal flows via control system calibrated readings or via hood readings of all terminals, supply (SA) and return air (RA) pitot traverse, SA or RA flow stations.
 - 2) Water: Pump curves, circuit setter, flow station, ultrasonic, etc.
 - j. Specific procedures that will ensure that both air and water side are operating at the lowest possible pressures and methods to verify this.
 - k. Procedures for formal deficiency reports, including scope, frequency and distribution.
- C. Final Report: Indicate deficiencies in systems that would prevent proper testing, adjusting, and balancing of systems and equipment to achieve specified performance.
1. Revise TAB plan to reflect actual procedures and submit as part of final report.
 2. Submit draft copies of report for review prior to final acceptance of Project. Provide final copies for Architect and for inclusion in operating and maintenance manuals.
 3. Include actual instrument list, with manufacturer name, serial number, and date of calibration.
 4. Form of Test Reports: Where the TAB standard being followed recommends a report format use that; otherwise, follow ASHRAE Std 111.
 5. Units of Measure: Report data in both I-P (inch-pound) and SI (metric) units.

PART 2 PRODUCTS - NOT USED

PART 3 EXECUTION

3.01 GENERAL REQUIREMENTS

- A. Perform total system balance in accordance with one of the following:
1. AABC MN-1, AABC National Standards for Total System Balance.
 2. ASHRAE Std 111, Practices for Measurement, Testing, Adjusting and Balancing of Building Heating, Ventilation, Air-Conditioning, and Refrigeration Systems.
 3. NEBB Procedural Standards for Testing Adjusting Balancing of Environmental Systems.
 4. SMACNA HVAC Systems Testing, Adjusting, and Balancing.
 5. Maintain at least one copy of the standard to be used at project site at all times.
- B. Begin work after completion of systems to be tested, adjusted, or balanced and complete work prior to Substantial Completion of the project.
- C. Where HVAC systems and/or components interface with life safety systems, including fire and smoke detection, alarm, and control, coordinate scheduling and testing and inspection procedures with the authorities having jurisdiction.
- D. TAB Agency Qualifications:
1. Company specializing in the testing, adjusting, and balancing of systems specified in this section.
 2. Having minimum of three years documented experience.
 3. Certified by one of the following:
 - a. AABC, Associated Air Balance Council: www.aabchq.com; upon completion submit AABC National Performance Guaranty.
 - b. NEBB, National Environmental Balancing Bureau: www.nebb.org.
 - c. TABB, The Testing, Adjusting, and Balancing Bureau of National Energy Management Institute: www.tabbcertified.org.

- E. TAB Supervisor and Technician Qualifications: Certified by same organization as TAB agency.

3.02 EXAMINATION

- A. Verify that systems are complete and operable before commencing work. Ensure the following conditions:
 - 1. Systems are started and operating in a safe and normal condition.
 - 2. Temperature control systems are installed complete and operable.
 - 3. Hydronic systems are flushed, filled, and vented.
 - 4. Pumps are rotating correctly.
 - 5. Proper strainer baskets are clean and in place.
 - 6. Service and balance valves are open.
- B. Submit field reports. Report defects and deficiencies that will or could prevent proper system balance.
- C. Beginning of work means acceptance of existing conditions.

3.03 PREPARATION

- A. Hold a pre-balancing meeting at least one week prior to starting TAB work.
 - 1. Require attendance by all installers whose work will be tested, adjusted, or balanced.
- B. Provide instruments required for testing, adjusting, and balancing operations. Make instruments available to Architect to facilitate spot checks during testing.
- C. Provide additional balancing devices as required.

3.04 ADJUSTMENT TOLERANCES

- A. Hydronic Systems: Adjust to within plus or minus 10 percent of design.

3.05 RECORDING AND ADJUSTING

- A. Ensure recorded data represents actual measured or observed conditions.
- B. Permanently mark settings of valves, dampers, and other adjustment devices allowing settings to be restored. Set and lock memory stops.
- C. After adjustment, take measurements to verify balance has not been disrupted or that such disruption has been rectified.
- D. Leave systems in proper working order, replacing belt guards, closing access doors, closing doors to electrical switch boxes, and restoring thermostats to specified settings.

3.06 WATER SYSTEM PROCEDURE

- A. Adjust water systems to provide required or design quantities.
- B. Use calibrated Venturi tubes, orifices, or other metered fittings and pressure gauges to determine flow rates for system balance. Where flow metering devices are not installed, base flow balance on temperature difference across various heat transfer elements in the system.
- C. Balance pumps with Variable frequency drives where available with triple duty valves in full open positions to reduce operating HP.
- D. Effect system balance with automatic control valves fully open to heat transfer elements.
- E. Effect adjustment of water distribution systems by means of balancing cocks, valves, and fittings. Do not use service or shut-off valves for balancing unless indexed for balance point.

- F. Where available pump capacity is less than total flow requirements or individual system parts, full flow in one part may be simulated by temporary restriction of flow to other parts.

3.07 SCOPE

- A. Test, adjust, and balance the following:
 - 1. HVAC Pumps
 - 2. Heat Exchanger

END OF SECTION

SECTION 23 0716 - HVAC EQUIPMENT INSULATION

PART 1 GENERAL

1.01 SECTION INCLUDES

- A. Equipment insulation.

1.02 RELATED REQUIREMENTS

- A. Section 23 0553 - Identification for HVAC Piping and Equipment.
- B. Section 23 2113 - Hydronic Piping: Placement of hangers and hanger inserts.
- C. Section 23 2114 - Hydronic Specialties.

1.03 REFERENCE STANDARDS

- A. ASTM C177 - Standard Test Method for Steady-State Heat Flux Measurements and Thermal Transmission Properties by Means of the Guarded-Hot-Plate Apparatus; 2013.
- B. ASTM C518 - Standard Test Method for Steady-State Thermal Transmission Properties by Means of the Heat Flow Meter Apparatus; 2010.
- C. ASTM C534/C534M - Standard Specification for Preformed Flexible Elastomeric Cellular Thermal Insulation in Sheet and Tubular Form; 2013.
- D. ASTM C592 - Standard Specification for Mineral Fiber Blanket Insulation and Blanket-Type Pipe Insulation (Metal-Mesh Covered) (Industrial Type); 2012.
- E. ASTM C612 - Standard Specification for Mineral Fiber Block and Board Thermal Insulation; 2014.
- F. ASTM E84 - Standard Test Method for Surface Burning Characteristics of Building Materials; 2013a.
- G. ASTM E96/E96M - Standard Test Methods for Water Vapor Transmission of Materials; 2013.

PART 2 PRODUCTS

2.01 REQUIREMENTS FOR ALL PRODUCTS OF THIS SECTION

- A. Surface Burning Characteristics: Flame spread/Smoke developed index of 25/50, maximum, when tested in accordance with ASTM E84, NFPA 255, or UL 723.

2.02 GLASS FIBER, RIGID

- A. Manufacturer:
 - 1. Knauf Insulation: www.knaufusa.com.
 - 2. Johns Manville Corporation: www.jm.com.
 - 3. Owens Corning Corp: www.owenscorning.com.
 - 4. CertainTeed Corporation; _____: www.certainteed.com.
 - 5. Substitutions: See Section 01 6000 - Product Requirements.
- B. Insulation: ASTM C612 or ASTM C592; rigid, noncombustible.
 - 1. 'K' ('Ksi') Value: 0.25 at 75 degrees F (0.036 at 24 degrees C), when tested in accordance with ASTM C177 or ASTM C518.
 - 2. Maximum Service Temperature: 850 degrees F (454 degrees C).
 - 3. Maximum Water Vapor Sorption: 5.0 percent by weight.
 - 4. Maximum Density: 8.0 lb/cu ft (128 kg/cu m).

- C. Vapor Barrier Jacket:
 - 1. Kraft paper reinforced with glass fiber yarn and bonded to aluminized film.
 - 2. Moisture Vapor Permeability: 0.02 perm inch (0.029 ng/Pa s m), when tested in accordance with ASTM E96/E96M.
 - 3. Secure with self-sealing longitudinal laps and butt strips.
 - 4. Secure with outward clinch expanding staples and vapor barrier mastic.
- D. Facing: 1 inch (25 mm) galvanized steel hexagonal wire mesh stitched on one face of insulation.
- E. Insulating Cement/Mastic:

2.03 FLEXIBLE ELASTOMERIC CELLULAR INSULATION

- A. Manufacturer:
 - 1. Aeroflex USA, Inc; _____: www.aeroflexusa.com.
 - 2. Armacell LLC; _____: www.armacell.us.
 - 3. K-Flex USA LLC; _____: www.kflexusa.com.
 - 4. Substitutions: See Section 01 6000 - Product Requirements.
- B. Insulation: Preformed flexible elastomeric cellular rubber insulation complying with ASTM C534/C534M Grade 3, in sheet form.
 - 1. Minimum Service Temperature: -40 degrees F (-40 degrees C).
 - 2. Maximum Service Temperature: 220 degrees F (104 degrees C).
 - 3. Connection: Waterproof vapor barrier adhesive.
- C. Elastomeric Foam Adhesive: Air dried, contact adhesive, compatible with insulation.

2.04 JACKETS

- A. Canvas Jacket: UL listed 6 oz/sq yd (220 g/sq m) plain weave cotton fabric treated with dilute fire retardant lagging adhesive.
 - 1. Lagging Adhesive:
 - a. Compatible with insulation.

PART 3 EXECUTION

3.01 EXAMINATION

- A. Verify that equipment has been tested before applying insulation materials.
- B. Verify that surfaces are clean and dry, with foreign material removed.

3.02 INSTALLATION

- A. Install in accordance with manufacturer's instructions.
- B. Factory Insulated Equipment: Do not insulate.
- C. Exposed Equipment: Locate insulation and cover seams in least visible locations.
- D. Apply insulation close to equipment by grooving, scoring, and beveling insulation. Fasten insulation to equipment with studs, pins, clips, adhesive, wires, or bands.
- E. Fill joints, cracks, seams, and depressions with bedding compound to form smooth surface. On cold equipment, use vapor barrier cement.
- F. Insulated equipment containing fluids below ambient temperature: Insulate entire system.

- G. Fiber glass insulated equipment containing fluids below ambient temperature: Provide vapor barrier jackets, factory-applied or field-applied. Finish with glass cloth and vapor barrier adhesive.
- H. For hot equipment containing fluids 140 degrees F (60 degrees C) or less, do not insulate flanges and unions, but bevel and seal ends of insulation.
- I. For hot equipment containing fluids over 140 degrees F (60 degrees C), insulate flanges and unions with removable sections and jackets.
- J. Fiber glass insulated equipment containing fluids above ambient temperature: Provide standard jackets, with or without vapor barrier, factory-applied or field-applied. Finish with glass cloth and adhesive.
- K. Finish insulation at supports, protrusions, and interruptions.
- L. Equipment in Mechanical Equipment Rooms or Finished Spaces: Finish with canvas jacket sized for finish painting.
- M. Cover glass fiber insulation with metal mesh and finish with heavy coat of insulating cement aluminum jacket.
- N. Nameplates and ASME Stamps: Bevel and seal insulation around; do not insulate over.
- O. Equipment Requiring Access for Maintenance, Repair, or Cleaning: Install insulation so it can be easily removed and replaced without damage.

3.03 SCHEDULE

- A. Heating Systems:
 - 1. Pump Bodies:
- B. Cooling Systems:
 - 1. Pump Bodies:
 - 2. Air Separators:
 - 3. Valve bodies

END OF SECTION

SECTION 23 0719 - HVAC PIPING INSULATION

PART 1 GENERAL

1.01 SECTION INCLUDES

- A. Piping insulation.
- B. Jackets and accessories.

1.02 RELATED REQUIREMENTS

- A. Section 23 2113 - Hydronic Piping: Placement of hangers and hanger inserts.

1.03 REFERENCE STANDARDS

- A. ASTM C177 - Standard Test Method for Steady-State Heat Flux Measurements and Thermal Transmission Properties by Means of the Guarded Hot Plate Apparatus; 2013.
- B. ASTM C547 - Standard Specification for Mineral Fiber Pipe Insulation; 2012.
- C. ASTM C795 - Standard Specification for Thermal Insulation for Use in Contact with Austenitic Stainless Steel; 2008 (Reapproved 2013).
- D. ASTM E84 - Standard Test Method for Surface Burning Characteristics of Building Materials; 2013a.
- E. NFPA 255 - Standard Method of Test of Surface Burning Characteristics of Building Materials; National Fire Protection Association; 2006.
- F. UL 723 - Standard for Test for Surface Burning Characteristics of Building Materials; Underwriters Laboratories Inc.; Current Edition, Including All Revisions.

1.04 SUBMITTALS

- A. See Section 01 3000 - Administrative Requirements, for submittal procedures.

PART 2 PRODUCTS

2.01 REQUIREMENTS FOR ALL PRODUCTS OF THIS SECTION

- A. Surface Burning Characteristics: Flame spread/Smoke developed index of 25/50, maximum, when tested in accordance with ASTM E84, NFPA 255, or UL 723.

2.02 GLASS FIBER

- A. Manufacturers:
 - 1. Knauf Insulation: www.knaufusa.com.
 - 2. Johns Manville Corporation: www.jm.com.
 - 3. Owens Corning Corp: www.owenscorning.com.
 - 4. CertainTeed Corporation; _____: www.certainteed.com.
 - 5. Substitutions: See Section 01 6000 - Product Requirements.
- B. Insulation: ASTM C547 and ASTM C795; rigid molded, noncombustible.
 - 1. 'K' ('Ksi') value: ASTM C177, 0.24 at 75 degrees F (0.035 at 24 degrees C).
 - 2. Maximum service temperature: 850 degrees F (454 degrees C).
 - 3. Maximum moisture absorption: 0.2 percent by volume.
- C. Vapor Barrier Jacket: White kraft paper with glass fiber yarn, bonded to aluminized film; moisture vapor transmission when tested in accordance with ASTM E96/E96M of 0.02 perm-inches (0.029 ng/Pa s m).

- D. Tie Wire: 0.048 inch (1.22 mm) stainless steel with twisted ends on maximum 12 inch (300 mm) centers.

2.03 JACKETS

- A. Canvas Jacket: UL listed 6 oz/sq yd (220 g/sq m) plain weave cotton fabric treated with dilute fire retardant lagging adhesive.
 - 1. Lagging Adhesive:
 - a. Compatible with insulation.

PART 3 EXECUTION

3.01 EXAMINATION

- A. Verify that piping has been tested before applying insulation materials.
- B. Verify that surfaces are clean and dry, with foreign material removed.

3.02 INSTALLATION

- A. Install in accordance with manufacturer's instructions.
- B. Exposed Piping: Locate insulation and cover seams in least visible locations.
- C. Insulated pipes conveying fluids below ambient temperature: Insulate entire system including fittings, valves, unions, flanges, strainers, flexible connections, pump bodies, and expansion joints.
- D. Glass fiber insulated pipes conveying fluids below ambient temperature:
 - 1. Provide vapor barrier jackets, factory-applied or field-applied. Secure with self-sealing longitudinal laps and butt strips with pressure sensitive adhesive. Secure with outward clinch expanding staples and vapor barrier mastic.
 - 2. Insulate fittings, joints, and valves with molded insulation of like material and thickness as adjacent pipe. Finish with glass cloth and vapor barrier adhesive.
- E. For hot piping conveying fluids 140 degrees F (60 degrees C) or less, do not insulate flanges and unions at equipment, but bevel and seal ends of insulation.
- F. For hot piping conveying fluids over 140 degrees F (60 degrees C), insulate flanges and unions at equipment.
- G. Inserts and Shields:
 - 1. Application: Piping 1-1/2 inches (40 mm) 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 the finish jacket.
 - 4. Insert configuration: Minimum 6 inches (150 mm) long, of same thickness and contour as adjoining insulation; may be factory fabricated.
 - 5. Insert material: Hydrous calcium silicate insulation or other heavy density insulating material suitable for the planned temperature range.
- H. Continue insulation through walls, sleeves, pipe hangers, and other pipe penetrations. Finish at supports, protrusions, and interruptions. At fire separations, refer to Section 07 8400.
- I. Pipe Exposed in Mechanical Equipment Rooms or Finished Spaces (less than 10 feet (3 meters) above finished floor): Finish with canvas jacket sized for finish painting.

3.03 SCHEDULE

- A. Heating Systems:
 - 1. Heating Water Supply and Return:
- B. Cooling Systems:
 - 1. Chilled Water:
 - 2. Cold Condensate Drains:

END OF SECTION

SECTION 23 0913 - INSTRUMENTATION AND CONTROL DEVICES FOR HVAC

PART 1 GENERAL

1.01 SECTION INCLUDES

- A. Control valves.
- B. BTU Meter
- C. Airflow Measuring Station

1.02 RELATED REQUIREMENTS

- A. Section 23 2113 - Hydronic Piping: Installation of control valves, flow switches, temperature sensor sockets, gage taps.
- B. Section 23 0923 - Direct-Digital Control System for HVAC.
- C. Section 23 0993 - Sequence of Operations for HVAC Controls.

1.03 REFERENCE STANDARDS

- A. AMCA 500-D - Laboratory Methods for Testing Dampers for Rating; Air Movement and Control Association International, Inc.; 2007.
- B. NFPA 90A - Standard for the Installation of Air-Conditioning and Ventilation Systems; National Fire Protection Association; 2009.

1.04 SUBMITTALS

- A. See Section 01 3000 - Administrative Requirements, for submittal procedures.
- B. Product Data: Provide description and engineering data for each control system component. Include sizing as requested. Provide data for each system component and software module.
- C. Shop Drawings: Indicate complete operating data, system drawings, wiring diagrams, and written detailed operational description of sequences. Submit schedule of valves indicating size, flow, and pressure drop for each valve. For automatic dampers indicate arrangement, velocities, and static pressure drops for each system.
- D. Design Data: Provide design data for sizing and selection of compressor.
- E. Manufacturer's Instructions: Provide for all manufactured components.
- F. Project Record Documents: Record actual locations of control components, including panels, thermostats, and sensors. Accurately record actual location of control components, including panels, thermostats, and sensors.
 - 1. Revise shop drawings to reflect actual installation and operating sequences.
- G. Operation and Maintenance Data: Include inspection period, cleaning methods, recommended cleaning materials, and calibration tolerances.
- H. Warranty: Submit manufacturers warranty and ensure forms have been filled out in Owner's name and registered with manufacturer.
- I. Operation and Maintenance Manuals: Include in manuals the information listed below. For information on how to prepare and submit manuals see section 1780 (Closeout Submittals).
 - 1. Recommended spare parts
 - 2. Spare parts lists
 - 3. Operating instructions
 - 4. Maintenance instructions, including preventative and corrective maintenance.

5. Copies of warranties
6. Wiring diagrams
7. Shop drawings and product data

PART 2 PRODUCTS

2.01 MANUFACTURERS

- A. Johnson Controls

2.02 EQUIPMENT - GENERAL

- A. Products Requiring Electrical Connection: Listed and classified by Underwriters Laboratories Inc., as suitable for the purpose specified and indicated.

2.03 CONTROL VALVES

- A. Globe Pattern:
 1. Up to 2 inches (50 mm): Bronze body, bronze trim, rising stem, renewable composition disc, screwed ends with backseating capacity repackable under pressure.
 2. Over 2 inches (50 mm): Iron body, bronze trim, rising stem, plug-type disc, flanged ends, renewable seat and disc.
 3. Hydronic Systems:
 - a. Rate for service pressure of 125 psig at 250 degrees F (860 kPa at 121 degrees C).
 - b. Replaceable plugs and seats of stainless steel.
 - c. Size for 3 psig (20 kPa) maximum pressure drop at design flow rate.
 - d. Two way valves shall have equal percentage characteristics, three way valves linear characteristics. Size two way valve operators to close valves against pump shut off head.
- B. Butterfly Pattern:
 1. Iron body, bronze disc, resilient replaceable seat for service to 180 degrees F (82 degrees C) wafer or lug ends, extended neck.
 2. Hydronic Systems:
 - a. Rate for service pressure of 125 psig at 250 degrees F (860 kPa at 121 degrees C).
 - b. Size for 1 psig (7 kPa) maximum pressure drop at design flow rate.
- C. Electronic Operators:
 1. Valves shall spring return to normal position as indicated on freeze, fire, or temperature protection.
 2. Select operator for full shut off at maximum pump differential pressure.

2.04 PRESSURE INDEPENDENT CONTROL VALVES

- A. Valves shall be configured with one integrated valve body to incorporate an adjustable Cv chamber and separate pressure regulating chamber to maintain a constant differential pressure across the control surface.
- B. Each control valve shall be individually flow tested and factory verified to deviate no more than $\pm 5\%$ through the selected operating pressure range. A calibrated performance tag shall be provided with each valve (optional for 1/2") that verifies the flow rate in 10° rotation increments up to full rated flow. All testing shall be performed with instruments calibrated to the requirements of ANSI/NCSL Z540-1-1994 with traceability to NIST and/or ISO standards.
- C. Control valve rangeability shall be 100:1 minimum.

- D. Each control valve shall be subjected to 70 psid and tested to exceed ANSI/FCI 70-2-1998 leakage ratings. Class IV leakage or better is required for control valves 2" nominal size and less. Class III leakage or better is required for control valves larger than 2".
- E. Control valve bodies shall be brass, ductile iron, carbon steel or stainless steel. All internal parts shall be brass, bronze, carbon steel, stainless steel or Teflon®. Plastic internal parts are not acceptable.
- F. Valve bodies 2" and smaller shall be rated at 300 PSIG working pressure. Valve bodies larger than 2" shall be rated at 150 PSIG minimum working pressure.
- G. In all control valves 8" and smaller it shall be possible to modify the valve flow characteristics without removing the valve from the piping system. In all hot water valves it shall be possible to change seals (at recommended 10 year maintenance intervals) without removing the valve from the piping system.
- H. Valves 2" and smaller shall have a minimum spring ratio of 5 pounds per inch to ensure stability and tolerance to common system debris. Minimum spring ratio for valves larger than 2" shall be 10 pounds per inch. Spring ratio is defined as operating spring force (lbf) at initial compression divided by the nominal valve size (in).
- I. Balancing valves and associated balancing shall not be required where pressure independent modulating control valves are installed.
- J. Control valves shall be compatible with modulating actuators from all major manufacturers. Any brand may be used pending approval by the valve manufacturer. Actuators shall modulate all valves up to 10" in nominal size from 0 to 100% design flow while rotating the valve stem a maximum of 90°.
 - 1. Valve actuators may be specified in the control system specification and shall be factory mounted.
 - 2. Actuators shall be selected by system close-off requirements. Valves shall be capable of a close-off rating of 200 PSID subject to actuator selection.
 - 3. For electric actuation it shall be possible to set the end stroke of the actuator with mechanical stops, signal adjustment or a control signal limit at the full design flow listed on the performance tag furnished with each valve.
- K. The control valve flow adjustment stem (for valves 8" and less) shall extend out from the control valve and have an indicator that may be used to verify valve position. The control valve shall have tapped mounting holes for mounting the control valve actuator bracket. The actuator shall rotate the valve stem to provide the required flow independent of pressure across the valve. Torque requirements for actuator selection shall be provided by the valve manufacturer.
- L. All valves shall have three integral ports factory installed capable of being used to measure pressure or temperature. The first port shall be installed at the inlet to the valve, the second shall be installed between the Cv chamber and the pressure regulating chamber and the third shall be installed at the outlet of the valve. Should the ports not be provided as part of the valve body, they shall be installed in a spool piece and attached to the body.
- M. The differential pressure between the first and the third port shall be used in commissioning to verify the minimum differential pressure required for pressure independent operation is available. The differential pressure between the first and second ports shall be used to verify proper valve operation and flow regulation.

- N. It shall be possible to verify the flow rate through the control valve using the valve stem position and the differential pressure measurement between the first and second port in the valve. If these valve features are not available, a flow meter shall be installed to verify actual flow rate in operation through the valve.
- O. All valves shall be warranted by the manufacturer for no less than 5 years from the date of purchase. The warranty provided by the actuator manufacturer shall apply to actuators.
- P. The control valve manufacturer shall provide written guarantee that the heating and cooling coils will meet or exceed maximum delta T performance at all load conditions as projected by ARI certified coil program at time of commissioning. The valve manufacturer will reimburse the full purchase price of the valve(s) if this performance level cannot be met. The actuators provided with the valve(s) shall have a minimum of 100 steps in 90° rotation to assure 100:1 turndown.

2.05 INPUT/OUTPUT SENSORS

- A. Temperature Sensors:
 - 1. Resistance temperature detectors with resistance tolerance of plus or minus 0.1 percent at 70 degrees F (21 degrees C), interchangeability less than plus or minus 0.2 percent, time constant of 13 seconds maximum for fluids and 200 seconds maximum for air.
 - 2. Measuring current maximum 5 mA with maximum self-heat of 0.031 degrees F/mW (0.017 degrees C/mW) in fluids and 0.014 degrees F/mW (0.008 degrees C/mW) in air.
 - 3. Provide 3 lead wires and shield for input bridge circuit.
 - 4. Use insertion elements in ducts not affected by temperature stratification or smaller than one square meter. Use averaging elements where larger or prone to stratification sensor length 8 feet (2.5 m) or 16 feet (5 m) as required.
 - 5. Insertion elements for liquids shall be with brass socket with minimum insertion length of 2-1/2 inches (60 mm).
 - 6. Room sensors: Locking cover .
 - 7. Outside air sensors: Watertight inlet fitting, shielded from direct rays of sun.
 - 8. Room security sensors: Stainless steel cover plate with insulated back and security screws.
- B. Equipment Operation Sensors:
 - 1. Status Inputs for Fans: Differential pressure switch with adjustable range of 0 to 5 inches wg (0 to 1250 Pa).
 - 2. Status Inputs for Pumps: Differential pressure switch piped across pump with adjustable pressure differential range of 8 to 60 psi (50 to 400 kPa).
 - 3. Status Inputs for Electric Motors: Current sensing relay with current transformers, adjustable and set to 175 percent of rated motor current.

2.06 TRANSMITTERS

- A. Pressure Transmitters:
 - 1. One pipe direct acting indicating type for gas, liquid, or steam service, range suitable for system, proportional electronic output.
- B. Temperature Transmitters:
 - 1. One pipe, directly proportional output signal to measured variable, linearity within plus or minus 1/2 percent of range for 200 degree F (93 degrees C) span and plus or minus 1

percent for 50 degree F (10 degrees C) span, with 50 degrees F (10 degree C) temperature range, compensated bulb, averaging capillary, or rod and tube operation on 20 psig (138 kPa) input pressure and 3 to 15 psig (20 to 100 kPa) output.

2.07 BTU METER

- A. Manufacturers and Model
 - 1. Onicon System-10 BTU Meter or equivalent.

2.08 STEAM FLOW METER

- A. Manufacturers and Model
 - 1. Onicon F-2000 Series or equivalent.

PART 3 EXECUTION

3.01 EXAMINATION

- A. Verify existing conditions before starting work.
- B. Verify that systems are ready to receive work.
- C. Beginning of installation means installer accepts existing conditions.
- D. Sequence work to ensure installation of components is complementary to installation of similar components in other systems.
- E. Coordinate installation of system components with installation of mechanical systems equipment such as air handling units and air terminal units.
- F. Ensure installation of components is complementary to installation of similar components.
- G. Coordinate installation of system components with installation of mechanical systems equipment such as air handling units and air terminal units.

3.02 INSTALLATION

- A. Install in accordance with manufacturer's instructions.
- B. Provide separable sockets for liquids and flanges for air bulb elements.
- C. Provide mixing dampers of opposed blade construction arranged to mix streams. Provide pilot positioners on mixed air damper motors. Provide separate minimum outside air damper section adjacent to return air dampers with separate damper motor.
- D. Mount control panels adjacent to associated equipment on vibration free walls or free standing angle iron supports. One cabinet may accommodate more than one system in same equipment room. Provide engraved plastic nameplates for instruments and controls inside cabinet and engraved plastic nameplates on cabinet face.
- E. Install "hand/off/auto" selector switches to override automatic interlock controls when switch is in "hand" position.
- F. Provide conduit and electrical wiring in accordance with Section 26 2717. Electrical material and installation shall be in accordance with appropriate requirements of Division 26.

END OF SECTION

SECTION 23 0923 - DIRECT-DIGITAL CONTROL SYSTEM FOR HVAC

PART 1 GENERAL

1.01 SECTION INCLUDES

- A. Control equipment.
- B. Software.

1.02 RELATED REQUIREMENTS

- A. Section 23 0913 - Instrumentation and Control Devices for HVAC.
- B. Section 23 0993 - Sequence of Operations for HVAC Controls.

1.03 SYSTEM DESCRIPTION

- A. Automatic temperature control field monitoring and control system using field programmable micro-processor based units .
- B. Provide control systems consisting of thermostats, control valves, dampers and operators, indicating devices, interface equipment and other apparatus and accessories required to operate mechanical systems, and to perform functions specified.
- C. Include installation and calibration, supervision, adjustments, and fine tuning necessary for complete and fully operational system.

1.04 SUBMITTALS

- A. See Section 01 3000 - Administrative Requirements, for submittal procedures.
- B. Product Data: Provide data for each system component and software module.
- C. Shop Drawings:
 - 1. Indicate trunk cable schematic showing programmable control unit locations, and trunk data conductors.
 - 2. List connected data points, including connected control unit and input device.
 - 3. Indicate system graphics indicating monitored systems, data (connected and calculated) point addresses, and operator notations.
 - 4. Show system configuration with peripheral devices, batteries, power supplies, diagrams, modems, and interconnections.
 - 5. Indicate description and sequence of operation of operating, user, and application software.
- D. Manufacturer's Instructions: Indicate manufacturer's installation instructions for all manufactured components.
- E. Project Record Documents: Record actual locations of control components, including control units, thermostats, and sensors.
 - 1. Revise shop drawings to reflect actual installation and operating sequences.
 - 2. Include submittals data in final "Record Documents" form.
- F. Operation and Maintenance Data:
 - 1. Include interconnection wiring diagrams complete field installed systems with identified and numbered, system components and devices.
 - 2. Include keyboard illustrations and step-by-step procedures indexed for each operator function.

3. Include inspection period, cleaning methods, cleaning materials recommended, and calibration tolerances.
- G. Warranty: Submit manufacturer's warranty and ensure forms have been filled out in Owner's name and registered with manufacturer.
- H. Operation and Maintenance Manuals: Include in manuals the information listed below. For information on how to prepare and submit manuals see section 1780 (Closeout Submittals).
 1. Recommended spare parts
 2. Spare parts lists
 3. Operating instructions
 4. Maintenance instructions, including preventative and corrective maintenance.
 5. Wiring diagrams
 6. Shop drawings and product data

PART 2 PRODUCTS

2.01 MANUFACTURERS

- A. Johnson Controls, Inc: www.johnsoncontrols.com.
- B. Substitutions: See Section 01 6000 - Product Requirements.

2.02 SYSTEM DESCRIPTION

- A. Base system on distributed system of fully intelligent, stand-alone controllers, operating in a multi-tasking, multi-user environment on token passing network, with central and remote hardware, software, and interconnecting wire and conduit.
- B. Include computer software and hardware, operator input/output devices, control units, local area networks (LAN), sensors, control devices, actuators.
- C. Provide control systems consisting of thermostats, control valves, dampers and operators, indicating devices, interface equipment and other apparatus and accessories required to operate mechanical systems, and to perform functions specified.
- D. Include installation and calibration, supervision, adjustments, and fine tuning necessary for complete and fully operational system.

2.03 CONTROL UNITS

- A. Units: Modular in design and consisting of processor board with programmable RAM memory, local operator access and display panel, and integral interface equipment.
- B. Battery Backup: For minimum of 48 hours for complete system including RAM without interruption, with automatic battery charger.
- C. Control Units Functions:
 1. Monitor or control each input/output point.
 2. Completely independent with hardware clock/calendar and software to maintain control independently.
 3. Acquire, process, and transfer information to operator station or other control units on network.
 4. Accept, process, and execute commands from other control unit's or devices or operator stations.
 5. Access both data base and control functions simultaneously.

6. Record, evaluate, and report changes of state or value that occur among associated points. Continue to perform associated control functions regardless of status of network.
7. Perform in stand-alone mode:
 - a. Start/stop.
 - b. Duty cycling.
 - c. Automatic Temperature Control.
 - d. Demand control via a sliding window, predictive algorithm.
 - e. Event initiated control.
 - f. Calculated point.
 - g. Scanning and alarm processing.
 - h. Full direct digital control.
 - i. Trend logging.
 - j. Global communications.
 - k. Maintenance scheduling.
- D. Global Communications:
 1. Broadcast point data onto network, making that information available to all other system control units.
 2. Transmit any or all input/output points onto network for use by other control units and utilize data from other control units.
- E. Input/Output Capability:
 1. Discrete/digital input (contact status).
 2. Discrete/digital output.
 3. Analog input.
 4. Analog output.
 5. Pulse input (5 pulses/second).
 6. Pulse output (0-655 seconds in duration with 0.01 second resolution).
- F. Monitor, control, or address data points. Mix shall include analog inputs, analog outputs, pulse inputs, pulse outputs and discrete inputs/outputs, as required. Install control unit's with minimum 30 percent spare capacity.
- G. Point Scanning: Set scan or execution speed of each point to operator selected time from 1 to 250 seconds.
- H. Upload/Download Capability: Download from or upload to operator station. Upload/Download time for entire control unit database maximum 10 seconds on hard wired LAN, or 60 seconds over voice grade phone lines.
- I. Test Mode Operation: Place input/output points in test mode to allow testing and developing of control algorithms on line without disrupting field hardware and controlled environment. In test mode:
 1. Inhibit scanning and calculation of input points. Issue manual control to input points (set analog or digital input point to operator determined test value) from work station.
 2. Control output points but change only data base state or value; leave external field hardware unchanged.
 3. Enable control actions on output points but change only data base state or value.
- J. Local display and adjustment panel: Portable control unit, containing digital display, and numerical keyboard. Display and adjust:

1. Input/output point information and status.
2. Controller set points.
3. Controller tuning constants.
4. Program execution times.
5. High and low limit values.
6. Limit differential.
7. Set/display date and time.
8. Control outputs connected to the network.
9. Automatic control outputs.
10. Perform control unit diagnostic testing.
11. Points in "Test" mode.

2.04 LOCAL AREA NETWORK (LAN)

- A. Provide communication between control units over local area network (LAN).
- B. LAN Capacity: Not less than 60 stations or nodes.
- C. Break in Communication Path: Alarm and automatically initiate LAN reconfiguration.
- D. LAN Data Speed: Minimum 19.2 Kb.
- E. Communication Techniques: Allow interface into network by multiple operation stations and by auto-answer/auto-dial modems. Support communication over telephone lines utilizing modems.
- F. Transmission Median: Fiber optic or single pair of solid 24 gauge twisted, shielded copper cable.
- G. Network Support: Time for global point to be received by any station, shall be less than 3 seconds. Provide automatic reconfiguration if any station is added or lost. If transmission cable is cut, reconfigure two sections with no disruption to system's operation, without operator intervention.

2.05 OPERATING SYSTEM SOFTWARE

- A. Input/Output Capability From Operator Station:
 1. Request display of current values or status in tabular or graphic format.
 2. Command selected equipment to specified state.
 3. Initiate logs and reports.
 4. Change analog limits.
 5. Add, delete, or change points within each control unit or application routine.
 6. Change point input/output descriptors, status, alarm descriptors, and engineering unit descriptors.
 7. Add new control units to system.
 8. Modify and set up maintenance scheduling parameters.
 9. Develop, modify, delete or display full range of color graphic displays.
 10. Automatically archive select data even when running third party software.
 11. Provide capability to sort and extract data from archived files and to generate custom reports.
 12. Support two printer operations.
 - a. Alarm printer: Print alarms, operator acknowledgements, action messages, system alarms, operator sign-on and sign-off.

- b. Data printer: Print reports, page prints, and data base prints.
- 13. Select daily, weekly or monthly as scheduled frequency to synchronize time and date in digital control units. Accommodate daylight savings time adjustments.
- 14. Print selected control unit data base.
- B. Operator System Access: Via software password with minimum 30 access levels at work station and minimum 3 access levels at each control unit.
- C. Data Base Creation and Support: Changes shall utilize standard procedures. Control unit shall automatically check work station data base files upon connection and verify data base match. Minimum capability shall include:
 - 1. Add and delete points.
 - 2. Modify any point parameter.
 - 3. Change, add, or delete English language descriptors.
 - 4. Add, modify, or delete alarm limits.
 - 5. Add, modify, or delete points in start/stop programs, trend logs, etc.
 - 6. Create custom relationship between points.
 - 7. Create or modify DDC loops and parameters.
 - 8. Create or modify override parameters.
 - 9. Add, modify, and delete any applications program.
 - 10. Add, delete, develop, or modify dynamic color graphic displays.
- D. Dynamic Color Graphic Displays:
 - 1. Utilizes custom symbols or system supported library of symbols.
 - 2. Sixteen (16) colors.
 - 3. Sixty (60) outputs of real time, live dynamic data per graphic.
 - 4. Dynamic graphic data.
 - 5. 1,000 separate graphic pages.
 - 6. Modify graphic screen refresh rate between 1 and 60 seconds.
- E. Operator Station:
 - 1. Accept data from LAN as needed without scanning entire network for updated point data.
 - 2. Interrogate LAN for updated point data when requested.
 - 3. Allow operator command of devices.
 - 4. Allow operator to place specific control units in or out of service.
 - 5. Allow parameter editing of control units.
 - 6. Store duplicate data base for every control unit and allow down loading while system is on line.
 - 7. Control or modify specific programs.
 - 8. Develop, store and modify dynamic color graphics.
 - 9. Provide data archiving of assigned points and support overlay graphing of this data utilizing up to four (4) variables.
- F. Alarm Processing:
 - 1. Off normal condition: Cause alarm and appropriate message, including time, system, point descriptor, and alarm condition. Select alarm state/value and which alarms shall cause automatic dial-out.
 - 2. Critical alarm or change-of-state: Display message, stored on disk for review and sort, or print.

3. Print on line changeable message, up to 60 characters in length, for each alarm point specified.
4. Display alarm reports on video. Display multiple alarms in order of occurrence.
5. Define time delay for equipment start-up or shutdown.
6. Allow unique routing of specific alarms.
7. Operator specifies if alarm requires acknowledgement.
8. Continue to indicate unacknowledged alarms after return to normal.
9. Alarm notification:
 - a. Automatic print.
 - b. Display indicating alarm condition.
 - c. Selectable audible alarm indication.
- G. Event Processing: Automatically initiate commands, user defined messages, take specific control actions or change control strategy and application programs resulting from event condition. Event condition may be value crossing operator defined limit, change-of-state, specified state, or alarm occurrence or return to normal.
- H. Automatic Restart: Automatically restart field equipment on restoration of power. Provide time delay between individual equipment restart and time of day start/stop.
- I. Messages:
 1. Automatically display or print user-defined message subsequent to occurrence of selected events.
 2. Compose, change, or delete any message.
 3. Display or log any message at any time.
 4. Assign any message to any event.
- J. Reports:
 1. Manually requested with time and date.
 2. Long term data archiving to hard disk.
 3. Automatic directives to download to transportable media such as floppy diskettes for storage.
 4. Data selection methods to include data base search and manipulation.
 5. Data extraction with mathematical manipulation.
 6. Data reports shall allow development of XY curve plotting, tabular reports (both statistical and summary), and multi-point timed based plots with not less than four (4) variables displayed.
 7. Generating reports either normally at operator direction, or automatically under work station direction.
 8. Reports may either manually displayed or printed, or may be printed automatically on daily, weekly, monthly, yearly or scheduled basis.
 9. Include capability for statistical data manipulation and extraction.
 10. Provide capability to generate four types of reports: Statistical detail reports, summary reports, trend graphic plots, x-y graphic plots.
- K. Parameter Save/Restore: Store most current operating system, parameter changes, and modifications on disk or diskette.
- L. Data Collection:
 1. Automatically collect and store in disk files.

2. Daily electrical energy consumption, peak demand, and time of peak demand for up to electrical meters over 2 year period.
 3. Daily consumption for up to 30 meters over a 2 year period.
 4. Daily billable electrical energy consumption and time for up to 1024 zones over a 10 year period.
 5. Provide archiving of stored data for use with system supplied custom reports.
- M. Graphic Display: Support graphic development on work station with software features:
1. Page linking.
 2. Generate, store, and retrieve library symbols.
 3. Single or double height characters.
 4. Sixty (60) dynamic points of data per graphic page.
 5. Pixel level resolution.
 6. Animated graphics for discrete points.
 7. Analog bar graphs.
 8. Display real time value of each input or output line diagram fashion.
- N. Maintenance Management:
1. Run time monitoring, per point.
 2. Maintenance scheduling targets with automatic annunciation, scheduling and shutdown.
 3. Equipment safety targets.
 4. Display of maintenance material and estimated labor.
 5. Target point reset, per point.
- O. Advisories:
1. Summary which contains status of points in locked out condition.
 2. Continuous operational or not operational report of interrogation of system hardware and programmable control units for failure.
 3. Report of power failure detection, time and date.
 4. Report of communication failure with operator device, field interface unit, point, programmable control unit.

2.06 LOAD CONTROL PROGRAMS

- A. General: Support inch-pounds and SI (metric) units of measurement.
- B. Demand Limiting:
1. Monitor total power consumption per power meter and shed associated loads automatically to reduce power consumption to an operator set maximum demand level.
 2. Input: Pulse count from incoming power meter connected to pulse accumulator in control unit.
 3. Forecast demand (kW): Predicted by sliding window method.
 4. Automatically shed loads throughout the demand interval selecting loads with independently adjustable on and off time of between one and 255 minutes.
 5. Demand Target: Minimum of 3 per demand meter; change targets based upon (1) time, (2) status of pre-selected points, or (3) temperature.
 6. Load: Assign load shed priority, minimum "ON" time and maximum "OFF" time.
 7. Limits: Include control band (upper and lower limits).
 8. Output advisory if loads are not available to satisfy required shed amount, advise shed requirements and requiring operator acknowledgement.

- C. Duty Cycling:
 - 1. Periodically stop and start loads, based on space temperature, and according to various On/Off patterns.
 - 2. Modify off portion of cycle based on operator specified comfort parameters. Maintain total cycle time by increasing on portion of cycle by same amount that off portion is reduced.
 - 3. Set and modify following parameters for each individual load.
 - a. Minimum and maximum Off time.
 - b. On/Off time in one minute increments.
 - c. Time period from beginning of interval until load can be cycled.
 - d. Manually override the DCC program and place a load in an On or Off state.
 - e. Cooling Target Temperature and Differential.
 - f. Heating Target Temperature and Differential.
 - g. Cycle off adjustment.
- D. Automatic Time Scheduling:
 - 1. Self-contained programs for automatic start/stop/scheduling of building loads.
 - 2. Support up to seven (7) normal day schedules, seven (7) "special day" schedules and two (2) temporary day schedules.
 - 3. Special days schedule shall support up to 30 unique date/duration combinations.
 - 4. Any number of loads assigned to any time program; each load can have individual time program.
 - 5. Each load assigned at least 16 control actions per day with 1 minute resolution.
 - 6. Time schedule operations may be:
 - a. Start.
 - b. Optimized Start.
 - c. Stop.
 - d. Optimized Stop.
 - e. Cycle.
 - f. Optimized Cycle.
 - 7. Minimum of 30 holiday periods up to 100 days in length may be specified for the year.
 - 8. Create temporary schedules.
 - 9. Broadcast temporary "special day" date and duration.
- E. Start/Stop Time Optimization:
 - 1. Perform optimized start/stop as function of outside conditions, inside conditions, or both.
 - 2. Adaptive and self-tuning, adjusting to changing conditions unattended.
 - 3. For each point under control, establish and modify:
 - a. Occupancy period.
 - b. Desired temperature at beginning of occupancy period.
 - c. Desired temperature at end of occupancy period.
- F. Night Setback/Setup Program: Reduce heating space temperature setpoint or raise cooling space temperature setpoint during unoccupied hours; in conjunction with scheduled start/stop and optimum start/stop programs.
- G. Calculated Points: Define calculations and totalization computed from monitored points (analog/digital points), constants, or other calculated points.

1. Employ arithmetic, algebraic, Boolean, and special function operations.
 2. Treat calculated values like any other analog value, use for any function that a "hard wired point" might be used.
- H. Event Initiated Programming: Event may be initiated by any data point, causing series of controls in a sequence.
1. Define time interval between each control action between 0 to 3600 seconds.
 2. Output may be analog value.
 3. Provide for "skip" logic.
 4. Verify completion of one action before proceeding to next. If not verified, program shall be able to skip to next action.
- I. Direct Digital Control: Each control unit shall provide Direct Digital Control software so that the operator may customize control strategies and sequences of operation by defining the appropriate control loop algorithms and choosing the optimum loop parameters.
1. Control loops: Defined using "modules" that are analogous to standard control devices.
 2. Output: Paired or individual digital outputs for pulse-width modulation, and analog outputs, as required.
 3. Firmware:
 - a. PID with analog or pulse-width modulation output.
 - b. Floating control with pulse-width modulated outputs.
 - c. Two-position control.
 - d. Primary and secondary reset schedule selector.
 - e. Hi/Lo signal selector.
 - f. Single pole double throw relay.
 - g. Single pole double throw time delay relay with delay before break, delay before make and interval time capabilities.
 4. Direct Digital Control loops: Downloaded upon creation or on operator request. On sensor failure, program shall execute user defined failsafe output.
 5. Display: Value or state of each of the lines which interconnect DDC modules.
- J. Fine Tuning Direct Digital Control PID or floating loops:
1. Display information:
 - a. Control loop being tuned
 - b. Input (process) variable
 - c. Output (control) variable
 - d. Setpoint of loop
 - e. Proportional band
 - f. Integral (reset) Interval
 - g. Derivative (rate) Interval
 2. Display format: Graphic, with automatic scaling; with input and output variable superimposed on graph of "time" vs "variable".
- K. Trend logging:
1. Each control unit will store samples of control unit's data points.
 2. Update file continuously at discretely assignable intervals.
 3. Automatically initiate upload request and then store data on hard disk.

4. Time synchronize sampling at operator specified times and intervals with sample resolution of one minute.
5. Co-ordinate sampling with on/off state of specified point.
6. Display trend samples on work station in graphic format. Automatically scale trend graph with minimum 60 samples of data in plot of time vs data.

2.07 HVAC CONTROL PROGRAMS

- A. General:
 1. Support Inch-pounds and SI (metric) units of measurement.
 2. Identify each HVAC Control system.
- B. Optimal Run Time:
 1. Control start-up and shutdown times of HVAC equipment for both heating and cooling.
 2. Base on occupancy schedules, outside air temperature, seasonal requirements, and interior room mass temperature.
 3. Start-up systems by using outside air temperature, room mass temperatures, and adaptive model prediction for how long building takes to warm up or cool down under different conditions.
 4. Use outside air temperature to determine early shut down with ventilation override.
 5. Analyze multiple building mass sensors to determine seasonal mode and worse case condition for each day.
 6. Operator commands:
 - a. Define term schedule
 - b. Add/delete fan status point.
 - c. Add/delete outside air temperature point.
 - d. Add/delete mass temperature point.
 - e. Define heating/cooling parameters.
 - f. Define mass sensor heating/cooling parameters.
 - g. Lock/unlock program.
 - h. Request optimal run time control summary.
 - i. Request optimal run time mass temperature summary.
 - j. Request HVAC point summary.
 - k. Request HVAC saving profile summary.
 7. Control Summary:
 - a. HVAC Control system begin/end status.
 - b. Optimal run time lock/unlock control status.
 - c. Heating/cooling mode status.
 - d. Optimal run time schedule.
 - e. Start/Stop times.
 - f. Selected mass temperature point ID.
 - g. Optimal run time system normal start times.
 - h. Occupancy and vacancy times.
 - i. Optimal run time system heating/cooling mode parameters.
 8. Mass temperature summary:
 - a. Mass temperature point type and ID.
 - b. Desired and current mass temperature values.

- c. Calculated warm-up/cool-down time for each mass temperature.
- d. Heating/cooling season limits.
- e. Break point temperature for cooling mode analysis.
- 9. HVAC point summary:
 - a. Control system identifier and status.
 - b. Point ID and status.
 - c. Outside air temperature point ID and status.
 - d. Mass temperature point ID and point.
 - e. Calculated optimal start and stop times.
 - f. Period start.

2.08 PROGRAMMING APPLICATION FEATURES

- A. Trend Point:
- B. Alarm Messages:
- C. Weekly Scheduling:
- D. Interlocking:

PART 3 EXECUTION

3.01 EXAMINATION

- A. Verify existing conditions before starting work.
- B. Verify that conditioned power supply is available to the control units and to the operator work station. Verify that field end devices, wiring, and pneumatic tubing is installed prior to installation proceeding.

3.02 INSTALLATION

- A. Install control units and other hardware in position on permanent walls where not subject to excessive vibration.
- B. Install software in control units and in operator work station. Implement all features of programs to specified requirements and appropriate to sequence of operation. Refer to Section 23 0993.
- C. Provide conduit and electrical wiring in accordance with Electrical Specifications. Electrical material and installation shall be in accordance with appropriate requirements of Division 26.

3.03 MANUFACTURER'S FIELD SERVICES

- A. Start and commission systems. Allow sufficient time for start-up and commissioning prior to placing control systems in permanent operation.
- B. Provide service engineer to instruct Owner's representative in operation of systems plant and equipment for 3 day period.

3.04 DEMONSTRATION AND INSTRUCTIONS

- A. Demonstrate complete and operating system to Owner.

END OF SECTION

SECTION 23 0993 - SEQUENCE OF OPERATIONS FOR HVAC CONTROLS

PART 1 GENERAL

1.01 SECTION INCLUDES

- A. This section defines the manner and method by which controls function. Requirements for each type of control system operation are specified. Equipment, devices, and system components required for control systems are specified in other sections.
- B. Sequence of operation for:
 - 1. Heating water zone control.
 - 2. Tertiary chilled water zone control.

1.02 SUBMITTALS

- A. See Section 01 3000 - Administrative Requirements, for submittal procedures.
- B. Control System Diagrams: Submit graphic schematic of the control system showing each control component and each component controlled, monitored, or enabled.
 - 1. Label with settings, adjustable range of control and limits.
 - 2. Include flow diagrams for each control system, graphically depicting control logic.
 - 3. Include the system and component layout of all equipment that the control system monitors, enables or controls, even if the equipment is primarily controlled by packaged or integral controls.
 - 4. Include draft copies of graphic displays indicating mechanical system components, control system components, and controlled function status and value.
 - 5. Include all monitoring, control and virtual points specified in elsewhere.
 - 6. Include a key to all abbreviations.
- C. Project Record Documents: Record actual locations of components and setpoints of controls, including changes to sequences made after submission of shop drawings.

PART 2 PRODUCTS - NOT USED

PART 3 EXECUTION

3.01 HEATING WATER ZONE CONTROL

- A. Flow switch in heating pump discharge provides on/off indication.
- B. Control pumps in primary, standby operation.
- C. Control heating water supply temperature set at 180 degrees F (82 degrees C) in accordance with outdoor reset schedule by modulating steam control valve.
- D. Flow switch in heating water circuit on no flow conditions closes valve and indicates alarm.
- E. On outside temperatures above 65 degrees F (18 degrees C) , de-energize heating pumps and suppress alarm. Temperature must be able to be reset remotely.
- F. Display:
 - 1. System graphic.
 - 2. System supply temperature.
 - 3. System supply control point adjustment.
 - 4. System return temperature.
 - 5. Pump on/off indication
 - 6. Pump on/off switch.

3.02 TERTIARY CHILLED WATER ZONE CONTROL

- A. Flow switch in Chilled water pump discharge provides on/off indication.
- B. Control pumps in primary, standby operation.
- C. Control tertiary loop based upon return water temperature.
- D. As tertiary chilled water return temperature approaches 55° F (setable) modulate return control valve open to allow cold secondary water into building loop.
- E. Flow switch in chilled water circuit on no flow conditions indicates alarm.
- F. Display:
 - 1. System graphic.
 - 2. System supply temperature.
 - 3. System supply control point adjustment.
 - 4. Building return temperature.
 - 5. Building return control point adjustment
 - 6. System supply flowrate
 - 7. Pump on/off indication
 - 8. Pump on/off switch.

END OF SECTION

SECTION 23 2113 - HYDRONIC PIPING

PART 1 GENERAL

1.01 SECTION INCLUDES

- A. Hydronic system requirements.
- B. Heating water piping, above grade.
- C. Chilled water piping, above grade.
- D. Equipment drains and overflows.
- E. Pipe hangers and supports.
- F. Unions, flanges, mechanical couplings, and dielectric connections.
- G. Valves:
 - 1. Gate valves.
 - 2. Ball valves.
 - 3. Butterfly valves.
 - 4. Check valves.
- H. Flow controls.

1.02 RELATED REQUIREMENTS

- A. Section 09 9000 - Painting and Coating.
- B. Section 23 2500 - HVAC Water Treatment: Pipe cleaning.

1.03 REFERENCE STANDARDS

- A. ASME BPVC-IX - Boiler and Pressure Vessel Code, Section IX - Welding, Brazing, and Fusing Qualifications; The American Society of Mechanical Engineers; 2013.
- B. ASME B16.3 - Malleable Iron Threaded Fittings: Classes 150 and 300; The American Society of Mechanical Engineers; 2011.
- C. ASME B16.18 - Cast Copper Alloy Solder Joint Pressure Fittings; The American Society of Mechanical Engineers; 2012 (ANSI B16.18).
- D. ASME B16.22 - Wrought Copper and Copper Alloy Solder Joint Pressure Fittings; 2013.
- E. ASME B31.9 - Building Services Piping; 2011 (ANSI/ASME B31.9).
- F. ASTM A53/A53M - Standard Specification for Pipe, Steel, Black and Hot-Dipped, Zinc-Coated, Welded and Seamless; 2012.
- G. ASTM A234/A234M - Standard Specification for Piping Fittings of Wrought Carbon Steel and Alloy Steel for Moderate and High Temperature Service; 2013.
- H. ASTM B32 - Standard Specification for Solder Metal; 2008.
- I. ASTM B88 - Standard Specification for Seamless Copper Water Tube; 2009.
- J. ASTM B88M - Standard Specification for Seamless Copper Water Tube (Metric); 2013.
- K. ASTM F708 - Standard Practice for Design and Installation of Rigid Pipe Hangers; 1992 (Reapproved 2008).
- L. AWS D1.1/D1.1M - Structural Welding Code - Steel; 2010.

- M. MSS SP-58 - Pipe Hangers and Supports - Materials, Design and Manufacture, Selection, Application, and Installation; Manufacturers Standardization Society of the Valve and Fittings Industry, Inc.; 2009.

1.04 SUBMITTALS

- A. See Section 01 3000 - Administrative Requirements, for submittal procedures.
- B. Welders Certificate: Include welders certification of compliance with ASME BPVC-IX.

1.05 QUALITY ASSURANCE

- A. Manufacturer Qualifications: Company specializing in manufacturing products of the type specified in this section, with minimum three years of documented experience.
- B. Welder Qualifications: Certify in accordance with ASME BPVC-IX.

1.06 DELIVERY, STORAGE, AND HANDLING

- A. Accept valves on site in shipping containers with labeling in place. Inspect for damage.
- B. Provide temporary protective coating on cast iron and steel valves.
- C. Provide temporary end caps and closures on piping and fittings. Maintain in place until installation.
- D. Protect piping systems from entry of foreign materials by temporary covers, completing sections of the work, and isolating parts of completed system.

PART 2 PRODUCTS

2.01 HYDRONIC SYSTEM REQUIREMENTS

- A. Comply with ASME B31.9 and applicable federal, state, and local regulations.
- B. Piping: Provide piping, fittings, hangers and supports as required, as indicated, and as follows:
 - 1. Where more than one piping system material is specified, provide joining fittings that are compatible with piping materials and ensure that the integrity of the system is not jeopardized.
 - 2. Use non-conducting dielectric connections whenever jointing dissimilar metals.
 - 3. Grooved mechanical joints may be used in accessible locations only.
 - a. Accessible locations include those exposed on interior of building, in pipe chases, and in mechanical rooms, aboveground outdoors, and as approved by Architect.
 - b. Use rigid joints unless otherwise indicated.
 - 4. Provide pipe hangers and supports in accordance with ASME B31.9 or MSS SP-58 unless indicated otherwise.
- C. Pipe-to-Valve and Pipe-to-Equipment Connections: Use flanges or unions to allow disconnection of components for servicing; do not use direct welded, soldered, or threaded connections.
- D. Valves: Provide valves where indicated:
 - 1. Provide drain valves where indicated, and if not indicated provide at least at main shut-off, low points of piping, bases of vertical risers, and at equipment. Use 3/4 inch (20 mm) gate valves with cap; pipe to nearest floor drain.
 - 2. Isolate equipment using butterfly valves with lug end flanges or grooved mechanical couplings.
 - 3. For throttling, bypass, or manual flow control services, use globe, ball, or butterfly valves.

4. For throttling and isolation service in chilled and condenser water systems, use only butterfly valves.
5. For shut-off and to isolate parts of systems or vertical risers, use gate, ball, or butterfly valves.
6. For throttling service, use plug cocks. Use non-lubricated plug cocks only when shut-off or isolating valves are also provided.

E. Welding Materials and Procedures: Conform to ASME BPVC-IX.

2.02 HEATING WATER PIPING, ABOVE GRADE

- A. Steel Pipe: ASTM A53/A53M, Schedule 40, black, using one of the following joint types:
1. Welded Joints: ASTM A234/A234M, wrought steel welding type fittings; AWS D1.1 welded.

2.03 CHILLED WATER PIPING, ABOVE GRADE

- A. Steel Pipe: ASTM A53/A53M, Schedule 40, black; using one of the following joint types:
1. Welded Joints: ASTM A234/A234M, wrought steel welding type fittings; AWS D1.1 welded.

2.04 EQUIPMENT DRAINS AND OVERFLOWS

- A. Steel Pipe: ASTM A53/A53M, Schedule 40 galvanized; using one of the following joint types:
1. Threaded Joints: Galvanized cast iron, or ASME B16.3 malleable iron fittings.
- B. Copper Tube: ASTM B88 (ASTM B88M), Type K (A), drawn; using one of the following joint types:
1. Solder Joints: ASME B16.18 cast brass/bronze or ASME B16.22 solder wrought copper fittings; ASTM B32 lead-free solder, HB alloy (95-5 tin-antimony) or tin and silver.

2.05 PIPE HANGERS AND SUPPORTS

- A. Provide hangers and supports that comply with MSS SP-58.
1. If type of hanger or support for a particular situation is not indicated, select appropriate type using MSS SP-58 recommendations.
 2. Hangers for Pipe Sizes 1/2 to 1-1/2 Inch (13 to 38 mm): Malleable iron, adjustable swivel, split ring.
 3. Hangers for Cold Pipe Sizes 2 Inches (50 mm) and Over: Carbon steel, adjustable, clevis.
 4. Hangers for Hot Pipe Sizes 2 to 4 Inches (50 to 100 mm): Carbon steel, adjustable, clevis.
 5. Hangers for Hot Pipe Sizes 6 Inches (150 mm) and Over: Adjustable steel yoke, cast iron roll, double hanger.
 6. Multiple or Trapeze Hangers: Steel channels with welded spacers and hanger rods.
 7. Multiple or Trapeze Hangers for Hot Pipe Sizes 6 Inches (150 mm) and Over: Steel channels with welded spacers and hanger rods, cast iron roll.
 8. Wall Support for Pipe Sizes to 3 Inches (76 mm): Cast iron hook.
 9. Wall Support for Pipe Sizes 4 Inches (100 mm) and Over: Welded steel bracket and wrought steel clamp.
 10. Wall Support for Hot Pipe Sizes 6 Inches (150 mm) and Over: Welded steel bracket and wrought steel clamp with adjustable steel yoke and cast iron roll.
 11. Vertical Support: Steel riser clamp.

12. Floor Support for Cold Pipe: Cast iron adjustable pipe saddle, lock nut, nipple, floor flange, and concrete pier or steel support.
13. Floor Support for Hot Pipe Sizes to 4 Inches (100 mm): Cast iron adjustable pipe saddle, lock nut, nipple, floor flange, and concrete pier or steel support.
14. Floor Support for Hot Pipe Sizes 6 Inches (150 mm) and Over: Adjustable cast iron roll and stand, steel screws, and concrete pier or steel support.
15. Hanger Rods: Mild steel threaded both ends, threaded one end, or continuous threaded.
16. 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.

2.06 UNIONS, FLANGES, MECHANICAL COUPLINGS, AND DIELECTRIC CONNECTIONS

- A. Unions for Pipe 2 Inches (50 mm) and Under:
- B. Flanges for Pipe Over 2 Inches (50 mm):
- C. Dielectric Connections:
 1. Waterways:
 - a. Water impervious insulation barrier capable of limiting galvanic current to 1 percent of short circuit current in a corresponding bimetallic joint.
 - b. Dry insulation barrier able to withstand 600 volt breakdown test.
 - c. Construct of galvanized steel with threaded end connections to match connecting piping.
 - d. Suitable for the required operating pressures and temperatures.
 2. Flanges:
 - a. Dielectric flanges with same pressure ratings as standard flanges.
 - b. Water impervious insulation barrier capable of limiting galvanic current to 1 percent of short circuit current in a corresponding bimetallic joint.
 - c. Dry insulation barrier able to withstand 600 volt breakdown test.
 - d. Construct of galvanized steel with threaded end connections to match connecting piping.
 - e. Suitable for the required operating pressures and temperatures.

2.07 GATE VALVES

- A. Manufacturers:
 1. Conbraco Industries: www.apollovalves.com.
 2. Milwaukee Valve Company: www.milwaukeevalve.com.
 3. Nibco, Inc: www.nibco.com.
 4. Substitutions: See Section 01 6000 - Product Requirements.
- B. Up To and Including 2 Inches (50 mm):
 1. Bronze body, bronze trim, screwed bonnet, non-rising stem, lockshield stem, inside screw with backseating stem, solid wedge disc, alloy seat rings, solder ends.
- C. Over 2 Inches (50 mm):
 1. Iron body, bronze trim, bolted bonnet, rising stem, handwheel, outside screw and yoke, solid wedge disc with bronze seat rings, flanged ends.

2.08 BALL VALVES

- A. Manufacturers:

1. Conbraco Industries: www.apollovalves.com.
 2. Grinnell Products, a Tyco Business: www.grinnell.com.
 3. Milwaukee Valve Company: www.milwaukeevalve.com.
 4. Nibco, Inc: www.nibco.com.
 5. Substitutions: See Section 01 6000 - Product Requirements.
- B. Up To and Including 2 Inches (50 mm):
1. Bronze one piece body, chrome plated brass ball, teflon seats and stuffing box ring, lever handle with balancing stops, solder ends with union.
- C. Over 2 Inches (50 mm):
1. Ductile iron body, chrome plated stainless steel ball, teflon or Virgin TFE seat and stuffing box seals, lever handle or gear operated, flanged ends, rated to 800 psi (5515 kPa).

2.09 BUTTERFLY VALVES

- A. Manufacturers:
1. Crane Co.: www.cranevalve.com.
 2. Grinnell Products, a Tyco Business: www.grinnell.com.
 3. Milwaukee Valve Company: www.milwaukeevalve.com.
 4. Substitutions: See Section 01 6000 - Product Requirements.
- B. Body: Cast or ductile iron with resilient replaceable EPDM seat, wafer, lug, or grooved ends, extended neck.
- C. Disc: Construct of aluminum bronze, chrome plated ductile iron, stainless steel, ductile iron with EPDM encapsulation, or Buna-N encapsulation.
- D. Operator: 10 position lever handle.

2.10 FLOW CONTROLS

- A. Manufacturers:
1. Griswold Controls: www.griswoldcontrols.com.
 2. ITT Bell & Gossett: www.bellgossett.com.
 3. Taco, Inc: www.taco-hvac.com.
 4. Substitutions: See Section 01 6000 - Product Requirements.
- B. Construction: Class 125, Brass or bronze body with union on inlet and outlet, temperature and pressure test plug on inlet and outlet, blowdown/backflush drain.
- C. Calibration: Control flow within 5 percent of selected rating, over operating pressure range of 10 times minimum pressure required for control, maximum minimum pressure 3.5 psi (24 kPa).

PART 3 EXECUTION

3.01 PREPARATION

- A. Ream pipe and tube ends. Remove burrs. Bevel plain end ferrous pipe.
- B. Remove scale and dirt on inside and outside before assembly.
- C. Prepare piping connections to equipment using jointing system specified.
- D. Keep open ends of pipe free from scale and dirt. Protect open ends with temporary plugs or caps.

- E. After completion, fill, clean, and treat systems. Refer to Section 23 2500 for additional requirements.

3.02 INSTALLATION

- A. Install in accordance with manufacturer's instructions.
- B. Route piping in orderly manner, parallel to building structure, and maintain gradient.
- C. Install piping to conserve building space and to avoid interfere with use of space.
- D. Group piping whenever practical at common elevations.
- E. Sleeve pipe passing through partitions, walls and floors.
- F. Install firestopping to preserve fire resistance rating of partitions and other elements, using materials and methods specified.
- G. Slope piping and arrange to drain at low points.
- H. All piping shall be welded except for piping located in riser shaft. Pipe in riser shaft shall flanged connections. No welding shall be done in return air shaft.
- I. Install piping to allow for expansion and contraction without stressing pipe, joints, or connected equipment.
- J. Inserts:
 - 1. Provide inserts for placement in concrete formwork.
 - 2. Provide inserts for suspending hangers from reinforced concrete slabs and sides of reinforced concrete beams.
 - 3. Provide hooked rod to concrete reinforcement section for inserts carrying pipe over 4 inches (100 mm).
 - 4. Where concrete slabs form finished ceiling, locate inserts flush with slab surface.
 - 5. Where inserts are omitted, drill through concrete slab from below and provide through-bolt with recessed square steel plate and nut above slab.
- K. Pipe Hangers and Supports:
 - 1. Install in accordance with ASME B31.9, ASTM F708, or MSS SP-89.
 - 2. Install hangers to provide minimum 1/2 inch (13 mm) space between finished covering and adjacent work.
 - 3. Place hangers within 12 inches (300 mm) of each horizontal elbow.
 - 4. Use hangers with 1-1/2 inch (38 mm) minimum vertical adjustment. Design hangers for pipe movement without disengagement of supported pipe.
 - 5. Support vertical piping at every other floor. Support riser piping independently of connected horizontal piping.
 - 6. Where several pipes can be installed in parallel and at same elevation, provide multiple or trapeze hangers.
 - 7. Provide copper plated hangers and supports for copper piping.
 - 8. Prime coat exposed steel hangers and supports. Refer to Section 09 9000. Hangers and supports located in crawl spaces, pipe shafts, and suspended ceiling spaces are not considered exposed.
- L. Provide clearance in hangers and from structure and other equipment for installation of insulation and access to valves and fittings.
- M. Provide access where valves and fittings are not exposed.

- N. Use eccentric reducers to maintain top of pipe level.
- O. Where pipe support members are welded to structural building framing, scrape, brush clean, and apply one coat of zinc rich primer to welds.
- P. Prepare unfinished pipe, fittings, supports, and accessories, ready for finish painting. Refer to Section 09 9000.
- Q. Install valves with stems upright or horizontal, not inverted.

3.03 SCHEDULES

- A. Hanger Spacing for Steel Piping.
 - 1. 1/2 inch (15 mm), 3/4 inch (20 mm), and 1 inch (25 mm): Maximum span, 7 feet (2100 mm); minimum rod size, 1/4 inch (6 mm).
 - 2. 1-1/4 inches (32 mm): Maximum span, 8 feet (2400 mm); minimum rod size, 3/8 inch (9 mm).
 - 3. 1-1/2 inches (40 mm): Maximum span, 9 feet (2700 mm); minimum rod size, 3/8 inch (9 mm).
 - 4. 2 inches (50 mm): Maximum span, 10 feet (3.0 m); minimum rod size, 3/8 inch (9 mm).
 - 5. 2-1/2 inches (65 mm): Maximum span, 11 feet (3.4 m); minimum rod size, 3/8 inch (9 mm).
 - 6. 3 inches (80 mm): Maximum span, 12 feet (3.6 m); minimum rod size, 3/8 inch (9 mm).
 - 7. 4 inches (100 mm): Maximum span, 14 feet (4.3 m); minimum rod size, 1/2 inch (13 mm).
 - 8. 6 inches (150 mm): Maximum span, 17 feet (5.1 m); minimum rod size, 1/2 inch (13 mm).

END OF SECTION

SECTION 23 2114 - HYDRONIC SPECIALTIES

PART 1 GENERAL

1.01 SECTION INCLUDES

- A. Air vents.
- B. Air separators.
- C. Strainers.
- D. Suction diffusers.
- E. Combination pump discharge valves.
- F. Pressure-temperature test plugs.
- G. Balancing valves.
- H. Relief valves.

1.02 RELATED REQUIREMENTS

- A. Section 23 2113 - Hydronic Piping.
- B. Section 23 2500 - HVAC Water Treatment: Pipe Cleaning.

1.03 ADMINISTRATIVE REQUIREMENTS

- A. Sequencing: Ensure that utility connections are achieved in an orderly and expeditious manner.

1.04 SUBMITTALS

- A. See Section 01 3000 - Administrative Requirements, for submittal procedures.

1.05 QUALITY ASSURANCE

- A. Manufacturer Qualifications: Company specializing in manufacturing the type of products specified in this section, with minimum three years of documented experience.

1.06 DELIVERY, STORAGE, AND HANDLING

- A. Accept valves on site in shipping containers with labeling in place. Inspect for damage.
- B. Provide temporary end caps and closures on piping and fittings. Maintain in place until installation.
- C. Protect piping systems from entry of foreign materials by temporary covers, completing sections of the work, and isolating parts of completed system.

PART 2 PRODUCTS

2.01 AIR VENTS

- A. Manufacturers:
 - 1. Armstrong International, Inc: www.armstronginternational.com.
 - 2. ITT Bell & Gossett: www.bellgossett.com.
 - 3. Taco, Inc: www.taco-hvac.com.
 - 4. Substitutions: See Section 01 6000 - Product Requirements.
- B. Manual Type: Short vertical sections of 2 inch (50 mm) diameter pipe to form air chamber, with 1/8 inch (3 mm) brass needle valve at top of chamber.
- C. Float Type:

1. Brass or semi-steel body, copper, polypropylene, or solid non-metallic float, stainless steel valve and valve seat; suitable for system operating temperature and pressure; with isolating valve.
 2. Cast iron body and cover, float, bronze pilot valve mechanism suitable for system operating temperature and pressure; with isolating valve.
- D. Washer Type:
1. Brass with hygroscopic fiber discs, vent ports, adjustable cap for manual shut-off, and integral spring loaded ball check valve.

2.02 AIR/DIRT SEPARATORS

- A. In-line Air/Dirt Separators:
1. Cast iron for sizes 1-1/2 inch (40 mm) and smaller, or steel for sizes 2 inch (50 mm) and larger; tested and stamped in accordance with ASME BPVC-VIII-1; for 125 psi (860 kPa) operating pressure.
 2. Coalescing type Separator
 3. Integral Blow-Down connection

2.03 STRAINERS

- A. Manufacturers:
1. Armstrong International, Inc: www.armstronginternational.com.
 2. Grinnell Products, a Tyco Business: www.grinnell.com.
 3. The Metraflex Company: www.metraflex.com.
- B. Size 2 inch (50 mm) and Under:
1. Screwed brass or iron body for 175 psi (1200 kPa) working pressure, Y pattern with 1/32 inch (0.8 mm) stainless steel perforated screen.
- C. Size 2-1/2 inch (65 mm) to 4 inch (100 mm):
1. Provide flanged iron body for 175 psi (1200 kPa) working pressure, Y pattern with 1/16 inch (1.6 mm) stainless steel perforated screen.
- D. Size 5 inch (125 mm) and Larger:
1. Provide flanged iron body for 175 psi (1200 kPa) working pressure, basket pattern with 1/8 inch (3.2 mm) stainless steel perforated screen.

2.04 SUCTION DIFFUSERS

- A. Manufacturers:
1. Anvil International, Inc: www.anvilintl.com.
 2. Grinnell Products, a Tyco Business: www.grinnell.com.
 3. ITT Bell & Gossett: www.bellgossett.com.
 4. Substitutions: See Section 01 6000 - Product Requirements.
- B. Fitting: Angle pattern, cast-iron body, threaded for 2 inch (50 mm) and smaller, flanged for 2-1/2 inch (65 mm) and larger, rated for 175 psi (1200 kPa) working pressure, with inlet vanes, cylinder strainer with 3/16 inch (5 mm) diameter openings, disposable 5/32 inch (4 mm) mesh strainer to fit over cylinder strainer, 20 mesh start up screen, and permanent magnet located in flow stream and removable for cleaning.
- C. Accessories: Adjustable foot support, blowdown tapping in bottom, gage tapping in side.

2.05 COMBINATION PUMP DISCHARGE VALVES

- A. Manufacturers:
 - 1. Crane Co.: www.cranevalve.com.
 - 2. Taco, Inc: www.taco-hvac.com.
 - 3. ITT Bell & Gossett
 - 4. Substitutions: See Section 01 6000 - Product Requirements.
- B. Valves: Straight or angle pattern, flanged cast-iron valve body with bolt-on bonnet for 175 psi (1200 kPa) operating pressure, non-slam check valve with spring-loaded bronze disc and seat, stainless steel stem, and calibrated adjustment permitting flow regulation.

2.06 PRESSURE-TEMPERATURE TEST PLUGS

- A. Construction: Brass body designed to receive temperature or pressure probe with removable protective cap, and Neoprene rated for minimum 200 degrees F (93 degrees C).
- B. Application: Use extended length plugs to clear insulated piping.

2.07 BALANCING VALVES

- A. Manufacturers:
 - 1. Armstrong International, Inc: www.armstronginternational.com.
 - 2. ITT Bell & Gossett: www.bellgossett.com.
 - 3. Taco, Inc: www.taco-hvac.com.
 - 4. Substitutions: See Section 01 6000 - Product Requirements.
- B. Size 2 inch (50 mm) and Smaller:
 - 1. Provide ball style with flow balancing, flow measurement, and shut-off capabilities, memory stops, minimum of two metering ports and NPT threaded or soldered connections.
 - 2. Metal construction materials consist of bronze or brass.
 - 3. Non-metal construction materials consist of Teflon, EPDM, or engineered resin.
- C. Size 2.5 inch (64 mm) and Larger:
 - 1. Provide ball or globe style with flow balancing, flow measurement, and shut-off capabilities, memory stops, minimum of two metering ports and flanged or weld end connections.
 - 2. Valve body construction materials consist of cast iron or carbon steel.
 - 3. Internal components construction materials consist of brass, aluminum bronze, bronze, Teflon, EPDM, NORYL, or engineered resin.

2.08 RELIEF VALVES

- A. Bronze body, teflon seat, stainless steel stem and springs, automatic, direct pressure actuated, capacities ASME certified and labelled.

PART 3 EXECUTION

3.01 SEE SECTION 01 7000 FOR ADDITIONAL REQUIREMENTS.

3.02 INSTALLATION

- A. Install specialties in accordance with manufacturer's instructions.
- B. Provide manual air vents at system high points and as indicated.

- C. For automatic air vents in ceiling spaces or other concealed locations, provide vent tubing to nearest drain.
- D. Provide valved drain and hose connection on strainer blow down connection.
- E. Provide pump suction fitting on suction side of base mounted centrifugal pumps where indicated. Remove temporary strainers after cleaning systems.
- F. Provide combination pump discharge valve on discharge side of base mounted centrifugal pumps where indicated.
- G. Support pump fittings with floor mounted pipe and flange supports.

END OF SECTION

SECTION 23 2123 - HYDRONIC PUMPS

PART 1 GENERAL

1.01 SECTION INCLUDES

- A. Base mounted pumps.

1.02 RELATED REQUIREMENTS

- A. Section 23 0716 - HVAC Equipment Insulation.
- B. Section 23 0719 - HVAC Piping Insulation.
- C. Section 23 2113 - Hydronic Piping.
- D. Section 23 2114 - Hydronic Specialties.

1.03 REFERENCE STANDARDS

- A. UL 778 - Standard for Motor-Operated Water Pumps; Underwriters Laboratories Inc.; Current Edition, Including All Revisions.

1.04 SUBMITTALS

- A. Millwright's Certificate: Certify that base mounted pumps have been aligned.

PART 2 PRODUCTS

2.01 MANUFACTURERS

- A. Armstrong Pumps Inc:
- B. ITT Bell & Gossett:
- C. Taco
- D. Substitutions: See Section 01 6000 - Product Requirements.

2.02 HVAC PUMPS - GENERAL

- A. Provide pumps that operate at specified system fluid temperatures without vapor binding and cavitation, are non-overloading in parallel or individual operation, and operate within 25 percent of midpoint of published maximum efficiency curve.
- B. Base Mounted Pumps: Aligned by qualified millwright.
- C. Products Requiring Electrical Connection: Listed and classified by UL or testing agency acceptable to authority having jurisdiction as suitable for the purpose specified and indicated.

2.03 BASE MOUNTED PUMPS

- A. Type: Horizontal shaft, single stage, direct connected, radially or horizontally split casing, for 125 psi (860 kPa) maximum working pressure.
- B. Casing: Cast iron, with suction and discharge gage ports, renewable bronze casing wearing rings, seal flush connection, drain plug, flanged suction and discharge.
- C. Impeller: Bronze, fully enclosed, keyed to shaft.
- D. Bearings: Oil lubricated roller or ball bearings.
- E. Shaft: Alloy steel with copper, bronze, or stainless steel shaft sleeve.
- F. Seal: Mechanical seal, 225 degrees F (107 degrees C) maximum continuous operating temperature.

- G. Seal: Packing gland with minimum four rings graphite impregnated packing and bronze lantern rings, 250 degrees F (121 degrees C) maximum continuous operating temperature.
- H. Drive: Flexible coupling with coupling guard.
- I. Baseplate: Cast iron or fabricated steel with integral drain rim.

PART 3 EXECUTION

3.01 PREPARATION

- A. Verify that electric power is available and of the correct characteristics.

3.02 INSTALLATION

- A. Install in accordance with manufacturer's instructions.
- B. Provide access space around pumps for service. Provide no less than minimum space recommended by manufacturer.
- C. Provide line sized shut-off valve and strainer on pump suction, and line sized soft seat check valve and balancing valve on pump discharge.
- D. Provide air cock and drain connection on horizontal pump casings.
- E. Provide drains for bases and seals, piped to and discharging into floor drains.
- F. Check, align, and certify alignment of base mounted pumps prior to start-up.
- G. Install base mounted pumps on concrete housekeeping base, with anchor bolts, set and level, and grout in place.
- H. Lubricate pumps before start-up.

END OF SECTION

SECTION 23 2500 - HVAC WATER TREATMENT

PART 1 GENERAL

1.01 SECTION INCLUDES

- A. Cleaning of piping systems.

1.02 RELATED REQUIREMENTS

- A. Section 23 2113 - Hydronic Piping.
- B. Section 23 2114 - Hydronic Specialties.
- C. Section 23 0913 - Instrumentation and Control Devices for HVAC.

1.03 SUBMITTALS

- A. See Section 01 3000 - Administrative Requirements, for submittal procedures.

1.04 QUALITY ASSURANCE

- A. Manufacturer Qualifications: Company specializing in manufacturing the type of products specified in this section, with minimum three years of documented experience. Company shall have local representatives with water analysis laboratories and full time service personnel.

PART 2 PRODUCTS

2.01 MANUFACTURERS

- A. AmSolv/Division of Amrep, Inc: www.amsolv.com.
- B. GE Water Technologies: www.gewater.com.
- C. Nalco Company: www.nalco.com.
- D. Substitutions: See Section 01 6000 - Product Requirements.

2.02 MATERIALS

- A. System Cleaner:
 - 1. Liquid alkaline compound with emulsifying agents and detergents to remove grease and petroleum products; sodium tripoly phosphate and sodium molybdate.
 - 2. Biocide chlorine release agents such as sodium hypochlorite or calcium hypochlorite.
- B. Closed System Treatment (Water):
 - 1. Sequestering agent to reduce deposits and adjust pH; polyphosphate.
 - 2. Corrosion inhibitors; boron-nitrite, sodium nitrite and borax, sodium tolyltriazole, low molecular weight polymers, phosphonates, sodium molybdate, or sulphites.
 - 3. Conductivity enhancers; phosphates or phosphonates.

PART 3 EXECUTION

3.01 PREPARATION

- A. Systems shall be operational, filled, started, and vented prior to cleaning. Use water meter to record capacity in each system.
- B. Place terminal control valves in open position during cleaning.
- C. Verify that electric power is available and of the correct characteristics.

3.02 CLEANING SEQUENCE

- A. Concentration:

1. As recommended by manufacturer.
- B. Hot Water Heating Systems:
 1. Apply heat while circulating, slowly raising temperature to 160 degrees F (71 degrees C) and maintain for 12 hours minimum.
 2. Remove heat and circulate to 100 degrees F (37.8 degrees C) or less; drain systems as quickly as possible and refill with clean water.
 3. Circulate for 6 hours at design temperatures, then drain.
 4. Refill with clean water and repeat until system cleaner is removed.
- C. Chilled Water Systems:
 1. Circulate for 48 hours, then drain systems as quickly as possible.
 2. Refill with clean water, circulate for 24 hours, then drain.
 3. Refill with clean water and repeat until system cleaner is removed.

3.03 INSTALLATION

- A. Install in accordance with manufacturer's instructions.

3.04 CLOSED SYSTEM TREATMENT

- A. Provide one bypass feeder on each system. Install isolating and drain valves and necessary piping. Install around balancing valve downstream of circulating pumps unless indicated otherwise.
- B. Introduce closed system treatment through bypass feeder when required or indicated by test.
- C. Provide 3/4 inch (19 mm) water coupon rack around circulating pumps with space for 4 test specimens.

END OF SECTION

SECTION 23 8101 - TERMINAL HEAT TRANSFER UNITS

PART 1 GENERAL

1.01 SECTION INCLUDES

- A. Fan-coil units.

1.02 RELATED REQUIREMENTS

- A. Section 23 2113 - Hydronic Piping.
- B. Section 23 2114 - Hydronic Specialties.
- C. Section 23 0993 - Sequence of Operations for HVAC Controls.

1.03 SUBMITTALS

- A. See Section 01 3000 - Administrative Requirements, for submittal procedures.
- B. Manufacturer's Instructions: Indicate installation instructions and recommendations.
- C. Operation and Maintenance Data: Include manufacturers descriptive literature, operating instructions, installation instructions, maintenance and repair data, and parts listings.
- D. Warranty: Submit manufacturer's warranty and ensure forms have been completed in Owner's name and registered with manufacturer.

1.04 QUALITY ASSURANCE

- A. Products Requiring Electrical Connection: Listed and classified by Underwriters Laboratories Inc. as suitable for the purpose specified and indicated.

1.05 WARRANTY

- A. See Section 01 7800 - Closeout Submittals, for additional warranty requirements.
- B. Provide five year manufacturers warranty for fan-coil unit.

PART 2 PRODUCTS

2.01 FAN-COIL UNITS

- A. Manufacturers:
 - 1. Carrier Corporation:
 - 2. Daikin Applied: .
 - 3. Trane Inc:
 - 4. Multi Aqua .
- B. Filter: Easily removed 1 inch (25 mm) thick glass fiber throw-away type, located to filter air before coil.

PART 3 EXECUTION

3.01 INSTALLATION

- A. Install in accordance with manufacturer's instructions.
- B. Install equipment exposed to finished areas after walls and ceiling are finished and painted. Do not damage equipment or finishes.
- C. Fan-Coil Units: Install as indicated. Coordinate to assure correct recess size for recessed units.
- D. Units with Cooling Coils: Connect drain pan to condensate drain.

3.02 CLEANING

- A. After construction is completed, including painting, clean exposed surfaces of units. Vacuum clean coils and inside of cabinets.

END OF SECTION

D I V I S I O N 26

**Applicable Portions Of The Conditions
Of The Contract And Division 1 General
Requirements Apply To The Work Of
This Division.**

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SECTION 26 05 19 - LOW-VOLTAGE ELECTRICAL POWER CONDUCTORS

PART 1 GENERAL

1.1 SUMMARY

- A. Section includes building wire.

1.2 REFERENCES

- A. National Fire Protection Association:
 - 1. NFPA 70 - National Electrical Code.
 - 2. NFPA 262 - Standard Method of Test for Flame Travel and Smoke of Wires and Cables for Use in Air-Handling Spaces.

1.3 SYSTEM DESCRIPTION

- A. Product Requirements: Provide products as follows:
 - 1. Solid conductor for feeders and branch circuits 10 AWG and smaller.
 - 2. Stranded conductors for control circuits.
 - 3. Increase wire size in branch circuits to limit voltage drop to a maximum of 3 percent.
- B. Wiring Methods: Provide the following wiring methods:
 - 1. Use only building wire, Type THHN/THWN insulation, in raceway.

1.4 DESIGN REQUIREMENTS

- A. Conductor sizes are based on copper.

1.5 QUALITY ASSURANCE

- A. Provide wiring materials located in plenums with peak optical density not greater than 0.5, average optical density not greater than 0.15, and flame spread not greater than 5 feet (1.5 m) when tested in accordance with NFPA 262.
- B. Maintain one copy of each document on site.

1.6 FIELD MEASUREMENTS

- A. Verify field measurements are as indicated on Drawings.

1.7 COORDINATION

- A. Where wire destination is indicated and routing is not shown, determine routing and lengths required.

- B. Wire routing indicated is approximate unless dimensioned.

PART 2 PRODUCTS

2.1 BUILDING WIRE

- A. Product Description: Single conductor insulated wire.
- B. Conductor: Copper.
- C. Insulation Voltage Rating: 600 volts.
- D. Insulation Temperature Rating: 75 degrees.

2.2 TERMINATIONS

- A. Terminal Lugs for Wires 6 AWG and Smaller: Solderless, compression type copper.
- B. Lugs for Wires 4 AWG and Larger: Color keyed, compression type copper, with insulating sealing collars.

PART 3 EXECUTION

3.1 EXAMINATION

- A. Coordination and project conditions.
- B. Verify raceway installation is complete and supported.

3.2 EXISTING WORK

- A. Remove exposed abandoned wire and cable, including abandoned wire and cable above accessible ceiling finishes. Patch surfaces where removed cables pass through building finishes.
- B. Disconnect abandoned circuits and remove circuit wire and cable. Remove abandoned boxes when wire and cable servicing boxes is abandoned and removed. Install blank cover for abandoned boxes not removed.
- C. Provide access to existing wiring connections remaining active and requiring access. Modify installation or install access panel.
- D. Extend existing circuits using materials and methods compatible with existing electrical installations.
- E. Clean and repair existing wire and cable remaining or wire to be reinstalled.

3.3 INSTALLATION

- A. Route wire to meet Project conditions.
- B. Neatly train and lace wiring inside boxes, equipment, and panelboards.
- C. Identify and color code wire under provisions of Section 26 05 53.
- D. Special Techniques--Building Wire in Raceway:
 - 1. Pull conductors into raceway at same time.
- E. Special Techniques - Wiring Connections:
 - 1. Clean conductor surfaces before installing lugs and connectors.
 - 2. Make splices, taps, and terminations to carry full ampacity of conductors with no perceptible temperature rise.
 - 3. Tape uninsulated conductors and connectors with electrical tape to 150 percent of insulation rating of conductor.
 - 4. Install split bolt connectors for copper conductor splices and taps, 6 AWG and larger.
 - 5. Install solderless pressure connectors with insulating covers for copper conductor splices and taps, 8 AWG and smaller.
 - 6. Install insulated spring wire connectors with plastic caps for copper conductor splices and taps, 10 AWG and smaller.
- F. Install terminal lugs on ends of 600 volt wires unless lugs are furnished on connected device, such as circuit breakers.
- G. Size lugs in accordance with manufacturer's recommendations terminating wire sizes. Install 2-hole type lugs to connect wires 4 AWG and larger to copper bus bars.
- H. For terminal lugs fastened together such as on motors, transformers, and other apparatus, or when space between studs is small enough that lugs can turn and touch each other, insulate for dielectric strength of 2-1/2 times normal potential of circuit.

3.4 WIRE COLOR

- A. General:
 - 1. For wire sizes 10 AWG and smaller, install wire colors in accordance with the following:
 - a. Black, red, and blue for circuits at 120/208 volts single or three phase.
 - b. Orange, brown, and yellow for circuits at 277/480 volts single or three phase.
 - 2. For wire sizes 8 AWG and larger, identify wire with colored tape at terminals, splices and boxes. Colors are as follows:
 - a. Black, red, and blue for circuits at 120/208 volts single or three phase.
 - b. Orange, brown, and yellow for circuits at 277/480 volts single or three phase.

- B. Neutral Conductors: White. When two or more neutrals are located in one conduit, individually identify each with proper circuit number.
- C. Branch Circuit Conductors: Install three or four wire home runs with each phase uniquely color coded.
- D. Feeder Circuit Conductors: Uniquely color code each phase.
- E. All conductors shall be landed under separate lug barrels.
- F. Ground Conductors:
 - 1. For 6 AWG and smaller: Green.
 - 2. For 4 AWG and larger: Identify with green tape at both ends and visible points including junction boxes.

END OF SECTION

SECTION 26 05 26 - GROUNDING AND BONDING FOR ELECTRICAL SYSTEMS

PART 1 GENERAL

1.1 SUMMARY

- A. Section Includes:
 - 1. Wire.
 - 2. Mechanical connectors.

1.2 REFERENCES

- A. Institute of Electrical and Electronics Engineers:
 - 1. IEEE 142 - Recommended Practice for Grounding of Industrial and Commercial Power Systems.
- B. National Fire Protection Association:
 - 1. NFPA 70.2011 - National Electrical Code.

1.3 SYSTEM DESCRIPTION

- A. Grounding systems use the following elements as grounding electrodes for this project:
 - 1. Metal building frame.

1.4 QUALITY ASSURANCE

- A. Provide grounding materials conforming to requirements of NEC, IEEE 142, and UL labeled.

1.5 DELIVERY, STORAGE, AND HANDLING

- A. Accept materials on site in original factory packaging, labeled with manufacturer's identification.
- B. Protect from weather and construction traffic, dirt, water, chemical, and mechanical damage, by storing in original packaging.
- C. Do not deliver items to project before time of installation. Limit shipment of bulk and multiple-use materials to quantities needed for immediate installation.

PART 2 PRODUCTS

2.1 WIRE

- A. Material: Stranded copper.

- B. Grounding Electrode Conductor: Copper conductor insulated.

2.2 MECHANICAL CONNECTORS

- A. Description: Bronze connectors, suitable for grounding and bonding applications, in configurations required for particular installation.

PART 3 EXECUTION

3.1 PREPARATION

- A. Remove paint, surface contaminants at connection points to building steel.

3.2 INSTALLATION

- A. Install grounding and bonding conductors concealed from view.
- B. Equipment Grounding Conductor: Install separate, insulated conductor within each feeder and branch circuit raceway. Terminate each end on suitable lug, bus, or bushing.
- C. Permanently ground entire light and power system in accordance with NEC, including service equipment, distribution panels, lighting panelboards, switch and starter enclosures, motor frames, grounding type receptacles, and other exposed non-current carrying metal parts of electrical equipment.
- D. Accomplish grounding of electrical system by using insulated grounding conductor installed with feeders and branch circuit conductors in conduits. Size grounding conductors in accordance with NEC. Install from grounding bus of serving panel to ground bus of served panel, grounding screw of receptacles, lighting fixture housing, light switch outlet boxes or metal enclosures of service equipment. Ground conduits by means of grounding bushings on terminations at panelboards.
- E. Grounding electrical system using continuous metal raceway system enclosing circuit conductors in accordance with NEC.
- F. Permanently attach equipment and grounding conductors prior to energizing equipment.
- G. All conductors shall be landed on separate lug barrels.

END OF SECTION

SECTION 26 05 33 - RACEWAY AND BOXES FOR ELECTRICAL SYSTEMS

PART 1 GENERAL

1.1 SUMMARY

- A. Section includes conduit and tubing, surface raceways, wireways, outlet boxes, pull and junction boxes.

1.2 REFERENCES

- A. NFPA 70.2011, The National Electrical Code

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.
- B. 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 (19 mm) unless otherwise specified.

PART 2 PRODUCTS

2.1 FLEXIBLE METAL CONDUIT

- A. Product Description: Interlocked steel construction.
- B. Fittings: NEMA FB 1.
- C. 1/2" min

2.2 ELECTRICAL METALLIC TUBING (EMT)

- A. Product Description: ANSI C80.3; galvanized tubing, 3/4" min.
- B. Fittings and Conduit Bodies: NEMA FB 1; steel compression type.

2.3 WIREWAY

- A. Product Description: General purpose type wireway.
- B. Size: 6 x 6 inch cross section length as indicated on Drawings.
- C. Cover: Hinged cover.

PART 3 EXECUTION

3.1 EXAMINATION

- A. Verify outlet locations and routing and termination locations of raceway prior to rough-in.

3.2 INSTALLATION

- A. 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.
- 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. Do not support raceway with wire or perforated pipe straps. Remove wire used for temporary supports
- E. Do not attach raceway to ceiling support wires or other piping systems.
- F. Route exposed raceway parallel and perpendicular to walls.
- G. Route raceway installed above accessible ceilings parallel and perpendicular to walls.
- H. Maintain clearance between raceway and piping for maintenance purposes.
- I. Maintain 12 inch (300 mm) clearance between raceway and surfaces with temperatures exceeding 104 degrees F (40 degrees C).
- J. Cut conduit square using saw or pipe cutter; de-burr cut ends.
- K. Bring conduit to shoulder of fittings; fasten securely.

- L. Install no more than equivalent of three 90 degree bends between boxes. Install conduit bodies to make sharp changes in direction, as around beams.
- M. Install suitable pull string or cord in each empty raceway except sleeves and nipples.
- N. Install suitable caps to protect installed conduit against entrance of dirt and moisture.
- O. Close ends and unused openings in wireway.

3.4 INSTALLATION - BOXES

- A. Orient boxes to accommodate wiring devices.
- B. Install pull boxes and junction boxes above accessible ceilings and in unfinished areas only.
- C. Support boxes independently of conduit.
- D. 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.

3.6 ADJUSTING

- A. Adjust flush-mounting outlets to make front flush with finished wall material.
- B. Install knockout closures in unused openings in boxes.

3.7 CLEANING

- A. Clean interior of boxes to remove dust, debris, and other material.
- B. Clean exposed surfaces and restore finish.

END OF SECTION

SECTION 26 05 53 - IDENTIFICATION FOR ELECTRICAL SYSTEMS

PART 1 GENERAL

1.1 SUMMARY

- A. Section Includes:
 - 1. Nameplates.
 - 2. Labels.
 - 3. Wire markers.

1.2 DELIVERY, STORAGE, AND HANDLING

- A. Accept materials on site in original factory packaging, labeled with manufacturer's identification, including product density and thickness.
- B. Protect insulation from weather and construction traffic, dirt, water, chemical, and mechanical damage, by storing in original wrapping.

PART 2 PRODUCTS

2.1 NAMEPLATES

- A. Product Description: Laminated three-layer plastic with engraved black letters on white contrasting background color.
- B. Letter Size:
 - 1. 1/8 inch (3 mm) high letters for identifying individual equipment and loads.
- C. Minimum nameplate thickness: 1/8 inch (3 mm).
- D. Description: Nameplate fastened with adhesive.

PART 3 EXECUTION

3.1 PREPARATION

- A. Degrease and clean surfaces to receive adhesive for identification materials.

3.2 INSTALLATION

- A. Nameplate Installation:
 - 1. Install nameplate parallel to equipment lines.
 - 2. Install nameplate for each electrical distribution and control equipment enclosure with adhesive.
 - 3. Install nameplates for the following:

UNIVERSITY OF SOUTH CAROLINA
USC BYRNES MECHANICAL - ELECTRICAL
INFRASTRUCTURE UPGRADES
COLUMBIA, SC

USC PROJECT #H27-Z153
BEA PROJECT US21404

- a. Panelboards.
- b. Transformers.
- c. Disconnects.

END OF SECTION

SECTION 26 22 00 - DRY TYPE TRANSFORMERS

PART 1 GENERAL

1.1 SUMMARY

- A. Section includes two-winding transformers.

1.2 SUBMITTALS

- A. Product Data: Submit outline and support point dimensions of enclosures and accessories, unit weight, voltage, kVA, and impedance ratings and characteristics, tap configurations, insulation system type, and rated temperature rise.

1.3 CLOSEOUT SUBMITTALS

- A. Project Record Documents: Record actual locations of transformers.

1.4 QUALIFICATIONS

- A. Manufacturer: Company specializing in manufacturing products specified in this section with minimum three years experience.

1.5 DELIVERY, STORAGE, AND HANDLING

- A. Store in clean, dry space. Maintain factory wrapping or provide additional canvas or plastic cover to protect units from dirt, water, construction debris, and traffic.
- B. Handle in accordance with manufacturer's written instructions. Lift only with lugs provided. Handle carefully to avoid damage to transformer internal components, enclosure, and finish.

PART 2 PRODUCTS

2.1 TWO-WINDING TRANSFORMERS

- A. Manufacturers:
 - 1. Eaton Cutler-Hammer
 - 2. General Electric
 - 3. Square D
- B. Primary Voltage: 480 volts, 3 phase.
- C. Secondary Voltage: 208Y/120 volts, 3 phase.

- D. Rating: K-13.
- E. Insulation system and average winding temperature rise for rated kVA as follows:
 - 1. 75-500 kVA: Class 220 with 150 degrees C rise.
- F. Case temperature: Do not exceed 35 degrees C rise above ambient at warmest point at full load.
- G. Winding Taps:
 - 1. Transformers 15 kVA and Larger: NEMA ST 20.
- H. Ground core and coil assembly to enclosure by means of visible flexible copper grounding strap.
- I. Mounting:
 - 1. Suitable for floor mounting.
- J. Coil Conductors: Continuous copper windings with terminations brazed or welded.
- K. Enclosure: NEMA ST 20, Type 1 ventilated.
- L. Isolate core and coil from enclosure using vibration-absorbing mounts.
- M. Nameplate: Include transformer connection data and overload capacity based on rated allowable temperature rise.

2.2 SOURCE QUALITY CONTROL

- A. Production test each unit according to NEMA ST20.

PART 3 EXECUTION

3.1 EXISTING WORK

- A. Disconnect and remove abandoned transformers.
- B. Maintain access and adequate ventilation to existing transformers and other installations remaining active and requiring access and ventilation. Modify installation or provide access panel or ventilation grilles.

3.2 INSTALLATION

- A. Set transformer plumb and level.
- B. Use flexible conduit, 2 feet (600 mm) minimum length, for connections to transformer case. Make conduit connections to side panel of enclosure.

- C. Install grounding and bonding in accordance with Section 26 05 26. Ground XO terminals to structure.
- D. All conductors shall be landed under separate lug barrels.

3.3 ADJUSTING

- A. Measure secondary voltages and make appropriate tap adjustments.

END OF SECTION

SECTION 26 24 16 - PANELBOARDS

PART 1 GENERAL

1.1 SUMMARY

- A. Section includes distribution and branch circuit panelboards.

1.2 REFERENCES

- A. National Fire Protection Association:
 - 1. NFPA 70.2011 - National Electrical Code.

1.3 SUBMITTALS

- A. Shop Drawings: Indicate outline and support point dimensions, voltage, main bus ampacity, integrated short circuit ampere rating, circuit breaker and fusible switch arrangement and sizes.
- B. Product Data: Submit catalog data showing specified features of standard products.

1.4 QUALIFICATIONS

- A. Manufacturer: Company specializing in manufacturing products specified in this section with minimum three years experience.

PART 2 PRODUCTS

2.1 DISTRIBUTION PANELBOARDS

- A. Manufacturers:
 - 1. Eaton, Cutgler-Hammer.
 - 2. GE Electrical.
 - 3. Square D.
- B. Product Description: NEMA PB 1, circuit breaker type, service entrance rated.
- C. Panelboard Bus: Copper. Furnish copper ground bus in each panelboard.
- D. Minimum integrated short circuit rating: 65,000 amperes rms symmetrical for 480 volt 800 amp panelboards

- E. Molded Case Circuit Breakers: NEMA AB 1, circuit breakers with integral thermal and instantaneous magnetic trip in each pole. Furnish circuit breakers UL listed.
- F. Enclosure: NEMA PB 1, Type 1.
- G. Cabinet Front: Surface door-in-door type, fastened with screws, hinged door with flush lock enamel.

2.2 BRANCH CIRCUIT PANELBOARDS

- A. Manufacturers:
 - 1. Eaton, Cutler-Hammer.
 - 2. GE Electrical.
 - 3. Square D.
- B. Product Description: NEMA PB1, circuit breaker type, lighting and appliance branch circuit panelboard.
- C. Panelboard Bus: Copper current carrying components, ratings as indicated on Drawings. Furnish copper ground bus in each panelboard.
- D. Minimum Integrated Short Circuit Rating: 10,000 for 208 volt panelboards; 14,000 amperes rms symmetrical for 480 volt panelboards.
- E. Molded Case Circuit Breakers: NEMA AB 1, bolt-on type thermal magnetic trip circuit breakers, with common trip handle for all poles, listed as Type SWD for lighting circuits, Type HACR for air conditioning equipment circuits, Class A ground fault interrupter circuit breakers as indicated on Drawings. Do not use tandem circuit breakers. All panels shall be filled with spare breakers.
- F. Enclosure: NEMA PB 1, Type 1.
- G. Cabinet Box: 6 inches (153 mm) deep, 20 inches (508 mm) wide.
- H. Cabinet Front: Surface cabinet front with concealed trim clamps, concealed hinge, metal directory frame, and flush lock keyed alike. Finish in manufacturer's standard enamel.

PART 3 EXECUTION

3.1 INSTALLATION

- A. Install panelboards plumb.

- B. Height: 6 feet (1800 mm) to top of panelboard; install panelboards taller than 6 feet (1800 mm) with bottom no more than 4 inches (100 mm) above floor.
- C. Provide typed circuit directory for each branch circuit panelboard. Revise directory to reflect circuiting changes to balance phase loads.
- D. Install engraved plastic nameplates.
- E. Ground and bond panelboard enclosure.

END OF SECTION

SECTION 26 27 26 - WIRING DEVICES

PART 1 GENERAL

1.1 SUMMARY

- A. Section includes wall switches; receptacles; and device plates.

1.2 QUALIFICATIONS

- A. Manufacturer: Company specializing in manufacturing products specified in this section with minimum three years experience.

PART 2 PRODUCTS

2.1 WALL SWITCHES

2.2 WALL SWITCHES

- A. Product Description: NEMA WD 1, Heavy-Duty specification grade, AC only snap switch.
- B. Body and Handle: White plastic with toggle handle.
- C. Ratings:
 - 1. Current: 20 amperes.
- D. Ratings: Match branch circuit voltage.

2.3 RECEPTACLES

- A. Duplex Convenience Receptacle: 20 amp.
- B. Color: white.
- C. Product Description: NEMA WD 1, Heavy-duty specification grade.

2.4 WALL PLATES

- A. Decorative Cover Plate: white smooth nylon..

PART 3 EXECUTION

3.1 EXAMINATION

- A. Verify outlet boxes are installed at proper height.
- B. Verify wall openings are neatly cut and completely covered by wall plates.
- C. Verify branch circuit wiring installation is completed, tested, and ready for connection to wiring devices.

3.2 PREPARATION

- A. Clean debris from outlet boxes.

3.3 EXISTING WORK

- A. Disconnect and remove abandoned wiring devices.
- B. Modify installation to maintain access to existing wiring devices to remain active.
- C. Clean and repair existing wiring devices to remain or to be reinstalled.

3.4 INSTALLATION

- A. Install devices plumb and level.
- B. Install switches with OFF position down.
- C. Install receptacles with grounding pole on bottom.
- D. Connect wiring devices by wrapping solid conductor around screw terminal. Install stranded conductor for branch circuits 10 AWG and smaller. When stranded conductors are used in lieu of solid, use crimp on fork terminals for device terminations. Do not place bare stranded conductors directly under device screws.

3.5 INTERFACE WITH OTHER PRODUCTS

- A. Install wall switch 48 inches above finished floor.
- B. Install convenience receptacle 18 above finished floor.

3.6 FIELD QUALITY CONTROL

- A. Inspect each wiring device for defects.
- B. Operate each wall switch with circuit energized and verify proper operation.
- C. Verify each receptacle device is energized.

- D. Test each receptacle device for proper polarity.

3.7 ADJUSTING

- A. Adjust devices and wall plates to be flush and level.

3.8 CLEANING

- A. Clean exposed surfaces to remove splatters and restore finish.

END OF SECTION

SECTION 26 28 13 - FUSES

PART 1 GENERAL

1.1 SUMMARY

- A. Section includes fuses.

1.2 DESIGN REQUIREMENTS

- A. Select fuses to provide appropriate levels of short circuit and overcurrent protection for the following components: wire, cable, bus structures, and other equipment. Design system to maintain component damage within acceptable levels during faults.

1.3 FUSE PERFORMANCE REQUIREMENTS

- A. Class RK1 (time delay).

1.4 QUALIFICATIONS

- A. Manufacturer: Company specializing in manufacturing products specified in this section with minimum three years experience.

1.5 EXTRA MATERIALS

- A. Furnish three spare fuses of each Class, size, and rating installed.

PART 2 PRODUCTS

2.1 FUSES

- A. Dimensions and Performance: NEMA FU 1, Class as specified or as indicated on Drawings.
- B. Voltage: Rating suitable for circuit phase-to-phase voltage.

2.2 CLASS RK1 (TIME DELAY) FUSES

- A. Dimensions and Performance: NEMA FU 1.
- B. Voltage: Rating suitable for circuit phase-to-phase voltage.

PART 3 EXECUTION

3.1 EXISTING WORK

- A. Remove fuses from abandoned circuits.
- B. Maintain access to existing fuses and other installations remaining active and requiring access. Modify installation or provide access panel.

3.2 INSTALLATION

- A. Install fuse with label oriented so manufacturer, type, and size are easily read.

END OF SECTION

SECTION 26 28 19 - ENCLOSED SWITCHES

PART 1 GENERAL

1.1 SUMMARY

- A. Section includes fusible switches.
- B. Related Sections:
 - 1. Section 26 28 13 - Fuses.

1.2 SUBMITTALS

- A. Product Data: Submit switch ratings and enclosure dimensions.

PART 2 PRODUCTS

2.1 FUSIBLE SWITCH ASSEMBLIES

- A. Manufacturers:
 - 1. Eaton, Cutler-Hammer
 - 2. GE Electrical.
 - 3. Square D.
- B. Product Description: NEMA KS 1, Type HD (480/277V), GD (120/208V).
- C. Fuse clips: Designed to accommodate NEMA FU 1, Class R fuses.
- D. Enclosure: NEMA KS 1, to meet conditions. Fabricate enclosure from steel finished with manufacturer's standard gray enamel.
 - 1. Interior Dry Locations: Type 1.
- E. Furnish switches with entirely copper current carrying parts.

2.2 SWITCH RATINGS

- A. Switch Rating: rated as indicated on Drawings.

PART 3 EXECUTION

3.1 EXISTING WORK

- A. Disconnect and remove abandoned enclosed switches.
- B. Maintain access to existing enclosed switches and other installations remaining active and requiring access. Modify installation or provide access panel.

3.2 INSTALLATION

- A. Install enclosed switches plumb.
- B. Height: 5 feet (1500 mm) to operating handle.
- C. Install fuses for fusible disconnect switches.
- D. Install engraved plastic nameplates.
- E. Apply adhesive tag on inside door of each fused switch indicating NEMA fuse class and size installed.

END OF SECTION

SECTION 26 51 00 - INTERIOR LIGHTING

PART 1 GENERAL

1.1 SUMMARY

- A. Section includes interior luminaires, lamps, ballasts, and accessories.

1.2 SUBMITTALS

- A. Product Data: Submit dimensions, ratings, and performance data.

1.3 FIELD MEASUREMENTS

- A. Verify field measurements prior to fabrication.

PART 2 PRODUCTS

2.1 INTERIOR LUMINAIRES

- A. Product Description: Complete interior luminaire assemblies, with features, options, and accessories as scheduled.

2.2 FLUORESCENT BALLASTS

- A. Product Description: Electronic ballast instant start less than 20 percent THD, suitable for lamps specified, with voltage to match luminaire voltage.

2.3 FLUORESCENT LAMPS

- A. Low mercury T8 or T5 as indicated on drawings.

PART 3 EXECUTION

3.1 EXISTING WORK

- A. Disconnect and remove abandoned luminaires, lamps, and accessories.
- B. Extend existing interior luminaire installations using materials and methods compatible with existing installations.
- C. Clean and repair existing interior luminaires to remain or to be reinstalled.

3.2 INSTALLATION

- A. Locate recessed ceiling luminaires as indicated on electrical Drawings.

- B. Install luminaires plumb and adjust to align with building lines and with each other. Secure to prevent movement.
- C. Install recessed luminaires to permit removal from below.
- D. Install recessed luminaires using accessories and firestopping materials to meet regulatory requirements for fire rating.
- E. Connect luminaires to branch circuit using flexible conduit.
- F. Install specified lamps in each luminaire.

3.3 FIELD QUALITY CONTROL

- A. Operate each luminaire after installation and connection. Inspect for proper connection and operation.

3.4 CLEANING

- A. Remove dirt and debris from enclosures.
- B. Clean photometric control surfaces as recommended by manufacturer.
- C. Clean finishes and touch up damage.

END OF SECTION